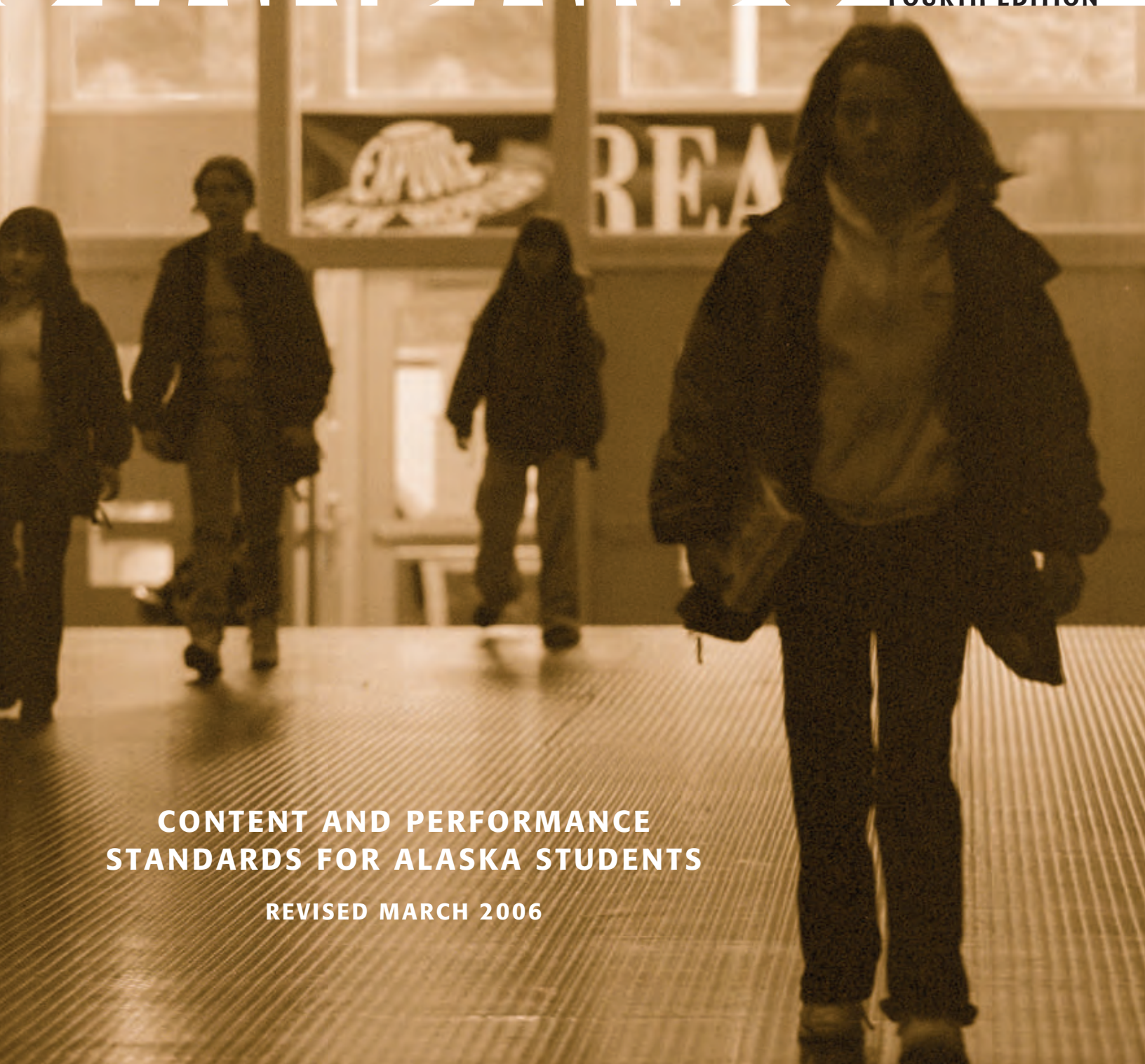
ALASKA STANDARDS

STANDARDS

FOURTH EDITION



CONTENT AND PERFORMANCE STANDARDS FOR ALASKA STUDENTS

REVISED MARCH 2006

Frank H. Murkowski, Governor

MESSAGE FROM THE GOVERNOR

I am proud to introduce the Third Edition of the Alaska Content and Performance Standards, which has been adopted into regulation by the State Board of Education & Early Development.

These standards represent the efforts of many people working for more than a decade to decide what young Alaskans should know and be able to do as a result of their public schooling.

During my administration, the State Board and Department of Education & Early Development have taken school accountability and expectations to a higher level than ever before. The third edition lays out clear, measurable academic grade level expectations in reading, writing, math, and science for students in grades 3 through 10.

This publication is for teachers, parents, local school board members, and other community members involved in the education of our children. Taken seriously and used well, this information will help prepare all our children to do their best in school and on state exams.

These efforts will help achieve our goal of educating young Alaskans to step forward confidently after high school prepared to tackle the next stage of life, whether in college, in technical school, or in the workplace.

Roger Sampson, Commissioner
Education & Early Development

MESSAGE FROM THE COMMISSIONER

This revised edition of the Alaska standards booklet represents the intense effort by many people to describe what the students in our state should know and be able to do as a result of their public school experience.

Our state embarked on this campaign in 1993 with the development of content standards—broad statements of what our students should know and be able to do. The first edition of this booklet included content standards in ten core subject areas: English/language arts, mathematics, science, geography, government and citizenship, history, skills for a healthy life, arts, world languages, and technology.

A second edition added content standards for employability and library information/literacy; performance standards in reading, writing, and mathematics; and cultural standards for students.

To fulfill requirements of the No Child Left Behind Act of 2001 (NCLB), the third edition of the standards booklet added:

- Expanded performance standards in reading, writing, and mathematics by inclusive grade level expectations for grades 3 through 10;
- Revised science content standards; and
- Science performance standards and grade level expectations for grades 3 through 11.

The State of Alaska has called upon school districts to adopt the state standards. In September 2001, the State Board of Education & Early Development adopted a regulation that extended statewide testing to all students in grades 3 through 9. Beginning in 2004, high school students were required to pass the High School Graduation Qualifying Examination, a criterion-referenced test targeting essential skills, in order to earn a high school diploma.

In April 2005, in response to NCLB, the state implemented criterion–referenced tests for students in grades 3 through 9, in order to measure how well all students meet the Alaska performance standards. Norm-referenced tests were required in fifth and seventh grades. In 2006, students in tenth grade will also be assessed on grade–specific performance standards.

This system of standards and assessments gives educators, families, and policy makers solid information with which to hold schools and communities accountable for the academic achievement of children and prepare all Alaska students for the future.

Alaska State Board of Education & Early Development

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June 2005

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ALL CHILDREN . . .
RISE EASILY TO THE COMMON LEVEL.
THERE THE MASS STOP;
STRONG MINDS ONLY ASCEND HIGHER.
BUT RAISE THE STANDARD,
AND, BY A SPONTANEOUS MOVEMENT,
THE MASS WILL RISE AGAIN AND REACH IT.

Horace Mann's First Annual Report (1837)

CONTENT STANDARDS FOR ALASKA STUDENTS

The State Board of Education & Early Development adopted into regulation Content Standards listed on the following pages. Content Standards are broad statements of what students should know and be able to do as a result of their public school experience.

ENGLISH/ LANGUAGE ARTS

A

A student should be able to speak and write well for a variety of purposes and audiences.

A student who meets the content standard should:

1) apply elements of effective writing and speaking; these elements include ideas, organization, vocabulary, sentence structure, and personal style;
2) in writing, demonstrate skills in sentence and paragraph structure, including grammar, spelling, capitalization, and punctuation;
3) in speaking, demonstrate skills in volume, intonation, and clarity;
4) write and speak well to inform, to describe, to entertain, to persuade, and to clarify thinking in a variety of formats, including technical communication;
5) revise, edit, and publish the student's own writing as appropriate;
6) when appropriate, use visual techniques to communicate ideas; these techniques may include role playing, body language, mime, sign language, graphics, Braille, art, and dance;
7) communicate ideas using varied tools of electronic technology; and
8) evaluate the student's own speaking and writing and that of others using high standards.

B

A student should be a competent and thoughtful reader, listener, and viewer of literature, technical materials, and a variety of other information.

A student who meets the content standard should:

1) comprehend meaning from written text and oral and visual information by applying a variety of reading, listening, and viewing strategies; these strategies include phonic, context, and vocabulary cues in reading, critical viewing, and active listening;
2) reflect on, analyze, and evaluate a variety of oral, written, and visual information and experiences, including discussions, lectures, art, movies, television, technical materials, and literature; and
3) relate what the student views, reads, and hears to practical purposes in the student's own life, to the world outside, and to other texts and experiences.

C

A student should be able to identify and select from multiple strategies in order to complete projects independently and cooperatively.

A student who meets the content standard should:

1) make choices about a project after examining a range of possibilities;
2) organize a project by
   a. understanding directions;
   b. making and keeping deadlines; and
   c. seeking, selecting, and using relevant resources;
3) select and use appropriate decision-making processes;
4) set high standards for project quality; and
5) when working on a collaborative project,
   a. take responsibility for individual contributions to the project;
   b. share ideas and workloads;
   c. incorporate individual talents and perspectives;
   d. work effectively with others as an active participant and as a responsive audience; and
   e. evaluate the processes and work of self and others.

D

A student should be able to think logically and reflectively in order to present and explain positions based on relevant and reliable information.

A student who meets the content standard should:

1) develop a position by
   a. reflecting on personal experiences, prior knowledge, and new information;
   b. formulating and refining questions;
   c. identifying a variety of pertinent sources of information;
   d. analyzing and synthesizing information; and
   e. determining an author's purposes;
2) evaluate the validity, objectivity, reliability, and quality of information read, heard, and seen;
3) give credit and cite references as appropriate; and
4) explain and defend a position orally, in writing, and with visual aids as appropriate.

E

A student should understand and respect the perspectives of others in order to communicate effectively.

A student who meets the content standard should:

1) use information, both oral and written, and literature of many types and cultures to understand self and others;
2) evaluate content from the speaker's or author's perspective;
3) recognize bias in all forms of communication; and
4) recognize the communication styles of different cultures and their possible effects on others.

MATHEMATICS

A

A student should understand mathematical facts, concepts, principles, and theories.

A student who meets the content standard should:

1) understand and use numeration, including
   a. numbers, number systems, counting numbers, whole numbers, integers, fractions, decimals, and percents; and
   b. irrationals and complex numbers;
2) select and use appropriate systems, units, and tools of measurement, including estimation;
3) perform basic arithmetic functions, make reasoned estimates, and select and use appropriate methods or tools for computation or estimation including mental arithmetic, paper and pencil, a calculator, and a computer;
4) represent, analyze, and use mathematical patterns, relations, and functions using methods such as tables, equations, and graphs;
5) construct, draw, measure, transform, compare, visualize, classify, and analyze the relationships among geometric figures; and
6) collect, organize, analyze, interpret, represent, and formulate questions about data and make reasonable and useful predictions about the certainty, uncertainty, or impossibility of an event.

B

A student should understand and be able to select and use a variety of problem-solving strategies.

A student who meets the content standard should:

1) use computational methods and appropriate technology as problem-solving tools;
2) use problem solving to investigate and understand mathematical content;
3) formulate mathematical problems that arise from everyday situations;
4) develop and apply strategies to solve a variety of problems;
5) check the results against mathematical rules;
6) use common sense to help interpret results;
7) apply what was learned to new situations; and
8) use mathematics with confidence.

C

A student should understand and be able to form and use appropriate methods to define and explain mathematical relationships.

A student who meets the content standard should:

1) express and represent mathematical ideas using oral and written presentations, physical materials, pictures, graphs, charts, and algebraic expressions;
2) relate mathematical terms to everyday language;
3) develop, test, and defend mathematical hypotheses; and
4) clarify mathematical ideas through discussion with others.

D

A student should be able to use logic and reason to solve mathematical problems.

A student who meets the content standard should:

1) analyze situations;
2) draw logical conclusions;
3) use models, known facts, and relationships to explain the student's reasoning;
4) use deductive reasoning to verify conclusions, judge the validity of arguments, and construct valid arguments; and
5) use inductive reasoning to recognize patterns and form mathematical propositions.

E

A student should be able to apply mathematical concepts and processes to situations within and outside of school.

A student who meets the content standard should:

1) explore problems and describe results using graphical, numerical, physical, algebraic, and verbal mathematical models or representations;
2) use mathematics in daily life; and
3) use mathematics in other curriculum areas.

SCIENCE

A

Science as Inquiry and Process

A student should understand and be able to apply the processes and applications of scientific inquiry.

A student who meets the content standard should:

1) develop an understanding of the processes of science used to investigate problems, design and conduct repeatable scientific investigations, and defend scientific arguments;
2) develop an understanding that the processes of science require integrity, logical reasoning, skepticism, openness, communication, and peer review; and
3) develop an understanding that culture, local knowledge, history, and interaction with the environment contribute to the development of scientific knowledge, and local applications provide opportunity for understanding scientific concepts and global issues.

B

Concepts of Physical Science

A student should understand and be able to apply the concepts, models, theories, universal principles, and facts that explain the physical world.

A student who meets the content standard should:

1) develop an understanding of the characteristic properties of matter and the relationship of these properties to their structure and behavior;
2) develop an understanding that energy appears in different forms, can be transformed from one form to another, can be transferred or moved from one place or system to another, may be unavailable for use, and is ultimately conserved;
3) develop an understanding of the interactions between matter and energy, including physical, chemical, and nuclear changes, and the effects of these interactions on physical systems; and
4) develop an understanding of motions, forces, their characteristics and relationships, and natural forces and their effects.

C

Concepts of Life Science

A student should understand and be able to apply the concepts, models, theories, facts, evidence, systems, and processes of life science.

A student who meets the content standard should:

1) develop an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural selection, and biological evolution;
2) develop an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms; and
3) develop an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy.

D

Concepts of Earth Science

A student should understand and be able to apply the concepts, processes, theories, models, evidence, and systems of earth and space sciences.

A student who meets the content standard should:

1) develop an understanding of Earth's geochemical cycles;
2) develop an understanding of the origins, ongoing processes, and forces that shape the structure, composition, and physical history of the Earth;
3) develop an understanding of the cyclical changes controlled by energy from the sun and by Earth's position and motion in our solar system; and
4) develop an understanding of the theories regarding the origin and evolution of the universe.

E

Science and Technology

A student should understand the relationships among science, technology, and society.

A student who meets the content standard should:

1) develop an understanding of how scientific knowledge and technology are used in making decisions about issues, innovations, and responses to problems and everyday events;
2) develop an understanding that solving problems involves different ways of thinking, perspectives, and curiosity that lead to the exploration of multiple paths that are analyzed using scientific, technological, and social merits; and
3) develop an understanding of how scientific discoveries and technological innovations affect and are affected by our lives and cultures

F

Cultural, Social, Personal Perspectives and Science

A student should understand the dynamic relationships among scientific, cultural, social, and personal perspectives.

A student who meets the content standard should:

1) develop an understanding of the interrelationships among individuals, cultures, societies, science, and technology;
2) develop an understanding that some individuals, cultures, and societies use other beliefs and methods in addition to scientific methods to describe and understand the world; and
3) develop an understanding of the importance of recording and validating cultural knowledge.

G

History and Nature of Science

A student should understand the history and nature of science.

A student who meets the content standard should:

1) develop an understanding that historical perspectives of scientific explanations demonstrate that scientific knowledge changes over time, building on prior knowledge;
2) develop an understanding that the advancement of scientific knowledge embraces innovation and requires empirical evidence, repeatable investigations, logical arguments, and critical review in striving for the best possible explanations of the natural world;
3) develop an understanding that scientific knowledge is ongoing and subject to change as new evidence becomes available through experimental and/or observational confirmation(s); and
4) develop an understanding that advancements in science depend on curiosity, creativity, imagination, and a broad knowledge base.

GEOGRAPHY

A

A student should be able to make and use maps, globes, and graphs to gather, analyze, and report spatial (geographic) information.

A student who meets the content standard should:

1) use maps and globes to locate places and regions;
2) make maps, globes, and graphs;
3) understand how and why maps are changing documents;
4) use graphic tools and technologies to depict and interpret the world's human and physical systems;
5) evaluate the importance of the locations of human and physical features in interpreting geographic patterns; and
6) use spatial (geographic) tools and technologies to analyze and develop explanations and solutions to geographic problems.

B

A student should be able to utilize, analyze, and explain information about the human and physical features of places and regions.

A student who meets the content standard should:

1) know that places have distinctive geographic characteristics;
2) analyze how places are formed, identified, named, and characterized;
3) relate how people create similarities and differences among places;
4) discuss how and why groups and individuals identify with places;
5) describe and demonstrate how places and regions serve as cultural symbols, such as the Statue of Liberty;
6) make informed decisions about where to live, work, travel, and seek opportunities;
7) understand that a region is a distinct area defined by one or more cultural or physical features; and
8) compare, contrast, and predict how places and regions change with time.

C

A student should understand the dynamic and interactive natural forces that shape the Earth's environments.

A student who meets the content standard should:

1) analyze the operation of the Earth's physical systems, including ecosystems, climate systems, erosion systems, the water cycle, and tectonics;
2) distinguish the functions, forces, and dynamics of the physical processes that cause variations in natural regions; and
3) recognize the concepts used in studying environments and recognize the diversity and productivity of different regional environments.

D

A student should understand and be able to interpret spatial (geographic) characteristics of human systems, including migration, movement, interactions of cultures, economic activities, settlement patterns, and political units in the state, nation, and world.

A student who meets the content standard should:

1) know that the need for people to exchange goods, services, and ideas creates population centers, cultural interaction, and transportation and communication links;
2) explain how and why human networks, including networks for communications and for transportation of people and goods, are linked globally;
3) interpret population characteristics and distributions;
4) analyze how changes in technology, transportation, and communication impact social, cultural, economic, and political activity; and
5) analyze how conflict and cooperation shape social, economic, and political use of space.

E

A student should understand and be able to evaluate how humans and physical environments interact.

A student who meets the content standard should:

1) understand how resources have been developed and used;
2) recognize and assess local, regional, and global patterns of resource use;
3) understand the varying capacities of physical systems, such as watersheds, to support human activity;
4) determine the influence of human perceptions on resource utilization and the environment;
5) analyze the consequences of human modification of the environment and evaluate the changing landscape; and
6) evaluate the impact of physical hazards on human systems.

F

A student should be able to use geography to understand the world by interpreting the past, knowing the present, and preparing for the future.

A student who meets the content standard should:

1) analyze and evaluate the impact of physical and human geographical factors on major historical events;
2) compare, contrast, and predict how places and regions change with time;
3) analyze resource management practices to assess their impact on future environmental quality;
4) interpret demographic trends to project future changes and impacts on human environmental systems;
5) examine the impacts of global changes on human activity; and
6) utilize geographic knowledge and skills to support interdisciplinary learning and build competencies required of citizens.

GOVERNMENT AND CITIZENSHIP

A

A student should know and understand how societies define authority, rights, and responsibilities through a governmental process.

A student who meets the content standard should:

1) understand the necessity and purpose of government;
2) understand the meaning of fundamental ideas, including equality, authority, power, freedom, justice, privacy, property, responsibility, and sovereignty;
3) understand how nations organize their governments; and
4) compare and contrast how different societies have governed themselves over time and in different places.

B

A student should understand the constitutional foundations of the American political system and the democratic ideals of this nation.

A student who meets the content standard should:

1) understand the ideals of this nation as expressed in the Declaration of Independence, the United States Constitution, and the Bill of Rights;
2) recognize American heritage and culture, including the republican form of government, capitalism, free enterprise system, patriotism, strong family units, and freedom of religion;
3) understand the United States Constitution, including separation of powers, the executive, legislative, and judicial branches of government, majority rule, and minority rights;
4) know how power is shared in the United States' constitutional government at the federal, state, and local levels;
5) understand the importance of individuals, public opinion, media, political parties, associations, and groups in forming and carrying out public policy;
6) recognize the significance of diversity in the American political system;
7) distinguish between constitution-based ideals and the reality of American political and social life;
8) understand the place of law in the American political system; and
9) recognize the role of dissent in the American political system.

C

A student should understand the character of government of the state.

A student who meets the content standard should:

1) understand the various forms of the state's local governments and the agencies and commissions that influence students' lives and property;
2) accept responsibility for protecting and enhancing the quality of life in the state through the political and governmental processes;

C *(continued)*

3) understand the Constitution of Alaska and Sec. 4 of the Alaska Statehood Act, which is known as the Statehood Compact;
4) understand the importance of the historical and current roles of Alaska Native communities;
5) understand the Alaska Native Claims Settlement Act and its impact on the state;
6) understand the importance of the multicultural nature of the state;
7) understand the obligations that land and resource ownership place on the residents and government of the state; and
8) identify the roles of and relationships among the federal, tribal, and state governments and understand the responsibilities and limits of the roles and relationships.

D

A student should understand the role of the United States in international affairs.

A student who meets the content standard should:

1) analyze how domestic politics, the principles of the United States Constitution, foreign policy, and economics affect relations with other countries;
2) evaluate circumstances in which the United States has politically influenced other nations and how other nations have influenced the politics and society of the United States;
3) understand how national politics and international affairs are interrelated with the politics and interests of the state;
4) understand the purpose and function of international government and non-governmental organizations in the world today; and
5) analyze the causes, consequences, and possible solutions to current international issues.

E

A student should have the knowledge and skills necessary to participate effectively as an informed and responsible citizen.

A student who meets the content standard should:

1) know the important characteristics of citizenship;
2) recognize that it is important for citizens to fulfill their public responsibilities;
3) exercise political participation by discussing public issues, building consensus, becoming involved in political parties and political campaigns, and voting;
4) establish, explain, and apply criteria useful in evaluating rules and laws;
5) establish, explain, and apply criteria useful in selecting political leaders;
6) recognize the value of community service; and
7) implement ways of solving problems and resolving conflict.

F

A student should understand the economies of the United States and the state and their relationships to the global economy.

A student who meets the content standard should:

1) understand how the government and the economy interrelate through regulations, incentives, and taxation;
2) be aware that economic systems determine how resources are used to produce and distribute goods and services;
3) compare alternative economic systems;
4) understand the role of price in resource allocation;
5) understand the basic concepts of supply and demand, the market system, and profit;
6) understand the role of economic institutions in the United States, including the Federal Reserve Board, trade unions, banks, investors, and the stock market;
7) understand the role of self-interest, incentives, property rights, competition, and corporate responsibility in the market economy;
8) understand the indicators of an economy's performance, including gross domestic product, inflation, and the unemployment rate;
9) understand those features of the economy of the state that make it unique, including the importance of natural resources, government ownership and management of resources, Alaska Native regional corporations, the Alaska Permanent Fund Corporation, the Alaska Housing Finance Corporation, and the Alaska Industrial Development and Export Authority; and
10) understand how international trade works.

G

A student should understand the impact of economic choices and participate effectively in the local, state, national, and global economies.

A student who meets the content standard should:

1) apply economic principles to actual world situations;
2) understand that choices are made because resources are scarce;
3) identify and compare the costs and benefits when making choices;
4) make informed choices on economic issues;
5) understand how jobs are created and their role in the economy;
6) understand that wages and productivity depend on investment in physical and human capital; and
7) understand that economic choices influence public and private institutional decisions.

HISTORY

A

A student should understand that history is a record of human experiences that links the past to the present and the future.

A student who meets the content standard should:

1) understand chronological frameworks for organizing historical thought and place significant ideas, institutions, people, and events within time sequences;
2) know that the interpretation of history may change as new evidence is discovered;
3) recognize different theories of history, detect the weakness of broad generalization, and evaluate the debates of historians;
4) understand that history relies on the interpretation of evidence;
5) understand that history is a narrative told in many voices and expresses various perspectives of historical experience;
6) know that cultural elements, including language, literature, the arts, customs, and belief systems, reflect the ideas and attitudes of a specific time and know how the cultural elements influence human interaction;
7) understand that history is dynamic and composed of key turning points;
8) know that history is a bridge to understanding groups of people and an individual's relationship to society; and
9) understand that history is a fundamental connection that unifies all fields of human understanding and endeavor.

B

A student should understand historical themes through factual knowledge of time, places, ideas, institutions, cultures, people, and events.

A student who meets the content standard should:

1) comprehend the forces of change and continuity that shape human history through the following persistent organizing themes:
   a. the development of culture, the emergence of civilizations, and the accomplishments and mistakes of social organizations;
   b. human communities and their relationships with climate, subsistence base, resources, geography, and technology;
   c. the origin and impact of ideologies, religions, and institutions upon human societies;
   d. the consequences of peace and violent conflict to societies and their cultures; and
   e. major developments in societies as well as changing patterns related to class, ethnicity, race, and gender;

B *(continued)*

2) understand the people and the political, geographic, economic, cultural, social, and environmental events that have shaped the history of the state, the United States, and the world;

3) recognize that historical understanding is relevant and valuable in the student's life and for participating in local, state, national, and global communities;

4) recognize the importance of time, ideas, institutions, people, places, cultures, and events in understanding large historical patterns; and

5) evaluate the influence of context upon historical understanding.

C

A student should develop the skills and processes of historical inquiry.

A student who meets the content standard should:

1) use appropriate technology to access, retrieve, organize, and present historical information;

2) use historical data from a variety of primary resources, including letters, diaries, oral accounts, archeological sites and artifacts, art, maps, photos, historical sites, documents, and secondary research materials, including almanacs, books, indices, and newspapers;

3) apply thinking skills, including classifying, interpreting, analyzing, summarizing, synthesizing, and evaluating, to understand the historical record; and

4) use historical perspective to solve problems, make decisions, and understand other traditions.

D

A student should be able to integrate historical knowledge with historical skill to effectively participate as a citizen and as a lifelong learner.

A student who meets the content standard should:

1) understand that the student is important in history;

2) solve problems by using history to identify issues and problems, generate potential solutions, assess the merits of options, act, and evaluate the effectiveness of actions;

3) define a personal position on issues while understanding the historical aspects of the positions and roles assumed by others;

4) recognize and demonstrate that various issues may require an understanding of different positions, jobs, and personal roles depending on place, time, and context;

5) base personal citizenship action on reasoned historical judgment with recognition of responsibility for self and others; and

6) create new approaches to issues by incorporating history with other disciplines, including economics, geography, literature, the arts, science, and technology.

SKILLS FOR A HEALTHY LIFE

A

A student should be able to acquire a core knowledge related to well-being.

A student who meets the content standard should:

1) understand that a person's well-being is the integration of health knowledge, attitudes, and behaviors;
2) understand how the human body is affected by behaviors related to eating habits, physical fitness, personal hygiene, harmful substances, safety, and environmental conditions;
3) understand and identify the causes, preventions, and treatments for diseases, disorders, injuries, and addictions;
4) recognize patterns of abuse directed at self or others and understand how to break these patterns;
5) use knowledge and skills to promote the well-being of the family;
6) use knowledge and skills related to physical fitness, consumer health, independent living, and career choices to contribute to well-being;
7) understand the physical and behavioral characteristics of human sexual development and maturity; and
8) understand the ongoing life changes throughout the life span and healthful responses to these changes.

B

A student should be able to demonstrate responsibility for the student's well-being.

A student who meets the content standard should:

1) demonstrate an ability to make responsible decisions by discriminating among risks and by identifying consequences;
2) demonstrate a variety of communication skills that contribute to well-being;
3) assess the effects of culture, heritage, and traditions on personal well-being;
4) develop an awareness of how personal life roles are affected by and contribute to the well-being of families, communities, and cultures;
5) evaluate what is viewed, read, and heard for its effect on personal well-being; and
6) understand how personal relationships, including those with family, friends, and co-workers, impact personal well-being.

C

A student should understand how well-being is affected by relationships with others.

A student who meets the content standard should:

1) resolve conflicts responsibly;
2) communicate effectively within relationships;
3) evaluate how similarities and differences among individuals contribute to relationships;
4) understand how respect for the rights of self and others contributes to relationships;
5) understand how attitude and behavior affect the well-being of self and others; and
6) assess the effects of culture, heritage, and traditions on well-being.

D

A student should be able to contribute to the well-being of families and communities.

A student who meets the content standard should:

1) make responsible decisions as a member of a family or community;
2) take responsible actions to create safe and healthy environments;
3) describe how public policy affects the well-being of families and communities;
4) identify and evaluate the roles and influences of public and private organizations that contribute to the well-being of communities;
5) describe how volunteer service at all ages can enhance community well-being; and
6) use various methods of communication to promote community well-being.

ARTS

A

A student should be able to create and perform in the arts.

A student who meets the content standard should:

1) participate in dance, drama, music, visual arts, and creative writing;
2) refine artistic skills and develop self-discipline through rehearsal, practice, and revision;
3) appropriately use new and traditional materials, tools, techniques, and processes in the arts;
4) demonstrate the creativity and imagination necessary for innovative thinking and problem solving;
5) collaborate with others to create and perform works of art;
6) integrate two or more art forms to create a work of art; and
7) investigate careers in arts production.

B

A student should be able to understand the historical and contemporary role of the arts in Alaska, the nation, and the world.

A student who meets the content standard should:

1) recognize Alaska Native cultures and their arts;
2) recognize United States and world cultures and their arts;
3) recognize the role of tradition and ritual in the arts;
4) investigate the relationships among the arts and the individual, the society, and the environment;
5) recognize universal themes in the arts such as love, war, childhood, and community;
6) recognize specific works of art created by artists from diverse backgrounds;
7) explore similarities and differences in the arts of world cultures;
8) respect differences in personal and cultural perspectives; and
9) investigate careers relating to arts history and culture.

C

A student should be able to critique the student's art and the art of others.

A student who meets the content standard should:

1) know the criteria used to evaluate the arts; these may include craftsmanship, function, organization, originality, technique, and theme;
2) examine historical and contemporary works of art, the works of peers, and the student's own works as follows:

C *(continued)*

a. identify the piece;
b. describe the use of basic elements;
c. analyze the use of basic principles;
d. interpret meaning and artist's intent; and
e. express and defend an informed opinion;

3) accept and offer constructive criticism;
4) recognize and consider an individual's artistic expression;
5) exhibit appropriate audience skills; and
6) investigate careers relating to arts criticism.

D

A student should be able to recognize beauty and meaning through the arts in the student's life.

A student who meets the content standard should:

1) make statements about the significance of the arts and beauty in the student's life;
2) discuss what makes an object or performance a work of art;
3) recognize that people tend to devalue what they do not understand;
4) listen to another individual's beliefs about a work of art and consider the individual's reason for holding those beliefs;
5) consider other cultures' beliefs about works of art;
6) recognize that people connect many aspects of life through the arts;
7) make artistic choices in everyday living; and
8) investigate careers related to the search for beauty and meaning, which is aesthetics.

WORLD LANGUAGES

A

A student should be able to communicate in two or more languages, one of which is English.

A student who meets the content standard should:

1) understand written and oral communication in two or more languages;
2) write and speak understandably in two or more languages;
3) use two or more languages effectively in real life situations; and
4) use two or more languages to learn new information in academic subjects.

B

A student should expand the student's knowledge of peoples and cultures through language study.

A student who meets the content standard should:

1) understand the relationship between language and culture;
2) learn about and experience surface characteristics of the culture, including art, cuisine, dance, dress, geography, history, music, and literature;
3) learn about and experience deep characteristics of the culture, including folkways, mores, laws, traditions, customs, and patterns of behavior;
4) improve the student's understanding of the student's language and culture through experiences with other languages and cultures;
5) apply knowledge of the functions and structure of one language to the study of another language; and
6) recognize through language study that all cultures contribute to the global society.

C

A student should possess the language skills and cultural knowledge necessary to participate successfully in multilingual communities and the international marketplace.

A student who meets the content standard should:

1) interact appropriately in multilingual communities through various means, including printed and electronic media, audio and visual sources, face-to-face conversations, penpals, and travel;
2) use experiences with language and culture to explore the student's personal interests and career options;
3) learn how language skills and cultural knowledge enhance a person's competitiveness in the international marketplace; and
4) apply language skills and cultural knowledge to enhance the student's intellectual and social growth and to promote lifelong learning.

TECHNOLOGY

A

A student should be able to operate technology-based tools.

A student who meets the content standard should:

1) use a computer to enter and retrieve information;
2) use technological tools for learning, communications, and productivity;
3) use local and worldwide networks;
4) manage and maintain technology tools; and
5) diagnose and solve common technology problems.

B

A student should be able to use technology to locate, select, and manage information.

A student who meets the content standard should:

1) identify and locate information sources using technology;
2) choose sources of information from a variety of media; and
3) select relevant information by applying accepted research methods.

C

A student should be able to use technology to explore ideas, solve problems, and derive meaning.

A student who meets the content standard should:

1) use technology to observe, analyze, interpret, and draw conclusions;
2) solve problems both individually and with others; and
3) create new knowledge by evaluating, combining, or extending information using multiple technologies.

D

A student should be able to use technology to express ideas and exchange information.

A student who meets the content standard should:

1) convey ideas to a variety of audiences using publishing, multi-media, and communications tools;
2) use communications technology to exchange ideas and information; and
3) use technology to explore new and innovative methods for interaction with others.

E

A student should be able to use technology responsibly and understand its impact on individuals and society.

A student who meets the content standard should:

1) evaluate the potentials and limitations of existing technologies;
2) discriminate between responsible and irresponsible uses of technology;
3) respect others' rights of privacy in electronic environments;
4) demonstrate ethical and legal behavior regarding intellectual property, which is the manifestation of an original idea, such as computer software, music, or literature;
5) examine the role of technology in the workplace and explore careers that require the use of technology;
6) evaluate ways that technology impacts culture and the environment;
7) integrate the use of technology into daily living; and
8) recognize the implications of emerging technologies.

EMPLOYABILITY

A

A student should be able to develop and be able to use employability skills in order to effectively make the transition from school to work and lifelong learning.

A student who meets the content standard should:

1) develop and maintain a work ethic necessary for success in the workplace that includes honesty, integrity, dependability, punctuality, self-discipline, initiative, reliability, accuracy, productivity, respect, and perseverance;
2) understand how to apply skills and academic knowledge in a variety of work settings;
3) understand the process for seeking employment including résumé development, application completion, interview skills, and appropriate dress for work settings;
4) understand the process for developing self-employment opportunities including marketing studies, business plan development, and managing business finances;
5) understand how an individual job fits into the overall organization and how the organization fits into the overall economy;
6) understand the need for safe practices in workplaces; and
7) understand employer and employee rights and responsibilities.

B

A student should be able to identify career interests and plan for career options.

A student who meets the content standard should:

1) identify and appreciate personal interests, aptitudes, abilities, and priorities;
2) identify possible career options, considering both employment and self employment, and understand how changes in the workplace affect career choice;
3) use labor market information to identify occupational and economic trends and opportunities, and evaluate possible career options;
4) identify education and/or training needed for career options and advancement, and develop a career plan; and
5) identify resources available to support education and training related to career possibilities.

LIBRARY/INFORMATION LITERACY

A

A student should understand how information and resources are organized.

A student who meets the content standard should:

1) recognize that libraries use classification systems to organize, store, and provide access to information and resources;
2) understand how library classification and subject heading systems work;
3) understand how information in print, non-print, and electronic formats is organized and accessed;
4) search for information and resources by author, title, subject, or keyword, as appropriate; and
5) identify and use search strategies and terms that will produce successful results.

B

A student should understand and use research processes necessary to locate, evaluate, and communicate information and ideas.

A student who meets the content standard should:

1) state a problem, question, or information need;
2) consider the variety of available resources and determine which are most likely to be useful;
3) access information;
4) evaluate the validity, relevancy, currency, and accuracy of information;
5) organize and use information to create a product; and
6) evaluate the effectiveness of the product to communicate the intended message.

C

A student should recognize that being an independent reader, listener, and viewer of material in print, non-print, and electronic formats will contribute to personal enjoyment and lifelong learning.

A student who meets the content standard should:

1) read for pleasure and information;
2) read, listen, and view a wide variety of literature and other creative expressions; and
3) recognize and select materials appropriate to personal abilities and interests.

D

A student should be aware of the freedom to seek information and possess the confidence to pursue information needs beyond immediately available sources.

A student who meets the content standard should:

1) know how to access information through local, national, and international sources in printed and electronic formats;
2) recognize the importance of access to information and ideas in a democratic society;
3) access information on local, state, national, and world cultures and issues;
4) evaluate information representing diverse views in order to make informed decisions; and
5) assimilate and understand how newly acquired information relates to oneself and others.

E

A student should understand ethical, legal, and social behavior with respect to information resources.

A student who meets the content standard should:

1) use library materials and information resources responsibly;
2) understand and respect the principles of intellectual freedom;
3) understand and respect intellectual property rights and copyright laws; and
4) develop and use citations and bibliographies.

CULTURAL STANDARDS FOR ALASKA STUDENTS

The Alaska Cultural Standards for Students were developed by the Alaska Native Knowledge Network in 1998. They also were adopted by the State Board of Education & Early Development in the same year. The Cultural Standards are meant to enrich the Content Standards and provide guidelines for nurturing and building in students the rich and varied cultural traditions that continue to be practiced in communities throughout Alaska.

The standards are broad statements of what students should know and be able to do as a result of their experience in a school that is aware of and sensitive to the surrounding physical and cultural environment.

CULTURAL STANDARDS

A

Culturally-knowledgeable students are well grounded in the cultural heritage and traditions of their community.

Students who meet this cultural standard are able to:

1) assume responsibilities for their role in relation to the well-being of the cultural community and their lifelong obligations as a community member;
2) recount their own genealogy and family history;
3) acquire and pass on the traditions of their community through oral and written history;
4) practice their traditional responsibilities to the surrounding environment;
5) reflect through their own actions the critical role that the local heritage language plays in fostering a sense of who they are and how they understand the world around them;
6) live a life in accordance with the cultural values and traditions of the local community and integrate them into their everyday behavior; and
7) determine the place of their cultural community in the regional, state, national, and international political and economic systems.

B

Culturally-knowledgeable students are able to build on the knowledge and skills of the local cultural community as a foundation from which to achieve personal and academic success throughout life.

Students who meet this cultural standard are able to:

1) acquire insights from other cultures without diminishing the integrity of their own;
2) make effective use of the knowledge, skills, and ways of knowing from their own cultural traditions to learn about the larger world in which they live;
3) make appropriate choices regarding the long-term consequences of their actions; and
4) identify appropriate forms of technology and anticipate the consequences of their use for improving the quality of life in the community.

C

Culturally-knowledgeable students are able to actively participate in various cultural environments.

Students who meet this cultural standard are able to:

1) perform subsistence activities in ways that are appropriate to local cultural traditions;
2) make constructive contributions to the governance of their community and the well-being of their family;

C *(continued)*

3) attain a healthy lifestyle through which they are able to maintain their social, emotional, physical, intellectual, and spiritual well-being; and

4) enter into and function effectively in a variety of cultural settings.

D

Culturally-knowledgeable students are able to engage effectively in learning activities that are based on traditional ways of knowing and learning.

Students who meet this cultural standard are able to:

1) acquire in-depth cultural knowledge through active participation and meaningful interaction with Elders;

2) participate in and make constructive contributions to the learning activities associated with a traditional camp environment;

3) interact with Elders in a loving and respectful way that demonstrates an appreciation of their role as culture-bearers and educators in the community;

4) gather oral and written history information from the local community and provide an appropriate interpretation of its cultural meaning and significance;

5) identify and utilize appropriate sources of cultural knowledge to find solutions to everyday problems; and

6) engage in a realistic self-assessment to identify strengths and needs and make appropriate decisions to enhance life skills.

E

Culturally-knowledgeable students demonstrate an awareness and appreciation of the relationships and processes of interaction of all elements in the world around them.

Students who meet this cultural standard are able to:

1) recognize and build upon the interrelationships that exist among the spiritual, natural, and human realms in the world around them, as reflected in their own cultural traditions and beliefs as well as those of others;

2) understand the ecology and geography of the bioregion they inhabit;

3) demonstrate an understanding of the relationship between world view and the way knowledge is formed and used;

4) determine how ideas and concepts from one knowledge system relate to those derived from other knowledge systems;

5) recognize how and why cultures change over time;

6) anticipate the changes that occur when different cultural systems come in contact with one another;

7) determine how cultural values and beliefs influence the interaction of people from different cultural backgrounds; and

8) identify and appreciate who they are and their place in the world.

PERFORMANCE STANDARDS

(Grade Level Expectations)

FOR ALASKA STUDENTS

The Alaska Performance Standards/Grade Level Expectations (PSGLEs) are aligned to the Alaska Content Standards. PSGLEs are statements that define what all students should know and be able to do at the end of a given grade level. Each Performance Standard/Grade Level Expectation is meant to further define a content standard. There is a progression of specificity; the content standards represent broad statements, while PSGLEs are more specific. The Alaska Performance Standards/Grade Level Expectations have been developed for grades 3 through 10 (reading, writing, and mathematics) and grades 3 through 11 (science) in fulfillment of the No Child Left Behind Act of 2001 (NCLB) requirements.

The PSGLEs are intended to provide a road map for the development of assessment items as well as the basis upon which school districts refine, align, and develop curricula. The content described by the PSGLEs does not represent the entire curriculum for a grade or course, nor does it represent the final word on the content that is presented. The PSGLEs indicate core content to be mastered by the end of a given grade. Content can be added and enriched as appropriate for a district program, school, or student. It may be necessary to introduce some skills at an earlier grade in order for students to achieve mastery at a given level. Similarly, skills will need to be maintained after mastery has occurred at a given grade level.

The PSGLEs were developed with the following goals in mind:

- to articulate learning in grades 3–10 (reading, writing, mathematics) and 3–11 (science);
- to be appropriate for the developmental or grade level of students;
- to move from the concrete to the abstract;
- to attend to prerequisite skills and understandings; and
- to be specific, but not so specific as to be too small in scope compared with other PSGLEs for a particular content area.

The PSGLEs were developed with an effort to avoid including statements of curricular activities, instructional strategies, or value-laden concepts and understandings.

The first column of each table includes a sentence that summarizes the Performance Standards. The second column includes the complete Performance Standards.

A letter/number key links each Performance Standard to the English/Language Arts Content Standards, so E.B.1 links to the English/Language Arts Content Standards, section B, item number 1.

PSGLEs repeated with no changes across grade levels are marked with asterisks. This indicates the PSGLE assumes a variety of text and increasing complexity to indicate growth in the PSGLE.

Each PSGLE includes a bolded statement called the "stem." Each stem is the same or similar across the grades for a given PSGLE and is meant to communicate the main curriculum and instructional focus of the PSGLE across the grades.

The student uses strategies to decode or comprehend meaning of words in text.

R1.1 a. Distinguish, reproduce, and manipulate the sounds in words;

b. Use a combination of the following to read and comprehend text: knowledge of phonics, alphabet, and alphabetic principle (e.g., recognition of letter/sound relationships, initial/final consonants, vowels, letter patterns); pictures and visual cues; sight recognition of high frequency vocabulary words; word structure (e.g., root words prefixes, suffixes, rhyming words); language structure (e.g. word order, grammar); meaning structures (e.g. prior knowledge and context); text structure (e.g., read left to right). E.B.1

R2.1 a. Use a combination of the following to read and comprehend text: knowledge of phonetics, language structure, and semantics; text structures such as illustrations, graphs, and headers; self-monitoring and self-correcting strategies; adjusting reading pace or style based on purpose, task, and type of text.

b. Use knowledge of word families, phonetics, context clues, visual cues, and structural elements to determine meaning of unfamiliar words. E.B.1

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student uses strategies to decode or comprehend meaning of words in text by	**The student uses strategies to decode or comprehend meaning of words in text by**	**The student uses strategies to decode or comprehend meaning of words in text by**	**The student uses strategies to decode or comprehend meaning of words in text by**
[3] 1.1.1 Reading regularly spelled, multi-syllabic (three syllables) words using decoding skills, including knowledge of letter-sound relationships (phonics), word structure (root or base word, prefixes, suffixes, rhyming words) and language structure (word order, grammar)	**[4] 2.1.1** Demonstrating knowledge of phonetics, word structure (root words, prefixes, suffixes, abbreviations) and language structure through reading words in text (word order, grammar)	**[5] 2.1.1** Demonstrating knowledge of word structure (root words, prefixes, suffixes, abbreviations) and language structure through reading words in text (word order, grammar)*	**[6] 2.1.1** Demonstrating knowledge of word structure (root words, prefixes, suffixes, abbreviations) and language structure through reading words in text (word order, grammar)*
[3] 1.1.2 Reading orally high-frequency words and abbreviations of proper nouns such as Dr., Mr., Mrs., Ms. (L)	**[4] 2.1.2** Determining the meaning of unfamiliar words using knowledge of word families, phonetics, context and visual cues, structural elements (contractions, compound words, root words, prefixes, suffixes, plurals)	**[5] 2.1.2** Determining the meaning of unfamiliar words using knowledge of word families, phonetics, context and visual cues, structural elements (contractions, compound words, root words, prefixes, suffixes, plurals)*	**[6] 2.1.2** Determining the meaning of unfamiliar words using knowledge of word families, phonetics, context and visual cues, structural elements (contractions, compound words, root words, prefixes, suffixes, plurals) *
[3] 1.1.3 Obtaining information using text features including pictures (illustrations for text) and visual cues (e.g., bolded or italicized text, chapter titles)	**[4] 2.1.3** Obtaining information using text features including pictures, illustrations, text structure (e.g., bolded or italicized text, graphs, charts, or headings)	**[5] 2.1.3** Obtaining information using text features including pictures, illustrations, text structure (e.g., bolded or italicized text, graphs, charts, or headings)*	**[6] 2.1.3** Obtaining information using text features including pictures, illustrations, text structure (e.g., bolded or italicized text. graphs, charts, headings, or subheadings)
[3] 1.1.4 Identifying words by using context clues (e.g., "canoe" in a story about fishing)	**[4] 2.1.4** Identifying relationships among words by categorizing (e.g., synonyms, antonyms, homophones, homographs)	**[5] 2.1.4** Identifying relationships among words by categorizing (e.g., synonyms, antonyms, homophones, homographs) and [identifying shades of meaning (e.g., hot, warm) L]	**[6] 2.1.4** Identifying relationships among words by categorizing (e.g., synonyms, antonyms, homophones, homographs), [identifying shades of meaning (e.g., happy, ecstatic), L], and analogies*
[3] 1.1.5 Self-monitoring and self-correcting while reading (e.g., sounding words out, adjusting reading pace) (L)	**[4] 2.1.5** Self-monitoring and self-correcting while reading (e.g., sounding words out, adjusting reading pace, rereading difficult or relevant material) (L)	**[5] 2.1.5** Self-monitoring and self-correcting while reading (e.g., sounding words out, adjusting reading pace, rereading difficult or relevant material)*(L)	**[6] 2.1.5** Self-monitoring and self-correcting while reading (e.g., adjusting reading pace)* (L)

Note: Items differentiated with an "i.e." indicate that statewide assessment items may be written only to the content contained within the statement in the parentheses. Items differentiated with an "e.g." do not limit assessment items to that content, but indicate examples of content that may be used in statewide assessment items.

The number in brackets indicates the grade level.

Some PSGLEs have been identified as Local. They are for local assessment and will not be on a state assessment.

Differences between grade levels are underlined.

The number indicates the Performance Standard and the Grade Level Expectation number; thus PSGLE [6] 2.1.4 represents Performance Standard 2.1, and the fourth PSGLE for that Performance Standard for grade 6.

The Performance Standards for reading have been organized into the following content strands.

FOR GRADE 3

Fluency	Word Identification Skills	Forming a General Understanding	Analysis of Content and Structure
R1.3 Read text aloud	R1.1 Use structural analysis; read words	R1.2 Comprehend literal meaning	R1.7 Identify forms of text
		R1.4 Retell or restate information	R1.8 Identify story elements
		R1.5 Identify main idea	R1.9 Express own opinions about text
		R1.6 Follow simple directions	R1.10 Make connections
			R1.11 Identify cultural influences

FOR GRADE 4–6

Fluency	Word Identification Skills	Forming a General Understanding	Analysis of Content and Structure
R2.3 Read text aloud	R2.1 Use structural analysis; determine meaning of unfamiliar words	R2.2 Infer meaning	R2.7 Identify forms of text
		R2.4 Retell or restate information	R2.8 Define story elements
		R2.5 Support main idea	R2.9 Differentiate fact from opinion
		R2.6 Follow multi-step directions	R2.10 Identify theme; make connections
			R2.11 Connect cultural influences

FOR GRADE 7–8

Fluency	Word Identification Skills	Forming a General Understanding	Analysis of Content and Structure
R3.2 Read text aloud	R3.1 Read unfamiliar words	R3.3 Restate or summarize	R3.6 Identify conventions of forms of text
		R3.4 Assess support of main idea	R3.7 Analyze story elements
		R3.5 Follow multi-step directions	R3.8 Analyze author's purpose
			R3.9 Support understanding of theme
			R3.10 Compare historical/cultural influences

FOR GRADE 9–10

Fluency	Word Identification Skills	Forming a General Understanding	Analysis of Content and Structure
R3.2 Read text aloud	R4.1 Read unfamiliar words	R4.2 Summarize information	R4.5 Analyze conventions of genres
		R4.3 Support main idea/critique arguments	R4.6 Analyze story elements
		R4.4 Follow multi-step directions	R4.7 Make assertions
			R4.8 Analyze themes
			R4.9 Analyze historical/cultural influences

The student uses strategies to decode or comprehend meaning of words in text.

R1.1 a. Distinguish, reproduce, and manipulate the sounds in words;

b. Use a combination of the following to read and comprehend text: knowledge of phonics, alphabet, and alphabetic principle (e.g., recognition of letter/sound relationships, initial/final consonants, vowels, letter patterns); pictures and visual cues; sight recognition of high frequency vocabulary words; word structure (e.g., root words prefixes, suffixes, rhyming words); language structure (e.g. word order, grammar); meaning structures (e.g. prior knowledge and context); text structure (e.g., read left to right). E.B.1

R2.1 a. Use a combination of the following to read and comprehend text: knowledge of phonetics, language structure, and semantics; text structures such as illustrations, graphs, and headers; self-monitoring and self-correcting strategies; adjusting reading pace or style based on purpose, task, and type of text.

b. Use knowledge of word families, phonetics, context clues, visual cues, and structural elements to determine meaning of unfamiliar words. E.B.1

GRADE 3

The student uses strategies to decode or comprehend meaning of words in text by

[3] 1.1.1 Reading regularly spelled, multi-syllabic (three syllable) words using decoding skills, including knowledge of letter-sound relationships (phonics), word structure (root or base word, prefixes, suffixes, rhyming words) and language structure (word order, grammar)

[3] 1.1.2 Reading orally high-frequency words and abbreviations of proper nouns such as Dr., Mr., Mrs., Ms. (**L**)

[3] 1.1.3 Obtaining information using text features including pictures (illustrations for text) and visual cues (e.g., bolded or italicized text, chapter titles)

[3] 1.1.4 Identifying words by using context clues (e.g., "canoe" in a story about fishing)

[3] 1.1.5 Self-monitoring and self-correcting while reading (e.g., sounding words out, adjusting reading pace) (**L**)

GRADE 4

The student uses strategies to decode or comprehend meaning of words in text by

[4] 2.1.1 Demonstrating knowledge of phonetics, word structure (root words, prefixes, suffixes, abbreviations) and language structure through reading words in text (word order, grammar)

[4] 2.1.2 Determining the meaning of unfamiliar words using knowledge of word families, phonetics, context and visual cues, structural elements (contractions, compound words, root words, prefixes, suffixes, plurals)

[4] 2.1.3 Obtaining information using text features including pictures, illustrations, text structure (e.g., bolded or italicized text, graphs, charts, or headings)

[4] 2.1.4 Identifying relationships among words by categorizing (e.g., synonyms, antonyms, homophones, homographs)

[4] 2.1.5 Self-monitoring and self-correcting while reading (e.g., sounding words out, adjusting reading pace, rereading difficult or relevant material) (**L**)

GRADE 5

The student uses strategies to decode or comprehend meaning of words in text by

[5] 2.1.1 Demonstrating knowledge of word structure (root words, prefixes, suffixes, abbreviations) and language structure through reading words in text (word order, grammar)*

[5] 2.1.2 Determining the meaning of unfamiliar words using knowledge of word families, phonetics, context and visual cues, structural elements (contractions, compound words, root words, prefixes, suffixes, plurals)*

[5] 2.1.3 Obtaining information using text features including pictures, illustrations, text structure (e.g., bolded or italicized text, graphs, charts, or headings)*

[5] 2.1.4 Identifying relationships among words by categorizing (e.g., synonyms, antonyms, homophones, homographs) and [identifying shades of meaning (e.g., hot, warm) L]

[5] 2.1.5 Self-monitoring and self-correcting while reading (e.g., sounding words out, adjusting reading pace, rereading difficult or relevant material)*(**L**)

GRADE 6

The student uses strategies to decode or comprehend meaning of words in text by

[6] 2.1.1 Demonstrating knowledge of word structure (root words, prefixes, suffixes, abbreviations) and language structure through reading words in text (word order, grammar)*

[6] 2.1.2 Determining the meaning of unfamiliar words using knowledge of word families, phonetics, context and visual cues, structural elements (contractions, compound words, root words, prefixes, suffixes, plurals) *

[6] 2.1.3 Obtaining information using text features including pictures, illustrations, text structure (e.g., bolded or italicized text. graphs, charts, headings, or subheadings)

[6] 2.1.4 Identifying relationships among words by categorizing (e.g., synonyms, antonyms, homophones, homographs), [identifying shades of meaning (e.g., happy, ecstatic) **L**] and analogies*

[6] 2.1.5 Self-monitoring and self-correcting while reading (e.g., adjusting reading pace)* (**L**)

Assumes a variety of text and increasing complexity

The student uses strategies to decode or comprehend the meaning of words in texts.

R3.1 Apply knowledge of word origins, root words, structure and context clues; and use dictionaries and glossaries to determine the meaning of new words and to comprehend text. E.B.1

R4.1 Apply knowledge of syntax, roots, and word origins, and use context clues and reference materials to determine the meaning of new words and to comprehend text. E.B.1

GRADE 7

The student uses strategies to decode or comprehend the meaning of words in text by

[7] 3.1.1 Determining meanings of unfamiliar words in context using knowledge of word structure, (prefixes/suffixes, base words, common roots, or word origins)

[7] 3.1.2 Determining meanings of unfamiliar words in context, including words from other languages that have been adopted into English (e.g., déjà vu), using knowledge of language structure, including using context clues, prior knowledge, and other resources (e.g., dictionaries, glossaries, thesauruses)

[7] 3.1.3 Identifying complex relationships among words including synonyms, antonyms, homonyms/homophones, [shades of meaning **L**], and analogies

[7] 3.1.4 Determining the meaning of words in context, including content-specific vocabulary, words with multiple meanings, or precise vocabulary (e.g., vague vs. ambiguous)

[7] 3.1.5 Self-monitoring and self-correcting while reading (e.g., adjusting reading pace, rereading difficult or relevant material)*(**L**)

GRADE 8

The student uses strategies to decode or comprehend the meaning of words in text by

[8] 3.1.1 Determining meanings of unfamiliar words in context using knowledge of word structure, (prefixes/suffixes, base words, common roots, or word origins)*

[8] 3.1.2 Determining meanings of unfamiliar words in context, including words from other languages that have been adopted into English (e.g., carpe diem), using knowledge of language structure including using context clues, prior knowledge, and other resources (e.g., dictionaries, glossaries, thesauruses)

[8] 3.1.3 Identifying complex relationships among words including synonyms, antonyms, homonyms/homophones, [shades of meaning **L**], and analogies*

[8] 3.1.4 Determining the meaning of words in context, including content-specific vocabulary, words with multiple meanings, or precise vocabulary (e.g., angry, vexed, segmented, segregation)

[8] 3.1.5 Self-monitoring and self-correcting while reading (e.g., rereading, adjusting reading pace, sub-vocalizing, consulting resources, questioning, flexible note taking/mapping, skimming, scanning, etc.) (**L**)

GRADE 9

The student uses strategies to decode or comprehend the meaning of words in text by

[9] 4.1.1 Determining meanings of unfamiliar words in context using knowledge of sounds, syllables, derivational roots and affixes, including cultural derivations (e.g., the root of photography and photosynthesis, kayak)

[9] 4.1.2 Determining meanings of unfamiliar words by utilizing context clues, literary allusions, syntax, or semantics in

- dialectical English (e.g., Huck Finn)
- other languages adopted into English (e.g., pie à la mode)
- idiomatic expressions (e.g., "it drives me up a wall")

[9] 4.1.3 Identifying complex relationships among words including synonyms, antonyms, homonyms/homophones, [shades of meaning **L**], analogies*

[9] 4.1.4 Determining the meaning of words in context including [connotation/denotation **L**], use of precise or technical vocabulary, content-specific vocabulary (symbiosis, suffrage, apartheid), or multiple meanings (e.g., Raven as a character in a myth and also representative of Native Alaskan notion of "trickster")

[9] 4.1.5 Self-monitoring and self-correcting while reading (e.g., rereading, adjusting reading pace, sub-vocalizing, consulting resources, questioning, flexible note taking/mapping, skimming, scanning, etc.)* (**L**)

GRADE 10

The student uses strategies to decode or comprehend the meaning of words in text by

[10] 4.1.1 Determining meanings of unfamiliar words in context using knowledge of sounds, syllables, derivational roots and affixes, including cultural derivations (e.g., the root of photography and photosynthesis, kayak)*

[10] 4.1.2 Determining meanings of unfamiliar words by utilizing context clues, literary allusions, syntax, or semantics in

- dialectical English (e.g., Huck Finn)
- other languages adopted into English (e.g., pie à la mode)
- idiomatic expressions (e.g., "it drives me up a wall")*

[10] 4.1.3 Identifying complex relationships among words including synonyms, antonyms, homonyms/homophones, [shades of meaning **L**], analogies*

[10] 4.1.4 Determining the meaning of words in context including [connotation/denotation **L**], use of precise or technical vocabulary, content-specific vocabulary (symbiosis, suffrage, apartheid), or multiple meanings (e.g., the James Joyce character Stephen Dedalus–Dedalus is a character and reference to Greek mythological figure)

[10] 4.1.5 Self-monitoring and self-correcting while reading (e.g. rereading, adjusting reading pace, sub vocalizing, consulting resources, questioning, flexible note taking/mapping, skimming, scanning, etc.)* (**L**)

Assumes a variety of text and increasing complexity

The student comprehends literal or inferred meaning from text.

R1.2 a. Comprehend literal meaning from text.

b. Use a variety of strategies to support comprehension including predicting, questioning, rereading, and monitoring own comprehension. E.B.1

R2.2 Infer meaning from text. E.B.1

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student comprehends literal or inferred meaning from text by	**The student comprehends literal or inferred meaning from text by**	**The student comprehends literal or inferred meaning from text by**	**The student comprehends literal or inferred meaning from text by**
[3] 1.2.1 Locating information explicitly stated in narrative and informational text to answer literal-comprehension questions	**[4] 2.2.1** Locating information explicitly stated in narrative and informational text to answer literal-comprehension questions*	**[5] 2.2.1** Locating information explicitly stated in narrative and informational text to answer literal-comprehension questions*	**[6] 2.2.1** Locating information explicitly stated in narrative and informational text to answer literal-comprehension questions*
[3] 1.2.2 Self-monitoring comprehension by making predictions or formulating questions while reading (e.g., why is the wolf dressed in grandmother's clothing, why are mother bears dangerous, what will happen next), or rereading (e.g., for clarification, confirmation, correction) (**L**)	**[4] 2.2.2** Self-monitoring comprehension by formulating questions while reading (e.g., why is this character not telling the truth, why are bears with cubs especially dangerous, what will happen next), or rereading (e.g., for clarification, confirmation, correction) (**L**)	**[5] 2.2.2** Self-monitoring comprehension by formulating questions while reading (e.g., why do characters react to the same situation differently) or rereading (e.g., for clarification, confirmation, correction)* (**L**)	**[6] 2.2.2** Self-monitoring comprehension by formulating questions while reading (e.g., what circumstances influenced a character to make a specific decision) or rereading (e.g., for clarification, confirmation, correction)* (**L**)
[3] 1.2.3. Making simple inferences (e.g., predicts logical outcomes)	**[4] 2.2.3**. Making simple inferences (e.g., predicts logical outcomes, deduces missing information, such as where a story takes place, if not directly stated)	**[5] 2.2.3** Making inferences (e.g., predicts logical outcomes, such as how would the story have been different if ____, deduces missing outcome or information, such as where a story takes place, if not directly stated)	**[6] 2.2.3** Making inferences (e.g., predicts logical outcomes, such as how would the story have been different if ____, deduces missing outcome or information, such as where a story takes place, if not directly stated)*
[3] 1.2.4 Drawing conclusions based on information presented in the text (e.g., cause and effect, character motivation)	**[4] 2.2.4** Drawing conclusions based on information presented in the text (e.g., cause and effect, character motivation)*	**[5] 2.2.4** Drawing conclusions based on information presented explicitly in the text (e.g., cause and effect, character motivation)*	**[6] 2.2.4** Drawing conclusions based on information presented explicitly in the text (e.g., cause and effect, character motivation, predictions)

Assumes a variety of text and increasing complexity

READING GRADES 3—6

The student reads text aloud.

R1.3 Read texts aloud with expression demonstrating knowledge of punctuation and other conventions of print. E.B.1

R2.3 Read texts aloud with rhythm, flow, and expression demonstrating knowledge of punctuation and other conventions of print. E.B.1

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student reads text aloud by	**The student reads text aloud by**	**The student reads text aloud by**	**The student reads text aloud by**
[3] **1.3.1** Reading orally with rhythm, flow, and expression showing understanding of punctuation and other conventions of print (L)	[4] **2.3.1** Reading orally with rhythm, flow, and expression showing understanding of punctuation and other conventions of print* (L)	[5] **2.3.1** Reading orally with rhythm, flow, and expression showing understanding of punctuation and other conventions of print* (L)	[6] **2.3.1** Reading orally with rhythm, flow, and expression showing understanding of punctuation and other conventions of print* (L)

READING GRADES 7—10

The student reads text aloud.

R3.2 Rehearse and read texts aloud to an audience in performances such as readers' theater, reading to younger students or peers, or as part of formal presentations including research reports and literature responses. E.B.1

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student reads texts aloud by	**The student reads texts aloud by**	**The student reads texts aloud by**	**The student reads texts aloud by**
[7] **3.2.1** Orally interpreting short stories, poetry, and drama to an audience (L) [7] **3.2.2** Reading aloud short factual information (e.g., reports, articles) (L)	[8] **3.2.1** Rehearsing and reading aloud with expression from a variety of genres to an audience (L) [8] **3.2.2** Giving an oral formal presentation (e.g., research reports, literature responses) (L)	[9] **3.2.1** Rehearsing and reading aloud with expression from a variety of genres to an audience* (L) [9] **3.2.2** Giving an oral formal presentation (e.g., research reports, literature responses)* (L)	[10] **3.2.1** Rehearsing and reading aloud with expression from a variety of genres to an audience* (L) [10] **3.2.2** Giving an oral formal presentation (e.g., research reports, literature responses)* (L)

Assumes a variety of text and increasing complexity

The student restates/ summarizes information.

R1.4 a. Retell or dramatize a story after reading it.
b. Restate information after reading a text. E.B.1

R2.4 a. Retell stories in correct sequence.
b. Restate and summarize information or ideas from a text. E.B.2

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student restates/summarizes information by **[3] 1.4.1** Retelling or dramatizing a story after reading it (L) **[3] 1.4.2** Restating information after reading a text or identifying accurate restatements	**The student restates/summarizes information by** **[4] 2.4.1** Retelling a story in correct sequence or identifying the correct sequence of events in a story (L) **[4] 2.4.2** Restating and summarizing information after reading a text or identifying accurate restatements and summaries	**The student restates/summarizes information by** **[5] 2.4.1** Restating and summarizing main ideas or events in correct sequence after reading a text (e.g., paraphrasing, constructing a topic outline, using graphic organizers) or identifying accurate restatements and summaries of main ideas or events or generalizations of a text	**The student restates/summarizes information by** **[6] 2.4.1** Restating and summarizing main ideas or events in correct sequence after reading a text (e.g., paraphrasing, constructing a topic outline, using graphic organizers) or identifying accurate restatements and summaries of main ideas or events or generalizations of a text*

*Assumes a variety of text and increasing complexity

The student restates/summarizes and connects information.

R3.3 Restate and summarize information or ideas from a text and connect new information or ideas to prior knowledge and experience. E.B.3

R4.2 Summarize information or ideas from a text and make connections between summarized information or sets of ideas and related topics or information. E.B.3

GRADE 7

The student restates/summarizes and connects information by

[7] 3.3.1 Restating and summarizing main ideas or events, in correct sequence, after reading a text (e.g., paraphrasing, constructing a topic outline, charting or mapping main ideas or events) or identifying accurate restatements and summaries of main ideas or events or generalizations of a text

[7] 3.3.2 Connecting information within a text by making inferences and/or drawing conclusions across texts or other summarized information

[7] 3.3.3 Connecting new information or ideas to prior knowledge and experience by citing or explaining relevant examples or concepts (e.g., cells get energy from glucose just as cars get energy from gas) (**L**)

GRADE 8

The student restates/summarizes and connects information by

[8] 3.3.1 Restating and summarizing main ideas or events, in correct sequence, after reading a text (e.g., paraphrasing, constructing a topic outline, charting or mapping main ideas or events) or identifying accurate restatements and summaries of main ideas or events or generalizations of a text*

[8] 3.3.2 Connecting information within a text by making inferences and/or drawing conclusions across texts or other summarized information*

[8] 3.3.3 Connecting new information or ideas to prior knowledge and experience by citing or explaining relevant examples or concepts (e.g., cells get energy from glucose just as cars get energy from gas)* (**L**)

GRADE 9

The student restates/summarizes and connects information by

[9] 4.2.1 Restating and summarizing main ideas or events, in correct sequence, after reading a text (e.g., paraphrasing, constructing a topic outline, charting or mapping main ideas or events) or identifying accurate restatements and summaries of main ideas or events or generalizations of a text*

[9] 4.2.2 Connecting information by making inferences and/or drawing conclusions within a text (e.g., why is the information in the chart included), across texts or other summarized information

GRADE 10

The student restates/summarizes and connects information by

[10] 4.2.1 Restating and summarizing main ideas or events, in correct sequence, after reading a text (e.g., paraphrasing, constructing a topic outline, charting or mapping main ideas or events) or identifying accurate restatements and summaries of main ideas or events or generalizations of a text*

[10] 4.2.2 Connecting information by making inferences and/or drawing conclusions within a text (e.g., why is the information in the chart included), across texts or other summarized information*

Assumes a variety of text and increasing complexity

The student demonstrates an understanding of main idea.

R1.5 Identify the main idea of a passage. E.B.1

R2.5 Locate evidence in the text and from related experiences to support understanding of a main idea. E.D.2

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student demonstrates an understanding of main idea by	**The student demonstrates an understanding of main idea by**	**The student demonstrates an understanding of main idea by**	**The student demonstrates an understanding of main idea by**
[3] 1.5.1 Identifying the main idea or central concept in various types of texts	**[4] 2.5.1** Identifying the main idea or central concept in various types of texts* **[4] 2.5.2** Locating information in narrative and informational text to answer questions related to main ideas or key details **[4] 2.5.3** Identifying or describing related experiences to support understanding of a main idea (**L**)	**[5] 2.5.1** Identifying the main idea or central concept in various types of texts* **[5] 2.5.2** Locating information in narrative and informational text to answer questions related to main ideas or key details* **[5] 2.5.3** Identifying or describing related experiences <u>and events</u> to support understanding of a main idea (e.g., <u>what event in history is similar to this one</u>) (**L**)	**[6] 2.5.1** Identifying the main idea or central concept in various types of texts* **[6] 2.5.2** Locating information in narrative and informational text to answer questions related to main ideas or key details* **[6] 2.5.3** <u>Locating</u> <u>references from the text that support</u> understanding of a main idea (e.g., what event in history is similar to this one) (**L**)

Assumes a variety of text and increasing complexity

The student demonstrates understanding of main ideas/ arguments.

R3.4 Clarify and connect main ideas and concepts, identify their relationship to other sources and related topics, and provide supporting details. E.B.2

R4.3 a. Identify and assess the validity, accuracy, and adequacy of evidence that supports an author's main ideas.

b. Critique the power, logic, reasonableness, and audience appeal of arguments advanced in public documents. E.D.2

GRADE 7

The student demonstrates understanding of main ideas/ arguments by

[7] 3.4.1 Identifying or explaining the main ideas in various types of texts (i.e., recognizing or developing appropriate titles, generalizations, assertions)

[7] 3.4.2 Locating information in narrative and informative text to answer questions related to main ideas or key details*

[7] 3.4.3 Comparing/contrasting the main ideas or concepts between related texts

[7] 3.4.4 Explaining connections among main ideas/concepts (text to self, text to text, text to world) (L)

GRADE 8

The student demonstrates understanding of main ideas/ arguments by

[8] 3.4.1 Identifying or explaining the main ideas in various types of texts (i.e., recognizing or developing appropriate titles, generalizations, assertions)*

[8] 3.4.2 Locating information in narrative and informative text to answer questions related to main ideas or key details*

[8] 3.4.3 Comparing/contrasting the main ideas or concepts between related texts*

[8] 3.4.4 Explaining connections among main ideas/concepts (text to self, text to text, text to world)* (L)

GRADE 9

The student demonstrates understanding of main ideas/ arguments by

[9] 4.3.1 Identifying or explaining the main ideas in various types of texts (i.e., recognizing or developing appropriate titles, generalizations, assertions)*

[9] 4.3.2 Locating information in narrative and informative text to answer questions related to main ideas or key details*

[9] 4.3.3 Comparing/contrasting the main ideas or concepts between related texts*

[9] 4.3.4 Explaining connections among main ideas/concepts (text to self, text to text, text to world)* (L)

[9] 4.3.5 Locating and using evidence from texts to assess the validity of an author's ideas (e.g., is the reasoning logical) and adequacy of support (e.g., is there enough supporting evidence)

[9] 4.3.6 Using evidence from the text to evaluate the power, logic, reasonableness, and audience appeal of arguments (e.g., identifies bias and propaganda techniques, emotional effect of specific word choices and sentence structures, well-supported logical arguments)

GRADE 10

The student demonstrates understanding of main ideas/ arguments by

[10] 4.3.1 Identifying or explaining the main ideas in various types of texts (i.e., recognizing or developing appropriate titles, generalizations, assertions)*

[10] 4.3.2 Locating information in narrative and informative text to answer questions related to main ideas or key details*

[10] 4.3.3 Comparing/contrasting the main ideas or concepts between related texts*

[10] 4.3.4 Explaining connections among main ideas/concepts (text to self, text to text, text to world)* (L)

[10] 4.3.5 Locating and using evidence from texts to assess the validity of an author's main ideas (e.g., is the reasoning logical) and adequacy of support (e.g., is there enough supporting evidence)*

[10] 4.3.6 Using evidence from the text to evaluate the power, logic, reasonableness, and audience appeal of arguments (e.g., identifies bias and propaganda techniques, emotional effect of specific word choices and sentence structures, well-supported logical arguments)*

Assumes a variety of text and increasing complexity

READING GRADES 3—6

The student follows written directions.

R1.6 Read and follow simple directions to complete a simple task. E.C.2

R2.6 Read and follow multi-step directions to complete a simple task. E.C.2

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student follows written directions by	**The student follows written directions by**	**The student follows written directions by**	**The student follows written directions by**
[3] 1.6.1 Completing a simple (1—2 step) task by following written directions (**L**) **[3] 1.6.2** Identifying the sequence of steps in simple directions	**[4] 2.6.1** Completing a simple task by following written, multi-step directions (e.g., recipe) (**L**) **[4] 2.6.2** Identifying the sequence of steps in multi-step directions	**[5] 2.6.1** Completing a task by following written, multi-step directions (e.g., origami) (**L**) **[5] 2.6.2** Identifying the sequence of steps in multi-step directions*	**[6] 2.6.1** Completing a task by following written, multi-step directions (e.g., basic science experiment)* (**L**) **[6] 2.6.2** Identifying the sequence of steps in multi-step directions*

READING GRADES 7—10

The student follows written directions.

R3.5 Read and follow multi-step directions to complete a task, and identify the sequence prescribed. E.C.2

R4.4 Read and follow multi-step directions to complete complex tasks. E.C.2

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student follows multi-step directions by	**The student follows multi-step directions by**	**The student follows multi-step directions by**	**The student follows multi-step directions by**
[7] 3.5.1 Completing a task by following written, multi-step directions (e.g., answer a multi-faceted text question) (L) **[7] 3.5.2** Identifying the sequence of steps in a list of directions (e.g., what is the first step, what is the second step)	**[8] 3.5.1** Completing a task by following written, multi-step directions (e.g., answer a multi-faceted text question)* (L) **[8] 3.5.2** Identifying the sequence of steps in a list of directions (e.g., what is the first step, what is the second step)*	**[9] 4.4.1** Reading, understanding, and applying multi-step directions to perform complex procedures and tasks (e.g., filling out a catalog order) **[9] 4.4.2** Identifying the sequence of steps in a list of directions (e.g., design a science experiment)	**[10] 4.4.1** Reading, understanding, and applying multi-step directions to perform complex procedures and tasks (e.g., filling out a sample income tax return or permanent fund dividend application) **[10] 4.4.2** Identifying the sequence of steps in a list of directions (e.g., design a science experiment)*

Assumes a variety of text and increasing complexity

The student analyzes content and structure of genres.

R1.7 Distinguish between common forms of texts (genres): fiction/nonfiction, prose/poetry, short story/drama. E.B.2

R2.7 Explain the characteristics of the following: fiction and nonfiction, prose and poetry, and four major genres of fiction: short story, drama, novel, and poetry. E.B.2

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student analyzes content and structure of genres by	**The student analyzes content and structure of genres by**	**The student analyzes content and structure of genres by**	**The student analyzes content and structure of genres by**
[3] 1.7.1 Distinguishing between fiction/nonfiction, prose/poetry, short story/drama (L)	**[4] 2.7.1** Identifying the four major genres of fiction: short story, drama (plays), novel, and poetry (L)	**[5] 2.7.1** Identifying or explaining the characteristics of the four major genres of fiction: short story, drama, novel, and poetry (L)	**[6] 2.7.1** Identifying or explaining the characteristics of the four major genres of fiction: short story, drama, novel, and poetry*
[3] 1.7.2 Identifying use of dialogue or rhyme in common forms of text	**[4] 2.7.2** Identifying or explaining the characteristics of fiction and nonfiction (L)	**[5] 2.7.2** Identifying or explaining the characteristics of fiction and nonfiction*	**[6] 2.7.2** Identifying or explaining the characteristics of fiction and nonfiction, prose and poetry
	[4] 2.7.3 Identifying use of literary elements and devices (i.e., dialogue, rhyme, alliteration, or simile)	**[5] 2.7.3** Identifying or explaining use of literary elements and devices (i.e., dialogue, rhyme, alliteration, simile, or metaphor)	**[6] 2.7.3** Identifying or explaining use of literary elements and devices appropriate to genre (i.e., dialogue, rhyme, alliteration, simile, metaphor, or personification)
		[5] 2.7.4 Identifying the characteristics of prose and poetry (L)	

*Assumes a variety of text and increasing complexity

The student analyzes and evaluates conventions and techniques of genres.

R3.6 Analyze basic rules (conventions) of the four genres of fiction (short story, drama, novel, and poetry) and nonfiction. E.B.2

R4.5 Analyze the rules (conventions) of the four genres of fiction (short story, drama, novel, and poetry) and nonfiction and the techniques used in these genres, and evaluate the effects of these conventions and techniques on the audience. E.B.2

GRADE 7

The student analyzes and evaluates conventions and techniques of genres by

[7] 3.6.1 Identifying or analyzing the characteristics and the effect on the reader of nonfiction and the four major structural genres: poetry, drama, novel, short story

[7] 3.6.2 Identifying or analyzing the use of literary devices appropriate to genre (i.e., dialogue, simile, metaphor, personification, foreshadowing, time sequence, imagery, or repetition) to analyze literary works and nonfiction

GRADE 8

The student analyzes and evaluates conventions and techniques of genres by

[8] 3.6.1 Analyzing the characteristics and the effect on the reader of nonfiction and the four major structural genres: poetry, drama, novel, short story*

[8] 3.6.2 Analyzing the use of literary devices appropriate to genre (i.e., dialogue, simile, metaphor, personification, foreshadowing, time sequence, imagery, or repetition) to analyze literary works and nonfiction*

GRADE 9

The student analyzes and evaluates conventions and techniques of genres by

[9] 4.5.1 Analyzing the characteristics and the effect on the reader of nonfiction and the four major structural genres: poetry, drama, novel, short story*

[9] 4.5.2 Analyzing the use of literary devices appropriate to genre (i.e., dialogue, simile, metaphor, personification, foreshadowing, time sequence, imagery, repetition, allusion or symbolism) to analyze literary works and nonfiction

[9] 4.5.3 Evaluating the intended effects of the author's use of conventions and techniques of genres on the reader (e.g., making inferences and judgments about ironic or hyperbolic statements, identifying impact of rich imagery, identifying multiple levels of meaning)

GRADE 10

The student analyzes and evaluates conventions and techniques of genres by

[10] 4.5.1 Analyzing the characteristics and the effect on the reader of nonfiction and the four major structural genres: poetry, drama, novel, short story*

[10] 4.5.2 Analyzing the use of literary devices appropriate to genre (i.e., dialogue, simile, metaphor, foreshadowing, personification, time sequence, imagery, repetition, allusion, symbolism, or syntax) to analyze literary works and nonfiction

[10] 4.5.3 Evaluating the intended effects of the author's use of conventions and techniques of genres on the reader (e.g., making inferences and judgments about ironic or hyperbolic statements, identifying impact of rich imagery, identifying multiple levels of meaning)*

Assumes a variety of text and increasing complexity

The student analyzes literary elements and devices.

R1.8 Identify and describe basic plot, main characters, and setting (time and place) in fiction. E.B.2

R2.8 a. Define and identify plots, settings, and characters in fiction.
b. Compare and contrast plots, settings, and characters in a variety of works by a variety of authors.

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student analyzes literary elements and devices by **[3] 1.8.1** Identifying or describing problem and solution, main characters, and setting in fiction	**The student analyzes literary elements and devices by** **[4] 2.8.1** Identifying or describing in fiction • plot (e.g., main conflict or problem, sequence of events) • settings (e.g., how they affect the characters or plot) • characters (e.g., physical characteristics, personality traits, motivation) **[4] 2.8.2** Comparing and contrasting plots, settings, and characters in different stories across a variety of works by a variety of authors (**L**)	**The student analyzes literary elements and devices by** **[5] 2.8.1** Identifying or describing in fiction • plot (e.g., main conflict or problem, sequence of events, resolution) • settings (e.g., how they affect the characters or plot) • characters (e.g., physical characteristics, personality traits, motivation) • point of view (who is telling the story) **[5] 2.8.2** Comparing and contrasting plots, settings, and characters in different stories across a variety of works by a variety of authors*	**The student analyzes literary elements and devices by** **[6] 2.8.1** Identifying or describing in fiction • plot (e.g., main conflict or problem, sequence of events, resolution) • settings (e.g., how they affect the characters or plot) • characters (e.g., physical characteristics, personality traits, motivation, growth and change) • point of view (who is telling the story) **[6] 2.8.2** Comparing and contrasting plots, settings, and characters in a variety of works by a variety of authors

Assumes a variety of text and increasing complexity

The student analyzes and evaluates literary elements and devices.

R3.7 Analyze and evaluate narrative elements including plot, character, setting, and point of view to determine their importance to the story. E.B.2

R4.6 Analyze and evaluate how authors use narrative elements and tone in fiction for specific purposes. E.B.2

GRADE 7

The student analyzes and evaluates literary elements and devices by

[7] 3.7.1 Identifying or describing or making logical predictions about (citing evidence and support from text) plot, setting, character, point of view, and theme

[7] 3.7.2 Comparing and contrasting literary elements and devices in a variety of works by a variety of authors

[7] 3.7.3 Analyzing and evaluating the importance to the story of plot, setting, character, point of view, and theme

GRADE 8

The student analyzes and evaluates literary elements and devices by

[8] 3.7.1 Identifying or describing or making logical predictions about (citing evidence and support from text) plot, setting, character, point of view, and theme*

[8] 3.7.2 Comparing and contrasting literary elements and devices in a variety of works by a variety of authors*

[8] 3.7.3 Analyzing and evaluating the importance to the story of plot, setting, character, point of view, and theme*

GRADE 9

The student analyzes and evaluates literary elements and devices by

[9] 4.6.1 Identifying or describing or making logical predictions about (citing evidence and support from text) plot, setting, character, point of view, theme, and tone

[9] 4.6.2 Comparing and contrasting literary elements and devices in a variety of works by a variety of authors*

[9] 4.6.3 Analyzing and evaluating the importance to the story of plot, setting, character, point of view, and theme*

[9] 4.6.4 Citing evidence from the text to analyze and evaluate the author's intent for utilizing literary elements and devices and tone

GRADE 10

The student analyzes and evaluates literary elements and devices by

[10] 4.6.1 Identifying or describing or making logical predictions about (citing evidence and support from text) plot, setting, character, point of view, theme, and tone*

[10] 4.6.2 Comparing and contrasting literary elements and devices in a variety of works by a variety of authors*

[10] 4.6.3 Analyzing and evaluating the importance to the story of plot, setting, character, point of view, theme, and tone

[10] 4.6.4 Citing evidence from the text to analyze and evaluate the author's intent for utilizing literary elements and devices and tone*

*Assumes a variety of text and increasing complexity

READING GRADES 3—6

The student analyzes content of text to differentiate fact and opinion.

R1.9 Express own opinions about texts. E.D.1

R2.9 a. Differentiate between fact and opinion.
b. Express opinions about a text and support these opinions with textual evidence. E.D.2

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student analyzes content of text to differentiate fact and opinion by	**The student analyzes content of text to differentiate fact and opinion by**	**The student analyzes content of text to differentiate fact and opinion by**	**The student analyzes content of text to differentiate fact and opinion by**
[3] **1.9.1** Expressing own opinion about material read (L)	[4] **2.9.1** Distinguishing fact from opinion in a text [4] **2.9.2** Expressing own opinion about material read and supporting opinions with evidence from text	[5] **2.9.1** Distinguishing fact from opinion in a text* [5] **2.9.2** Expressing own opinion about material read and supporting opinions with evidence from text*	[6] **2.9.1** Distinguishing fact from opinion in a text* [6] **2.9.2** Identifying bias/propaganda by citing textual evidence [6] **2.9.3** Expressing own opinion about material read and supporting opinions with evidence from text*

READING GRADES 7—10

The student expresses opinion/differentiates fact from opinion/critiques the effectiveness of text.

R3.8 a. Differentiate between fact and opinion in text.
b. Analyze an author's purpose and offer a critical opinion of the effectiveness of the text in meeting that purpose. E.D.2

R4.7 Express and support assertions, with evidence from the text or experience, about the effectiveness of a text. E.D.4

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student expresses opinion/ differentiates fact from opinion/ critiques the effectiveness of text by	**The student expresses opinion/ differentiates fact from opinion/ critiques the effectiveness of text by**	**The student expresses opinion/ differentiates fact from opinion/ critiques the effectiveness of text by**	**The student expresses opinion/ differentiates fact from opinion/ critiques the effectiveness of text by**
[7] **3.8.1** Identifying bias/propaganda by citing textual evidence* [7] **3.8. 2** Identifying or analyzing author's purpose (e.g., to narrate, inform, entertain, explain, persuade) by citing textual evidence	[8] **3.8.1** Identifying bias/propaganda by citing textual evidence* [8] **3.8.2** Analyzing author's purpose (e.g., to narrate, inform, entertain, explain, persuade) by citing textual evidence*	[9] **4.7.1** Identifying bias/propaganda by citing textual evidence* [9] **4.7.2** Analyzing author's purpose (e.g. to narrate, inform, entertain, explain, persuade) by citing textual evidence*	[10] **4.7.1** Identifying bias/propaganda by citing textual evidence* [10] **4.7.2** Analyzing author's purpose (e.g., to narrate, inform, entertain, explain, persuade) by citing textual evidence*

Assumes a variety of text and increasing complexity

READING GRADES 3—6

The student connects themes.

R1.10 Make connections between a text and personal experiences, experiences of others, or other texts, and locate details in the text to illustrate these connections. E.B.3

R2.10 Identify themes in texts and connect them to personal experiences, experiences of others, and other texts. E.B.3

GRADE 3	GRADE 4	GRADE 4	GRADE 6
The student connects themes by	**The student connects themes by**	**The student connects themes by**	**The student connects themes by**
[3] 1.10.1 Making connections between a text [and personal experiences (e.g., this reminds me of when I gave my favorite toy away), experiences of others (e.g., sister helps in toy drive), **L**] or other texts (e.g., the March sisters helped others in need) **[3] 1.10.2** Locating details in text to illustrate relevant connections to [personal experience, experience of others, or **L**] other texts	**[4] 2.10.1** Identifying author's message, theme, or purpose (e.g., helping others brings great rewards) **[4] 2.10.2** Identifying themes in texts and making relevant connections to [personal experiences, experiences of others, or **L**] other texts	**[5] 2.10.1** Identifying author's message, theme, or purpose, stated or implied (e.g., helping others brings great rewards) **[5] 2.10.2** Identifying themes in texts and making relevant connections to [personal experiences, experiences of others, or **L**] other texts*	**[6] 2.10.1** Identifying author's message, theme, or purpose, stated or implied (e.g., helping others brings great rewards)* **[6] 2.10.2** Identifying themes in texts and making relevant connections to [personal experiences, experiences of others, or **L**] other texts *

READING GRADES 7—10

The student connects themes.

R3.9 Connect themes to personal experiences, experiences of others, and other texts, and locate evidence from texts to support or illustrate these connections. E.B.3

R4.8 Analyze and evaluate themes across a variety of texts, using textual and experiential evidence. E.B.3

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student connects themes by	**The student connects themes by**	**The student connects themes by**	**The student connects themes by**
[7] 3.9.1 Locating evidence within the text to make connections to an author's message, theme, or purpose **[7] 3.9.2** Utilizing textual evidence to make thematic connections between texts **[7] 3.9.3** Making thematic connections between a variety of texts and relating these themes to personal experiences, experiences of others, prior knowledge, and the broader world of ideas (**L**)	**[8] 3.9.1** Locating evidence within the text to make connections to an author's message, theme, or purpose* **[8] 3.9.2** Utilizing textual evidence to make thematic connections between texts* **[8] 3.9.3** Making thematic connections between literary and other texts related to personal experiences, experiences of others, prior knowledge, and the broader world of ideas* (**L**)	**[9] 4.8.1** Analyzing and evaluating evidence within the text to identify an author's message, theme, or purpose **[9] 4.8.2** Analyzing and evaluating textual evidence to make thematic connections between texts **[9] 4.8.3** Analyzing and evaluating thematic connections between texts related to personal experiences, the experience of others, prior knowledge, and the broader world of ideas (**L**)	**[10] 4.8.1** Analyzing and evaluating evidence within the text to identify an author's message, theme, or purpose* **[10] 4.8.2** Analyzing and evaluating textual evidence to make thematic connections between texts* **[10] 4.8.3** Analyzing and evaluating thematic connections between texts related to personal experiences, the experience of others, prior knowledge, and the broader world of ideas* (**L**)

**Assumes a variety of text and increasing complexity*

READING GRADES 3—6

The student makes connections between cultural influences/events.

R1.11 Identify basic cultural influences in texts. E.E.1

R2.11 Connect cultural events, ideas, settings, and influences from one text to similar texts from other cultures. E.E.1

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student makes connections between cultural influences/ events by [3] **1.11.1** Identifying cultural influences in texts (e.g., dialects, customs, traditions) (L)	**The student makes connections between cultural influences/ events by** [4] **2.11.1** Identifying cultural influences in texts (e.g., dialects, customs, traditions)* (L) [4] **2.11.2** Identifying common ideas, events, and situations in multicultural readings (e.g., trickster tales about Raven) (L)	**The student makes connections between cultural influences/ events by** [5] **2.11.1** Identifying cultural influences in texts (e.g., dialects, customs, traditions, geography) (L) [5] **2.11.2** Identifying common ideas, events, and situations in multicultural readings (e.g., trickster tales about [African] Anansi the Spider and [American Southwest] Coyote)* (L)	**The student makes connections between cultural influences/ events by** [6] **2.11.1** Comparing and contrasting cultural events, ideas, settings, and influences in one story or text to similar stories or texts from other cultures (e.g., coming-of-age stories) (L)

READING GRADES 7—10

The student connects and evaluates cultural influences/ events.

R3.10 Compare and contrast how texts reflect historical and cultural influences. E.E.1

R4.9 Analyze the effects of cultural and historical influences on texts. E.E.1

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student connects and evaluates cultural influences/events by [7] **3.10.1** Comparing and contrasting cultural events, ideas, settings, and influences in one story or text across other similar stories or texts in other cultures (e.g., creation stories) (L) [7] **3.10.2** Analyzing the effects of historical or cultural influences/events on texts (L)	**The student connects and evaluates cultural influences/ events by** [8] **3.10.1** Comparing and contrasting cultural events, ideas, settings, and influences in one story or text across other similar stories or texts in other cultures (e.g., individual/family/ community identity formation) (L) [8] **3.10.2** Analyzing the effects of historical or cultural influences/events on texts* (L)	**The student connects and evaluates cultural influences/ events by** [9] **4.9.1** Comparing and contrasting cultural events, ideas, settings, and influences in one story or text across other similar stories or texts in other cultures (e.g., mythology, colonialism, Western/Eastern medicine) (L) [9] **4.9.2** Analyzing the effects of historical or cultural influences/events on texts* (L)	**The student connects and evaluates cultural influences/ events by** [10] **4.9.1** Comparing and contrasting cultural events, ideas, settings, and influences in one story or text across other similar stories or texts in other cultures (e.g., Puritanism, immigration, Harlem Renaissance) (L) [10] **4.9.2** Analyzing the effects of historical or cultural influences/ events on texts* (L)

**Assumes a variety of text and increasing complexity*

Conventions of Print—Punctuation or other devices (e.g., using all caps, bold, or italics to indicate that certain words should be emphasized) to indicate how text should be read (a pause at a comma, a longer pause for ellipsis).

Conclusion—A judgment reached after consideration or deliberation.

Explicit/Implicit—Explicit information is directly stated. Implicit information requires inference. Deductions or conclusions are suggested or implied rather than overtly stated.

Fiction—Fiction includes a full range of literary genres including realistic and historical fiction, science fiction, fantasy, and folk literature.

Inference—The act of making logical conclusions based on evidence or known facts.

Informational/Nonfiction—These texts include primary sources, personal narratives and autobiographies, schedules and manuals, as well as synthesized information found in textbooks. Informational texts use format, illustrations, and graphics to support understanding of meaning.

Reference to Text—Mentioning or alluding to something in the text without directly quoting the text (e.g., Romeo's impulsiveness caused him to be banished).

Restate—To state information again in another way.

Retell—To relate a story or to tell it again.

Each PSGLE includes a bolded statement called the "stem." Each stem is the same or similar across the grades for a given PSGLE and is meant to communicate the main curriculum and instructional focus of the PSGLE across the grades.

The first column of each table includes a sentence that summarizes the Performance Standards. The second column includes the complete Performance Standards.

A letter/number key links each Performance Standard to the English/ Language Arts Content Standards, so E.A.2 links to the English/Language Arts Content Standards, section A, item number 2.

The numbering indicates the performance standard and the Grade Level Expectation number, so PSGLE [6] 2.1.1 is Performance Standard 2.1, and the first PSGLE for that Performance Standard for grade 6.

The student writes about a topic.	**W1.1** a. Write complete sentences with a subject and a predicate. E.A.1 b. Write a paragraph with a topic sentence and supporting details. E.A.2 c. Write short stories or compositions with a beginning, middle, and end. E.A. 4 **W2.1** Write a well organized two-paragraph composition that addresses a single topic. E.A.1

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student writes about a topic by	**The student writes about a topic by**	**The student writes about a topic by**	**The student writes about a topic by**
[3] 1.1.1 Writing complete sentences with a subject and a predicate	**[4] 2.1.1** Writing a paragraph that maintains a focused idea and includes details that support the main idea	**[5] 2.1.1** Writing more than one paragraph stating and maintaining a focused idea and including details that support the main idea of each paragraph	**[6] 2.1.1** Writing a story or composition of at least two paragraphs with a topic sentence (which may include a lead or hook), maintaining a focused idea, and including supporting details
[3] 1.1.2 Writing a paragraph on a single topic with two or more supporting details	**[4] 2.1.2** Organizing ideas logically (**L**)	**[5] 2.1.2** Using paragraph form: indents or uses paragraph breaks (**L**)	**[6] 2.1.2** Using paragraph form: indents or uses paragraph breaks, and places paragraph breaks appropriately (**L**)
[3] 1.1.3 Writing a story or composition with a beginning, middle, and end (**L**)	**[4] 2.1.3** Writing a story or composition with a beginning and middle and ending with a concluding statement (**L**)	**[5] 2.1.3** Organizing ideas logically to establish clear relationships within and between paragraphs (e.g., using transition words or phrases that reveal order or chronology) (**L**)	**[6] 2.1.3** Organizing and sequencing ideas logically to establish clear relationships within and between paragraphs (e.g., using transition words or phrases that reveal order or chronology, comparison/contrast) (**L**)
		[5] 2.1.4 Writing a concluding statement	**[6] 2.1.4** Writing a concluding statement*

Note: Items differentiated with an "i.e." indicate that statewide assessment items may be written only to the content contained within the statement in the parentheses. Items differentiated with an "e.g." do not limit assessment items to that content, but indicate examples of content that may be used in statewide assessment items.

Some PSGLEs have been identified as Local. They are for local assessment and will not be on a state assessment.

The number in brackets indicates the grade level.

Differences between grade levels are underlined.

PSGLEs repeated with no changes across grade levels are marked with asterisks. This indicates the PSGLE assumes an increasing level of writing skill applications to indicate growth in the PSGLE.

The Performance Standards for writing have been organized into the following content strands.

FOR GRADE 3

Write Using a Variety of Forms	Structures & Conventions of Writing	Revise	Cite Sources	Use Resources
W1.1 Write about a Topic	W1.3 Use a Variety of Simple Sentence Structures/Proofread	W1.4 Revise Writing/Provide Peer Feedback	W1.5 List Sources	
W1.2 Write for a Specific Audience				

FOR GRADE 4–6

Write Using a Variety of Forms	Structures & Conventions of Writing	Revise	Cite Sources	Use Resources
W2.1 Write Two Paragraphs on a Topic	W2.3 Use a Variety of Sentences /Proofread	W2.4 Revise Writing/Provide Peer Feedback	W2.5 Give Credit	W2.6 Use Resources
W2.2 Use a Variety of Forms				

FOR GRADE 7–8

Write Using a Variety of Forms	Structures & Conventions of Writing	Revise	Cite Sources	Use Resources
W3.1 Write a Composition	W3.3 Use Conventions	W3.4 Revise	W3.5 Document Sources	W3.6 Use Word Processing
W3.2 Use a Variety of Forms				

FOR GRADE 9–10

Write Using a Variety of Forms	Structures & Conventions of Writing	Revise	Cite Sources	Use Resources
W4.1 Write a Composition	W4.3 Use Conventions	W4.4 Revise	W4.5 Cite Sources	W3.6 Use Word Processing
W4.2 Use a Variety of Forms				

The student writes about a topic.

W1.1 a. Write complete sentences with a subject and a predicate. E.A.1
b. Write a paragraph with a topic sentence and supporting details. E.A.2
c. Write short stories or compositions with a beginning, middle, and end. E.A. 4

W2.1 Write a well organized two-paragraph composition that addresses a single topic. E.A.1

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student writes about a topic by **[3] 1.1.1** Writing complete sentences with a subject and a predicate **[3] 1.1.2** Writing a paragraph on a single topic with two or more supporting details **[3] 1.1.3** Writing a story or composition with a beginning, middle, and end (**L**)	**The student writes about a topic by** **[4] 2.1.1** Writing a paragraph that maintains a focused idea and includes details that support the main idea **[4] 2.1.2** Organizing ideas logically (**L**) **[4] 2.1.3** Writing a story or composition with a beginning and middle and ending with a concluding statement (**L**)	**The student writes about a topic by** **[5] 2.1.1** Writing more than one paragraph stating and maintaining a focused idea and including details that support the main idea of each paragraph **[5] 2.1.2** Using paragraph form: indents or uses paragraph breaks (**L**) **[5] 2.1.3** Organizing ideas logically to establish clear relationships within and between paragraphs (e.g., using transition words or phrases that reveal order or chronology) (**L**) **[5] 2.1.4** Writing a concluding statement	**The student writes about a topic by** **[6] 2.1.1** Writing a story or composition of at least two paragraphs with a topic sentence (which may include a lead or hook), maintaining a focused idea, and including supporting details **[6] 2.1.2** Using paragraph form: indents or uses paragraph breaks, and places paragraph breaks appropriately (**L**) **[6] 2.1.3** Organizing and sequencing ideas logically to establish clear relationships within and between paragraphs (e.g., using transition words or phrases that reveal order or chronology, comparison/contrast) (**L**) **[6] 2.1.4** Writing a concluding statement*

**Assumes an increasing level of writing skill applications*

The student writes about a topic.

W3.1 Write a coherent composition that includes a thesis statement, supporting evidence, and a conclusion. E.A.1

W4.1 Write a coherent composition with a thesis statement that is supported with evidence, well-developed paragraphs, transitions, and a conclusion. E.A.1

GRADE 7

The student writes about a topic by

[7] 3.1.1 Writing a thesis statement that identifies the focus or controlling idea for the entire composition

[7] 3.1.2 Writing in paragraphs that include relevant details and evidence that support the main idea of the paragraph and thesis statement

[7] 3.1.3 Organizing ideas using appropriate structures (e.g., chronology order, order of importance, comparison and contrast) to maintain the unity of the composition with a variety of transitional words and phrases

[7] 3.1.4 Writing a conclusion that supports the thesis or summarizes the main ideas

GRADE 8

The student writes about a topic by

[8] 3.1.1 Incorporating the thesis statement, which identifies the focus or controlling idea for the entire composition, into an introductory paragraph

[8] 3.1.2 Writing in paragraphs that include relevant details and evidence that support the main idea of the paragraph and thesis statement *

[8] 3.1.3 Organizing ideas using appropriate structures (e.g., chronology order, order of importance, comparison and contrast, classification and definition) to maintain the unity of the composition using a variety of transitional words and phrases

[8] 3.1.4 Writing a concluding paragraph (e.g., restating the thesis and summarizing the main point)

GRADE 9

The student writes about a topic by

[9] 4.1.1 Incorporating the thesis statement, which identifies the focus or controlling idea for the entire composition, into an introductory paragraph (the introductory paragraph may include a lead or hook, such as an anecdote, startling statistic, or quotation)

[9] 4.1.2 Writing in paragraphs that include relevant details and evidence that support the main idea of the paragraph and thesis statement, grouping ideas logically within the paragraph, placing paragraph breaks logically

[9] 4.1.3 Organizing ideas using appropriate structure (e.g., chronology order, order of importance, comparison and contrast, classification and definition, cause and effect) to maintain the unity of the composition using a variety of transitional words and phrases

[9] 4.1.4 Writing a concluding paragraph that connects concluding elements to the introductory elements

GRADE 10

The student writes about a topic by

[10] 4.1.1 Incorporating the thesis statement, which identifies the focus or controlling idea for the entire composition, into an introductory paragraph (the introductory paragraph may include a lead or hook, such as an anecdote, startling statistic, or quotation)*

[10] 4.1.2 Writing in paragraphs that include relevant details and evidence that support the main idea of the paragraph and thesis statement, grouping ideas logically within the paragraph, placing paragraph breaks logically*

[10] 4.1.3 Organizing ideas using appropriate structure to maintain the unity of the composition (e.g., chronology order, order of importance, comparison and contrast, cause and effect, classification and definition) using a variety of transitional words and phrases*

[10] 4.1.4 Writing a conclusion that ties it to the introduction

*Assumes an increasing level of writing skill applications

The student writes for a variety of purposes and audiences.

W1.2 Write for a specific audience, including self, other children, parents, and other adults. E.A.4

W2.2 Use a variety of fiction and nonfiction forms when writing for different audiences. E.A.4

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student writes for a variety of purposes and audiences by	**The student writes for a variety of purposes and audiences by**	**The student writes for a variety of purposes and audiences by**	**The student writes for a variety of purposes and audiences by**
[3] 1.2.1 Choosing the appropriate organizational structure to match a purpose and audience (e.g., letters and notes, recounts, stories, and poems) (**L**)	**[4] 2.2.1** Writing an understandable story that incorporates setting, character, problem, and solution	**[5] 2.2.1** Writing an understandable story that incorporates setting, character, and basic plot	**[6] 2.2.1** Writing an understandable story that incorporates story elements and literary devices (e.g., dialogue, descriptive details)
[3] 1.2.2 Using expressive language when responding to literature or producing text (e.g., journals, pictures supported by text or poetry) (**L**)	**[4] 2.2.2** Writing in a variety of nonfiction forms using appropriate information and structure (i.e., personal letters, recounts, descriptions or observations)	**[5] 2.2.2** Writing in a variety of nonfiction forms using appropriate information and structure (i.e., step-by-step directions, descriptions, observations, or report writing)	**[6] 2.2.2** Writing in a variety of nonfiction forms using appropriate information and structure (i.e., step-by-step directions, descriptions, observations, or report writing)*
	[4] 2.2.3 Using expressive language when responding to literature or producing text (e.g., writer's notebook, memoirs, poetry, plays, or lyrics) (**L**)	**[5] 2.2.3** Using expressive language when responding to literature or producing text (e.g., writer's notebook, memoirs, poetry, plays, or lyrics)* (**L**)	**[6] 2.2.3** Using expressive language when responding to literature or producing text (e.g., writer's notebook, memoirs, poetry, plays, or lyrics)* (**L**)
			[6] 2.2.4 Using diagrams, charts or illustrations with captions or labels in research projects or extended reports (**L**)

*Assumes an increasing level of writing skill applications

The student writes for a variety of purposes and audiences.

W3.2 Select and use appropriate forms of fiction and nonfiction to achieve different purposes when writing for different audiences. E.A.4

W4.2 Demonstrate understanding of elements of discourse (purpose, speaker, audience, form) when completing expressive (creative, narrative, descriptive), persuasive, research-based, informational, or analytic writing assignments. E.A.4

GRADE 7

The student writes for a variety of purposes and audiences by

[7] 3.2.1 Writing a narrative using setting and character to advance the plot (L)

[7] 3.2.2 Writing in a variety of nonfiction forms (e.g., letter, report, biography, and/or autobiography) to inform or describe

[7] 3.2.3 Writing expressively when producing or responding to texts (e.g., poetry, journals, editorials, and/or newsletters) (L)

[7] 3.2.4 Using diagrams, charts or illustrations with captions or labels in research projects or extended reports*(L)

GRADE 8

The student writes for a variety of purposes and audiences by

[8] 3.2.1 Writing a narrative using elements of fiction (e.g., setting, character, conflict and resolution, dialogue, sensory details) to advance the plot (L)

[8] 3.2.2 Writing in a variety of nonfiction forms (e.g., letter, report, biography, and/or autobiography) to inform, describe, or persuade

[8] 3.2.3 Writing expressively when producing or responding to texts (e.g., poetry, journals, editorials, drama, reflective essays, and/or newsletters) (L)

[8] 3.2.4 Using research-based information and/or analysis in research projects or extended reports (L)

GRADE 9

The student writes for a variety of purposes and audiences by

[9] 4.2.1 Writing a narrative using elements of fiction to advance the plot (L)

[9] 4.2.2 Writing in a variety of nonfiction forms (e.g., letter, report, biography, autobiography, and/or essay) to inform, describe, or persuade

[9] 4.2.3 Writing expressively when producing or responding to texts (e.g., poetry, journals, editorials, drama, reflective essays, and/or newsletters)* (L)

[9] 4.2.4 Using research-based information and/or analysis in research projects or extended reports*(L)

GRADE 10

The student writes for a variety of purposes and audiences by

[10] 4.2.1 Writing a narrative using elements of fiction to advance the plot* (L)

[10] 4.2.2 Writing in a variety of nonfiction forms (e.g., letter, report, biography, autobiography, and/or essay) to inform, describe or persuade*

[10] 4.2.3 Writing expressively when producing or responding to texts (e.g., poetry, journals, editorials, drama, reflective essays, and/or newsletters)* (L)

[10] 4.2.4 Using research-based information and/or analysis in research projects or extended reports*(L)

Assumes an increasing level of writing skill applications

The student writes and edits using conventions of Standard English.

W1.3 a. Use a variety of simple sentence structures and basic rules of punctuation and capitalization in written work. E.A.2

b. Proofread writing for legibility, spelling, capitalization, and punctuation when producing final drafts. E.A.5

W2.3 a. Use a variety of simple and complex sentence structures in written work.

b. Proofread and correct grammar, sentence structure, paragraph structure, punctuation, capitalization, spelling, and usage in finished written work. E.A.5

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student writes and edits using conventions of Standard English by	**The student writes and edits using conventions of Standard English by**	**The student writes and edits using conventions of Standard English by**	**The student writes and edits using conventions of Standard English by**
[3] 1.3.1 Writing a variety of complete, simple sentences (i.e., statement, question, exclamation)	**[4] 2.3.1** Writing a variety of simple and complex sentences including the conjunctions *and, or, but,* or *because*	**[5] 2.3.1** Varying the beginnings, lengths, and patterns of sentences to improve flow and to enhance meaning of writing (**L**)	**[6] 2.3.1** Varying the beginnings, lengths, and patterns of sentences to improve flow and to enhance meaning of writing*
[3] 1.3.2 Identifying and/or correcting mistakes in spelling (e.g., grade-appropriate, high-frequency words) (**L**)	**[4] 2.3.2** Identifying and/or correcting mistakes in spelling (e.g., grade-appropriate, high frequency words and contractions) (**L**)	**[5] 2.3.2** Identifying and/or correcting mistakes in spelling (e.g., grade-appropriate, high frequency words, homophones, and contractions)	**[6] 2.3.2** Identifying and/or correcting mistakes in spelling (e.g., grade-appropriate, high-frequency words, homophones, and contractions)*
[3] 1.3.3 Identifying and/or correcting mistakes in punctuation at the end of sentences and capitalization (i.e., beginning of sentences and proper nouns)	**[4] 2.3.3** Identifying and/or correcting mistakes in punctuation (i.e., end of sentences, commas in dates, salutations and closings in letters, and commas in series) and capitalization (i.e., book titles, beginning of sentences, and proper nouns)	**[5] 2.3.3** Identifying and/or correcting mistakes in punctuation (i.e., end of sentences, commas in dates, salutations and closings in letters, and commas in a series) and capitalization*	**[6] 2.3.3** Identifying and/or correcting mistakes in punctuation (i.e., quotation marks for dialogue, commas in dates, salutations and closings in letters, and commas in a series) and capitalization
[3] 1.3.4 Rewriting handwritten work to improve legibility, if necessary, when producing final drafts (**L**)	**[4] 2.3.4** Identifying and/or correcting usage mistakes in subject/verb agreement (**L**)	**[5] 2.3.4** Identifying and/or correcting mistakes in usage (i.e., subject/verb agreement, verb tense, sentence fragments and run-on sentences, and possessives) (**L**)	**[6] 2.3.4** Identifying and/or correcting mistakes in usage (i.e., subject/verb agreement, verb tense, sentence fragments and run-on sentences, possessives, and pronouns)

**Assumes an increasing level of writing skill applications*

The student writes and edits using conventions of Standard English.

W3.3 Use the conventions of standard English including grammar, sentence structure, paragraph structure, punctuation, spelling, and usage in written work. E.A.2

W4.3 Use the conventions of standard English independently and consistently including grammar, sentence structure, paragraph structure, punctuation, spelling, and usage. E.A.2

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student writes and edits using conventions of Standard English by	**The student writes and edits using conventions of Standard English by**	**The student writes and edits using conventions of Standard English by**	**The student writes and edits using conventions of Standard English by**
[7] 3.3.1 Varying beginnings, lengths, and patterns of sentences to improve flow and to enhance meaning and style of writing	**[8] 3.3.1** Varying beginnings, lengths, and patterns of sentences to improve flow and to enhance meaning and style of writing *	**[9] 4.3.1** Varying beginnings, lengths, and patterns of sentences to improve flow and to enhance meaning and style of writing *	**[10] 4.3.1** Varying beginnings, lengths, and patterns of sentences to improve flow and to enhance meaning and style of writing *
[7] 3.3.2 Applying rules of spelling (e.g., homophones, irregular plurals, and contractions)	**[8] 3.3.2** Applying rules of spelling (e.g., homophones, irregular plurals, and contractions)*	**[9] 4.3.2** Applying rules of spelling (e.g., homophones, irregular plurals, and contractions)*	**[10] 4.3.2** Applying rules of spelling (e.g., homophones, irregular plurals, and contractions)*
[7] 3.3.3 Applying rules of punctuation (i.e., commas, quotation marks, and apostrophes)	**[8] 3.3.3** Applying rules of punctuation (i.e., commas, quotation marks, apostrophes, parentheses, and colons)	**[9] 4.3.3** Applying rules of punctuation (i.e., comma, quotation marks, apostrophes, semicolons, colons, hyphens, and parentheses)	**[10] 4.3.3** Applying rules of punctuation (i.e., comma, quotation marks, apostrophes, semicolons, colons, hyphens, and parentheses)*
[7] 3.3.4 Applying rules of capitalization (e.g., titles and proper nouns)	**[8] 3.3.4** Applying rules of capitalization (e.g., titles and proper nouns)*	**[9] 4.3.4** Applying rules of capitalization (e.g., titles and proper nouns)*	**[10] 4.3.4** Applying rules of capitalization (e.g., titles and proper nouns)*
[7] 3.3.5 Applying rules of usage (i.e., verb tense, subject/verb agreement, possessives, pronouns, adjectives, adverbs, and sentence structure)	**[8] 3.3.5** Applying rules of usage (i.e., verb tense, subject/verb agreement, possessives, pronouns, adjectives, adverbs, and sentence structure)*	**[9] 4.3.5** Applying rules of usage (i.e., verb tense, subject/verb agreement, possessives, pronouns, adjectives, adverbs, and sentence structure)*	**[10] 4.3.5** Applying rules of usage (i.e., verb tense, subject/verb agreement, possessives, pronouns, adjectives, adverbs, and sentence structure)*

*Assumes an increasing level of writing skill applications

The student revises writing.

W1.4 a. Revise writing for detail and clarity. E.A.5

b. Provide appropriate feedback to peers about written work. E.A.8

W2.4 a. Revise writing to improve the logical progression of ideas and supporting information. E.A.5

b. Revise own and others' work and provide appropriate feedback to peers based upon established criteria, to improve quality and effectiveness of writing. E.A.8

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student revises writing by	**The student revises writing by**	**The student revises writing by**	**The student revises writing by**
[3] 1.4.1 Rearranging and/or adding supporting details to improve clarity	**[4] 2.4.1** Rearranging and/or adding details to improve focus and to support main ideas	**[5] 2.4.1** Rearranging and/or adding details to improve focus, to support main ideas, and to make sequence clear	**[6] 2.4.1** Rearranging and/or adding details to improve focus, to support main ideas, to clarify topic sentence, and to make sequence clear
[3] 1.4.2 Giving/receiving appropriate feedback about written work (**L**)	**[4] 2.4.2** Giving/receiving appropriate feedback and using established criteria to review own and others' written work (e.g., peer conferences, checklists, scoring guides, or rubrics) (**L**)	**[5] 2.4.2** Giving/receiving appropriate feedback and using established criteria to review own and others' written work (e.g., peer conferences, checklists, scoring guides, or rubrics)* (**L**)	**[6] 2.4.2** Giving/receiving appropriate feedback and using established criteria to review own and others' written work (e.g., peer conferences, checklists, scoring guides, or rubrics)* (**L**)
			[6] 2.4.3 Combining sentences for fluency and selecting precise, descriptive words to improve the quality and effectiveness of writing (**L**)

*Assumes an increasing level of writing skill applications

The student revises writing.

W3.4 a. Revise writing to improve organization, word choice, paragraph development, and voice appropriate to the purpose. E.A.5

b. Form and explain own standards or judgments of quality writing. E.A.8

W4.4 Revise writing to improve style, word choice, sentence variety, and subtlety of meaning in relation to the purpose and audience. E.A.5

GRADE 7

The student revises writing by

[7] 3.4.1 Rearranging details to improve clarity and logical progression of ideas (e.g., making chronological sequence clear, creating a logically consistent story line)

[7] 3.4.2 Giving/receiving appropriate feedback and evaluating writing based on established criteria (e.g., self-created checklists, peer conference formats, scoring guides, or rubrics)* (L)

[7] 3.4.3 Combining sentences for fluency, using precise and descriptive words, and/or eliminating irrelevant details to improve quality and effectiveness of writing

[7] 3.4.4 Clarifying thesis statement and/or topic sentence and adding details to support main ideas, if needed

[7] 3.4.5 Using appropriate voice for intended audience (e.g., humorous, informal, formal, or technical)

[7] 3.4.6 Using resources throughout the writing process (e.g., dictionary, thesaurus, peer conference, scoring guide, rubric, word processor) (L)

GRADE 8

The student revises writing by

[8] 3.4.1 Rearranging details to improve clarity and logical progression of ideas (e.g. making chronological sequence clear, clarifying cause and effect, creating a logically consistent story line)

[8] 3.4.2 Giving/receiving appropriate feedback and evaluating writing based on established criteria (e.g., self-created checklists, peer conference formats, scoring guides, or rubrics)* (L)

[8] 3.4.3 Combining sentences for fluency, using precise and descriptive words, and/or eliminating irrelevant details to improve quality and effectiveness of writing*

[8] 3.4.4 Clarifying thesis statement and/or topic sentence and adding details to support main ideas, if needed*

[8] 3.4.5 Using appropriate voice for intended audience (e.g., humorous, informal, formal, or technical)*

[8] 3.4.6 Using resources throughout the writing process (e.g., dictionary, thesaurus, peer conference, scoring guide, rubric, word processor)* (L)

GRADE 9

The student revises writing by

[9] 4.4.1 Reviewing content and organization and making appropriate changes to improve clarity and logical progression of ideas (e.g., increasing elaboration or support for ideas/thesis, providing relevant details, examples, definitions, narrative anecdotes, illustrative scenarios, or counterarguments appropriate to the genre)

[9] 4.4.2 Giving/receiving appropriate feedback and evaluating writing based on established criteria (e.g., self-created checklists, peer conference formats, scoring guides, or rubrics)* (L)

[9] 4.4.3 Combining sentences for fluency, using precise and descriptive words, and/or eliminating irrelevant details to improve quality and effectiveness of writing*

[9] 4.4.4 Clarifying thesis statement and/or topic sentence and adding details to support main ideas, if needed*

[9] 4.4.5 Making style, diction, and voice or persona more consistent with form (e.g., organizational structure or writing genre) and the perspective conveyed

[9] 4.4.6 Using resources throughout the writing process (e.g., dictionary, thesaurus, peer conference, scoring guide, genre exemplars, style manual, rubric, word processor) (L)

GRADE 10

The student revises writing by

[10] 4.4.1 Reviewing content and organization and making appropriate changes to improve clarity and logical progression of ideas (e.g., increasing elaboration or support for ideas/thesis, providing relevant details, examples, definitions, narrative anecdotes, illustrative scenarios, or counterarguments appropriate to the genre)*

[10] 4.4.2 Giving/receiving appropriate feedback and evaluating writing based on established criteria (e.g., self-created checklists, peer conference formats, scoring guides, or rubrics)* (L)

[10] 4.4.3 Combining sentences for fluency, using precise and descriptive words, and/or eliminating irrelevant details to improve quality and effectiveness of writing*

[10] 4.4.4 Clarifying thesis statement and/or topic sentence and adding details to support main ideas, if needed*

[10] 4.4.5 Making style, diction, and voice or persona more consistent with form (e.g., organizational structure or writing genre) and the perspective conveyed*

[10] 4.4.6 Using resources throughout the writing process (e.g. dictionary, thesaurus, peer conference, scoring guide, genre exemplars, style manual, rubric, word processor)* (L)

Assumes an increasing level of writing skill applications

WRITING GRADES 3—6

The student documents sources.

W1.5 List titles and authors of books and other materials when used as references in written work. E.D.3

W2.5 Give credit for others' ideas, images, and information by citing information about sources, including title and author. E.D.3

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student documents sources by	**The student documents sources by**	**The student documents sources by**	**The student documents sources by**
[3] 1.5.1 Listing sources or authors and titles of books and other materials when used as references in written work (**L**)	**[4] 2.5.1** Giving credit for others' information by citing title and source (e.g., author, storyteller, translator, songwriter, or artist) (**L**)	**[5] 2.5.1** Giving credit for others' ideas, images, and information by citing title and source (e.g., author, storyteller, translator, songwriter, or artist) (**L**)	**[6] 2.5.1** Giving credit for others' ideas, images, and information by citing title and source (e.g., author, storyteller, translator, songwriter, or artist)* (**L**)

WRITING GRADES 7—10

The student documents sources.

W3.5 List and document sources using a given format. E.D.3

W4.5 Cite sources of information using a standard method of documentation. E.D.3

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student documents sources by	**The student documents sources by**	**The student documents sources by**	**The student documents sources by**
[7] 3.5.1 Giving credit for others' ideas, images, and multimedia information by citing sources, including author, title, and publishing information (using simplified MLA or APA style) (**L**)	**[8] 3.5.1** Giving credit for others' ideas, images, and multimedia information, including others' ideas directly quoted or paraphrased by student, by citing sources, including author, title, publishing information, and page number (using simplified MLA or APA style) (**L**)	**[9] 4.5.1** Giving credit for others' ideas, images, and multimedia information, including others' ideas directly quoted or paraphrased by student, by citing sources using a standard method of documentation (e.g., MLA or APA style) (**L**)	**[10] 4.5.1** Giving credit for others' ideas, images, and multimedia information, including others' ideas directly quoted or paraphrased by student, by citing sources using a standard method of documentation (e.g., MLA or APA style)* (**L**)

**Assumes an increasing level of writing skill applications*

The student uses resources.

W2.6 Use resources such as computers, word processing software, dictionaries, and thesauruses to make choices when writing. E.A.7

GRADE 3	GRADE 4	GRADE 5	GRADE 6
No Grade Level Expectations at this grade level.	**The student uses resources by** **[4] 2.6.1** Looking up spelling or definitions of words in dictionaries (**L**) **[4] 2.6.2** Using a thesaurus to find synonyms for common words (**L**)	**The student uses resources by** **[5] 2.6.1** Looking up spelling or definitions of words in dictionaries <u>or correcting misspellings using software programs</u> (**L**) **[5] 2.6.2** Using a thesaurus to find synonyms for common words* (**L**) **[5] 2.6.3** Writing using a word processor (**L**)	**The student uses resources by** **[6] 2.6.1** Looking up spelling or definitions of words in dictionaries or correcting misspellings using software programs, <u>including choosing the correct spelling option among several choices</u> (**L**) **[6] 2.6.2** Using a thesaurus to find synonyms for common words* (**L**) **[6] 2.6.3** Writing with a word processor <u>using formatting features to produce a final draft</u> (**L**)

**Assumes an increasing level of writing skill applications*

The student uses resources.

W3.6 Compose and edit a composition with a word processing program. E.A.7

GRADE 7

The student uses resources by

[7] 3.6.1 Correcting misspellings using available software programs, including choosing the correct spelling option among several choices* (**L**)

[7] 3.6.2 Using a thesaurus to locate and choose effective synonyms for common words (**L**)

[7] 3.6.3 Using formatting features to produce a final draft by centering title, choosing appropriate font size and style, indentation, pagination, and line spacing (**L**)

GRADE 8

The student uses resources by

[8] 3.6.1 Correcting misspellings using available software programs, including choosing the correct spelling option among several choices* (**L**)

[8] 3.6.2 Using a thesaurus to locate and choose effective synonyms for common words* (**L**)

[8] 3.6.3 Selecting and using formatting features to produce final draft (e.g., centering title, choosing appropriate font size and style, indentation, pagination, and line spacing) (**L**)

GRADE 9

The student uses resources by

[9] 3.6.1 Correcting misspellings using available software programs, including choosing the correct spelling option among several choices* (**L**)

[9] 3.6.2 Using a thesaurus to locate and choose effective synonyms for common words or to avoid redundancy (**L**)

[9] 3.6.3 Selecting and using formatting features to produce final draft (e.g., centering title, choosing appropriate font size and style, indentation, pagination, and line spacing)* (**L**)

[9] 3.6.4 Selecting correct choice when using grammar-checking software (e.g., accepts suggested change or disregards inappropriate suggested change) (**L**)

GRADE 10

The student uses resources by

[10] 3.6.1 Correcting misspellings using available software programs, including choosing the correct spelling option among several choices* (**L**)

[10] 3.6.2 Using a thesaurus to locate and choose effective synonyms for common words or to avoid redundancy* (**L**)

[10] 3.6.3 Selecting and using formatting features to produce final draft (e.g., centering title, choosing appropriate font size and style, indentation, pagination, and line spacing)* (**L**)

[10] 3.6.4 Selecting correct choice when using grammar-checking software (e.g., accepts suggested change or disregards inappropriate suggested change)* (**L**)

**Assumes an increasing level of writing skill applications*

APA Style—Editorial style of the American Psychological Association

Audience—Those who read or hear what is written. Many qualities of writing must be appropriate to the audience: voice and tone, language, etc.

Coherence—The quality achieved when all the ideas are clearly arranged and connected. The arrangement of ideas, within and among paragraphs, should be organized in such a way that the reader can easily move from one point to another. When all ideas are arranged and connected, a piece of writing has coherence.

Complex Sentences—Complex sentences have an independent clause and a dependent clause.

Conclusion—The conclusion gives the reader closure; it sums up the essay's points or provides a final viewpoint about the topic.

Controlling Idea—This is the main idea/focus that runs throughout the paper.

Elements of Fiction—Character, setting, plot, point of view, theme, and various kinds of symbolism and language are the structures and techniques used to create fiction.

Expository Writing—Expository writing is meant to inform the reader.

Expressive Language—Those areas of language in which the communicator is conveying observations, thoughts, and/or feelings.

Focus—The specific idea(s) within the topic that the writer is addressing. (For example, if the topic is "winter," the focus might be: Winter provides many recreational opportunities in Alaska.)

Format vs. Form—Form refers to different types of writing (narrative, informational, etc.); format refers to the physical arrangement or presentation of information, such as the specific arrangement of publisher, author, and title when citing sources.

Functional Writing—Functional writing communicates and interprets information in a way that makes it useful for a reader.

Genre—A category of literary work, which refers to both form (e.g., poetry, drama, novel) and content (science fiction, tragedy).

Hook/Lead—An interesting or "catchy" way to begin a piece of writing, intended to motivate the reader to continue. Typically a hook/lead includes such things as: startling statistic, anecdote/scenario, moving from generalization to specific, or quotation/dialogue.

Images—Charts, graphs, pictures, etc.

Informational Writing—Informational writing conveys meaning or information. Informational writing uses format, illustrations, and graphics to support understanding of meaning.

Literary Devices—Techniques used in writing (particularly expressive writing) to create images (e.g., similes, metaphors, alliteration, assonance, personification, onomatopoeia).

MLA Style—Editorial style of the Modern Language Association

Multimedia—The combined use of media, such as text, audio, still images, video, and graphics.

Narrative Writing—Writing that tells a story.

Organizational Structure—The internal structure of a piece of writing. Organizational structure can be based on comparison-contrast, chronology, point-by-point analysis, or many other patterns. When the organization is strong, the piece begins meaningfully and events proceed logically; information is given at the right times, transitions form strong connections, and the conclusion creates a sense of resolution.

Plot—The pattern of events in a narrative or drama.

Problem and Solution—The problem is the conflict in a story and the solution is the resolution.

Procedural Writing—Procedural writing explains how to complete tasks by providing specific directions and information.

Recount—A recount is a personal account of something that happened with an orientation to *who, where, when, what, why.* Events are given in time order.

The first column of each table includes a heading that refers to the content standard and the content strand.

The second and third columns include the Performance Standards.

The coding indicates the content strand and the PSGLE number, so PSGLE [6] N-1 is content strand Numeration, and the first PSGLE for that content strand for grade 6.

Each PSGLE includes a bolded statement called the "stem." Each stem is the same or similar across the grades for a given PSGLE and is meant to communicate the main curriculum and instructional focus of the PSGLE across the grades.

Content Standard A:
Mathematical facts, concepts, principles, and theories

Numeration:
Understand and use numeration

Numeration Performance Standards that apply to grade 3:

M1.1.1 Read, write, order, count, and model one-to-one correspondence with whole numbers to100.

M1.1.2 Use, model, and identify place value positions of 1's, 10's, and 100's.

M1.1.3 Model and explain the processes of addition and subtraction, describing the relationship between the operations.

M1.1.4 Select and use various representations of ordinal and cardinal numbers.

M1.1.5 Identify, model, and label simple fractions, describing and defining them as equal parts of a whole, a region, or a set.

M1.1.6 Identify, describe, and extend patterns inherent in the number system. Skip count by 2's, 5's, and 10's. Add and subtract by 10. Identify even and odd numbers.

M1.1.7 Demonstrate the commutative and identity properties of addition.

Numeration Performance Standards that apply to grades 4-6:

M1.2.1 Read, write, model, order, and count with positive whole numbers to 1,000,000 and negative whole numbers.

M1.2.2 Use, model, and identify place value positions from 0.001 to 1,000,000.

M1.2.3 Model and explain the processes of multiplication and division. Describe the relationships among the four basic operations.

M1.2.4 Identify and describe different uses for the same numerical representation.

M1.2.5 Model and explain the process of adding and subtracting fractions with common denominators and decimals that represent money.

M1.2.6 Identify and describe factors and multiples including those factors and multiples common to a pair or set of numbers.

M1.2.7 Demonstrate the commutative and identity properties of multiplication.

Understanding Numbers

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student demonstrates conceptual understanding	**The student demonstrates conceptual understanding**	**The student demonstrates conceptual understanding**	**The student demonstrates conceptual understanding**
• **of whole numbers to one thousand by** **[3] N-1** reading, writing, ordering, or [counting L] (M1.1.1) **[3] N-2** modeling (base ten blocks) or identifying place value positions to thousands (M1.1.2) **[3] N-3** using appropriate representations of ordinal or cardinal numbers (M1.1.4)	• **of whole numbers to ten thousands by** **[4] N-1** reading, writing, ordering, or [counting L] (M1.2.1) **[4] N-2** modeling (base ten blocks) or identifying place value positions to <u>ten thousands</u> (M1.2.2) **[4] N-3** t converting between whole numbers expressed in expanded notation and standard form (M1.2.4)	• **of whole numbers to millions by** **[5] N-1** reading, writing, ordering, or [counting L] (M1.2.1) **[5] N-2** identifying place value positions from <u>tenths to millions</u> (M1.2.2) **[5] N-3** converting between whole numbers written in expanded notation and standard form (M1.2.4)	• **of fractions (proper or mixed numbers), decimals, percents (whole number), or integers by** **[6] N-1** reading, writing, ordering, or [counting L] (M1.2.1) **[6] N-2** identifying place value positions <u>from thousandths to millions</u> (L) (M1.2.2) **[6] N-3** converting between whole numbers written in expanded notation and standard form (M1.2.4)
• **of simple fractions with denominators 2, 3, 4, or 10 by identifying, describing with explanations, or illustrating** **[3] N-4** equal parts of a whole, a region, or a set (using models) (M1.1.5) **[3] N-5** equivalent representation of fractions (using models) (M1.1.5)	• **of fractions with denominators 2 through 12 by identifying, describing with explanations, or illustrating** **[4] N-4** equal parts of a whole, a region, or a set (using models) (M1.2.4) **[4] N-5** equivalent fractions <u>or mixed numbers</u> (M1.2.4 & M3.2.5)	• **of positive fractions with denominators 1 through 12 and 100 with proper and mixed numbers and benchmark percents (10%, 25%, 50%, 75%, 100%) by modeling, identifying, describing with explanations, or illustrating** **[5] N-4** equal parts of a whole, a region, or a set (M1.2.4) **[5] N-5** equivalent fractions or mixed numbers (M1.2.4 & M3.2.5)	• **of fractions, mixed numbers, or percents by [modeling L], identifying, describing, or illustrating** **[6] N-4** equal parts of a whole, a region, or a set (M1.2.4) **[6] N-5** equivalent fractions or mixed numbers (M1.2.4 & M3.2.5)

NOTE: Items differentiated with an "i.e." indicate that statewide assessment items may be written only to the content contained within the statement in the parentheses. Items differentiated with an "e.g." do not limit assessment items to that content, but indicate examples of content that may be used in statewide assessment items.

The number in brackets indicates the grade level.

Differences between grade levels are underlined.

The coding at the end of each PSGLE indicates the Performance Standard the PSGLE is aligned to.

Some PSGLEs have been identified as Local. They are for local assessment and will not be on a state assessment.

Mathematics Performance Standards are organized into 10 content strands and are coded as follows:

N = Numeration
MEA = Measurement
E&C = Estimation and Computation
F&R = Functions and Relationships
G = Geometry
S&P = Statistics and Probability
PS = Process Skills (The Process Skills include Problem-Solving, Communication, Reasoning, and Connections.)

NOTE: All the PSGLEs for Process Skills are for local assessment. Process Skills that would be assessed on a state assessment have been embedded in PSGLEs for other content strands. For instance, a grade level expectation for the Statistics and Probability content strand for eighth grade is, "[Designing, collecting **L**], organizing, displaying, or explaining the classification of data in real-world problems." That PSGLE for Statistics and Probability incorporates one of the PSGLEs for Process Skills, "representing mathematical problems numerically, graphically, and/or symbolically."

Content Standard A:

Mathematical facts, concepts, principles, and theories

Numeration:

Understand and use numeration

Numeration Performance Standards that apply to grade 3:

M1.1.1 Read, write, order, count, and model one-to-one correspondence with whole numbers to 100.

M1.1.2 Use, model, and identify place value positions of 1's, 10's, and 100's.

M1.1.3 Model and explain the processes of addition and subtraction, describing the relationship between the operations.

M1.1.4 Select and use various representations of ordinal and cardinal numbers.

M1.1.5 Identify, model, and label simple fractions, describing and defining them as equal parts of a whole, a region, or a set.

M1.1.6 Identify, describe, and extend patterns inherent in the number system. Skip count by 2's, 5's, and 10's. Add and subtract by 10. Identify even and odd numbers.

M1.1.7 Demonstrate the commutative and identity properties of addition.

Numeration Performance Standards that apply to grades 4-6:

M1.2.1 Read, write, model, order, and count with positive whole numbers to 1,000,000 and negative whole numbers.

M1.2.2 Use, model, and identify place value positions from 0.001 to 1,000,000.

M1.2.3 Model and explain the processes of multiplication and division. Describe the relationships among the four basic operations.

M1.2.4 Identify and describe different uses for the same numerical representation.

M1.2.5 Model and explain the process of adding and subtracting fractions with common denominators and decimals that represent money.

M1.2.6 Identify and describe factors and multiples including those factors and multiples common to a pair or set of numbers.

M1.2.7 Demonstrate the commutative and identity properties of multiplication.

Understanding Numbers

GRADE 3

The student demonstrates conceptual understanding

- **of whole numbers to one thousand by**

  [3] N-1 reading, writing, ordering, or [counting **L**] (M1.1.1)

  [3] N-2 modeling (base ten blocks) or identifying place value positions to thousands (M1.1.2)

  [3] N-3 using appropriate representations of ordinal or cardinal numbers (M1.1.4)

- **of simple fractions with denominators 2, 3, 4, or 10 by**

  [3] N-4 identifying, describing with explanations, or illustrating equal parts of a whole, a region, or a set (using models) (M1.1.5)

  [3] N-5 identifying, describing with explanations, or illustrating equivalent representation of fractions (using models) (M1.1.5)

GRADE 4

The student demonstrates conceptual understanding

- **of whole numbers to ten thousands by**

  [4] N-1 reading, writing, ordering, or [counting **L**] (M1.2.1)

  [4] N-2 modeling (base ten blocks) or identifying place value positions to ten thousands (M1.2.2)

  [4] N-3 converting between whole numbers expressed in expanded notation and standard form (M1.2.4)

- **of fractions with denominators 2 through 12 by**

  [4] N-4 identifying, describing with explanations, or illustrating equal parts of a whole, a region, or a set (using models) (M1.2.4)

  [4] N-5 identifying, describing with explanations, or illustrating equivalent fractions or mixed numbers (M1.2.4 & M3.2.5)

GRADE 5

The student demonstrates conceptual understanding

- **of whole numbers to millions by**

  [5] N-1 reading, writing, ordering, or [counting **L**] (M1.2.1)

  [5] N-2 identifying place value positions from tenths to millions (M1.2.2)

  [5] N-3 converting between whole numbers written in expanded notation and standard form (M1.2.4)

- **of positive fractions with denominators 1 through 12 and 100 with proper and mixed numbers and benchmark percents (10%, 25%, 50%, 75%, 100%) by**

  [5] N-4 modeling, identifying, describing with explanations, or illustrating equal parts of a whole, a region, or a set (M1.2.4)

  [5] N-5 modeling, identifying, describing with explanations, or illustrating equivalent fractions or mixed numbers (M1.2.4 & M3.2.5)

GRADE 6

The student demonstrates conceptual understanding

- **of fractions (proper or mixed numbers), decimals, percents (whole number), or integers by**

  [6] N-1 reading, writing, ordering, or [counting **L**] (M1.2.1)

  [6] N-2 identifying place value positions from thousandths to millions (**L**) (M1.2.2)

  [6] N-3 converting between whole numbers written in expanded notation and standard form (M1.2.4)

- **of fractions, mixed numbers, or percents by**

  [6] N-4 [modeling **L**], identifying, describing, or illustrating equal parts of a whole, a region, or a set (M1.2.4)

  [6] N-5 [modeling **L**], identifying, describing, or illustrating equivalent fractions or mixed numbers (M1.2.4 & M3.2.5)

Understanding Meaning of Operations

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student demonstrates conceptual understanding of mathematical operations by	**The student demonstrates conceptual understanding of mathematical operations by**	**The student demonstrates conceptual understanding of mathematical operations by**	**The student demonstrates conceptual understanding of mathematical operations by**
[3] N-6 [using models, explanations, number lines, or real-life situations **L**] describing or illustrating the processes of addition and subtraction of whole numbers and their relationships (M1.1.3)	**[4] N-6** [using models, explanations, number lines, or real-life situations **L**] describing or illustrating the processes of multiplication (M1.2.3) **[4] N-7** [using models, explanations, number lines, or real-life situations **L**] describing or illustrating the relationship between multiplication and addition (M1.2.3) **[4] N-8** [using models, explanations, number lines, or real-life situations **L**] describing or illustrating the relationship between multiplication and division (M1.2.3) **[4] N-9** [using models, explanations, number lines, or real-life situations **L**] describing or illustrating the process of adding or subtracting fractions with like denominators (2 to 12) (M1.2.5)	**[5] N-6** [using models, explanations, number lines, or real-life situations **L**] describing or illustrating the process of division and its relationship to subtraction or to multiplication (M1.2.3) **[5] N-7** [using models, explanations, number lines, or real-life situations **L**] describing or illustrating the process of adding and subtracting proper fractions or mixed numbers (like denominators) (M1.2.5) **[5] N-8** [using models, explanations, number lines, or real-life situations **L**] describing or illustrating the process of adding or subtracting decimals that represent money (M1.2.5)	**[6] N-6** [using models, explanations, number lines, or real-life situations **L**] describing or illustrating the relationships among the four basic operations (M1.2.3) **[6] N-7** [using models, explanations, number lines, or real-life situations **L**] describing or illustrating the process of adding and subtracting fractions with different denominators (M1.2.5)

Number Theory

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student demonstrates conceptual understanding of number theory by	**The student demonstrates conceptual understanding of number theory by**	**The student demonstrates conceptual understanding of number theory by**	**The student demonstrates conceptual understanding of number theory by**
[3] N-7 describing or illustrating identity property of addition (**L**) (M1.1.7) **[3] N-8** modeling (with manipulatives) and explaining commutative property of addition (**L**) (M1.1.7) **[3] N-9** identifying or using patterns in the number system (skip count by 2's, 5's, or 10's; add or subtract by 10; even or odd numbers) (M1.1.6)	**[4] N-10** describing or illustrating identity property of multiplication (**L**) (M1.2.7) **[4] N-11** modeling (with manipulatives) and explaining commutative property of multiplication (**L**) (M1.2.7) **[4] N-12** identifying or listing factors and multiples of a number (M1.2.6)	**[5] N-9** describing or illustrating commutative or identity properties of addition or multiplication using models or explanations (M1.2.7) **[5] N-10** identifying or listing factors and multiples common to a pair or set of numbers (M1.2.6)	**[6] N-8** describing or illustrating commutative, [associative, inverse **L**] or identity properties of addition or multiplication using models or explanations (M1.2.7) **[6] N-9** identifying or describing factors and multiples common to a pair or set of numbers (e.g., Least Common Multiple or Greatest Common Factor) (M1.2.6) **[6] N-10** modeling (base 10 blocks) distributive property (**L**) (M1.3.6)

Content Standard A:

Mathematical facts, concepts, principles, and theories

Numeration:

Understand and use numeration

Numeration Performance Standards that apply to grades 7-8:

M1.3.1 Read, write, model, and order real numbers, explaining scientific notation, exponents, and percents.

M1.3.2 Model counting in a different base system.

M1.3.3 Translate between equivalent representations of the same number. Select a respresentation that is appropriate for the situation.

M1.3.4 Describe and model the relationship of fractions to decimals, percents, ratios, and proportions.

M1.3.5 Use, explain, and define the rules of divisibility, prime and composite numbers, multiples, and order of operations.

M1.3.6 Use commutative, identity, associative, and distributive properties with variables.

Numeration Performance Standards that apply to grades 9-10:

M1.4.1 Read, write, model, order, and define real numbers and subsets.

M1.4.2 Add in a different base system.

M1.4.3 Compare and contrast the relationship between various applications of the same operation.

M1.4.4 Translate between equivalent representations of the same exponential expression.

M1.4.5 Recognize, describe, and use properties of the real number system.

Understanding Numbers

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student demonstrates understanding • **of rational numbers (fractions, decimals, percents, or integers) by** **[7] N-1** ordering rational numbers (M1.3.1) **[7] N-2** modeling (place value blocks) or identifying place value positions of whole numbers and decimals (L) (M1.3.2) **[7] N-3** converting between expanded notation (multiples of ten) and standard form for decimal numbers (M1.3.3) • **of positive fractions, decimals, or percents by** **[7] N-4** identifying or representing equivalents of numbers (M1.3.4 & M3.3.5)	**The student demonstrates understanding** • **of real numbers by** **[8] N-1** ordering real numbers (M1.3.1) **[8] N-2** distinguishing between a whole number in scientific notation and real numbers in standard form (M1.3.1) **[8] N-3** converting between expanded notation (multiples of ten with exponents) and standard form (M1.3.3) • **of rational numbers (fractions, decimals, or percents including integers) by** **[8] N-4** identifying, describing, or illustrating equivalent representations (M1.3.4 & M3.3.5) **[8] N-5** expressing products of numbers using exponents (M1.3.1 & M1.3.3)	**The student demonstrates understanding** • **of real numbers by** **[9] N-1** converting between a rational number in scientific notation and standard form (M1.4.4 & M3.4.4) **[9] N-2** equating different equivalent representations of the same exponential expression (e.g., $2^3 \bullet 2^5 = 2^8$) (M1.4.4 & M3.4.4)	**The student demonstrates understanding** • **of real numbers by** **[10] N-1** identifying their subsets (natural, whole, integers, rational, irrational) (M1.4.1) **[10] N-2** simplifying expressions with positive and negative exponents (M1.4.4 & M3.4.4) **[10] N-3** expressing square roots in simplest radical form (M1.4.4 & M3.4.4)

Understanding Meaning of Operations

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student demonstrates conceptual understanding of mathematical operations by **[7] N-5** [using models, explanations, number lines, real-life situations **L**] describing or illustrating the effects of arithmetic operations on rational numbers (fractions, decimals) (M1.2.3)	**The student demonstrates conceptual understanding of mathematical operations by** **[8] N-6** [using models, explanations, number lines, real-life situations **L**] describing or illustrating the effects of arithmetic operations on rational numbers (percents) (M1.2.3) **[8] N-7** using models, explanations, number lines, real-life situations, describing, or illustrating the use of inverse operations (addition/subtraction or multiplication/division) (M1.2.3)	**The student demonstrates conceptual understanding of mathematical operations by** **[9] N-3** [using models, explanations, number lines, real-life situations **L**] describing or illustrating the effects of arithmetic operations on real numbers (M1.4.3) **[9] N-4** using models, explanations, number lines, real-life situations, describing, or illustrating the use of inverse operations (squaring/square root) (M1.4.3 & 1.4.5)	**The student demonstrates conceptual understanding of mathematical operations by** **[10] N-4** describing or illustrating the effects of arithmetic operations on real numbers (M1.4.3) **[10] N-5** describing or illustrating the use of inverse operations (cubing/cube root) (M1.4.3 & 1.4.5) **[10] N-6** describing or illustrating [counting and adding in different bases **L**] (M1.4.2)

Number Theory

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student demonstrates conceptual understanding of number theory by **[7] N-6** using commutative, [associative **L**], inverse, or identity properties with rational numbers (M1.3.6) **[7] N-7** applying rules of divisibility to whole numbers (M1.3.5) **[7] N-8** identifying prime and composite numbers (M1.3.5) **[7] N-9** using distributive property with rational numbers (**L**) (M1.3.6)	**The student demonstrates conceptual understanding of number theory by** **[8] N-8** applying the rules for order of operations to rational numbers (M1.3.5) **[8] N-9** identifying or writing the prime factorization of a number using exponents (M1.3.5) **[8] N-10** [using distributive property with real numbers (**L**) (M1.3.6)	**The student demonstrates conceptual understanding of number theory by** **[9] N-5** applying the rules for order of operations to real numbers and variables (M1.3.5) **[9] N-6** using distributive property with variables (**L**) (M1.4.5)	**The student demonstrates conceptual understanding of number theory by** **[10] N-7** identifying or applying commutative, identity, associative, inverse, or distributive properties to real numbers and variables (M1.4.5) **[10] N-8** identifying or writing the prime factorization of a variable expression using exponents (M1.4.4)

Content Standard A:
Mathematical facts, concepts, principles, and theories

Measurement: Select and use systems, units, and tools of measurement

Measurement Performance Standards that apply to grade 3:

M2.1.1 Compare and order objects by various measurable attributes including calendar, temperature, length, weight, capacity, area, and volume.

M2.1.2 Compare objects to standard and non-standard units to identify objects that are greater than, less than, and equal to a given unit.

M2.1.3 Choose a unit of measure, estimate the length or weight of objects and then measure to check for reasonableness.

M2.1.4 Tell time to the nearest half hour, distinguishing between morning, afternoon, and evening.

M2.1.5 Identify coins, their value, and the value of given sets of coins.

Measurement Performance Standards that apply to grades 4-6:

M2.2.1 Estimate and measure weights, lengths, and temperatures to the nearest unit using the metric and standard systems.

M2.2.2 Identify and use equivalent measurements (e.g., 60 minutes = 1 hour, 7 days = 1 week).

M2.2.3 Use a variety of measuring tools; describe the attribute(s) they measure.

M2.2.4 Estimate and measure the dimensions of geometric figures.

M2.2.5 Tell time using analog and digital clocks identifying AM and PM; find elapsed time.

M2.2.6 Read, write, and use money notation, determining possible combinations of coins and bills to equal given amounts; count back change for any given situation.

Measurable Attributes

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student demonstrates understanding of measurable attributes by	**The student demonstrates understanding of measurable attributes by**	**The student demonstrates understanding of measurable attributes by**	**The student demonstrates understanding of measurable attributes by**
[3] MEA-1 estimating length to the nearest inch or foot (**L**) (M2.1.3)	**[4] MEA-1** estimating length to the nearest half-inch or centimeter (**L**) (M2.2.1)	**[5] MEA-1** estimating length to the nearest one-fourth inch or centimeter (**L**) (M2.2.1)	**[6] MEA-1** estimating length to the nearest eighth-inch or millimeter (**L**) (M2.2.1)
[3] MEA-2 comparing and ordering objects according to measurable attribute (calendar, length, [temperature, weight, area, or volume L]) (M2.1.1)	**[4] MEA-2** estimating temperature (degree Celsius or Fahrenheit) or weight (pounds or kilograms) to the nearest unit (**L**) (M2.2.1)	**[5] MEA-2** estimating temperature (degree Celsius or Fahrenheit, plus or minus 5 degrees) or weight (half-pounds or kilograms) to the nearest unit (**L**) (M2.2.1)	**[6] MEA-2** identifying equivalent measures within systems English • length (inches, feet, yards, miles) • weight (ounces, pounds, [tons L]) • volume (fluid ounces, cups, pints, quarts, gallons) Metric • length (millimeters, centimeters, meters, kilometers) • volume (milliliters, liters) (M2.2.2)
[3] MEA-3 identifying or describing objects that are greater than, less than, or equal to a unit of measure (standard or non-standard) (M2.1.2)	**[4] MEA-3** identifying or using equivalent measures for length (inch, foot, yard: 12 inches = 1 foot, 3 feet = 1 yard, 36 inches = 1 yard; centimeter, meter: 100 centimeters = 1 meter) (M2.2.2)	**[5] MEA-3** identifying or using equivalent measures for weight/mass (16 oz. = 1 pound or 1000 grams = 1 kilogram), length (1000 millimeters = 1 meter), or time (M2.2.2)	
[3] MEA-4 selecting an appropriate unit of English, metric, or non-standard measurement to estimate length, time, weight, or temperature (M2.1.3)	**[4] MEA-4** selecting an appropriate unit of metric measurement to estimate length, weight, or temperature (M2.2.1)		
[3] MEA-5 identifying coins, their value, or the value of a set of coins (M2.1.5)			

Measurement Techniques

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student demonstrates ability to use measurement techniques using pictorial representations [or manipulatives L] in real-world contexts by **[3] MEA-6** measuring length to the nearest half-inch (M2.1.3) **[3] MEA-7** telling time to the nearest ¼ hour using an analog clock or [distinguishing morning, afternoon, or evening L] (M2.1.4) **[3] MEA-8** determining elapsed time using a calendar (M2.2.5) **[3] MEA-9** counting back change from $1.00 (**L**) (M2.2.6)	**The student demonstrates ability to use measurement techniques using pictorial representations [or manipulatives L] in real-world contexts by** **[4] MEA-5** measuring length to the nearest half-inch or [centimeter **L**] (M2.2.1, M2.2.3, & M2.2.4) **[4] MEA-6** telling time in 5-minute increments using analog clocks (M2.2.5) **[4] MEA-7** counting back change from $5.00 (**L**) (M2.2.6) **[4] MEA-8** determining possible combinations of coins and bills equal to given amounts (M2.2.6) **[4] MEA-9** simulating multiple purchases and calculating the amount of change from a given bill(s) up to $50.00 (**L**) (M2.2.6)	**The student demonstrates ability to use measurement techniques by** **[5] MEA-4** measuring temperature or weight using appropriate tools (**L**) (M2.2.1 & M2.2.3) **[5] MEA-5** telling time using analog clocks to the nearest minute and using AM or PM (M2.2.5) **[5] MEA-6** determining possible combinations of coins and bills to given amounts (M2.2.6) **[5] MEA-7** simulating multiple purchases and calculating the amount of change from given bills up to $100.00 (**L**) (M2.2.6) **[5] MEA-8** measuring length to the nearest ¼ inch or centimeter (M2.2.1)	**The student demonstrates ability to use measurement techniques by** **[6] MEA-3** using a scaled ruler to an eighth of an inch or millimeter on a map or drawing (M2.2.1 & M2.2.3) **[6] MEA-4** calculating elapsed time (minutes, hours) (M2.2.5) **[6] MEA-5** solving real-world problems involving elapsed time between U.S. time zones (including Alaska Standard time) (M2.2.5) **[6] MEA-6** converting and using equivalent measurements within the same system (M2.2.2) **[6] MEA-7** measuring length to the nearest ⅛ of an inch or nearest millimeter (M2.2.1)

Content Standard A: Mathematical facts, concepts, principles, and theories

Measurement: Select and use systems, units, and tools of measurement

Measurement Performance Standards that apply to grades 7-8:

M2.3.1 Estimate and measure various dimensions to a specified degree of accuracy.

M2.3.2 Estimate and convert measurements within the same system.

M2.3.3 Use a variety of methods and tools to construct and compare plane figures.

M2.3.4 Describe and apply the relationships between dimensions of geometric figures to solve problems using indirect measurement; describe and apply the concepts of rate and scale.

M2.3.5 Apply information about time zones and elapsed time to solve problems.

Measurement Performance Standards that apply to grades 9-10:

M2.4.1 Evaluate measurements for accuracy, precision, and error with respect to the measuring tools, methods, and the computational process.

M2.4.2 Estimate and convert measurements between different systems.

M2.4.3 Apply various measurement systems to describe situations and solve problems.

M2.4.4 Use indirect methods, including the Pythagorean Theorem and right triangle trigonometry, to find missing dimensions.

Measurable Attributes

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student demonstrates understanding of measurable attributes by **[7] MEA-1** estimating length to the nearest sixteenth of an inch or millimeter, volume to the nearest cubic centimeter or milliliter, or angle to the nearest 30 degrees (L) (M2.3.1) **[7] MEA-2** identifying or using equivalent English (square inches, square feet, square yards) or metric systems (square centimeters, square meters) (M2.3.2)	**The student demonstrates understanding of measurable attributes by** **[8] MEA-1** converting measurements within the same system (English or metric) (M2.3.2)	**The student demonstrates understanding of measurable attributes by** **[9] MEA-1** estimating or converting measurements between the English and metric systems in real-world applications, given a conversion factor (e.g., miles/kilometers) (M2.4.2)	**The student demonstrates understanding of measurable attributes by** **[10] MEA-1** converting square and cubic units within the same system, English or metric, in real-world applications (M2.4.2)

Measurement Techniques

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student demonstrates understanding of measurement techniques by **[7] MEA-3** applying a given scale factor to find missing dimensions of similar figures (M2.3.4) **[7] MEA-4** measuring various dimensions to one-sixteenth of an inch or millimeter (M2.3.1) **[7] MEA-5** accurately measuring a given angle using a protractor to the nearest plus or minus 2 degrees (M2.3.1) **[7] MEA-6** solving real-world problems involving elapsed time between world time zones (M2.3.5)	**The student demonstrates understanding of measurement techniques by** **[8] MEA-2** using scale drawings involving indirect measurement (determining the scale factor and applying it to find missing dimension) (M2.3.4) **[8] MEA-3** [modeling the conversion within the same system L] (M2.3.2)	**The student demonstrates understanding of measurement techniques by** **[9] MEA-2** applying indirect methods, such as the Pythagorean Theorem to find missing dimensions in real-world applications (M2.4.4)	**The student demonstrates understanding of measurement techniques by** **[10] MEA-2** [Applying right triangle trigonometry (sine, cosine, and tangent) to find missing dimensions in real-world applications L] (M2.4.4)

Content Standard A:
Mathematical facts, concepts, principles, and theories

Estimation and Computation:
Perform basic arithmetic functions, make reasoned estimates, and select and use appropriate methods or tools

Estimation and Computation Performance Standards that apply to grade 3:

M3.1.1 Make reasonable estimates of "how many" and "how much"; estimate the results of simple addition and subtraction problems.

M3.1.2 Recall and use basic addition and subtraction facts orally and with paper and pencil without a calculator.

M3.1.3 Add and subtract whole numbers to 100 using a variety of models and algorithms.

M3.1.4 Model multiplication as repeated addition and grouping objects; model division as "sharing equally" and grouping objects.

Estimation and Computation Performance Standards that apply to grades 4-6:

M3.2.1 Describe and use a variety of estimation strategies including rounding to the appropriate place value, multiplying by powers of 10, and using front-end estimation to check the reasonableness of solutions.

M3.2.2 Recall and use basic multiplication and division facts orally and with paper and pencil without a calculator.

M3.2.3 Add and subtract whole numbers, fractions with common denominators to 12, and decimals, including money amounts, using models and algorithms.

M3.2.4 Multiply and divide multi-digit whole numbers by 2-digit numbers, limiting the 2-digit divisors to those that end in 0; multiply and divide decimals that represent money by whole numbers.

M3.2.5 Find equivalent fractions. Convert between fractions and mixed numbers.

M3.2.6 Develop and interpret scales and scale models.

Estimation

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student determines reasonable answers to real-life situations, paper/pencil computations, or calculator results by	**The student determines reasonable answers to real-life situations, paper/pencil computations, or calculator results by**	**The student determines reasonable answers to real-life situations, paper/pencil computations, or calculator results by**	**The student determines reasonable answers to real-life situations, paper/pencil computations, or calculator results by**
[3] E&C-1 finding "how many" or "how much" to 50 (M3.1.1)	**[4] E&C-1** identifying or using [a variety of **L**] strategies (e.g., rounding to appropriate place value, multiplying by powers of ten, using front-end estimation) to estimate the results of whole number addition or subtraction computations to 10,000, or simple multiplication or division (M3.2.1)	**[5] E&C-1** identifying or using [a variety of **L**] strategies (e.g., rounding to appropriate place value, multiplying by powers of ten, using front-end estimation to estimate the results of addition or subtraction computations from tenths to 100,000, including money, or simple multiplication or division (M3.2.1)	**[6] E&C-1** identifying or using [a variety of **L**] strategies (e.g., truncating, rounding to compatible numbers) to estimate the results of addition, subtraction or multiplication from thousandths to millions or simple division (M3.2.1)
[3] E&C-2 estimating the results of simple addition and subtraction problems up to 1,000 (M3.1.1)			

Computation

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student accurately solves problems (including real-world situations) by **[3] E&C-3** recalling basic addition and subtraction facts, sums to 20, and corresponding subtraction facts efficiently (L) (M3.1.2) **[3] E&C-4** adding or subtracting two-digit whole numbers (M3.1.3) **[3] E&C-5** using repeated addition to model multiplication with whole numbers with products to 25 (M3.1.4) **[3] E&C-6** using grouping or "sharing equally" to model division with whole numbers to 25 (M3.1.4)	**The student accurately solves problems (including real-world situations) by** **[4] E&C-2** recalling basic multiplication facts, products to 100, and corresponding division facts efficiently (L) (M3.2.2) **[4] E&C-3** adding or subtracting three-digit whole numbers (M3.2.3) **[4] E&C-4** multiplying two-digit numbers by single-digit numbers (M3.2.4) **[4] E&C-5** adding fractions with like denominators to 12 (M3.2.3)	**The student accurately solves problems (including real-world situations) by** **[5] E&C-2** recalling basic multiplication facts, products to 144, and corresponding division facts efficiently (L) (M3.2.2) **[5] E&C-3** adding or subtracting four-digit whole numbers, fractions with like denominators to 12, or decimals involving money (M3.2.3) **[5] E&C-4** multiplying two-digit whole numbers by two-digit numbers or dividing three-digit whole numbers by single-digit numbers (M3.2.4)	**The student accurately solves problems (including real-world situations) by** **[6] E&C-2** recalling basic addition, subtraction, multiplication, and division facts efficiently (L) (M3.2.2) **[6] E&C-3** adding or subtracting whole numbers, fractions with unlike denominators to 12, or decimals to the hundredths place (M3.2.3) **[6] E&C-4** multiplying whole numbers by two- or three-digit numbers, dividing three-digit numbers by one- or two-digit numbers, or multiplying or dividing decimals that represent money by whole numbers, or multiplying or dividing proper fractions (M3.2.4) **[6] E&C-5** developing or interpreting scale models (scale factors such as 1 in. = 1 ft.) (L) (M3.2.6)

Content Standard A:
Mathematical facts, concepts, principles, and theories

Estimation and Computation:
Perform basic arithmetic functions, make reasoned estimates, and select and use appropriate methods or tools

Estimation and Computation Performance Standards that apply to grades 7-8:

M3.3.1 Apply, explain, and assess the appropriateness of a variety of estimation strategies including truncating and rounding to compatible numbers.

M3.3.2 Apply basic operations efficiently and accurately, using estimation to check the reasonableness of results.

M3.3.3 Add and subtract fractions, decimals, and percents.

M3.3.4 Multiply and divide rational numbers in various forms including fractions, decimals, and percents.

M3.3.5 Convert between equivalent fractions, decimals, percents, and proportions. Convert from exact to decimal representations of irrational numbers.

M3.3.6 Solve problems using ratios and proportions.

Estimation and Computation Performance Standards that apply to grades 9-10:

M3.4.1 Use estimation to solve problems and to check the accuracy of solutions; state whether the estimation is greater or less than the exact answer.

M3.4.2 Add and subtract real numbers using scientific notation, powers, and roots.

M3.4.3 Multiply and divide real numbers in various forms including scientific notation, powers, and roots.

M3.4.4 Select, convert, and apply an equivalent representation of a number for a specified situation.

M3.4.5 Use ratios and proportions to model and solve fraction and percent problems with variables.

Estimation

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student solves problems (including real-world situations) using estimation by	**The student solves problems (including real-world situations) using estimation by**	**The student solves problems (including real-world situations) using estimation by**	**The student solves problems (including real-world situations) using estimation by**
[7] E&C-1 identifying or using [a variety of **L**] strategies, including truncating, rounding, front-end estimation, compatible numbers, to check for reasonableness of solutions (M3.3.1)	**[8] E&C-1** applying and assessing the appropriateness of a variety of estimation strategies (**L**) (M3.3.1)	**[9] E&C-1** judging whether the strategy will result in an answer greater or less than the exact answer (M3.4.1)	**[10] E&C-1** explaining why one strategy is more appropriate than another and determining why the estimation result is greater or less than the exact answer (**L**) (M3.4.1)
[7] E&C-2 comparing results of different strategies (**L**) (M3.3.1)			

Computation

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student accurately solves problems (including real-world situations) by [7] **E&C-3** adding or subtracting fractions or mixed numbers with unlike denominators, or decimals to the thousandths place (M3.3.3) [7] **E&C-4** multiplying or dividing decimals to hundredths, or multiplying or dividing by powers of ten, or multiplying or dividing fractions or mixed numbers (M3.3.4) [7] **E&C-5** converting between equivalent fractions, terminating decimals, or percents (10% = 1/10 = 0.1) (M3.3.5) [7] **E&C-6** solving proportions using a given scale (M3.3.6)	**The student accurately solves problems (including real-world situations) by** [8] **E&C-2** adding, subtracting, multiplying or dividing integers or positive rational numbers (M3.3.3 & M3.3.4) [8] **E&C-3** using percents and percentages (e.g., tax, discount) (M3.3.3 & M3.3.4) [8] **E&C-4** converting between equivalent fractions, decimals, or percents (M3.3.5) [8] **E&C-5** using ratio and proportion (M3.3.6)	**The student accurately solves problems (including real-world situations) by** [9] **E&C-2** adding or subtracting rational numbers including integers with whole number exponents (M3.4.2) [9] **E&C-3** multiplying or dividing rational numbers including integers with whole number exponents (M3.4.3) [9] **E&C-4** determining rate by using ratio and proportion (M3.4.5) [9] **E&C-5** multiplying or dividing numbers in scientific notation (**L**) (M3.4.3)	**The student accurately solves problems (including real-world situations) by** [10] **E&C-2** applying basic operations with real numbers using powers [and scientific notation **L**] (M3.4.2 & M3.4.3) [10] **E&C-3** solving problems involving percent increase or decrease (M3.4.5)

Content Standard A:

Mathematical facts, concepts, principles, and theories

Functions and Relationships:

Represent, analyze, and use patterns, relations, and functions

Functions and Relationships Performance Standards that apply to grade 3:

M4.1.1 Recognize, describe, create, and extend repeating and increasing patterns with a variety of materials including symbols, objects, and manipulatives.

M4.1.2 Generate and solve simple functions by identifying and applying addition and subtraction patterns.

M4.1.3 Use a calculator to find and extend patterns in the number system.

M4.1.4 Complete open space sentences with missing numbers; use appropriate vocabulary including greater than, less than, and equal to; and use the correct symbols.

Functions and Relationships Performance Standards that apply to grades 4-6:

M4.2.1 Use patterns and their extensions to make predictions and solve problems; describe patterns found in the number system including those formed by multiples, factors, perfect squares, and powers of 10.

M4.2.2 Generate and solve simple functions by identifying and applying multiplication and division patterns.

M4.2.3 Use a calculator to find a missing item in a number sequence.

M4.2.4 Use words, lists, and tables to represent and analyze patterns.

M4.2.5 Explain the purpose of variables and use them in open sentences to express relationships and describe simple functions.

Describing Patterns and Functions

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student demonstrates conceptual understanding of functions by	**The student demonstrates conceptual understanding of functions, patterns, or sequences by**	**The student demonstrates conceptual understanding of functions, patterns, or sequences by**	**The student demonstrates conceptual understanding of functions, patterns, or sequences by**
[3] F&R-1 identifying a missing element in a pattern up to the next three terms (identifying a number using addition or subtraction or objects); or explaining how missing elements could be found (M4.1.1)	**[4] F&R-1** extending patterns that use addition, subtraction, multiplication, or symbols, up to 10 terms, represented by models (function machines), tables, sequences, or in problem situations (M4.2.1)	**[5] F&R-1** extending patterns that use addition, subtraction, multiplication, division or symbols, up to 10 terms, represented by models (function machines), tables, sequences, or in problem situations (M4.2.1)	**[6] F&R-1** extending patterns (found in the number system, formed by multiples, factors, perfect squares up to 100, powers of ten), up to 10 terms, represented in tables, sequences, or in problem situations (M4.2.1)
[3] F&R-2 expressing a generalization of a pattern using words (**L**) (M4.1.1 & M4.1.2)	**[4] F&R-2** using rules to express the generalization of a pattern using words, lists, or tables (**L**) (M4.2.4)	**[5] F&R-2** using rules to express the generalization of a pattern using words, lists, or tables (M4.2.4)	**[6] F&R-2** using rules to express the generalization of a pattern using words, lists, or tables, with or without variables (M4.2.4)
[3] F&R-3 using manipulatives, including a calculator, as tools when describing, extending, or representing patterns (**L**) (M4.1.1 & M4.13)	**[4] F&R-3** using manipulatives, including a calculator, as tools when describing, extending, or representing a number sequence (**L**) (M4.2.1 & M4.2.3)	**[5] F&R-3** identifying or applying addition or subtraction patterns to find missing values in a function (M4.1.2)	**[6] F&R-3** identifying or applying multiplication or division patterns to find missing values in a function (M4.2.2)
		[5] F&R-4 using manipulatives, including a calculator, as tools when describing, extending, or representing a number sequence (**L**) (M4.2.1 & M4.2.3)	**[6] F&R-4** using manipulatives, including a calculator, as tools when describing, extending, or representing a number sequence (**L**) (M4.2.1 & M 4.2.3)

Modeling and Solving Equations and Inequalities

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student demonstrates algebraic thinking by	**The student demonstrates algebraic thinking by**	**The student demonstrate algebraic thinking by**	**The student demonstrates algebraic thinking by**
[3] F&R-4 using an open number sentence (addition or subtraction) to solve for an unknown represented by a box or circle (e.g., 5+□=16, □−7=4, 5+2=□) (M4.1.4)	**[4] F&R-4** using an open number sentence (addition, subtraction, or multiplication) to solve for an unknown represented by a box or circle (e.g., 9 • □= 36, □• 8=56, 3 • 6=□) (M4.2.5)	**[5] F&R-5** using an open number sentence (addition, subtraction, multiplication, or division) to solve for an unknown represented by a box or circle (e.g., 256 ÷□=8, □ ÷8=56, 36÷3=□) (M4.2.5)	**[6] F&R-5** solving for an unknown represented by a letter, (addition, subtraction, multiplication, or division) (e.g., 3 • n = 15, n – 5 = 12) (M4.2.5)
[3] F&R-5 using appropriate vocabulary or symbols for greater than, less than, or equal to (M4.1.4)			

Content Standard A:

Mathematical facts, concepts, principles, and theories

Functions and Relationships:

Represent, analyze, and use patterns, relations, and functions

Functions and Relationships Performance Standards that apply to grades 7-8:

M4.3.1 Identify numeric and geometric patterns to find the next term and predict the nth term.

M4.3.2 Identify and describe how a change in one variable in a function affects the remaining variables (e.g., how changing the length affects the area and volume of a rectangular prism).

M4.3.3 Use a calculator to find a missing item in an arithmetic and a geometric sequence; predict the graph of each function.

M4.3.4 Translate among and use tables of ordered pairs, graphs on coordinate planes, and linear equations as tools to represent and analyze patterns.

M4.3.5 Find the value of a variable by evaluating formulas and algebraic expressions for given values.

Functions and Relationships Performance Standards that apply to grades 9-10:

M4.4.1 Identify, graph, and describe the graphs of basic families of functions including linear, absolute value, quadratic, and exponential using a graphing calculator.

M4.4.2 Create and solve linear and quadratic equations and inequalities.

M4.4.3 Create and solve simple systems of equations, algebraically and graphically, using a graphing calculator.

M4.4.4 Use discrete structures, such as networks, matrices, sequences, and iterations, as tools to analyze patterns, expressions, and equations.

M4.4.5 Add, subtract, multiply, divide, and simplify rational expressions; add, subtract, and multiply polynomials.

Describing Patterns and Functions

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student demonstrates conceptual understanding of functions, patterns, or sequences including those represented in real-world situations by	**The student demonstrates conceptual understanding of functions, patterns, or sequences including those represented in real-world situations by**	**The student demonstrates conceptual understanding of functions, patterns, or sequences including those represented in real-world situations by**	**The student demonstrates conceptual understanding of functions, patterns, or sequences including those represented in real-world situations by**
[7] F&R-1 describing or extending patterns (linear) up to ten terms, represented in tables, sequences, or in problem situations (M4.3.1)	**[8] F&R-1** describing or extending patterns (linear) up to the nth term, represented in tables, sequences, graphs, or in problem situations (M4.3.1)	**[9] F&R-1** describing or extending patterns (families of functions: linear quadratic, absolute value) up to the nth term, represented in tables, sequences, graphs, or in problem situations (M4.4.1)	**[10] F&R-1** describing or extending patterns (families of functions: linear, quadratic, absolute value) up to the nth term, represented in tables, sequences, graphs, or in problem situations (M4.4.1)
[7] F&R-2 generalizing relationships (linear) using a table of ordered pairs, a function, or an equation (M4.3.4)	**[8] F&R-2** generalizing relationships (linear) using a table of ordered pairs, a graph, or an equation (M4.3.4)	**[9] F&R-2** generalizing relationships (linear, quadratic, absolute value) using a table of ordered pairs, a graph, or an equation (M4.4.4)	**[10] F&R-2** generalizing equations and inequalities (linear, quadratic, absolute value) using a table of ordered pairs or a graph (M4.4.4)
[7] F&R-3 describing in words how a change in one variable in a formula affects the remaining variables (how changing the length affects the area of a quadrilateral) (M4.3.2)	**[8] F&R-3** describing in words how a change in one variable in a formula affects the remaining variables (how changing the length affects the area of quadrilaterals or volume of a rectangular prism) (M4.3.2)	**[9] F&R-3** describing in words how a change in one variable in a formula affects the remaining variables (e.g., how changing the radius affects the volume of a cylinder) (M4.3.2)	**[10] F&R-3** describing in words how a change in one variable or constant in an equation affects the outcome of the equation (M4.3.2)
[7] F&R-4 using a calculator as a tool when describing, extending, or representing patterns (**L**) (M4.3.3)	**[8] F&R-4** using a calculator as a tool when describing, extending, or representing patterns (**L**) (M4.3.3)	**[9] F&R-4** using a calculator as a tool when describing, extending, representing, or graphing patterns or linear equations (**L**) (M4.4.2)	**[10] F&R-4** using a calculator as a tool when describing, extending, representing, or graphing patterns, linear, equations, or quadratic equations (**L**) (M4.4.2)

Modeling and Solving Equations and Inequalities

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student demonstrates algebraic thinking by **[7] F&R-5** evaluating algebraic expressions (M4.3.5) **[7] F&R-6** solving or identifying solutions to one-step linear equations of the form x ± a=b or ax=b, where a and b are whole numbers; translating a story problem into an equation of similar form; or translating a story problem into an equation of similar form and solving it (M4.3.5)	**The student demonstrates algebraic thinking by** **[8] F&R-5** translating a written phrase to an algebraic expression (M4.3.5) **[8] F&R-6** solving or identifying solutions to <u>two-step</u> linear equations of the form ax ± b =c, where a, b, and c are rational numbers, and $a \neq 0$; translating a story problem into an equation of similar form; or translating a story problem into an equation of similar form and solving it (M4.3.5)	**The student demonstrates algebraic thinking by** **[9] F&R-5** modeling (graphically or algebraically) or solving situations (including real-world applications) using systems of linear equations (M4.4.3) **[9] F&R-6** solving or identifying solutions to <u>multi-step</u> linear equations of the form $ax \pm b = cx \pm d$, where a, b, c, and d are rational numbers and $a \neq 0$, $c \neq 0$ (M4.4.2) **[9] F&R-7** solving literal equations or formulas for a variable involving one step (e.g., solve for t when $d = rt$) (M4.4.2)	**The student demonstrates algebraic thinking by** **[10] F&R-5** modeling (graphically or algebraically) or solving situations using systems of linear equations or <u>inequalities</u> (including real-world applications) (M4.4.3) **[10] F&R-6** selecting and using the quadratic formula to solve problems (M4.4.2) **[10] F&R-7** solving or <u>identifying</u> solutions to literal equations or formulas for a variable involving <u>multi-steps</u> (e.g., solve for h when $A = \frac{1}{2} h(b_1 + b_2)$) (M4.4.2)

Content Standard A:
Mathematical facts, concepts, principles, and theories

Geometry: Construct, transform, and analyze geometric figures

Geometry Performance Standards that apply to grade 3:

M5.1.1 Identify, sort, describe, model, and compare circles, triangles, and rectangles including squares regardless of orientation.

M5.1.2 Identify, sort, describe, model, and compare solid figures including cubes, cylinders, and spheres.

M5.1.3 Identify and create examples of line symmetry; compare and describe given circles, triangles, and rectangles as larger, smaller, or congruent.

M5.1.4 Demonstrate conservation of area using drawings or manipulatives.

M5.1.5 Describe and identify geometric transformations including slides, flips, and turns.

M**5.1.6** Use comparative directional and positional words: above, below, inside, outside, on, in, right and left, horizontal, vertical, and middle.

M5.1.7 Draw and build familiar shapes.

Geometry Performance Standards that apply to grades 4-6:

M5.2.1 Identify and compare various triangles and quadrilaterals according to their sides and/or angles.

M5.2.2 Compare and contrast plane and solid figures (e.g., circle/sphere, square/cube, triangle/pyramid) using relevant attributes, including the number of vertices, edges, and the number and shape of faces.

M5.2.3 Identify and model geometric figures that are congruent, similar, and/or symmetrical.

M5.2.4 Distinguish between area and perimeter; find both using a variety of methods including rulers, grid paper, and tiles.

M5.2.5 Identify and model transformations of geometric figures, describing the motions as slides, flips, or rotations.

M5.2.6 Locate and describe objects in terms of their position with and without compass directions; identify coordinates for a given point or locate points of given coordinates on a grid.

M5.2.7 Sketch and identify line segments, midpoints, intersections, parallel, and perpendicular lines.

Geometric Relationships

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student demonstrates an understanding of geometric relationships by	**The student demonstrates an understanding of geometric relationships by**	**The student demonstrates an understanding of geometric relationships by**	**The student demonstrates an understanding of geometric relationships by**
[3] G-1 using the number or length of sides to identify, describe, [model **L**], or compare triangles or rectangles (including squares) (M5.1.1)	**[4] G-1** using the attributes and properties of angles to identify and compare triangles (acute, right, or obtuse) and regular polygons (M5.2.1)	**[5] G-1** using the attributes and properties of angles and the number, length, and orientation of sides to identify or compare triangles (scalene, isosceles, or equilateral) or quadrilaterals (parallelograms, trapezoids, rhombi) (M5.2.1)	**[6] G-1** using the attributes and properties (sides and angles) of regular polygons to identify, classify, or compare regular or irregular polygons (M5.2.1)
[3] G-2 using the attributes and properties of plane figures to [model **L**], identify, compare, or describe plane figures (circles, rectangles, squares, and triangles)[and solid figures (cubes, cylinders, or spheres) **L**] (M5.1.1 & M5.1.2)	**[4] G-2** using the attributes and properties of solid figures (edges, vertices, or the number or shape of faces) to [model L], identify, compare, or describe solid figures (cubes, cylinders, rectangular prisms, or spheres) (e.g., cans, dice, boxes, balls) (M5.2.2)	**[5] G-2** using the attributes and properties of solid figures (edges, vertices, number of faces) to [model **L**], identify, compare, or describe (cubes, cylinders, cones, spheres, pyramids, or rectangular prisms) (e.g., boxes, buildings, packages) (M5.2.2)	**[6] G-2** identifying, comparing, or describing attributes and properties of circles (radius and diameter) (M5.2.2)
			[6] G-3 using the attributes and properties of prisms (vertices, length and alignment of edges, shape and number of bases, shape of faces) to [model **L**], identify, compare, or describe triangular or rectangular prisms (M5.2.2)
			[6] G-4 identifying a 3-dimensional shape from the 2-dimensional drawing of the shape (M5.2.2)

Similarity, Congruence, Symmetry, and Transformation of Shapes

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student demonstrates conceptual understanding of similarity, congruence, symmetry, or transformations of shapes by [3] **G-3** identifying, creating, or drawing lines of symmetry for real-world objects (e.g., block letters, flags, insects) (M5.1.3) [3] **G-4** comparing or describing shapes (circles, triangles, or rectangles) as "larger than," "smaller than," or "congruent to," a given shape (M5.1.3) [3] **G-5** illustrating or identifying the results of transformations (slides) of polygons (M5.1.5)	**The student demonstrates conceptual understanding of similarity, congruence, symmetry, or transformations of shapes by** [4] **G-3** identifying or drawing all lines of symmetry to identify figures that are symmetrical (M5.2.3) [4] **G-4** identifying shapes that are congruent (M5.2.3) [4] **G-5** illustrating or identifying the results of transformations (turns) of polygons by continuing a given pattern (M5.2.5)	**The student demonstrates conceptual understanding of similarity, congruence, symmetry, or transformations of shapes by** [5] **G-3** illustrating or identifying the results of transformation (slides, turns, or flips of polygons) (e.g., pictures of cultural art, fabric designs, architecture, logos) (M5.2.5) [5] **G-4** identifying, creating, or drawing geometric figures that are congruent, similar, or symmetrical (M5.2.3) [5] **G-5** modeling designs (e.g., tessellations) that contain a series of slides, flips, and/or turns (**L**) (M5.2.5)	**The student demonstrates conceptual understanding of similarity, congruence, symmetry, or transformations of shapes by** [6] **G-5** identifying, creating, or drawing geometric figures that are congruent, similar, or symmetrical (M5.2.3) [6] **G-6** drawing or describing the results of transformations of polygons such as slides, turns, or flips (**L**) (M5.2.5)

Perimeter, Area, Volume, and Surface Area

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student solves problems using perimeter or area by [3] **G-6** estimating or determining area or perimeter of rectangular or square shapes on grids (M5.1.4)	**The student solves problems using perimeter or area by** [4] **G-6** estimating or determining area or perimeter of rectangles, squares, and irregular shapes on grids with a key or ruler (M5.2.4)	**The student solves problems (including real-world situations) using perimeter or area by** [5] **G-6** estimating or determining area or perimeter of rectangles using a key, ruler, or given measures (M5.2.4) [5] **G-7** estimating or determining the area and circumference of a circle using a grid or manipulatives (**L**) (M5.2.4 & M5.3.4)	**The student solves problems (including real-world situations) by using perimeter, area, or volume by** [6] **G-7** estimating or determining area or perimeter of polygons (parallelograms, trapezoids, triangles) using a key, ruler, or given measures (M5.2.4) [6] **G-8** estimating the area and circumference of a circle using a grid or manipulatives and comparing the relationship of the diameter to the circumference (π) (**L**) (M5.2.4 & M5.3.4) [6] **G-9** [estimating or determining the volume of a right rectangular prism using manipulatives and formulas (e.g., cereal box, sand box, planter) **L**] (M5.3.4)

Position and Direction

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student demonstrates understanding of position and direction by	**The student demonstrates understanding of position and direction by**	**The student demonstrates understanding of position and direction by**	**The student demonstrates understanding of position and direction by**
[3] **G-7** using directional terms (inside, outside, right, left, horizontal, vertical) to describe relative location of objects in a picture (**L**) (M5.1.6)	[4] **G-7** describing the relative location of places or objects on a map using compass directions of north, south, east, or west (**L**) (M5.2.6)	[5] **G-8** locating points of given coordinates on a grid or identifying coordinates for a given point (e.g., items on a treasure map) (**L**) (M5.2.6)	[6] **G-10** graphing a vertical or horizontal line segment (given whole number coordinates for its end points) on a coordinate grid and/or identifying its length or midpoint (e.g., using a map to trace a route and calculate distance) (M5.2.6 & M5.2.7)

Construction

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student demonstrates a conceptual understanding of geometric drawings or constructions by	**The student demonstrates a conceptual understanding of geometric drawings or constructions by**	**The student demonstrates a conceptual understanding of geometric drawings or constructions by**	**The student demonstrates a conceptual understanding of geometric drawings or constructions by**
[3] **G-8** drawing real-world objects that consist of geometric shapes (squares, rectangles, triangles, or circles) (**L**) (M5.1.7)	[4] **G-8** identifying or drawing parallel or intersecting line segments (**L**) (M5.2.7)	[5] **G-9** identifying or drawing perpendicular line segments or midpoints (**L**) (M5.2.7)	[6] **G-11** drawing or measuring quadrilaterals with given dimensions or angles (**L**) (M5.3.7)

Content Standard A:
Mathematical facts, concepts, principles, and theories

Geometry: Construct, transform, and analyze geometric figures

Geometry Performance Standards that apply to grades 7-8:

M5.3.1 Identify, classify, compare, and sketch regular and irregular polygons.

M5.3.2 Model, identify, draw, and describe 3-dimensional figures including tetrahedrons, dodecahedrons, triangular prisms, and rectangular prisms.

M5.3.3 Apply the properties of equality and proportionality to solve problems involving congruent or similar shapes.

M5.3.4 Estimate and determine volume and surface areas of solid figures using manipulatives and formulas; estimate and find circumferences and areas of circles.

M5.3.5 Draw and describe the results of transformations including translations (slides), rotations (turns), reflections (flips), and dilations (shrinking or enlarging).

M5.3.6 Use coordinate geometry to represent and interpret relationships defined by equations and formulas including distance and midpoint.

M5.3.7 Draw, measure, and construct geometric figures including perpendicular bisectors, polygons with given dimensions and angles, circles with given dimensions, perpendicular and parallel lines.

Geometry Performance Standards that apply to grades 9-10:

M5.4.1 Identify and use the properties of polygons, including interior and exterior angles, and circles (including angles, arcs, chord, secants, and tangents) to solve problems.

M5.4.2 Create 2-dimensional representations of 3-dimensional objects.

M5.4.3 Identify congruent and similar figures using Euclidean and coordinate geometries; apply this information to solve problems.

M5.4.4 Use transformations to demonstrate geometric properties.

M5.4.5 Use coordinate geometry to graph linear equations, determine slopes of lines, identify parallel and perpendicular lines, and to find possible solutions to sets of equations.

M5.4.6 Construct geometric models, transformations, and scale drawings using a variety of methods including paper folding, compass, straight edge, protractor, and technology.

Geometric Relationships

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student demonstrates an understanding of geometric relationships by **[7] G-1** using the attributes and properties of polygons (diagonals, number of sides and angles) to identify and classify regular or irregular polygons (M5.3.1) **[7] G-2** using the attributes and properties of prisms (vertices, length and alignment of edges, shape and number of bases, shape of faces) to identify and describe triangular or rectangular pyramids (M5.3.2)	**The student demonstrates an understanding of geometric relationships by** **[8] G-1** using the attributes and properties of regular polygons to sketch regular or irregular polygons (**L**) (M5.3.1) **[8] G-2** using the attributes and properties of solid figures (vertices, length and alignment of edges, shape and number of bases) to identify and describe cylinders and cones (M5.3.2) **[8] G-3** using 2-dimensional nets to create 3-dimensional objects (prisms and cylinders) (M5.3.2)	**The student demonstrates an understanding of geometric relationships by** **[9] G-1** identifying, analyzing, comparing, or using properties of angles (including supplementary or complementary) or circles (degrees in a circle) (M5.4.1)	**The student demonstrates an understanding of geometric relationships by** **[10] G-1** identifying, analyzing, comparing, or using properties of plane figures: • supplementary, complementary or vertical angles • angles created by parallel lines with a transversal • sum of interior or exterior angles of a polygon • central angles, chords, inscribed angles or arcs of a circle (M5.4.1) **[10] G-2** using isometric drawings to create 2-dimensional drawings of 3-dimensional objects (shapes that are composites of rectangular right prisms) (**L**) (M5.4.2)

Similarity, Congruence, Symmetry, and Transformation of Shapes

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student demonstrates conceptual understanding of similarity, congruence, symmetry, or transformations of shapes by	**The student demonstrates conceptual understanding of similarity, congruence, symmetry, or transformations of shapes by**	**The student demonstrates conceptual understanding of similarity, congruence, symmetry, or transformations of shapes by**	**The student demonstrates conceptual understanding of similarity, congruence, symmetry, or transformations of shapes by**
[7] G-3 using a scale factor to solve problems involving similar shapes (e.g., scale drawings, maps) (M5.3.3)	**[8] G-4** using proportionality to solve real-world problems involving similar shapes (e.g., two real-world objects casting shadows) (M5.3.3)	**[9] G-2** using a coordinate plane to solve problems involving congruent or similar shapes (M5.4.3)	**[10] G-3** identifying congruent and similar figures using Euclidean geometry (e.g., [constructions **L**], coordinate geometry) (M5.4.3)
[7] G-4 drawing or describing the results of applying transformations such as translations, rotations, reflections, or dilations to figures (**L**) (M5.3.5)	**[8] G-5** identifying the results of applying transformations (translations, rotations, reflections, dilations) to figures on a coordinate plane (M5.3.5)	**[9] G-3** drawing or describing the results of applying transformations (translations, rotations, reflections, or dilations) to figures on a coordinate plane (**L**) (M5.4.4)	**[10] G-4** using transformations to show congruence or similarity of figures on a coordinate plane (M5.4.4)

Perimeter, Area, Volume, and Surface Area

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student solves problems (including real-world situations) by	**The student solves problems (including real-world situations) by**	**The student solves problems (including real-world situations) by**	**The student solves problems (including real-world situations) by**
[7] G-5 determining the volume of cubes and rectangular prisms (M5.3.4)	**[8] G-6** determining the volume of right triangular prisms or cylinders (M5.3.4)	**[9] G-4** determining the volume or surface area of prisms, cylinders, cones or pyramids (M5.3.4)	**[10] G-5** determining the volume or surface area of spheres or compound solids (M5.3.4)
[7] G-6 determining the surface area of rectangular prisms (M5.3.4)	**[8] G-7** determining the surface area of cylinders or triangular prisms (M5.3.4)		
[7] G-7 determining the circumference of a circle (M5.3.4)	**[8] G-8** determining the circumference and area of a circle (M5.3.4)		

Position and Direction

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student demonstrates understanding of position and direction by [7] **G-8** graphing or identifying values of variables on a coordinate grid (M5.3.6)	**The student demonstrates understanding of position and direction by** [8] **G-9** graphing or identifying relationships of variables on a coordinate plane (e.g., length/width, area/diameter, cost/pound) (M5.3.6)	**The student demonstrates understanding of position and direction when solving problems (including real-world situations) by** [9] **G-5** graphing or identifying (using equations or formulas to determine the slope of line segments) on a coordinate plane (M5.4.5)	**The student demonstrates understanding of position and direction when solving problems (including real-world situations) by** [10] **G-6** graphing a line segment on a coordinate grid and/or identifying its length or midpoint by using formulas (M5.4.5) [10] **G-7** graphing a system of equations on a coordinate grid, identifying a solution, or determining their relationship (intersecting, parallel, perpendicular) (M5.4.5)

Construction

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student demonstrates a conceptual understanding of geometric drawings or constructions by [7] **G-9** drawing or measuring polygons with given dimensions and angles or circles with given dimensions (**L**) (M5.3.7)	**The student demonstrates a conceptual understanding of geometric drawings or constructions by** [8] **G-10** drawing, measuring, or constructing geometric figures (polygons, perpendicular bisectors, or perpendicular or parallel lines) (**L**) (M5.3.7)	**The student demonstrates a conceptual understanding of geometric drawings or constructions by** [9] **G-6** drawing, measuring, or constructing geometric models of plane figures (containing parallel and/or perpendicular lines) (**L**) (M5.4.6)	**The student demonstrates a conceptual understanding of geometric drawings or constructions by** [10] **G-8** drawing, measuring, or constructing geometric models of plane figures (containing parallel and/or perpendicular lines, angles, perpendicular bisectors, congruent angles, regular polygons) (**L**) (M5.4.6)

Content Standard A:

Mathematical facts, concepts, principles, and theories

Statistics and Probability:

Formulate questions, gather and interpret data, and make predictions

Statistics and Probability Performance Standards that apply to grade 3:

M6.1.1 Collect, record, organize, display, and explain the classification of data.

M6.1.2 Describe data from a variety of visual displays including tallies, tables, pictographs, bar graphs, and Venn diagrams.

M6.1.3 Use the terms "maximum" and "minimum" when working with a data set.

M6.1.4 Find and record the possibilities of simple probability experiments; explain differences between chance and certainty, giving examples.

M6.1.5 Conduct a survey and tally the results.

Statistics and Probability Performance Standards that apply to grades 4-6:

M6.2.1 Collect, organize, and display data creating a variety of visual displays including tables, charts, and line graphs.

M6.2.2 Present the data using a variety of appropriate representations and explain the meaning of the data.

M6.2.3 Describe and interpret a data set using mean, median, mode, and range.

M6.2.4 Estimate whether a game is mathematically fair or unfair; analyze and present probability data using simple fractions.

M6.2.5 Conduct simple probability experiments using concrete materials and represent the results using fractions and probability.

Data Display

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student demonstrates an ability to classify and organize data by	**The student demonstrates an ability to classify and organize data by**	**The student demonstrates an ability to classify and organize data by**	**The student demonstrates an ability to classify and organize data by**
[3] S&P-1 [designing an investigation and collecting, recording **L**], organizing, displaying, or explaining the classification of data in real-world problems (e.g., literature, self, or family), using bar graphs, and [Venn diagrams **L**] (M6.1.1, M6.1.2, & M6.1.5)	**[4] S&P-1** [designing an investigation and collecting **L**], organizing or displaying, using appropriate scale, data in real-world problems (e.g., social studies, friends, or school), using bar graphs, tables, charts, or diagrams with whole numbers up to 25 (M6.2.1 & M6.2.2)	**[5] S&P-1** [designing an investigation and collecting **L**], organizing, or displaying, using appropriate scale, data in real-world problems (e.g., social studies, friends, or school), using bar graphs, tables, charts, diagrams, or line graphs with whole numbers up to 50 (M6.2.1 & M6.2.2)	**[6] S&P-1** [designing an investigation and collecting **L**], organizing, or displaying, using appropriate scale for data displays (tables, bar graphs, line graphs, or circle graphs), data in real-world problems (e.g., social studies, friends, or school), with whole numbers up to 100 (M6.2.1 & M6.2.2)

Analysis and Central Tendency

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student demonstrates an ability to analyze data (comparing, explaining, interpreting, or justifying conclusions) by	**The student demonstrates an ability to analyze data (comparing, explaining, interpreting, evaluating; drawing or justifying conclusions) by**	**The student demonstrates an ability to analyze data (comparing, explaining, interpreting, evaluating; drawing or justifying conclusions) by**	**The student demonstrates an ability to analyze data (comparing, explaining, interpreting, evaluating; drawing or justifying conclusions) by**
[3] S&P-2 using information from a variety of displays (tallies, tables, pictographs, bar graphs, or [Venn diagrams **L**] (M6.1.2)	**[4] S&P-2** using information from a variety of displays (tables, bar graphs, or Venn diagrams) (M6.2.2)	**[5] S&P-2** using information from a variety of displays (tables, bar graphs, line graphs, or Venn diagrams) (M6.2.2)	**[6] S&P-2** using information from a variety of displays (tables, bar graphs, line graphs, circle graphs, or Venn diagrams) (M6.2.2)
[3] S&P-3 using the terms "maximum" or "minimum" (M6.1.3)	**[4] S&P-3** using mode or range with up to 5 pieces of data with a value of 10 or less each (M6.2.3)	**[5] S&P-3** using mode, median, or range with up to 10 pieces of data with a value of 10 or less each (M6.2.3)	**[6] S&P-3** using mean, median, mode, or range (M6.2.3)

Probability

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student demonstrates a conceptual understanding of probability by **[3] S&P-4** explaining the differences between chance and certainty or recognizing events that may be certain or chance events (**L**) (M6.1.4) **[3] S&P-5** [finding and recording **L**] and making predictions about the likelihood of outcomes of a simple probability experiment (e.g., spinner, tossing a coin) (M6.1.4)	**The student demonstrates a conceptual understanding of probability and counting techniques by** **[4] S&P-4** predicting or explaining the probability of all possible outcomes in a simple experiment (e.g., spinners, dice, coins) (M6.2.4) **[4] S&P-5** determining possible combinations in a given situation involving up to 3 items (e.g., how many ways can you choose two fruits out of a basket containing oranges and bananas?) (M6.2.5)	**The student demonstrates a conceptual understanding of probability and counting techniques by** **[5] S&P-4** predicting or explaining the probability of all possible outcomes in an experiment using ratios or fractions to describe the probability (M6.2.4) **[5] S&P-5** solving or identifying solutions to problems involving money combinations (e.g., how many ways can you make 25 cents using nickels, dimes, or quarters?) (M6.2.5)	**The student demonstrates a conceptual understanding of probability and counting techniques by** **[6] S&P-4** analyzing whether a game is mathematically fair or unfair by explaining the probability of all possible outcomes (**L**) (M6.2.4) **[6] S&P-5** solving or identifying solutions to problems involving possible combinations (e.g., if ice cream sundaes come in 3 flavors with 2 possible toppings, how many different sundaes can be made using only one flavor of ice cream with one topping?) (M6.2.5)

Content Standard A:

Mathematical facts, concepts, principles, and theories

Statistics and Probability:

Formulate questions, gather and interpret data, and make predictions

Statistics and Probability Performance Standards that apply to grades 7-8:

M6.3.1 Collect, analyze, and display data in a variety of visual displays including frequency distributions, circle graphs, box and whisker plots, stem and leaf plots, histograms, and scatter plots with and without technology.

M6.3.2 Interpret and analyze information found in newspapers, magazines, and graphical displays.

M6.3.3 Determine and justify a choice of mean, median, or mode as the best representation of data for a practical situation.

M6.3.4 Make projections based on available data and evaluate whether or not inferences can be made given the parameters of the data.

M6.3.5 Use tree diagrams and sample spaces to make predictions about independent events.

M6.3.6 Design and conduct a simulation to study a problem and communicate the results.

Statistics and Probability Performance Standards that apply to grades 9-10:

M6.4.1 Analyze and draw inferences from a wide variety of data sources that summarize data; construct graphical displays with and without technology.

M6.4.2 Determine the line of best fit and use it to predict unknown data values.

M6.4.3 Describe data, selecting measures of central tendencies and distribution, to convey information in the data.

M6.4.4 Analyze the validity of statistical conclusions and the use, misuse, and abuse of data caused by a wide variety of factors including choices of scale, inappropriate choices of measures of center, incorrect curve fitting, and inappropriate uses of controls or sample groups.

M6.4.5 Analyze data from multiple events and predict theoretical probability; find and compare experimental and theoretical probability for a simple situation, discussing possible differences between two results.

M6.4.6 Design, conduct, analyze, and communicate the results of multi-stage probability experiments.

Data Display

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student demonstrates an ability to classify and organize data by	**The student demonstrates an ability to classify and organize data by**	**The student demonstrates an ability to classify and organize data by**	**The student demonstrates an ability to classify and organize data by**
[7] S&P-1 [collecting, **L**] displaying, organizing, or explaining the classification of data in real-world problems (e.g., science or humanities, peers or community), using circle graphs, frequency distributions, stem and leaf, [or scatter plots **L**] with appropriate scale (M6.3.1)	**[8] S&P-1** [designing, collecting **L**], organizing, displaying, or explaining the classification of data in real-world problems (e.g., science or humanities, peers or community), using histograms, scatter plots, or box and whisker plots with appropriate scale [or with technology **L**] (M6.3.1)	**[9] S&P-1** [designing, collecting **L**], organizing, displaying, or explaining the classification of data in real-world problems (e.g., science or humanities, peers, community, or careers) using information from tables or graphs that display two sets of data [or with technology **L**] (M6.4.1)	**[10] S&P-1** [designing, collecting **L**], organizing, displaying, or explaining the classification of data in real-world problems (e.g., science or humanities, peers, community, or careers), using information from tables or graphs that display two or more sets of data [or with technology **L**] (M6.4.1)

Analysis and Central Tendency

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student demonstrates an ability to analyze data (comparing, explaining, interpreting, evaluating, making predictions; drawing or justifying conclusions) by [7] **S&P-2** using information from a variety of displays (e.g., as found in graphical displays in newspapers and magazines) (M6.3.2) [7] **S&P-3** determining mean, median, mode, or range (M6.3.3)	**The student demonstrates an ability to analyze data (comparing, explaining, interpreting, evaluating, making predictions, describing trends; drawing, formulating, or justifying conclusions) by** [8] **S&P-2** using information from a variety of displays or analyzing the validity of statistical conclusions found in the media (M6.3.2) [8] **S&P-3** determining or justifying a choice of range, mean, median, or mode as the best representation of data for a practical situation (M6.3.3)	**The student demonstrates an ability to analyze data (comparing, explaining, interpreting, evaluating, making predictions, describing trends; drawing, formulating, or justifying conclusions) by** [9] **S&P-2** using information from a variety of displays or analyzing the validity of statistical conclusions found in the media (M6.4.1) [9] **S&P-3** using range and measures of central tendency to determine the best representation of the data for a practical situation (M6.4.3) [9] **S&P-4** identifying and/or showing the meaning of a best fit line (M6.4.2)	**The student demonstrates an ability to analyze data (comparing, explaining, interpreting, evaluating, making predictions, describing trends; drawing, formulating, or justifying conclusions) by** [10] **S&P-2** using information from a display to solve a problem or analyzing the validity of statistical conclusions (M6.4.1 & M6.4.4) [10] **S&P-3** using and justifying range and measures of central tendency to determine the best representation of the data for a practical situation (M6.4.3) [10] **S&P-4** using a best fit line to describe trends and make predictions about data (M6.4.2)

Probability

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student demonstrates a conceptual understanding of probability and counting techniques by [7] **S&P-4** determining the [experimental and] (**L**) theoretical probability of a simple event (M6.3.5) [7] **S&P-5** using a systematic approach to finding sample spaces or to making predictions about the probability of independent events (M6.3.5) [7] **S&P-6** designing and conducting a simulation to study a problem and communicate the results (**L**) (M6.3.6)	**The student demonstrates a conceptual understanding of probability and counting techniques by** [8] **S&P-4** determining or comparing the experimental and/or theoretical probability of simple events (M6.3.5) [8] **S&P-5** using a systematic approach to finding sample spaces or to making predictions about the probability of independent events and using the information to solve real-world problems (M6.3.5) [8] **S&P-6** designing and conducting a simulation to study a problem and communicate the results (**L**) (M6.3.6)	**The student demonstrates a conceptual understanding of probability and counting techniques by** [9] **S&P-5** determining or comparing the experimental and/or theoretical probability of independent or dependent events (M6.4.5) [9] **S&P-6** making predictions about the probability of independent or dependent events and using the information to solve problems (M6.4.5) [9] **S&P-7** designing, conducting, analyzing, and communicating the results of a probability experiment (**L**) (M6.4.6)	**The student demonstrates a conceptual understanding of probability and counting techniques by** [10] **S&P-5** explaining in words or identifying the difference between experimental and theoretical probability of independent or dependent events (M6.4.5) [10] **S&P-6** analyzing data to make predictions about the probability of independent or dependent events as a basis for solving real-world problems (M6.4.5) [10] **S&P-7** designing, conducting, analyzing, and communicating the results of a multi-stage probability experiment (**L**) (M6.4.6)

Content Standards B, C, D, and E: Process skills and abilities

Applying conceptual knowledge and skills as designated in all strands of Content Standard A by problem solving, communicating, reasoning, and making connections

Problem Solving: Understand and be able to select and use a variety of problem-solving strategies

Problem-Solving Performance Standards that apply to grade 3:

M7.1.1 Formulate problems from practical and mathematical activities.

M7.1.2 Develop and apply strategies including guess and check, modeling and acting out, drawings, and extending patterns to solve a variety of problems.

M7.1.3 Predict an answer before solving a problem and compare results to check for reasonableness.

Problem-Solving Performance Standards that apply to grades 4-6:

M7.2.1 Read and summarize a problem, using mathematical terms and symbols.

M7.2.2 Select and apply a variety of strategies including making a table, chart or list, drawing pictures, making a model, and comparing with previous experience to solve problems.

M7.2.3 Explain and verify results of the original problem and apply what was learned to new situations.

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student demonstrates an ability to problem solve by	**The student demonstrates an ability to problem solve by**	**The student demonstrates an ability to problem solve by**	**The student demonstrates an ability to problem solve by**
[3] PS-1 selecting and applying an appropriate strategy (e.g., guess and check, draw a picture, make a model, extend a pattern) to solve a variety of problems (M7.1.2)	**[4] PS-1** selecting and applying appropriate strategy (e.g., lists, guess and check, extended patterns) to solve a variety of problems (M7.2.2) **[4] PS-2** explaining and verifying results of an original problem and applying what was learned to new situations (M7.2.3)	**[5] PS-1** selecting and applying an appropriate strategy (e.g., tables, charts, lists, or graphs; guess and check; extended patterns; making a model) to solve a variety of problems and verify the results (M7.2.2) **[5] PS-2** explaining and verifying results of an original problem and applying what was learned to new situations (M7.2.3)	**[6] PS-1** selecting, modifying, and applying appropriate problem-solving strategies (e.g., graphing, Venn diagrams, tables, lists, working backwards, guess and check, or extending a pattern) and verifying results (M7.2.2, M7.3.2) **[6] PS-2** evaluating and interpreting solutions to problems (M7.3.3)

Communication: Form and use appropriate methods to define and explain mathematical relationships

Communication Performance Standards that apply to grade 3:

M8.1.1 Translate problems from everyday language into math language and symbols.

M8.1.2 Use manipulatives, models, pictures, and language to represent and communicate mathematical ideas.

M8.1.3 Use everyday language to explain thinking about problem-solving strategies and solutions to problems.

Communication Performance Standards that apply to grades 4-6:

M8.2.1 Use the mathematical vocabulary appropriate to the problem.

M8.2.2 Represent mathematical and practical situations using concrete, pictorial, and symbolic representation.

M8.2.3 Organize and communicate mathematical problem-solving strategies and solutions to problems.

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student communicates his or her mathematical thinking by	**The student communicates his or her mathematical thinking by**	**The student communicates his or her mathematical thinking by**	**The student communicates his or her mathematical thinking by**
[3] PS-2 representing mathematical problems using manipulatives, models, pictures, and/or everyday language; or using everyday language to explain thinking about the problem-solving strategies and solutions to problems (M8.1.1, M8.1.2, & M8.1.3)	**[4] PS-3** representing problems using mathematical language including concrete, pictorial, and/or symbolic representation; or by organizing and communicating mathematical problem-solving strategies and solutions to problems (M8.2.1, M8.2.2, & M8.2.3)	**[5] PS-3** representing problems using mathematical language including concrete, pictorial, and/or symbolic representation; or organizing and communicating mathematical problem-solving strategies and solutions using mathematical language (M8.2.1, M8.2.2, & M8.2.3)	**[6] PS-3** representing problems using mathematical language including concrete, pictorial, and/or symbolic representation; or using appropriate vocabulary, symbols, and technology to explain mathematical solutions (M8.2.1, M8.2.2, & M8.2.3)

Reasoning: Use logic and reason to solve mathematical problems

Reasoning Performance Standards that apply to grade 3:

M9.1.1 Draw conclusions about mathematical problems.

M9.1.2 Find examples that support or refute mathematical statements.

M9.1.3 Explain why a prediction, estimation, or solution is reasonable.

Reasoning Performance Standards that apply to grades 4-6:

M9.2.1 Draw logical conclusions about mathematical situations.

M9.2.2 Given a rule or generalization, determine whether the example fits.

M9.2.3 Justify answers and mathematical strategies as reasonable.

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student demonstrates an ability to use logic and reason by	**The student demonstrates an ability to use logic and reason by**	**The student demonstrates an ability to use logic and reason by**	**The student demonstrates an ability to use logic and reason by**
[3] PS-3 drawing conclusions about mathematical problems; or finding examples that support or refute mathematical statements (M9.1.1 & M9.1.2) **[3] PS-4** explaining whether or not a prediction, estimation, or solution is reasonable (M9.1.3)	**[4] PS-4** drawing conclusions about mathematical problems (given a rule or generalization, determining whether the example fits) or justifying answers and mathematical strategies (M9.2.1, M9.2.2, & M9.2.3)	**[5] PS-4** drawing logical conclusions about mathematical situations (given a rule or generalization, determining whether the example fits); or justifying answers and mathematical strategies as reasonable (M9.2.1, M9.2.2, & M9.2.3)	**[6] PS-4** using informal deductive reasoning in concrete contexts; or justifying answers and mathematical strategies using examples (M9.3.1 & M9.3.3)

Connections: Apply mathematical concepts and processes to situations within and outside of school

Connections Performance Standards that apply to grade 3:

M10.1.1 Apply mathematical skills and processes to literature.

M10.1.2 Apply mathematical skills and processes to situations with self and family.

Connections Performance Standards that apply to grades 4-6:

M10.2.1 Apply mathematical processes to social studies.

M10.2.2 Apply mathematical skills and processes to situations with friends and school.

GRADE 3	GRADE 4	GRADE 5	GRADE 6
The student demonstrates the ability to apply mathematical skills and processes across the content strands by	**The student demonstrates the ability to apply mathematical skills and processes across the content strands by**	**The student demonstrates the ability to apply mathematical skills and processes across the content strands by**	**The student demonstrates the ability to apply mathematical skills and processes across the content strands by**
[3] **PS-5** using real-world contexts such as literature, self, and family (M10.1.1. & M10.1.2)	[4] **PS-5** using real-world contexts such as social studies, friends, and school (M10.2.1 & M10.2.2)	[5] **PS-5** using real-world contexts such as social studies, friends, and school (M10.2.1 & M10.2.2)	[6] **PS-5** using real-world contexts such as social studies, friends, school and community (M10.2.1, M10.2.2, & M10.3.2)

Content Standards B, C, D, and E: Process skills and abilities

Applying conceptual knowledge and skills as designated in all strands of Content Standard A by problem solving, communicating, reasoning, and making connections

Problem Solving: Understand and be able to select and use a variety of problem-solving strategies

Problem-Solving Performance Standards that apply to grades 7-8:

M7.3.1 Analyze and summarize a problem using the relationships between the known facts and unknown information.

M7.3.2 Select, modify, and apply a variety of problem-solving strategies including graphing, inductive and deductive reasoning, Venn diagrams, and spreadsheets.

M7.3.3 Evaluate, interpret, and justify solutions to problems.

Problem-Solving Performance Standards that apply to grades 9-10:

M7.4.1 Recognize and formulate mathematical problems from within and outside the field of mathematics.

M7.4.2 Apply multi-step, integrated, mathematical problem-solving strategies, persisting until a solution is found or it is clear no solution exits.

M7.4.3 Verify the answer by using an alternative strategy.

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student demonstrates an ability to problem solve by	**The student demonstrates an ability to problem solve by**	**The student demonstrates an ability to problem solve by**	**The student demonstrates an ability to problem solve by**
[7] PS-1 selecting, modifying, and applying a variety of problem-solving strategies (e.g., working backwards, drawing a picture, Venn diagrams) and verifying the results (M7.3.2)	**[8] PS-1** selecting, modifying, and applying a variety of problem-solving strategies (e.g., inductive and deductive reasoning, Venn diagrams, making a simpler problem) and verifying the results (M7.3.2)	**[9] PS-1** selecting, modifying, and applying a variety of problem-solving strategies (e.g., charts, graphing, inductive and deductive reasoning, Venn diagrams) and verifying the results (M7.4.2)	**[10] PS-1** applying multi-step, integrated, mathematical problem-solving strategies (M7.4.2)
[7] PS-2 evaluating, interpreting, and justifying solutions to problems (M7.3.3)	**[8] PS-2** evaluating, interpreting, and justifying solutions to problems (M7.3.3)	**[9] PS-2** evaluating, interpreting, and justifying solutions to problems by using an alternative strategy (M7.4.3)	**[10] PS-2** verifying the answer by using an alternative strategy (M7.4.3)

Communication: Form and use appropriate methods to define and explain mathematical relationships

Communication Performance Standards that apply to grades 7-8:

M8.3.1 Use math vocabulary, symbols, and notation to represent information in the problem.

M8.3.2 Represent a problem numerically, graphically, and symbolically; translate among these alternative representations.

M8.3.3 Use appropriate vocabulary, symbols, and technology to explain, justify, and defend mathematical solutions.

Communication Performance Standards that apply to grades 9-10:

M8.4.1 Use appropriate technology to represent the information and ideas in a problem.

M8.4.2 Use numerical, graphic, and symbolic representations to support oral and written communication about math ideas.

M8.4.3 Explain, justify, and defend mathematical ideas, solutions, and methods to various audiences.

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student communicates his or her mathematical thinking by	**The student communicates his or her mathematical thinking by**	**The student communicates his or her mathematical thinking by**	**The student communicates his or her mathematical thinking by**
[7] **PS-3** representing mathematical problems numerically, graphically, and/or symbolically; or using appropriate vocabulary, symbols, or technology to explain, justify, and defend strategies and solutions (M8.3.1, M8.3.2, & M8.3.3)	[8] **PS-3** representing mathematical problems numerically, graphically, and/or symbolically, translating among these alternative representations; or using appropriate vocabulary, symbols, or technology to explain, justify, and defend strategies and solutions (M8.3.1, M8.3.2, & M8.3.3)	[9] **PS-3** representing mathematical problems numerically, graphically, and/or symbolically, translating among these alternative representations; or using appropriate vocabulary, symbols, or technology to explain, justify, and defend strategies and solutions (M8.4.1, M8.4.2, & M8.4.3)	[10] **PS-3** representing mathematical problems numerically, graphically, and/or symbolically, communicating math ideas in writing; or using appropriate vocabulary, symbols, or technology to explain, justify, and defend strategies and solutions (M8.4.1, M8.4.2, & M8.4.3)

Reasoning: Use logic and reason to solve mathematical problems

Reasoning Performance Standards that apply to grades 7-8:

M9.3.1 Use informal deductive and inductive reasoning in both concrete and abstract contexts.

M9.3.2 State counterexamples to disprove statements.

M9.3.3 Justify and defend the validity of mathematical strategies and solutions using examples and counterexamples.

Reasoning Performance Standards that apply to grades 9-10:

M9.4.1 Follow and evaluate an argument, judging its validity using inductive or deductive reasoning and logic.

M9.4.2 Make and test conjectures.

M9.4.3 Use methods of proofs including direct, indirect, and counterexamples, to validate conjectures.

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student demonstrates an ability to use logic and reason by	**The student demonstrates an ability to use logic and reason by**	**The student demonstrates an ability to use logic and reason by**	**The student demonstrates an ability to use logic and reason by**
[7] **PS-4** using informal deductive and inductive reasoning in concrete contexts or stating counterexamples to disprove statements; or justifying and defending the validity of mathematical strategies and solutions using examples (M9.3.1, M9.3.2, & M9.3.3)	[8] **PS-4** generalizing from patterns of observations (inductive reasoning) about mathematical problems and testing using a logical verification (deductive reasoning); or justifying and defending the validity of mathematical strategies and solutions using examples and counterexamples (M9.3.1, M9.3.2, & M9.3.3)	[9] **PS-4** following and evaluating an argument, judging its validity using inductive or deductive reasoning and logic; or making and testing conjectures (M9.4.1 & M9.4.2)	[10] **PS-4** using methods of proof including direct, indirect, and counterexamples to validate conjectures (M9.4.3)

Connections: Apply mathematical concepts and processes to situations within and outside of school

Connections Performance Standards that apply to grades 7-8:

M10.3.1 Apply mathematical skills and processes to science and humanities.

M10.3.2 Apply mathematical skills and processes to situations with peers and community.

Connections Performance Standards that apply to grades 9-10:

M10.4.1 Apply mathematical skills and processes to global issues.

M10.4.2 Describe how mathematics can be used in knowing how to prepare for careers.

GRADE 7	GRADE 8	GRADE 9	GRADE 10
The student demonstrates the ability to apply mathematical skills and processes across the content strands by	**The student demonstrates the ability to apply mathematical skills and processes across the content strands by**	**The student demonstrates the ability to apply mathematical skills and processes across the content strands by**	**The student demonstrates the ability to apply mathematical skills and processes across the content strands by**
[7] PS-5 using real-world contexts such as science, humanities, peers, and community (M10.3.1 & M10.3.2)	**[8] PS-5** using real-world contexts such as science, humanities, peers, community, and careers (M10.3.1 & M10.4.2)	**[9] PS-5** using real-world contexts such as science, humanities, peers, community, careers, and national issues (M10.4.1 & M10.4.2)	**[10] PS-5** using real-world contexts such as global issues and careers (M10.4.1 & M10.4.2)

Introduction to Science Performance Standards

(Grade Level Expectations)

The Alaska Science Performance Standards/Grade Level Expectations (PSGLEs) have been developed for grades 3 through 11 in fulfillment of the No Child Left Behind Act of 2001 (NCLB) requirements.

This document is intended to provide a road map for the development of assessment items as well as the basis upon which school districts refine, align, and develop their science curriculum. The content described by the PSGLEs does not represent the entire science curriculum for a grade or course. Nor does it represent the final word on the science content that is presented since one of the basic understandings in science is that our knowledge continues to grow and change as we gather more evidence about a subject. The PSGLEs indicate core content to be mastered by the end of a given grade. Science content can be added and enriched as appropriate for a district program, school, or student. It may be necessary to introduce some skills at an earlier grade in order for students to achieve mastery at a given level. Similarly, skills will need to be maintained after mastery has occurred at a given grade level.

The Alaska Science PSGLEs are aligned to the Alaska Science Content Standards. The Content Standards were revised in 2003 to align with the National Science Education Standards. Participants in the development of the PSGLEs actively researched the concepts and skills contained within this document.

References

National Research Council (U.S.). (1996). *National Science Education Standards: Observe, interact, change, learn*. Washington, DC: National Academy Press.

Project 2061 (American Association for the Advancement of Science). (2001). *Atlas of science literacy*. Washington, DC: American Association for the Advancement of Science: National Science Teachers Association.

The Science Content Standards are grouped into seven strands, A-1 through G-1.

Each PSGLE includes a bolded statement called the "stem." Each stem is the same or similar across the grades for a given PSGLE and is meant to communicate the main curriculum and instructional focus of the PSGLE across the grades.

A1—Science as Inquiry and Process

SA Students develop an understanding of the processes and applications of scientific inquiry.

SA1 Students develop an understanding of the processes of science used to investigate problems, design and conduct repeatable scientific investigations, and defend scientific arguments.

SA2 Students develop an understanding that the processes of science require integrity, logical reasoning, skepticism, openness, communication, and peer review.

SA3 Students develop an understanding that culture, local knowledge, history, and interaction with the environment contribute to the development of scientific knowledge, and local applications provide opportunity for understanding scientific concepts and global issues.

GRADE 3	GRADE 4	GRADE 5
The student demonstrates an understanding of the processes of science by	**The student demonstrates an understanding of the processes of science by**	**The student demonstrates an understanding of the processes of science by**
[3] SA1.1 asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating	**[4] SA1.1** asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating*	**[5] SA1.1** asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating*
[3] SA1.2 observing and describing their world to answer simple questions	**[4] SA1.2** observing, measuring, and collecting data from explorations and using this information to classify, predict, and communicate	**[5] SA1.2** using quantitative and qualitative observations to create their own inferences and predictions
The student demonstrates an understanding of the attitudes and approaches to scientific inquiry by	**The student demonstrates an understanding of the attitudes and approaches to scientific inquiry by**	**The student demonstrates an understanding of the attitudes and approaches to scientific inquiry by**
[3] SA2.1 answering "how do you know?" questions with reasonable answers	**[4] SA2.1** supporting their ideas with observations and peer review (**L**)	**[5] SA2.1** supporting their statements with facts from a variety of resources and by identifying their sources (**L**)
The student demonstrates an understanding that interactions with the environment provide an opportunity for understanding scientific concepts by	**The student demonstrates an understanding that interactions with the environment provide an opportunity for understanding scientific concepts by**	**The student demonstrates an understanding that interactions with the environment provide an opportunity for understanding scientific concepts by**
[3] SA3.1 observing local conditions that determine which plants and/or animals survive (**L**)	**[4] SA3.1** identifying the local limiting factors (e.g., weather, human influence, species interactions) that determine which plants and/or animals survive (**L**)	**[5] SA3.1** identifying the limiting factors (e.g., weather, human influence, species interactions) that determine which plants and/or animals survive

PSGLEs repeated with no changes across grade levels are marked with asterisks to indicate that the PSGLE assumes increasing complexity to indicate growth in the PSGLE.

The number in brackets indicates the grade level.

Note: Items differentiated with an "i.e." indicate that statewide assessment items may be written only to the content contained within the statement in the parentheses. Items differentiated with an "e.g." do not limit assessment items to that content, but indicate examples of content that may be used in statewide assessment items.

Some PSGLEs have been identified as Local. They are for local assessment and will not be on a state assessment.

The number indicates the Content Standard and the Grade Level Expectation number; thus PSGLE [4] SA3.1 represents Content Standard SA3, and the first PSGLE for that Content Standard for grade 4.

Differences between grade levels are underlined.

Participants in the development of the PSGLEs actively researched the concepts and skills contained within this document.

References

National Research Council (U.S.). (1996). *National Science Education Standards: Observe, interact, change, learn.* Washington, DC: National Academy Press.

Project 2061 (American Association for the Advancement of Science). (2001). *Atlas of science literacy.* Washington, DC: American Association for the Advancement of Science: National Science Teachers Association.

A1—Science as Inquiry and Process

SA Students develop an understanding of the processes and applications of scientific inquiry.

SA1 Students develop an understanding of the processes of science used to investigate problems, design and conduct repeatable scientific investigations, and defend scientific arguments.

SA2 Students develop an understanding that the processes of science require integrity, logical reasoning, skepticism, openness, communication, and peer review.

SA3 Students develop an understanding that culture, local knowledge, history, and interaction with the environment contribute to the development of scientific knowledge, and that local applications provide opportunity for understanding scientific concepts and global issues.

GRADE 3	GRADE 4	GRADE 5
The student demonstrates an understanding of the processes of science by [3] **SA1.1** asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating [3] **SA1.2** observing and describing the student's own world to answer simple questions	**The student demonstrates an understanding of the processes of science by** [4] **SA1.1** asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating* [4] **SA1.2** observing, measuring, and collecting data from explorations and using this information to classify, predict, and communicate	**The student demonstrates an understanding of the processes of science by** [5] **SA1.1** asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating* [5] **SA1.2** using quantitative and qualitative observations to create inferences and predictions
The student demonstrates an understanding of the attitudes and approaches to scientific inquiry by [3] **SA2.1** answering "how do you know?" questions with reasonable answers	**The student demonstrates an understanding of the attitudes and approaches to scientific inquiry by** [4] **SA2.1** supporting the student's own ideas with observations and peer review (**L**)	**The student demonstrates an understanding of the attitudes and approaches to scientific inquiry by** [5] **SA2.1** supporting the student's own statements with facts from a variety of resources and by identifying their sources (**L**)
The student demonstrates an understanding that interactions with the environment provide an opportunity for understanding scientific concepts by [3] **SA3.1** observing local conditions that determine which plants and/or animals survive (**L**)	**The student demonstrates an understanding that interactions with the environment provide an opportunity for understanding scientific concepts by** [4] **SA3.1** identifying the local limiting factors (e.g., weather, human influence, species interactions) that determine which plants and/or animals survive (**L**)	**The student demonstrates an understanding that interactions with the environment provide an opportunity for understanding scientific concepts by** [5] **SA3.1** identifying the limiting factors (e.g., weather, human influence, species interactions) that determine which plants and/or animals survive

** Same concept at a higher level*

B1— Concepts of Physical Science

SB Students develop an understanding of the concepts, models, theories, universal principles, and facts that explain the physical world.

SB1 Students develop an understanding of the characteristic properties of matter and the relationship of these properties to their structure and behavior.

SB2 Students develop an understanding that energy appears in different forms, can be transformed from one form to another, can be transferred or moved from one place or system to another, may be unavailable for use, and is ultimately conserved.

SB3 Students develop an understanding of the interactions between matter and energy, including physical, chemical, and nuclear changes, and the effects of these interactions on physical systems.

SB4 Students develop an understanding of motions, forces, their characteristics and relationships, and natural forces and their effects.

GRADE 3	GRADE 4	GRADE 5
The student demonstrates an understanding of the structure and properties of matter by	**The student demonstrates an understanding of the structure and properties of matter by**	**The student demonstrates an understanding of the structure and properties of matter by**
[3] **SB1.1** classifying matter according to physical properties (i.e., color, size, shape, weight, texture, flexibility)	[4] **SB1.1** identifying and comparing the characteristics of gases, liquids, and solids	[5] **SB1.1** comparing models that represent matter as solids, liquids, or gases and the changes from one state to another (**L**)
The student demonstrates an understanding of how energy can be transformed, transferred, and conserved by	**The student demonstrates an understanding of how energy can be transformed, transferred, and conserved by**	**The student demonstrates an understanding of how energy can be transformed, transferred, and conserved by**
[3] **SB2.1** classifying materials as insulators or conductors (i.e., fur, metal, wood, plastic) and identifying their applications	[4] **SB2.1** investigating the effectiveness of different insulating and conducting materials with respect to heat flow and record the results (**L**)	[5] **SB2.1** classifying the changes (i.e., heat, light, sound, and motion) that electrical energy undergoes in common household appliances (i.e., toaster, blender, radio, light bulb, heater)
The student demonstrates an understanding of the interactions between matter and energy and the effects of these interactions on systems by	**The student demonstrates an understanding of the interactions between matter and energy and the effects of these interactions on systems by**	**The student demonstrates understanding of the interactions between matter and energy and the effects of these interactions on systems by**
[3] **SB3.1** recognizing that temperature changes cause changes in phases of substances (e.g., ice changing to liquid, water changing to water vapor, and vice versa)	[4] **SB3.1** explaining that temperature changes cause changes in phases of substances (e.g., ice changing to liquid water and liquid water to water vapor)	[5] **SB3.1** identifying physical and chemical changes based on observable characteristics (e.g., tearing paper vs. burning paper)
The student demonstrates an understanding of motions, forces, their characteristics, relationships, and effects by	**The student demonstrates an understanding of motions, forces, their characteristics, relationships, and effects by**	**The student demonstrates an understanding of motions, forces, their characteristics, relationships, and effects by**
[3] **SB4.2** recognizing that objects can be moved without being touched (e.g., using magnets, falling objects, static electricity)	[4] **SB4.1** simulating that changes in speed or direction of motion are caused by forces (**L**)	[5] **SB4.1** investigating that the greater the force acting on an object, the greater the change in motion will be (**L**)

SB4.1 is not addressed until grade 4.

C1—Concepts of Life Science

SC Students develop an understanding of the concepts, models, theories, facts, evidence, systems, and processes of life science.

SC1 Students develop an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural selection, and biological evolution.

SC2 Students develop an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms.

SC3 Students develop an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy.

GRADE 3	GRADE 4	GRADE 5
The student demonstrates an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural selection, and biological evolution by [3] **SC1.1** sorting Alaskan plants and/or animals using physical characteristics (e.g., leaves, beaks) (L) [3] **SC1.2** describing how some traits (e.g., claws, teeth, camouflage) of living organisms have helped them survive as a species	**The student demonstrates an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural selection, and biological evolution by** [4] **SC1.1** showing the relationship between physical characteristics of Alaskan organisms and the environment in which they live [4] **SC1.2** describing fossil evidence (e.g., casts, track ways, imprints, etc.) of extinct organisms	**The student demonstrates an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural selection, and biological evolution by** [5] **SC1.1** contrasting inherited traits (e.g., flower color, number of limbs) with those that are not (riding a bike, scar from an accident) [5] **SC1.2** making reasonable inferences about fossil organisms based on physical evidence
The student demonstrates an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms by [3] **SC2.1** sorting animals and plants into groups based on appearance and behaviors [3] **SC2.2** observing and comparing external features of plants and of animals that may help them grow, survive, and reproduce	**The student demonstrates an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms by** [4] **SC2.1** choosing appropriate tools (i.e., hand lens, microscopes, ruler, balance) to examine the basic structural components (e.g., stems, leaves, fish scales, wings) of living things [4] **SC2.2** describing the basic characteristics and requirements of living things	**The student demonstrates an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms by** [5] **SC2.1** identifying and sorting animals into groups using basic external and internal features [5] **SC2.2** explaining how external features and internal systems (i.e., respiratory, excretory, skeletal, circulatory, and digestive) of plants and animals may help them grow, survive, and reproduce [5] **SC2.3** recognizing that organisms are composed of cells
The student demonstrates an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy by [3] **SC3.1** identifying and sorting examples of living and non-living things in the local environment (L) [3] **SC3.2** organizing a simple food chain of familiar plants and animals (L)	**The student demonstrates an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy by** [4] **SC3.1** identifying examples of living and non-living things <u>and the relationship between them</u> (e.g., living things need water, herbivores need plants) [4] **SC3.2** <u>identifying</u> a simple food chain of familiar plants and animals, diagramming how energy flows through it; describing the effects of removing one link	**The student demonstrates an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy by** [5] **SC3.1** diagramming how matter and energy are transferred within and between living and nonliving things [5] **SC3.2** <u>organizing</u> a simple food chain of familiar plants and animals <u>that traces the source of the energy back to sunlight</u>

D1—Concepts of Earth Science

SD Students develop an understanding of the concepts, processes, theories, models, evidence, and systems of earth and space sciences.

SD1 Students develop an understanding of Earth's geochemical cycles.

SD2 Students develop an understanding of the origins, ongoing processes, and forces that shape the structure, composition, and physical history of the Earth.

SD3 Students develop an understanding of the cyclical changes controlled by energy from the sun and by Earth's position and motion in our solar system.

SD4 Students develop an understanding of the theories regarding the evolution of the universe.

GRADE 3	GRADE 4	GRADE 5
The student demonstrates an understanding of geochemical cycles by [3] **SD1.1** recognizing that most rocks are composed of combinations of different substances [3] **SD1.2** describing the water cycle to show that water circulates through the crust, oceans, and atmosphere of Earth	**The student demonstrates an understanding of geochemical cycles by** [4] **SD1.1** describing that most smaller rocks come from the breaking and weathering of larger rocks as part of the rock cycle [4] **SD1.2** recognizing the physical properties of water as they relate to the rock cycle	**The student demonstrates an understanding of geochemical cycles by** [5] **SD1.1** observing a model of the rock cycle showing that smaller rocks come from the breaking and weathering of larger rocks and that smaller rocks (e.g., sediments and sands) may combine with plant materials to form soils (L)
The student demonstrates an understanding of the forces that shape Earth by [3] **SD2.1** identifying and comparing a variety of Earth's land features (i.e., rivers, deltas, lakes, glaciers, mountains, valleys, and islands)	**The student demonstrates an understanding of the forces that shape Earth by** [4] **SD2.1** observing models of how waves, wind, water, and ice shape and reshape the Earth's surface by eroding rock and soil (L) [4] **SD2.2** identifying causes (i.e., earthquakes, tsunamis, volcanoes, floods, landslides, and avalanches) of rapid changes on the surface	**The student demonstrates an understanding of the forces that shape Earth by** [5] **SD2.1** describing how wind and water tear down and build up the Earth's surface resulting in new land formations (i.e., deltas, moraines, and canyons)
The student demonstrates an understanding of cycles influenced by energy from the sun and by Earth's position and motion in our solar system by [3] **SD3.1** using recorded weather patterns (e.g., temperature, cloud cover, or precipitation) to make reasonable predictions (L)	**The student demonstrates an understanding of cycles influenced by energy from the sun and by Earth's position and motion in our solar system by** [4] **SD3.1** recognizing changes to length of daylight over time and its relationship to seasons [4] **SD3.2** observing that heat flows from one object to another (L)	**The student demonstrates an understanding of cycles influenced by energy from the sun and by Earth's position and motion in our solar system by** [5] **SD3.1** observing a model that shows how the regular and predictable motion of the Earth and moon determine the apparent shape (phases) of the moon over time (L) [5] **SD3.2** comparing heat absorption and loss by land and water

The student demonstrates an understanding of the theories regarding the origin and evolution of the universe by

[3] SD4.1 recognizing that objects appear smaller the farther away they are

[3] SD4.2 recognizing that objects have properties, locations, and movements that can be observed and described

[3] SD4.3 recognizing and using appropriate instruments of magnification (e.g., binoculars and telescopes) (**L**)

The student demonstrates an understanding of the theories regarding the origin and evolution of the universe by

[4] SD4.1 recognizing that stars are like the sun but are so far away that they look like points of light

[4] SD4.2 recognizing that objects have properties, locations, and movements that can be observed and described*

[4] SD4.3 recognizing and using appropriate instruments of magnification (e.g., binoculars and telescopes)* (**L**)

The student demonstrates an understanding of the theories regarding the origin and evolution of the universe by

[5] SD4.1 distinguishing among stars, planets, moons, comets, and meteors (**L**)

[5] SD4.2 recognizing that the Earth is in regular and predictable motion and this motion explains the length of a day and a year

[5] SD4.3 recognizing and using appropriate instruments of magnification (e.g., binoculars and telescopes)* (**L**)

** Same concept at a higher level*

E1—Science and Technology

SE Students develop an understanding of the relationships among science, technology, and society.

SE1 Students develop an understanding of how scientific knowledge and technology are used in making decisions about issues, innovations, and responses to problems and everyday events.

SE2 Students develop an understanding that solving problems involves different ways of thinking, perspectives, and curiosity that lead to the exploration of multiple paths that are analyzed using scientific, technological, and social merits.

SE3 Students develop an understanding of how scientific discoveries and technological innovations affect and are affected by our lives and cultures.

GRADE 3	GRADE 4	GRADE 5
The student demonstrates an understanding of how to integrate scientific knowledge and technology to address problems by	**The student demonstrates an understanding of how to integrate scientific knowledge and technology to address problems by**	**The student demonstrates an understanding of how to integrate scientific knowledge and technology to address problems by**
[3] **SE1.1** identifying local problems and discussing solutions (**L**)	[4] **SE1.1** recognizing that tools (e.g., spear, hammer, hand lens, kayak, computer) and processes (e.g., drying fish, sewing, photography) are an important part of human cultures	[5] **SE1.1** identifying a community problem or issue and describing the information needed to develop a scientific solution (**L**)
The student demonstrates an understanding that solving problems involves different ways of thinking, perspectives, and curiosity by	**The student demonstrates an understanding that solving problems involves different ways of thinking, perspectives, and curiosity by**	**The student demonstrates an understanding that solving problems involves different ways of thinking, perspectives, and curiosity by**
[3] **SE2.1** identifying local tools and materials used in everyday life (**L**)	[4] **SE2.1** identifying the function of a variety of tools (e.g., spear, hammer, hand lens, kayak, computer) [4] **SE2.2** identifying multiple explanations (e.g., oral traditions, folklore, scientific theory) of everyday events (e.g., weather, seasonal changes) (**L**)	5] **SE2.1** investigating a problem or project over a specified period of time and identifying the tools and processes used in that project (**L**) [5] **SE2.2** comparing multiple explanations (e.g., oral traditions, folklore, scientific theory) of everyday events (e.g., weather, seasonal changes) (**L**)
The student demonstrates an understanding of how scientific discoveries and technological innovations affect our lives and society by	**The student demonstrates an understanding of how scientific discoveries and technological innovations affect our lives and society by**	**The student demonstrates an understanding of how scientific discoveries and technological innovations affect our lives and society by**
[3] **SE3.1** listing the positive and negative effects of a single technological development in the local community (e.g., fish trap, fish wheel, four-wheeler, computer) (**L**)	[4] **SE3.1** listing the positive and negative effects of a scientific discovery	[5] **SE3.1** describing the various effects of an innovation (e.g., snow machines, airplanes, immunizations) on the safety, health, and environment of the local community (**L**)

F1—Cultural, Social, Personal Perspectives, and Science

SF Students develop an understanding of the dynamic relationships among scientific, cultural, social, and personal perspectives.

SF1 Students develop an understanding of the interrelationships among individuals, cultures, societies, science, and technology.

SF2 Students develop an understanding that some individuals, cultures, and societies use other beliefs and methods in addition to scientific methods to describe and understand the world.

SF3 Students develop an understanding of the importance of recording and validating cultural knowledge.

GRADE 3	GRADE 4	GRADE 5
The student demonstrates an understanding of the dynamic relationships among scientific, cultural, social, and personal perspectives by	**The student demonstrates an understanding of the dynamic relationships among scientific, cultural, social, and personal perspectives by**	**The student demonstrates an understanding of the dynamic relationships among scientific, cultural, social, and personal perspectives by**
[3] SF1.1-SF3.1 exploring local or traditional stories that explain a natural event (**L**) Cross referenced with SA3.1.	**[4] SF1.1-SF3.1** connecting observations of nature to a local or traditional story that explains a natural event (e.g., animal adaptation, weather, rapid changes to Earth's surface) (**L**) Cross referenced with SA3.1.	**[5] SF1.1-SF3.1** telling a local or traditional story that explains a natural event (e.g., animal adaptation, weather, rapid changes to Earth's surface) and relating it to a scientific explanation*(**L**) Cross referenced with SA3.1.

G1–History and Nature of Science

SG Students develop an understanding of the history and nature of science.

SG1 Students develop an understanding that historical perspectives of scientific explanations demonstrate that scientific knowledge changes over time, building on prior knowledge.

SG2 Students develop an understanding that the advancement of scientific knowledge embraces innovation and requires empirical evidence, repeatable investigations, logical arguments, and critical review in striving for the best possible explanations of the natural world.

SG3 Students develop an understanding that scientific knowledge is ongoing and subject to change as new evidence becomes available through experimental and/or observational confirmation(s).

SG4 Students develop an understanding that advancements in science depend on curiosity, creativity, imagination, and a broad knowledge base.

GRADE 3	GRADE 4	GRADE 5
[3] SG 1.1**	[4] SG 1.1**	[5] SG 1.1**

GRADE 3	GRADE 4	GRADE 5
The student demonstrates an understanding of the bases of the advancement of scientific knowledge by	**The student demonstrates an understanding of the bases of the advancement of scientific knowledge by**	**The student demonstrates an understanding of the bases of the advancement of scientific knowledge by**
[3] **SG2.1** comparing the results of multiple observations of a single local event (**L**)	[4] **SG2.1** recognizing the need for repeated measurements	[5] **SG2.1** reviewing and recording results of investigations into the natural world

GRADE 3	GRADE 4	GRADE 5
[3] SG 3.1**	[4] SG 3.1**	[5] SG 3.1**

GRADE 3	GRADE 4	GRADE 5
The student demonstrates an understanding that advancements in science depend on curiosity, creativity, imagination, and a broad knowledge base by	**The student demonstrates an understanding that advancements in science depend on curiosity, creativity, imagination, and a broad knowledge base by**	**The student demonstrates an understanding that advancements in science depend on curiosity, creativity, imagination, and a broad knowledge base by**
[3] **SG4.1** asking questions about the natural world	[4] **SG4.1** using an account of a discovery to recognize that an individual's (e.g., George Washington Carver, Marie Curie) curiosity led to advancements in science	[5] **SG4.1** <u>investigating that scientists' curiosity</u> led to advancements in science (**L**)

**"Most of the historical benchmarks do not appear until high school." (Project 2061 [American Association for the Advancement of Science], 2001, p. 129)

Project 2061 (American Association for the Advancement of Science). (2001). *Atlas of science literacy.* Washington, DC: American Association for the Advancement of Science: National Science Teachers Association.

A1—Science as Inquiry and Process

SA Students develop an understanding of the processes and applications of scientific inquiry.

SA1 Students develop an understanding of the processes of science used to investigate problems, design and conduct repeatable scientific investigations, and defend scientific arguments.

SA2 Students develop an understanding that the processes of science require integrity, logical reasoning, skepticism, openness, communication, and peer review.

SA3 Students develop an understanding that culture, local knowledge, history, and interaction with the environment contribute to the development of scientific knowledge, and that local applications provide opportunity for understanding scientific concepts and global issues.

GRADE 6	GRADE 7	GRADE 8
The student demonstrates an understanding of the processes of science by [6] **SA1.1** asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating* [6] **SA1.2** collaborating to design and conduct simple repeatable investigations (**L**)	**The student demonstrates an understanding of the processes of science by** [7] **SA1.1** asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating* [7] **SA1.2** collaborating to design and conduct simple repeatable investigations, in order to record, analyze (i.e., range, mean, median, mode), interpret data, and present findings (**L**)	**The student demonstrates an understanding of the processes of science by** [8] **SA1.1** asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating* [8] **SA1.2** collaborating to design and conduct repeatable investigations, in order to record, analyze (i.e., range, mean, median, mode), interpret data, and present findings (**L**)*
The student demonstrates an understanding of the attitudes and approaches to scientific inquiry by [6] **SA2.1** identifying and differentiating fact from opinion	**The student demonstrates an understanding of the attitudes and approaches to scientific inquiry by** [7] **SA2.1** identifying and evaluating the sources used to support scientific statements	**The student demonstrates an understanding of the attitudes and approaches to scientific inquiry by** [8] **SA2.1** recognizing and analyzing differing scientific explanations and models
The student demonstrates an understanding that interactions with the environment provide an opportunity for understanding scientific concepts by [6] **SA3.1** gathering data to build a knowledge base that contributes to the development of questions about the local environment (e.g., moose browsing, trail usage, river erosion) (**L**)	**The student demonstrates an understanding that interactions with the environment provide an opportunity for understanding scientific concepts by** [7] **SA3.1** designing and conducting a simple investigation about the local environment (**L**)	**The student demonstrates an understanding that interactions with the environment provide an opportunity for understanding scientific concepts by** [8] **SA3.1** conducting research to learn how the local environment is used by a variety of competing interests (e.g., competition for habitat/resources, tourism, oil and mining companies, hunting groups) (**L**)

** Same concept at a higher level*

B1—Concepts of Physical Science

SB Students develop an understanding of the concepts, models, theories, universal principles, and facts that explain the physical world.

SB1 Students develop an understanding of the characteristic properties of matter and the relationship of these properties to their structure and behavior.

SB2 Students develop an understanding that energy appears in different forms, can be transformed from one form to another, can be transferred or moved from one place or system to another, may be unavailable for use, and is ultimately conserved.

SB3 Students develop an understanding of the interactions between matter and energy, including physical, chemical, and nuclear changes, and the effects of these interactions on physical systems.

SB4 Students develop an understanding of motions, forces, their characteristics and relationships, and natural forces and their effects.

GRADE 6	GRADE 7	GRADE 8
The student demonstrates understanding of the structure and properties of matter by [6] **SB1.1** using models to represent matter as it changes from one state to another	**The student demonstrates understanding of the structure and properties of matter by** [7] **SB1.1** using physical properties (i.e., density, boiling point, freezing point, conductivity) to differentiate among and/or separate materials (i.e., elements, compounds, and mixtures)	**The student demonstrates an understanding of the structure and properties of matter by** [8] **SB1.1** using physical and chemical properties (i.e., density, boiling point, freezing point, conductivity, flammability) to differentiate among materials (i.e., elements, compounds, and mixtures)
The student demonstrates an understanding of how energy can be transformed, transferred, and conserved by [6] **SB2.1** recognizing that energy can exist in many forms (i.e., heat, light, chemical, electrical, mechanical)	**The student demonstrates an understanding of how energy can be transformed, transferred, and conserved by** [7] **SB2.1** explaining that energy (i.e., heat, light, chemical, electrical, mechanical) can change form	**The student demonstrates an understanding of how energy can be transformed, transferred, and conserved by** [8] **SB2.1** identifying the initial source and resulting change in forms of energy in common phenomena (e.g., sun to tree to wood to stove to cabin heat)
The student demonstrates an understanding of the interactions between matter and energy and the effects of these interactions on systems by [6] **SB3.1** recognizing that most substances can exist as a solid, liquid, or gas depending on temperature	**The student demonstrates an understanding of the interactions between matter and energy and the effects of these interactions on systems by** [7] **SB3.1** recognizing that most substances can exist as a solid, liquid, or gas depending on the motion of their particles	**The student demonstrates an understanding of the interactions between matter and energy and the effects of these interactions on systems by** [8] **SB3.1** exploring changes of state with increase or decrease of particle speed associated with heat transfer (**L**) [8] **SB3.2** exploring through a variety of models (e.g., gumdrops and toothpicks) how atoms may bond together into well defined molecules or bond together in large arrays (**L**)
The student demonstrates an understanding of motions, forces, their characteristics, relationships, and effects by [6] **SB4.2** stating that every object exerts gravitational force on every other object [6] **SB4.3** making waves move through a variety of media (**L**) *SB4.1 is not addressed in grade 6.*	**The student demonstrates an understanding of motions, forces, their characteristics, relationships, and effects by** [7] **SB4.1** illustrating that unbalanced forces will cause an object to accelerate [7] **SB4.2** recognizing that electric currents and magnets can exert a force on each other [7] **SB4.3** describing the characteristics of a wave (i.e., amplitude, wavelength, and frequency)	**The student demonstrates an understanding of motions, forces, their characteristics, relationships, and effects by** [8] **SB4.1** demonstrating (**L**) and explaining circular motion [8] **SB4.2** describing the interactions between charges

C1—Concepts of Life Science

SC Students develop an understanding of the concepts, models, theories, facts, evidence, systems, and processes of life science.

SC1 Students develop an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural selection, and biological evolution.

SC2 Students develop an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms.

SC3 Students develop an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy.

GRADE 6	GRADE 7	GRADE 8
The student demonstrates an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural selection, and biological evolution by	**The student demonstrates an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural selection, and biological evolution by**	**The student demonstrates an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural selection, and biological evolution by**
[6] **SC1.1** recognizing sexual and asexual reproduction [6] **SC1.2** recognizing that species survive by adapting to changes in their environment	[7] **SC1.1** comparing and contrasting sexual and asexual reproduction [7] **SC1.2** describing possible outcomes of mutations (i.e., no effect, damage, benefit)	[8] **SC1.1** describing the role of genes in sexual reproduction (i.e., traits of the offspring)
The student demonstrates an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms by	**The student demonstrates an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms by**	**The student demonstrates an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms by**
[6] **SC2.1** using a dichotomous key to classify animals and plants into groups using external or internal features [6] **SC2.2** identifying basic behaviors (e.g., migration, communication, hibernation) used by organisms to meet the requirements of life [6] **SC2.3** describing the levels of organization within a human body (i.e., cells, tissues, organs, systems)	[7] **SC2.1** describing the basic structure and function of plant and animal cells [7] **SC2.2** identifying the seven levels of classification of organisms [7] **SC2.3** identifying and describing the functions of human organs (i.e., heart, lungs, brain)	[8] **SC2.1** placing vertebrates into correct classes of taxonomy based on external, observable features [8] **SC2.2** explaining that most organisms utilize inherited and learned behaviors to meet the basic requirements of life [8] **SC2.3** describing the functions and interdependence of human body systems (i.e., circulatory, respiratory, nervous)
The student demonstrates an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy by	**The student demonstrates an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy by**	**The student demonstrates an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy by**
[6] **SC3.1** recognizing that organisms can cause physical and chemical changes (e.g., digestion, growth, respiration, photosynthesis) to matter and recognizing the importance of energy transfer in these changes [6] **SC3.2** organizing a food web using familiar plants and animals	[7] **SC3.1** recognizing and explaining that organisms can cause physical and chemical changes (e.g., digestion, growth, respiration, photosynthesis) to matter and recognizing and explaining the importance of energy transfer in these changes [7] **SC3.2** classifying organisms within a food web as producers, consumers, or decomposers	[8] **SC3.1** stating that energy flows and that matter cycles but is conserved within an ecosystem [8] **SC3.2** organizing a food web that shows the cycling matter

D1—Concepts of Earth Science

SD Students develop an understanding of the concepts, processes, theories, models, evidence, and systems of earth and space sciences.

SD1 Students develop an understanding of Earth's geochemical cycles.

SD2 Students develop an understanding of the origins, ongoing processes, and forces that shape the structure, composition, and physical history of the Earth.

SD3 Students develop an understanding of the cyclical changes controlled by energy from the sun and by Earth's position and motion in our solar system.

SD4 Students develop an understanding of the theories regarding the evolution of the universe.

GRADE 6

The student demonstrates an understanding of geochemical cycles by

[6] SD1.1 exploring the rock cycle and its relationship to igneous, metamorphic, and sedimentary rocks (**L**)

[6] SD1.2 identifying the physical properties of water within the stages of the water cycle

The student demonstrates an understanding of the forces that shape Earth by

[6] SD2.1 describing the formation and composition (i.e., sand, silt, clay, organics) of soils

[6] SD2.2 identifying and describing its layers (i.e., crust, mantle, core)

[6] SD2.3 describing how the surface can change rapidly as a result of geological activities (i.e., earthquakes, tsunamis, volcanoes, floods, landslides, avalanches)

The student demonstrates an understanding of cycles influenced by energy from the sun and by Earth's position and motion in our solar system by

[6] SD3.1 connecting the water cycle to weather phenomena

[6] SD3.2 identifying that energy transfer is affected by surface conditions (e.g., snow cover, asphalt, vegetation) and that this affects weather

GRADE 7

The student demonstrates an understanding of geochemical cycles by

[7] SD1.1 describing the rock cycle and its relationship to igneous, metamorphic, and sedimentary rocks

[7] SD1.2 explaining the water cycle's connection to changes in the Earth's surface

The student demonstrates an understanding of the forces that shape Earth by

[7] SD2.1 identifying strategies (e.g., reforestation, dikes, wind breaks, off road activity guidelines) for minimizing erosion

[7] SD2.2 describing how the movement of the tectonic plates results in both slow changes (e.g., formation of mountains, ocean floors, and basins) and short-term events (e.g., volcanic eruptions, seismic waves, and earthquakes) on the surface

The student demonstrates an understanding of cycles influenced by energy from the sun and by Earth's position and motion in our solar system by

[7] SD3.1 describing the weather using accepted meteorological terms (e.g., pressure systems, fronts, precipitation)

[7] SD3.2 recognizing the relationship between phase changes (i.e., sublimation, condensation, evaporation) and energy transfer

GRADE 8

The student demonstrates an understanding of geochemical cycles by

[8] SD1.1 making connections between components of the locally observable geologic environment and the rock cycle (**L**)

[8] SD1.2 applying knowledge of the water cycle to explain changes in the Earth's surface

The student demonstrates an understanding of the forces that shape Earth by

[8] SD2.1 interpreting topographical maps to identify features (i.e., rivers, lakes, mountains, valleys, islands, and tundra)

[8] SD2.2 using models to show the relationship between convection currents within the mantle and the large-scale movement of the surface (**L**)

The student demonstrates an understanding of cycles influenced by energy from the sun and by Earth's position and motion in our solar system by

[8] SD3.1 recognizing the relationship between the seasons and Earth's tilt relative to the sun and describing the day/night cycle as caused by the rotation of the Earth every 24 hours

[8] SD3.2 recognizing types of energy transfer (convection, conduction, and radiation) and how they affect weather

The student demonstrates an understanding of the theories regarding the origin and evolution of the universe by

[6] SD4.1 contrasting characteristics of planets and stars (i.e., light reflecting, light emitting, orbiting, orbited, composition)

[6] SD4.2 defining a light year

The student demonstrates an understanding of the theories regarding the origin and evolution of the universe by

[7] SD4.1 comparing and contrasting characteristics of planets and stars (i.e., light reflecting, light emitting, orbiting, orbited, composition)

[7] SD4.2 using light years to describe distances between objects in the universe

The student demonstrates an understanding of the theories regarding the origin and evolution of the universe by

[8] SD4.1 creating models of the solar system illustrating size, location/position, composition, moons/rings, and conditions (L)

[8] SD4.2 comparing the brightness of a star to its distance and size

E1—Science and Technology

SE Students develop an understanding of the relationships among science, technology, and society.

SE1 Students develop an understanding of how scientific knowledge and technology are used in making decisions about issues, innovations, and responses to problems and everyday events.

SE2 Students develop an understanding that solving problems involves different ways of thinking, perspectives, and curiosity that lead to the exploration of multiple paths that are analyzed using scientific, technological, and social merits.

SE3 Students develop an understanding of how scientific discoveries and technological innovations affect and are affected by our lives and cultures.

GRADE 6	GRADE 7	GRADE 8
The student demonstrates an understanding of how to integrate scientific knowledge and technology to address problems by	**The student demonstrates an understanding of how to integrate scientific knowledge and technology to address problems by**	**The student demonstrates an understanding of how to integrate scientific knowledge and technology to address problems by**
[6] SE1.1 recognizing that technology cannot always provide successful solutions for problems or fulfill every human need	**[7] SE1.1** describing how public policy affects the student's life (e.g., public waste disposal) (L)	**[8] SE1.1** describing how public policy affects the student's life and participating diplomatically in evidence-based discussions relating to the student's community (L)
The student demonstrates an understanding that solving problems involves different ways of thinking by	**The student demonstrates an understanding that solving problems involves different ways of thinking by**	**The student demonstrates an understanding that solving problems involves different ways of thinking by**
[6] SE2.1 identifying and designing a solution to a problem **[6] SE2.2** comparing the student's work to the work of peers in order to identify multiple paths that can be used to investigate a question or problem (L)	**[7] SE2.1** identifying, designing, testing, and revising solutions to a local problem (L) **[7] SE2.2** comparing the student's work to the work of peers in order to identify multiple paths that can be used to investigate a question or problem* (L)	**[8] SE2.1** identifying, designing, testing, and revising solutions to a local problem* (L) **[8] SE2.2** comparing the student's work to the work of peers in order to identify multiple paths that can be used to investigate and evaluate potential solutions to a question or problem (L)
The student demonstrates an understanding of how scientific discoveries and technological innovations affect our lives and society by	**The student demonstrates an understanding of how scientific discoveries and technological innovations affect our lives and society by**	**The student demonstrates an understanding of how scientific discoveries and technological innovations affect our lives and society by**
[6] SE3.1 describing the various effects of an innovation on a global level	**[7] SE3.1** recognizing the effects of a past scientific discovery, invention, or scientific breakthrough (e.g., DDT, internal combustion engine)	**[8] SE3.1** predicting the possible effects of a recent scientific discovery, invention, or scientific breakthrough (L)

** Same concept at a higher level*

F1—Cultural, Social, Personal Perspectives, and Science

SF Students develop an understanding of the dynamic relationships among scientific, cultural, social, and personal perspectives.

SF1 Students develop an understanding of the interrelationships among individuals, cultures, societies, science, and technology.

SF2 Students develop an understanding that some individuals, cultures, and societies use other beliefs and methods in addition to scientific methods to describe and understand the world.

SF3 Students develop an understanding of the importance of recording and validating cultural knowledge.

GRADE 6	GRADE 7	GRADE 8
The student demonstrates an understanding of the dynamic relationships among scientific, cultural, social, and personal perspectives by	**The student demonstrates an understanding of the dynamic relationships among scientific, cultural, social, and personal perspectives by**	**The student demonstrates an understanding of the dynamic relationships among scientific, cultural, social, and personal perspectives by**
[6] SF1.1-SF3.1 telling a local or traditional story that explains a natural event (e.g., animal adaptation, weather, rapid changes to Earth's surface) and relating it to a scientific explanation* (L). Cross referenced with SA3.1.	**[7] SF1.1-SF3.1** investigating the basis of local knowledge (e.g., describing and predicting weather) and sharing that information (L). Cross referenced with SA3.1.	**[8] SF1.1-SF3.1** describing how local knowledge, culture, and the technologies of various activities (e.g., hunting, fishing, subsistence) influence the development of scientific knowledge (L). Cross referenced with SA3.1.

** Same concept at a higher level*

G1—History and Nature of Science

SG Students develop an understanding of the history and nature of science.

SG1 Students develop an understanding that historical perspectives of scientific explanations demonstrate that scientific knowledge changes over time, building on prior knowledge.

SG2 Students develop an understanding that the advancement of scientific knowledge embraces innovation and requires empirical evidence, repeatable investigations, logical arguments, and critical review in striving for the best possible explanations of the natural world.

SG3 Students develop an understanding that scientific knowledge is ongoing and subject to change as new evidence becomes available through experimental and/or observational confirmation(s).

SG4 Students develop an understanding that advancements in science depend on curiosity, creativity, imagination, and a broad knowledge base.

GRADE 6	GRADE 7	GRADE 8
The student demonstrates an understanding of the bases of the advancement of scientific knowledge by	**The student demonstrates an understanding of the bases of the advancement of scientific knowledge by**	**The student demonstrates an understanding of the bases of the advancement of scientific knowledge by**
[6] SG1.1**	[7] SG1.1**	[8] SG1.1**
[6] **SG2.1** recognizing differences in results of repeated experiments	[7] **SG2.1** explaining differences in results of repeated experiments	[8] **SG2.1** describing how repeating experiments improves the likelihood of accurate results
See [6] SE 3.1	**The student demonstrates an understanding that scientific knowledge is ongoing and subject to change by**	**The student demonstrates an understanding that scientific knowledge is ongoing and subject to change by**
	[7] **SG3.1** revising a personal idea when presented with experimental/observational data inconsistent with that personal idea (e.g., the rates of falling bodies of different masses) (L)	[8] **SG3.1** revising a personal idea when presented with experimental/observational data inconsistent with that personal idea (e.g., the rates of falling bodies of different masses)* (L)
[6] SG4.1**	[7] SG4.1**	[8] SG4.1**

** Same concept at a higher level*

**"Most of the historical benchmarks do not appear until high school." (Project 2061 [American Association for the Advancement of Science], 2001, p. 129)

Project 2061 (American Association for the Advancement of Science). (2001). *Atlas of science literacy.* Washington, DC: American Association for the Advancement of Science: National Science Teachers Association.

A1—Science as Inquiry and Process

SA Students develop an understanding of the processes and applications of scientific inquiry.

SA1 Students develop an understanding of the processes of science used to investigate problems, design and conduct repeatable scientific investigations, and defend scientific arguments.

SA2 Students develop an understanding that the processes of science require integrity, logical reasoning, skepticism, openness, communication, and peer review.

SA3 Students develop an understanding that culture, local knowledge, history, and interaction with the environment contribute to the development of scientific knowledge, and that local applications provide opportunity for understanding scientific concepts and global issues.

GRADE 9	GRADE 10	GRADE 11
The student demonstrates an understanding of the processes of science by [9] **SA1.1** asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating* [9] **SA1.2** hypothesizing, designing a controlled experiment, making qualitative and quantitative observations, interpreting data, and using this information to communicate conclusions	**The student demonstrates an understanding of the processes of science by** [10] **SA1.1** asking questions, predicting, observing, describing, measuring, classifying, making generalizations, analyzing data, developing models, inferring, and communicating [10] **SA1.2** reviewing pertinent literature, hypothesizing, making qualitative and quantitative observations, controlling experimental variables, analyzing data statistically (i.e., mean, median, mode), and using this information to draw conclusions, compare results to others, suggest further experimentation, and apply student's conclusions to other problems (**L**)	**The student demonstrates an understanding of the processes of science by** [11] **SA1.1** asking questions, predicting, observing, describing, measuring, classifying, making generalizations, analyzing data, developing models, inferring, and communicating* [11] **SA1.2** recognizing and analyzing multiple explanations and models, using this information to revise student's own explanation or model if necessary (**L**)
The student demonstrates an understanding of the attitudes and approaches to scientific inquiry by [9] **SA2.1** formulating conclusions that are logical and supported by evidence	**The student demonstrates an understanding of the attitudes and approaches to scientific inquiry by** [10] **SA2.1** examining methodology and conclusions to identify bias and determining if evidence logically supports the conclusions	**The student demonstrates an understanding of the attitudes and approaches to scientific inquiry by** [11] **SA2.1** evaluating the credibility of cited sources when conducting the student's own scientific investigation (**L**)
		The student demonstrates an understanding that interactions with the environment provide an opportunity for understanding scientific concepts by [11] **SA3.1** conducting research and communicating results to solve a problem (e.g., fish and game management, building permits, mineral rights, land use policies) (**L**)

**Same concept at a higher level*

B1—Concepts of Physical Science

SB Students develop an understanding of the concepts, models, theories, universal principles, and facts that explain the physical world.

SB1 Students develop an understanding of the characteristic properties of matter and the relationship of these properties to their structure and behavior.

SB2 Students develop an understanding that energy appears in different forms, can be transformed from one form to another, can be transferred or moved from one place or system to another, may be unavailable for use, and is ultimately conserved.

SB3 Students develop an understanding of the interactions between matter and energy, including physical, chemical, and nuclear changes, and the effects of these interactions on physical systems.

SB4 Students develop an understanding of motions, forces, their characteristics and relationships, and natural forces and their effects.

GRADE 9	GRADE 10	GRADE 11
The student demonstrates an understanding of the structure and properties of matter by [9] **SB1.1** describing atoms and their base components (i.e., protons, neutrons, electrons)	**The student demonstrates an understanding of the structure and properties of matter by** [10] **SB1.1** using the periodic table to describe atoms in terms of their base components (i.e., protons, neutrons, electrons)	**The student demonstrates an understanding of the structure and properties of matter by** [11] **SB1.1** predicting the properties of an element (i.e., reactivity, metal, non-metal) using the periodic table and verifying the predictions through experimentation (**L**)
The student demonstrates an understanding of how energy can be transformed, transferred, and conserved by [9] **SB2.1** applying the concepts of heat transfer (i.e., conduction, convection, radiation) to Alaskan dwellings [9] **SB2.2** recognizing simple electrical circuits	**The student demonstrates an understanding of how energy can be transformed, transferred, and conserved by** [10] **SB2.1** examining energy (i.e., nuclear, electromagnetic, chemical, mechanical, thermal) transfers, transformations, and efficiencies by comparing useful energy to total energy	**The student demonstrates an understanding of how energy can be transformed, transferred, and conserved by** [11] **SB2.1** demonstrating energy (e.g., nuclear, electromagnetic, chemical, mechanical, thermal) transfers and transformations by comparing useful energy to total energy (entropy) (**L**)
The student demonstrates an understanding of the interactions between matter and energy and the effects of these interactions on systems by [9] **SB3.1** recognizing that a chemical reaction has taken place [9] **SB3.2** explaining that in chemical and nuclear reactions, energy (e.g., heat, light, mechanical, and electrical) is transferred into and out of a system [9] **SB3.3** recognizing that atoms emit and absorb electromagnetic radiation	**The student demonstrates an understanding of the interactions between matter and energy and the effects of these interactions on systems by** [10] **SB3.1** describing the behavior of electrons in chemical bonding [10] **SB3.2** recognizing that radioactivity is a result of the decay of unstable nuclei [10] **SB3.3** comparing the relative wavelengths and applications of different forms of electromagnetic radiation (i.e., x-ray, visible, infrared, microwaves, radio)	**The student demonstrates an understanding of the interactions between matter and energy and the effects of these interactions on systems by** [11] **SB3.1** predicting how an atom can interact with other atoms based on its electron configuration and verifying the results (**L**) [11] **SB3.2** researching applications of nuclear reactions in which a small amount of matter is converted directly into a huge amount of energy (i.e., $E=MC^2$) (**L**)

The student demonstrates an understanding of motions, forces, their characteristics, relationships, and effects by

[9] SB4.1 explaining the relationship of motion to an object's mass and the applied force

[9] SB4.2 recognizing that the gravitational attraction between objects is proportional to their masses and decreasing with their distance

[9] SB4.3 describing the interactions of waves (i.e., reflection, refraction, wave addition)

The student demonstrates an understanding of motions, forces, their characteristics, relationships, and effects by

[10] SB4.1 recognizing that when one thing exerts a force on another, an equal amount of force is exerted back on it

[10] SB4.2 explaining that different kinds of materials respond to electric and magnetic forces (i.e., conductors, insulators, magnetic, and non-magnetic materials)

The student demonstrates an understanding of motions, forces, their characteristics, relationships, and effects by

[11] SB4.1 conducting an experiment to demonstrate that when one thing exerts a force on another, an equal amount of force is exerted back on it (**L**)

[11] SB4.2 conducting an experiment to explore the relationship between magnetic forces and electric forces to show that they can be thought of as different aspects of a single electromagnetic force (e.g., generators and motors) (**L**)

C1—Concepts of Life Science

SC Students develop an understanding of the concepts, models, theories, facts, evidence, systems, and processes of life science.

SC1 Students develop an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural selection, and biological evolution.

SC2 Students develop an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms.

SC3 Students develop an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy.

GRADE 9

The student demonstrates an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural selection, and biological evolution by

[9] **SC1.1** recognizing that all organisms have chromosomes made of DNA and that DNA determines traits

[9] **SC1.2** using probabilities to recognize patterns of inheritance (e.g., Punnett Squares)

[9] **SC1.3** inferring evolutionary pathways from evidence (e.g., fossils, geologic samples, recorded history)

GRADE 10

The student demonstrates an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural selection, and biological evolution by

[10] **SC1.2** explaining how the processes of natural selection can cause speciation and extinction

[10] **SC1.3** examining issues related to genetics (**L**)

SC1.1 is not addressed in grade 10.

GRADE 11

The student demonstrates an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural selection, and biological evolution by

[11] **SC1.1** relating the structure of DNA to characteristics of an organism

[11] **SC1.2** researching how the processes of natural selection cause changes in species over time (**L**)

The student demonstrates an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms by

[9] **SC2.1** describing and comparing the characteristics of phyla/divisions from each kingdom

[9] **SC2.3** stating the function of major physiological systems (i.e., circulatory, excretory, digestive, respiratory, reproductive, nervous, immune, endocrine, musculoskeletal, and integumentary)

SC2.2 is not addressed in grade 9.

The student demonstrates an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms by

[10] **SC2.1** describing the structure-function relationship (e.g., joints, lungs)

[10] **SC2.2** explaining that cells have specialized structures in which chemical reactions occur

[10] **SC2.3** explaining the functions of organs of major systems (i.e., respiratory, digestive, circulatory, reproductive, nervous, musculoskeletal, and excretory)

[10] **SC2.4** tracing the pathways of the digestive, circulatory, and excretory systems

The student demonstrates an understanding of the structure, function, behavior, development, life cycles, and diversity of living organisms by

[11] **SC2.1** describing the structure-function relationship*

[11] **SC2.2** describing the learned behaviors (e.g., classical conditioning, imprinting, trial and error) that are utilized by living organisms to meet the requirements of life

[11] **SC2.3** describing the functions and interdependencies of the organs within the immune system and within the endocrine system

** Same concept at a higher level*

The student demonstrates an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy by

[9] **SC3.1** describing the carbon and nitrogen cycle within an ecosystem and how the continual input of energy from sunlight keeps the process going (**L**)

[9] **SC3.3** identifying dynamic factors (e.g., carrying capacity, limiting factors, biodiversity, and productivity) that affect population size

SC3.2 is not addressed in grade 9.

** Same concept at a higher level*

The student demonstrates an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy by

[10] **SC3.1** relating the carbon cycle to global climate change

[10] **SC3. 2** exploring ecological relationships (e.g., competition, niche, feeding relationships, symbiosis) (**L**)

The student demonstrates an understanding that all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy by

[11] **SC3.1** relating the carbon cycle to global climate change*

[11] **SC3.2** analyzing the potential impacts of changes (e.g., climate change, habitat loss/gain, cataclysms, human activities) within an ecosystem

D1—Concepts of Earth Science

SD Students develop an understanding of the concepts, processes, theories, models, evidence, and systems of earth and space sciences.

SD1 Students develop an understanding of Earth's geochemical cycles.

SD2 Students develop an understanding of the origins, ongoing processes, and forces that shape the structure, composition, and physical history of the Earth.

SD3 Students develop an understanding of the cyclical changes controlled by energy from the sun and by Earth's position and motion in our solar system.

SD4 Students develop an understanding of the theories regarding the evolution of the universe.

GRADE 9	GRADE 10	GRADE 11
The student demonstrates an understanding of geochemical cycles by [9] **SD1.1** using a model to demonstrate the rock cycle (**L**) [9] **SD1.2** applying knowledge of the water cycle to explain changes in the Earth's surface*	**The student demonstrates an understanding of geochemical cycles by** [10] **SD1.1** using a model to explain the processes (i.e., formation, sedimentation, erosion, reformation) of the rock cycle [10] **SD1.2** describing their interrelationships (i.e., water cycle, carbon cycle, oxygen cycle)	**The student demonstrates an understanding of geochemical cycles by** [11] **SD1.1** creating a model to demonstrate the rock cycle (**L**) [11] **SD1.2** integrating knowledge of the water cycle and biogeochemical cycling to explain changes in the Earth's surface (**L**)
The student demonstrates an understanding of the forces that shape Earth by [9] **SD2.1** recognizing the dynamic interaction of erosion and deposition including human causes [9] **SD2.2** describing how the theory of plate tectonics explains the dynamic nature of its surface	**The student demonstrates an understanding of the forces that shape Earth by** [10] **SD2.1** recognizing the dynamic interaction of erosion and deposition including human causes* [10] **SD2.2** describing how the theory of plate tectonics explains the dynamic nature of its surface*	**The student demonstrates an understanding of the forces that shape Earth by** [11] **SD2.1** recognizing the dynamic interaction of erosion and deposition including human causes* [11] **SD2.2** describing how the theory of plate tectonics explains the dynamic nature of its surface*
The student demonstrates an understanding of cycles influenced by energy from the sun and by Earth's position and motion in our solar system by [9] **SD3.1** recognizing the effect of the moon and sun on tides [9] **SD3.2** explaining the phenomena of the aurora	**The student demonstrates an understanding of cycles influenced by energy from the sun and by Earth's position and motion in our solar system by** [10] **SD3.1** describing causes, effects, preventions, and mitigations of human impact on climate	**The student demonstrates an understanding of cycles influenced by energy from the sun and by Earth's position and motion in our solar system by** [11] **SD3.1** describing causes, effects, preventions, and mitigations of human impact on climate* [11] **SD3.2** exploring causes and effects related to phenomena (e.g., the aurora, solar winds, Coriolis Effect) (**L**)

** Same concept at a higher level*

The student demonstrates an understanding of the theories regarding the origin and evolution of the universe by

[9] SD4.1 recognizing that a star changes over time

[9] SD4.2 explaining that the position of stars changes in the expanding universe

[9] SD4.4 identifying the Big Bang Theory

The student demonstrates an understanding of the theories regarding the origin and evolution of the universe by

[10] SD 4.1 recognizing phenomena in the universe (i.e., black holes, nebula)

[10] SD 4.2 explaining that the position of stars changes in the expanding universe*

[10] SD 4.4 describing the Big Bang Theory

The student demonstrates an understanding of the theories regarding the origin and evolution of the universe by

[11] SD4.1 describing phenomena in the universe (i.e., black holes, nebula)

[11] SD4.2 using evidence to explain how the position of stars changes in the expanding universe

[11] SD4.4 describing the Big Bang Theory and exploring the evidence that supports it (L)

SD4.3 is not continued in 9-11.

** Same concept at a higher level*

E1—Science and Technology

SE Students develop an understanding of the relationships among science, technology, and society.

SE1 Students develop an understanding of how scientific knowledge and technology are used in making decisions about issues, innovations, and responses to problems and everyday events.

SE2 Students develop an understanding that solving problems involves different ways of thinking, perspectives, and curiosity that lead to the exploration of multiple paths that are analyzed using scientific, technological, and social merits.

SE3 Students develop an understanding of how scientific discoveries and technological innovations affect and are affected by our lives and cultures.

GRADE 9	GRADE 10	GRADE 11
The student demonstrates an understanding of how to integrate scientific knowledge and technology to address problems by	**The student demonstrates an understanding of how to integrate scientific knowledge and technology to address problems by**	**The student demonstrates an understanding of how to integrate scientific knowledge and technology to address problems by**
[9] **SE1.1** recognizing that the value of any given technology may be different for different groups of people and at different points in time (e.g., different uses of snow machines in different regions of Alaska)	[10] **SE1.1** identifying that progress in science and invention is highly interrelated to what else is happening in society	[11] **SE1.1** researching how social, economic, and political forces strongly influence which technology will be developed and used (L)
The student demonstrates an understanding that solving problems involves different ways of thinking by	**The student demonstrates an understanding that solving problems involves different ways of thinking by**	**The student demonstrates an understanding that solving problems involves different ways of thinking by**
[9] **SE2.1** questioning, researching, modeling, simulating, and testing a solution to a problem (L)	[10] **SE2.1** questioning, researching, modeling, simulating, and testing multiple solutions to a problem (L)	[11] **SE2.1** questioning, researching, modeling, simulating, and testing multiple solutions to a problem* (L)
The student demonstrates an understanding of how scientific discoveries and technological innovations affect our lives and society by	**The student demonstrates an understanding of how scientific discoveries and technological innovations affect our lives and society by**	**The student demonstrates an understanding of how scientific discoveries and technological innovations affect our lives and society by**
[9] **SE3.1** predicting and evaluating the possible effects of a recent scientific discovery, invention, or scientific breakthrough (L)	[10] **SE3.1** researching a current problem, identifying possible solutions, and evaluating the impact of each solution (L)	[11] **SE3.1** researching a current problem, identifying possible solutions, and evaluating the impact of each solution* (L)

** Same concept at a higher level*

F1—Cultural, Social, Personal Perspectives, and Science

SF Students develop an understanding of the dynamic relationships among scientific, cultural, social, and personal perspectives.

SF1 Students develop an understanding of the interrelationships among individuals, cultures, societies, science, and technology.

SF2 Students develop an understanding that some individuals, cultures, and societies use other beliefs and methods in addition to scientific methods to describe and understand the world.

SF3 Students develop an understanding of the importance of recording and validating cultural knowledge.

GRADE 9	GRADE 10	GRADE 11
The student demonstrates an understanding of the dynamic relationships among scientific, cultural, social, and personal perspectives by	**The student demonstrates an understanding of the dynamic relationships among scientific, cultural, social, and personal perspectives by:**	**The student demonstrates an understanding of the dynamic relationships among scientific, cultural, social, and personal perspectives by**
[9] **SF1.1-SF3.1** describing the scientific principles involved in a subsistence activity (e.g., hunting, fishing, gardening) (L). Cross referenced with SA3.1.	[10] **SF1.1-SF3.1** analyzing the competition for resources by various user groups to describe these interrelationships. Cross referenced with SA3.1.	[11] **SF1.1-SF3.1** investigating the influences of societal and/or cultural beliefs on science (L). Cross referenced with SA3.1.

G1—History and Nature of Science

SG Students develop an understanding of the history and nature of science.

SG1 Students develop an understanding that historical perspectives of scientific explanations demonstrate that scientific knowledge changes over time, building on prior knowledge.

SG2 Students develop an understanding that the advancement of scientific knowledge embraces innovation and requires empirical evidence, repeatable investigations, logical arguments, and critical review in striving for the best possible explanations of the natural world.

SG3 Students develop an understanding that scientific knowledge is ongoing and subject to change as new evidence becomes available through experimental and/or observational confirmation(s).

SG4 Students develop an understanding that advancements in science depend on curiosity, creativity, imagination, and a broad knowledge base.

GRADE 9	GRADE 10	GRADE 11
The student demonstrates an understanding of changes in historical perspectives of science by [9] **SG1.1** identifying those perspectives (i.e., cultural, political, religious, philosophical) that have impacted the advancement of science	**The student demonstrates an understanding of changes in historical perspectives of science by** [10] **SG1.1** describing how those perspectives (i.e., cultural, political, religious, philosophical) have impacted the advancement of science	
The student demonstrates an understanding of the bases of the advancement of scientific knowledge by [9] **SG2.1** explaining the importance of innovations (i.e., microscope, immunization, computer)	**The student demonstrates an understanding of the bases of the advancement of scientific knowledge by** [10] **SG2.1** using an account of an event to recognize the processes of science used by historically significant scientists (e.g., Goodall, Watson & Crick, Newton)	**The student demonstrates an understanding of the bases of the advancement of scientific knowledge by** [11] **SG2.1** describing the importance of logical arguments (i.e., thought experiments by Einstein, Hawking, Newton)
The student demonstrates an understanding that scientific knowledge is ongoing and subject to change by [9] **SG3.1** describing the role of serendipity in scientific discoveries	**The student demonstrates an understanding that scientific knowledge is ongoing and subject to change by** [10] **SG3.1** using experimental or observational data to evaluate a hypothesis	**The student demonstrates an understanding that scientific knowledge is ongoing and subject to change by** [11] **SG3.1** investigating instances when scientists' observations were not in accord with prevailing ideas of the time (L)
	The student demonstrates an understanding that advancements in science depend on curiosity, creativity, imagination, and a broad knowledge base by [10] **SG4.1** recognizing the role of these factors on scientific advancements	

Introduction to Alaska History Standards

Unlike the Performance Standards/Grade Level Expectations developed for each grade in reading, writing, mathematics, and science, the Alaska History Standards reflect the cumulative knowledge a student must demonstrate in order to fulfill the Alaska history graduation requirement detailed in regulation 4 AAC 06.075 (g) High school graduation requirements.

The teaching of history should introduce students to the process of historical inquiry. This process requires critical examination of evidence and careful weighing of facts and hypotheses. It provides experience in the kind of reasoned and informed decision-making that should characterize each student's knowledge of and participation in state events and issues. For this reason, the standard for historical inquiry stands alone; the intent is to integrate this standard, where appropriate, into the standards that follow. The objective of the historical inquiry standard is to apply conceptual knowledge and skills as designated in all strands of Alaska History by problem solving, communicating, reasoning, and making connections.

This framework uses the scholarly approach of the historian to define the content of the standards. This approach presents the people, ideas, events, themes, and sources to be included in order for a student to demonstrate competency in Alaska History. While recognizing that knowledge of specifics is important, the framework design emphasizes that knowledge of context is crucial to meaning and understanding.

The framework organizes Alaska history into four central themes that give perspective and meaning to the people, ideas, and events that shaped the state. The framework also divides Alaska history into five chronological periods that structure the sequence of events.

From the statewide perspective, these are the essential learnings. The state encourages districts to add to and enrich the scope of their local Alaska history curriculum.

Items differentiated with an "i.e." indicate that assessment items may be written only to the content contained with the statement in the parentheses. Items differentiated with an "e.g." do not limit assessment items to that content, but indicate examples of content that may be used in assessment items.

Chronological Period

The first column of each table includes suggested topics for instruction. As this is not an inclusive list, it is expected that other topics will also be explored.

Themes

Colonial Era—The Russian period (1741-1867)	PEOPLE, PLACES, ENVIRONMENT	CONSUMPTION, PRODUCTION, DISTTRIBUTION	INDIVIDUAL, CITIZENSHIP, GOVERNANCE, POWER	CONTINUITY AND CHANGE
Suggested Topics *[not an inclusive list]* • Rationale for European explorations • Epidemics • Utilization of Alaskan resources • Relationships with indigenous peoples • Role of significant leaders (e.g., Katlian, Baranov, Veniaminov, Netsvetov) • Missionary activities • Russian dependence on Alaska Natives • Russia's incentive to sell	**The student demonstrates an understanding of the interaction between people and their physical environment by:** **AH. PPE 2** using texts/sources to analyze the similarities and differences in the cultural attributes (e.g., language, hunting and gathering practices, art, music/dance, beliefs, worldview), movement, interactions, and settlement of Alaska Native peoples. [DOK 3] (G. D1, D4) — *repeated from Indigenous Alaskans* **AH. PPE 3** using texts/sources to analyze the effect of the historical contributions and/or influences of significant individuals, groups and local, regional, statewide, and/or international organizations. [DOK 3] (H. B4) — *repeated in Colonial Era—United States period*	**The student demonstrates an understanding of the discovery, impact, and role of natural resources by:** **AH. CPD 1** identifying patterns of growth, transformation, competition, and boom and bust, in response to use of natural resources (e.g., supply and demand of fur, minerals, and whaling). [DOK 2] (G. D1)	**The student demonstrates an understanding of the historical rights and responsibilities of Alaskans by:** **AH. ICGP 2** using texts/sources to analyze the impacts of the relationships between Alaska Natives and Russians (i.e., Russian Orthodox Church, early fur traders, Russian American Companies, enslavement, and Creoles). [DOK 3] (H. B1d)	**The student demonstrates an understanding of the chronology of Alaska history by:** **AH. CC 1** using texts/sources to recognize and explain the interrelationships among Alaska, national, and international events and developments (e.g., international interest, trade, commerce). [DOK 3] (H. B2)

Depth of Knowledge*

History—Section B—Standard number 4

The coding in parentheses at the end of the standard indicates alignment of the Alaska History standard to existing Alaska Content Standards for social studies. G=Geography; GC=Government and Citizenship; H=History; C=Cultural Standards

* Depth of Knowledge (DOK) is the cognitive demand associated with each item. Briefly, DOK levels reflect the following: DOK 1: Recall of Information; DOK 2: Basic Reasoning; DOK 3: Complex Reasoning; DOK 4: Extended Reasoning. For additional information, please see the accompanying document, *Depth-of-Knowledge (DOK) Levels for Social Studies.*

Because the Alaska History standards are intended to provide the content to which a student demonstrates knowledge of Alaska History, the DOK assigned to each standard should be used as the ceiling to which assessment items are written. When considering the highest DOK Level as the ceiling not the target, the standard has the potential to be assessed at Depth of Knowledge Levels at the ceiling, and up to the ceiling, depending upon the demand of the standard.

Depth-of-Knowledge (DOK) Levels for Social Studies

Descriptors of DOK Levels for Social Studies (based on Webb, *Technical Issues in Large-Scale Assessment,* report published by CCSSO, December 2002)

Level 1 Recall of Information

Level 1 asks students to recall facts, terms, concepts, trends, generalizations and theories or to recognize or identify specific information contained in graphics. This level generally requires students to identify, list, or define. The items at this level usually ask the student to recall who, what, when and where. Items that require students to "describe" and "explain" could be classified at Level 1 or 2 depending on what is to be described and explained. A Level 1 "describe or explain" would recall, recite or reproduce information. Items that require students to recognize or identify specific information contained in maps, charts, tables, graphs or drawings are generally level 1.

Level 2 Basic Reasoning

Level 2 includes the engagement of some mental processing beyond recalling or reproducing a response. This level generally requires students to contrast or compare people, places, events and concepts; convert information from one form to another; give an example; classify or sort items into meaningful categories; describe, interpret or explain issues and problems, patterns, reasons, cause and effect, significance or impact, relationships, points of view or processes. A Level 2 "describe or explain" would require students to go beyond a description or explanation of recalled information to describe or explain a result or "how" or "why."

Level 3 Complex Reasoning

Level 3 requires reasoning, using evidence, and a higher level of thinking than the previous two levels. Students would go beyond explaining or describing "how and why" to justifying the "how and why" through application and evidence. The cognitive demands at Level 3 are more complex and more abstract than Levels 1 or 2. Items at Level 3 include drawing conclusions; citing evidence; applying concepts to new situations; using concepts to solve problems; analyzing similarities and differences in issues and problems; proposing and evaluating solutions to problems; recognizing and explaining misconceptions or making connections across time and place to explain a concept or big idea.

Level 4 Extended Reasoning

Level 4 requires the complex reasoning of Level 3 with the addition of planning, investigating, or developing that will most likely require an extended period of time. The extended time period is not a distinguishing factor if the required work is only repetitive and does not require applying significant conceptual understanding and higher-order thinking. At this level the cognitive demands should be high and the work should be very complex. Students should be required to connect and relate ideas and concepts *within* the content area or *among* content areas in order to be at this highest level. The distinguishing factor for Level 4 would be evidence through a task or product that the cognitive demands have been met. A Level 4 performance will require students to analyze and synthesize information from multiple sources, examine and explain alternative perspectives across a variety of sources, and/or describe and illustrate how common themes and concepts are found across time and place. In some Level 4 performance students will make predictions with evidence as support, develop a logical argument, or plan and develop solutions to problems.

Many on-demand assessment instruments will not include assessment activities that could be classified as Level 4. However, standards, goals, and objectives can be stated so as to expect students to perform thinking at this level. On-demand assessments that do include tasks, products, or extended responses would be classified as Level 4 when the task or response requires evidence that the cognitive requirements have been met.

Historical Inquiry

The student demonstrates an understanding of the methods of documenting history by:

AH. HI 1 planning and developing history projects, utilizing research tools such as: interviewing protocols, oral history, historical context, pre-interview research, primary sources, secondary sources, proper citation, corroboration, and cause and effect of historical events. [DOK 4] (H. C1-4)

Indigenous Alaskans before western contact (time immemorial—contact)

Suggested Topics
[not an inclusive list]

- Locations
- Social organizations
- Cultures
- Political traditions
- Natural resources
- Cultural changes
- Archeology
- Native oral traditions

PEOPLE, PLACES, ENVIRONMENT	CONSUMPTION, PRODUCTION, DISTTRIBUTION	INDIVIDUAL, CITIZENSHIP, GOVERNANCE, POWER	CONTINUITY AND CHANGE
The student demonstrates an understanding of the interaction between people and their physical environment by: **AH. PPE 1** comparing and contrasting geographic regions of Alaska. [DOK 2] (G. B4, B8) **AH. PPE 2** using texts/ sources to analyze the similarities and differences in the cultural attributes (e.g., language, hunting and gathering practices, art, music/ dance, beliefs, worldview), movement, interactions, and settlement of Alaska Native peoples. [DOK 3] (G. D1, D4) **AH. PPE 3** using texts/ sources to analyze the effect of the historical contributions and/or influences of significant individuals, groups and local, regional, statewide, international organizations. [DOK 3] (H. B4)		**The student demonstrates an understanding of the historical rights and responsibilities of Alaskans by:** **AH. ICGP 1** identifying and summarizing the structures, functions, and transformation of various attributes (e.g., leadership, decision-making, social and political organization) of traditional Alaska Native governance. [DOK 2] (GC. A4)	

Colonial Era—
The Russian period
(1741-1867)

Suggested Topics
[not an inclusive list]

- Rationale for European explorations
- Epidemics
- Utilization of Alaskan resources
- Relationships with indigenous peoples
- Role of significant leaders (e.g., Katlian, Baranov, Veniaminov, Netsvetov)
- Missionary activities
- Russian dependence on Alaska Natives
- Russia's incentive to sell

PEOPLE, PLACES, ENVIRONMENT	CONSUMPTION, PRODUCTION, DISTTRIBUTION	INDIVIDUAL, CITIZENSHIP, GOVERNANCE, POWER	CONTINUITY AND CHANGE
The student demonstrates an understanding of the interaction between people and their physical environment by: **AH. PPE 2** using texts/sources to analyze the similarities and differences in the cultural attributes (e.g., language, hunting and gathering practices, art, music/dance, beliefs, worldview), movement, interactions, and settlement of Alaska Native peoples. [DOK 3] (G. D1, D4) **AH. PPE 3** using texts/ sources to analyze the effect of the historical contributions and/or influences of significant individuals, groups and local, regional, statewide, and/or international organizations. [DOK 3] (H. B4)	**The student demonstrates an understanding of the discovery, impact, and role of natural resources by:** **AH. CPD 1** identifying patterns of growth, transformation, competition, and boom and bust, in response to use of natural resources (e.g., supply and demand of fur, minerals, and whaling). [DOK 2] (G. D1)	**The student demonstrates an understanding of the historical rights and responsibilities of Alaskans by:** **AH. ICGP 2** using texts/ sources to analyze the impacts of the relationships between Alaska Natives and Russians (i.e., Russian Orthodox Church, early fur traders, Russian American Companies, enslavement, and Creoles). [DOK 3] (H. B1d)	**The student demonstrates an understanding of the chronology of Alaska history by:** **AH. CC 1** using texts/ sources to recognize and explain the interrelationships among Alaska, national, and international events and developments (e.g., international interest, trade, commerce). [DOK 3] (H. B2)

Colonial Era
The United States Period (1867-1912)

Suggested Topics
[Not an inclusive list]

- United States' motives for purchasing Russia's interest in Alaska
- Treaty of Cession
- Legal status of Alaska Natives under the Commerce Clause and the Marshall Trilogy
- Mining Law of 1872
- Organic Act of 1884
- Role of Sheldon Jackson
- Resources (e.g., whaling, fur trading, mining, commercial fisheries)
- Gold Rush
- Nelson Act of 1905 and the dual school system
- Creation of National Forests

PEOPLE, PLACES, ENVIRONMENT

The student demonstrates an understanding of the interaction between people and their physical environment by:

AH. PPE 3 using texts/sources to analyze the effect of the historical contributions and/or influences of significant individuals or groups and local, regional, statewide, and/or international organizations. [DOK 3] (H. B4)

CONSUMPTION, PRODUCTION, DISTTRIBUTION

The student demonstrates an understanding of the discovery, impact, and role of natural resources by:

AH. CPD 2 using texts/source to draw conclusions about the role of the federal government in natural resource development and land management (e.g., jurisdiction, authority, agencies, programs, policies). [DOK 3] (GC. F1)

INDIVIDUAL, CITIZENSHIP, GOVERNANCE, POWER

The student demonstrates an understanding of the historical rights and responsibilities of Alaskans by:

AH. ICGP 3 explaining and analyzing tribal and western concepts of land ownership and how acting upon those concepts contributes to changes in land use, control, and ownership. [DOK 4] (H. C7, C8)

AH. ICGP 4 explaining Alaskans' quest for self-determination (i.e., full rights as U.S. citizens) through the statehood movement. [DOK 1] (GC. C3)

AH.ICGP 5 explaining the impacts of military actions (e.g., Naval bombardment of Angoon, Aleut internment, military expeditions) relative to Native communities. [DOK 2] (H. B1)

IGCP 6 using texts/sources to analyze how the military population and its activities, including administrative, policing, defense, mapping, communication, and construction, have impacted communities. [DOK 3] (H. B2)

AH. ICGP 7 describing the historical basis of federal recognition of tribes, their inherent and delegated powers, the ongoing nature and diversity of tribal governance, and the plenary power of Congress. [DOK 1] (GC. C8)

CONTINUITY AND CHANGE

The student demonstrates an understanding of the chronology of Alaska history by:

AH. CC 2 describing how policies and practices of non-natives (e.g., missionaries, miners, Alaska Commercial Company merchants) influenced Alaska Natives. [DOK 2] (H. B4, B5)

Alaska as a Territory (1912-1959)

Suggested Topics
[Not an inclusive list]

- Territorial Organic Act of 1912
- Native efforts toward civil and land rights (e.g., founding of Alaska Native Brotherhood (ANB), Alaska Native Sisterhood (ANS), and Tanana Chiefs)
- Role of significant individuals (e.g., Judge Wickersham, William Paul, Elizabeth Peratrovich, Ernest Gruening)
- Infrastructure (e.g., railroad, aviation, roads, ships)
- Indian Reorganization Act
- World War II and internment of Aleuts and Japanese Americans
- Cold War
- National Parks and National Forests, resources (e.g., oil, timber, coal)
- Constitutional Convention, constitution, and statehood

PEOPLE, PLACES, ENVIRONMENT

The student demonstrates an understanding of the interaction between people and their physical environment by:

AH. PPE 4 describing how Alaska's strategic location played an important role in military buildup and explaining the interrelated social and economic impacts. [DOK 2] (G. A5)

CONSUMPTION, PRODUCTION, DISTTRIBUTION

The student demonstrates an understanding of the discovery, impact, and role of natural resources by:

AH. CPD 3 using texts/ sources to draw conclusions about the significance of natural resources (e.g., fisheries, timber, Swanson River oil discovery, "sustained yield" in the Alaska Constitution) in Alaska's development and in the statehood movement. [DOK 3] (G. F1, F4)

INDIVIDUAL, CITIZENSHIP, GOVERNANCE, POWER

The student demonstrates an understanding of the historical rights and responsibilities of Alaskans by:

AH. ICGP 4 explaining Alaskans' quest for self-determination (i.e., full rights as U.S. citizens) through the statehood movement. [DOK 1] (GC. C3)

AH.ICGP 5 explaining the impacts of military actions relative to Native communities (e.g., Naval bombardment of Angoon, Aleut internment, military expeditions). [DOK 2] (H. B1)

AH. ICGP 8 describing how Alaskans, particularly the Native people, challenge the status quo to gain recognition of their civil rights (e.g., appeals to the Russian government, Ward Cove Packing Co. Case, Molly Hootch, anti-discrimination acts, women's suffrage). [DOK 2] (H. B2, GC. B5)

AH. ICGP 9 exploring the federal government's influence on settlements in Alaska (e.g., Matanuska Colony, Anchorage, Adak, Tok, Hydaburg) by establishment of post offices, military facilities, schools, courts, and railroads. [DOK 1] (G. G2, H. B1)

AH. ICGP 10 identifying the role of Alaska Native individuals and groups in actively proposing and promoting federal legislation and policies (e.g., William Paul, Tanana Chiefs, ANB, ANS) [DOK 1] (H. A1, B2)

AH. ICGP 11 exploring federal policies and legislation (e.g., Alaska Citizenship Act, Tlingit-Haida Jurisdictional Act, Indian Citizenship Act of 1924, Alaska Reorganization Act, ANCSA) that recognized Native rights. [DOK 1] (H. B2)

CONTINUITY AND CHANGE

The student demonstrates an understanding of the chronology of Alaska history by:

AH. CC 3 describing how the roles and responsibilities in Alaska Native societies have been continuously influenced by changes in technology, economic practices, and social interactions. [DOK 2] (G. D4, H. B1b)

Alaska as a State (1959-present)

Suggested Topics
[Not an inclusive list]

- Role of significant individuals (e.g., Eben Hopson, Howard Rock, Ted Stevens, Katie John)
- Controversies of Statehood Act land selections
- Disasters (e.g., 1964 Earthquake, 1967 Interior flood, Exxon Valdez oil spill)
- Formation of Inuit Circumpolar Conference
- Formation of AFN
- Development of public education (e.g., Molly Hootch case)
- Prudhoe Bay and oil pipeline construction
- Permanent Fund
- Alaska Native Claims Settlement Act (ANCSA)
- Marine Mammal Protection Act 1972 (MMPA)
- Alaska National Interest Lands Conservation Act (ANILCA)
- Indian Self-Determination Act 1975
- Indian Child Welfare Act 1978
- Arctic National Wildlife Refuge (ANWR)
- Tourism
- Fiscal issues

PEOPLE, PLACES, ENVIRONMENT

The student demonstrates an understanding of the interaction between people and their physical environment by:

AH. PPE 4 describing how Alaska's strategic location played an important role in military buildup and explaining the interrelated social and economic impacts. [DOK 2] (G. A5)

AH. PPE 5 comparing and contrasting the differing perspectives between rural and urban areas. [DOK 2] (H. B1b, C. E4)

AH. PPE 6 analyzing patterns of movement and settlement. [DOK 2] (H. B4, G. D3)

AH. PPE 7 using texts/ sources to explain the political, social, cultural, economic, geographic, and historic characteristics of the student's community or region. [DOK 3] (H. B1b, C. E2, E8)

CONSUMPTION, PRODUCTION, DISTTRIBUTION

The student demonstrates an understanding of the discovery, impact, and role of natural resources by:

AH. CPD 4 describing the federal government's construction and maintenance of Alaska's infrastructure (e.g., transportation, communication, public health system, education). [DOK 1] (G. D4)

AH. CPD 5 using texts/ sources to analyze the multiple perspectives in the continuing debate between conservation and development of resources. [DOK 3] (G. E4, F3)

AH. CPD 6 describing the formation of Alaska Native Corporations and their impact on Alaska's economy. [DOK 2] (GC. F9)

AH. CPD 7 explaining the creation and implementation of the Permanent Fund and how it has impacted the state. [DOK 2] (GC. F9)

INDIVIDUAL, CITIZENSHIP, GOVERNANCE, POWER

The student demonstrates an understanding of the historical rights and responsibilities of Alaskans by:

AH. ICGP 3 explaining and analyzing tribal and western concepts of land ownership and how acting upon those concepts contributes to changes in land use, control, and ownership (e.g., ANCSA, ANILCA). [DOK 4] (H. C7, C8)

AH. ICGP 8 describing how Alaskans, particularly the Native people, challenge the status quo to gain recognition of their civil rights (e.g., appeals to the Russian government, Ward Cove Packing Co. Case, Molly Hootch, anti-discrimination acts, women's suffrage). [DOK 2] (H. B2, GC. B5)

AH. ICGP 10 identifying the role of Alaska Native individuals and groups in actively proposing and promoting federal legislation and policies (e.g., William Paul, Tanana Chiefs, ANB, ANS) [DOK 1] (H. A1, B2)

AH. ICGP 12 using texts/ sources to analyze the evolution of self-government through an examination of organic documents (i.e., Treaty of Cession, Organic Act, Territorial Act, Alaska State Constitution, Statehood Act). [DOK 3] (H. B2, B4)

CONTINUITY AND CHANGE

The student demonstrates an understanding of the chronology of Alaska history by:

AH. CC 4 giving correct and incorrect examples to explain subsistence as a way of life. [DOK 2] (H. B1b)

AH. CC 5 defining, describing, and illustrating the economic, political, and social characteristics of the major periods, their key turning points (e.g., implementation of Prudhoe Bay pipeline, Molly Hootch case, ANCSA, ANILCA, ANWR, natural and manmade disasters, establishment of Alaska Native Corporations) and how they interrelate. [DOK 4] (H. B2)

AH. CC 6 explaining the historical context and the legal foundations (e.g., Alaska Constitution, ANCSA, MMPA, ANILCA, Katie John case) pertinent to subsistence. [DOK 1] (GC. A2, C. A4)

AH. CC 7 comparing and contrasting the perspectives of sport, commercial, and subsistence users on policies regarding fish and game management. [DOK 2] (G. E4, F5)