

Science—Grade 6 Physical Sciences

SC.6.4 Energy		Access Points		
Standard/Indicator	Extension	A	B	C
SC.6.4.1.A Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. Assessment does not include calculating the total amount of thermal energy transferred.	Participate in an investigation to test how much the temperature of a material changes (more heat or less heat is transferred into the material) in the presence of a heat source.	Given results from an investigation, identify which material had the most/least temperature change in the presence of a heat source.	Identify that the temperature of some materials changes more or less than the temperature of other materials in the presence of a heat source.	Identify the relative temperature of a material that is near or far from a heat source as warm/cool, warm/warmer, or cool/cold/colder.

Standard Clarification

Students will experience that when objects or containers made of different kinds of materials are exposed to the same heat source (e.g., sunshine, hot soup), certain materials will feel warmer than others. Students will observe that metals transfer heat (warm up) better than wood (stay cool), and test different materials to decide which materials transfer more or less heat.

Target Activities for Access Point A

- A.** Students participate in an investigation to test materials to see if they transfer more or less heat in the presence of a heat source.
- participate in a discussion about the properties of metal and wood (e.g., does metal/wood/plastic heat up or does it stay cool?)
 - discuss what might happen when objects made from different materials (e.g., a wooden ruler, a metal spoon) are in the presence of a heat source (e.g., sunlight, hot water), and then place the objects in the heat source to identify what happens
 - look at data in a graph or table from an investigation to identify which material had the most or the least temperature change in the presence of a heat source

Scaffolding Activities for Access Points B and C

- B.** Students identify that some materials (e.g., metals) transfer more heat (become warmer) and that other materials (e.g., wood) transfer less heat (stay cool) in the presence of a heat source.
- observe and record what happens to butter placed at the eating end of metal and wooden spoons when the handle ends are placed in hot water (the heat transfers up the metal spoon and melts the butter; the wooden spoon transfers less heat and the butter does not melt)
 - observe an adult touching the handle of two cooking pots, one with a metal handle and one with a wooden handle, and discuss the difference in temperature after the pots have been gently warmed
 - feel the difference in temperature when metal and wooden objects are set out in the sun
 - sort objects into two categories: heat/more transfer and cool/less transfer
 - label metal objects as objects that transfer more heat and may require protection for touch (e.g., pot holders)
 - label wooden objects as objects that transfer less heat and may be safe to touch
- C.** Students recognize the difference between hot/warm containers and cold/room temperature containers.
- feel containers that contain warm or cold water (e.g., baggies, plastic bowls) and label them as hot or cold
 - after feeling objects warmed in the microwave, hot water, or the sun or cooled by the refrigerator or snow, sort them by feel of hot and cold
 - feel the difference between an ice pack and a heating pad
 - sort warm containers and cold containers
 - create a chart, poster, or living book with examples of cold things or hot things (e.g., ice cube, refrigerator, snowman, sun, fire, light bulb)

Prerequisite Skill: Students recognize what is hot and cold.

- label common items as hot or cold

- recognize what is okay to touch and what is not okay to touch based on temperature (e.g., room temperature water is okay, boiling water is not okay)
- identify proper clothing choices based on the weather and/or temperature outside

Prerequisite Skill: Students recognize that heat moves from place to place.

- touch a sidewalk in the shade and the same sidewalk after it has been in the Sun, and recognize that it is warmer after being in the sunlight
- feel a cold liquid (e.g., juice) and then the same liquid once it is at room temperature, and recognize that the liquid gets warmer after being out of the refrigerator for a set amount of time

Key Terms	change, cold, colder, cool, heat, heat source, less, material, more, temperature, transfer, warm, warmer
Additional Resources or Links	<p>This is a website with an experiment on the transfer of heat observed through butter, spoons, and boiling water. https://coolscienceexperimentshq.com/conducting-heat/</p> <p>This is a video about heat and thermal energy. https://www.generationgenius.com/videolessons/heat-transfer-of-thermal-energy-video-for-kids/</p> <p>This is an investigation that looks at heat transfer using bottles of water and a lamp. https://cdn.shopify.com/s/files/1/0030/6207/1369/files/ASLab_57.pdf?v=1660588109</p> <p>This is an investigation that uses the same material with different colors to see if the color of a material matters in heat transfer. https://www.teachengineering.org/activities/view/colors_absorb_heat_better</p> <p>This is a unit about heat transfer and defines the three types of heat transfer (conduction, convection, and radiation). Includes investigations and demonstrations in the lessons. https://www.teachengineering.org/lessons/view/duk_heattransfer_smary_less</p>
Cross-Content Standards	<p>Language Arts: Identify Evidence (6.W.4.b) and Identify Credible Sources for Research (6.W.6.b)</p> <p>Mathematics: Add and Subtract Numbers (6.1.2.d)</p>

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SC.6.4 Energy		Access Points		
Standard/Indicator	Extension	A	B	C
SC.6.4.1.B Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	Compare proposed solutions to a problem related to energy use based on criteria, constraints, and/or the potential impacts of the solution on people and the natural environment.	Given proposed solutions to an energy problem or other problem, compare the proposed solutions based on potential impacts of the solution on people and the natural environment.	Identify the advantages and/or disadvantages of a proposed solution to a problem.	Recognize that a problem may have multiple solutions.
Standard Clarification				
Students will recognize a predefined list of solutions to a problem and later discuss the potential advantages and disadvantages of each solution. Students will determine the best solution to a problem based on its impact(s) on people and the natural environment.				
Target Activities for Access Point A				
<p>A. Students compare proposed solutions to an energy problem based on potential impact(s) of the solution on people and the natural environment.</p> <ul style="list-style-type: none"> ● compare two or more solutions to pollution due to coal use, after watching a video about the effects of coal use on the environment ● research potential solutions to a local or state energy problem, and compare one or more solutions to the problem ● read or listen to potential solutions to the effects of the use of electricity on the environment, and compare the solutions based on the impact (positive or negative) on the people or the natural environment ● research solar and wind power energy resources, and compare the impact of each on the local or state environment 				
Scaffolding Activities for Access Points B and C				
<p>B. Students identify advantages and/or disadvantages of a solution to a problem.</p> <ul style="list-style-type: none"> ● identify a local or state problem (e.g., farmland flooding), and research solutions to the problem ● identify a common problem in the school (e.g., trash on the sports field), and discuss the advantages or disadvantages of asking students to clean the field versus hiring a company to clean the field ● compare the advantages and disadvantages of recycling, and identify if recycling has an impact on the environment <p>C. Students recognize that there may be multiple solutions to a problem.</p> <ul style="list-style-type: none"> ● participate in a discussion about a class or school problem, and assist in creating a list of solutions that may help solve that problem ● identify a problem in the community, and choose possible solutions to the problem using word or picture cards ● watch a video about solutions to throwing away too much trash (e.g., recycle, compost, reuse), and recognize that these are all possible solutions to throwing away too much trash 				
<p>Prerequisite Skill: Students identify a problem.</p> <ul style="list-style-type: none"> ● participate in a class discussion about problems within the school and the local community 				

- identify a problem in a given scenario
- determine if there is a problem in a given scenario

Prerequisite Skill: Students identify cause and effect relationships.

- complete sentences or scenarios that show a cause and effect (e.g., Marcy went for a walk in the rain without an umbrella. She got _____.)
- create a list of possible effects of an activity (e.g., I overslept; effects: late to class, tired)

Key Terms	advantage, constraint, criteria, disadvantage, energy problem, energy use, impact, natural environment, people, problem, solution
Additional Resources or Links	<p>This is a website with resources and ideas about environmental problems and solutions. https://www.ducksters.com/science/environment/</p> <p>This is a unit about taking care of Earth. https://www.coreknowledge.org/free-resource/ckla-domain-11-taking-care-earth/</p>
Cross-Content Standards	<p>Language Arts: Identify the Central Idea and/or a Supporting Detail (6.RI.1), Compare How the Same Topic Is Presented in Different Texts (6.RI.5), Use Descriptive Language (6.W.3.d), and Identify Evidence (6.W.4.b)</p> <p>Mathematics: Match a Word Phrase with an Input/Output Box (6.2.1.a), Solve One-Step Equations (6.2.2.e), and Interpret a Histogram (6.4.2.a)</p>

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SC.6.4 Energy		Access Points		
Standard/Indicator	Extension	A	B	C
SC.6.4.1.C Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. Assessment does not include calculating the total amount of thermal energy transferred.	Participate in an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.	Participate in an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.	Recognize that heated particles move faster and have more kinetic energy than cooled particles.	Identify that some substances transfer thermal energy better than others.

Standard Clarification

Students will understand that heat can transfer from one object to another and that warm objects have more kinetic energy than cool objects. After participating in investigations, students will determine which material has more kinetic energy by measuring the change of temperature.

Target Activities for Access Point A

- A.** Students measure, observe, and record data about matter before and after heat is applied to it, noting the change in temperature as evidence that energy has been transferred.
- participate in an investigation with heating various liquids to identify a change in temperature; pour 50 mL, 100 mL, and 200 mL of tap water into four identical containers, and record the starting temperature; heat each container of water for one minute in a microwave, and record the new temperature; note that the container with the least water (mass) is the hottest (and had the greatest change in temperature) and the container with the most water is the coolest (had the least change in temperature); conduct the same investigation with different materials (e.g., applesauce, noodles, potting soil)

Scaffolding Activities for Access Points B and C

- B.** Students recognize that heated particles have more kinetic energy than their cool counterparts.
- watch a video on kinetic energy, and recognize that heated particles move faster and have more kinetic energy than cooled particles
 - read or listen to a passage about kinetic energy, and choose pictures of materials that have more kinetic energy or are heated
 - observe room temperature water and boiling water, under adult supervision
 - record which water is moving and which one is still, and recognize that the water that is moving has more kinetic energy than the water that is still
 - use other materials and repeat the same investigation (e.g., glue at room temperature and cooled)
 - observe how the pliability of objects or the motion of objects change as they are warmed up or cooled down
- C.** Students observe the transfer of heat in a variety of materials (e.g., metal objects, water, plastic, wood, rubber) and identify which materials transfer energy better.
- use boiling water (with adult support) or sunlight as a heat source to observe energy transfer
 - collect objects (e.g., metal, plastic, wooden, rubber) to drop in boiling water or place in a sunny location
 - measure the temperature of all objects

- drop the objects in boiling water or place in a sunny location
- wait for a fixed amount of time
- drain the water or remove the objects from the sunlight
- measure the new temperature immediately and record the data
- measure the temperature again after a fixed amount of time and record the data
- conclude that metal objects transfer heat best based on their ability to warm up and stay warm after being transferred from the boiling water

Prerequisite Skill: Students recognize that objects are made of different materials.

- use the five senses to distinguish objects based on the different materials they are made of
- compare objects to recognize the differences between the objects

Key Terms	conduction, convection, cool, energy, heat, kinetic energy, mass, matter, particle, radiation, relationship, temperature, thermal energy, transfer
Additional Resources or Links	<p>This is a video that explains the concepts of heat transfer. https://www.youtube.com/watch?v=lvyCe0UaqJY</p> <p>This is a website with an experiment that will result in either a chemical exothermic reaction (temperature goes up/heat is released) or endothermic (temperature goes down/heat is absorbed). https://blog.growingwithscience.com/2015/01/easy-exothermic-and-endothermic-chemical-reactions-for-kids/</p> <p>This is a website with an experiment that will result in an endothermic reaction. https://www.fizzicseducation.com.au/150-science-experiments/heat-experiments/endothermic-reaction/</p> <p>This is a unit on energy transformation. https://www.coreknowledge.org/free-resource/cksci-unit-1-energy/</p>
Cross-Content Standards	<p>Language Arts: Identify the Central Idea and/or a Supporting Detail (6.RI.1), Identify a Detail That Introduces a Key Idea (6.RI.2), Use Descriptive Language (6.W.3.d), Identify Evidence (6.W.4.b), and Identify a Word or Phrase That Shows a Connection (6.W.4.c)</p> <p>Mathematics: Identify Models of Integers -10 to 10 (6.1.1.g), Compare and Order Integers (6.1.1.h), and Add and Subtract Numbers (6.1.2.d)</p>

Science—Grade 6 Physical Sciences

SC.6.4 Energy		Access Points		
Standard/Indicator	Extension	A	B	C
SC.6.4.1.D Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. Assessment does not include calculations of energy.	Develop and use models to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	Use models to describe that when the kinetic energy of an object changes, energy is transferred to or from the object.	Identify that changing the temperature of a substance changes the kinetic energy of a substance.	Recognize that kinetic energy is motion energy.
Standard Clarification				
Students will define kinetic energy and explain that adding heat or motion to an object increases its kinetic energy or removing heat or motion from an object decreases its kinetic energy. Students will use simple models made from common household items to demonstrate a change in kinetic energy.				
Target Activities for Access Point A				
<p>A. Students use models that demonstrate that a change in kinetic energy can be observed through a change in temperature and/or motion of an object.</p> <ul style="list-style-type: none"> ● make a rubber band car from a two-liter plastic bottle, rubber band, CDs, dowel rods, and bottle caps, and demonstrate the change in kinetic energy when the rubber band is stretched to different lengths and the car is released ● using a heat source and a balloon, demonstrate how heating up the balloon causes the balloon to burst into kinetic energy ● roll toy cars down a ramp ● put marbles on a tray and keep them still and flat, or roll them back and forth ● feel an unlit candle and identify that it is cool to the touch and has no kinetic energy, then light the candle and describe the change that occurs (i.e., the heat energy is transferred to the wax, causing it to melt and run down the sides due to the increased kinetic energy.) ● use ice to show that as a solid it has no kinetic energy (cannot be stirred) but when heated, the ice begins to melt and flow as it becomes water and eventually comes to a boil due to an increase in kinetic energy 				
Scaffolding Activities for Access Points B and C				
<p>B. Students explain that adding heat to an object increases its kinetic energy by making the object move faster or removing heat from an object decreases its kinetic energy by making the object move slower.</p> <ul style="list-style-type: none"> ● use data to identify that heating up certain substances (e.g., glue, syrup, chocolate bar) causes them to flow more easily, and cooling them causes them to flow less easily, which shows a change in kinetic energy ● predict what will happen when different objects are heated or cooled ● sort objects into different stages of being heated or cooled from least to most kinetic energy (e.g., ice has no kinetic energy, ice melting has some kinetic energy, boiling water has the most kinetic energy) <p>C. Students recognize that kinetic energy is motion energy.</p> <ul style="list-style-type: none"> ● play a stop-and-move-game, such as freeze tag, and recognize that when frozen or stopped, a person has no kinetic energy and when unfrozen or moving, the person has kinetic energy ● demonstrate actions as kinetic and inaction as not kinetic <ul style="list-style-type: none"> ○ play musical chairs—when the music plays, everyone moves around the circle and says “kinetic” while holding up a word to display; when the music stops, everyone sits down and flips over the word card ○ play with toy cars and trains while demonstrating kinetic energy ● watch videos about kinetic energy ● sort pictures into two groups—kinetic energy and nonkinetic energy (e.g., runners in a race at the starting line, runners running in the race; a ball on the table not moving, a ball falling or bouncing) 				

<p>Prerequisite Skill: Students explain that an object's movement is related to a change in temperature.</p> <ul style="list-style-type: none"> participate in cooking classes or lessons, and explain what happens when a substance, such as butter, is heated or cooled 	
Key Terms	action, cool, flow, heat kinetic energy, melt, move, potential energy, transfer
Additional Resources or Links	<p>This is a video about heating and cooling and changes that occur due to changes in temperature. https://www.generationgenius.com/videolessons/heating-and-cooling-video-for-kids/</p> <p>This is an article with information about energy transfers and transformations. https://education.nationalgeographic.org/resource/energy-transfers-and-transformations</p>
Cross-Content Standards	<p>Language Arts: Identify Evidence (6.W.4.b)</p> <p>Mathematics: Demonstrate Understanding of Order of Operations (6.2.2.c), Solve Ratios (6.2.3.d), Find the Mode (6.4.2.c), and Find the Median (6.4.2.d)</p>

Science—Grade 6

Life Sciences

SC.6.6 Structure and Function and Information Processing		Access Points		
Standard/Indicator	Extension	A	B	C
SC.6.6.2.A Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.	Participate in an investigation to provide evidence that living things are made of one cell or many different types of cells.	Using results of an investigation, explain that living things are made of one cell or many different types of cells.	Using results of an investigation, identify whether a living thing is made of one cell or many different types of cells.	Given results of an investigation, identify a cell.

Standard Clarification

Students will use evidence from an investigation to identify, and explain that living things are made of one cell or many types of cells.

Target Activities for Access Point A

- A.** Students use data or other information from an investigation to explain that living things are made of one or more different types of cells.
- use text and pictures to create a list of different types of cells found in multicellular organisms (e.g., nerve, skin, muscle, plant cells)
 - match names of cells with corresponding pictures
 - participate in an investigation that collects cheek cells and skin cells, and explain that these collections show two types of cells found in the human body
 - participate in an investigation that compares various things that are made of cells (e.g., cork, paramecium, onion skin, prepared slides of human or animal cells), and identify which are made of one cell and which are made of more than one cell

Scaffolding Activities for Access Points B and C

- B.** Students identify whether a living thing is made of one cell or many types of cells.
- use a microscope or images from a microscope to look at multicellular (e.g., animals, plants) and single-celled organisms (e.g., bacteria, yeast)
 - create a list of multicellular organisms (e.g., animals, plants) and single-celled organisms (e.g., bacteria, yeast) after watching a video or reading or listening to text about cells
- C.** Students identify a cell.
- identify a cell when given a picture of a cell and something else (e.g., Ping-Pong ball)
 - read or listen to text about cells, and discuss ideas presented in the text
 - assist in creating a poster or other visual about cells

Prerequisite Skill: Students recognize a microscope and its purpose.

- recognize a microscope when asked to choose between a microscope and another scientific instrument (e.g., beaker)
- use a microscope to look at different objects during an investigation

Prerequisite Skill: Students identify one or more than one of something.

- sort items by groups of one or more than one
- add to a group of one when asked to make the group equal more than one

<p>Prerequisite Skill: Students use data from an investigation to provide information.</p> <ul style="list-style-type: none"> ● participate in an investigation, and complete a table with data from the results of the investigation ● participate in an investigation, and answer questions about the results using information from the investigation 	
<p>Key Terms</p>	<p>animal cell, cell, living, multicellular organism, plant cell, single-celled organism</p>
<p>Additional Resources or Links</p>	<p>This is an article comparing unicellular and multicellular organisms. https://education.nationalgeographic.org/resource/unicellular-vs-multicellular</p> <p>This is a video about multicellular organisms. https://www.generationgenius.com/videolessons/multicellular-organisms-video-for-kids/</p> <p>This is a video about plant and animal cells. https://www.generationgenius.com/videolessons/plant-and-animal-cells-video-for-kids/</p> <p>This is a resource with activities and lesson plans on animal and plant cells, including sample lab plans and investigation ideas. https://www.biologycorner.com/lesson-plans/cells/</p> <p>This is an investigation in which students compare various things that are made of cells. https://www.biologycorner.com/worksheets/investigation-exploring-cells.html</p> <p>This is an investigation in which students collect and observe skin cells and cheek cells. https://www.biologycorner.com/worksheets/cell_human_cheek.html</p> <p>This is a resource with activities and lesson plans on the single-celled organism yeast. https://serpmedia.org/scigen/l5.html</p>
<p>Cross-Content Standards</p>	<p>Language Arts: Use Descriptive Language (6.W.3.d) and Identify Evidence (6.W.4.b)</p> <p>Mathematics: Solve a One-Step Equation (6.2.2.e)</p>

Science—Grade 6

Life Sciences

SC.6.6 Structure and Function and Information Processing		Access Points		
Standard/Indicator	Extension	A	B	C
SC.6.6.2.B Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. Assessment of organelle structure/function relationships is limited to the cell wall and cell membrane. Assessment of the function of the other organelles is limited to their relationship to the whole cell. Assessment does not include the biochemical function of cells or cell parts.	Develop and use a model to explain basic cell parts (e.g., nucleus, cell wall, cell membrane, chloroplasts) and function and identify the similarities (e.g., nucleus and cell membrane) and differences (e.g., cell wall and chloroplast) between animal and plant cells.	Use a model to identify basic cell parts (e.g., nucleus, cell wall, cell membrane, chloroplasts) and function of each part; and identify the similarities (e.g., nucleus and cell membrane) and differences (e.g., cell wall and chloroplast) between animal and plant cells.	Use a model to identify the nucleus and cell membrane of a cell and the function of both parts of the cell.	Given a model of a cell, identify the cell membrane and nucleus.

Standard Clarification

Students will develop and use a model to identify the basic parts of a cell. Students will use the model to explain the basic cell parts and functions. Students will use the model to compare animal and plant cells.

Target Activities for Access Point A

- A.** Students compare and contrast animal and plant cells by developing or using a model with parts.
- make an animal cell model from a clear plastic baggie for the cell membrane and a red marble or red plastic egg for the nucleus
 - make a plant cell model by using a clear plastic baggie for the cell membrane, a red marble or red plastic egg for the nucleus, green marbles or green grapes for chloroplasts and then placing the model inside an empty tissue box, rectangular baby wipe container, or other rigid rectangular or square container to represent the cell wall
 - make a giant-sized cell model from modeling clay, and label the cell parts with toothpicks and flags
 - demonstrate on a Venn diagram how plant cells and animal cells are the same and different (e.g., both have cell membranes and a nucleus; chloroplasts and cell walls are present only in plant cells)

Scaffolding Activities for Access Points B and C

- B.** Students identify the functions of the cell membrane and nucleus, describing how animal and plant cells are the same and different.
- define the basic parts of a cell
 - nucleus: the brain of the cell; the boss; all cells have this
 - cell membrane: the gatekeeper; the “skin” of the cell; all cells have this
 - cell wall: makes a plant (vegetable) cell crunchy and crisp and so it won’t fall over and has shape; only plant cells have this
 - demonstrate by folding a flower stem or snapping a bean or celery stick (“Did you hear and see a burst of juice and a crunch? That’s because we broke the cell wall and the cell membrane, and now the cell is spilling out of its skin.”)
 - chloroplasts—makes food from the sun for plants; only plant cells have this because plants do not eat living things and need to make their own food
 - watch videos and sing songs about the parts of cells
 - create and bake plant cell and animal cell pizzas, and compare the different parts (i.e., various ingredients) in

each pizza

C. Students identify the cell membrane and nucleus of a cell.

- use two different colors to represent the cell membrane and nucleus of a cell on a worksheet
- look at a cell under a microscope and identify a part of the cell
- label the cell membrane and nucleus in a model of a cell

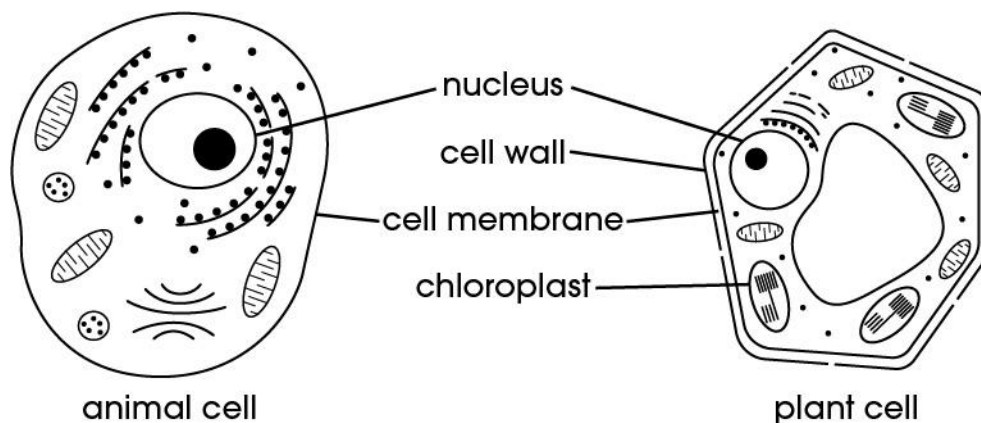
Prerequisite Skill: Students can tell the difference between a plant and an animal.

- sort pictures of plants and animals into groups
- compare fossil pictures of plants and animals, and identify what each fossil is

Prerequisite Skill: Students identify that living things are made of parts.

- identify parts of an animal (e.g., fur, skin, head, eyes) or parts of a plant (e.g., stem, roots, petals)
- complete a puzzle of a living thing, and explain that the living thing is made of many parts

Key Terms	animal cell, cell membrane, cell wall, chloroplasts, nucleus, plant cell
Additional Resources or Links	<p>This is a video about the nucleus in a cell. https://www.youtube.com/watch?v=aYlvssudA_0</p> <p>This is a video about cells. The video compares animal and plant cells at the 2:14 mark. https://www.youtube.com/watch?v=Hbpe3FhsQp8</p> <p>This is a lesson plan that gives instructions on how to create a model of a cell from modeling clay and glue. https://www.crayola.com/lesson-plans/giantsize-cell-model-lesson-plan/</p> <p>This is a video that shows how to make a cell pizza. https://www.childrensmuseum.org/blog/saturday-science-homemade-plant-cell-pizza</p> <p>This is a lesson plan on plant and animal cells. https://keslerscience.com/plant-and-animal-cells-lesson-plan-a-complete-science-lesson-using-the-5e-method-of-instruction/</p>
Cross-Content Standards	<p>Language Arts: Identify the Central Idea and/or a Supporting Detail (6.RI.1), Answer Questions (6.RI.6), Use Context Clues (6.V.1.a), and Use Descriptive Language (6.W.3.d)</p> <p>Mathematics: Solve Real-World Problems Using Ratios (6.2.3.d)</p>



Science—Grade 6

Life Sciences

SC.6.6 Structure and Function and Information Processing		Access Points		
Standard/Indicator	Extension	A	B	C
SC.6.6.2.C Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. Assessment does not include the mechanism of one body system independent of others. Assessment is limited to the circulatory, excretory, digestive, respiratory, muscular, and nervous systems.	Use models to describe that body systems are made of cells, cells form tissues, tissues form organs, and organs form systems that work to support life.	Given a model of a body system, identify or sequence the parts (e.g., cells, tissues, organs, organ systems) that work together to support life.	Given an incomplete model of the body system, identify the missing part.	Recognize an organ and an organ system.
Standard Clarification				
Students will discover that there are different systems that support the body’s functioning. These systems are the result of tiny cells grouping together to form different tissues, and these tissues group together to form important organs.				
Target Activities for Access Point A				
<p>A. Students use a variety of system models to explain how life is supported by each body system.</p> <ul style="list-style-type: none"> ● using a drawing or an active model, begin with one cell and walk another person through the way a body system is built (from stomach cell to stomach tissue to stomach to digestive system) ● form a small group with students in teams of four, and give each student a game piece or puzzle piece <ul style="list-style-type: none"> ○ choose a body system ○ have student 1 tell or show what the cell does and then pass the game piece to student 2 ○ have student 2 tell or show what the tissue does and then pass both game pieces to student 3 ○ have student 3 tell or show what the organ is and what it does and then pass all three game pieces to student 4 ○ have student 4 use the game pieces to tell how the system is built and then name the body system 				
Scaffolding Activities for Access Points B and C				
<p>B. Students explore and identify the hierarchical development of systems from cells to tissues to organs to systems.</p> <ul style="list-style-type: none"> ● make a mnemonic device with props to remember the hierarchical order <ul style="list-style-type: none"> ○ use a snack-size clear plastic ziplock bag to represent a cell, an empty tissue box to represent tissues, a large paper grocery bag or other shopping or gift bag for the organ, and a bigger plastic tote for the system ○ label the parts on the props ● play a game to distribute the correct cells, tissues, and organs to the correct system in the correct building order <ul style="list-style-type: none"> ○ make a group of cells from plastic bags or index cards; label them (e.g., bone cells, blood cells, muscle cells, skin cells) and draw on them; put them on a table together ○ label and draw the type of tissue to be represented (e.g., bone tissue, cartilage tissue, vein tissue, muscle tissue, skin tissue) on empty tissue boxes or other containers; put those on a different table together ○ label and draw the type of organ to be represented (e.g., heart, lungs, brain, spinal cord, veins, bones, cartilage) on a large paper bag or cardboard box; put them on another table together ○ label and draw the type of system to be represented (i.e., circulatory, digestive, muscular, nervous, or respiratory) on large plastic totes; put them on the floor together ○ label the areas 1 through 4 ○ starting at area 1 with the cells, take them one by one to the correct “tissue” box and place them inside ○ when all the tissues have been assembled, take these and sort them into the correct organ containers 				

- take all the organ containers (full of tissues and cells) and sort them into the correct systems

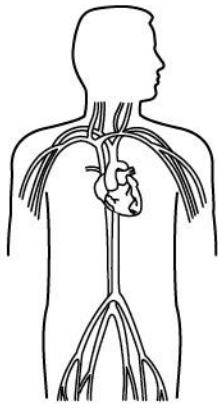
C. Students recognize that there are different organs and organ systems.

- make a list of different systems (i.e., circulatory, digestive, muscular, nervous, and respiratory) or organs (e.g., heart, lungs, brain)
- match systems by name or picture, using a number along with the name as a prompt if needed
- listen to and watch videos about the body systems and the organs within the systems
- match the body systems to their simple function (i.e., muscular, muscles/movement; nervous, brain and nerves/senses; circulatory, heart, arteries, and veins/pump blood throughout the body; respiratory, lungs/breathing air; digestive, stomach and intestines/food and nutrient distribution)

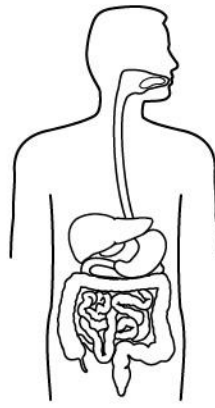
Prerequisite Skill: Students understand that the body is made of different parts (both inside and out).

- identify the body part when given its name
- label parts of the body

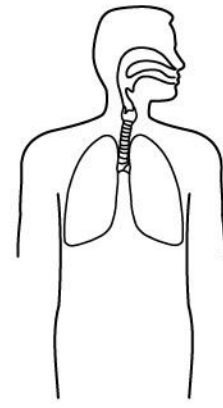
Key Terms	cell, circulatory system (heart, arteries, veins, blood), digestive system (mouth, tongue, esophagus, stomach, intestine, colon, rectum), function, nervous system (brain, nerves, spinal cord), organ, structure, respiratory system (lungs, trachea), muscular system, tissue
Additional Resources or Links	<p>This is an animated video lesson on the body systems and their functions. https://www.youtube.com/watch?v=GytJKrbqhiQ</p> <p>This is a unit on the respiratory and circulatory systems. https://www.coreknowledge.org/free-resource/cksci-unit-6-human-respiration-and-circulation/</p> <p>This is a video on the muscular system. https://tpt.pbslearningmedia.org/resource/muscles-science-trek/muscles-science-trek/</p> <p>This is a video on the nervous system. https://tpt.pbslearningmedia.org/resource/d3df70fc-487f-48e3-9f9a-743862ee9b49/nervous-system/</p> <p>This is a video about all of the systems in the human body. https://tpt.pbslearningmedia.org/resource/e5ab0d2e-3089-4529-8def-6aeda2b507d7/what-is-the-human-body-young-explorers/</p> <p>This is a website that has multiple lesson plans for each system in the human body. https://www.ngsslifescience.com/science/biology-lesson-plans-human-body-systems</p>
Cross-Content Standards	<p>Language Arts: Answer Questions (6.RI.6), Use Context Clues (6.V.1.a), and Identify Evidence (6.W.4.b)</p> <p>Mathematics: Match a Word Phrase with an Input/Output Box (6.2.1.a)</p>



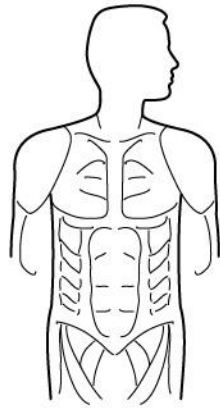
the circulatory system



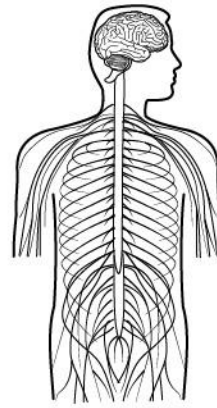
the digestive system



the respiratory system



the muscular system



the nervous system

Science—Grade 6

Life Sciences

SC.6.6 Structure and Function and Information Processing		Access Points		
Standard/Indicator	Extension	A	B	C
SC.6.6.2.D Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. Assessment does not include mechanisms for the transmission of this information.	Participate in investigations to explain that the five senses send information via the nervous system to the brain, which results in a physical response and/or storage of information as a memory.	Given results of an investigation, describe that one of the five senses sends information via the nervous system to the brain, which results in a physical response and/or storage of information as a memory.	Given a scenario, identify whether the result of the sensory stimuli was an immediate physical response or a storage of information in the memory.	Recognize the organ that is associated with each of the five senses.
Standard Clarification				
Students will name the five senses and the major organs associated with each sense. Students will explore how organs send messages and then trace those message pathways to the brain, ending in a physical response and/or stored as a memory.				
Target Activities for Access Point A				
<p>A. Students explore how organs send messages and then trace those message pathways to the brain, ending in a physical response and/or stored as a memory.</p> <ul style="list-style-type: none"> ● use a worksheet or model to look at, trace, and explore how messages are sent to the brain via the nervous system ● practice using senses to see what kinds of memories the brain has saved <ul style="list-style-type: none"> ○ listen to common sounds (e.g., an animal noise, doorbell, cellphone chime), and write the name, circle the name from a predetermined list, or point to the sound the students' brains remembered ○ conduct a blind taste test of salt and sugar to determine whether students can correctly identify what they tasted ○ feel different objects from a mystery box when blindfolded, and record what the object is (e.g., squishy ball, regular ball, pencil, paper, bottle of glue, spoon, fork) ○ smell mystery fragrances (odors) from numbered bottles containing a cotton ball that has been dipped in an essential oil or spice, and guess which fragrance (odor) is which from a list of answers (e.g., vanilla, cinnamon, orange, banana) ● discover that when the brain receives a message from a sense, it often tells the body to do something <ul style="list-style-type: none"> ○ When I see a stop sign, my brain tells me to stop, and I stop. ○ When I hear a fire alarm, my brain tells me to leave the building with my class, and I leave. ○ When I touch something that is too hot, my brain tells my hand to pull away quickly. ○ When I smell smoke, my brain tells me to leave the room because it might be dangerous. ○ When I taste something that is gross, my brain tells me to get it out of my mouth and not to eat any more because it could be harmful. 				
Scaffolding Activities for Access Points B and C				
<p>B. Students learn that senses send information to the brain and then assess from which organ the information originated.</p> <ul style="list-style-type: none"> ● create a model to demonstrate the five senses sending information to the brain <ul style="list-style-type: none"> ○ make a gingerbread person or create a large drawing on a magnetic surface ○ paste a brain picture inside the head and make sure it has a magnet underneath or that a magnetized surface is being used 				

- glue or draw pictures of the five senses and their organs around the body
- cut yarn and attach one cut end to each of the five senses; tie a paper clip to the other end and let it hang
- demonstrate the connections between the brain and the senses by naming a sense and then attaching the paper clip end to the magnetized brain
- answer the questions “What sense sent a message to my brain?” and “Where do the senses send their messages?”

C. Students name the five senses and the major organs associated with each sense.

- read a book about the five senses
- use a tracing of your body to create a five senses anchor chart
- play a game using a doll with multiple removable pieces and cards with each of the five senses on them; put the names of the five senses on cards placed face-down; students draw a card, the body part associated with it, and attach it to the doll
- sort objects using a task box activity labeled with the five senses
 - marshmallow (taste), piece of sandpaper (touch), bell (hearing), colored markers (sight), flower (smell)
- select a body part (i.e., nose, eyes, ears, skin, mouth) and tell or demonstrate what it does

Prerequisite Skill: Students name basic body parts used with the five senses (i.e., nose, ears, skin, eyes, tongue).

- play a game such as Simon Says, and correctly identify the part of the body that is mentioned
- draw a picture or use a premade worksheet and label various body parts

Prerequisite Skill: Students identify and describe the five senses.

- communicate one or more of the five senses when asked
- participate in investigations using the five senses, and identify and describe the sense(s) involved in the investigation
- match sentences about the five senses with the correct sense (e.g., “I see the trees outside.” paired with a picture of eyes)

Key Terms	brain, information, memory, nervous system, organ, physical response, sense, stimuli, storage of information
Additional Resources or Links	<p>This is a unit on human senses and movement. https://www.coreknowledge.org/free-resource/cksci-unit-5-human-senses-and-movement/</p> <p>This is a unit on body systems and senses. https://www.coreknowledge.org/free-resource/ckla-domain-03-human-body-systems-senses/</p> <p>This is an animated video explaining the five senses. https://www.youtube.com/watch?v=q1xNuU7gaAQ</p> <p>This is a video about the five senses and how information travels through the nervous system to a person’s brain. https://www.generationgenius.com/vidlessons/senses-video-for-kids/</p> <p>This is a unit on how the brain controls the body. https://mysteryscience.com/body/mystery-4/brain-nerve-information-processing/62</p> <p>This is a classroom activity using the five senses. Adaptations for students with low physical and communication skills are included. https://www.ablenetinc.com/sensing-patterns/</p>
Cross-Content Standards	<p>Language Arts: Identify a Supporting Detail (6.RI.1), Use Descriptive Language (6.W.3.d), and Identify Evidence to Answer a Question (6.W.4.b)</p> <p>Mathematics: Match a Word Phrase with an Input/Output Box (6.2.1.a)</p>

Science—Grade 6

Life Sciences

SC.6.9 Growth, Development, and Reproduction of Organisms		Access Points		
Standard/Indicator	Extension	A	B	C
SC.6.9.3.A Construct an argument based on evidence for how plant and animal adaptations affect the probability of successful reproduction.	Use evidence to explain that animal and plant features and/or behaviors affect their ability to reproduce.	Given evidence about conditions necessary for a plant or animal to reproduce, describe that animal and plant characteristics and/or behaviors affect their ability to reproduce.	Identify plant characteristics that help them reproduce in different environments (e.g., thorns, waxy coating, deep roots, shallow spread-out roots, shade tolerance, needle-like leaves, flexible stems and leaves, flowers that attract pollinators).	Identify animal behavior or characteristics that help them find a mate for reproduction (e.g., mating calls, colorful plumage to attract mates).

Standard Clarification

Students will identify animal behavior or characteristics that help them find a mate for reproduction. Students will identify plant characteristics help them reproduce in different environments. Students will use evidence to explain how plant and animal features and/or behaviors influence reproduction.

Target Activities for Access Point A

- A.** Students use evidence about conditions necessary for a plant or animal to reproduce to describe that animal and plant features and/or behaviors affect their ability to reproduce.
- watch a video about animal or plant reproduction, and create a list or other visual of animal or plant characteristics and/or behaviors that affect the ability to reproduce
 - choose a plant or animal to research, and after being given evidence about the conditions it needs to reproduce, describe how one characteristic and/or one behavior affects its ability to reproduce
 - use information about conditions necessary for a specific plant or animal to reproduce, and discuss which characteristics or behaviors affect the plant's or animal's ability to reproduce
 - use information about conditions necessary for a specific plant or animal to reproduce and classify different characteristics or behaviors as helpful or harmful to the plant's or animal's ability to reproduce

Scaffolding Activities for Access Points B and C

- B.** Students identify plant characteristics that help them reproduce in different environments.
- identify the characteristics of a plant that help it reproduce in a specific environment, and recognize that those characteristics may not be beneficial for reproduction in another environment (e.g., shade-tolerant plants grow well and reproduce in environments with a lot of shade but may be less successful in a very sunny environment)
 - draw or create a model that shows plant characteristics in various healthy environments (e.g., desert cactus, rainforest orchid, black-eyed Susan planted in a garden)
 - read or listen to a book about specific plants in an environment, and identify characteristics that help them reproduce in that environment
 - plant flower seeds in different types of earth (e.g., soil, clay) with differing amounts of sunlight and water, identify which combination allows the flower seeds to grow the best, and participate in a class discussion about what the flower seeds need to grow and reproduce
- C.** Students identify animal behaviors or characteristics that help them find a mate.
- read or listen to a book on bird mating, and identify one or more behaviors or characteristics that most help a bird find a mate (e.g., colorful feathers)

- watch a video about animal mating behavior, and match pictures of behaviors or characteristics with a picture of an animal that the behavior or characteristic benefits (e.g., loud call, body color)

Prerequisite Skill: Students identify positive and negative traits for a plant or animal to survive.

- sort pictures into favorable or unfavorable traits for a plant or animal to survive in a cold environment (e.g., thick fur versus thin fur)
- identify traits or characteristics of specific animals or plants (e.g., body color, body covering)

Key Terms	behavior, characteristic, condition, environment, feature, mate, reproduce
Additional Resources or Links	<p>This is a video from the Smithsonian Institution that shows various animal mating characteristics. https://www.google.com/search?q=examples+of+animals+showing+off+for+reproduction&source=lmns&tbm=vid&bih=754&biw=1536&rlz=1C1CHBF_enUS881US881&hl=en&sa=X&ved=2ahUKEwiG5uDOsNb8AhWkrHIEHX-7Cy4Q_AUoAnoECAEQAg#fpstate=ive&vld=cid:fe81d37a,vid:mo85rziHDrl</p> <p>This is a video from BBC Earth about animal mating behaviors. https://www.youtube.com/watch?v=nNrieMwfpWQ</p> <p>This is an article about the life cycle of flowering plants. https://www.natgeokids.com/uk/discover/science/nature/the-life-cycle-of-flowering-plants/</p>
Cross-Content Standards	<p>Language Arts: Identify Central Idea and/or Supporting Detail (6.RI.1), Identify a Detail That Develops a Key Idea or Event (6.RI.2), Answer Questions (6.RI.6), Use Context Clues to Determine Word Meanings (6.V.1.a), Use Descriptive Details (6.W.3.d), and Identify Evidence That Answers a Question (6.W.4.b)</p> <p>Mathematics: Interpret a Histogram (6.4.2.a), Find the Mode (6.4.2.d), and Find the Median (6.4.2.d)</p>

Science—Grade 6

Life Sciences

SC.6.9 Growth, Development, and Reproduction of Organisms		Access Points		
Standard/Indicator	Extension	A	B	C
<p>SC.6.9.3.B Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. Assessment does not include genetic mechanisms, gene regulation, or biochemical processes.</p>	<p>Develop and use a model to describe how the physical traits of plants and animals (resulting from genetics or environmental factors) might affect their growth and survival or have no effect at all.</p>	<p>Given a model, describe how the physical traits of plants and animals (resulting from genetic or environmental factors) might affect their growth and survival or have no effect at all.</p>	<p>Identify the physical traits (inherited or acquired) of plants and animals that result from genetic or environmental factors.</p>	<p>Recognize that the physical traits of plants can affect their ability to grow and survive (e.g., damaged seed or leaf, atypical flower shape, disease).</p>

Standard Clarification

Students will develop and use a model to describe how the physical traits of a plant or an animal might affect its growth and survival or have no effect at all.

Target Activities for Access Point A

- A.** Students describe how the physical traits of plants and animals may or may not affect their growth and survival.
- participate in an investigation of two plants, one that is watered regularly and gets ample sunlight and air and a second one that does not, and identify and describe the difference between the two and the factors that affect the growth of each plant
 - watch a video about plant pollination, and describe what may happen to flowers and bees if bees cannot pollinate flowers
 - compare two pictures of the same animal with one or more physical traits (e.g., a fox with a white coat and a fox with a red coat), and identify which animal will grow and survive better in a specific environment (e.g., the Arctic) and describe why (e.g., the fox with the white coat because the color helps camouflage the fox from predators)

Scaffolding Activities for Access Points B and C

- B.** Students identify the physical traits of plants and animals that result from genetic or environmental factors.
- identify the physical trait of the snowshoe hare's fur in the winter from a given list (i.e., it changes to white, gets thinner, and falls out)
 - observe a picture of a plant that is watered daily and another picture of a plant that is given no water, and describe the physical differences in the plants
 - create a list of physical traits of a bear before, during, and after hibernation, and discuss how the physical traits change in each part of hibernation (e.g., weight gain before hibernation and weight loss during and after hibernation)
 - sort examples of physical traits and behaviors into their respective categories
- C.** Students recognize that the physical traits of plants can affect their ability to grow and survive.
- identify (e.g., touch, point, state) the healthy plant when given a choice between a healthy plant leaf and an unhealthy plant leaf, and identify that the healthy plant will more likely to grow and survive better than the unhealthy plant
 - choose a healthy seed to plant from a mixed group of healthy seeds and unhealthy seeds (e.g., misshapen, broken) when asked which seed would be better to plant in order to get a healthy plant that is more likely to survive

Prerequisite Skill: Students recognize the physical traits of a plant or animal.

- recognize physical traits of a plant or animal, such as color of fur, skin pattern, leaf size, and size

	<ul style="list-style-type: none"> organize pictures of plants or animals by a specific physical trait
Key Terms	animal, environmental factor, environmental trait, genetic factor, growth, healthy, inherited trait, model, physical trait, plant, survival, unhealthy
Additional Resources or Links	<p>This is an activity from the National Park Service about tree and animal traits and how they affect survival. https://www.nps.gov/teachers/classrooms/traits-survival.htm</p> <p>This is a unit with lessons about animal traits and what is needed to survive. https://ngss.nsta.org/Resource.aspx?ResourceID=505</p>
Cross-Content Standards	<p>Language Arts: Identify the Central Idea and/or Supporting Detail (6.RI.1), Identify Key Idea or Event (6.RI.2), Answer Questions (6.RI.6), Use Descriptive Language (6.W.3.e), and Identify Evidence (5.W.4.b)</p> <p>Mathematics: Solve Real-World Problems Using Ratios (6.2.3.d)</p>

Science—Grade 6

Life Sciences

SC.6.9 Growth, Development, and Reproduction of Organisms		Access Points		
Standard/Indicator	Extension	A	B	C
SC.6.9.3.C Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. Assessment does not include specific changes at the molecular level, mechanisms for protein synthesis, or specific types of mutations.	Use models to explain that asexual reproduction involves one parent which results in genetically identical offspring and sexual reproduction involves two parents which results in genetically varied offspring.	Use models to identify asexual reproduction (one parent) and sexual reproduction (two parents) and the results as genetically identical or varied offspring.	Identify that the outcome of sexual reproduction is genetic variation of inherited traits.	Recognize that body cells and some organisms reproduce asexually, resulting in two cells with identical inherited traits.
Standard Clarification				
Students will explain that asexual reproduction involves one parent and results in genetically identical offspring in contrast to sexual reproduction that involves two parents and results in genetically varied offspring.				
Target Activities for Access Point A				
<p>A. Students will use models to identify asexual reproduction and sexual reproduction and the relative results as genetically identical or varied offspring.</p> <ul style="list-style-type: none"> ● watch a video on asexual and sexual reproduction, and sort pictures of organisms into each category (e.g., an animal is an example of sexual reproduction, splitting a potato and replanting it is an example of asexual reproduction) ● grow a plant or vegetable using a section of the parent plant or vegetable (e.g., piece of potato with “eyes,” split a plant in two), and compare the new plant or vegetable with the original one 				
Scaffolding Activities for Access Points B and C				
<p>B. Students identify that the outcome of sexual reproduction is genetic variation of inherited traits.</p> <ul style="list-style-type: none"> ● observe pictures of two parents and their offspring, and identify similarities or differences between the parents and the offspring (e.g., hair/fur color, eye color, ear length) ● observe pictures of two parents and their offspring, and identify ways the offspring are different from each other (e.g., one offspring has spots and the other doesn't) ● observe pictures of families (both human and nonhuman), and identify differences in the traits of the members of the families <p>C. Students recognize that body cells and some organisms reproduce asexually, resulting in two cells with identical inherited traits.</p> <ul style="list-style-type: none"> ● cut modeling clay or paper in half, and recognize that both halves are identical (e.g., same color, size, feeling) ● assist in creating a visual showing a cell or organism reproducing asexually, and recognize that the cells are identical <p>Prerequisite Skill: Students recognize physical traits of organisms.</p> <ul style="list-style-type: none"> ● point to similarities and/or differences between two pictures or objects ● describe one or more physical traits of a given organism (e.g., height, body covering, eye color) <p>Prerequisite Skill: Students understand division or dividing objects into one or more pieces.</p> <ul style="list-style-type: none"> ● complete simple division problems (e.g., dividing by twos) ● match pictures that have been cut into multiple pieces 				

Key Terms	asexual reproduction, cells, genetic, genetically identical, genetic variation, inherit, offspring, organism, parent, sexual reproduction, traits, varied
Additional Resources or Links	This is a video about reproduction of living things that references both asexual and sexual reproduction. https://www.generationgenius.com/videolessons/reproduction-of-living-things-video-for-kids/
Cross-Content Standards	Language Arts: Compare a Topic in Two Informational Texts (6.RI.5), Answer Questions (6.RI.6), Use Descriptive Language (6.W.3.e), and Identify Evidence (6.W.4.b) Mathematics: Multiply and Divide Positive Fractions, Halves, Fourths, Thirds, and Tenths (6.1.2.a)

Science—Grade 6

Earth and Space Sciences

SC.6.12 Weather and Climate		Access Points		
Standard/Indicator	Extension	A	B	C
SC.6.12.4.A Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions. Assessment does not include recalling the names of cloud types or weather symbols used on weather maps or the reported diagrams from weather stations.	Use instruments to collect weather data and describe the weather in an area.	Use data collected about weather to describe the weather in an area.	Identify the tools used to collect weather data (e.g., temperature/thermometer, air pressure/barometer, rainfall/rain gauge, wind direction/wind sock or weather vane).	Recognize a tool used to collect weather data.
Standard Clarification				
Students will identify and correctly use various tools to collect weather data and report weather data.				
Target Activities for Access Point A				
<p>A. Students use data to describe the weather in an area.</p> <ul style="list-style-type: none"> ● assist in collecting local weather data for a set period of time (e.g., week, month), and describe the weather data found (e.g., it was mostly sunny, there was a thunderstorm twice during the month) ● watch or listen to a weather report, and then discuss the information in the report ● use weather data in a specific area or region and describe what type of clothing and instruments would be appropriate to have in that area or region (e.g., the average temperature in Antarctica is 14 degrees Fahrenheit, which is very cold, so it is important to have heavy coats and boots) <p>A. Students observe the use of instruments to collect weather data.</p> <ul style="list-style-type: none"> ● look at a rain gauge after it rains, and track how much rain the area received ● observe the temperature on a thermometer at various times throughout the day to identify whether the temperature changes ● look at pictures of a wind sock at an airport to identify which way the wind is blowing 				
Scaffolding Activities for Access Points B and C				
<p>B. Students identify tools to collect weather data.</p> <ul style="list-style-type: none"> ● use a thermometer to measure the outside temperature over a set number of days ● use a rain gauge to measure the amount of rain received in the area after a rainstorm ● use a wind sock or look at pictures of a wind sock being used at an airport to recognize which way the wind is blowing and/or how hard the wind is blowing ● match a weather tool or picture of a weather tool to a picture of weather (e.g., rain gauge with a picture of a thunderstorm) ● create one or more weather tools to use in the classroom <p>C. Students recognize one or more tools used to collect weather data.</p> <ul style="list-style-type: none"> ● practice using weather-related instruments for their intended purpose (e.g., observe the rain gauge filling up throughout a rainy day, check the thermometer to determine the outside temperature) ● differentiate between weather tools and other tools by sorting them into groups ● watch or listen to a weather report, and then discuss or identify the tools used in the report <p>Prerequisite Skill: Students identify local weather conditions.</p> <ul style="list-style-type: none"> ● give a local weather report during a morning meeting or at another appropriate time during the school day 				

	<ul style="list-style-type: none"> • identify the proper clothing needed for certain types of weather
Key Terms	air pressure, barometer, instrument, rainfall, rain gauge, temperature, thermometer, tools, weather, weather data, weather vane, wind, wind sock
Additional Resources or Links	<p>This is a list of weather report vocabulary words. https://www.teachstarter.com/vocabulary-list/weather-vocabulary/</p> <p>This website explains how to create a homemade thermometer. https://www.scientificamerican.com/article/measure-up-with-a-homemade-thermometer/</p> <p>This website explains how to create a homemade barometer. https://easyscienceforkids.com/make-your-own-barometer/</p> <p>This website explains how to make a rain gauge. https://www.communityplaythings.com/resources/articles/2017/making-a-rain-gauge</p> <p>This is a video that explains how to make a weather vane. https://www.youtube.com/watch?v=jHgHcuCRXmA</p> <p>This is website explains how to make a wind sock. https://www.weatherwizkids.com/experiments-windsock.htm</p> <p>This website provides a movement lesson to use with weather units. https://gpb.pbslearningmedia.org/resource/d38cbb1a-4848-4eaa-a2f7-c7c9f7f30206/kids-in-motion-weather-fitness-lesson-plan/</p>
Cross-Content Standards	<p>Language Arts: Answer Questions (6.RI.6), Describe Events (6.W.3.d), Identify Evidence (6.W.4.b), and Identify a Connection between a Claim and Supporting Evidence (6.W.4.c)</p> <p>Mathematics: Identify Models of Integers (6.1.1.g), Compare and Order Integers (6.1.1.h), Interpret a Histogram (6.4.2.a), Solve Problems Using Histograms (6.4.2.b), Find the Mode of a Set of Ordered Data (6.4.2.c), and Find the Median of a Set of Ordered Data (6.4.2.d)</p>

Science—Grade 6

Earth and Space Sciences

SC.6.12.4 Weather and Climate		Access Points		
Standard/Indicator	Extension	A	B	C
SC.6.12.4.B Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. Assessment does not include the dynamics of the Coriolis effect.	Develop and use models to describe that air and water rise when heated by the sun, and sink when cooled, causing circulation patterns in the oceans and atmosphere that affect the climates of regions.	Use models to identify that air and water rise when heated by the sun and sink when cooled, causing circulation patterns in the oceans and atmosphere that affect the climate of regions.	Identify that air and water rise when heated by the sun and sink when cooled.	Recognize that air and water rise when heated and sink when cooled.

Standard Clarification

Students will identify that air and water temperatures rise and fall, causing patterns of water and air movement in the oceans and atmosphere that affect the climate. Students will develop models to describe the circulation patterns in the oceans and atmospheres that affect the climates of regions.

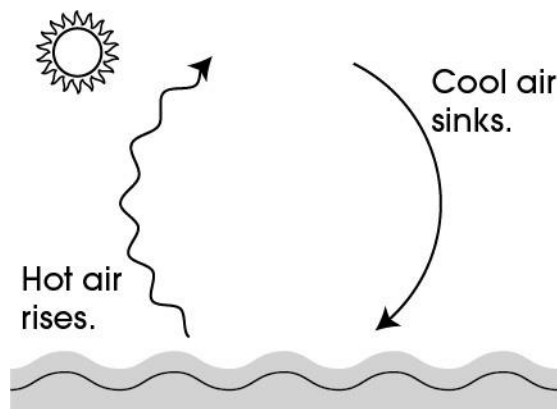
Target Activities for Access Point A

- A.** Students use models to identify and describe that air and water rise when heated by the sun and sink when cooled, which causes patterns in the oceans and atmosphere that affect climates.
- complete an experiment with food coloring and warm and cool water to model the effect of cold water (or air) sinking and warm water (or air) rising
 - compare the results of a warm water/cold water experiment (e.g., the first activity) to the temperatures in the oceans, then use a weather map to discuss how the change in temperature affects the climate of regions (e.g., Earth is heated most directly at the Equator and air rises there, but air will sink as it moves toward the poles and is cooled)
 - label a map showing the circulation of warm air rising and cool air sinking, and trace the circulation patterns in the oceans and atmosphere that show how the patterns affect the climate of regions

Scaffolding Activities for Access Points B and C

- B.** Students identify that air and water rise when heated by the sun and sink when cooled.
- create a diagram of daytime that displays arrows showing that air and water temperatures are rising, then create a diagram of nighttime that displays arrows showing that air and water temperatures are dropping
 - watch a video about air currents or water currents, and identify that air and water rise when heated and sink when cooled by pointing to the appropriate arrows on a visual
- C.** Students recognize that air and water rise when heated and sink when cooled.
- trace a diagram showing warm and cold temperatures rising and falling, while using a red marker to indicate warm air and water and a blue marker to indicate cold air and water
 - identify the type of temperature change (i.e., hotter or colder) when given two temperatures
 - complete sentence strips or use word cards to create correct sentences about what happens to air and water when temperatures increase or decrease (e.g., When water temperature decreases, water will **move** or **stay still**)
- Prerequisite Skill:** Students understand that temperatures can change.
- use a thermometer to find the temperature outside in the morning and again in the late afternoon or evening to identify that the temperature changes
 - compare temperatures in the same region at different times throughout the year to identify that the temperature

	<p>changes</p> <ul style="list-style-type: none"> measure the temperature of water taken directly from the tap, after being heated in the microwave, and after being cooled (e.g., placed in the refrigerator) to identify that water can change temperature depending on the situation
Key Terms	air, atmosphere, climate, circulation pattern, cool, current, Equator heat, ocean, region, rise, sink, sun, temperature, water
Additional Resources or Links	<p>This is a video showing an experiment about cold and warm water sinking and rising. https://www.youtube.com/watch?v=bN7E6FCuMbY</p> <p>This is a video about climate zones and ocean currents. https://www.generationgenius.com/videolessons/climate-zones-and-ocean-currents-video-for-kids/</p>
Cross-Content Standards	<p>Language Arts: Use Descriptive Language (6.W.3.d) and Identify Credible Sources (6.W.6.b)</p> <p>Mathematics: Identify Models of Integers (6.1.1.g), Compare and Order Integers (6.1.1.i), Interpret a Histogram (6.4.2.a), Solve Problems Using Histograms (6.4.2.b), Find the Mode (6.4.2.c), and Find the Median (6.4.2.d)</p>



Science—Grade 6

Earth and Space Sciences

SC.6.12 Weather and Climate		Access Points		
Standard/Indicator	Extension	A	B	C
SC.6.12.4.C Ask questions to clarify evidence of the factors that have caused the change in global temperatures over thousands of years.	Find and use patterns in data to explain how different factors influence the global temperature over time.	Use given patterns in data to describe how different factors influence the global temperature over time.	Identify factors that can affect the global temperature of Earth.	Recognize that the temperature of Earth has changed over time.
Standard Clarification				
Students will use data to identify and explain that the temperature of Earth has changed over time and how different factors influence that change.				
Target Activities for Access Point A				
<p>A. Students use patterns in data to explain how different factors influence the global temperature over time.</p> <ul style="list-style-type: none"> ● examine a color-coded (e.g., red represents hot temperatures, blue represents cold temperatures) temperature timeline by tracing the timeline with a finger or other tool, and recognize that, while the temperatures on Earth fluctuate (e.g., are not constant), in recent years the temperatures on Earth have been increasing ● recognize basic information about the different eras or changes in Earth's history (e.g., Paleozoic Era, Mesozoic Era, glacial periods) ● use data from books, videos, or other media to assist in creating a timeline that includes major changes or events in Earth's history (e.g., glacial periods, meteor events, increase in world population) ● compare temperature data with periods of great change in Earth's history (e.g., glacial periods, meteor events, increase in world population), and discuss what happens to the temperature when these changes occur ● use data (e.g., interactive maps, bar graphs) from NASA to identify how Earth's temperature has changed over the last decade ● observe data (e.g., graphs) of the average temperature of Nebraska over the past 100 years, and discuss what happened to the temperature over that time (e.g., it increased) ● observe data (e.g., graphs) of the average temperature of various continents or areas of the world over the past 100 years, and recognize that the overall average temperature of the world has increased during that time 				
Scaffolding Activities for Access Points B and C				
<p>B. Students identify factors that affect the global temperature of Earth.</p> <ul style="list-style-type: none"> ● after watching a video on global warming and climate change, identify one or more factors that contribute to global warming and climate change and create a visual (e.g., poster, list) using the factors ● recognize activities that people or countries can do to decrease or slow down the rising global temperature (e.g., recycling, driving less) <p>C. Students recognize that the temperature of Earth has changed over time.</p> <ul style="list-style-type: none"> ● compare three data points on a graph that shows global temperature changes over time, and recognize that there is a change from the first data point to the third data point ● observe three pictures of a glacier over time or watch a video of a melting glacier, and recognize that the glacier gets smaller or melts from the first picture to the third picture and that the melting occurs due to a change in temperature 				
Prerequisite Skill: Students identify that temperature can change.				
<ul style="list-style-type: none"> ● use data from local or global weather reports to identify that daily, monthly, and seasonal temperatures change 				

- plot data from local weather reports on a graph to show a temperature change throughout a fixed period of time
- measure the local temperature at the beginning of the day and at the end of the day, and identify that the temperature has changed throughout the day

Prerequisite Skill: Students explain cause and effect relationships.

- identify a cause or an effect of an activity or event (e.g., eating too much junk food gives you a stomachache)
- explain why an activity or event occurred (e.g., the flowers grew because they received enough water and sunlight)

Key Terms	change, data, Earth, factors, global temperature, patterns,
Additional Resources or Links	<p>This is an informational article for educators about the change in Earth temperature over time. https://www.climate.gov/news-features/climate-qa/whats-hottest-earths-ever-been</p> <p>This is a list of important dates from 900—1300 BCE to 2009 that show global temperature change and events during particular times. https://www.newscientist.com/article/dn9912-timeline-climate-change/</p> <p>This is an article from the National Aeronautics and Space Administration (NASA) about global temperature changes since the Industrial Revolution. https://earthobservatory.nasa.gov/world-of-change/global-temperatures</p> <p>This is a video about climate change that explains why Earth’s average temperature has increased over the past century. https://www.generationgenius.com/vidlessons/climate-change-video-for-kids/</p> <p>This is a source for pictures of glaciers before and after melting. https://newatlas.com/before-after-photos-glaciers-climate-change/49143/#gallery:1</p> <p>This is a CNN video about melting glaciers and climate change. https://www.youtube.com/watch?v=dzRvmjBGqp8</p>
Cross-Content Standards	<p>Language Arts: Answer Questions (6.RI.6), Describe Events (6.W.3.d), and Identify Evidence (6.W.4.b)</p> <p>Mathematics: Identify Models of Integers (6.1.1.g), Compare and Order Integers (6.1.1.h), Interpret a Histogram (6.4.2.a), Find the Mode of a Set of Ordered Data (6.4.2.c), and Find the Median of a Set of Ordered Data (6.4.2.d)</p>

Science—Grade 6

Earth and Space Sciences

SC.6.12 Weather and Climate		Access Points		
Standard/Indicator	Extension	A	B	C
<p>SC.6.12.4.D Analyze and interpret data on weather and climate to forecast future catastrophic events and inform the development of technologies to mitigate their effect.</p>	<p>Use data about weather to find patterns and predict future weather or severe weather events.</p>	<p>Given data about weather conditions, identify patterns that can be used to predict severe weather events.</p>	<p>Identify instruments and technology that can be used to predict and monitor severe weather events.</p>	<p>Recognize characteristics of severe weather events (e.g., thunderstorm, hurricane, tornado, flash flooding, ice storm).</p>
Standard Clarification				
<p>Students will identify and define severe weather events, learn how they are monitored and studied by professionals, and use that data to find patterns and predict future weather or severe weather events.</p>				
Target Activities for Access Point A				
<p>A. Students use data about weather conditions to identify patterns that can be used to predict future weather or severe weather events.</p> <ul style="list-style-type: none"> ● track the local weather, including temperature, amount of precipitation (e.g., rain, snow), and the amount of sun (e.g., full sun, partly cloudy) for a week, and chart the results on a class bar graph or table ● use online sources to observe local weather data over a fixed period of time ● use weather data collected by the class to predict what will happen the next day, week, or month (e.g., it has been hot for the last three days, so it will probably be hot tomorrow) ● identify local severe weather events (e.g., tornado, thunderstorm) as well as other severe weather events (e.g., hurricane, earthquake) ● observe weather data before and after a severe weather event, and compare that data with weather data from a second, similar severe weather event to identify similarities or patterns (e.g., watch weather reports from before or after a severe weather event) 				
Scaffolding Activities for Access Points B and C				
<p>B. Students identify tools that can be used to predict and monitor severe weather events.</p> <ul style="list-style-type: none"> ● learn about a meteorologist’s job through research, videos, or interviews ● research various instruments and technology used to predict and monitor severe weather events by watching weather reports, looking at the National Weather Service (NWS) website, and using weather reporting apps ● use weather reporting tools such as thermometers, barometers, and computer programs to explain the current local weather ● watch videos of weather reports during a severe weather event, and create a list of the various instruments and/or technology used during the reports ● choose an instrument or a form of technology used to predict or monitor severe weather events and create a short presentation describing it <p>C. Students identify severe weather events and recognize characteristics of the severe weather events.</p> <ul style="list-style-type: none"> ● match pictures of characteristics of severe weather events with the name of the event (e.g., picture of heavy rain and lightning with a word card with the word “thunderstorm”) ● watch videos or read or listen to books about various types of severe weather, and choose one characteristic of the severe weather mentioned (e.g., read about snowstorms and choose a picture of heavy snow) ● recognize a severe weather event when given information about the characteristics of the event ● participate in investigations that model severe weather events, such as creating a tornado in a bottle or using a fan to blow items over to simulate a windstorm 				

<p>Prerequisite Skill: Students explain various types of weather.</p> <ul style="list-style-type: none"> ● identify the current weather, either local or in a given area, and describe what is occurring based on the weather ● research familiar weather events, and explain characteristics of the events <p>Prerequisite Skill: Students make predictions about familiar events.</p> <ul style="list-style-type: none"> ● read or listen to the beginning and middle of a story, and predict what will happen at the end of the story ● predict one thing that may happen when participating in a familiar activity (e.g., we are going grocery shopping, so we will probably buy some cereal) <p>Prerequisite Skill: Students create and/or follow a pattern.</p> <ul style="list-style-type: none"> ● continue an AABBAABB pattern with blocks or other manipulatives ● play a game that requires the ability to follow a pattern (e.g., repeating colors, repeating words) 	
Key Terms	data, instrument, monitor, pattern, predict, severe weather, technology, weather, weather condition
Additional Resources or Links	<p>This is a unit about weather patterns. https://www.coreknowledge.org/free-resource/cksci-unit-4-weather-patterns/</p> <p>This is a unit about weather and climate, as well as patterns of weather across time and location. https://www.coreknowledge.org/free-resource/cksci-unit-4-weather-and-climate/</p> <p>This is an activity to make a tornado in a bottle. https://www.billnye.com/home-demos/twistin-tornado</p> <p>This is the National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) website. https://www.weather.gov/</p> <p>This is the NOAA NWS website for kids and teens. https://www.weather.gov/owlie/science_kt</p> <p>This is an activity that is part of a larger unit on weather and that has students forecast and track a tropical storm during the hurricane season. https://ngss.nsta.org/Resource.aspx?ResourceID=545</p>
Cross-Content Standards	<p>Language Arts: Identify an Author’s Purpose (6.RI.3), Compare the Same Topic in Two Texts (6.RI.5), and Identify Evidence (6.W.4.b)</p> <p>Mathematics: Estimate the Sum (6.1.2.e), Match a Word Phrase with an Input/Output Box (6.2.1.a), Find a Missing Number in a Ratio Table (6.2.2.f), Interpret a Histogram (6.4.2.a), Solve Problems Using Histograms (6.4.2.b), and Find the Mode (6.4.2.c) and the Median (6.4.2.d) of a Set of Ordered Data</p>

Science—Grade 6

Earth and Space Sciences

SC.6.13 Earth's Systems		Access Points		
Standard/Indicator	Extension	A	B	C
SC.6.13.5.A Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. (A quantitative understanding of the latent heats of vaporization and fusion is not assessed.)	Develop and use a model of the water cycle to explain the cycling of water and how the sun and gravity supply the energy for that cycle.	Use a model of the water cycle to describe the cycling of water or how the sun and gravity supply the energy for that cycle.	Identify how the sun and gravity provide energy for the water cycle.	Recognize the steps of the water cycle.

Standard Clarification

Students will develop and use a model of the water cycle to describe or explain the cycling of water and what role the sun and gravity play in the water cycle.

Target Activities for Access Point A

- A.** Students develop and use a model of the water cycle to describe the cycling of water.
- create a 3D model of the water cycle, and point to each section of the cycle as it is described
 - create a water cycle model in a bowl or a bag, and observe and describe what happens during the cycle
 - identify three parts of the water cycle (i.e., precipitation, evaporation, and condensation) in a model, and describe what happens in each part
- A.** Students develop and use a model of the water cycle to describe how the sun and gravity supply the energy for the cycle.
- create a model of the water cycle, including the sun, and identify what role the sun plays in the cycle
 - read or listen to a passage about the water cycle, including information about the sun and gravity as part of the water cycle, and describe how the sun and gravity supply the energy for the cycle
 - create graphics or word cards of the sun and gravity, and place them in the correct positions on a visual model of the water cycle

Scaffolding Activities for Access Points B and C

- B.** Students identify how the sun and gravity play a role in the water cycle (i.e., provide energy).
- observe a model of the water cycle that includes the sun and a representation of gravity (e.g., arrows, lines), and identify that the sun and gravity are part of the water cycle by pointing to or reading the parts of the water cycle
 - identify that the sun provides energy in the water cycle by heating up the water and causing evaporation and that gravity provides energy by making water move downward after watching a video about the water cycle
- C.** Students recognize the water cycle and its parts (or steps).
- complete part of the water cycle by attaching word cards or pictures of the steps to a model
 - complete a class worksheet about the water cycle
 - recognize the water cycle when shown a picture of the water cycle and a picture of the life cycle of an animal or plant
- Prerequisite Skill:** Students recognize different forms of water (e.g., rain, snow, mist).
- describe the weather outside when a form of water is occurring (e.g., it is raining hard, snow is falling)
 - participate in an investigation that shows the different forms of water (i.e., gas, liquid, solid)
 - recognize that rain puddles evaporate after some time

<p>Prerequisite Skill: Students understand that gravity pulls things together or causes objects to fall or stay on the floor.</p> <ul style="list-style-type: none"> participate in an investigation that shows the effects of gravity when a ball is dropped watch a video or read or listen to a passage that defines gravity, and participate in a class discussion about gravity 	
<p>Key Terms</p>	<p>cloud, evaporation, gravity, precipitation, rain, snow, solar energy, sun, water vapor</p>
<p>Additional Resources or Links</p>	<p>This is a unit on the water cycle. https://www.coreknowledge.org/free-resource/ckla-domain-06-cycles-nature/</p> <p>This is a lesson plan about the role of sunlight and gravity in the water cycle. https://www.legendsoflearning.com/learning-objectives/role-of-sunlight-and-gravity-in-the-water-cycle/</p> <p>This is a visual of the water cycle that includes the sun. https://water.usgs.gov/edu/watercycle-kids-beg.html</p> <p>This is a website with activities and experiments to teach about the water cycle. https://thewaterproject.org/resources/the_water_cycle</p> <p>This is a resource with lesson plans for teaching about the water cycle. https://extension.usu.edu/waterquality/educator-resources/lessonplans/wc</p> <p>This is a lesson about the water cycle. https://gpm.nasa.gov/education/lesson-plans/exploring-water-cycle</p>
<p>Cross-Content Standards</p>	<p>Language Arts: Use Descriptive Language (6.W.3.d), Identify Evidence (6.W.4.b), Identify a Word or Phrase that Connects a Claim and Supporting Evidence (6.W.4.c), and Identify Credible Print and Digital Sources (6.W.6.b)</p> <p>Mathematics: Solve Real-World Problems Using Ratios (6.2.3.d)</p>

Water Cycle

