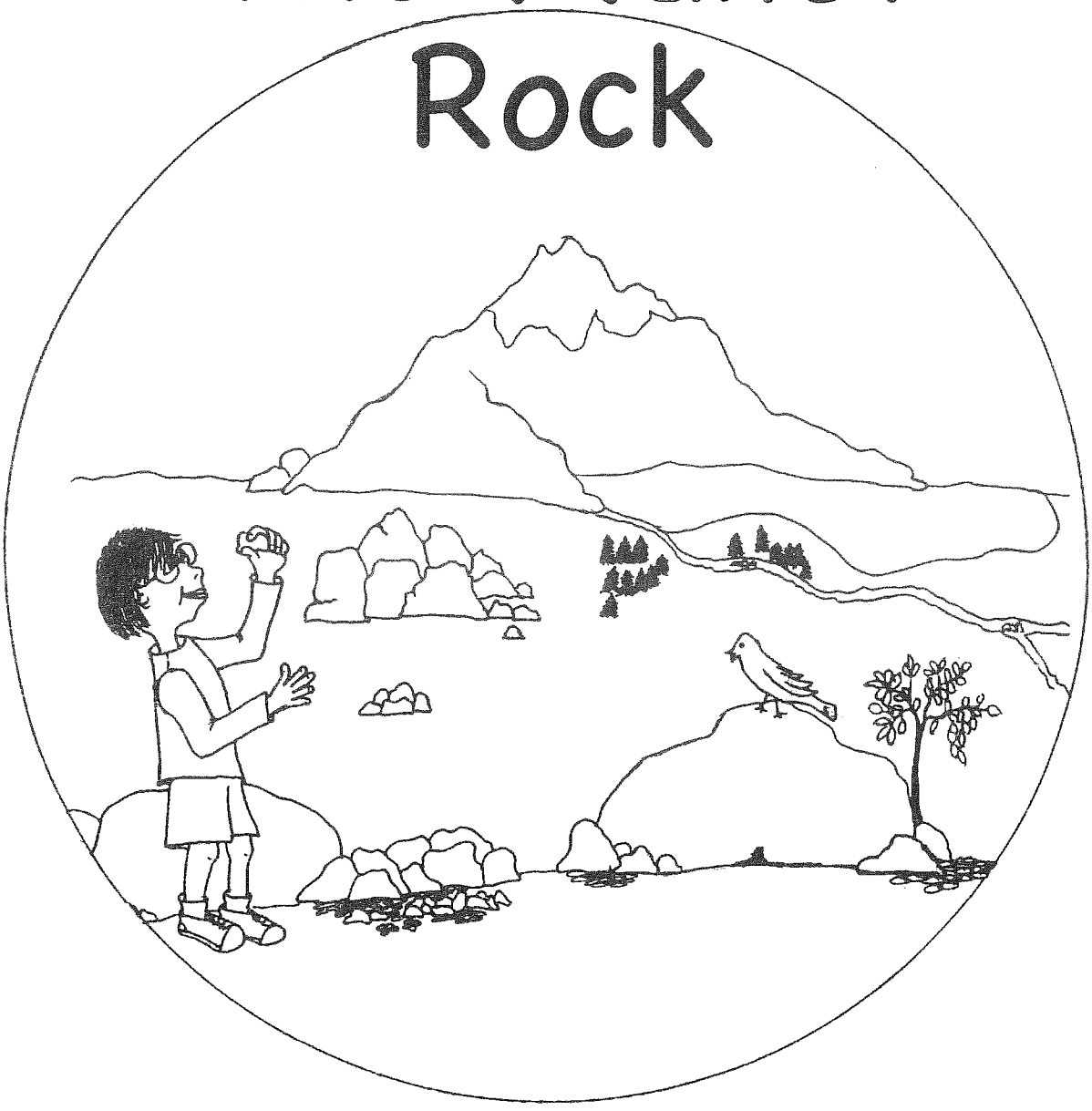
BATTLE CREEK AREA
Mathematics & Science Center

Student Journal

6ES1

The Planet Rock



A Sixth Grade Unit
supporting the
Michigan Science K-7 Content Expectations

Name: _____

Name: _____

Date: _____

ACTIVITY

Rocks Tell a Story

1

Make a chart and record your observations of your rock. Include the physical properties of your rock.

J O U R N A L

Rocks Tell a Story (cont.)

Name: _____

Date: _____

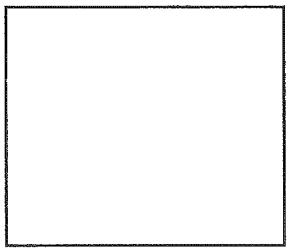
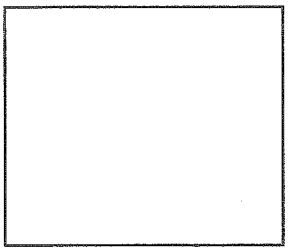
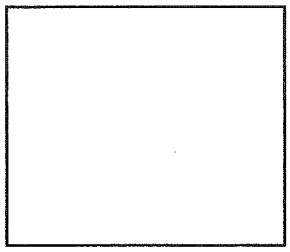
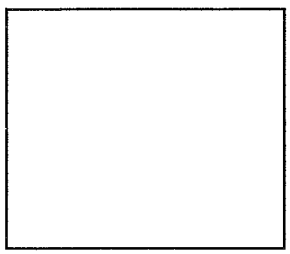
1

Write a paragraph about the properties of your rock. Include what you have discovered about what your rock is made of.

Name: _____

Date: _____

Draw and write your description of the following sediments: gravel, sand, silt, and clay.

Sediment	Description of Sediment
 gravel	
 sand	
 silt	
 clay	

JOURNAL

Weathering Rocks and Minerals (cont.)

Name: _____

Date: _____

2

1. Explain how rocks are broken down into different sizes of sediment.

2. Explain how the crayons in this activity are used as a model to show the weathering of rocks.

Name: _____

Date: _____

ACTIVITY

Sediments Become Rocks

3

Challenge:

Your group has combined samples of crayon sediments. Your challenge is to think of a plan that will combine the samples into one solid piece again. The plan for this sediment sample does NOT include heating or melting. Draw and write your plan for combining the group sediments.

ACTIVITY

Sediments Become Rocks (cont.)

Name: _____

Date: _____

3

1. Draw and label each sedimentary rock specimen.

2. Compare the rock sediments to the different sedimentary rock specimens. Write what sediments you think make up the different sedimentary rocks.

Name: _____

Date: _____

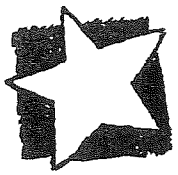
JOURNAL

Sediments Become Rocks (cont.)

3

1. Draw and label a diagram of how sedimentary rocks are formed. Include the elements that contribute to weathering and erosion. Write a caption for your drawing.

2. Draw and label a diagram of the sediments in the jar of water. Write a caption for your drawing.



ACTIVITY

Rocks Can Change

Name: _____

Date: _____

4

Your group is comparing four sedimentary rocks to four unknown rocks that are formed in a different manner. Describe how the sedimentary samples are similar and different from the unknown rock samples.

Name: _____

Date: _____

JOURNAL

Rocks Can Change (cont.)

4

1. Draw and label a diagram of how metamorphic rocks are formed. Include the elements that contribute to weathering and erosion. Write a caption for your drawing.

2. Describe the difference between how sedimentary rocks are formed and how metamorphic rocks are formed.

ACTIVITY

Rocks Can Melt

Name: _____

Date: _____

5

1. Make observations of the sedimentary, metamorphic, and igneous rock. Describe the types of rocks in the chart below. Include texture, specks, luster, and markings in your descriptions.

Type of Rock	Description
Sedimentary	
Metamorphic	
Igneous	

2. Describe the differences in how the three different rocks are formed.

Name: _____

Date: _____

5

1. Draw and explain the three ways that minerals and rocks are formed.

2. Explain how crayons can be used as a model that represents the formation of sedimentary, metamorphic, and igneous rock.

Name: _____

Date: _____

Rock Cycle Game

1. Before you begin to play the game, write the different processes that take place in the formation of the different types of rocks on the index cards. Use the class list, Venn diagram, and the book, *Remarkable Rocks*, as references for your game cards if necessary.

2. Make duplicate cards of some of the processes you think are most important.

3. Once the game cards are complete, shuffle the cards and place them in a stack for all the players to reach.

4. Each player chooses a game piece: Sedimentary Rock, Sediments, Metamorphic Rock, Magma, or Igneous Rock.

5. All the players start on the space their piece represents. The goal of the *Rock Cycle Game* is to go around the board and finish in your original space.

6. Roll the die to determine which player will go first.

7. The first player selects and reads a card and determines what effect the condition on the card has on him/her.

8. The player moves his/her piece in the direction determined by the conditions on the card and the number on the die. Caution: Some cards may not have an effect on your game piece; for example, if you are Magma and turn over a "weathering and erosion" card, you lose a turn, as magma is not affected by weathering and erosion on the surface of the Earth.

9. When a player lands on a labeled space with a "short cut" arrow, he/she makes another throw of the die. The player must roll a 4, 5, or 6 to follow the "short cut" arrow. If another number is rolled, the player can advance on the game the "long" way around.

10. Continue the play until the first player is back to the original space or until your teacher says, "Time is up."

Name: _____

Date: _____

ACTIVITY 6

My Rock Tells a Story (cont.)

Use the space below to write an outline or concept map of your rock story.

ACTIVITY

7 Constructive and Destructive Changes on Earth: Weathering

Name: ____________________

Date: ____________________

1. Draw and label a picture of the lava flow down the slope. Include the surface features of the slope.

2. Write a description of the movement of the lava and the effect it had on the slope.

____

____

____

____

____

3. Describe the difference between the observations of the model and what happens when a volcano erupts and lava flows downhill.

____

____

____

____

____

Name: _____

Date: _____

ACTIVITY

Constructive and Destructive Changes on Earth: Weathering (cont.)

7

1. Draw and label a picture of the model igneous rock and the obsidian.

2. Draw a Venn diagram to compare and contrast the model igneous rock and the obsidian.

Constructive and Destructive Changes on Earth: Weathering (cont.)

Name: _____

Date: _____

3. Draw a Venn diagram to compare the obsidian and the granite. Use what you have learned about how they are formed and what you observe in your comparison.

4. Write a paragraph that describes the similarities and differences between obsidian and granite.

Name: _____

Date: _____

Draw and label a picture of a volcano and lava flow. Write a caption for your picture that explains how the volcano and lava flow are related to the constant changes on the surface of the Earth.

Name: _____

Date: _____

8

Make a list of the forces of nature that may have an effect on the mountain.

Name: _____

Date: _____

ACTIVITY 8

The Nature of Weathering (cont.)

1. Names of group members:

2. My group is going to build a model that investigates

_____

_____

_____

_____

3. Draw and label a picture of the model your group is going to build.

The Nature of Weathering (cont.)

Name: _____

Date: _____

4. List the materials you will need:

5. Explain how your model will demonstrate your topic of investigation.

6. Write what you think will happen.

Name: _____

Date: _____

7. Write the steps you will take.

8. Make a chart for observations and data collection.

The Nature of Weathering (cont.)

Name: _____

Date: _____

9. Write what you found out. (Include a claim, evidence, and reasoning in your conclusion.)

Name: _____

Date: _____

J O U R N A L

The Nature of Weathering (cont.)

8

1. Draw a picture of the model your group made that demonstrates weathering.

2. Explain how weathering changes the surface of the Earth.

_____

_____

_____

_____

_____

_____

_____

ACTIVITY

Chemical Weathering

Name: _____

Date: _____

9

Part 1 **Chemical Weathering Investigation**

1. Write the question you are investigating.

_____

_____

_____

_____

2. Write what you think will happen.

_____

_____

_____

_____

_____

3. List the materials you will use.

Name: _____

Date: _____

4. Write the steps you will take.

5. Make a chart to record your observations and data.

Name: _____

Date: _____

6. Write what you found out. (Include a claim, evidence, and reasoning in your conclusion.)

Name: _____

Date: _____

Part 2 **Oxidation Investigation**

1. Write the question you are investigating.

_____

_____

_____

_____

2. Write what you think will happen.

_____

_____

_____

_____

_____

3. List the materials you will use.

Chemical Weathering (cont.)

Name: _____

Date: _____

4. Write the steps you will take.

5. Make a chart to record your observations and data.

Name: _____

Date: _____

6. Write your conclusion or scientific explanation to your investigation. (Include a claim, evidence, and reasoning in your conclusion.)

J O U R N A L

Chemical Weathering (cont.)

Name: _____

Date: _____

9

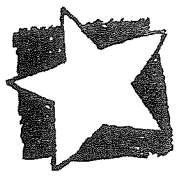
Pretend you are a piece of granite that contains a great deal of iron. Describe the place you would most want to live and the place you would least like to live and explain why. Use data from your investigation to support your reasoning.

Name: _____

Date: _____

ACTIVITY

Glacier Grooves and Moves!



10

1. Draw and label a picture of your group's model of a glacier before it has been placed in the freezer.

2. Draw and label a prediction of what you think will happen after the model has been in the freezer overnight.

Glacier Grooves and Moves! (cont.)

Name: _____

Date: _____

3. Draw and label a picture of the glacier model after it has been in the freezer. Compare your frozen model to your prediction.

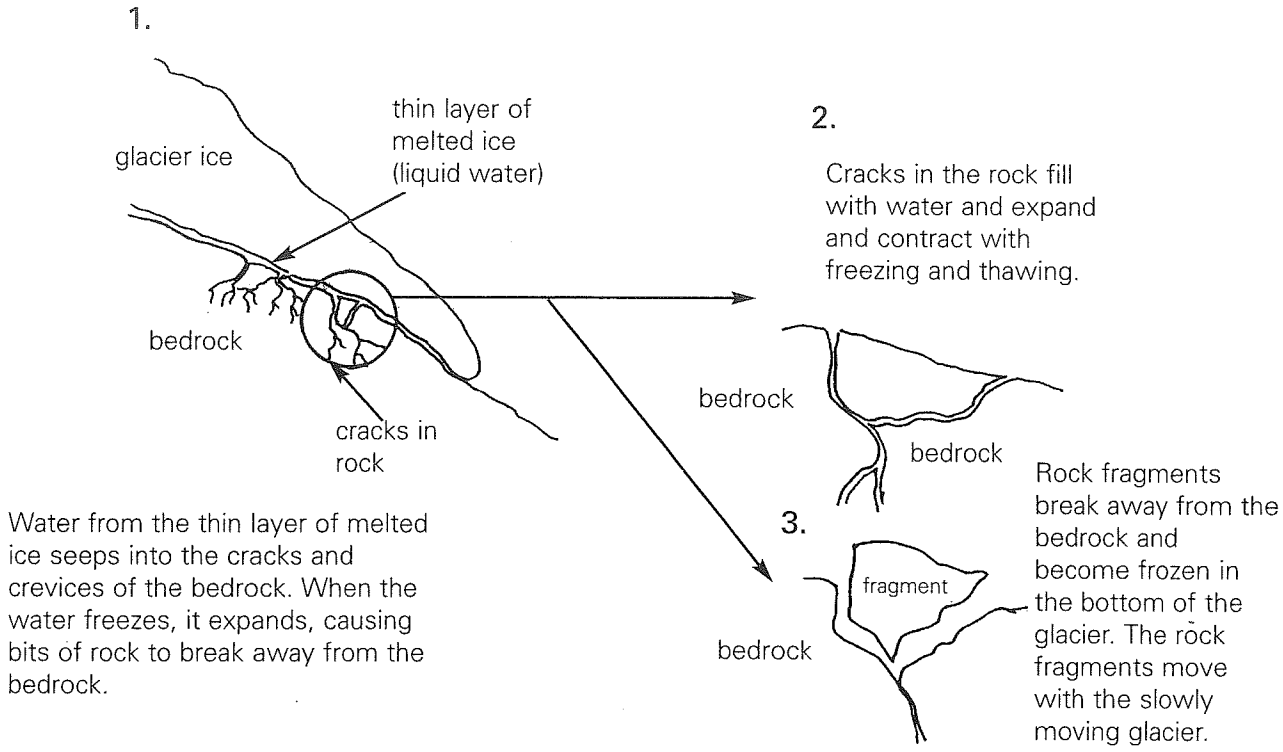
Name: _____

Date: _____

Glaciers Pluck Rocks and Soil From the Earth

Rocks are weakened and cracked through the freezing and thawing of water that moves into the tiny nooks and crannies of rocks and rock beds. When liquid water seeps into tiny cracks and freezes, the volume of the water expands, creating larger cracks and weakened rocks or rock fragments.

As the glacier moves slowly over the surface of rocks and rock beds, there are conditions where the glaciers melt a little bit, creating a thin layer of water between the rock and ice. This melted ice flows down into the cracks of the rocks where it can freeze and melt several times. Rocks become loose and dislodged from the rock bed. The loose rocks are "plucked" from the rock bed and frozen into the glacier and move as part of the glacier to different locations. The "plucked" rocks in the glacier can be as small as gravel or large boulders that are the size of automobiles or semis!



ACTIVITY

Glacier Grooves and Moves! (cont.)

Name: _____

Date: _____

10

1. Describe the materials that made scratches or grooves in other materials. Explain why you think that happened.

2. Rank the materials based on their ability to create a groove.

3. Rank the materials based on their ability to become grooved or scratched.

4. Explain why some rocks are able to erode certain rocks and not others.

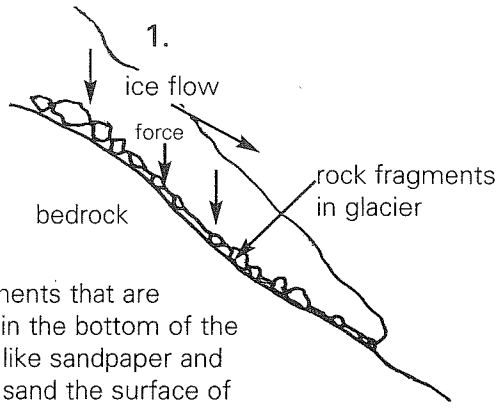
Name: _____

Date: _____

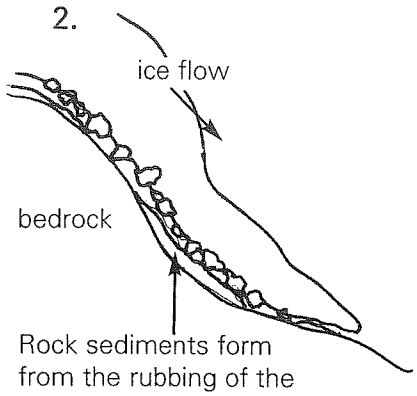
Glacial Abrasion

Glacial abrasion is the second type of weathering and erosion that occurs when glaciers slowly move across the surface of the Earth. Glacial abrasion occurs when there is contact or rubbing between the rocks that are embedded in the bottom of the glacier through plucking and the bedrock or rocks on the surface of the Earth. The glacier acts like sandpaper and smoothes and scratches the surface of the bedrock. The grooves and scratches are called striations. The striations in rocks that are softer, such as limestone and sandstone, are deeper and create more sediment or dust than harder rock such as granite.

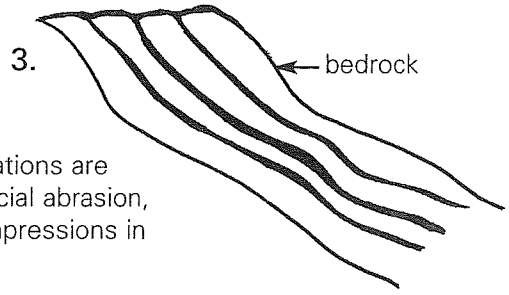
The weight and force of the glacier pushes down on the rocks and also affects the depth of the grooves, smoothness of the bedrock, and amount of sediment that is produced from the rubbing and scraping. As the glacier slowly moves over the bedrock, the rocks embedded in the underside of the glacier grind into the bedrock and polish and smooth the surface, creating a path of dust or sediments. Abrasion also leaves a trail of striations or grooves that appear as parallel lines. The size and hardness of the surfaces of the rocks in the glacier and the bedrock determine the amount and depth of striations and how smooth or polished the bedrock becomes.



Rock fragments that are imbedded in the bottom of the glacier act like sandpaper and polish and sand the surface of the bedrock.



Rock sediments form from the rubbing of the rock fragments on the bedrock.



Grooves or striations are evidence of glacial abrasion, leaving deep impressions in the bedrock.

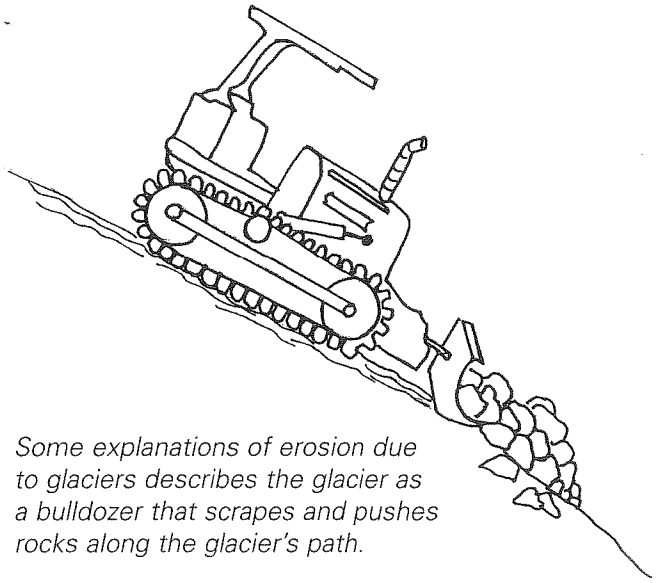
J O U R N A L

Glacier Grooves and Moves! (cont.)

Name: _____

Date: _____

10



Some explanations of erosion due to glaciers describes the glacier as a bulldozer that scrapes and pushes rocks along the glacier's path.

Look at the picture of the diagram of the bulldozer as a model for glacier movement and how glaciers shape and reshape the surface of the Earth. Explain how the picture is NOT an accurate model of how glaciers cause rocks to move, grooves in rocks, and other formations on the surface of the Earth. Include the terms *glacier, glacial plucking,* and *glacial abrasion* in your response.

Name: _____

Date: _____

ACTIVITY 11

What Is Soil?

1. Make a chart that describes the properties of your soil sample. (color, texture, different particles, other observations)

2. List what you think makes up your soil sample.

ACTIVITY

What Is Soil? (cont.)

Name: _____

Date: _____

11

1. Write what you are trying to find out.

_____

_____

_____

_____

_____

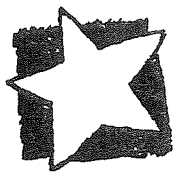
2. Draw and label how your jar looks after the soil has settled.

Name: _____

Date: _____

JOURNAL

What Is Soil? (cont.)



11

Explain how soil is related to the weathering and erosion of rocks. Include in your explanation what materials make up soil and how soil may differ from place to place.

ACTIVITY

Taking a Closer Look at Sediments

Name: _____

Date: _____

12

Sediment Properties Chart

Sediment	Color	Particle Size	Texture	Mass	Sink/Float	
gravel						
sand						
silt						
clay						

Name: _____

Date: _____

ACTIVITY 12

Taking a Closer look at Sediments (cont.)

1. Write the question you are investigating.

_____

_____

_____

_____

2. List the materials you will use.

3. Draw a picture of your set-up for the investigation.

Taking a Closer Look at Sediments (cont.)

Name: _____

Date: _____

4. Make a chart to organize your data.

Name: _____

Date: _____

ACTIVITY 12

Taking a Closer look at Sediments (cont.)

5. Write a scientific explanation or conclusion for your investigation. (Include a claim, evidence, and reasoning in your conclusion.)

J O U R N A L

Taking a Closer Look at Sediments (cont.)

Name: _____

Date: _____

12

-1. Choose two sediments and use a Venn diagram to compare and contrast their properties.

Name: _____

Date: _____

2. Explain how the particle size of sediments affects how they interact with water.

Key Terms

chemical weathering - Chemical weathering is the process by which rocks are decomposed or loosened by chemical processes to form sediments and other materials.

clay - Clay is a sediment that is produced by physical weathering of rock. The particle size of clay is smaller than silt. Clay has the ability to be molded and then dried or fired into specific shapes.

constructive forces - Constructive forces are forces that help in building new rocks and landforms.

cycle - A cycle is a pattern of change that reoccurs through time. It helps to explain how natural events or phenomena occur.

destructive forces - Destructive forces are forces that wear away rocks and landforms.

erosion - Erosion involves the processes that move weathered material from place to place. Erosion occurs through the forces of gravity, wind, ice, water, and human actions.

glacial abrasion - Glacial abrasion is the result of the scraping of rocks that are imbedded in the ice of the glacier against the rock bed beneath the glacier.

glacial plucking - Glacial plucking refers to the slight melting of the bottom surface of the glacier that causes freezing and thawing in the cracks in the rocks below. The loosened rocks become imbedded or attached to the ice and move with the glacier.

glacier - A glacier is a large mass of ice that has formed from many years of compacted snow. The glaciers are slow moving masses that change the surface of the Earth.

gravel - Gravel is sediment produced by physical weathering. Gravel has large particles and is considered loose rock that is larger than 2mm and smaller than 64 mm.

humus - Humus is the decomposed (rotting) organic material (living material) found in soil.

igneous rock - Igneous rock is formed when molten rock material cools and hardens to become a solid. It is one of the three types of rocks.

lava - Lava is the magma that reaches the Earth's surface during a volcanic eruption or lava flow.

magma - Magma is molten rock material found beneath the Earth's surface, which forms igneous rock when it cools and hardens.

metamorphic rocks – Metamorphic rocks are preexisting rocks in which minerals are changed by great pressure and heat.

mineral – A mineral is a solid element or compound with a unique structure of atoms. Minerals are formed by natural processes and are the building blocks of rocks.

organic material - Organic material is the living, or once living, material that makes up soil.

particle size - Particle size is the size of each grain of a sediment. The particle size decreases from gravel to sand to silt and, finally, clay.

physical weathering - Physical weathering refers to the effect of motion, such as wind, rain, waves, glacial movement, and freezing and thawing that wear away rocks and bedrock.

pressure – Pressure is a force that occurs when an object pushes on other objects. Pressure is involved in the formation of sedimentary and metamorphic rocks.

properties - Properties are characteristics by which matter is described. Hardness, size, color, shape, flexibility, buoyancy (sinking and floating), state of matter (solid, liquid, gas), odor, mass, and volume are some properties of matter.

Key Terms (cont.)

rock – A rock is a natural, solid earth material that is made of one or more different minerals. Rocks form a major part of the Earth's surface.

rock cycle - The rock cycle is an endless process of change in which existing rocks are changed into new rocks.

sand - Sand is sediment produced by physical weathering of rock. The particle size of sand has visible grains of a variety of colors. Sand feels gritty to the touch.

sediment - Sediment is made of small pieces of broken rocks created by wind, water, or ice and carried to other locations. Sediments include gravel, sand, silt, and clay.

sedimentary rock - Sedimentary rock is formed when sediments are deposited in layers, pressed down under great pressure over a long period of time, and become cemented or fastened together into a solid piece.

silt - Silt is a sediment that is produced by physical weathering of rock. The particle size of silt is smaller than sand and larger than clay. Silt is often deposited in the bottom of bodies of water.

soil - Soil is a mixture of organic (living) and inorganic (nonliving) material that makes up the top layer of the surface of the Earth. Soil provides the necessary nutrients and minerals for plant growth and repair and is home to many species of animals.

thermal contraction - Thermal contraction refers to a decrease in volume due to change in temperature. Water contracts when it thaws.

thermal expansion - Thermal expansion refers to an increase in volume due to a change in temperature. Water expands when it freezes.

weathering - Weathering includes the processes that cause minerals and rocks to become smaller. It includes the actions of frost, plant roots, thermal expansion, the rubbing of rocks upon rocks, moving water and wind, gases, and living organisms.