2015-2016

3rd Grade Milestones Study Guide

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Atlanta Public Schools

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Georgia Milestones Study Guide

3rd GRADE

The Grade 3 Science EOG assessment has a total of 75 selected-response (multiple-choice) items only.

Questions for Teacher Review
(DOK 1: Life Science) – 2 Questions
Standard: S3L1. Students will investigate the habitats of different organisms and the dependence of organisms on their habitat. b**.** Identify features of green plants that allow them to live and thrive in different regions of Georgia.
Standard: S3CS8. Students will understand important features of the process of scientific inquiry. a. Scientific investigations may take many different forms, including observing what things are like or what is happening somewhere, collecting specimens for analysis, and doing experiments.

Q1. A student is observing swamp habitats in Georgia. The wet soil is often flooded and has few nutrients. What feature would MOST help a plant to survive in a swamp habitat?
A. leaves that can trap insects for food
B. a thin stem that can bend in the wind
C. waxy stems and leaves to hold in extra water
D. a long central root to reach water deep underground

The correct answer is choice **(A)** leaves that can trap insects for food. Swamp and marsh habitats are often flooded and lack nutrients in thesoil. Some swamp plants have specialized leaves that allow them to trap insects, which the plants then use as food. This enables the plants to obtain enough key nutrients to survive in the poor soil of the swamp. Choice (B) is incorrect because plants in swamp habitats often have thick, dense stems for support. Being able to bend in the wind is an adaptation for plants near the shore. Choice (C) is incorrect because thick, waxy stems and leaves are a characteristic of plants in dry environments; waxy leaves hold and store water. Choice (D) is incorrect because a long root that reaches deep water would not help a plant survive in a swamp habitat. Plants in swamps get too much water.

(DOK 1: Life Science)

Standard: S3L1. Students will investigate the habitats of different organisms and the dependence of organisms on their habitat. a. Differentiate between habitats of Georgia (mountains, marsh/swamp, coast, Piedmont, Atlantic Ocean) and the organisms that live there.

Q2. A pine tree has needle-like leaves that help it survive cold winters and save water during warm summers.

In which two habitats are pine trees usually found in Georgia?

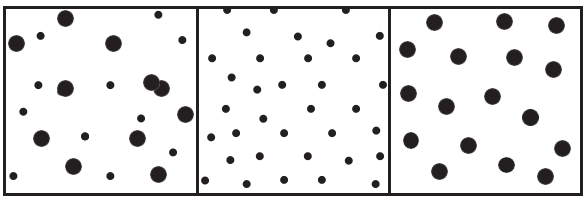
A. marshes and swamps
B. Piedmont and the ocean
C. coastal plains and marshes
D. Piedmont and the mountains

Explanation of Correct Answer: The correct answer is choice **(D)** Piedmont and the mountains. The Piedmont is a region of rolling hills that lead up to the mountains in the north of the state. In these regions, winters are typically cold and summers are typically dry, so pine trees are well suited to survive there. Choices (A) and (C) are incorrect because marshes, which are typically warm and wet, are less well suited to support pine trees. Choice (B) is incorrect because pine trees grow on land, not in the ocean.

(DOK 1: Earth Science)

Standard: S3E1. Students will investigate the physical attributes of rocks and soils. **c.** Use observation to compare the similarities and differences of texture, particle size, and color in top soils (such as clay, loam or potting soil, and sand).

A student's drawing shows three different types of soil.



Q3. Which statement BEST describes a difference between the types of soil?

A. Particles in clay are smaller than particles in loam and sand.
B. Particles in loam are lighter in color, and particles in clay are darker in color.
C. Particles in loam are the same size, but particles in sand are different sizes.
D. Particles in sand have a smooth texture, and particles in clay have a rough texture.

Explanation of Correct Answer: The correct answer is choice **(A)** Particles of clay are smaller than particles of loam and sand. The student's drawing shows the relative sizes of the particles that make up each type of soil. Clay has the smallest particles and sand has the largest particles; loam contains a mixture of large and small particles. Choice (B) is incorrect because the composition of a soil, not the size of the particles, determines the soil's color. Choice (C) is incorrect because particles in loam are different sizes while the particles in sand are the same size. Choice (D) is incorrect because particles in sand typically have coarse textures, while particles in clay typically have sticky textures

(DOK 2: Earth Science)
Standard: S3E1. Students will investigate the physical attributes of rocks and soils.
b. Recognize the physical attributes of rocks and minerals using observation (shape, color, texture) measurement, and simple tests (hardness).
Standard: S3CS8. Students will understand important features of the process of scientific inquiry. a. Scientific investigations may take many different forms, including observing what things are like or what is happening somewhere, collecting specimens for analysis, and doing experiments.

Q4. A student is learning about the characteristics of rocks and minerals. His teacher gives him a mineral sample to test.

Mohs Scale	Mineral
1	Talc
2	Gypsum
3	Calcite
4	Fluorite
5	Apatite
6	Feldspar
7	Quartz
8	Topaz
9	Corundum
10	Diamond

He makes the following notes about the mineral sample:

- **It can scratch calcite and gypsum.**
- **It will not scratch topaz.**
- **It is softer than feldspar.**
- **It is harder than talc and fluorite.**

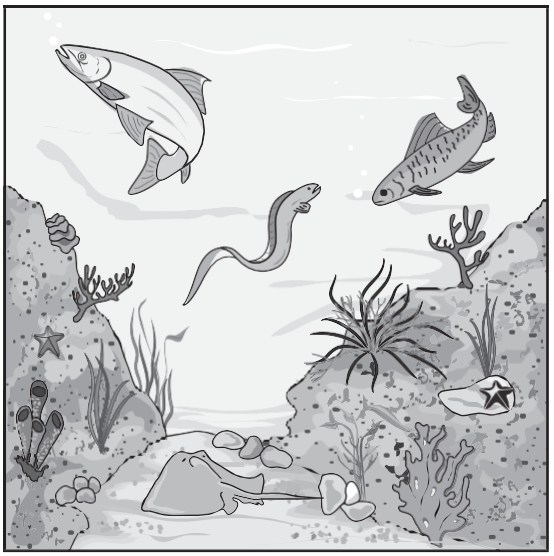
Which mineral from the table is the BEST match for the hardness of the mineral sample the student has?

A. apatite
B. corundum
C. diamond
D. quartz

Explanation of Correct Answer: The correct answer is choice **(A)** apatite. On the Mohs Scale, softer minerals have lower numbers and harder minerals have higher numbers. Apatite has a higher number than fluorite, calcite, gypsum, and talc; therefore, apatite is harder than these minerals and can scratch them. Apatite has a lower number than diamond, corundum, topaz, quartz, and feldspar; therefore, apatite is softer than these minerals and cannot scratch them. Choice (B) is incorrect because corundum is harder than feldspar. Choice (C) is incorrect because diamond has the highest number; it is the hardest mineral. Choice (D) is incorrect because quartz is harder than feldspar.

(DOK 2: Life Science)
Standard: S3L1. Students will investigate the habitats of different organisms and the dependence of organisms on their habitat. a. Differentiate between habitats of Georgia (mountains, marsh/swamp, coast, Piedmont, Atlantic Ocean) and the organisms that live there

Q5. A student made a poster to show the habitat he learned about in class.



Which habitat is shown in the student's poster?

A. ocean
B. marsh
C. Piedmont
D. Coastal Plain

Explanation of Correct Answer: The correct answer is choice **(A)** ocean. The student's poster shows plants and animals that live in the underwater environment of the ocean. Choices (B), (C), and (D) are incorrect because marshes, the Piedmont region, and the Coastal Plain are primarily land environments; though each region does contain underwater habitats, none supports the particular organisms shown in the student's poster.

(DOK 2: Earth Science)
Standard: S3E1. Students will investigate the physical attributes of rocks and soils.
b. Recognize the physical attributes of rocks and minerals using observation (shape, color, texture), measurement, and simple tests (hardness).

Mohs' Scale	Mineral
1	Talc
2	Gypsum
3	Calcite
4	Fluorite
5	Apatite
6	Feldspar
7	Quartz
8	Topaz
9	Corundum
10	Diamond

Q6. A student is asked to identify a mineral with these characteristics:

- **It can scratch fluorite and calcite.**
- **It will not scratch diamond.**
- **It is softer than topaz.**
- **It is harder than feldspar and apatite.**

Which mineral fits the description?

A. talc
B. quartz
C. gypsum
D. corundum

Explanation of Correct Answer: The correct answer is choice **(B)** quartz. On the Mohs' Scale, softer minerals have lower numbers, and harder minerals have higher numbers. Quartz has a higher number than fluorite, calcite, feldspar, and apatite; therefore, quartz is harder than these minerals and can scratch them. Quartz has a lower number than diamond and topaz; therefore, quartz is softer than these minerals and cannot scratch them. Choice (A) is incorrect because talc has the lowest number; it is the softest mineral. Choice (C) is incorrect because gypsum is harder than talc only. Choice (D) is incorrect because corundum is harder than topaz.

(DOK 3: Physical Science)
Standard: S3P1. Students will investigate how heat is produced and the effects of heating and cooling, and will understand a change in temperature indicates a change in heat.
b. Investigate how insulation affects heating and cooling.
Standard: S3CS1. Students will be aware of the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works. b. Offer reasons for findings and consider reasons suggested by others.

Q7. A student has two cups of ice. She wraps one cup in newspaper. Then she places both cups in sunlight. She observes that the ice in the newspaper-wrapped cup takes longer to melt than the ice in the other cup.

Why did the ice in the newspaper-wrapped cup take longer to melt?
A. The newspaper absorbed all the heat from the Sun.
B. The newspaper stopped heat flowing from the ice to the cup.
C. The newspaper stopped heat flowing from the Sun to the ice.
D. The newspaper slowed the flow of heat from the Sun to the ice.

Explanation of Correct Answer: The correct answer choice is **(D).** The newspaper slowed the flow of heat from the Sun to the ice. The newspaper acted as an insulator. Insulators are poor conductors of heat, so heat flows slowly. Choice (A) is incorrect because the newspaper cannot absorb all of the Sun's heat. Choice (B) is incorrect because heat was not flowing from the ice to the cup. Choice (C) is incorrect because the newspaper did not block all of the Sun's heat from reaching the ice. The ice eventually melted.

(DOK 3: Earth Science)
Standard: S3E1.Students will investigate the physical attributes of rocks and soils. d. Determine how water and wind can change rocks and soil over time using observation and research.

Q8. A student saw sharp rocks on his way to a stream, and saw smooth rocks in the stream. Why were the rocks in the stream smoother?

A. because wind wears down rocks
B. because moving water wears down rocks
C. because wind breaks rocks into smaller pieces
D. because moving water breaks rock into smaller pieces

Explanation of Correct Answer: The correct answer is choice **(B)** Moving water wears down rocks. The rocks in the stream were likely once sharp like the rocks outside the stream. Over time, however, the water in the stream smoothed the rocks as it flowed over them. Choices (A) and (C) are incorrect because wind would not affect rocks that are underwater. Choice (D) is incorrect because rocks do not typically become smoother when they are broken into smaller pieces.

Standards/Units	Dates	Number of Items:	Question #'s
Habitats and Pollution (LS)	8/17 – 10/29	12 Items:	1-4 (Habitats) 19 – 22 (Pollution) 5, 7, 9, 10 (Sample)
Heat Energy (PS)	11/2 – 12/11	6 Items	13 – 16 4,6 (Sample
Magnets (PS)	12/15 – 1/15	3 Items	17 – 18 2 (Sample)
Rocks and Soil (ES)	1/20 – 3/4	6 Items	5-8, 2,8 (Sample)
Fossils (ES)	3/8 – 3/31	5 Items	9-12, 1 (Sample)
Total	N/A	32 Items	Study Guide/Samples

SAMPLE ITEMS (1-10)

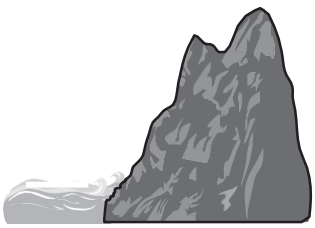
1. Why do scientists use models to learn how fossils are formed?

A. Plants turn into fossils as soon as they die.
B. Animal fossils are valuable and hard to find.
C. Fossils are so small that they are hard to see.
D. Fossils are formed slowly over a long period of time.

2. A student is experimenting with objects in his house to find those that are attracted to a magnet. It was found that the magnet was attracted to the door of a refrigerator because

A. The door is made of a material that contains iron or steel.
B. The door is made of a material that contains aluminum.
C. The door is covered with something sticky.
D. The door is covered with paint containing copper.

3. A scientist observed the following changes in these seaside cliffs over a period of twenty years.



20 years ago

10 years ago

Today

How can the scientist BEST explain the changes?

A. erosion by wind
B. erosion by waves
C. increase in sea level
D. increase in sea temperature

4. A student places equal amounts of water in four containers made of different materials. She places the containers in the Sun and records the temperatures of the water after one hour.

In which type of container will the water have the highest temperature?

A. copper
B. glass
C. plastic
D. wood

5. Which pair of features would MOST help an animal to live in the ocean?

A. thick skin and lungs
B. sharp teeth and claws
C. fins and long, slender body
D. long legs and sharp, clawed feet

6. The thermometers in the picture show the temperature of the water in each cup.

Beaker 1 *Beaker 2* *Beaker*

Which of these shows the temperatures in order from cold to hot?

A. 1, 2, 3
B. 3, 2, 1
C. 1, 3, 2
D. 2, 3, 1

7. Harmful chemicals from a farm wash into a nearby river when it rains. The river flows through a forested area.
If chemicals from the farm keep washing into the river, what will MOST LIKELY happen to the forested area over time?

A. The forested area will support fewer animals.
B. The forested area will grow larger plants.
C. The forested area will clean the water naturally.
D. The forested area will support more trees.

8. Which of these would be LEAST helpful when trying to identify a mineral?

A. color
B. hardness
C. mass
D. streak

9. Ben reads in a newspaper that scientists found a crocodile fossil that is much bigger than crocodiles living today.

Based on this information, which statement is MOST LIKELY true?

A. Crocodiles lived longer in the past.
B. Small crocodiles cannot become fossil.
C. Crocodiles were once larger than they are today.
D. Crocodile bones get bigger when they turn into fossils.

10. Which characteristic is MOST needed for a tree to survive in dry areas?

A. tall trunk
B. long roots
C. wide leaves
D. many branches

Item	Standard Element	Characteristics of Science	DOK Level	Correct Answer	Explanation
1	S3E2b	S3CS4b	1	D	The correct answer is choice (D) Fossils are formed slowly over a long period of time. Because scientists cannot study fossils directly as they form, they use models to simulate the processes that form fossils. Choice (A) is incorrect because plants and other organisms do not turn into fossils as soon as they die. Choice (B) is incorrect because not all fossils are valuable or difficult to find; these factors do not prevent scientists from studying fossils. Choice (C) is incorrect because not all fossils are small; this factor does not prevent scientists from studying fossils
2	S3P2a	S3CS4a	2	A	The correct answer is choice (A) The door is made of a material that contains iron or steel. Magnets are attracted to some but not all metals. Choices (B) and (D) are incorrect because aluminum and copper are examples of metals that are not magnetic. Choice (C) is incorrect because the presence of a sticky substance does
3	S3E1d	S3CS1b	2	B	The correct answer is choice (B) erosion by waves. Over time, the waves cause water to crash and flow against the cliffs. As this happens, the water breaks apart and carries away bits of rock from the cliffs. Choice (A) is incorrect because wind would not affect rock located under water. Choices (C) and (D) are incorrect because changes to sea level and sea temperature might result in more or less rock being exposed to water, but these factors are not themselves agents of
4	S3P1c	S3CS8a	1	A	The correct answer is choice (A) copper. Of the four materials, copper is the best conductor of heat. Therefore, sunlight will heat a copper container, and the water inside the container, most quickly. Choices (B), (C), and (D) are incorrect because glass, plastic, and wood are not good conductors of heat.

Item	Standard/ Element	Characteristics of Science	DOK Level	Correct Answer	Explanation
5	S3L1c	S3CS4a	2	C	The correct answer is choice (C) fins and long, slender body. The animal would use its fins to move itself through the water, which would flow easily around the animal's long, slender body. Choice (A) is incorrect because animals use lungs to remove oxygen from air, not from water. Choice (B) is incorrect because sharp teeth and claws are not specifically needed to live under water. Choice (D) is incorrect because long legs are better suited to moving on land than through water.
6	S3P1d	S3CS5c	2	D	The correct answer is choice (D) 2, 3, 1. Beaker 2 has the thermometer with the lowest temperature; therefore, its water is coldest. Beaker 1 has the thermometer with the highest temperature; therefore, its water is hottest. Choices (A) and (C) are incorrect because Beaker 1 has the thermometer with the highest temperature; its water is hottest, not Coldest. Choice (B) is incorrect because Beaker 2, not Beaker 3, has the thermometer with the lowest temperature; therefore, the water in Beaker 2 is coldest.
7	S3L2a	S3CS4a	2	A	The correct answer is choice (A) The forested area will support fewer animals. The chemicals will either harm the animals directly or harm food sources lower in the food chain which they rely upon. Choice (B) is incorrect because it is a harmful chemical, so it will not encourage growth. Choice (C) is incorrect because the ecosystem may be able to temporarily remove small amounts of pollutants, but it will not be able to do so continuously. Choice (D) is incorrect because a harmful chemical will likely reduce the number of trees.

Item	Standard/ Element	Characteristics of Science	DOK Level	Correct Answer	Explanation
8	S3E1b	S3CS2c	1	C	The correct answer is choice (C) mass. Mass describes the amount of matter in an object. A larger mineral will have greater mass than a smaller sample of the same mineral. On the other hand, samples of two different minerals may have the same mass. Choices (A), (B), and (D) are incorrect because color, hardness, and streak are properties that scientists use to identify minerals: these properties are different for different minerals, regardless of each sample's mass.
9	S3E2a	S3CS8a	2	C	The correct answer choice is (C) Crocodiles were once larger than they are today. Fossils are evidence of organisms that lived long ago, so the larger crocodile must have lived in the past. Choice (A) is incorrect because the life span of the crocodile does not necessitate that it grows to a larger size. Choice (B) is incorrect because the size of the animal does not determine its ability to become a fossil. Choice (D) is incorrect because the process of fossilization does not drastically change the size of the bones.
10	S3L1b	S3CS4a	3	B	The correct answer is choice (B) long roots. Trees use their roots to absorb water from the soil. Trees with longer roots can access water deep beneath Earth's surface, allowing them to survive in dry areas. Choices (A) and (D) are incorrect because trees typically need lots of water to grow tall trunks or many branches; such trees would probably not get enough water to survive in dry areas. Choice (C) is incorrect because a tree uses its leaves mainly to get energy from sunlight, not to get water.

Unit 1: Habitats of Georgia **(8/17 – 10/29)**

In this Life Science unit, you will learn about the many different kinds of habitats found in Georgia. You will also learn about some of the organisms that live in these habitats.

KEY TERMS

An **organism** is a living being. You are a living being. A tree is a living being. Most organisms move, eat, breathe, grow, reproduce, and respond to their environment. Not all organisms do all these things. For example, you move, but trees do not. (S3L1)

A **habitat** is the type of area an organism lives in. A habitat has four parts that an organism needs: shelter, water, food, and space. (S3L1a)

Mountain habitats are found in the north of the state of Georgia. The Blue Ridge Mountains and Appalachian Mountains make up the mountains in the north of Georgia. Mountains are the highest of Earth's landforms. Black bears, deer, raccoons, and many other animals live in the mountains. Trout live in the streams. Bass and bluegill fish live in the lakes. Many kinds of trees grow in the mountains. (S3L1a)

The Okefenokee **swamp** is an area of land covered by water. The land in swamps and marshes is soft and wet. The swamp is located in the southern part of the state of Georgia. Alligators, otters, frogs, and many other smaller animals live in the swamp. Only a few kinds of trees can grow in the swamp. (S3L1a)

The **coastal plains** are a habitat located where the ocean meets the land. Coastal plains are made up of beaches, swamps, ponds, and many other landforms. The soil in the coastal plains has a lot of sand in it. Deer, wild boar, rattlesnakes, and many other smaller animals live in the coastal plains. Oak trees, peanut plants, and cotton plants grow in the coastal plains. (S3L1a)

The **Piedmont** is a habitat located in the middle of Georgia. It is between the mountains and coastal plains. The Piedmont is made up of many small hills. There are forests, lakes, and rivers in the Piedmont. The soil has a red color from the red clay in it. Geese, opossums, owls, and many other smaller animals like to live there. Oak, pine, and hickory trees grow in the Piedmont. (S3L1a)

The **Atlantic Ocean** is a habitat off the coast of Georgia. Oceans are the largest bodies of water in the world. The ocean is made of salt water. Turtles, sea trout, and shrimp are some of the animals that live in the ocean off the coast of Georgia. Plants like seaweed and seagrass grow in the ocean. Coral reefs grow off the coast of Georgia too. (S3L1a)

Important Tips

- If part of a habitat changes, the animals that live there may need to move. When the trees in a forest are all cut down, the squirrels and other animals that live there will need to move to a new home. Some animals are better at moving to a new habitat. Black bears are known for living in many different habitats. (S3L1c, S3L1d)
- Animals are fit to live in their habitats. This means they have qualities that help them live in the habitat. An animal that can live in one type of habitat may be able to live in a different habitat. A black bear can live in a mountain or a plateau habitat. Some animals may not be able to live in a different habitat. A black bear can live in a swamp but would have trouble moving around the wet ground. (S3L1c)

Sample Items 1–4

Item 1

The Coastal Plains region of Georgia has areas of wetlands. These wetlands include salt marshes and swamps. Salt marshes have loose, sandy, wet soil and salt water. A student collected some data about organisms to see if they would live in this region.

Organism	What Does It Eat?	Characteristics
Crab	Algae, bacteria, decaying plants	Hard outer shell, can survive on land or in water
Whale	Zooplankton and krill	15 meters long, can hold their breath for up to 40 minutes under water
Pocket gopher	Plants, plant roots	Brown fur, needs loose, sandy, dry soil to dig tunnels
Gopher tortoise	Grasses, fruit	Gray shell and legs, digs and lives in dry burrows

Based on the student's data, which organism would MOST LIKELY live in a salt marsh?

A. Crab
B. Whale
C. Pocket gopher
D. Gopher tortoise

Item 2

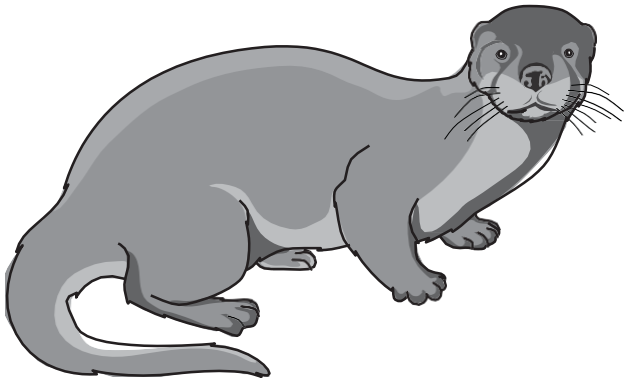
A scientist is observing an alligator. He observes that the alligator uses its webbed feet and long tail to swim through shallow water while hunting fish and other prey.

In which region of Georgia is the alligator MOST LIKELY found?

A. Atlantic Ocean
B. mountains
C. Piedmont
D. swamps

Item 3

River otters are found in waterways throughout Georgia. Otters mostly feed on fish. They hunt by diving underwater and chasing their prey.



Which characteristics BEST helps river otters live in water-based habitats?

A. their sharp teeth, which help them to catch prey
B. their thick fur, which helps them to keep warm
C. their long claws, which help them dig burrows
D. their webbed feet, which help them to swim

Item 4

A forest is home to many kinds of animals. The forest trees give shelter and food to many animals. The trees in a large area of the forest are destroyed in a fire.

What will MOST LIKELY happen to the animals living in the forest after the fire changes their habitat?

A. The animals will adapt to eat different food.
B. The animals will find homes near a pond or lake.
C. The animals will hibernate until the trees grow back.
D. The animals will move to a place that has more trees.

Unit 2: Rocks and Soil **(1/20 – 3/4)**

In this Earth Science unit, you will learn about rocks and minerals and their attributes. You will also study soil and learn about the tools and instruments used to observe and compare different types of topsoil.

KEY TERMS

The earth is made up of **minerals**. Minerals are made by nature. You can tell how hard a kind of mineral is with a **scratch test**. A scratch test is done by scratching a mineral with different objects. A fingernail is very soft. If you scratch a mineral with your fingernail and it leaves a mark, the mineral is very soft. If you scratch a mineral with a nail and it does not leave a mark, the mineral is very hard. (S3E1a, b)

Minerals can be identified by their **characteristics**. Characteristics are the features that help to identify a thing. Some of these characteristics are shape, color, texture, and hardness. Each mineral can be identified by the features it has. (S3E1a, b)

Minerals can be put in order from the softest to the hardest. This is known as a **hardness scale**. A hardness scale tells you how hard a mineral is. Talc is a mineral. You can scratch a piece of talc with your fingernail. Diamond is a very hard mineral. A nail will not scratch a diamond. (S3E1a, b)

Most **rocks** are made up of two or more kinds of minerals. The features of the minerals that make up a rock can be passed on to the rock. Limestone is a rock that is white or gray. The minerals that make up limestone are also white or gray. (S3E1a, b)

Rocks have **attributes**, or features, that can be used to identify the rock. Shape, color, streak, and texture are features of rocks. (S3E1b)

The **shape** of a rock can show you how it was made. The shape also shows what kinds of different minerals are in the rock. A rock like shale breaks into flat pieces. Shale is made up of small pieces of minerals that were pressed flat into rock. (S3E1b)

The **color** of a rock can show you the different minerals that make up the rock. Granite is made when some minerals cool at a low temperature. The color of most granite will be a lighter color, like white, pink, or red. The **streak** of a rock is the colored powder of the mineral left behind when you scratch a mineral on a hard surface. The color of the powder can be different from the color of the sample itself. (S3E1b)

The **texture** of a rock describes how a rock feels. The rock known as obsidian is made of glass. Obsidian has a smooth texture just like glass. (S3E1b)

Soil is made up of pieces of rock, minerals, organic matter (the remains of once-living things), air, and water. The amount of each material is different in different types of soil. Sandy soil has more rocks and minerals. Soils in swamps and rain forests have more pieces of organic matter and less rock particles and minerals. (S3E1c)

Soil has **attributes**, or features, that can be used to identify the type of soil. The color, texture, grain size, and absorption of water are all features of soils. (S3E1c)

The **color** of soil tells you the amounts of the things that make up the soil. Soil with more sand in it will be lighter in color. Soil with more organic matter in it will be darker in color. (S3E1c)

The **texture** of soil, the way it feels, tells you the amounts of the things in the soil. Soil with more rock particles in it will feel rougher. Soil with more organic matter in it will feel smoother and softer. (S3E1c)

The parts of soil have different **grain sizes**. The pieces of rock are the biggest grain sizes. Sand has much smaller grain sizes. As the pieces of organic matter break down, they get smaller and smaller. (S3E1c)

The **absorption of water** tells you how much water the soil will hold. Soils with more organic matter will hold more water. Water that moves through this kind of soil will move slower. Soils with more rock and sand will hold less water. Water that moves through this kind of soil will move faster. (S3E1c)

Important Tips

- Different areas and habitats of Georgia have different types of soil with different properties. (S3E1c)
- Mountain areas will have more pieces of rock in the soil. The rock is broken apart from the mountains and moves down the mountain. (S3E1c)
- Swamps will have soil that has a lot of organic matter and water in it. Coastal plains will have soil that contains a lot of sand. (S3E1c)

Sample Items 5–8

Item 5

A student made observations about a mineral. It was smooth and flat with round edges.

What did the student observe about the mineral?

A. color and texture
B. texture and shape
C. hardness and color
D. shape and hardness

Item 6

A scientist studies a large rock on the bottom of a deep, fast-moving river. He notices that the rock gets smaller over a period of several years.

Which statement MOST LIKELY explains why the rock gets smaller?

A. The rock is being worn away by wind.
B. The rock is being broken apart by ice.
C. The rock is being broken apart by gravity.
D. The rock is being worn away by moving water.

Item 7

A student is describing a sample of soil. The soil sample is made up of very small particles. It can hold a lot of water, and plants do not grow well in the soil.

Which type of soil does the student MOST LIKELY have?

A. clay
B. loam
C. sand
D. silt

Item 8

Two students observe an object near a river. The object is hard and has a rough texture. It is magnetic and made of two materials. One student says it is a rock and the other student says it is a mineral.

Which observation will BEST help the students identify if the object is a rock or a mineral?

A. The object is a mineral because it is hard.
B. The object is a mineral because it is magnetic.
C. The object is a rock because it has a rough texture.
D. The object is a rock because it is made of two materials.

Unit 3: Fossils **(3/8 – 3/31)**

In this Earth Science unit, you will investigate fossils as evidence of organisms that lived long ago. You will observe fossils and use information resources to learn how fossils form.

KEY TERMS

When a living thing dies it may be covered with rock and soil. Over time, parts of its body can be replaced with the minerals around it. This is how a **fossil** is created. Fossils can also be things left behind by living things. Footprints left in the sand, which then became rock, are an example of something dinosaurs left behind. (S3E2b)

Fossils are **evidence** of living things that lived long ago. We know dinosaurs existed because we have their bones as evidence. Fossils show us how dinosaurs lived. Fossils also show us where dinosaurs lived and what they ate. (S3E2a)

Fossils are usually found in **sedimentary** rock. Sedimentary rock is rock that is made when sand, soil, and other small particles settle into a place. Over a long time, more sediment will push down and harden the sediment into rock. Sedimentary rock is from areas that were once covered with water. (S3E2b)

Fossil formation happens most of the time in water. When a plant or animal dies in a watery area, mud can cover it. Over time the soft tissue-like skin breaks down. The bones take longer to break down. The minerals in the mud replace the bone. This is why most fossils we have of animals are bone. (S3E2b)

Plant fossils are formed when the plants are covered in mud and water. The shape of the plant leaves an **imprint** in the mud. When you press your hand into a piece of clay, you make an imprint of your hand. Over time, the mud that the plant was in becomes rock. Some of the mud fills in the imprint and makes a **mold** of the plant. If you look at a piece of limestone, you can see the molds of things that lived long ago. There are also fossils of plants that were made the same way fossils of bones were made. (S3E2b)

A **cast** is a hard object that is made from an imprint. Scientists will make a cast of a fossil by pouring plaster into an imprint. A cast will show you the features of the organism that left the imprint. (S3E2b)

Two other ways fossils can form are in **amber** or in **ice**. Amber fossils are organisms that became trapped in tree resins (sticky material that can ooze from some trees) that surrounded the organism and hardened over time. Plants or animals frozen in ice are sometimes found in places like the Arctic that have been cold for thousands of years; entire animals have been found, preserved like food in your freezer. (S3E2b)

Scientists that study how and what organisms lived long ago are called **paleontologists**. Some study just the animals or plants from long ago. Some study the habitats from long ago. Some look at the ways that one kind of living thing changed over a long time. (S3E2a)

Important Tip

- We know the size and shape of many organisms based on the fossils they left behind. We know the way they moved and what they ate. We even know the texture of their skin. One thing scientists usually cannot tell from fossils is the color of organisms. (S3E2a)

Sample Items 9–12

Item 9

Four students observed a fossil found in a rock. They disagreed about how the fossil was formed. Each student recorded an idea about how the fossil was formed.

Which idea MOST LIKELY describes how the fossil was formed?

A. The leaf was frozen in ice.
B. The leaf became rock as it decayed.
C. The leaf fell into mud and left an imprint when it decayed.
D. The leaf was trapped in tree sap that hardened into amber.

Item 10

A scientist finds a rock that looks like a part of a fish.

What should a scientist conclude by studying the rock?

A. A fish lived recently in the rock.
B. A fish lived long ago in the rock.
C. A fish that lived recently turned to stone slowly.
D. A fish that lived long ago turned to stone slowly.

Item 11

A scientist uses a rock hammer to look for fossils. She finds a large fossil of an animal.

Which part of the animal MOST LIKELY formed the fossils the scientist finds?

A. bones
B. fur
C. skin
D. wings

Item 12

A student finds this fossil along the beach. He thinks about how the fossil was formed, but he is not sure about the order of the steps that took place.

1. organism dies
2. organism gets buried in sediment
3. the shell is replaced by minerals
4. organism's soft parts decay

Which of these tells the steps of fossil formation in the correct order?

A. 1, 3, 4, 2
B. 1, 2, 4, 3
C. 1, 4, 3, 2
D. 1, 3, 2, 4

Unit 4: Heat Energy **(11/2 – 12/11)**

In this Physical Science unit, you will understand how temperature measures heat and how heat is transferred and produced. You will use thermometers to measure changes in temperature of water samples. You will investigate the transfer of heat from the Sun to various materials. You will learn about the effects of insulation on heating and cooling.

KEY TERMS

Heat energy is the flow of energy from an object that is warm to one that is cold. When the atoms inside an object are moving fast, the object is warmer. When the atoms inside an object are moving slow, the object is colder. The heat moves from an area that is warm to one that is cold. (S3P1a)

Heat describes the way **thermal energy** moves. Thermal energy is the form of energy you experience when you feel heat. (S3P1a)

Heat can also be made when a **chemical reaction** happens. A chemical reaction is when two or more substances react and change. The energy from fire speeds up the combining of the chemicals that makes up paper and air. When paper and air combine, extra energy is released. This is the heat you feel from a fire. (S3P1a)

A **thermometer** is a tool used to measure temperature. Temperature is a **measurement** of how hot or cold something is. A thermometer measures the heat energy of an object. (S3P1d)

When heat moves from one object to another it is called an **energy transfer**. It can be when the energy moves between objects but stays the same kind of energy. It can also be where one type of energy becomes another type of energy. Sunlight, also known as light energy, will transfer heat energy to an object as it warms the object up. (S3P1c)

Friction is a force that resists motion between two surfaces. When you rub your hands together friction creates heat. If you swing your arm in the air, you can feel the air as it moves past your hand. The feeling is because of the friction between your hand and the air. (S3P1a)

Dark colors reflect less light energy and absorb more light energy that becomes heat energy. **Light colors** reflect more light energy so they absorb less light energy that becomes heat energy. (S3P1c)

Water is a **liquid.** Liquids take up a definite volume but have no fixed shape. You can pour water into different shaped glasses and it will take the shape of each glass. (S3P1d)

When water is ice, it is a **solid**. Solids have a definite volume and shape. Their volume and shape cannot be easily changed. (S3P1d)

When water is steam, which is also called water **vapor**, it is a **gas**. Gases have no definite volume and take the shape of their container. (S3P1d)

Melting happens when a substance heats up. This changes the substance from a solid to a liquid. When ice melts, it turns into liquid water. (S3P1d)

Boiling happens when a substance heats up. This changes the substance from a liquid to a gas. When water boils, it turns into water vapor. (S3P1d)

Freezing happens when a substance cools down. This changes the substance from a liquid to a solid. (S3P1d)

An **insulator** is a material that slows the flow of heat between two objects. A jacket keeps the heat from your body from moving to the cold air around it. Since heat moves from warm to cold areas, insulation is made to slow down how fast the heat moves. (S3P1b)

Important Tips

- Insulators will slow down the movement of heat. Insulators will not stop the movement of heat. A thermal travel jug will keep something hot or cold. Over time, cold things in a thermal jug will get warmer while hot things will get colder. (S3P1b)
- Insulators do not keep the cold in. Insulators keep the warm out. Because heat moves from warm to cold areas, insulators can be thought of as keeping the warm out or holding the warm in. (S3P1b)

Sample Items 13–16

Item 13

A student rubs his hands together to produce heat. Which action produces heat in the same way?

A. burning a piece of paper
B. using sandpaper on a stick
C. mixing two chemicals together
D. lighting the burner on a gas stove

Item 14

A student leaves a metal chair and a plastic chair of the same color in direct sunlight for 30 minutes.

Which of these would BEST describe the chairs after 30 minutes in the sunlight?

A. The temperatures of the chairs will not change.
B. The temperatures of the chairs will increase the same amount.
C. The temperature of the metal chair will be greater than that of the plastic chair.
D. The temperature of the plastic chair will be greater than that of the metal chair.

Item 15

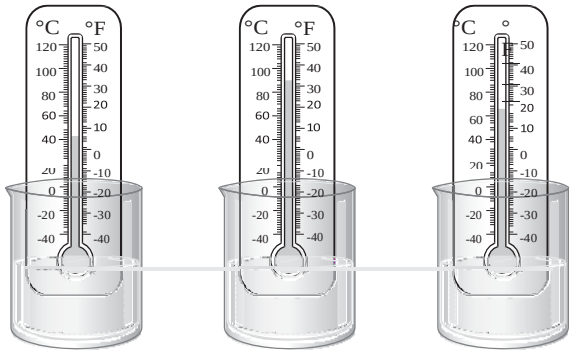
A student wants to stay cooler while she is playing outside on a sunny day. She owns a white shirt and a black shirt.

Which shirt will keep her cooler, and why?

A. the white shirt, because it will reflect more heat than the black shirt
B. the black shirt, because it will reflect more heat than the white shirt
C. the white shirt, because it will absorb more heat than the black shirt
D. the black shirt, because it will absorb more heat than the white shirt

Item 16

A student uses thermometers to measure the changes in temperature of three water samples.



Which of these correctly orders the samples from COLDEST to HOTTEST?

A. A, B, C
B. B, A, C
C. C, A, B
D. A, C, B

Unit 5: Magnets **(12/15 – 1/15)**

In this Physical Science unit, you will learn about magnets. You will identify common objects that are attracted by magnets. You will learn how magnets attract and repel each other.

KEY TERMS

Magnets can **attract** other types of metal. Attract means to pull on something. The **north pole** of a magnet will attract the **south pole** of another magnet. (S3P2a, b)

Magnets can **repel** other magnets. Repel means to push away. The **north pole** of a magnet will repel the **north pole** of another magnet. (S3P2b)

A **magnet** is an object that makes a magnetic field. The magnetic field creates a magnetic force that attracts or repels other magnets. Materials that can be attracted by a magnet are called **magnetic materials**. Magnetic materials are generally made of iron, nickel, cobalt, and some natural occurring minerals. (S3P2a, b)

Magnets can have **different** strengths. Some magnets are strong and can attract magnetic materials that are heavy or are far away from them. Some magnets are weak and can only attract magnetic materials that are light and are closer to them. (S3P2a, b)

Magnets attract **iron** and steel. Objects that magnets attract have the **characteristics** of these metals. A characteristic is a feature of an item. Most other metals are not attracted by magnets. Glass, plastic, and wood are not attracted to magnets. (S3P2a)

Magnets may be of different shapes such as a **bar magnet**, which is shaped like a bar, or a **horseshoe magnet**, which is shaped like the letter C or the letter U, but all the shapes have a **north pole** and a **south pole**. The north pole of a magnet points to the Magnetic North Pole. The south pole of a magnet points to the Magnetic South Pole. (S3P2b)

Sample Items 17–18

Item 17

A student tests several objects with a magnet. She puts her observations into a table.

Object	Attracted to Magnet?
Frying pan	No
Paper clip	Yes
Plasticbuildingblock	No
Aluminum foil	No
Iron nail	Yes

What conclusion can be made from these observations?

A. Small objects are attracted to magnets.
B. Heavy objects are attracted to magnets.
C. Some metal objects are attracted to magnets.
D. Some plastic objects are attracted to magnets.

Item 18

A student tries to put two magnets together. The magnets repel each other. Which of these BEST explains this observation?

A. One magnet is larger than the other.
B. The magnets were placed too far apart.
C. One magnet is made of a different material.
D. The like poles of the magnets were placed together.

Unit 6: Interdependence of Man Pollution/Conservation **(8/17 – 10/29)**

In this Life Science unit, you will study the effects of pollution on habitats. You will also identify ways to protect the environment, including conservation and recycling.

KEY TERMS

A **habitat** is the type of area an organism lives in. A habitat has four parts that an organism needs: shelter, water, food, and space. (S3L2a)

The **environment** is all the living and nonliving things around an organism. All the things that can help or harm an organism are also part of an environment. A change in the environment can help or harm things that live in the environment. (S3L2b)

Pollution describes materials that should not usually be in the environment or a habitat. Pollution can harm living things. (S3L2a)

Air pollution is when the air contains substances that can cause harm to organisms and the environment. When a volcano or power plant puts ash into the air, it is considered air pollution. (S3L2a)

Land pollution is made when humans put things into and on the land that harm the land. Land can be damaged by chemicals on crops. Land can be damaged by mining. Land can be damaged by farming. Littering is another way people pollute land. Littering is when people leave trash on the ground. (S3L2a)

Water pollution happens when things that should not be in bodies of water get into bodies of water. Chemicals can get into water and pollute the water. Acid rain is rain that has too much acid in it. Acid rain that gets into the water pollutes the water. Objects that should not be in water also pollute water. There is a patch of garbage that floats in the Pacific Ocean. It is made of all kinds of garbage, like plastic bottles. It is about the size of the state of Texas. (S3L2a)

Conservation is the way humans can protect the environment. There are many ways humans can help protect Earth. (S3L2b)

People can **recycle**. To recycle means to break down old things and make them into new things. People recycle plastic into new plastic things. People recycle yard waste and make it into new dirt. (S3L2b)

People can **reduce the amount of natural resources they use**. To reduce means to use less. When you turn the lights off as you leave a room, you reduce the amount of electricity you use. You can reduce the amount of water you use by turning the faucet off as soon as you finish washing your hands. (S3L2b)

People can **reuse things**. To reuse means to use old objects a second time. Many times people reuse an object by finding another use for it. When you grow too big for your bike, letting someone else have it is a way to reuse the bike. (S3L2b)

Important Tip

- Conservation is something humans have been doing for the last 150 years. As America grew in size, more pollution was created. People saw how pollution harmed the environment. They decided to try to reduce the amount of pollution. Today, people try to reduce the amount of pollution in many ways. (S3L2b)

Sample Items 19–22

Item 19

Fertilizer on lawns can run off into nearby lakes, increasing the amount of nutrients in the water. Which event MOST LIKELY occurs as a result?

A. More algae grow in the lakes because of the extra nutrients.
B. More oxygen is available to fish in the lakes because of the extra nutrients.
C. More animals move to the area to drink water from the lakes because the water has extra nutrients.
D. More birds eat fish from the lakes because the fish are healthier due to living in water with extra nutrients.

Item 20

Scientists are finding many raccoons that are tangled in garbage.

What event MOST LIKELY caused this effect?

A. tossing aluminum cans into the ocean
B. dumping motor oil on the ground near local lakes
C. using chemicals in homes and gardens to kill pests
D. failing to recycle plastic bags and six-pack rings from soda pop cans

Item 21

Which statement BEST explains why conserving trees would be helpful to the air?

A. It would give people more shade during the summertime.
B. It would help increase oxygen and reduce carbon dioxide.
C. It would make natural building materials for people.
D. It would provide homes and shelter for animals.

Item 22

A student lives in a town that does not have a recycling program.

Which action will MOST LIKELY help protect the environment while the student is shopping?

A. bringing cloth bags
B. asking for plastic bags
C. buying bottled drinking water
D. choosing items with the most packaging

SCIENCE ADDITIONAL SAMPLE ITEM KEYS

Item	Standard/ Element	Characteristics of Science	DOK Level	Correct Answer	Explanation
1	S3L1a	S3CS8a	2	A	The correct answer is choice (A) Crab. Crabs use the coastal salt marshes as nursery areas. They eat other organisms found in salt marshes. Choice (B) is incorrect because whales are too large to live in shallow salt marshes; whales are found in the Atlantic Ocean region of Georgia. Choices (C) and (D) are incorrect because pocket gophers and gopher tortoises require dry soil, but salt marsh soils are wet.
2	S3L1a	S3CS8a	2	D	The correct answer is choice (D) swamps. Georgia's swamps are areas of land covered in still or slow-moving water. Alligators can hunt for food in the shallow water found in swamps. Choice (A) is incorrect because alligators cannot live in deep water away from land. Choices (B) and (C) are incorrect because mountains and Piedmonts, which are regions of rolling hills, are less well suited to support alligators because they do not have as much shallow water.
3	S3L1c	S3CS1b	2	D	The correct answer is choice (D) their webbed feet, which help them to swim. River otters are very well adapted to their aquatic habitats. Their webbed feet and streamlined bodies help them swim and chase their prey. Choice (A) is incorrect because many carnivores have sharp teeth to help them eat their prey. This characteristic does not make them better suited to live in water. Choice (B) is incorrect because many animals have thick fur for warmth. This feature helps organisms survive in cold climates, but it is not the characteristic that makes them best suited for a water habitat. Choice (C) is incorrect because long claws do not make the otter better suited to live in water. They use the claws to dig burrows.

Item	Standard Element	Characteristics of Science	DOK Level	Correct Answer	Explanation
4	S3L1d	S3CS4a	2	D	The correct answer is choice (D) The animals will move to a place that has more trees. Animals need food, shelter, and space to survive. If their habitat no longer fills those needs, they must find a new one to survive. Choice (A) is incorrect because this type of adaptation takes place over a long period of time. Choice (B) is incorrect because a forest fire will not cause animals to choose to live near a pond or a lake. Choice (C) is incorrect because not all animals hibernate and trees grow very slowly; animals could not hibernate for that amount of time. Animals
5	S3E1b	S3CS8a	2	B	The correct answer is choice (B) texture and shape. The observations given for the mineral are texture (smooth) and shape (flat with rounded edges). Choice (A) is incorrect because the color is not described. Choice (C) is incorrect because neither the hardness nor the color was described. Choice (D) is incorrect because the hardness was not
6	S3E1d	S3CS1b	2	D	The correct answer is choice (D) The rock is being worn away by moving water. The rock is getting narrower because the water is wearing down the sides of the rock. Choice (A) is incorrect because wind could not reach the underwater rock. Choice (B) is incorrect because it is unlikely ice will form in a fast-moving river. Choice (C) is incorrect because gravity could not reduce the size of a rock.

Item	Standard/ Element	Characteristics of Science	DOK Level	Correct Answer	Explanation
7	S3E1c	S3CS8a	2	A	The correct answer is choice (A) clay. Clay is made up of very small particles. The spaces between the particles of clay are also very small. Both water and air move slowly through clay. Because of this, it is a poor choice for growing plants. Choice (B) is incorrect because plants grow well in loam soil. Choice (C) is incorrect because water drains easily through sand and plants do not grow well in it. Choice (D) is incorrect because silt has larger particles than clay and it is better for growing plants.
8	S3E1a	S3CS8a	2	D	The correct answer is choice (D) The object is a rock because it is made of two materials. Rocks are made of one or more minerals. Choice (A) is incorrect because not all minerals are hard. Choice (B) is incorrect because not all minerals are magnetic. Choice (C) is incorrect because not all rocks have a rough texture.
9	S3E2b	S3CS1b	2	C	The correct answer is choice (C) The leaf fell into mud and left an imprint when it decayed. A leaf left an imprint in mud that later hardened into rock. Fossils can be formed when organisms make impressions in sediment. When the sediment hardens, the impression, or mold, of the organism is preserved as a fossil. Choice (A) is incorrect because this fossil is in rock, not in ice. Choice (B) is incorrect because the fossil is an impression of a leaf. Choice (D) is incorrect because the fossil is in rock, not amber.

Item	Standard/ Element	Characteristics of Science	DOK Level	Correct Answer	Explanation
10	S3E2a	S3CS1b	2	D	The correct answer is choice (D) A fish that lived long ago turned to stone slowly. Fossils are evidence of organisms that lived long ago. Choice (A) is incorrect because fossils are evidence of organisms that lived long ago, and also, fish do not live in rock. Choice (B) is incorrect because fish do not and did not live in rock. Choice (C) is incorrect because fossils are evidence of organisms that lived long ago.
11	S3E2a	SC3S8a	2	A	The correct answer is choice (A) bones. Hard parts are preserved in fossils where soft parts are more likely to decompose. Choices (B) and (C) are incorrect because these are all soft parts that are not preserved. Choice (D) is incorrect because wings can have both soft and hard parts, making it less likely to form a fossil than the hard parts of an organism.
12	S3E2b	S3CS5a	2	B	The correct answer is choice (B) 1, 2, 4, 3. When an organism dies, it can become buried in mud and silt (sediments); the soft parts decompose and the hard parts, such as bone, teeth, or shells, remain. If these parts become buried, over millions of years minerals such as calcium carbonate replace these hard structures. Choices (A), (C), and (D) are incorrect because the shell does not change into a fossil until after it is buried in
13	S3P1a	S3CS8a	2	B	The correct answer is choice (B) using sandpaper on a stick. When sandpaper is rubbed against a stick, it produces heat from friction. This is the same way heat is produced when hands rub together. Choices (A) and (D) are incorrect because they produce heat by burning something, not from friction. Choice (C) is incorrect because the act of mixing chemicals does not produce heat from friction.

Item	Standard/ Element	Characteristics of Science	DOK Level	Correct Answer	Explanation
14	S3P1c	S3CS8a	2	C	The correct answer is choice (C) The temperature of the metal chair will be greater than that of the plastic chair. When placed in direct sunlight, the metal chair will become warmer than the plastic chair. Choice (A) is incorrect because both chairs will become warmer. Choices (B) and (D) are incorrect because the metal chair will become warmer than the
15	S3P1c	S3CS1b	3	A	The correct answer is choice (A) the white shirt, because it will reflect more heat than the black shirt. Lighter colors reflect more light. If more light is reflected, it cannot be turned into heat energy, so it will keep the student cooler. Choice (B) is incorrect because the white shirt, not the black shirt, would reflect more heat. Choice (C) is incorrect because the white shirt will absorb less heat than the black shirt. Choice (D) is incorrect because the black shirt will absorb more heat than the white shirt, which will keep the student hotter, not cooler.
16	S3P1d	S3CS5c	2	D	The correct answer is choice (D) A, C, B. Sample A has the thermometer with the lowest temperature, so it has the coldest water. Sample B has the highest temperature, so it has the hottest water. Choice (A) is incorrect because the water in Sample B has a higher temperature than the water in Sample C. Choices (B) and (C) are incorrect because they put Sample A, which has the coldest temperature, in the middle.
17	S3P2a	S3CS1b	2	C	The correct answer is choice (C) Some metal objects are attracted to magnets. Choice (A) is incorrect because magnetic attraction does not depend on the size of the object. Choice (B) is incorrect because not all heavy objects are attracted to magnets. Choice (D) Is incorrect because plastic is not attracted to magnets.

Item	Standard/ Element	Characteristics of Science	DOK Level	Correct Answer	Explanation
18	S3P2b	S3CS8a	2	D	The correct answer is choice (D) The like poles of the magnets were placed together. Putting two north poles or two south poles together will cause the magnets to repel each other. Choice (A) is incorrect because the size of the magnet would not affect whether two magnets attract or repel each other. Choice (B) is incorrect because the distance between the magnets will not alter how they repel or attract each other. Choice (C) is incorrect because what the magnets are made of would not affect whether they repel or attract each other.
19	S3L2a	S3CS4a	3	A	The correct answer is choice (A) More algae grow in the lakes because of the extra nutrients. Fertilizers add nutrients to the water so that algae, which are single celled plants that live in colonies can reproduce in numbers that clog up lakes. Choice (B) is incorrect because the nutrients do not add oxygen to the water. Choice (C) is incorrect because more animals will not move into the lake area as a result of the extra nutrients as these nutrients affect plant growth, not animals. Choice (D) is incorrect because the nutrients do not directly affect the fish, so more birds would not be attracted to the lakes.
20	S3L2a	S3CS8a	2	D	The correct answer is choice (D) failing to recycle plastic bags and six-pack rings from soda pop cans. Many animals get entangled in plastic trash such as plastic shopping bags or the plastic rings on soda cans. Choice (A) is incorrect because tossing aluminum cans into the ocean would not cause land animals to become tangled in trash. Choice (B) is incorrect because although an oil spill is very harmful to marine life, it would not cause animals to get tangled in garbage. Choice (C) is incorrect because runoff from insecticides could cause animals to become sick, but it would not cause them to get caught in debris.

Item	Standard/ Element	Characteristics of Science	DOK Level	Correct Answer	Explanation
21	S3L2b	S3CS1b	2	B	The correct answer is choice (B) It would help increase oxygen and reduce carbon dioxide. Conserving trees would help increase oxygen and decrease carbon dioxide. Choice (A) is incorrect because while having more trees would give people shade, this is not something that will help the air. Choice (C) is incorrect because making more building materials is not a way to help the air. Choice (D) is incorrect because although trees provide homes and shelter for many animals, this does not help the air.
22	S3L2b	S3CS4a	3	A	The correct answer is choice (A) bringing cloth bags. By taking cloth bags to the grocery store, the student eliminates the consumption of paper or plastic bags to carry his or her groceries. Choices (B) and (C) are incorrect because shoppers should reduce or eliminate the use of plastic bags and bottles if they wish to help protect the environment. Choice (D) is incorrect because shoppers should choose items with the least amount of packaging to reduce the impact on the environment.

ACTIVITY

The following activity develops skills in Earth Science, Unit 2: Rocks and Soils.

Standards: S3E1c, S3CS1a, S3CS1b, S3CS4b, S3CS5c

Use this activity to observe topsoil types. You will then test each soil sample to determine which one holds the most water. Using your observation records, identify what properties of each soil affect its ability to retain water.

Before beginning, make sure that the following materials are available:

- plastic cup filled with potting soil
- plastic cup filled with clay
- plastic cup filled with sand
- hand lens
- sieve or strainer
- bowl

For the second part of this activity, the following materials will be needed:

- 4 cups with holes punched in the bottom
- pitcher of water
- small measuring cup
- large measuring cup

Part One:

Use a hand lens and sieve to compare the texture, particle size, and color of soil samples of potting soil, clay, and sand.

- Get three plastic cups each filled with a single type of soil: potting soil, clay, and sand.
- Observe the samples using a hand lens.
- Pour the sample through the sieve or strainer to understand the size of the particles.
- Then create a chart comparing the three samples. The chart may include drawings of the soil particles and should tell about the particle size, texture, and color of each sample.
- Use this information to predict which type of soil will hold the most water.

Example of chart:

Characteristics of Topsoils

Topsoil Sample	Texture	Particle Size	Color
Potting soil			
Clay			
Sand			

Part Two:

Test your prediction. Perform an experiment to see which type of topsoil holds the most water.

- Get four cups, water, a small measuring cup, and a large measuring cup.
- Each cup should have equal numbers of small holes punched out of the bottom.
- Fill one cup with clay, one with potting soil, and one with sand.
- In the fourth cup, create a mixture of the three soils.
- Be sure that each cup is filled with the same amount of soil.
- Take the first cup of soil and hold it over the large measuring cup. While holding it, pour $\frac{1}{2}$ cup of water, using the small measuring cup, into the cup containing the soil. After 2 minutes, record the amount of water that passed through the cup of soil into the large measuring cup. Then record the data in a table.

Example of a data table:

Soil Sample Data

Soil Sample	Amount of Water Lost After 2	Amount of Water Held
Cup 1: potting soil		
Cup 2: clay		
Cup 3: sand		
Cup 4: mixed soil		

Repeat this activity for the three remaining cups of soil. Then use the data to calculate which sample absorbed or held the most water.

Write an explanation of the experiment and answer the following questions:

- *Which sample held the most water?*
- *Which characteristics help the soil absorb or hold water?*
- *Was your original prediction correct? Why or why not?*

ACTIVITY

The following activity develops skills in Physical Science, Unit 4:

Heat Energy. Standards: S3P1b, S3P1c, S3CS1a, S3CS1b,

S3CS4b, S3CS5c

You will test the effects of insulation on water samples. An insulator slows the flow of heat. When it is cold outside, people put on layers of clothing to keep warm. The clothing acts as an insulator to stop heat from leaving your body. Different fabrics insulate better than others.

Before beginning, make sure that the following materials are available:

- 4 different fabric samples
- rubber bands
- 5 glasses
- pitcher of warm water
- 5 thermometers
- timer or clock

For the second part of this activity, the following materials will be needed:

- dark-colored fabric
- light-colored fabric
- rubber bands
- three glasses of ice
- lamp
- timer or clock

You will test fabrics to see which ones make the better insulators.

- Get 4 fabric samples, such as cotton, fleece, lace, and wool.
- Take time to observe the fabrics.
- Predict which fabric will be the best insulator.
- Get 5 thermometers and 5 glasses. (A separate thermometer for each glass will give the most accurate results.)
- Wrap fabric around 4 of the glasses and hold it in place with a rubber band. The fifth glass will be used as a control sample.
- Fill each glass to the same level with warm water.
- Place a thermometer in each glass and record the temperature of each of the water samples at the start of the experiment. Each sample should start at the same temperature.
- Check the temperatures again after 15 minutes, 30 minutes, and 45 minutes. Then record the data in a table.

Example of a Data Table: Insulator Data

Water Sample	Initial Temperature of Water	Temperature After 15 Minutes	Temperature After 30 Minutes	Temperature After 45 Minutes
Cup 1: cotton				
Cup 2: fleece				
Cup 3: lace				
Cup 4: wool				
Cup 5: control				

Write an explanation of the experiment and answer the following questions:

- *Did the temperature of any of the samples go up or down? Did any stay the same?*
- *Based on your data, which fabric is the best insulator?*
- *Was your initial prediction correct? Why or why not?*

Investigate how the color of a material can affect the transfer of heat.

- Choose one of the fabrics from the first part of the activity. Get two pieces of the fabric. One piece should be a dark color and one should be a light color, such as black and white.
- Get three glasses of ice. Wrap two of the glasses of ice in fabric. The third glass will act as the control. Make sure to also cover the top of the cups. Rubber bands can be used to hold the fabric in place.
- Place each glass under a lamp or in direct sunlight. Check your glasses every ten minutes for a half hour. Record your observations, write an explanation of the experiment, and answer the following questions:
  - *Which glass of ice melted first?*
  - *Which glass of ice took the longest to melt?*
  - *Do different color fabrics absorb different amounts of heat than others?*