

Science for Students with Significant
Disabilities
Part 4 of 5

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10th Grade MC 1.B.3

Investigate the Importance of Water

Molecules and Cells	Content Standard 1: Students shall demonstrate an understanding of the role of chemistry in life processes.				
<i>Student Learning Expectation</i>	<i>Essence of Student Learning Expectation</i>	Less Complex  More Complex			
MC.1.B.3 Investigate the properties and importance of water and its significance for life: <ul style="list-style-type: none"> • surface tension • <i>adhesion</i> • <i>cohesion</i> • <i>polarity</i> • <i>pH</i> 	*Investigate why the properties of water are important to life	Determine the effects of water on living things Example: Using two (2) plants, water one plant, do not water the other; record observations of both plants	*Investigate the properties of water and relate to a function in living things *Example: Conduct penny activity demonstrating surface tension and cohesion of water See Appendix	*Investigate the properties of water and relate to a function in living things *Example: Conduct celery activity demonstrating adhesion and cohesion See Appendix	*Research the effects of water deprivation on living things *Example: Respond to one or more writing prompts (e.g., investigate the effects of prolonged dehydration on the human body)

Investigate the properties and importance of water and its significance for life: Dehydrated Blueberries



The student is learning about the importance of water and its significance for life. She has been given a dehydration experiment to see what happens when blueberries are deprived of water. 1. She begins by weighing the fresh blueberries. 2. She communicates using talk buttons. She states the fresh blueberries weigh 1 pound. 3. They place the blueberries on the dehydrator.

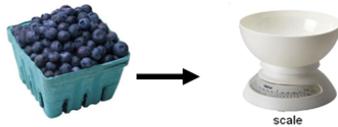


Work samples add to evidence by showing comprehension and understanding of the task.

Dehydration: The Importance of Water and its Significance for Life

Directions: Follow the steps to conduct the experiment and answer the questions pertaining to your findings.

1. Place the fresh blueberries on the kitchen scale.

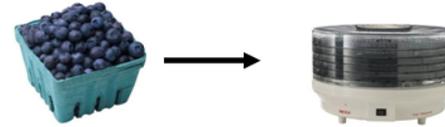


2. Weigh the fresh blueberries.



3. How much do the fresh blueberries weigh? _____

4. Place the fresh blueberries into the dehydrator.



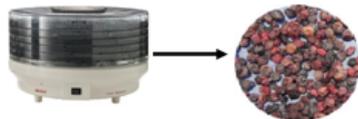
5. Press the switch to turn on the dehydrator.



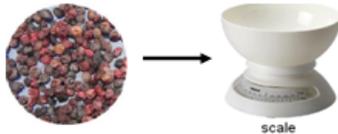
6. Observe the blueberries for the next four days.



7. Take the dehydrated blueberries out of the dehydrator.



8. Place the dehydrated blueberries on the scale.



9. Weigh the dehydrated blueberries.



10. How much do the dehydrated blueberries weigh? _____

11. How did the blueberries look before you placed them in the dehydrator?



12. How did the blueberries look after you placed them in the dehydrator?



13. Why did the blueberries shrivel and dry up?



Resurrection Plant Experiment

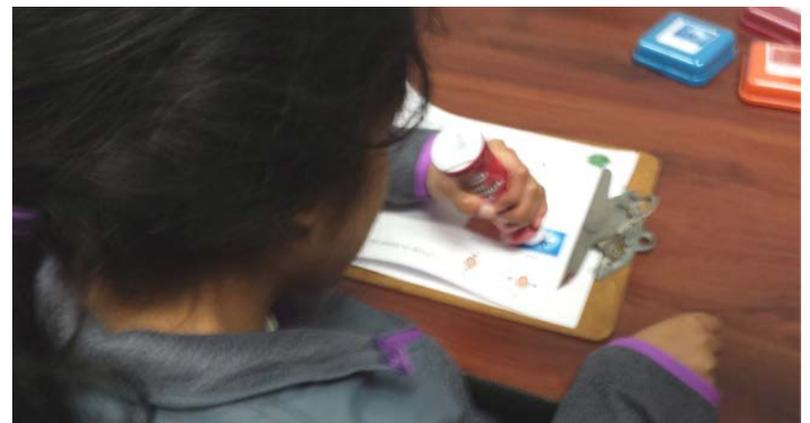


1. The student is learning about the importance of water and its significance for plant life. She is given an experiment to test the effects of water on a resurrection plant. 2. She pours the rocks into the bowl. 3. She then places the bulb inside the bowl. 4. The student is unable to independently pour the water into the bowl. She is provided with a switch and a measuring cup that is switch activated. She presses the switch to pour the water into the bowl.





5. Stephanie watches the plant for the next four hours. The plant has fully open and turned green after four hours. 6. She answers the question pertaining to how long the resurrection of the plant took. Stephanie identifies the number four and presses the talk button to communicate her answer. She glues the answer on her worksheet in the space provided. 7. When asked what made the plant grow, Stephanie presses the talk button with the water picture/word icon to communicate her answer. 8. She records her answer on the worksheet using a Bingo dauber.



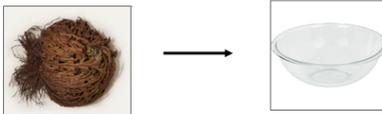
Importance of Water for Plant Life

Directions: Conduct the experiment using the Resurrection plant and answer the questions pertaining to your findings.

1. Place the rocks inside the bowl.



2. Place the Resurrection plant inside the bowl.



3. Add 1 cup of water to the bowl.



4. How does the plant look right now?



5. Make a prediction of how the plant will look in 1 hour.



6. Make a prediction of how the plant will look in 2 hours.



Resurrection Plant

Why is Water so Important?

Water keeps us healthy.

Water keeps us clean.

Water helps things grow.

Water is used as energy.

Water is used for sanitation.

Water is used to dispose of waste.



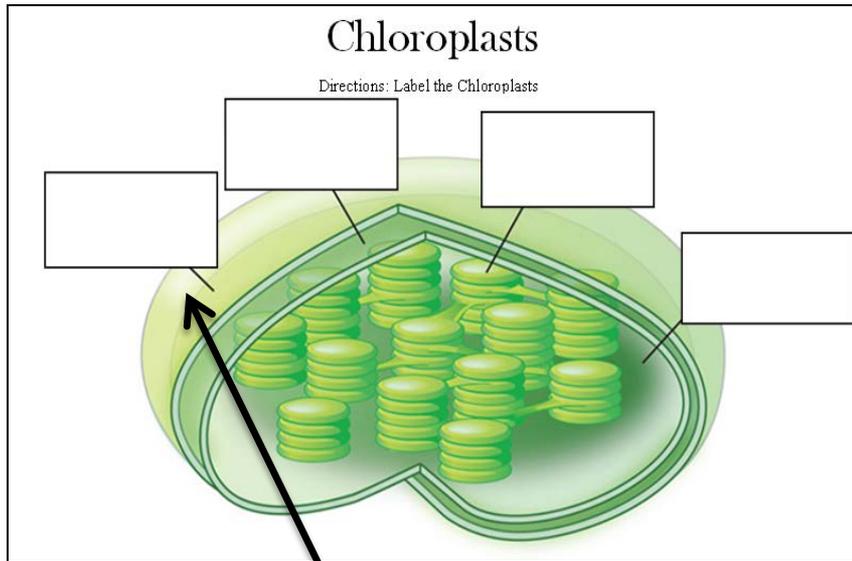
Picture Choices to complete worksheet.

10th Grade MC 3.B.1

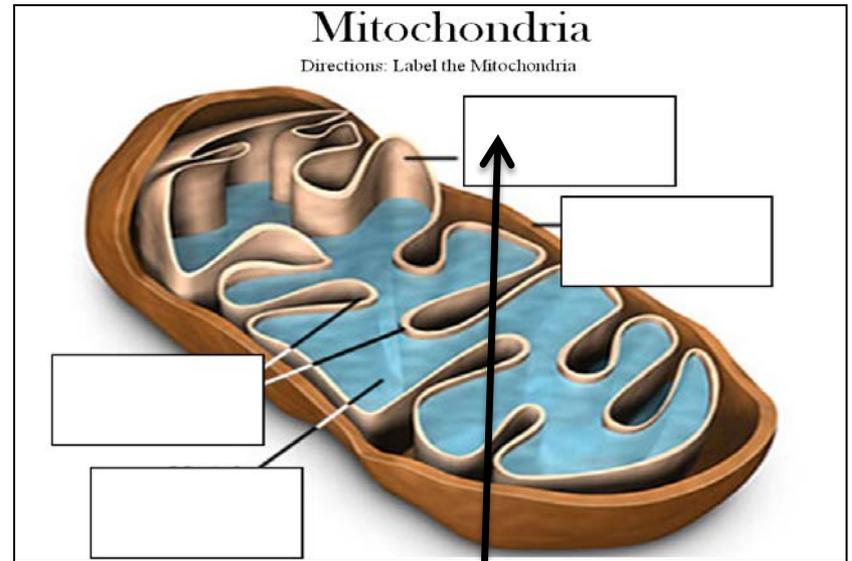
Mitochondria & Chloroplasts

Molecules and Cells	Content Standard 3: Students shall demonstrate an understanding of how cells obtain and use energy (<i>energetics</i>).				
<i>Student Learning Expectation</i>	<i>Essence of Student Learning Expectation</i>	Less Complex  More Complex			
MC.3.B.1 Compare and contrast the structure and function of <i>mitochondria</i> and <i>chloroplasts</i>	*Demonstrate how animal cells and plant cells get their energy	*Compare plant and animal cell structures that function in energy conversion *Example: Label chloroplasts and mitochondria on diagrams of animal and plant cells (mitochondria are located in both animals and plants, chloroplasts are located in plants only)	*Model the structure of chloroplasts and mitochondria in cells *Example: Create a simplified model of a plant cell highlighting chloroplasts and mitochondria and a simplified model of an animal cell highlighting mitochondria	*Compare and contrast the structure and function of mitochondria and chloroplasts *Examples: Create a Venn diagram or T-chart; write a paragraph	*Describe the relationship between mitochondria and chloroplasts in the functions of photosynthesis and cellular respiration *Examples: Create a flowchart or diagram; write a paragraph; experiment with oxygen production using Elodea and snail Resources: Cells See Appendix
Resources: United Streaming, Cells					

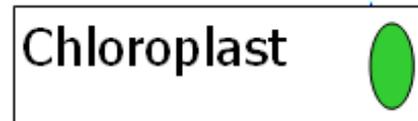
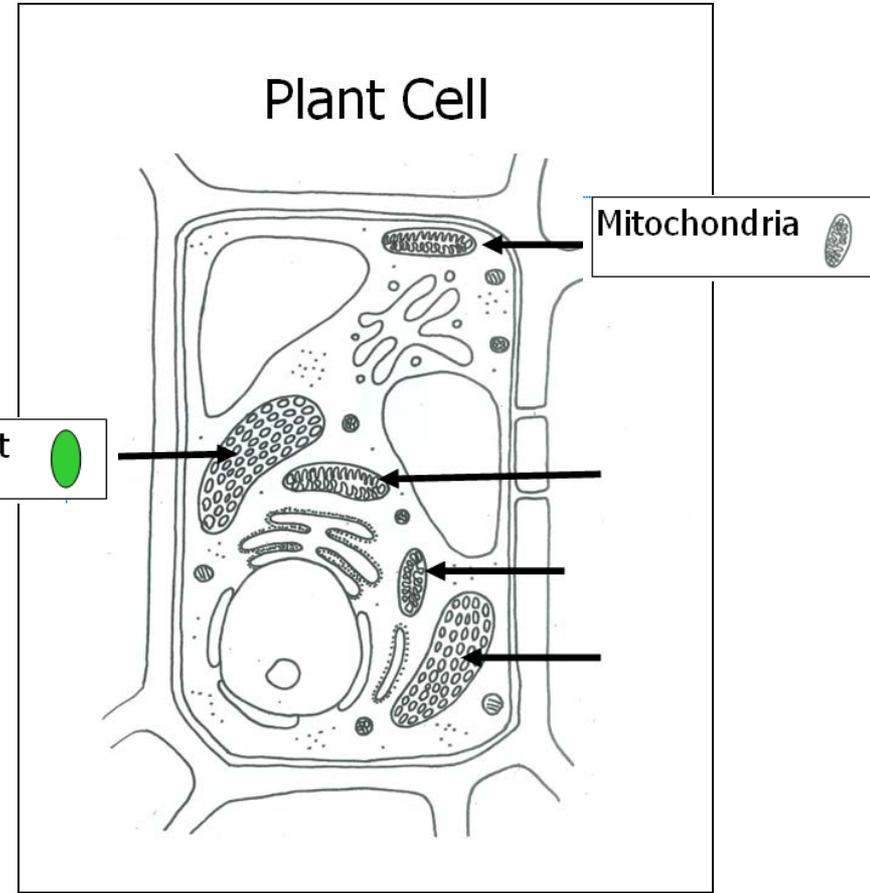
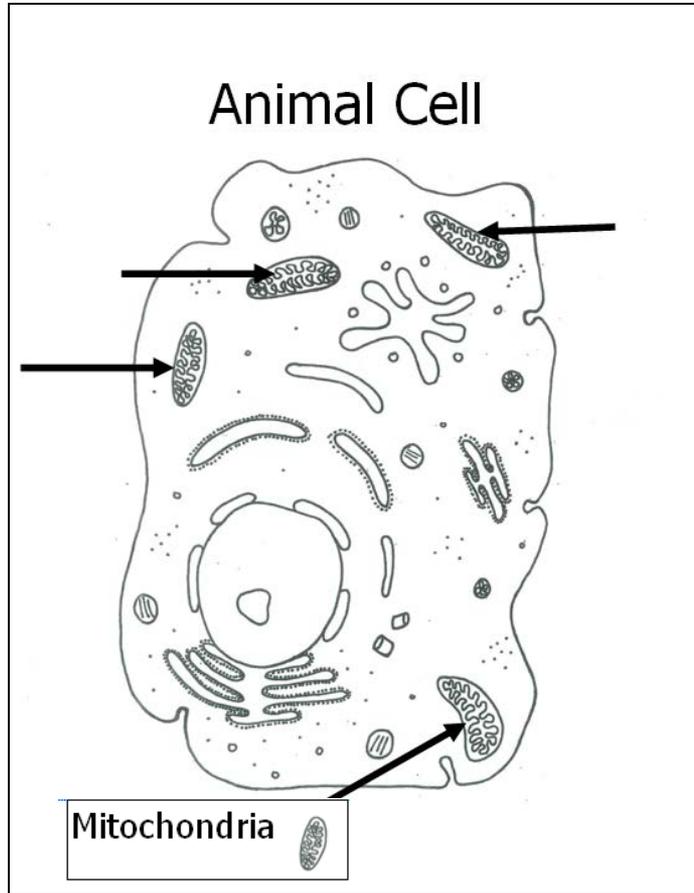
Chloroplasts & Mitochondria



Thylakoid		Outer Membrane	
Stroma		Inner Membrane	



Cristae		Inner Membrane	
Matrix		Outer Membrane	



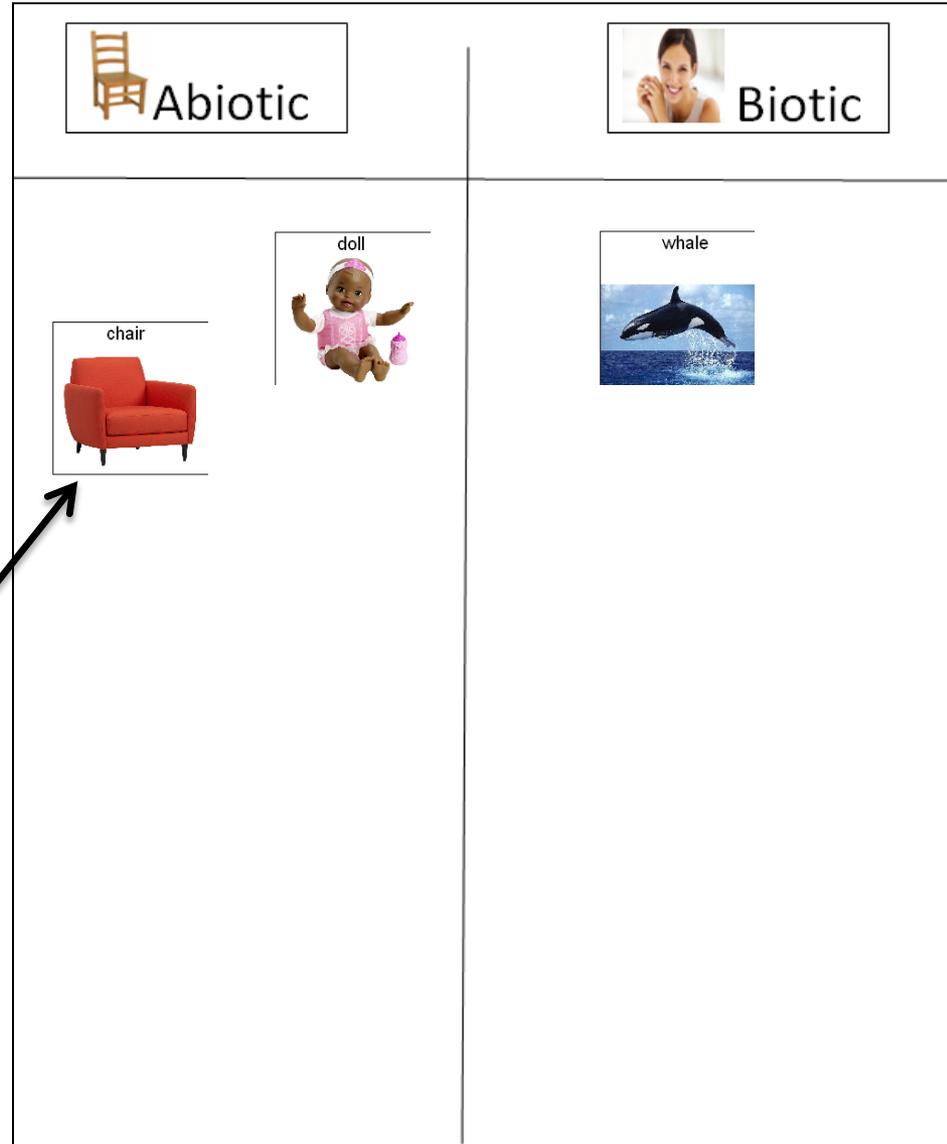
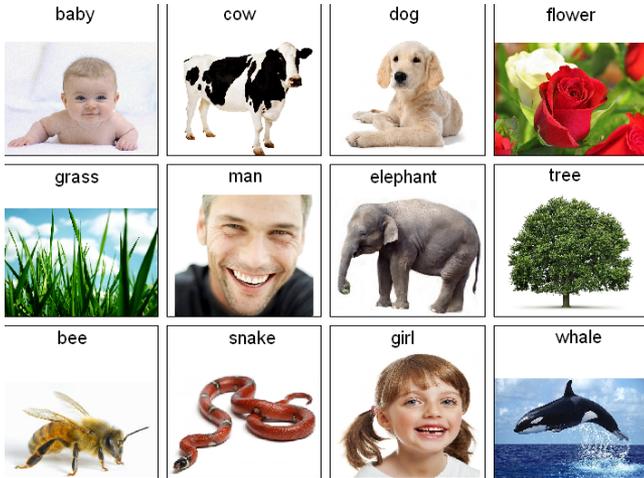
Biotic or Abiotic



1. The student is learning to distinguish between living (biotic) and non-living (abiotic) things. She is shown a chair and asked if it is a living or non-living item. Because she is non-verbal she is provided with a communication device to assist her in communicating her responses. She presses the button with the photo /word card "Abiotic". 2. Next she is shown a classmate and asked if he is biotic/ abiotic , she uses the device to correctly communicate "Biotic". 3 & 4. She continues the task by sorting photo magnets by objects that are biotic or abiotic.



Biotic or Abiotic



Biotic or Abiotic



1. This student is blind and is asked to feel objects in his environment and identify them as biotic or abiotic. 2. He correctly identifies the grass as biotic and the artificial turf as abiotic. 3. He continues to identify the items requested. 4. The student is then given items representing living and non-living objects. He must feel the item then identify it verbally then sort it on the chart provided. NOTE: The words are typed in Braille and the chart is outlined in puff paint so the student can feel the lines of separation.



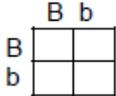
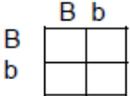
Biotic or Abiotic



The student is then given items representing living and non-living objects. He must feel the item then identify it verbally then sort it on the chart provided. NOTE: The words are typed in Braille and the chart is outlined in puff paint so the student can feel the lines of separation.



10th Heredity

Heredity and Evolution		Content Standard 4: Students shall demonstrate an understanding of <i>heredity</i> .			
Student Learning Expectation	Essence of Student Learning Expectation	Less Complex → More Complex			
HE.4.B.1 Summarize the outcomes of Gregor Mendel's experimental procedures Resources: Genetics, United Streaming	*Compare dominant and recessive traits	Identify traits of plants and animals given real examples or photographs *Example: Identify traits, such as height, hair color, eye color, flower color Resources: Animals and Plants	Sort plants or animals based on dominant and recessive traits given real examples or photographs Examples: Sort by tall/short, dark hair/light hair, dark eyes/light eyes	Distinguish traits as dominant or recessive *Examples: Give specific examples of dominant and recessive traits using pictures, charts, or case studies of various traits	*Explain how offspring acquire dominant and recessive traits (e.g., guinea pigs, pea plants) *Example: Create imaginary animal with dominant and recessive traits (Reebops activity) Resources: Genetics
HE.4.B.3 Use the <i>laws</i> of probability and <i>Punnett squares</i> to predict <i>genotypic</i> and <i>phenotypic ratios</i> Resources: Genetics, United Streaming	Predict appearance of organisms based on inherited genes	Identify inherited traits Example: Match offspring to parents using picture cards of living things (e.g., chick to chicken, puppy to dog)	Predict the appearance of offspring based on observation of parents Example: Use picture cards depicting various traits such as height, hair color, eye color, flower color	Predict appearance of offspring using manipulatives with a pre-constructed Punnett square Example: Use colored candy or checkers 	Complete a Punnett square to predict the appearance of offspring Example: 

Punnett Squares

Punnett Square

Directions: Complete the Punnett Square to predict the appearance of the offspring.

B=Black Coat (dominant) **b= White Coat (recessive)**



BB
Dad has black coat.



bb
Mom has white coat.

	B Black Coat 	B Black Coat 
b  White Coat		
b  White Coat		

Circle the correct answer below



Offspring has white coat.



Offspring has black coat.



BB=Curly Hair (dominant) **bb=Straight Hair (recessive)**



BB
Mom has curly hair.



bb
Dad has straight hair.

	B Curly Hair 	B Curly Hair 
b  Straight Hair		
b  Straight Hair		

Circle the correct answer below



Offspring has straight hair.



Offspring has curly hair.

If student cannot write, provide picture cues for him to complete the Punnett Square.



Human Heredity Traits

Directions: Look at the different human traits and determine which baby belongs to each set of parents



Asian



African American



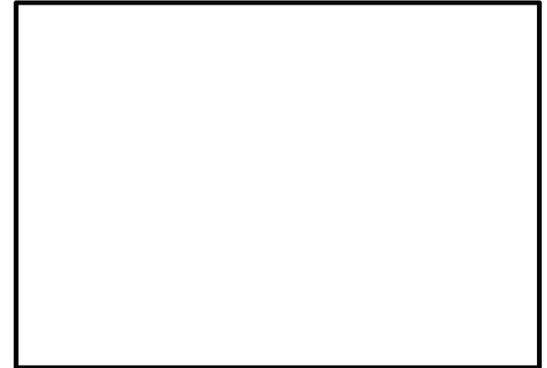
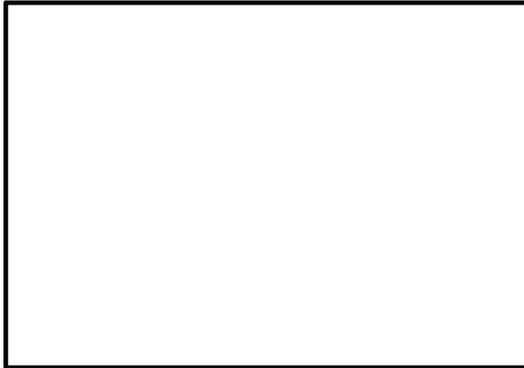
Caucasian



Animal Heredity Traits

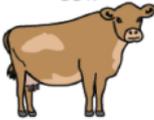
HE 4.B.3

Directions: Look at the different animal traits and determine which baby goes with the mother. Glue the correct baby under its mother.



Animal Heredity Traits

Animal Matching Sheet

Baby Animals	Adult Animals	Baby Animals	Adult Animals
	kangaroo 		deer 
	panda 		eagle 
	frog 		cow 
	chicken 		goat 

Baby Animal Sheet

fawn 	tadpole 	cub 	eaglet 
kid 	calf 	chick 	joey 

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1. Do all baby animals look just like their matching adults? 

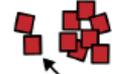
yes



no



some



2. Did the names of the baby and adult help to match them together? 

yes



no



sometimes



Inherited Traits

HE.4.B.1 Inherited Traits

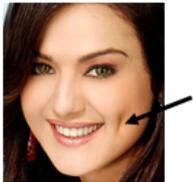
Identify the traits of the students in your class. Mark your findings on the graph and answer the questions pertaining to your findings.



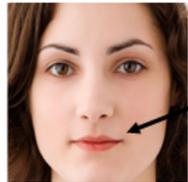
Can roll tongue



Can't roll tongue



Dimples



No Dimples



Widow's Peak



No Widow's Peak



Attached Earlobes



Unattached Earlobes

Inherited Traits

7								
6								
5								
4								
3								
2								
1								
Trait								

Provide a non-verbal student a voice out put device to question his/her peers. Use a stamp or dauber to mark the results if the student is unable to mark the box using a writing tool.

1. How many students inherited the ability to roll their tongue?



1	2	3	4	5	7
---	---	---	---	---	---

2. How many students inherited the widow's peak?



1	2	3	4	5	7
---	---	---	---	---	---

3. How many students inherited dimples?



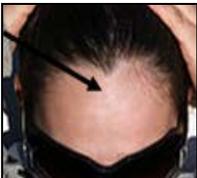
1	2	3	4	5	7
---	---	---	---	---	---

4. How many students inherited attached earlobes?



1	2	3	4	5	7
---	---	---	---	---	---

5. Which of these traits did you inherit?

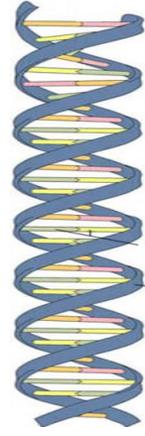
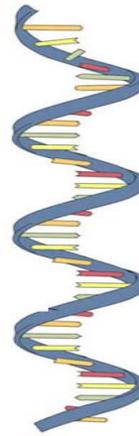
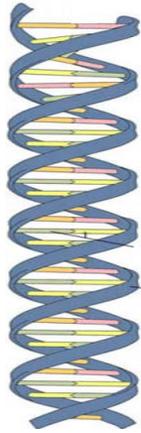
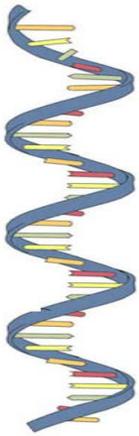
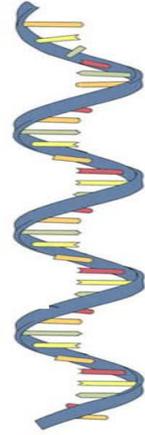
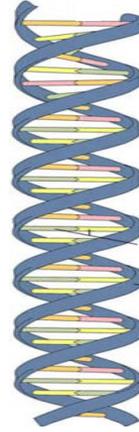
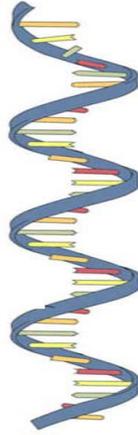
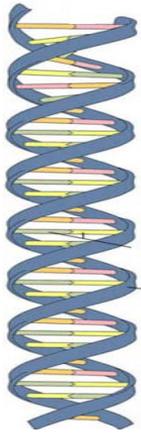


10th Grade HE 5.B.3

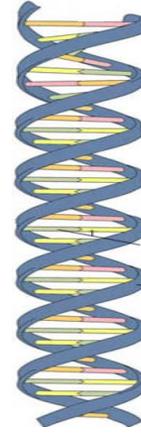
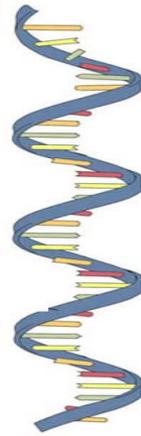
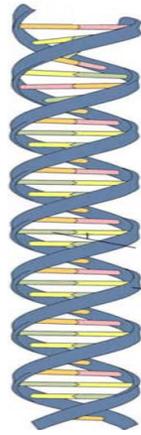
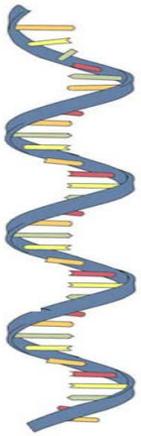
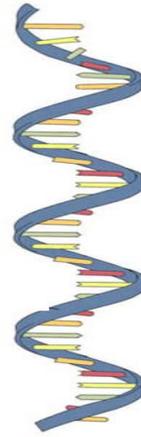
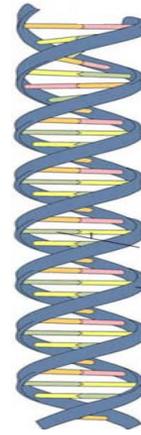
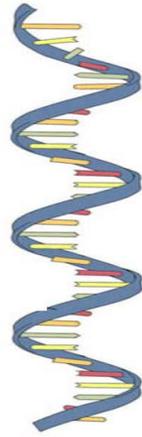
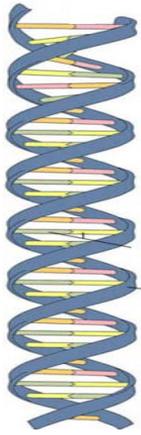
Compare and contrast *DNA and RNA*

Heredity and Evolution	Content Standard 5: Students shall investigate the molecular basis of genetics.				
Student Learning Expectation	Essence of Student Learning Expectation	Less Complex  More Complex			
<p>HE.5.B.3 Compare and contrast the structure and function of <i>DNA</i> and <i>RNA</i></p> <p>Resources: Genetics, United Streaming</p>	<p>Identify the differences between DNA and RNA</p>	<p>Recognize DNA (double strand) and RNA (single strand) models</p> <p>Examples: Models made of licorice candy, pull and peel candy, yarn, string cheese</p>	<p>Distinguish between the appearances of DNA and RNA</p> <p>Examples: Sort materials by appearance such as a zipper, string, string cheese, fabric hook and loop fasteners, pull and peel candy</p>	<p>Depict or illustrate the appearances of DNA and RNA</p> <p>*Example: Label or assemble a model of DNA and RNA</p> <p>Resource: Genetics</p>	<p>Make 3-D models of DNA and RNA and identify their functions</p> <p>*Examples: Design a puzzle; create model from marshmallows and toothpicks</p>

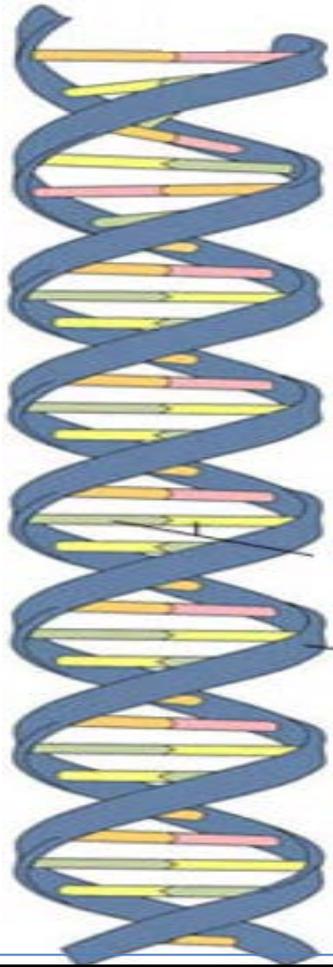
DNA is a double helix. Mark the DNA.



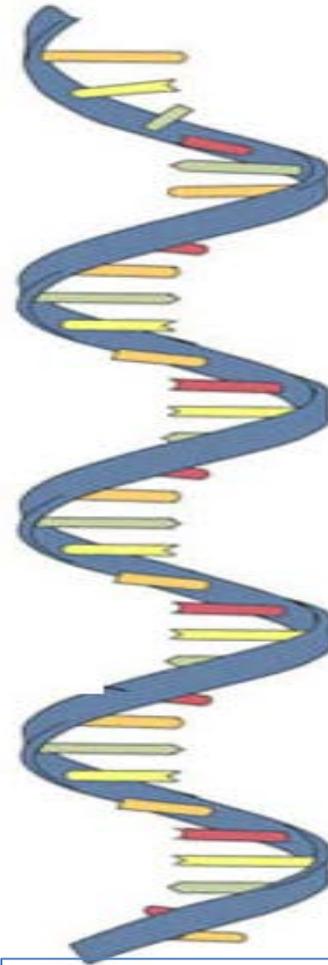
RNA is a single helix. Mark the RNA.



Have the student label each strand after identifying each on the previous work samples.



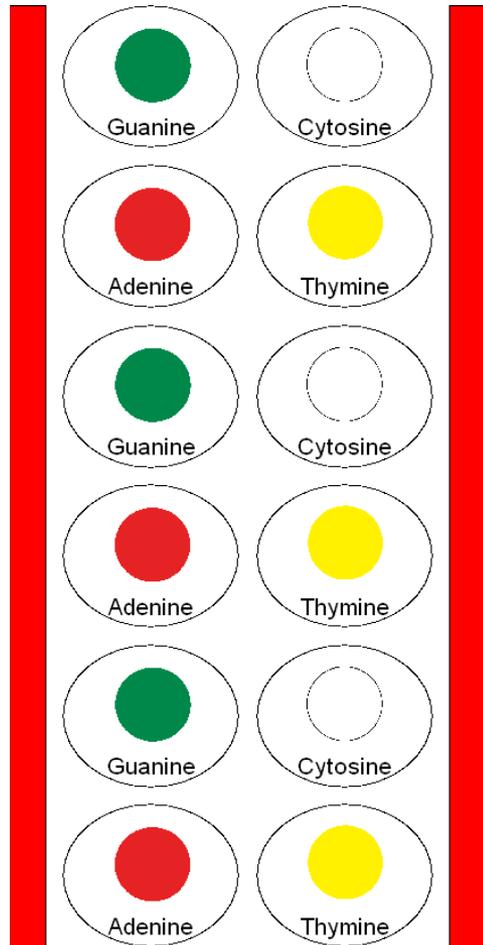
DNA



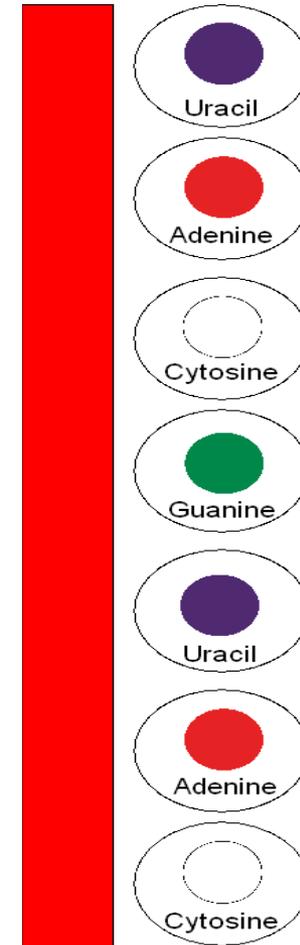
RNA

Candy RNA and DNA Models

Candy DNA Model

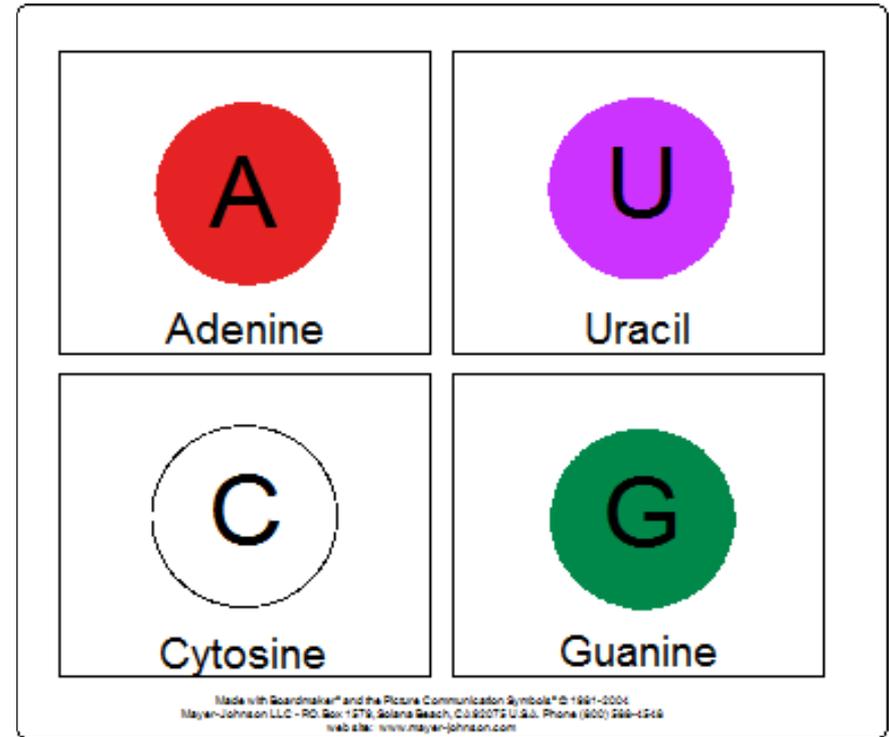
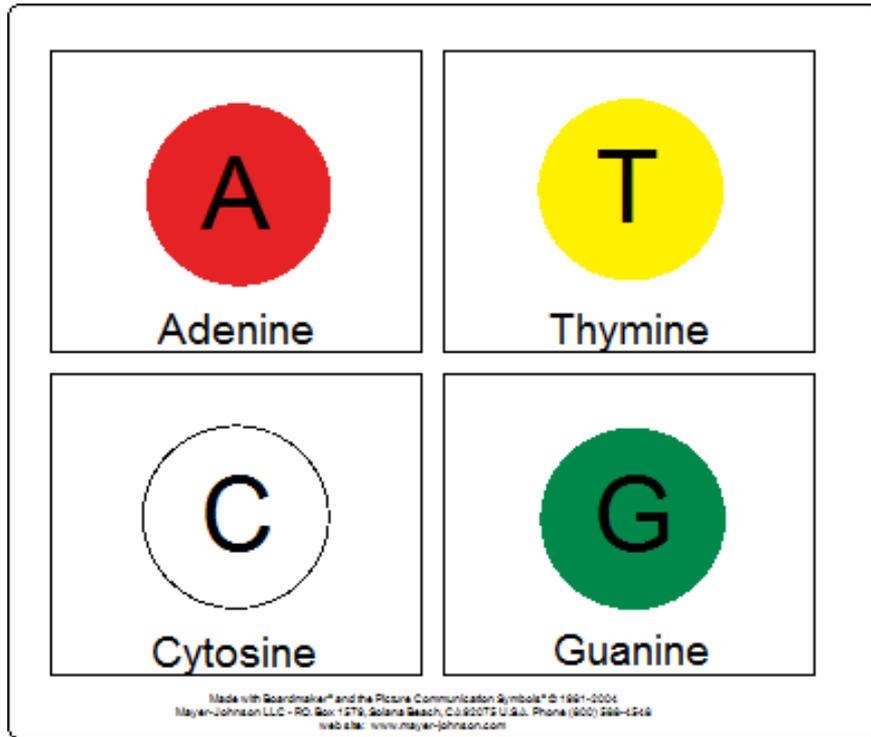


Candy RNA Model



Use gum drops and twizzles to represent the , have the student place them on the model then use tooth picks to put the candy pieces together.

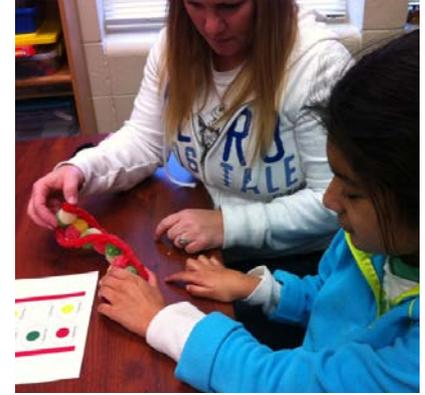
Communication Overlays



Use the overlays on a communication device or provide the individual cards for the student to point to while communicating which nitrogenous base is needed to build the model.



1. The student is learning to recognize that DNA is a double strand made of base pairs AT and CG while and RNA has a single strand. She has been provided with a paper model and manipulatives (Twizzlers, gum drops, and popsicle sticks) and directed to look at the illustration and create a candy Model of DNA. 2. Her teacher asks her what is the first base on the illustration. She correctly identifies the Green G button on the voice out-put device to state "Guanine". 3. She places the green gum drop on the illustration. 4. She then identifies the Cytosine as the base pair for the Guanine by pressing the C button on the device.



5. She continues to identify the bases for the DNA model and placing them on the model. 6. Once she has completed the task of laying out the manipulatives, she uses popsicle sticks to build the DNA Model. Due to fine motor limitations, she requires much assistance with this portion of the task. 7. Once the model is complete, they twist it to demonstrate the way the two strands wind around each other. 14. Stephanie has successfully demonstrated the ability to use manipulatives to show how DNA has a double strand with base pairs.

5th and 10th Grade

HE.6.B.5/ ESS.9.5.1 Fossils

Heredity and Evolution	Content Standard 6: Students shall examine the development of the <i>theory of biological evolution</i> .				
Student Learning Expectation	Essence of Student Learning Expectation	Less Complex \longrightarrow More Complex			
HE.6.B.5 Evaluate <i>evolution</i> in terms of evidence as found in the following: <ul style="list-style-type: none"> • fossil record • <i>DNA</i> analysis • <i>artificial selection</i> • morphology • embryology • <i>viral evolution</i> • geographic distribution of related <i>species</i> • <i>antibiotic</i> and <i>pesticide resistance</i> in various organisms Resources: Evolution, United Streaming	Recognize that the theory of evolution is supported by evidence	Recognize that organisms leave proof of their existence Examples: Place a finger in mud or plaster, fingerprint; cooking activities that use moldings	Identify specific evidences of evolution *Example: Create a representation of how fossils can be found in various layers on the Earth's surface	Construct a model of a fossil Examples: Create drawing, clay model, or plaster model of a fossil	Research evidences of fossil records *Examples: Report on fossils found in Arkansas; create slide presentation on fossils found in Arkansas

Fossils



1. The student is given the task of creating and identifying prehistoric fossils.



2. The student looks at the play dough fossil he has made. It is a Trilobite. He is given two talk buttons with the recorded names and photos of two fossils. He looks at the choices.



3. He correctly identifies the fossil by touching the talk box with the Trilobite fossil picture



4. He glues the Trilobite picture on the worksheet. He has recognized that organisms leave proof of their existence in the form of fossils.

Fossil Molds

Name _____

Ammonite



Chirostenotes Claw

Ammonite

King Crab

Trilobite



Trilobite

Gryodus

Sea Star



Sea Star

Ammonite



King Crab



Chirostenotes Claw



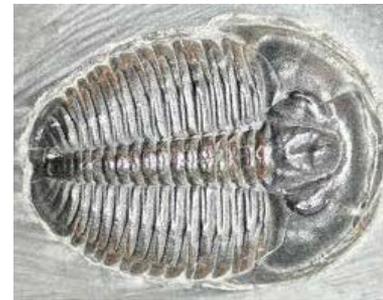
Gryodus



Sea Star



Trilobite





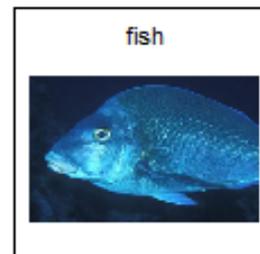
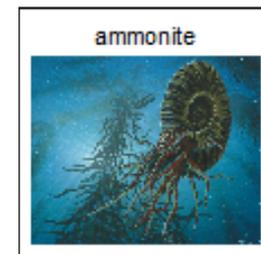
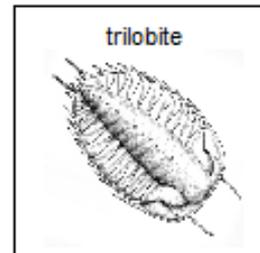
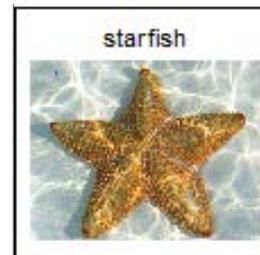
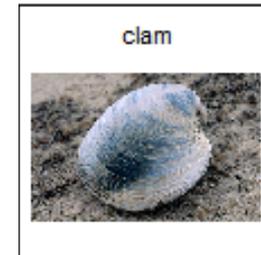
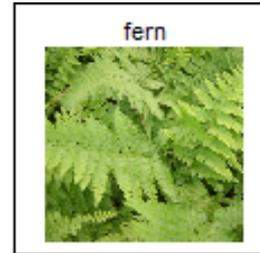
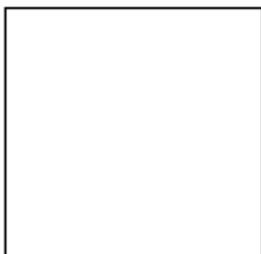
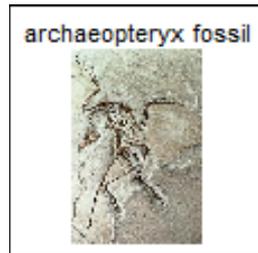
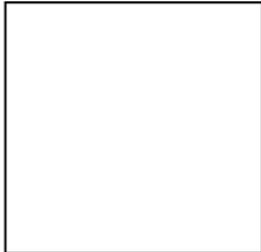
After a lesson on the theory of biological evolution, the student with visual impairments was given a fossil mold made from play dough. He was then given two objects and asked to identify which item made the fossil. He correctly identified organisms by feeling their “fossil”.



Fossils

HE.6.B.5/ ESS.9.5.1

Match the picture of the organism to its fossil record.



Model of a Fossil

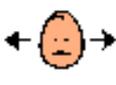
Make a model of a fossil to demonstrate how organisms leave behind proof of their existence.

What you will need:



What you do:



1.	Prepare the Plaster of Paris according to the package directions. Put it in a pan.	
2.	Press leaves, bones, feathers, or your hand into the plaster to make a clear, detailed impression.	
3.	Remove the objects and let the plaster mixture harden.	
4.	Can you identify what made the plaster fossil?	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>yes</p>  </div> <div style="text-align: center;"> <p>no</p>  </div> </div>

Must include photos if choosing to do an experiment. This is simply the directions for completing the experiment.

5th and 10th Grade LS.4.5.16/EBR.9.B.1 Human Effects on Environment

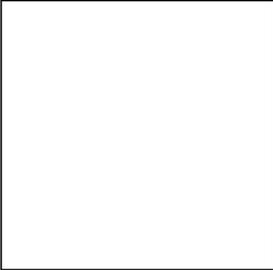
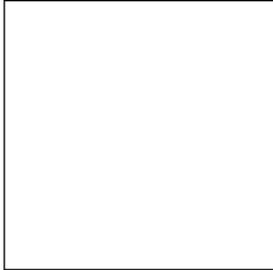
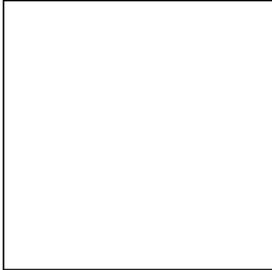
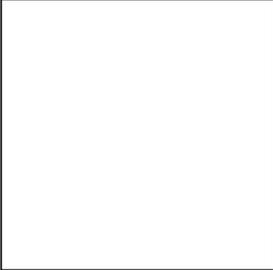
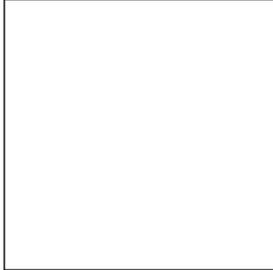
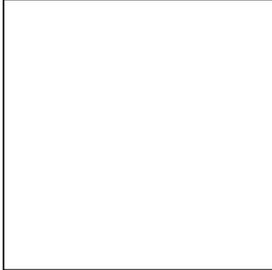
Life Science	Content Standard 4: Populations and Ecosystems: Students shall demonstrate and apply knowledge of populations and ecosystems using appropriate safety procedures, equipment, and technology.				
Student Learning Expectation	Essence of Student Learning Expectation	Less Complex → More Complex			
Grade 5					10th Grade
LS.4.5.16- Evaluate positive and negative human effects on ecosystems.	Recognize human impact on the environment.	Identify human effects. Positive Examples: --planting trees --recycling --picking up trash	Identify human effects. Negative Examples: --littering --oil spills --forest fires --cars and smog	Make a positive impact on the environment. Examples: --pick up trash --recycle --animal feeders --plant trees/flowers	Research positive and/or negative human impact on the environment using the Internet.

Ecology and Behavioral Relationships	Content Standard 9. Students shall demonstrate an understanding of the ecological impact of global issues.				
Student Learning Expectation	Essence of Student Learning Expectation	Less Complex → More Complex			
Grade 5					10th Grade
EBR.9.B.1 Analyze the effects of human <i>population</i> growth and <i>technology</i> on the environment/ <i>biosphere</i> Resources: Ecology	Describe effects that humans have on the environment	Recognize that humans affect the environment Examples: Pollution, global warming, picking up trash, recycling	Identify positive and negative human effects on the environment Examples: Construct a list of ways to conserve energy; create flyers and/or brochures	Predict the effects of human population growth on the environment Examples: Food shortage, loss of habitat, extinct species	Research positive/negative human impacts on the environment Examples: Create an informative poster, report, or multi-media presentation defending the protection of an endangered species

Human Effects on the Environment

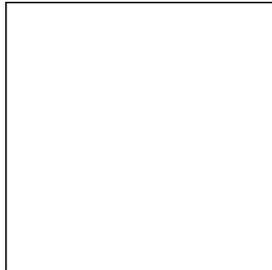
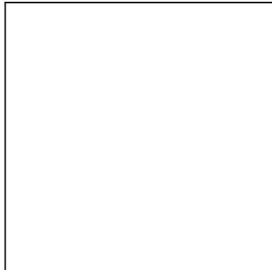
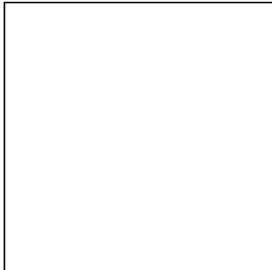
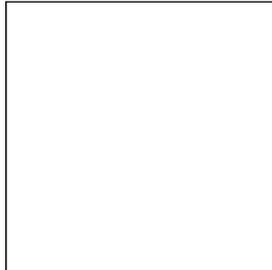
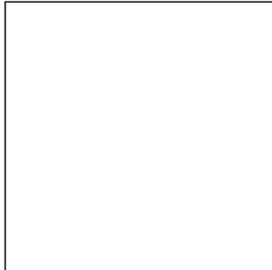
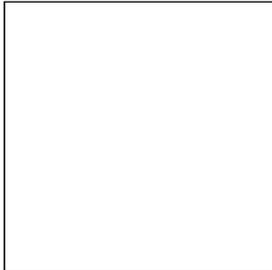
Positive Human Effects on the Environment

Identify which photos show a positive human effect on the environment.

		
planting trees	recycling paper and cans	feeding birds
		
picking up trash	making compost	recycling plastic bags

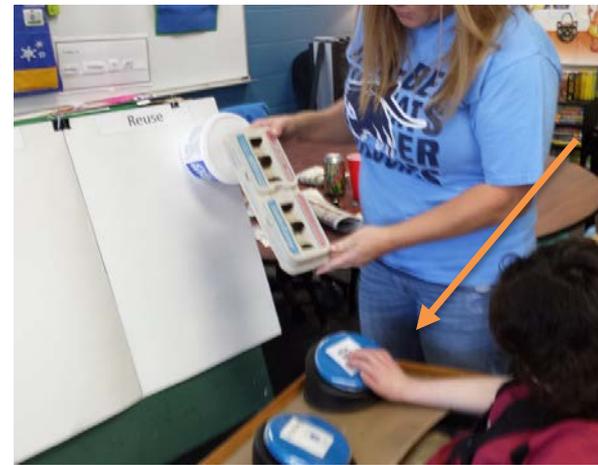
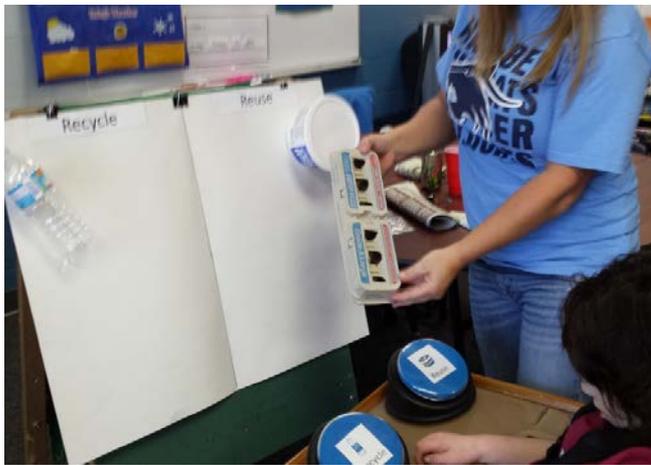
Negative Human Effects on the Environment

Identify which photos show a negative human effect on the environment.

		
littering along roads	oil spills on animals	forest fires
		
cars and smog	oil spills on beaches	air pollution from factories





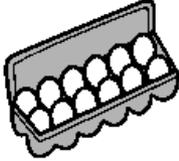


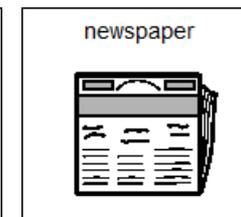
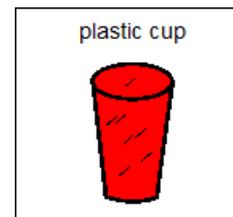
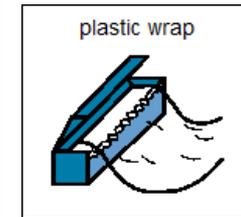
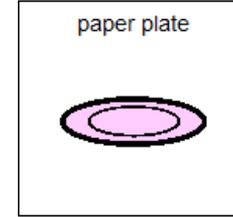
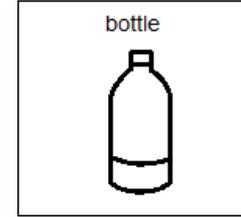
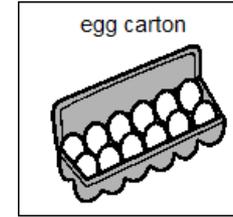
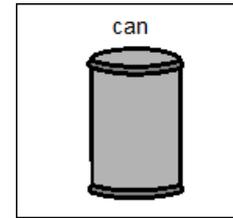
1. During a lesson on recycling, the student demonstrates that humans can have positive effects on the environment by recycling or reusing items. Her teacher discusses ways to recycle or reuse various household items. She is provided with a T-Chart with the titles "Recycle" or "Reuse" and two Big Mac switches with the same titles. She is instructed to use the switches to verbalize her responses. She listens as her teacher asks her if she should recycle or reuse an egg carton. 2. She correctly identifies the egg carton as an item that could be reused. 3. When asked if a red solo cup could be recycled or reused, 4. she correctly states reused by pressing the correct button.



Save Our Planet

Directions: Think of positive ways you can impact our planet. Sort the pictures in to the correct column.

<p>Recycle</p> 	<p>Reuse</p> 
	



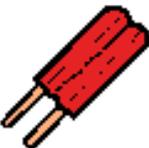
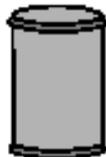
Directions: Think of positive ways you can impact our planet.
Sort the pictures into the correct column.

Reduce

Reuse

Recycle

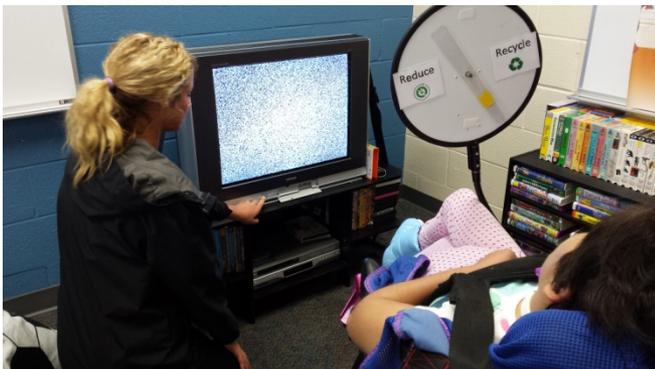
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<p>use both sides of paper</p> 	<p>newspaper</p> 	<p>old tire</p> 	<p>cereal box</p> 	<p>reuse plastic bag</p> 	<p>reuse plastic wrap</p> 
<p>milk carton</p> 	<p>popsicle sticks</p> 	<p>glass jar</p> 	<p>turn off water</p> 	<p>turn off light</p> 	<p>turn off TV</p> 
<p>unplug things</p> 	<p>can</p> 	<p>coke bottle</p> 	<p>soda cans</p> 	<p>reuse wrapping paper</p> 	<p>cell phone</p> 
<p>recycle papers</p> 	<p>jug</p> 	<p>plastic bottle</p> 	<p>baby bottle</p> 	<p>cloth diaper</p> 	

Demonstrate Positive Human Effects



1. The student is learning positive effects humans have on their environment. After a lesson in reducing and recycling, She is directed to identify examples of reducing and recycling. Her peer helper turns off the lights to demonstrate ways to reduce electricity. 2. She is given a Clock Communicator to help her communicate her responses. The device has the words/icons for Reduce and Recycle. She correctly identifies the task of turning off the lights as reducing. She presses her cheek switch to move the dial on the Clock Communicator to the word "Reduce". 3. She continues to identify ways to have a positive effect on her environment.



Recycling and Garbage

1. What does recycling mean?

save garbage to use again



washing clothes



mowing the lawn



2. Items to recycle are:

Thrown away



Kept in separate containers.



3. What are two things that can be recycled?

cans



sand

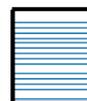


paper



4. What does your school recycle?

paper



cans



plastic bag



glass bottle

