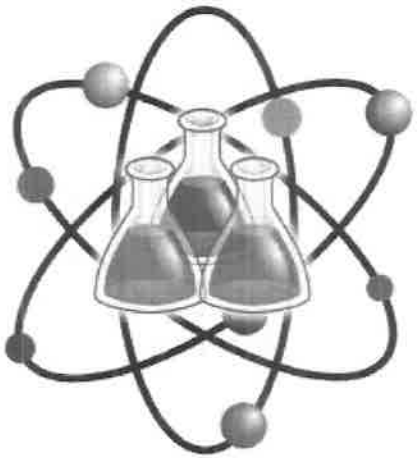
My Science Journal
Soils, Rocks, and Landforms

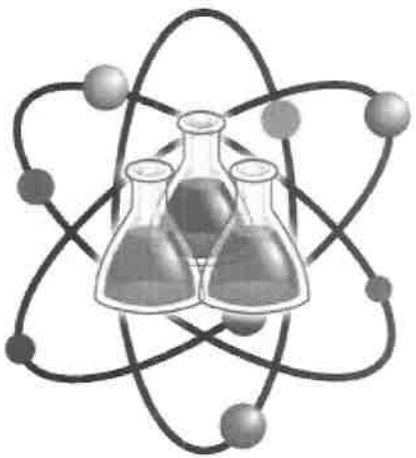
Name_____



4th Grade

My Science Journal
Soils, Rocks, and Landforms

Name _____



4th Grade

What is soil?

What is soil?

Soil Observations

Soil 1	Soil 2

Soil 3	Soil 4

Soil Observations

Soil 1	Soil 2

Soil 3	Soil 4

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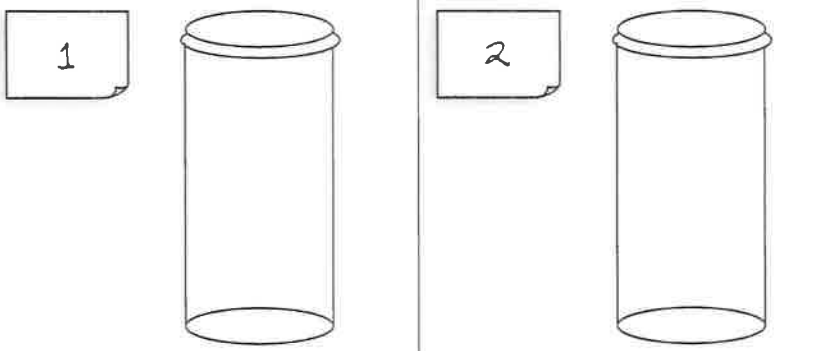
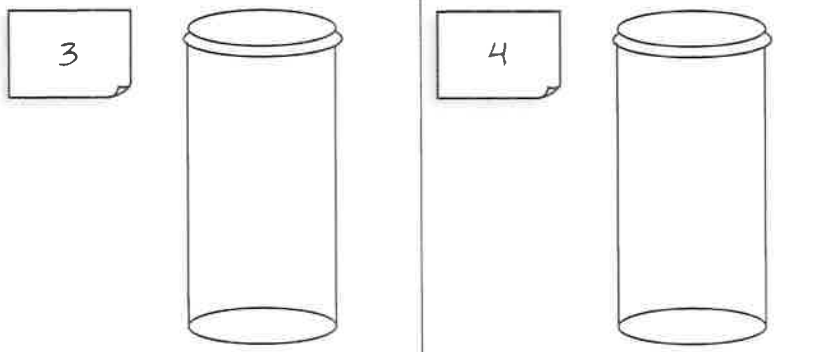
Soils, Rocks, and Landforms Module
Investigation 1: Soils and Weathering
No. 1—Notebook Master

Soils in Vials



Location

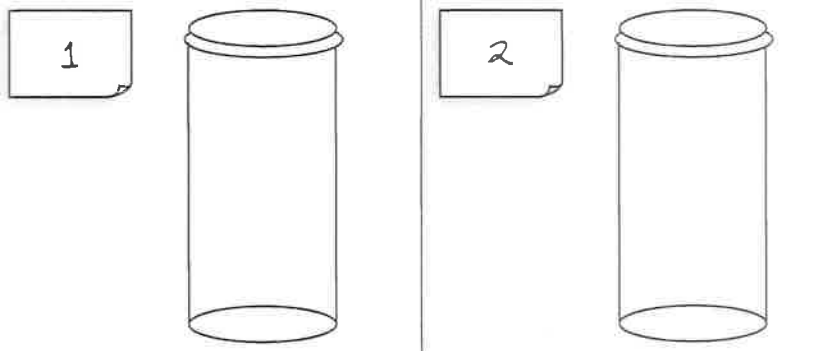
Location



Location

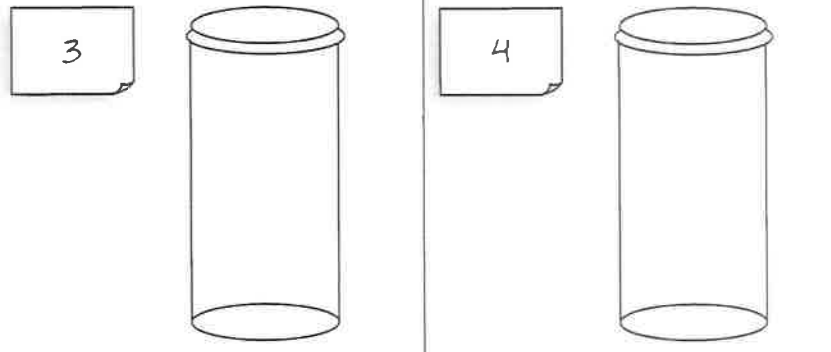
Location

Soils in Vials



Location

Location



Location

Location

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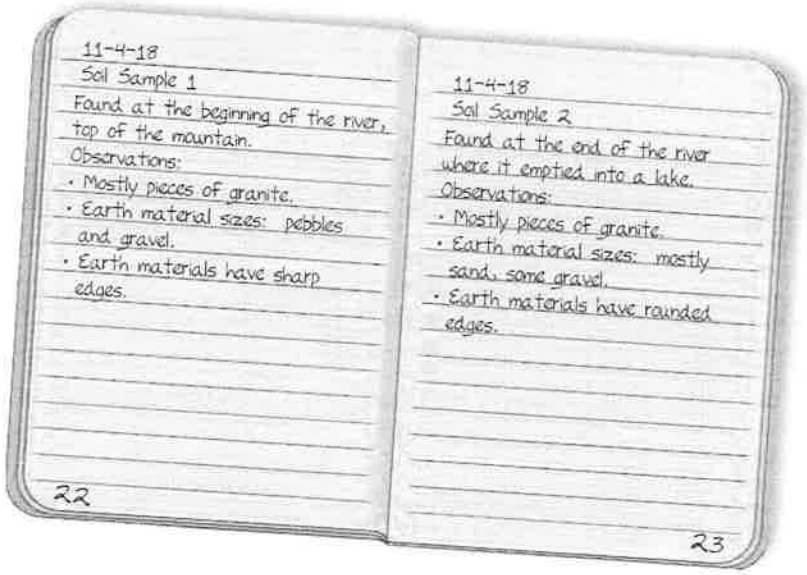
Soils, Rocks, and Landforms Module
Investigation 1: Soils and Weathering
No. 2—Notebook Master

Response Sheet—Investigation 1

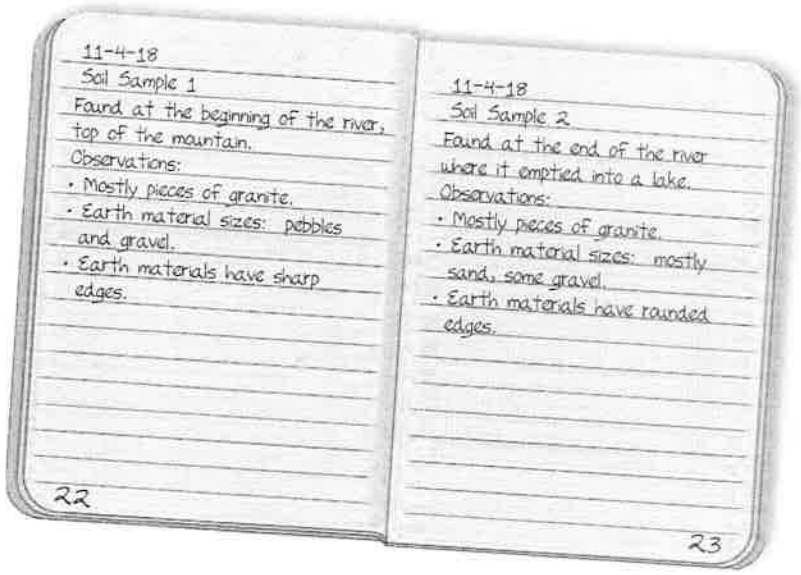
A soil scientist collected two samples of soil from a river that is 10 km long. Here is what she wrote in her notebook about the samples.



Explain why she found the same kind of rocks in both places, but saw differences in the size and shape of the rocks.

Response Sheet—Investigation 1

A soil scientist collected two samples of soil from a river that is 10 km long. Here is what she wrote in her notebook about the samples.



Explain why she found the same kind of rocks in both places, but saw differences in the size and shape of the rocks.

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Soils, Rocks, and Landforms Module
Investigation 1: Soils and Weathering
No. 3—Notebook Master

What causes big rocks to break down into smaller rocks?

What causes big rocks to break down into smaller rocks?

Rock Observations

Basalt

Limestone

Marble

Sandstone

Rock Observations

Basalt

Limestone

Marble

Sandstone

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Soils, Rocks, and Landforms Module
Investigation 1: Soils and Weathering
No. 4—Notebook Master

How are rocks affected by acid rain?

How are rocks affected by acid rain?

Rocks in Acid Rain

Safety Note: Wear safety goggles when working with chemicals such as vinegar.

Place each rock in a vial and add 25 milliliters of vinegar. Record your observations in the table below.

	Observations of rocks in vinegar
	Basalt
	Limestone
	Marble
	Sandstone

Put a check next to each rock that acid rain affects.

Rocks in Acid Rain

Safety Note: Wear safety goggles when working with chemicals such as vinegar.

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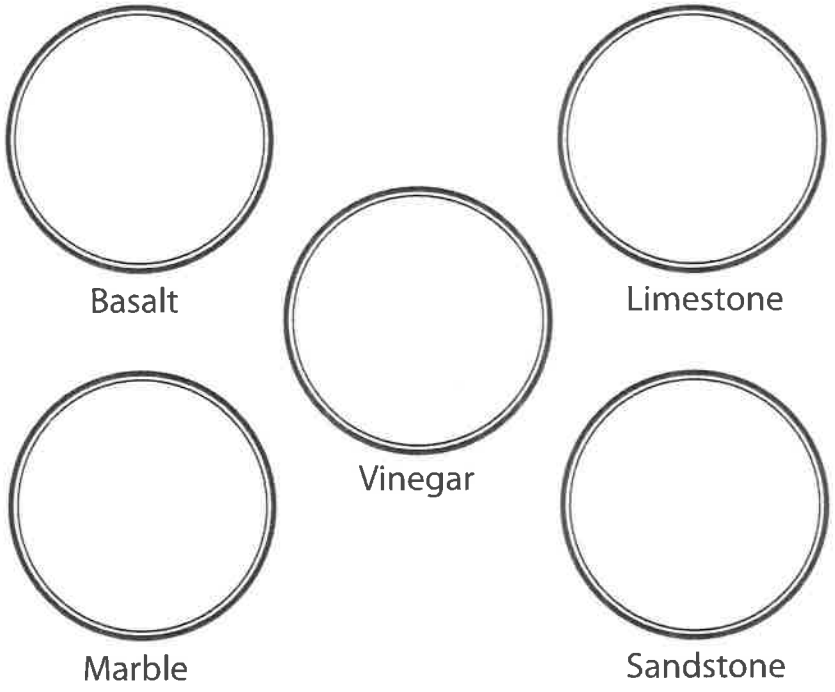
Soils, Rocks, and Landforms Module
Investigation 1: Soils and Weathering
No. 5—Notebook Master

Acid-Rain Evaporation

1. What do you observe in each evaporation dish?
2. What conclusions can you draw from your observations?
3. Where does the white material in the evaporation dish come from?
4. Explain what happens when acid rain falls on different rocks.



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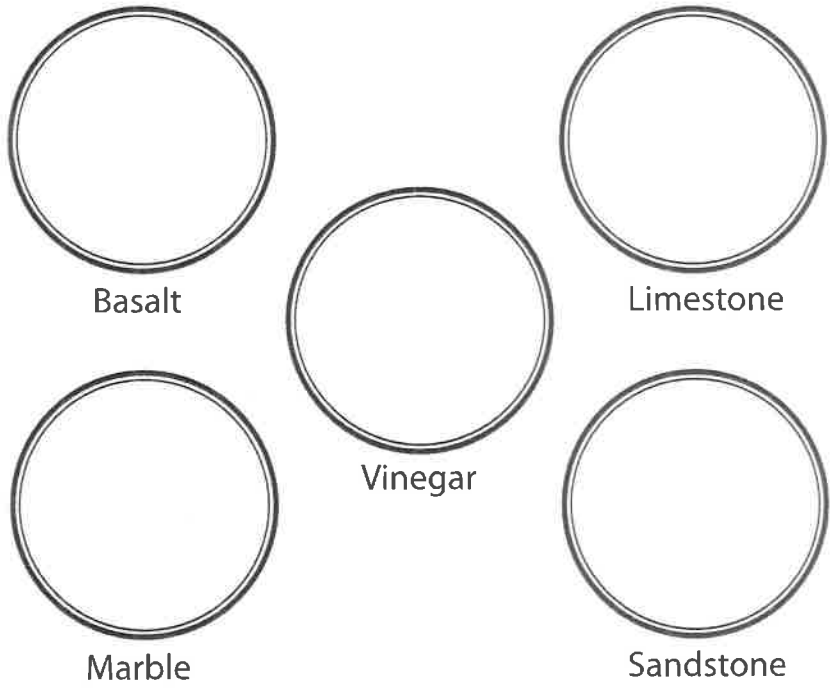

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Soils, Rocks, and Landforms Module
Investigation 1: Soils and Weathering
No. 6—Notebook Master

What's in our schoolyard soils?

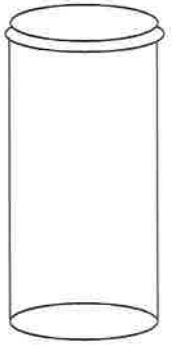
Schoolyard Soil Samples

Location

Location

A

B



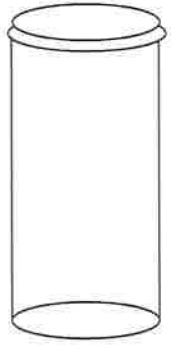
Schoolyard Soil Samples

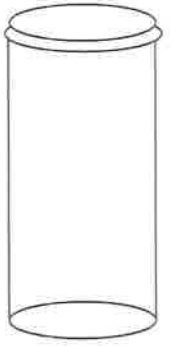
Location

Location

A

B





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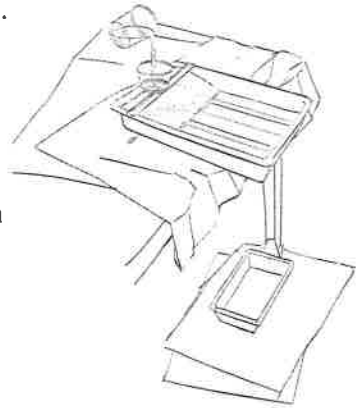
Soils, Rocks, and Landforms Module
Investigation 1: Soils and Weathering
No. 7—Notebook Master

How do weathered rock pieces move from one place to another?

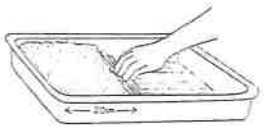
How do weathered rock pieces move from one place to another?

Standard Stream-Table Setup

1. Cover the table with newspapers.
2. Position the plastic tray so the end with the drain hole extends over the edge of the table.



3. Place the basin on newspaper on the floor under the drain hole.
4. Use the wood angle to push the earth material to the end of the plastic tray away from the drain hole. Make sure it is all behind an imaginary line, 20 centimeters (cm) from the end. Smooth the surface of the earth material with the wood angle to make a flat, even surface with a cliff-like edge.



5. Set a-30 cm ruler across the top of the tray, about 6 or 7 cm from the end. Secure it in place with small pieces of duct tape.
6. Support and center the standard water source on the edge of the plastic tray and the ruler.

7. Put a pencil under the tray to lift it a bit.
8. Use a 1-liter (L) container to add water to the water source, as your teacher directs.

Standard Stream-Table Setup

1. Cover the table with newspapers.
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3. Place the basin on newspaper on the floor under the drain hole.
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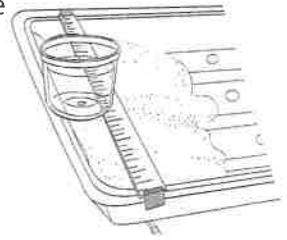
5. Set a 30-cm ruler across the top of the tray, about 6 or 7 cm from the end. Secure it in place with small pieces of duct tape.
6. Support and center the standard water source on the edge of the plastic tray and the ruler.



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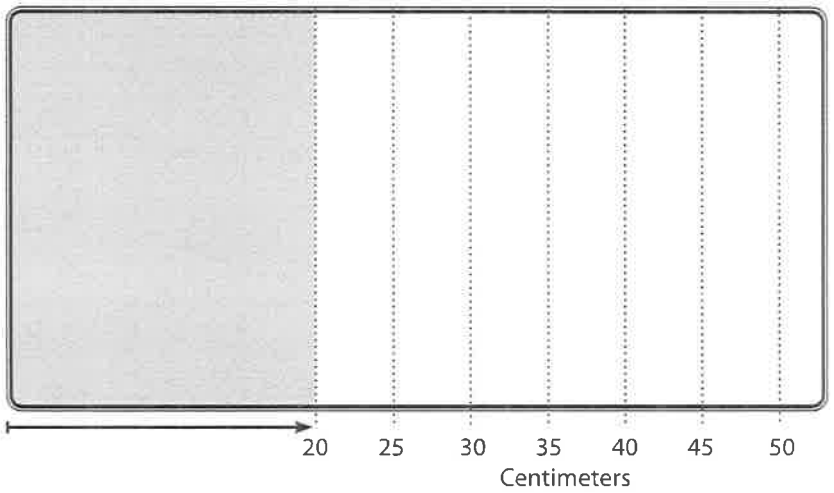
Soils, Rocks, and Landforms Module
Investigation 2: Landforms
No. 8—Notebook Master

How does slope affect erosion and deposition?

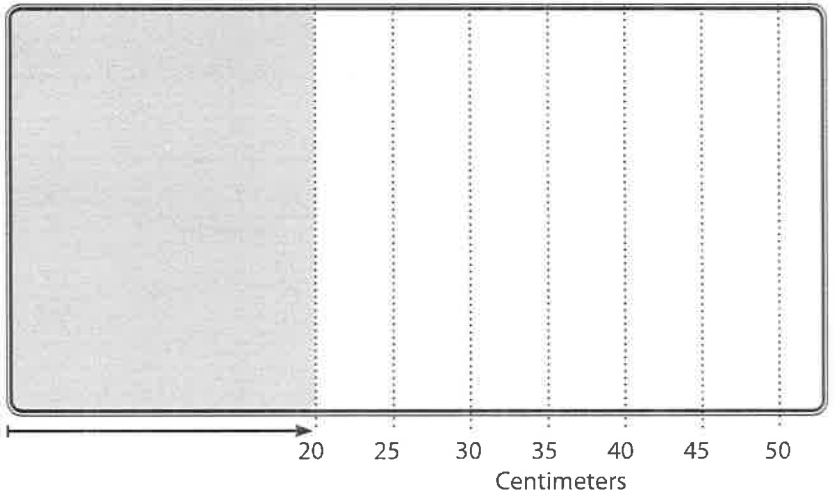
How does slope affect erosion and deposition?

Stream-Table Observations

Condition _____

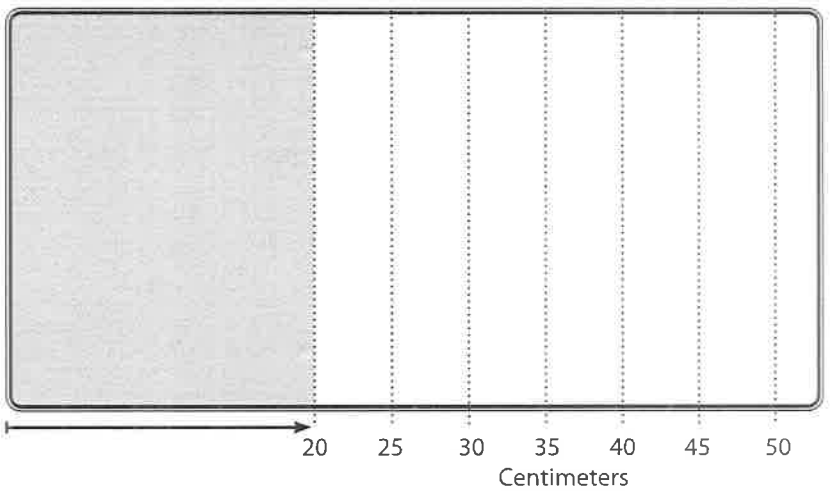


Condition _____

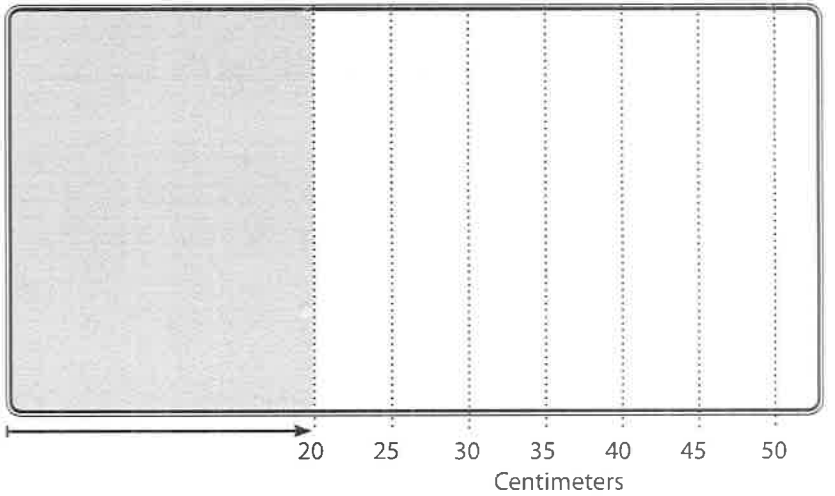


Stream-Table Observations

Condition _____



Condition _____



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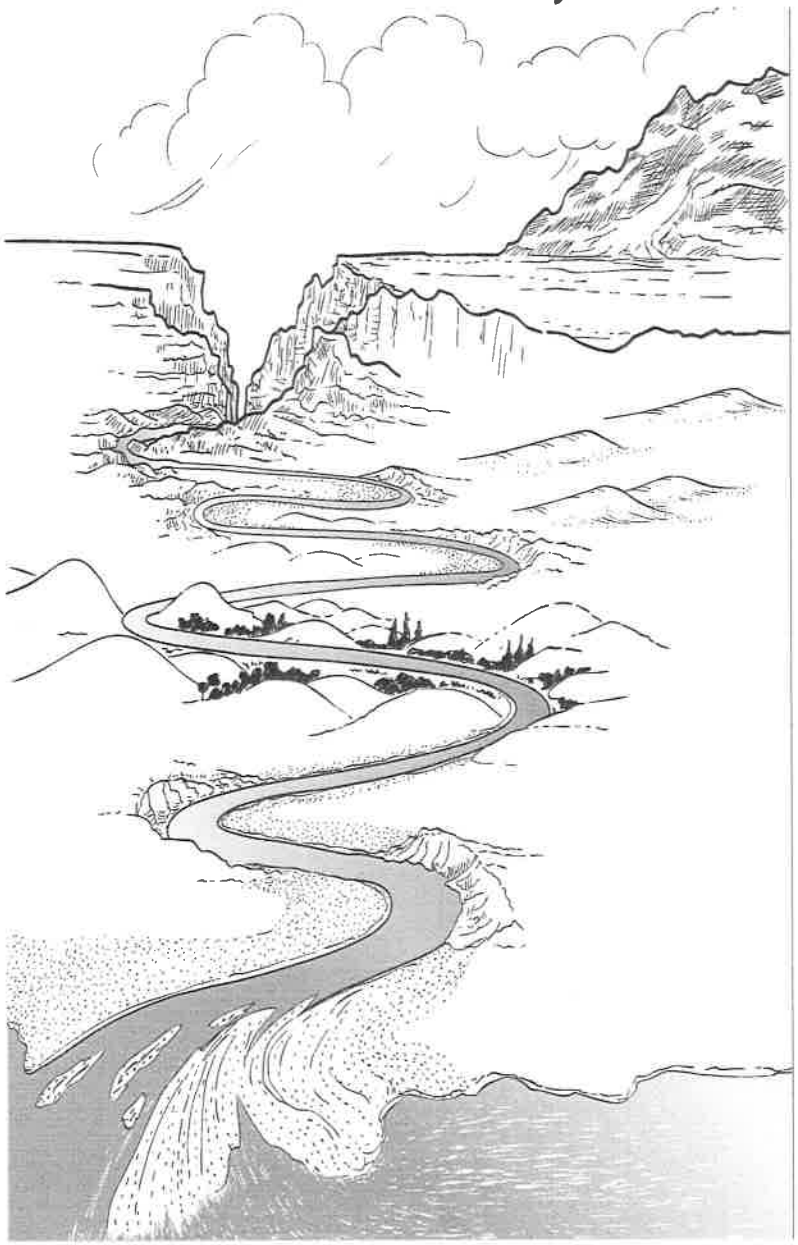
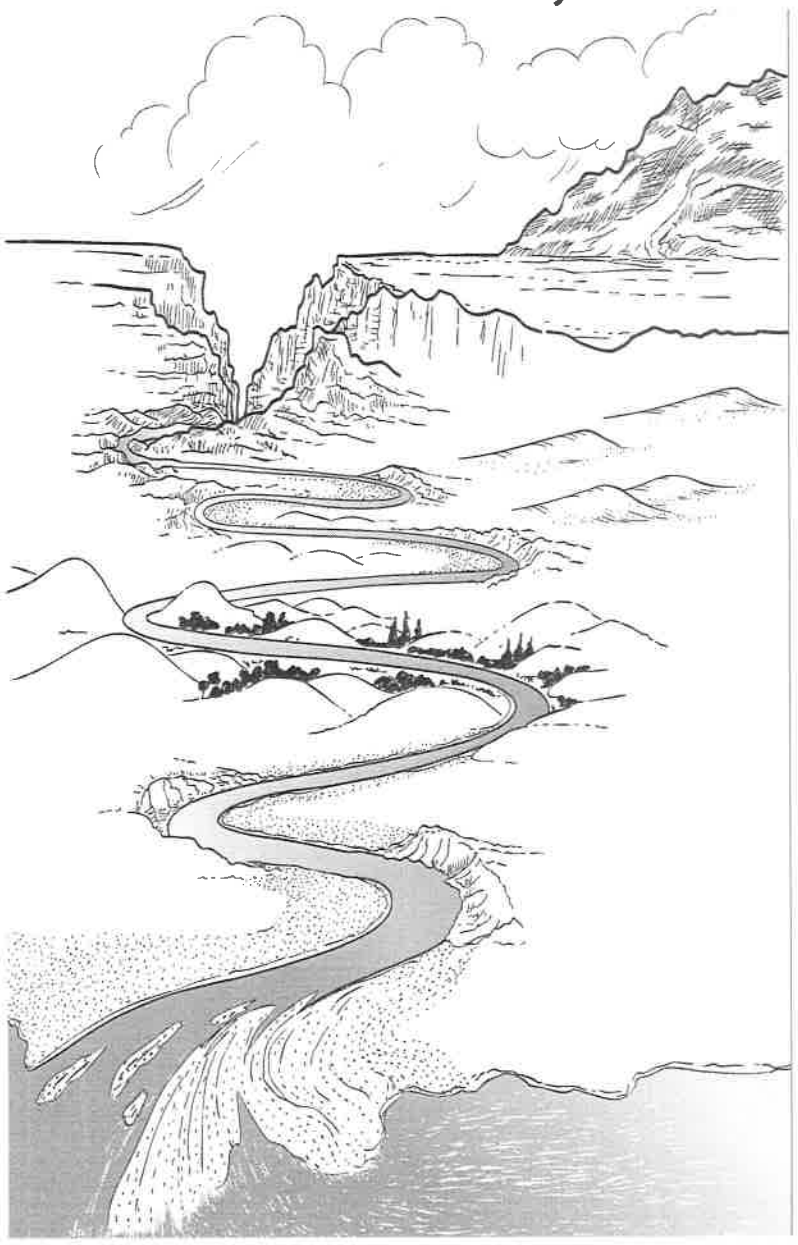
Soils, Rocks, and Landforms Module
Investigation 2: Landforms
No. 9—Notebook Master

Landform Vocabulary



Landform Vocabulary



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Soils, Rocks, and Landforms Module
Investigation 2: Landforms
No. 10—Notebook Master

Where are erosion and deposition happening in our schoolyard?

Where are erosion and deposition happening in our schoolyard?

Landform Definitions

Alluvial fan A fan-shaped deposit formed when a fast-flowing stream (often a flash flood) flows out onto a dry area

Canyon A deep valley with steep sides eroded by a river

Delta A fan-shaped deposit at the mouth of a river

Deposition The process by which eroded materials settle out in another place

Erosion The process by which water, wind, or ice carries away earth materials

Floodplain The land that gets covered by water from a stream or river during a flood

Hill A small mountain; lower and less steep than a mountain

Meander A curve or loop in a river

Mountain A high, uplifted area with steep slopes

Valley A low area between hills and mountains, often where a river flows

Landform Definitions

Alluvial fan A fan-shaped deposit formed when a fast-flowing stream (often a flash flood) flows out onto a dry area

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Soils, Rocks, and Landforms Module
Investigation 2: Landforms
No. 11—Notebook Master

Stream-Table Investigation

1. Investigation question:

_____

_____

2. Prediction:

_____

_____

3. Record the setup for the standard run:

Earth materials start at _____ centimeters.

Water source _____

Slope/no slope _____

One liter of water through the system.

4. Record the setup for the experimental run:

Earth materials start at _____ centimeters.

Water source _____

Slope/no slope _____

New variable _____

Amount of water through the system _____

Stream-Table Investigation

1. Investigation question:

_____

_____

2. Prediction:

_____

_____

3. Record the setup for the standard run:

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Water source _____

Slope/no slope _____

One liter of water through the system.

4. Record the setup for the experimental run:

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Water source _____

Slope/no slope _____

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Amount of water through the system _____

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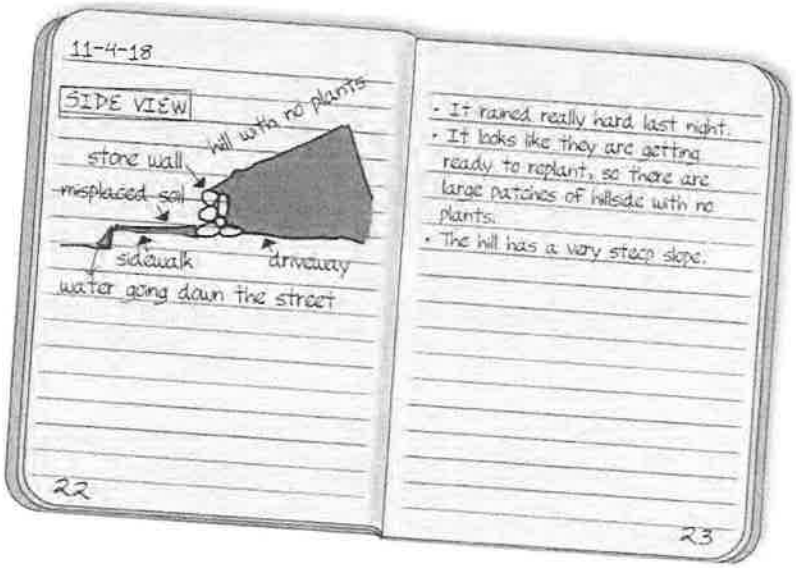
Soils, Rocks, and Landforms Module
Investigation 2: Landforms
No. 12—Notebook Master

Response Sheet—Investigation 2

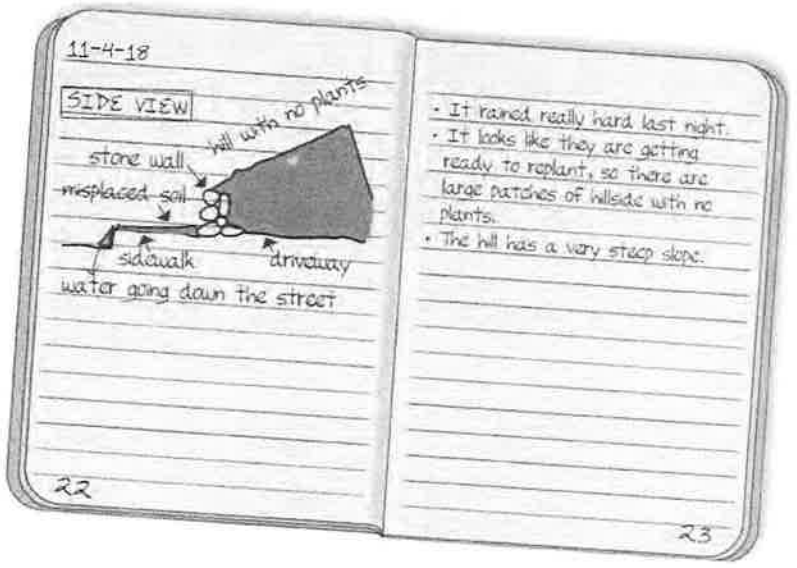
A student on his way to school one morning noticed a fan-shaped pile of rocky soil covering part of the sidewalk. It wasn't there the day before, and he wondered how it got there. He made a list of clues to help him solve the mystery.



Write a paragraph explaining what happened. How did the soil get onto the sidewalk? Where would you expect to find the largest pieces of soil and rock? Where would you expect to find the smallest pieces?

Response Sheet—Investigation 2

A student on his way to school one morning noticed a fan-shaped pile of rocky soil covering part of the sidewalk. It wasn't there the day before, and he wondered how it got there. He made a list of clues to help him solve the mystery.



Write a paragraph explaining what happened. How did the soil get onto the sidewalk? Where would you expect to find the largest pieces of soil and rock? Where would you expect to find the smallest pieces?

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Soils, Rocks, and Landforms Module
Investigation 2: Landforms
No. 13—Notebook Master

How do fossils get in rocks and what can they tell us about the past?

How do fossils get in rocks and what can they tell us about the past?

Modeling Fossils

1. You will need a small paper cup and a piece of modeling clay.
2. Soften the ball of clay using your hands to knead the clay. Place it into the cup and press it on the bottom of the cup to make a flat, smooth surface. This represents one layer of sediments settling into a basin.
3. Go to the materials station and choose a shell. Press the shell halfway into the clay to make an imprint or mold. Remove the shell when you're finished. This represents an organism that died and was buried in the sediments.
4. Now you're ready for the next layer of sediments. When everyone is ready, your teacher will mix a batch of plaster of paris and pour that over the top of the clay and your imprint. The plaster represents another layer of sediment settling over the first layer (the clay).
5. Next, you will let your fossil model sit for "a million years" (1 or 2 days). When the plaster is hard and dry, you will tear the cup away and look for the fossil cast left between the rock layers.

Modeling Fossils

1. You will need a small paper cup and a piece of modeling clay.
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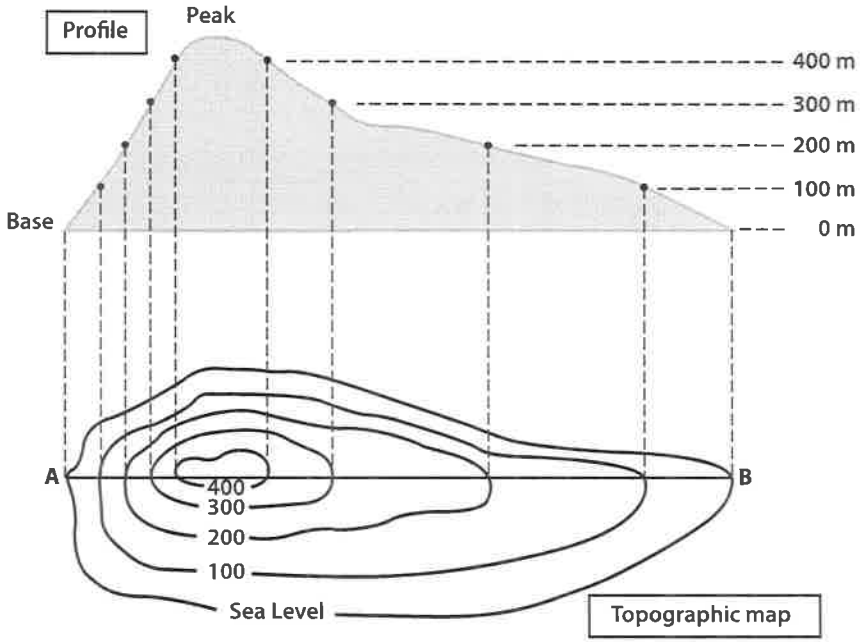
How can we represent the different elevations of landforms?

How can we represent the different elevations of landforms?

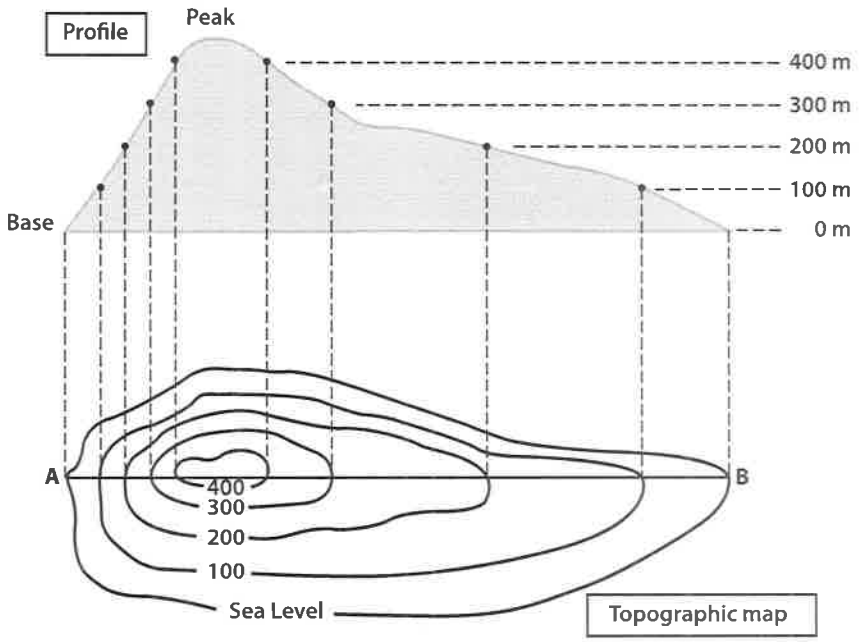
Contours and Intervals



The distance between contour lines on a topographic map is not always the same. But the contour interval (the difference in elevation between the lines) is always the same. The contour interval for this map is 100 m.

Contour lines that are spaced closer together represent a steeper slope.

Contours and Intervals



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Soils, Rocks, and Landforms Module
Investigation 3: Mapping Earth's Surface
No. 15—Notebook Master

How can we draw the profile of a mountain from a topographic map?

How can we draw the profile of a mountain from a topographic map?

Response Sheet A—Investigation 3

William and his uncle are planning a hike to Mallard Peak, a landform in a nearby park. They will park the car near the picnic area close to the highway and hike from there.

They have a topographic map of the area. They want to use it to plan the best route to the peak. They don't mind climbing up steep slopes and want to stop by a waterfall on the way up. They think it would be good to walk down a less steep slope at the end of the day.

Help William and his uncle out. Use the map on Response Sheet B to draw a trail that you suggest they take to get to the top of the peak and back again. Label the start and end points. Use arrows to show the direction they should hike.

On a blank page in your notebook, explain why you think the route you drew will be the best one.

Response Sheet A—Investigation 3

William and his uncle are planning a hike to Mallard Peak, a landform in a nearby park. They will park the car near the picnic area close to the highway and hike from there.

They have a topographic map of the area. They want to use it to plan the best route to the peak. They don't mind climbing up steep slopes and want to stop by a waterfall on the way up. They think it would be good to walk down a less steep slope at the end of the day.

Help William and his uncle out. Use the map on Response Sheet B to draw a trail that you suggest they take to get to the top of the peak and back again. Label the start and end points. Use arrows to show the direction they should hike.

On a blank page in your notebook, explain why you think the route you drew will be the best one.

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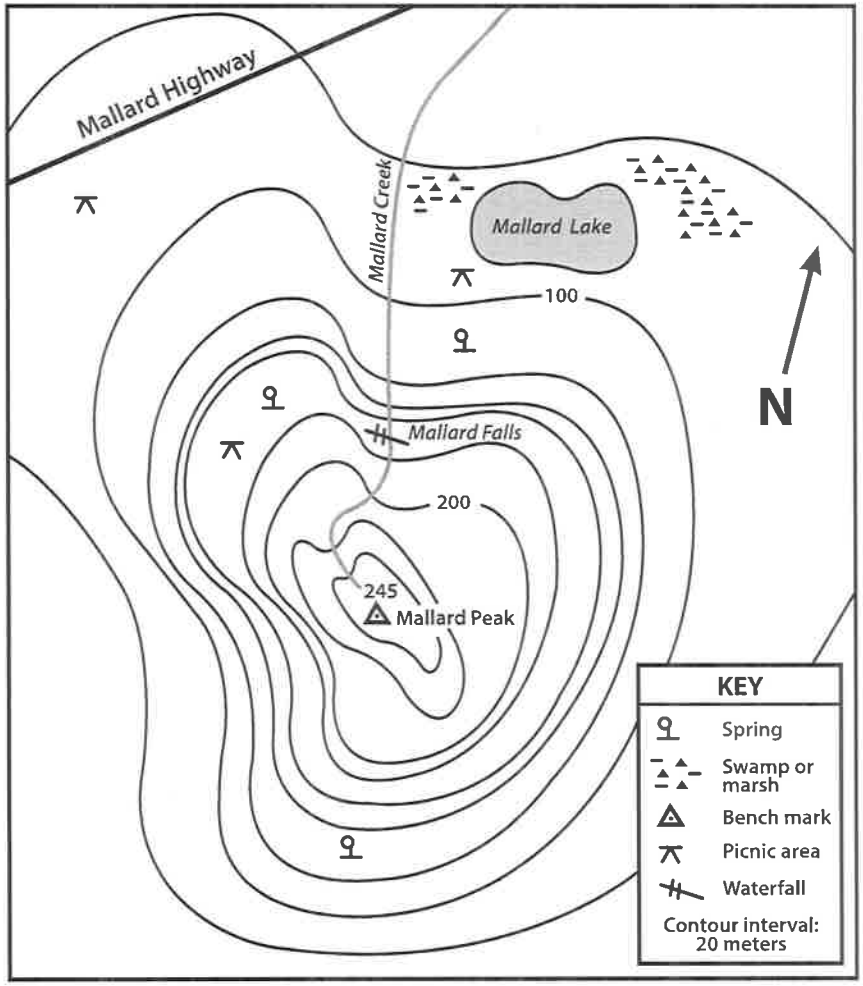
Soils, Rocks, and Landforms Module
Investigation 3: Mapping Earth's Surface
No. 16—Notebook Master

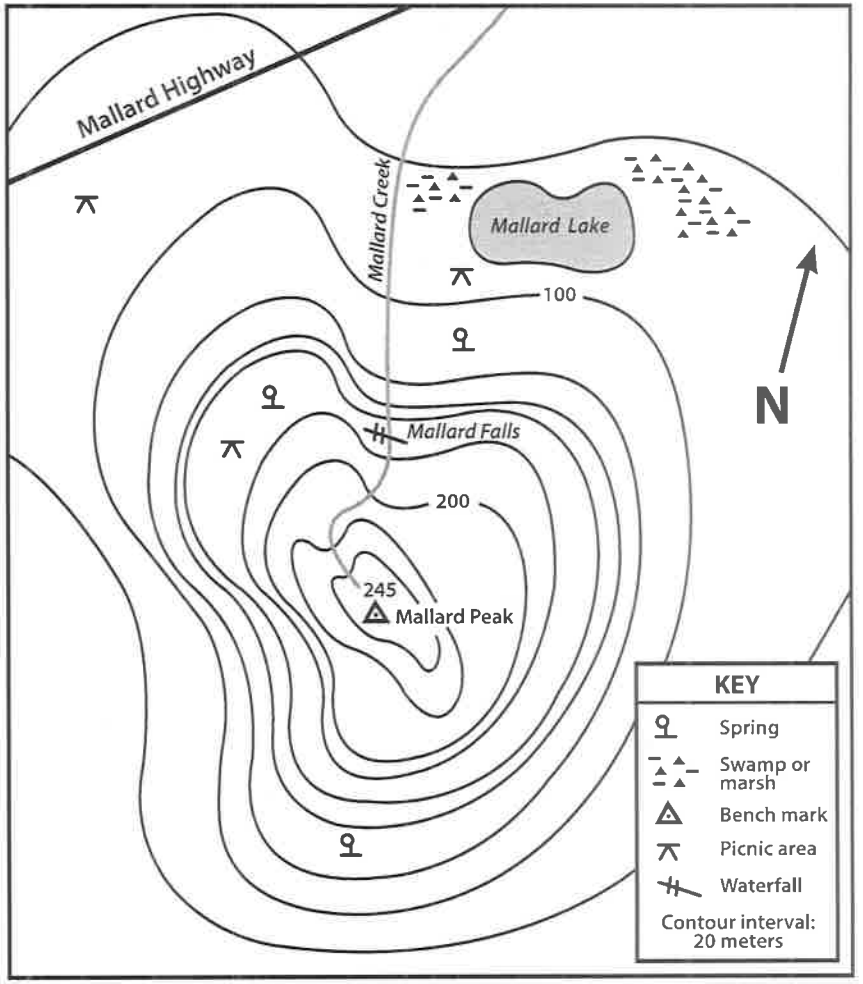
How can scientists and engineers help reduce the impacts that events like volcanic eruptions might have on people?

How can scientists and engineers help reduce the impacts that events like volcanic eruptions might have on people?

Response Sheet B—Investigation 3



Response Sheet B—Investigation 3



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Soils, Rocks, and Landforms Module
Investigation 3: Mapping Earth's Surface
No. 17—Notebook Master

What events can change Earth's surface quickly?

What events can change Earth's surface quickly?

What are natural resources and what is important to know about them?

What are natural resources and what is important to know about them?

Response Sheet—Investigation 4

A friend tells you that soil is a nonrenewable resource because it might take 500 years to produce 3 centimeters of topsoil. Do you agree that soil is a nonrenewable resource? Why or why not?

Response Sheet—Investigation 4

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Soils, Rocks, and Landforms Module
Investigation 4: Natural Resources
No. 18—Notebook Master

How are natural resources used to make concrete?

How are natural resources used to make concrete?

How do people use natural resources to make or build things?

How do people use natural resources to make or build things?