

NEBRASKA

Alternate Science Instructional Supports for NSCAS Science Extended Indicators Grade 7

for
Students with the Most Significant Cognitive Disabilities
who take the
Statewide Science Alternate Assessment



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Overview

Introduction

Science standards apply to all students, regardless of age, gender, cultural or ethnic background, disabilities, aspirations, or interest and motivation in science (NRC, 1996).

The science standards, extended indicators, and instructional supports in this document were developed by Nebraska educators to facilitate and support science instruction for students with the most significant intellectual disabilities. They are directly aligned to the Nebraska's College and Career Ready Standards for Science adopted by the Nebraska State Board of Education.

The instructional supports included here are sample tasks that are available to be used by educators in classrooms to help instruct students with significant intellectual disabilities.

The Role of Extended Indicators

For students with the most significant intellectual disabilities, achieving grade-level standards is not the same as meeting grade-level expectations, because the instructional program for these students addresses extended indicators.

It is important for teachers of students with the most significant intellectual disabilities to recognize that extended indicators are not meant to be viewed as sufficient skills or understandings. Extended indicators must be viewed only as access or entry points to the grade-level standards. The extended indicators in this document are not intended as the end goal but as a starting place for moving students forward to conventional reading and writing. Lists following "e.g." in the extended indicators are provided only as possible examples.

Students with the Most Significant Intellectual Disabilities

In the United States, approximately 1% of school-aged children have an intellectual disability that is "characterized by significant impairments both in intellectual and adaptive functioning as expressed in conceptual, social, and practical adaptive domains" (U.S. Department of Education, 2002 and American Association of Intellectual and Developmental Disabilities, 2013). These students show evidence of cognitive functioning in the range of severe to profound and need extensive or pervasive support. Students need intensive instruction and/or supports to acquire, maintain, and generalize academic and life skills in order to actively participate in school, work, home, or community. In addition to significant intellectual disabilities, students may have accompanying communication, motor, sensory, or other impairments.

Alternate Assessment Determination Guidelines

The student taking a Statewide Alternate Assessment is characterized by significant impairments both in intellectual and adaptive functioning which is expressed in conceptual, social, and practical adaptive domains and that originates before age 18 (American Association of Intellectual and Developmental Disabilities, 2013). It is important to recognize the huge disparity of skills possessed by students taking an alternate assessment and to consider the uniqueness of each child.

Thus, the IEP team must consider all of the following guidelines when determining the appropriateness of a curriculum based on Extended Indicators and the use of the Statewide Alternate Assessment.

- The student requires extensive, pervasive, and frequent supports in order to acquire, maintain, and demonstrate performance of knowledge and skills.
- The student's cognitive functioning is significantly below age expectations and has an impact on the student's ability to function in multiple environments (school, home, and community).
- The student's demonstrated cognitive ability and adaptive functioning prevent completion of the general academic curriculum, even with appropriately designed and implemented modifications and accommodations.
- The student's curriculum and instruction is aligned to the Nebraska College and Career Ready Science Standards with Extended Indicators.
- The student may have accompanying communication, motor, sensory, or other impairments.

The Nebraska Department of Education's technical assistance documents "***IEP Team Decision Making Guidelines—Statewide Assessment for Students with Disabilities***" and "***Alternate Assessment Criteria/Checklist***" provide additional information on selecting appropriate statewide assessments for students with disabilities. [School Age Statewide Assessment Tests for Students with Disabilities—Nebraska Department of Education](#).

Instructional Supports Overview

As stated, these science instructional supports are sample tasks available for use by educators who are instructing students with significant intellectual disabilities. The instructional supports are aligned to the extended indicators in grades five, eight, and high school. Each instructional support includes the following components:

- Standard/extended indicator/access points
- Standard clarification
- Target activities for access point A
- Scaffolding activities for access points B and C
- Prerequisite skills (where applicable)
- Key terms
- Additional resources or links
- Cross-content standards
- Graphics (where applicable)

The standard clarification statement provides educators with additional science background knowledge related to the content of the extended indicator.

The target activities, scaffolding activities, and prerequisite skills are presented in a top down model with the most complex access or entry points (e.g., learning objective and activities for access point A) listed first and the least complex access or entry points (e.g., learning objective and activities for access point C or prerequisite skills) listed last.

The activities listed are suggestions for augmenting or enhancing current instruction and are intended to provide additional support for students to achieve the learning objective stated at each level (access point A, B, C, and prerequisite skills). The activities listed are not intended to be all-inclusive, nor is it intended to imply that all students would benefit from every activity. Educators can select and modify activities to support or enhance current instruction based on individual student needs and abilities.

Key terms may be selected and used by educators to guide vocabulary instruction as determined appropriate for each individual student. The list of key terms are suggestions and not intended to be an all-inclusive list.

Additional resources or links are optional images, video clips, and other additional activities to provide guidance or further support instruction.

The cross-content standards and life skills activities are suggestions to assist educators in planning multidisciplinary activities for integrated curricula.

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Science—Grade 7 Physical Sciences

SC.7.3 Structure and Properties of Matter

SC.7.3.1.A

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Develop models to describe the atomic composition of simple molecules. Assessment does not include valence electrons and bonding energy, discussing the ionic nature of subunits of complex structures, or a complete description of all individual atoms in a complex molecule or extended structure is not required.	Build and use models to explain the particle arrangement of solids, liquids, and gases.	Use models to describe that solids are made of tightly packed particles, liquids are made of particles sliding over one another, and gases are made of particles spaced far apart.	Given a model showing particle arrangements of a material, identify the material as a solid, liquid, or gas.	Given an object or material, identify the object as a solid, liquid, or gas.

Standard Clarification

Students will use models to identify the arrangement of particles in solids, liquids, and gases. All states of matter are made up of atoms, molecules, and ions.

Target Activities for Access Point A

- A. Students use models to identify and describe a solid, liquid, or gas by looking at the particle arrangement.
- observe three boxes filled with dots, and identify which box represents a solid, liquid, or gas: box one should contain closely compacted dots in a regular pattern to represent solids, box two should contain dots that are close but less compacted and in no regular pattern to represent liquids, and box three should contain dots that are well spaced out to represent gases
 - observe three pictures of particles, each one representing a solid, liquid, or gas, and describe the formation of the particles and identify which represents a solid, a liquid, and a gas

SC.7.3 Structure and Properties of Matter

Scaffolding Activities for Access Points B and C

- B.** Students identify particle models of common materials and objects as solids (e.g., table, chair, pencil), liquids (e.g., water, juice, rain), or gases (e.g., steam from cooking, carbon dioxide, air)
- sort pictures of particle models into three groups: liquids (i.e., materials that flow and take the shape of any container they are placed in), solids (i.e., materials that have their own shape), and gases (i.e., materials that float and have no shape)
 - fill three gloves to demonstrate the states of matter; fill one with air to demonstrate that gases fill up their container; fill one with solid objects to demonstrate that solids keep their shape; fill one with liquid to show that liquids take the shape of their containers (later pour the water into a different container to demonstrate the shape change)
- C.** Students identify an object or material as a solid, liquid, or gas.
- sort objects or pictures of objects into groups of solids (e.g., rock), liquid (e.g., juice), and gas (e.g., steam)
 - identify the form of water as it is heated and cooled (i.e., it is a solid when it is an ice cube, liquid when it is water, and gas when it is steam)

Prerequisite Skill: Students recognize that particles are too small to be seen but take up space.

- pump a basketball full of air to demonstrate air particles being compressed into a container and pushing on the walls of the ball
- watch a video on the particles of matter

Key Terms

gas, liquid, particle, solid

Additional Resources or Links

- This is a video on the particles of matter.
<https://www.generationgenius.com/videolessons/particle-nature-of-matter-video-for-kids/>
- This is a chart that shows models of the three states of matter.
<http://misswise.weebly.com/states-of-matter.html>
- This is a lesson plan on the states of matter.
<https://www.nagwa.com/en/plans/507183272606/>

Cross-Content Standards

- Language Arts: Describe Experiences and Events (7.W.3.d) and Identify Evidence (7.W.4.b)
- Mathematics: Collect Data to Answer an Investigative Question (7.D.1.a)

SC.7.3 Structure and Properties of Matter

SC.7.3.1.B

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. Assessment is limited to qualitative information.	Gather and use information to explain that some synthetic materials are made from natural materials and affect the natural environment.	Given information, describe that some synthetic materials are made from natural materials.	Identify a material as natural or made by humans from natural materials (synthetic).	Identify natural materials used by humans.

Standard Clarification

Students will understand how synthetic materials (materials that come from the environment but undergo a chemical change) impact our environment.

Target Activities for Access Point A

- A.** Students describe which natural resource is used to make a given synthetic material and the impact that process has on the environment.
- describe the natural materials that are changed to make synthetic products (e.g., gasoline, houses, glass cleaning products) when given information about raw natural resources (e.g., oil, trees, sand, plant extracts) and the processes used to change them
 - conduct an experiment to demonstrate a natural resource becoming a synthetic material by mixing common materials to cause a chemical reaction
 - watch a video on how plastic is made
 - mix wood shavings in glues to show how a natural resource (wood) is changed into synthetic particle board, and compare that with a piece of raw lumber to observe the differences

SC.7.3 Structure and Properties of Matter

Scaffolding Activities for Access Points B and C

- B.** Students recognize common materials as natural (not significantly changed from their original form in nature) or synthetic (made from natural products that are changed significantly from their natural form in nature) materials.
- create a Venn diagram to compare natural and synthetic materials, describing how both are beneficial to humans
 - sort pictures of natural resources (e.g., herbs, plants, minerals, rocks, water, sediments, metals) and synthetic materials (e.g., vitamins, plastic bottles, carpet)
- C.** Students identify natural materials used by humans.
- go on a scavenger hunt to find natural materials used by humans (e.g., find the material used to plant flowers (soil); find the material used to build houses (trees))
 - watch a video on how paper is made from a tree
 - categorize natural resources (e.g., medicinal herbs, paper, cattle, coal, toothpaste, ice) used by humans into five categories: plants, animals, water/air/sun, fossil fuels, and minerals

Prerequisite Skill: Students recognize physical and chemical changes.

- melt ice to demonstrate a physical change
- observe an apple and then demonstrate a chemical change with the same apple

Prerequisite Skill: Students identify a natural resource.

- watch a video on natural resources that are found in the environment
- go on a nature walk and find items that are natural to the environment (e.g., plants, soil, rocks)

Key Terms

environment, human, made (created), natural material, synthetic material

SC.7.3 Structure and Properties of Matter

Additional Resources or Links

- This is a video about synthetic material.
<https://www.generationgenius.com/videolessons/synthetic-materials-video-for-kids/>
- This is an activity about creating a synthetic material.
<https://www.generationgenius.com/wp-content/uploads/diy-activities/fake-worms-diy.pdf>
- This is a science experiment and lesson where students can create plastic (synthetic material) from milk (natural material).
https://www.sciencebuddies.org/science-fair-projects/project-ideas/Chem_p101/chemistry/turn-milk-into-plastic
- This is a video about plastic, its uses, and how it is made.
<https://www.youtube.com/watch?v=ggh0Ptk3VGE>
- This is a lesson plan and bingo game where students identify natural resources used by humans.
<https://drive.google.com/file/d/1H39qVPjml5ELIShL3KqjA6VN9SWv1ETK/view?usp=sharing>

Cross-Content Standards

- Language Arts: Answer Questions (7.RI.6), Identify Evidence (7.W.4.b), and Use Descriptive Language (7.W.3.d)
- Mathematics: Collect Data to Answer an Investigative Question (7.D.1.a) and Solve a One-Step Equation Using Multiplication (7.A.1.c)

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SC.7.3 Structure and Properties of Matter

SC.7.3.1.C

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.	Use a model to show or explain the change in particle motion, change in state of matter, and the increase or decrease in temperature when heat (thermal energy) is added to or taken away.	Given a model, describe the change in particle motion, change in state of matter, and/or the increase or decrease in temperature when heat (thermal energy) is added to or taken away.	Identify that the addition of heat can cause solids to melt and liquids to boil and that the removal of heat can cause liquids to form solids.	Recognize that as heat (thermal energy) is added to a substance, the temperature of the substance increases.

Standard Clarification

Students will understand how properties change when thermal energy is added or taken away. When thermal energy is added or taken away, the state of matter can change. Atoms are constantly vibrating because they have thermal energy. When heat is added, the molecules and atoms move faster and the space between them increases. The increased motion causes the object to take up more space.

Target Activities for Access Point A

- A.** Students describe how particle motion changes when heat is added or taken away.
- use candy to model the atoms and molecules of a solid (close together), a liquid (spaced apart), and the solid after it has been heated
 - add food coloring to a glass of extremely cold water and a similar glass of very warm water, and observe how long it takes for the food coloring to move through the water in each glass (i.e., the food coloring molecules in the warm water will move much faster because the molecules vibrate faster when the thermal energy is greater)

SC.7.3 Structure and Properties of Matter

Scaffolding Activities for Access Points B and C

B. Students identify how the addition or loss of heat impacts a substance.

- use a hair dryer to apply heat to ice and observe it melting, and discuss that the particles are moving faster and expanding, causing the solid to turn into a liquid
- fill an ice tray with juice and place it in a freezer, then wait 3-4 hours and observe the liquid turning into a solid; explain that the motion of the particles in the juice is decreasing as the temperature drops

C. Students recognize that adding heat to a substance causes the temperature of that substance to rise.

- record the temperature of water before adding heat and after adding heat
- measure the temperature of a substance (e.g., soup) multiple times as heat is added, and recognize that as more heat is added, the temperature of the substance increases (e.g., the soup starts out at room temperature and eventually reaches a boiling point as more and more heat is added)

Prerequisite Skill: Students understand the difference between hot and cold.

- identify substances that are hot (e.g., hot chocolate) or cold (e.g., chocolate milk)

Prerequisite Skill: Students identify a thermometer and understand its use.

- choose a thermometer when given two common measuring tools (e.g., a thermometer and a measuring cup)
- explain what a thermometer is used for
- correctly use a thermometer in various settings (e.g., while cooking, while measuring temperature outside)

Key Terms

add, boil, decrease, heat, increase, liquid, matter, melt, motion, particle, remove (take away), solid, substance, temperature, thermal energy

SC.7.3 Structure and Properties of Matter

Additional Resources or Links

- This is a video that teaches about heat energy.
<https://www.youtube.com/watch?v=jKokXIJ9Gw4>
- This is a unit on thermal energy.
<https://www.generationgenius.com/videolessons/thermal-energy-video-for-kids/>
- This is a unit that teaches about changes in state of matter, including changes from solid to liquid.
<https://ngss.nsta.org/Resource.aspx?ResourceID=454>

Cross-Content Standards

- Language Arts: Answer Questions (7.RI.6), Use Descriptive Language (7.W.3.d), and Identify Evidence (7.W.4.b)
- Mathematics: Identify the Degree of Likelihood of an Event as More Likely, Equally Likely, or Less Likely (7.D.3.a)

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SC.7.5 Chemical Reactions

SC.7.5.2.A

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. Assessment is limited to analysis of the following properties: density, melting point, boiling point, solubility, flammability, and odor.	Use data about the physical and chemical properties of substances before and after an interaction to determine if a chemical reaction occurred.	Given data or information about the physical properties (e.g., density, color, hardness, melting point, boiling point, state of matter and chemical properties (e.g., flammability, acidity, reactivity) of substances before and after an interaction, determine if a chemical reaction occurred.	Given the reactants and products of a chemical interaction determine whether the material or its chemical properties changed.	Recognize that all substances have specific physical and chemical properties.

Standard Clarification

Students will identify chemical and physical properties of matter to determine whether a chemical reaction occurred.

SC.7.5 Chemical Reactions

Target Activities for Access Point A

- A.** Students examine data or a chemical interaction to determine whether a chemical reaction occurred.
- watch a video on chemical and physical properties of matter, observe an investigation in which a chemical change occurs (e.g., a burning log turns to ash), and chart the process before (e.g., untouched log), during (e.g., log is on fire and burning), and after the change occurs (e.g., the log has turned to ash) in order to determine whether a chemical change occurred
 - compare the physical traits of an egg before it is placed in a cup of vinegar (shell is hard and white) and after it is placed in a cup of vinegar (shell has dissolved or become thin and soft, the shell color is lighter), and discuss what happened to the egg during the experiment (the vinegar reacted with the eggshell and created a chemical reaction, forming carbon dioxide bubbles)
 - observe the physical properties of an egg before and after it is scrambled and cooked, and determine that cooking causes a chemical change in the egg
 - observe the physical properties of cake ingredients before and after they are mixed and baked, and determine that cooking causes a chemical change in the cake ingredients

Scaffolding Activities for Access Points B and C

- B.** Students observe a chemical reaction to determine whether properties of matter have changed (e.g., oxygen is a reactive chemical that causes oxidation when some substances are exposed to it).
- observe a loaf of fresh bread, and describe the physical properties (e.g., the smell of the bread, the feel of the bread), then observe the same piece of bread after it has been left out overnight, compare the physical properties (e.g., now the bread is hard), and determine that leaving the bread out in the air (oxygen) for a long period of time caused the bread to change
 - cut open an apple, exposing it to oxygen, and describe the changes in the apple over several days
 - watch a video about chemical reactions and chemical changes
- C.** Students recognize that all substances have both physical properties (the way the substance looks and feels) and chemical properties (how the substance behaves when it interacts with other substances).
- indicate whether common substances have physical properties, chemical properties, or both

Prerequisite Skill: Students understand that all things are made of matter.

- watch a video on the states of matter
- fill three gloves to demonstrate the states of matter: fill one glove with air to demonstrate that gases fill up their container, fill one glove with solid objects to demonstrate that solids keep their shape, and fill one glove with liquid to show that liquids take the shape of their containers (pour the water into a different container to demonstrate the shape change)

SC.7.5 Chemical Reactions

Key Terms

carbon dioxide, chemical change, chemical property, chemical reaction, gas, interaction, material, matter, oxygen, physical change, physical property, product, reactant, substance

Additional Resources or Links

- This is a video of simple experiments that students can do that represent chemical reactions.
https://youtu.be/sJuJH_GT36k
- This is a chart of a physical change versus a chemical change.
<https://docs.google.com/document/d/1P43ce8DcbTDo0UL-OHeUep-UOuTZpnlvJBUkM0i1vIE/edit?usp=sharing>
- This is a video explaining the states of matter.
<https://www.youtube.com/watch?v=24Yromifcss>
- This is an experiment that uses an egg to show a chemical reaction.
<https://www.kiwico.com/diy/stem/crazy-chemistry/egg-in-vinegar-experiment>

Cross-Content Standards

- Language Arts: Answer Questions (7.RI.6), Use Words and Descriptive Details (7.W.3.d), and Identify Evidence (7.W.4.b)
- Mathematics: Identify the Degree of Likelihood of an Event as More Likely, Equally Likely, or Less Likely (7.D.3.a)

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SC.7.5 Chemical Reactions

SC.7.5.2.B

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. Assessment does not include the use of atomic masses, balancing symbolic equations, or intermolecular forces.	Use a model to explain that mass is conserved when reactants (left side of equation) are converted to products (right side of equation).	Use a model to describe that mass stays the same when reactants (left side of equation) are converted to products (right side of equation).	Identify that even though the substance may physically change, mass does not change in a chemical reaction.	Recognize that the mass of combined objects is equal to the mass of the individual objects added together (e.g., cookie dough vs ingredients).

Standard Clarification

Students will understand that during chemical reactions the mass of the substance does not change; the atoms are regrouped, but the total number of each type of atom is conserved.

Target Activities for Access Point A

- A.** Students demonstrate that mass is conserved when reactants (i.e., substances that are present at the beginning of a chemical reaction) are converted to products (i.e., the substances present at the end of a chemical reaction).
- watch a video of the conservation of mass in chemical and physical changes, noting that the reactant is the substance that is present at the beginning of a chemical reaction and the product is the substance that is present at the end of a chemical reaction
 - place vinegar in a paper cup and baking soda in a large zippered plastic bag, measure the mass of the bag and the cup with their contents, place the cup inside the bag with the baking soda, seal the bag, tip the cup to mix the contents, and then measure the mass again
 - use objects (e.g., cereal pieces) to demonstrate the atoms in substances before and after a chemical reaction, demonstrating that the number of atoms remains the same

SC.7.5 Chemical Reactions

Scaffolding Activities for Access Points B and C

- B.** Students identify the mass of substances before and after a chemical reaction and determine whether the total mass of the reactants is different from the total mass of the products.
- fill small paper cups halfway with different substances (e.g., water, lemon juice, vinegar and salt, soda, dish soap and water), and weigh them; then weigh several old, brown copper pennies and place each in a cup for 5–10 minutes; weigh the mass of the cup with the penny, and then remove the penny using a plastic spoon (being careful to not spill the contents); dry the penny, and observe whether it changed color (a color change indicates a chemical reaction); weigh the penny and the cup with the substances again to see that the mass did not change
 - demonstrate that the total mass of the products is equal to the total mass of the reactants by weighing vinegar and baking soda on the same scale in separate plastic zippered bags; combine the baking soda and vinegar into one bag, and notice the gas expanding in the bag; weigh the bag, and observe that the weight remains the same as when the reactants were separated
 - watch a video on the conservation of mass
- C.** Students weigh objects and substances before and after they are combined to observe that the total mass of the combined objects/substances is equal to the sum of the masses of each individual object/substance.
- create a model with cheese and two pieces of bread, identifying the reactants (i.e., the cheese and the bread); put the bread and cheese together to make a sandwich, and identify the sandwich as representing the product (the mass of the reactants will remain the same as the product)
 - place a cup of water on a scale, and record the weight of water when ice is added; wait for the ice to melt, and determine whether the mass has changed
 - measure 5 grams of salt and 10 grams of water (a total of 15 grams), mix the solutions together to demonstrate that mass does not change, and then weigh the new product to see that the mixture weighs a combined total of 15 grams, demonstrating that the salt did not disappear, it just went through a physical change
 - gather ingredients to bake a cake; identify the reactants (e.g., flour, sugar, egg, milk) and the product (i.e., cake) to demonstrate that matter can change

Prerequisite Skill: Students understand that matter can change between different states (i.e., solids, liquids, and gases).

- sort objects into categories of solids, liquids, and gases
- demonstrate matter changing its form by changing whole sugar into dissolved sugar (i.e., mixing sugar in water)
- watch a video on the three states of matter

Prerequisite Skill: Students identify that matter contains mass.

- weigh different items, such as water and sugar, to represent that matter contains mass

SC.7.5 Chemical Reactions

Key Terms

chemical change, chemical reaction, combine, conserve, convert, equal, mass, physical change, product, reactant, substance

Additional Resources or Links

- This is an animation to demonstrate that mass is conserved when water freezes.
<https://www.acs.org/content/acs/en/education/resources/k-8/inquiryinaction/fifth-grade/ice-conservation-of-mass.html>
- This is an animation to demonstrate that mass is conserved during chemical and physical changes.
<https://www.acs.org/content/acs/en/education/resources/k-8/inquiryinaction/fifth-grade/conservation-of-mass.html>
- This video demonstrates the Law of Conservation of Mass and provides an example.
https://www.youtube.com/watch?v=HmzFG_xOeaQ

Cross-Content Standards

- Language Arts: Answer Questions (7.RI.7), Use Words and Descriptive Details to Describe Events (7.W.3.d), and Identify Evidence (7.W.4.b)
- Mathematics: Collect Data to Answer an Investigative Question (7.D.1.a)

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SC.7.5 Chemical Reactions

SC.7.5.2.C

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. Assessment is limited to the criteria of amount, time, and temperature of substance in testing the device.	Participate in investigations to test ways to improve devices designed to release or absorb heat.	Given results of investigations using objects designed to release or absorb heat (e.g., hot packs, cold packs, glow sticks), describe that thermal energy impacts a chemical reaction.	Given results of investigations using objects designed to release or absorb heat, identify which reaction releases or absorbs the greatest amount of heat.	Observe a reaction to identify if a product releases heat or if the product absorbs heat (feels cooler).

Standard Clarification

Students will understand the difference between an endothermic reaction (i.e., a chemical reaction that absorbs heat from its surroundings, such as photosynthesis or cooking an egg) and an exothermic reaction (i.e., a chemical reaction that releases heat energy to its surroundings, such as burning paper or condensation of water vapor into rain).

Target Activities for Access Point A

- A.** Students identify that the temperature of the surroundings in which a chemical reaction occurs can affect the speed of the chemical reaction in an object designed to release or absorb heat.
- activate two glow sticks; place one in hot water and one in ice water to determine whether temperature impacts the rate of the chemical reaction; the glow stick in the hot water will glow brighter but will not last as long (conclusion: when thermal energy is added, i.e., hot water, the molecules react faster and produce more light for a shorter period of time; when thermal energy is removed, i.e., by the cold water, the molecules react slower and produce less light but last for a longer period of time; the glow sticks contain the same amount of chemical reactants, so they will produce the same amount of light but with different intensities and at different rates)

SC.7.5 Chemical Reactions

Scaffolding Activities for Access Points B and C

- B.** Students understand that some reactions release or absorb more heat than others, which affects the chemicals used in objects designed to release or absorb heat.
- observe two pictures (e.g., a burning fire and a lit candle), and determine which object releases the more heat
- C.** Students determine whether a reaction is releasing heat (i.e., exothermic reaction) or absorbing heat (i.e., endothermic reaction).
- hold an ice pack or a bag of ice, and discuss how the ice pack feels; discuss that the ice pack is absorbing heat from the body, causing a person to feel cold just like the ice pack
 - combine the following into three separate cups: 1 cup of water and 4 ice cubes, 1 cup of water and 3 tablespoons of Epsom salts, 1 cup of vinegar and 1 tablespoon of baking soda; make a chart with the following columns: Temperature of One Liquid, Temperature after Adding Second Ingredient, Absorb/Release; after measuring the temperature before and after the ingredients are mixed, determine whether heat was released (i.e., increased in temperature) or absorbed (i.e., decreased in temperature)

Prerequisite Skill: Students understand that heat energy can be transferred from one object or substance to another.

- draw a picture of the progression of what happens to a liquid (e.g., water) when thermal energy (i.e., heat) is added (i.e., water boils and then turns into gas) and taken away (i.e., the gas turns into liquid, and further cooling will turn the liquid into ice as the particles move slower)

Key Terms

absorb, atoms, chemical reaction, endothermic, exothermic, molecules, particle, release, thermal energy

SC.7.5 Chemical Reactions

Additional Resources or Links

- This is a chart of an endothermic reaction and an exothermic reaction.
https://docs.google.com/document/d/19PVyN90_Fz_gnN20KrBVQKIA90umPo4WFcO-6ZGdo-U/edit?usp=sharing
- This is a video on the conservation of mass.
<https://www.youtube.com/watch?v=3IHHOiTdmK4>
- This is a video that shows that different colors absorb heat better than others.
<https://www.youtube.com/watch?v=61JT9SYBk4A>
- This is a lesson plan to help students investigate whether some colors absorb heat better than others.
https://www.teachengineering.org/activities/view/colors_absorb_heat_better

Cross-Content Standards

- Language Arts: Describe Experiences and Events (7.W.3.d) and Identify Evidence (7.W.4.b)
- Mathematics: Identify Equations and Represent Authentic Situations (7.A.2.a)

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SC.7.5 Chemical Reactions

SC.7.5.2.D

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better <u>meet the criteria</u> for success.	Use data and other information to describe the properties of a substance that best contribute to a desired purpose.	Given data or other information, identify the properties of a substance that best contribute to a desired purpose (e.g., waterproofing chemical on surface makes it repel water).	Compare properties of multiple objects with the same purpose.	Recognize properties of objects designed for similar purposes (e.g., waterproofing for dryness, insulation for warmth).

Standard Clarification

Students will use data to identify the properties of a substance that best contribute to a desired purpose.

Target Activities for Access Point A

- A.** Students identify the properties of a substance that best contribute to a desired purpose.
- identify the key properties of insulation (i.e., keeps you warm by slowing heat flow and keeps you cool by reducing heat gain)
 - observe a picture of a thin piece of insulation and a thick piece of insulation, and determine which piece would keep a home warmer
 - pour water onto a shirt, and watch the shirt absorb the water; allow time for the shirt to dry, observe an adult spray the shirt with a waterproofing product, and pour water on the shirt again; explain the property that causes the material to not absorb water the second time
 - use a chart to classify the properties of a substance (e.g., hardness, strength, toughness, elasticity, plasticity, stiffness, absorbency, waterproof, transparency)

SC.7.5 Chemical Reactions

Scaffolding Activities for Access Points B and C

B. Students will compare and contrast two objects that are designed for the same purpose.

- soak a piece of linen fabric and a piece of wool fabric with water; using a hairdryer, apply heat to both objects; record the amount of time it takes for both materials to dry; create a Venn diagram to compare two materials that are designed for the same purpose (i.e., both are designed to dry fast)
- observe an adult spray one waterproofing product on piece of cotton fabric, and a different waterproofing product on a second piece of cotton fabric, allow the fabric pieces to dry and then observe an adult spray both pieces of fabric with water; discuss which product provides the most waterproofing (i.e., the fabric that absorbs the least water)
- observe pictures of items that are absorbent and those that are not (e.g., toilet paper, rain boots, umbrella, towel, cotton balls, sponge), and sort the items into absorbent and nonabsorbent groups

C. Students recognize the properties of an object that contribute to its desired function (e.g., waterproofing keeps you dry).

- observe pictures of two objects (e.g., an umbrella and a firefighter's coat), identify the properties that make them useful, and match the picture of the object to what it protects you from (e.g., an umbrella protects a person from water/getting wet, a firefighter's coat protects a person from fire)
- place a liquid (e.g., water) inside a plastic bag and inside a paper bag, and observe which material contains the liquid; discuss that plastic holds the liquid because it is made from materials that do not attract water molecules; paper is made from materials that do attract water molecules, so it cannot hold the liquid

Prerequisite Skill: Students classify objects by their observable physical properties.

- group objects (e.g., candle, wax paper, copy paper, construction paper, plastic spoon, plastic ruler, craft stick, pencil, aluminum foil, paper clip, rubber band, eraser, crayon, plastic bag) into three groups based on the following properties: shape, flexibility, and material
- identify what given objects are made of (e.g., a box is made of wood, a pan is made of metal, and a water bottle is made of plastic)

Key Terms

compare, contribute, object, property, purpose, substance

SC.7.5 Chemical Reactions

Additional Resources or Links

- This is an activity to help students determine whether objects are waterproof or absorbent.
<https://drive.google.com/file/d/1KU-FQGeL6V4iDeXR71nexoQ8q9tI3cEs/view?usp=sharing>
- This is a chart where students can classify the properties of a material.
<https://drive.google.com/file/d/18LHW0TT0Pwma4GHYsYqxecrfMr1hIP9J/view?usp=sharing>
- This is a video about properties of matter.
<https://www.generationgenius.com/videolessons/properties-of-matter-video-for-kids/>
- This is a video about properties of materials and their purposes.
<https://www.generationgenius.com/videolessons/material-properties-and-purposes-video-for-kids/>
- This is a video about classification of materials.
<https://www.generationgenius.com/videolessons/classification-of-materials-video-for-kids/>

Cross-Content Standards

- Language Arts: Answer Questions (7.RI.6), Describe Experiences Using Descriptive Details (7.W.3.d), and Identify Evidence (7.W.4.b)
- Mathematics: Solve Authentic Problems Involving Perimeter and Area (7.G.3.a)

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Science—Grade 7 Life Sciences

SC.7.7 Interdependent Relationships in Ecosystems

SC.7.7.3.A

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.	Use evidence to identify and explain competitive, predatory, and mutually beneficial relationships between organisms in an ecosystem.	Given information about the relationship between organisms in an ecosystem, identify and describe the relationship as competitive, predatory, or mutually beneficial.	Given a competitive, mutually beneficial, or predatory relationship between two organisms in an ecosystem, identify the competition, the benefit, or the predator/prey.	Given two familiar organisms, identify the predator and prey in a predator/prey relationship.

Standard Clarification

Students will understand an organism's basic needs for survival and the dependency that organisms have on each other and their environment in order to meet those basic needs. Students will demonstrate the impact that one organism has on another and describe relationships between organisms within an ecosystem.

Target Activities for Access Point A

- A. Students use evidence to identify and describe relationships between organisms in an ecosystem.
- complete a chart identifying a relationship as competitive, predatory, or mutually beneficial, and then discuss the aspects of the relationship
 - watch a video that shows how organisms depend on one another within their environment (e.g., a bear catching a fish)

SC.7.7 Interdependent Relationships in Ecosystems

Scaffolding Activities for Access Points B and C

B. Students describe mutually beneficial, predator/prey, and competitive relationships between organisms in an ecosystem.

- observe a photo of a mutually beneficial relationship (e.g., ants and acacia trees: ants benefit from the tree's nectar; the tree benefits from the ants' protection), and describe how both organisms are benefiting
- observe a predator/prey relationship (e.g., observe a bear catching a fish), and describe which organism is the predator and which is the prey
- watch a video on plants competing for sunlight, and describe the relationship between the plants

C. Students identify the predator and prey in a predator/prey relationship.

- given two organisms (e.g., wolf and rabbit, pelican and fish), identify which is the predator (e.g., wolf, pelican) and which is the prey (e.g., rabbit, fish)

Prerequisite Skill: Students understand that all organisms have basic needs for food, water, and air to survive.

- select the correct picture (e.g., apple or headphones) to identify food as a basic need
- select the correct picture (e.g., water or new shoes) to identify water as a basic need
- select the correct picture (e.g., air or ice cream) to identify air as a basic need

Prerequisite Skill: Students recognize relationships in an ecosystem.

- watch a video on animals living in Nebraska, and when given two choices, recognize which animal lives in Nebraska (e.g., a deer and a penguin)
- identify one way that humans and a given animal or plant are related (e.g., some humans eat deer, some humans grow flower gardens)

Key Terms

benefit, ecosystem, organism, predator, prey, survive

SC.7.7 Interdependent Relationships in Ecosystems

Additional Resources or Links

- This is a video describing ecological relationships.
<https://www.youtube.com/watch?v=VECARZ-zhKM>
- This is a Google Slide presentation on relationships between organisms.
<https://docs.google.com/presentation/d/1K9q8-J58zSKDbMnAtm-116Qsj1K1FSLsqDhpo1QdtsA/edit?usp=sharing>

Cross-Content Standards

- Language Arts: Answer Questions (7.RI.6), Identify Evidence (7.W.4.b), Determine Connection between Claim and Supporting Evidence (7.W.4.c), and Identify Credible Sources (7.W.6.b)
- Mathematics: Identify a Solution to an Inequality (7.A.1.e) and Solve a One-Step Multiplication Equation (7.A.1.c)

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SC.7.7 Interdependent Relationships in Ecosystems

SC.7.7.3.B

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Evaluate competing design solutions for maintaining biodiversity and ecosystem services.	Compare design solutions intended to maintain biodiversity and ecosystem services.	Given information about two potential design solutions, identify which will meet stated requirements of maintaining biodiversity and/or ecosystem services (e.g., nutrient cycling, soil improvement, water purification).	Given an environment with a problem, identify a solution that will help maintain biodiversity or a stated ecosystem service.	Recognize ways that ecosystem services benefit people and communities.

Standard Clarification

Students will identify and compare design solutions that maintain and benefit biodiversity and ecosystem services.

Target Activities for Access Point A

- A. Students compare two design solutions to identify which will meet the requirements of maintaining biodiversity and ecosystem services.
- compare two solutions to a flooded parking lot and select which one is more environmentally (e.g., a parking lot with a rain garden or one with additional drains)
 - after watching a video on farming, compare two solutions to improving soil for growing corn (e.g., planting cover crops or watering the soil more often)

SC.7.7 Interdependent Relationships in Ecosystems

Scaffolding Activities for Access Points B and C

B. Students identify a solution that will help maintain biodiversity or ecosystem services.

- given a map showing an area with different land uses, identify where a building and parking lot can go that best maintains the biodiversity of the area (e.g., selecting an area with limited value, like a dirt field)
- identify the problem of an overused hiking trail, and identify a solution that may help (e.g., limiting use, prohibiting pets on the trails, adding mulch to reduce erosion)

C. Students identify ways that ecosystem services benefit people and communities.

- identify one way that healthy farms can benefit people (e.g., grow food, provide habitats for animals or insects)
- identify an organism from a choice of two that benefits from a garden (e.g., butterfly, whale)
- list different ways that a tree can help an ecosystem (e.g., provides shelter, releases oxygen, produces food)

Prerequisite Skill: Students understand how to compare and contrast two or more things.

- compare and contrast two common items (e.g., a car and a truck) to determine which is better for the scenario presented
- complete a Venn diagram that compares and contrasts two common objects, people, or ideas (e.g., a teacher and a student, going to the movies or going to the mall)

Prerequisite Skill: Students identify a solution to a common classroom problem.

- identify the best solution to the problem of not having enough writing utensils (e.g., pencils) for each student
- identify the best solution to the problem of having too many desks in the classroom

Key Terms

benefit, biodiversity, community, design, ecosystem, habitat, organism, people, problem, solution

SC.7.7 Interdependent Relationships in Ecosystems

Additional Resources or Links

- This is an investigation that looks at whether planting more plants can reduce the amount of soil that is eroded due to heavy rainfall.
https://www.sciencebuddies.org/science-fair-projects/project-ideas/EnvEng_p037/environmental-engineering/can-plants-stop-soil-erosion
- This is an investigation in which students create a mini rain garden to see how it changes runoff.
https://www.sciencebuddies.org/science-fair-projects/project-ideas/EnvSci_p066/environmental-science/rain-garden
- This is a lesson plan that asks students to create water filtration devices to clean water so that it is safe to drink.
https://www.teachengineering.org/activities/view/uoh_cleandrink_activity1
- This is an investigation about how to prevent and clean up oil spills.
https://www.teachengineering.org/activities/view/cub_enveng_lesson01_activity2

Cross-Content Standards

- Language Arts: Identify Evidence (7.W.4.b)
- Mathematics: Collect Data to Answer an Investigative Question (7.D.1.a)

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SC.7.8 Matter and Energy in Organisms and Ecosystems

SC.7.8.4.A

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. Assessment does not include the biochemical mechanisms of photosynthesis.	Use data as evidence to explain the role of sunlight as a source of energy for plants to grow and thrive.	Given data, compare plants' ability to grow and thrive with varying amounts of sunlight.	Given data, determine what a plant needs to grow and thrive.	Recognize that plants need air, water, and light to survive.

Standard Clarification

Students will use evidence to explain that plants need sunlight to grow and identify which environment has the best amount of sunlight for plant growth.

Target Activities for Access Point A

- A. Students use data to identify the best environment or amount of sunlight for plant growth.
- use the information in a graph from an experiment in which the same type of seed is planted in two different environments (e.g., sunny versus no sunlight) to determine which environment was best for the seeds to grow into plants
 - analyze anecdotal notes from seeds that have germinated for 14 days in three different environments: direct sunlight (e.g., on a windowsill), indirect sunlight (e.g., on a bookshelf that gets some sun), and no sunlight (e.g., in a closed cabinet); the notes should include data such as the amount of leaf growth, plant height, how much water was provided, sprout information, etc. to determine the best environment for plant growth
 - watch a video on photosynthesis

SC.7.8 Matter and Energy in Organisms and Ecosystems

Scaffolding Activities for Access Points B and C

B. Students investigate what a plant needs to survive.

- participate in or observe an investigation comparing the growth of two seeds into plants that receive different amounts of sunlight (e.g., one in direct sunlight and one in a dark environment) but the same amount of water, and graph the results of the plants' growth for two weeks
- for 14 days, observe the germination of seeds and track the growth as plants begin to sprout; track the growth of the plants exposed to three different light sources (i.e., full sun, some sun, limited or no sun), and discuss the differences between the three plants
- watch a time-lapse video or observe data of plants with varying amounts of sunlight, water, or air, and discuss what a plant needs to grow and thrive

C. Students recognize what a plant needs to survive.

- when given a group of pictures, identify what a plant needs to survive (i.e., sunlight, air, and water)
- complete a worksheet, matching the basic needs of a plant (i.e., sunlight, air, and water)

Prerequisite Skill: Students differentiate between needs and wants.

- sort pictures of objects that are needed versus wanted

Prerequisite Skill: Students identify plants as living organisms.

- when given a group of three pictures (e.g., tree, book, water), identify the tree as a living organism

Key Terms

air, direct, energy, germination, grow, indirect, light, photosynthesis, plant, sunlight, thrive, water

SC.7.8 Matter and Energy in Organisms and Ecosystems

Additional Resources or Links

- This is a video about photosynthesis.
<https://www.youtube.com/watch?v=UPBMG5EYydo>
- This is a step-by-step activity to measure plant growth with sunlight.
<https://www.clearwaycommunitysolar.com/blog/science-center-home-experiments-for-kids/measuring-plant-growth-with-sunlight/>
- This is a lesson plan that teaches students that plants need water and light to grow.
<https://www.generationgenius.com/wp-content/uploads/2019/06/Needs-of-Plants-Lesson-Plan-GG.pdf>

Cross-Content Standards

- Language Arts: Use Descriptive Language (7.W.3.d), Identify Evidence (7.W.4.b), and Identify Credible Sources (7.W.6.b)
- Mathematics: Collect Data to Answer an Investigative Question (7.D.1.a)

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SC.7.8 Matter and Energy in Organisms and Ecosystems

SC.7.8.4.B

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as matter moves through an organism. Assessment does not include details of the chemical reactions for photosynthesis or respiration.	Develop a model to show that healthy foods supply different nutrients (e.g., fats, proteins, sugars) that are used for growth and energy.	Use a model to show that healthy foods supply different nutrients (e.g., fats, proteins, sugars) that are used for growth and energy.	Identify healthy foods that are rich in nutrients used for growth and energy.	Recognize how the body uses energy.

Standard Clarification

Students will identify the benefits that nutrients from food have on the body.

Target Activities for Access Point A

A. Students use a model to show the function of the nutrients in healthy foods.

- use a Venn diagram to categorize healthy food into carbohydrates or sugars (e.g., bread, beans, corn), fats (e.g., butter, oil, nuts), and proteins (e.g., meat, fish, eggs)
- watch a video that discusses how the body uses healthy food for growth and energy
- match pictures of healthy foods (e.g., apple, banana) to their function (e.g., energy)

SC.7.8 Matter and Energy in Organisms and Ecosystems

Scaffolding Activities for Access Points B and C

B. Students use a model to identify healthy foods that are rich in nutrients used for growth and energy.

- observe a food group model, and participate in a class discussion about how protein helps muscles grow
- cut out pictures of examples of healthy foods high in protein (e.g., meat, fish, eggs), healthy foods high in fat (e.g., nuts, fish), and/or healthy foods high in carbohydrates or sugars (e.g., bread, beans) from food or health magazines
- watch a video that explains how healthy foods help our bodies
- sort foods into two groups, healthy (e.g., fruits, vegetables) and unhealthy (e.g., ice cream, candy, chips)
- use the Healthy Eating Plate to place foods in the appropriate food groups (i.e., fruits, grains, vegetables, proteins, dairy)
- compare the nutrition labels on cereal boxes, and identify the healthiest choices based on the nutrients found in the cereal

C. Students recognize how the body uses energy.

- create a list of verbs (e.g., sing, walk, jump), and recognize that these actions require energy
- recognize that some activities (e.g., running in gym class) take more energy to do than other activities (e.g., sitting in a desk and writing during class)

Prerequisite Skill: Students understand that food is a basic need for survival.

- when given two pictures (e.g., food and video games), identify and explain which picture is needed to survive

Prerequisite Skill: Students identify that humans grow and change over time.

- compare pictures at different periods in life (e.g., baby, elementary school, middle school), and identify differences in the pictures
- measure a person's height at the beginning of the school year and at the end to see whether the height has changed throughout the year
- sort pictures of the same person in chronological order (e.g., baby, child, adult)

Key Terms

energy, fat, food, growth, healthy, nutrient, protein, sugar, unhealthy

SC.7.8 Matter and Energy in Organisms and Ecosystems

Additional Resources or Links

- This is a video that looks at macronutrients to help students understand how the body uses food.

<https://www.youtube.com/watch?v=AA0QMn9VfoE>

- This is an activity in which students sort pictures of healthy and unhealthy foods.

https://docs.google.com/document/d/1PL9D_JheEZQjudL5kvCzrD_nLz10D-uk/edit?usp=sharing&oid=106679321606041857365&rtpof=true&sd=true

- This is an image of the Healthy Eating Plate from ChooseMyPlate.gov.

https://docs.google.com/document/d/1-PYDr5azqiVfyP55MEAoiWL9hNrVN_YaXMPGC3Q9sbQ/edit?usp=sharing

- This is a video about healthy eating.

<https://tpt.pbslearningmedia.org/resource/envh10.health.lpk4/healthy-eating/>

- This is a lesson plan about energy balance.

https://kidshealth.org/classroom/prekto2/personal/nutrition/energy_balance.pdf

Cross-Content Standards

- Language Arts: Identify a Phrase That Contributes to Ideas in a Text (7.RI.5), Answer Questions (7.RI.6), and Identify Evidence (7.W.4.b)
- Mathematics: Proportional Relationships in Authentic Situations (7.R.1.b)

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SC.7.8 Matter and Energy in Organisms and Ecosystems

SC.7.8.4.C

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.	Analyze and interpret data to identify the effect of resource availability on an organism or population of organisms.	Given data or other information, identify the effect of resource availability on an organism or population of organisms.	Given data or other information, identify resource availability to an organism or population of organisms.	Recognize the effect of limited resources on an organism or population of organisms.

Standard Clarification

Students will identify the effect of resource availability on individual organisms and populations. The emphasis is on the cause-and-effect relationship between resource availability and the health and wellness of organisms and populations of organisms.

Target Activities for Access Point A

- A.** Students use data to identify the effects resource availability has on different organisms and their populations.
- compare and contrast two pictures of an area before and after a drought, and then discuss the impact that the drought has on the organisms, resources, and populations in that area
 - use data from an area that is experiencing deforestation to identify the changes in wildlife populations (e.g., fewer birds because there are no trees for them to build nests in)
 - look at data relating to the cause-and-effect relationship between sea urchins and coral (e.g., coral grows better when sea urchins are near), and discuss the impact that sea urchins have on coral
- A.** Students use data to show how food, water, space, and other important resources affect populations (e.g., limited resources increase competition between organisms, which leads to a decrease in populations).
- complete a cause-and-effect chart to demonstrate the impact that limited resources would have on an ecosystem (e.g., cause: limited food; effect: disruption in the food chain, extinction, relocation of organisms)
 - watch a video on the food chain to demonstrate how organisms depend on one another for survival

SC.7.8 Matter and Energy in Organisms and Ecosystems

Scaffolding Activities for Access Points B and C

B. Students use data to show available resources within a population.

- identify pictures of available resources in desert and forest ecosystems (e.g., desert: salt, minerals, rocks, sandy soil, plants; forest: soil, trees, plants, water)
- use a Venn diagram to compare and contrast resources available in grasslands and freshwater ecosystems (e.g., grasslands: vegetation from grasses and herbs, contain a variety of wildlife; freshwater: contain a variety of land and water plants and wildlife)

C. Students recognize the effect of limited resources on an organism or population of organisms.

- identify resources that deer need in order to survive (e.g., space, food)
- identify resources that fish need in order to survive (e.g., water, food)
- observe a complete and then an incomplete food web of an owl, and recognize that the missing part (e.g., the eagle's prey) can affect the eagle or eagle population
- observe a simple graph of an organism's population (e.g., a fish) and a second simple graph of the same organism's population after an event that limits the availability of resources in the area (e.g., severe water pollution), and recognize that the organism's population decreased after the event

Prerequisite Skill: Students identify a simple food chain.

- correctly order a simple food chain (e.g., grass, grasshopper, frog, snake)

Prerequisite Skill: Students explain a cause-and-effect relationship.

- explain that one of the effects of too much rain in an area can be a flood
- explain that one of the effects of getting enough sleep is having energy the next day

Key Terms

availability, consumer, ecosystem, herbivore, limited, organism, population, predator, producer, resource

SC.7.8 Matter and Energy in Organisms and Ecosystems

Additional Resources or Links

- This is an image of a simple food chain.
https://docs.google.com/document/d/1ebGG_SsEYtLVRQP7cn36FW_MRdvXsRyEy7o8qgS6FI/edit?usp=sharing
- This is a lesson plan that provides research and data to explain how sea urchins impact coral growth.
<https://drive.google.com/file/d/1cd-wZr54A2hakDSKrx5oYDKd9k-ymbKw/view?usp=sharing>
- This is a video about ecosystems and organism survival.
<https://www.generationgenius.com/videolessons/ecosystems-video-for-kids/>
- This is an interactive computer module that shows what happens to resources when an organism population greatly increases.
<https://learn.concord.org/resources/658/population-explosion>

Cross-Content Standards

- Language Arts: Identify the Structure of a Text (7.RI.4), Use Descriptive Language (7.W.3.d), and Identify Evidence (7.W.4.b)
- Mathematics: Collect Data to Answer an Investigative Question (7.D.1.a) and Solve a One-Step Equation Using Multiplication (7.A.1.c)

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SC.7.8 Matter and Energy in Organisms and Ecosystems

SC.7.8.4.D

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. Assessment does not include the use of chemical reactions to describe the processes.	Develop and use a model to explain that nutrients and energy are transferred through living and nonliving parts of an ecosystem.	Given a model, describe that nutrients and energy are transferred through living and nonliving parts of an ecosystem.	Use a food chain to identify the flow of energy moving from one living organism to another living organism or from a nonliving part of an ecosystem to a living organism.	Use a simple food chain to identify the organism that gets nutrients from a given organism or the organism that gets nutrients from a nonliving part of an ecosystem.

Standard Clarification

Students will describe how nutrients and energy are transferred through living and nonliving parts of an ecosystem. Students will understand that in an ecosystem, plants and animals depend on each other to live. Plants get energy from sunlight and use that energy to grow. Some animals eat plants to get energy and nutrients, and some animals consume other animals to get energy and nutrients. As a food chain progresses, energy is lost and there are fewer organisms (e.g., there are more plants than there are gazelles, and there are more gazelles than there are lions).

SC.7.8 Matter and Energy in Organisms and Ecosystems

Target Activities for Access Point A

- A.** Students use a model to describe how nutrients and energy move through living and nonliving parts of an ecosystem.
- use a food web to demonstrate how matter and energy are transferred between producer (e.g., plant that provides food), consumer (e.g., animal that eats the plant or another animal), and decomposer (e.g., something that recycles dead plant or animal matter or waste back into the soil)
 - given a diagram of a forest food web containing biotic (i.e., living organisms such as plants and animals, and dead organic matter or waste from plants and animals) and abiotic resources (i.e., nonliving matter such as sunlight, minerals, water, and soil), use arrows to connect one simple food chain within that diagram
 - given a diagram of an ecosystem, determine that there are more plants than animals within that ecosystem; discuss how energy is lost as you move up the food chain
 - place pictures of organisms (e.g., grass, rabbit, owl, bobcat, fungi) from a food chain into an energy pyramid containing four parts (i.e., the bottom part being the producer, the two middle parts being the primary and secondary consumers, the top part being the top consumer, and the decomposer being off to the side); have an object (e.g., beans) represent energy at each trophic level; as you move up the energy pyramid, reduce the number of objects by 10% to demonstrate how energy is lost at each level
 - watch a video that demonstrates the loss of energy at each trophic level of a food pyramid

Scaffolding Activities for Access Points B and C

- B.** Students describe how food and energy move from the environment to one organism or from one organism to another in simple food chains.
- given a food chain in an environment, identify the source of energy for one organism in the chain
 - given information about the source of energy for organisms in an environment, build a food chain, one organism at a time, and discuss the flow of energy through the system
 - recognize that all animals in a food chain depend on the energy producers get from the sun, and without producers, none of the animals would get energy to live
- C.** Students use a simple food chain to show how one organism gets food (i.e., nutrients) from its environment or from another organism.
- given information about the food of organisms in an environment, place organisms in order, one at a time, in a food chain (e.g., grass, grasshopper, frog, snake, eagle)
 - watch a video that describes the food chain by explaining the concept of producers (i.e., plants or algae that make their own food), consumers (i.e., animals), and decomposers (i.e., living things that break down dead plants and animals and their wastes)

SC.7.8 Matter and Energy in Organisms and Ecosystems

Prerequisite Skill: Students understand that organisms are dependent on one another for survival.

- match predators (e.g., frog) to prey (e.g., fly)

Prerequisite Skill: Students understand that plants produce their own food through photosynthesis.

- watch a video that explains photosynthesis

Key Terms

consumer, decomposer, ecosystem, energy, energy flow, energy pyramid, food chain, food web, living, nonliving, nutrients, organism, predator, prey, producer, transfer

Additional Resources or Links

- This is a video that describes the food chain.
<https://www.youtube.com/watch?v=xvW4Cg-1g4U>
- This is a website that describes ecosystems, food chains, and food webs.
<https://www.youtube.com/watch?v=xvW4Cg-1g4U>
- This is a video of an energy pyramid activity using pinto beans.
https://www.youtube.com/watch?v=keVUt_c2cDQ
- This is a picture that demonstrates energy flow at each trophic level.
https://docs.google.com/document/d/1gM8WjEYE9HoS-ko6Zhdt2wWKZDL9EojB_AeBy5TwPb4/edit?usp=sharing

Cross-Content Standards

- Language Arts: Identify Central Idea (7.RI.1), Use Words and Descriptive Details (7.W.3.d), Answer Questions (7.W.4.b), and Determine Word or Phrase Connecting Evidence (7.W.4.c)
- Mathematics: Identify the Degree of Likelihood of an Event as More Likely, Equally Likely, or Less Likely (7.D.3.a)

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SC.7.8 Matter and Energy in Organisms and Ecosystems

SC.7.8.4.E

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Construct an argument supported by evidence that changes to physical or biological components of an ecosystem affect populations.	Use models to show that environmental changes affect ecosystems and the populations that interact within ecosystems.	Given a model or other information, describe how environmental changes affect ecosystems and the populations that interact within ecosystems.	Use a model to identify an environmental change that could impact a population in that ecosystem.	Recognize an environmental change.

Standard Clarification

Students will use graphic models to describe how environmental changes affect populations within an ecosystem.

Target Activities for Access Point A

- A.** Students use graphic models to describe how changes in the environment affect the population and the general environment.
- create a graph that indicates cause-and-effect relationships of environmental changes on organisms in that ecosystem (e.g., the impact that years of heavy rainfall has on honeybees; heavy rain harms flowers and creates less pollen, which causes the relocation of honeybees over the years)
 - create a table with three headings: environmental changes, effect on population, effect on environment; complete the table (e.g., environmental change: forest fire; effect on population: people move to avoid danger; effect on environment: plants and animals die or relocate)
 - sort environmental changes into two categories: short-term changes (e.g., forest fires, storm damage, flooding, pollution) and long-term changes (e.g., climate change, deforestation, urbanization, extinction, large volcano eruption)

Scaffolding Activities for Access Points B and C

- B.** Students explain how environmental changes affect organisms and how they respond to these changes using graphic models.
- make a bar graph to show the correlation between ice pack cover and polar bear litters, after researching this topic (e.g., smaller litters when the ice pack cover is at a minimum and larger litters when the ice pack cover is at a maximum)
 - given the needs of an organism, identify which environmental change would likely impact a population of the organisms

SC.7.8 Matter and Energy in Organisms and Ecosystems

C. Students identify environmental changes.

- create a Venn diagram identifying the similarities and differences that floods and droughts have on an environment (e.g., similarities: food shortage, harmful to habitats, affected by the amount of rain; differences: droughts cause water shortage, can be hard on farmers, usually occur in hot summer months; floods can create structural problems, can be extremely dangerous, usually occur during rainy seasons)
- watch a video about forest fires and how they impact the environment as well as the organisms within that environment

Prerequisite Skill: Students recognize that all organisms depend on other organisms within their environment to survive.

- watch a video on how organisms survive within their ecosystem
- categorize organisms (e.g., cat, bird, goat, grass) into two categories (e.g., predator/prey) to demonstrate how organisms depend on one another

Key Terms

change, ecosystem, environmental changes, impact, interact, population

Additional Resources or Links

- This is a video about how organisms depend on each other.
<https://www.youtube.com/watch?v=dKGNsye4HV8>
- This is an editable interactive Google Slide activity to help students determine long-term and short-term changes to the environment.
https://docs.google.com/presentation/d/1Qjuzj_XHlpOy4qXF1Gx5Hf7sMhpbrZM5I-DrbY7hQ1M/edit?usp=sharing
- This is a journal article about the effects of climate change on polar bear litter size.
<https://www.nature.com/articles/ncomms1183>

Cross-Content Standards

- Language Arts: Identify Informational Text Structure (7.RI.4), Answer Questions (7.RI.6), Use Context Clues (7.V.1.a), and Identify Evidence (7.W.4.b)
- Mathematics: Collect Data to Answer an Investigative Question (7.D.1.a)

Science—Grade 7 Earth and Space Sciences

SC.7.13 Earth's Systems

SC.7.13.5.A

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. Assessment does not include the identification and naming of minerals.	Develop and use a model to describe how one type of rock is converted to another and that the rock cycle is powered by heat from the core.	Given a model, describe how one type of rock is converted to another or that the rock cycle is powered by heat from the core.	Identify that heat from the core of Earth melts mantle rock, making it fluid.	Recognize the three main types of rocks (sedimentary, metamorphic, and igneous) within a rock cycle.

Standard Clarification

Students will understand that rocks change form during the rock cycle and that the rock cycle is powered mainly by heat from Earth's core. Students will recognize the three main types of rocks (i.e., sedimentary, metamorphic, and igneous).

Target Activities for Access Point A

- A. Students describe how one type of rock is transformed into another through processes in the rock cycle that are powered by Earth's internal heat energy (i.e., heat from the core).
- complete a diagram of the rock cycle by labeling components (i.e., rock types or processes that change rocks), adding arrows, or adding pictures
 - use a model to identify how each of the three main types of rocks are formed: sedimentary rocks are formed by weathering, erosion, deposition, and pressure; metamorphic rocks are formed by the exposure of different rock types to heat and pressure; igneous rocks are formed by the cooling (i.e., crystallization) of magma
 - watch a video on the rock cycle, and participate in a class discussion about the rock cycle

Scaffolding Activities for Access Points B and C

B. Students identify that heat from the core of Earth melts mantle rock, making it fluid.

- identify a picture of the core or mantle of Earth as “hot” to demonstrate that this heat is what melts rock in Earth’s mantle
- use a picture of Earth’s layers (i.e., core, mantle, crust) to identify that heat comes from the core and that heat from the core makes the mantle hot but as you move away from the core, the temperature cools
- identify a picture of molten material in Earth’s mantle as a fluid or as magma

C. Students recognize sedimentary, metamorphic, and igneous rocks.

- sort rocks into three groups (i.e., sedimentary, metamorphic, and igneous) based on the features of each rock: sedimentary rock has hardened layers of sediment, is usually brown or gray, may have a striped appearance or contain larger chunks of rock and/or fossils, and may look glued together), metamorphic rock may have a flat, sheet-like structure with distinct bands of minerals and appear striped or folded), and igneous rock has different minerals in the rock that are crystalized or fused together, may have a spotted appearance from different colors of crystals throughout, or may appear glassy)
- participate in activities creating sedimentary, metamorphic, and igneous rocks with common materials (e.g., candy, crayons)
- match a picture of a rock with its group type

Prerequisite Skill: Students can identify rocks.

- choose the rock or picture of a rock when given two choices (e.g., a rock and a piece of bark)
- create a rock garden in the classroom using rocks found outside the school

Prerequisite Skill: Students understand that a solid can become a liquid.

- identify what happens to ice when it gets hot (e.g., it melts, it becomes water)
- identify the liquid form of a solid when given two choices (e.g., liquid butter after the stick has been melted in the microwave)

Key Terms

core, crystallization, deposition, erosion, igneous rock, interior, layers, magma, mantle, metamorphic rock, pressure, sedimentary rock, weathering

Additional Resources or Links

- This is a worksheet to help students identify components of the rock cycle.
<https://drive.google.com/file/d/1oaveahq7YQAwZUbit5o7uATd0Z3dslm5/view?usp=sharing>
- This is a website that explains the three types of rocks.
<https://www.amnh.org/exhibitions/permanent/planet-earth/how-do-we-read-the-rocks/three-types>
- This is a video that explains the three types of rocks and how they can change from one type to another.
https://www.youtube.com/watch?v=pm6cCg_Do6k
- This is an interactive online lesson on rocks and the rock cycle.
<https://www.learner.org/series/interactive-rock-cycle/>
- This is an activity in which students use Starburst candies to create the three main types of rocks and the rock cycle.
https://miningmatters.ca/docs/default-source/mining-matters---resources/activities-and-lesson-plans/starburst-v1.pdf?sfvrsn=701abd98_4
- This is an activity in which students use crayons to learn about the rock cycle.
<https://serc.carleton.edu/sp/mnstep/activities/34972.html>

Cross-Content Standards

- Language Arts: Identify Structure (7.RI.4) and Answer Questions (7.RI.6)
- Mathematics: Identify a Solution to an Inequality (7.A.1.e) and Collect Data to Answer an Investigative Question (7.D.1.a)

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SC.7.13 Earth's Systems

SC.7.13.5.B

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.	Use evidence of geoscience processes to explain the uneven distribution of Earth's mineral, energy, and groundwater resources.	Given evidence of geoscience processes, describe the relatively uneven distribution (more or less) of Earth's mineral, energy, and groundwater resources.	Compare the distribution of Earth's mineral, energy, and groundwater resources in different areas.	Recognize that Earth's mineral, energy, and groundwater resources are not evenly distributed.

Standard Clarification

Students will use evidence to explain the uneven distribution of Earth's mineral, energy, and groundwater resources.

Target Activities for Access Point A

- A. Students use evidence to describe the uneven distribution of Earth's mineral, energy, and groundwater resources.
- create a map of the United States to show the distribution of Earth's mineral, energy, and groundwater resources, and describe the distribution of those resources (e.g., they are not distributed the same)
 - determine which state has the highest mineral, groundwater, and/or energy resource, using a map that shows the distribution of those resources in the United States
 - choose a resource (i.e., mineral, energy, or groundwater), research areas of Earth where that resource is found, and present the findings to the class

Scaffolding Activities for Access Points B and C

- B. Students compare the distribution of Earth's mineral, energy, and groundwater resources in different areas.
- identify mineral, energy, and/or groundwater resources in various areas, using a map with a key showing the distribution of Earth's resources
 - color regions on a map that are high in minerals, energy, and groundwater, using a different color for each resource

SC.7.13 Earth's Systems

- C. Students recognize that Earth's mineral, energy, and groundwater resources are not evenly distributed.
- indicate countries that have high levels of minerals, energy, and groundwater, using three colors of modeling clay
 - use a color-coded map or other visual that shows mineral, energy, and groundwater resources in the United States, sort the colors into three groups (e.g., red buttons for mineral resources, yellow buttons for energy resources, blue buttons for groundwater resources), and decide which resource is most prevalent in the United States or compare areas of the United States to see where a resource is most often found

Prerequisite Skill: Students use maps to locate information.

- identify a map of the United States and a map of the world
- identify a map key, and recognize how to use it to locate information

Key Terms

Earth, energy resource, geoscience process, groundwater resource, mineral resource, uneven distribution

Additional Resources or Links

- This is an interactive map of the geology and natural resources of the United States.
<https://www.americangeosciences.org/critical-issues/maps/interactive-map-united-states-geology-and-natural-resources>
- This is a website that develops a lesson on the distribution of natural resources in the United States.
<https://www.bbsd.org/packets/weekfour/science6.pdf>
- This is a video about natural resources and the distribution of those resources on Earth.
<https://www.generationgenius.com/videolessons/natural-resource-distribution-video-for-kids>

Cross-Content Standards

- Language Arts: Answer Questions (7.RI.6) and Identify Evidence (7.W.4.b)
- Mathematics: Collect Data to Answer an Investigative Question (7.D.1.a)

SC.7.13 Earth's Systems

SC.7.13.5.C

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.	Gather and use data to explain how population increases affect Earth's natural resources.	Use data to explain how population increases affect Earth's natural resources.	Identify that humans consume Earth's resources and that some resources are limited, and others are renewable (unlimited) resources.	Recognize limited resources and renewable (unlimited) resources.

Standard Clarification

Students will understand how population affects Earth's natural resources (e.g., as the human population grows, the consumption of natural resources increases).

Target Activities for Access Point A

- A.** Students use data to explain how population increases affect the use and availability of Earth's natural resources.
- observe a graph of human population growth increasing over time and a graph showing the change in use of a given resource over time, and discuss how the changes shown in each graph are related and why
 - given graphs that show a trend, discuss how this trend will impact Earth's natural resources if the trend continues over time
 - review a freshwater availability resource map, and discuss the availability of those resources in relation to the population of people in the region; calculate the availability of freshwater per person
 - discuss how natural resources that people use are also used by wildlife and plants and how human use affects the availability of the resource for other organisms (competition)

Scaffolding Activities for Access Points B and C

- B.** Students recognize that humans use natural resources that are renewable and nonrenewable.
- watch a video about renewable and nonrenewable resources, and discuss what makes them renewable (e.g., abundant, unlimited source, quickly replenished) or nonrenewable (e.g., limited amount, takes a long time to replenish)
 - given information about a resource, identify how it is consumed by humans
 - given a list of resources and information on how they are used, their sources, and their abundance on Earth, identify which resources are renewable and which are nonrenewable
- C.** Students identify common unlimited (i.e., renewable) and limited (i.e., nonrenewable) resources.
- sort pictures into two groups: limited resources (e.g., coal, oil, natural gas) and unlimited resources (e.g., trees, sunlight, wind power)
 - watch a video about natural resources
 - go on a nature walk to identify limited and unlimited resources in the area
 - given two pictures (e.g., coal and tree), identify the unlimited resource

Prerequisite Skill: Students recognize things that are natural resources and things that are not natural resources.

- sort pictures into two groups: items that are natural resources (e.g., coal, oil, wood) and items that are not natural resources (e.g., shoes, hat, lamp)

Prerequisite Skill: Students understand that certain things are needed for survival.

- identify pictures of needs (e.g., air, water)

Key Terms

coal, fossil fuel, limited, mineral, natural gas, natural resource, nonrenewable resource, renewable resource, unlimited

Additional Resources or Links

- This is a video about renewable and nonrenewable resources and how humans can affect these resources.
https://www.youtube.com/watch?v=dsTgyb_ITtk
- This is a Freshwater Availability thematic map.
<https://www.nationalgeographic.org/photo/waterstress-2008-unesp/>
- This is a video that discusses the human population's impact on natural resources.
https://www.youtube.com/watch?v=LxHdUd_Q12Y
- This is a video about renewable and nonrenewable resources on Earth.
<https://www.generationgenius.com/videolessons/renewable-vs-nonrenewable-energy-for-kids/>
- This is a lesson on renewable and nonrenewable energy sources, ways to conserve energy, and ways to evaluate individual use of energy.
https://www.mountainelectric.com/wp-content/uploads/forms-of-energy_renewables.pdf

Cross-Content Standards

- Language Arts: Use Precise Words (7.W.3.d) and Identify Evidence (7.W.4.b)
- Mathematics: Identify the Degree of Likelihood of an Event as More Likely, Equally Likely, or Less Likely (7.D.3.a) and Collect Data to Answer an Investigative Question (7.D.1.a)

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SC.7.14 History of Earth

SC.7.14.6.A

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.	Explain how geoscience processes constantly change Earth's surface.	Identify that geoscience processes constantly change Earth's surface.	Identify that some geoscience processes occur quickly (instantaneous) while others take a very long time (geologic time scale).	Recognize a geoscience process (e.g., earthquakes, volcanoes, meteor impacts, landslides, tectonic plate motion, mountain building, weathering and erosion).

Standard Clarification

Students will identify a geoscience process, recognize the speed in which it occurs, and explain how it changes Earth's surface.

Target Activities for Access Point A

- A. Students explain the constant change to Earth's surface due to geoscience processes.
- use evidence from observations to support a claim about how changes in Earth's surface occur
 - view a video or slideshow about erosion, and discuss what erosion is and how it impacts the area it occurs in
 - compare pictures of an area before and after a landslide (or other geoscience process), and explain the change in Earth's surface as a result of the landslide

SC.7.14 History of Earth

Scaffolding Activities for Access Points B and C

- B.** Students identify the geoscience processes that happen quickly and the ones that take a long time to occur.
- identify pictures of earthquakes, volcanic eruptions, floods, meteor impacts, and landslides as fast processes and mountain building, volcano building, and weathering as slow processes (Note: Erosion can happen quickly during a flood or landslide, or it can happen slowly as a glacier moves down a mountain.)
 - watch a video on fast geoscience processes and slow geoscience processes, and then sort the geoscience processes into two groups (i.e., fast processes and slow processes)
- C.** Students identify that earthquakes, volcanoes, meteor impacts, landslides, tectonic plate motion, mountain building, weathering, and erosion are geoscience processes.
- walk around the school and take pictures to show evidence of ways that plants have caused sidewalks, blacktop (e.g., parking lot), and roads to be cracked (i.e., weathered) or displaced (i.e., eroded)
 - observe soil before and after a wind or rain event, and identify that some of the soil was displaced (i.e., eroded) during the event
 - identify examples of geoscience processes (e.g., earthquakes, volcanoes, meteor impacts, landslides, tectonic plate motion, mountain building, weathering, and erosion) when given a choice between geoscience and non-geoscience processes

Prerequisite Skill: Students identify natural events that occur on Earth.

- identify a picture of a landslide when given two pictures (e.g., landslide and a mountain)

Prerequisite Skill: Students recognize that Earth has changed over time.

- compare a picture of Nebraska from a long time ago to a picture of Nebraska today, and recognize similarities and differences between the pictures
- watch a video about Pangea, and recognize that the world map of today shows seven different continents rather than one large landmass

Key Terms

Earth, earthquake, erosion, geological time scale, geoscience process, impact, instantaneous, landslide, meteor, surface, tectonic plate, volcano, weathering

SC.7.14 History of Earth

Additional Resources or Links

- This is a worksheet that helps students see that some changes to Earth are fast and some are slow.
<https://drive.google.com/file/d/13riWD6-VySHh1dg2tgav70d4LYZR0fNE/view?usp=sharing>
- This is a worksheet that helps students understand the concept of weathering.
https://drive.google.com/file/d/1VMRocgt8_sn6xya3pPh_T9hwPaLwdmgK/view?usp=sharing
- This is a video of rapid changes that occur to Earth's surfaces.
<https://www.youtube.com/watch?v=kX27blegRTk>
- This is a slideshow of fast and slow changes on Earth.
<https://contrib.pbslearningmedia.org/WGBH/buac20/buac20-int-fastandslowchanges/index.html>
- This is a website on fast and slow changes on Earth.
<https://aptv.pbslearningmedia.org/resource/buac20-k2-sci-ess-fastandslowchanges/fast-and-slow-changes-on-earths-surface/>

Cross-Content Standards

- Language Arts: Identify the Structure of Informational Text (7.RI.4), Answer Questions (7.RI.6), and Use Context Clues (7.V.1.a)
- Mathematics: Identify a Solution to an Inequality (7.A.1.e) and Identify the Degree of Likelihood of an Event as More Likely, Equally Likely, or Less Likely (7.D.3.a)

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SC.7.14 History of Earth

SC.7.14.6.B

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of past plate motions. Paleomagnetic anomalies in oceanic and continental crust are not assessed.	Use data (e.g., fossils, ages of rock layers, shapes of continents) to explain and provide evidence of tectonic plate motion.	Describe how data (e.g., fossils, ages of rock layers, shapes of continents) provide evidence of past tectonic plate motion.	Identify evidence of past tectonic plate motion.	Recognize that Earth's tectonic plates are in constant motion.

Standard Clarification

Students will use data to explain the process of tectonic plate motion. Students will provide evidence of tectonic plate motion using data (e.g., fossils, ages of rock layers, shapes of continents).

Target Activities for Access Point A

A. Students use data to describe evidence of tectonic plate motion.

- observe a fossil map to locate areas on Earth that have similar fossils, and describe how these fossils help provide evidence of tectonic plate motion
- complete a plate tectonic puzzle to demonstrate how Earth looked in the past (i.e., Pangea) and how it currently looks (i.e., multiple continents)
- watch a video about tectonic plate motion, and explain how data (ages of rock layers in different locations) provide evidence of past tectonic plate motion
- investigate how Iceland's area (physical size) is changing over time, and explain why this change is evidence for plate motion

Scaffolding Activities for Access Points B and C

B. Students identify evidence of past tectonic plate motion.

- use a plate tectonic puzzle to show how parts of Earth's landmasses may have fit together
- identify areas of Earth that may have been affected by past tectonic plate motion by matching fossils in different areas of Earth
- observe visuals of rock layers in the United States or other areas on Earth, and identify that Earth has changed due to tectonic plate motion
- participate in a tectonic plate investigation, and identify that the movement of tectonic plates causes changes in Earth's features (e.g., creates mountains)

C. Students recognize that Earth's tectonic plates are constantly in motion.

- watch a video about tectonic plates, and choose the correct answer when given two choices (e.g., tectonic plates move, tectonic plates do not move)
- cut out or separate a model of Pangea, and match the pieces to a visual (e.g., map) of modern Earth

Prerequisite Skill: Students identify continents on a map.

- count the continents on a map
- choose a continent when given two choices on a map (e.g., the United States and South America)

Prerequisite Skill: Students identify fossils.

- identify a fossil when given two choices (e.g., a fossil of a leaf and a living leaf)
- use modeling clay to create a fossil of a modern-day organism

Prerequisite Skill: Students identify rock layers and recognize that the bottom layer is the oldest layer.

- identify that rocks are made of layers by coloring or labeling layers on a picture of a rock or a rock formation
- use modeling clay or other medium to create a model of a rock with multiple layers, and point to or otherwise indicate the bottom layer as being the oldest

Key Terms

continent, Earth feature, fossil, location, Pangea, rock age, rock layer, tectonic plate, tectonic plate motion

SC.7.14 History of Earth

Additional Resources or Links

- This is an activity using food to represent plate tectonics.
<https://evavarga.net/modeling-plate-tectonics/>
- This is a video demonstrating plates on the move.
<https://www.amnh.org/explore/ology/earth/plates-on-the-move2>
- This is an experiment that shows how tectonic plate movement creates mountains.
<https://www.billnye.com/home-demos/move-mountains>

Cross-Content Standards

- Language Arts: Identify a Key Detail (7.RI.1) and Identify Evidence (7.W.4.b)
- Mathematics: Collect Data to Answer an Investigative Question (7.D.1.a)

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SC.7.14 History of Earth

SC.7.14.6.C

Standard/Indicator	Extension	Access Point A	Access Point B	Access Point C
Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.	Identify natural hazards and describe how technology can be used to reduce their effects.	Identify natural hazards and how technology can be used to reduce their effects.	Identify that humans use technology (e.g., radar, seismometers, satellites, computer modeling) to track natural hazards.	Recognize natural hazards (e.g., earthquakes, volcanic eruptions, hurricanes, tornadoes, thunderstorms, flooding).

Standard Clarification

Students will identify that earthquakes, volcanic eruptions, hurricanes, tornadoes, and other natural events can be hazardous and explain how technology can help reduce their effects.

Target Activities for Access Point A

- A.** Students identify a natural hazard and describe how technology can help humans reduce its effect.
- watch a video of a tornado being detected on radar, practice a tornado safety drill, and then discuss how the radar helped keep people safe (e.g., it allowed them to get to a safe place)
 - track a hurricane using radar and a hurricane tracking chart, and then discuss how tracking a hurricane allows people to know the location that will be impacted, allowing them to move to a different location during the hurricane

SC.7.14 History of Earth

Scaffolding Activities for Access Points B and C

B. Students recognize different types of technology that are used to track hazardous weather.

- observe two pictures (e.g., radar and a seismometer), and recognize which one would be used to track an earthquake
- sort pictures of tracking technologies (e.g., radar, seismometers, satellites, computer modeling) and non-tracking technologies (e.g., video games, music players, e-readers) into two groups
- discuss various hazards and monitoring technologies, and match a picture of a hazard (e.g., volcanic eruption, hurricane, tornado, thunderstorm, flooding) to the best technology to track it (e.g., radar, seismometers, satellites, computer modeling)
- watch a video to introduce the concepts of a seismometer, radar, and satellite technology

C. Students identify a natural hazard.

- select the correct picture (e.g., erupting volcano or pond) to identify a natural hazard
- differentiate between a natural hazard and another type of hazard (e.g., a thunderstorm and marbles left out on the floor for someone to trip on)

Prerequisite Skill: Students understand basic weather conditions.

- select the correct picture (e.g., rain or lightning) when asked to identify rain

Prerequisite Skill: Students understand that some weather conditions are more significant than others.

- select the picture of the weather condition that is more severe (e.g., light rain or a tornado)

Prerequisite Skill: Students understand the difference between something that is harmful versus something that is not harmful.

- sort items relating to weather into categories of safe and not safe (e.g., safe: staying inside in a storm, going to a safe place during a tornado; unsafe: going outside in a storm, driving during a flood)

Key Terms

computer modeling, effect, natural hazard, radar, satellite, seismometer, technology

SC.7.14 History of Earth

Additional Resources or Links

- This is a link to pictures of natural hazards and technologies that can be used to detect the hazards.

https://docs.google.com/document/d/1I4JQHoUs4md_26oQ_v6hQR1GP9k0oluFneRd7zJMhhQ/edit?usp=sharing

- This is a website that teaches students about hazardous weather.

<https://web.extension.illinois.edu/treehouse/rockweather.cfm?Slide=1>

- This is an activity that allows students to practice tracking the weather.

<https://www.pbs.org/parents/printables/track-your-daily-weather>

- This is a hurricane tracking chart/map that allows students to practice tracking a hurricane.

<https://www.weatherwizkids.com/hurricane-tracking-charts.htm>

- This is a video that introduces the concept of earthquake monitoring using seismometers.

<https://www.youtube.com/watch?v=GcNVpMZIIDo>

- This is a video explaining what a seismograph is and what it is used for.

<https://www.youtube.com/watch?v=Gbd1FcuLJLQ>

Cross-Content Standards

- Language Arts: Identify Information Structure (7.RI.4) and Answer Questions (7.RI.6)
- Mathematics: Identify the Degree of Likelihood of an Event as More Likely, Equally Likely, or Less Likely (7.D.3.a) and Collect Data to Answer an Investigative Question (7.D.1.a)

Alternate Science
Instructional Supports
for
NSCAS Science Extended Indicators
Grade 7



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