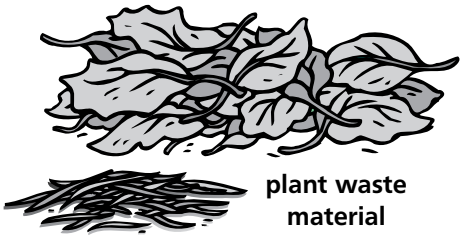
Chapter Science Investigation Name _____

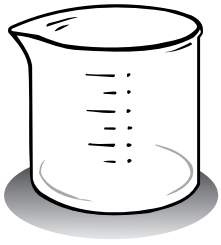
Making a Compost Pile

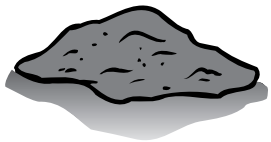
What You Need


fruit and vegetable scraps


plant waste material


gardening gloves


500-mL beaker


high-nitrogen fertilizer


shovel


large plastic trash can with lid


water in a watering can

Find Out

Do this activity to see how new soil is made.

Process Skills

Hypothesizing
Measuring
Observing
Communicating

Time

- One hour the first day
- 15 minutes every two weeks for eight weeks

What to Do

1. Write a **hypothesis** about what you think will happen when organic material is left to break down.

2. Bring scraps of fruits and vegetables to school. The vegetables can be raw or cooked, but be sure they do not contain any oil or grease. Do not bring scraps that include meat.

   Safety! ***Be sure there is adult supervision when sharp objects are used.***

3. Have your teacher punch 20 or 30 holes in the sides and top of the trash can. This is so your compost has good air circulation.

4. Find a warm, sunny spot outside for your trash can. Fill the bottom with bulky, lightweight plant material. Use dead leaves, grass clippings, sawdust, or shredded newspaper.

   Safety! ***Wear gloves when handling plant material.***

5. Put the scraps in the can and cover with more plant material.

6. Have your teacher **measure** 500 mL of the fertilizer and add it to the trash can. Add just enough water to moisten the mixture.

7. Use the shovel to mix the compost mixture well. Put the lid on and leave the can.

8. Check your compost in one week. The center of the pile should be warm. **Record** your **observations.**

Safety! ***Don't touch the compost with your hands. Hold your hand above it to see if you can feel the heat.***

9. Every two weeks, have your teacher help you use the shovel to turn the pile over. What's on top of the pile needs to be moved to the center so it can decay. Keep the pile damp, but not wet. **Observe** how the pile changes from one turning to the next.

10. Compare your **hypothesis** with your observations. Was your hypothesis correct?

Hypothesis: What do you think will happen in your compost pile?

Student hypotheses will vary.

Changes in a Compost Pile	
Time	**Observations**
After 1 week	Students may need more than eight weeks to see real changes in the compost pile.
After 2 weeks	
After 4 weeks	
After 6 weeks	
After 8 weeks	

Conclusions

1. How did your compost pile change during the first week?
It should be warm and moist in the center.

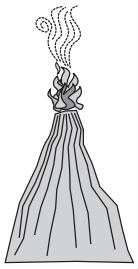
2. How was it different at the end of the second week?
The organic matter has started to break down.

3. What natural factors work together in the process of producing compost?
air, water, warm temperatures, and microorganisms

New Questions

1. What could compost be used for?
Add it to your garden; use it for potted plants; and use it for landscaping around trees and bushes.

2. Write a new question you have about making compost.
Accept any reasonable questions.



Name _____

ACTIVITY

Classifying Rocks

Record your **observations** in the table below.
Students may need to make more charts to record all of the rock samples.

Name of Rock	Drawing of Rock	Description

Name _____

Conclusions

1. Did you change your original groupings? Why or why not?
Students should support their classification schemes. Accept all reasonable answers.

2. Are your groups like your classmates' groups? Is there only one way to group the rocks? Explain.
Classifications can vary depending on the properties observed.

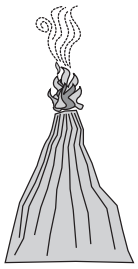
3. Did some rocks fall into more than one category? Yes.
Why or why not?
Answers will vary. Example: A rock could have the same texture as one type of rock, but the same color as a different type of rock.

Asking New Questions

1. **Explain** why you grouped your rocks the way you did. What characteristics did you look for?
Answers will vary. Accept all reasonable answers.

2. What other characteristics could you look for?
Make sure answers include texture, color, and composition.

3. After looking at the different properties of the rocks, try to **describe** how each rock could have been formed.
Accept any reasonable answer. Granite, obsidian, pumice, and basalt are igneous rocks. Slate, marble, gneiss, and schist are metamorphic rocks. Shale, sandstone, and limestone are sedimentary rocks.



Name _____

ACTIVITY

Naming Minerals

Record your **observations** on the chart below. Students should make more charts as needed for the samples used. Have students compare and discuss their findings.

Mineral	Luster	Streak Color	Heaviness	Softness/ Hardness Rank
	Student observations will vary.			

Name _____

Conclusions

1. Did any minerals produce a surprising streak?
Answers may vary depending on samples. Yellow-gold pyrite has a greenish-black streak. Silvery hematite leaves a reddish-brown streak.

2. Which samples stood out as being heavy? Can you suggest a reason why this might be?
Answers may vary depending on samples. Pyrite, hematite, galena, and feldspar are heavier due to the presence of metals.

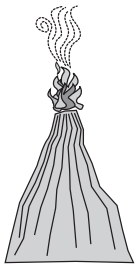
3. Which sample was the hardest? Which was the softest?
Answers will vary depending on samples. Quartz is hardest; talc is softest.

4. Which samples could be scratched by a fingernail? By a penny? By the steel file? Which could scratch glass?
Talc, gypsum, mica, halite, and galena can be scratched by a fingernail. These, plus calcite, can be scratched by a penny. Fluorite can be scratched by a steel file. Hematite, orthoclase, quartz, and pyrite can scratch glass.

Asking New Questions

1. Which tests seemed to be best for classifying minerals? Which tests were not so good?
Students should support their responses. It might be hard to determine which mineral produces the scratch. Streaks sometimes look like scratches.

2. Why are some of these minerals harder than others?
Accept all reasonable hypotheses. Students may infer that mineral formation and internal arrangement of a mineral's atoms are directly related to hardness.



Name _____

ACTIVITY

Testing Soil Characteristics

Record your **observations** in the table below.

Students should make more charts as needed for the samples used. Have students compare and discuss their findings.

Soil Sample	Characteristics	Which Soil Is Harder?	Soaking Time
1			
2			

Name _____

Conclusions

1. What similarities and differences did you find between the two soil samples?
Answers will vary. Students should address each of the characteristics they were to observe.

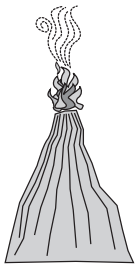
2. Where was water absorbed more quickly?
Answers will vary depending on the soil samples.

3. Remember the results when you poked the soil at each spot with your pencil. Do you think there is a relationship between soil characteristics and water absorption? Explain.
A hard, compacted soil will not absorb water as quickly as a loose, airy soil.

Asking New Questions

1. **Explain** the relationship between your findings and the growth (or lack of growth) of plants at the soil locations.
Answers will vary depending on the soil samples. Plants grow less well in hard, compacted soil because their roots cannot penetrate the soil to obtain enough moisture.

2. How might you get grass to grow better on bare spots where little grass grows?
Loosen up the soil to allow air and moisture to penetrate. Add sandy soil if the soil sticks together too much. Add clay if it doesn't hold together enough.



Name _____

ACTIVITY

Modeling Earth's Limited Resources

Draw a circle and divide it to show the different parts of your model. Try to keep the same proportions as your clay model.

Student drawings should show approximately $\frac{3}{4}$ of the circle as water, $\frac{1}{4}$ as land. Students may also show that of the land portion, $\frac{1}{32}$ is farmable land.

Name _____

Conclusions

1. Why are there more yellow sections than green sections?
Not all land on Earth can grow crops. Some soil is too wet, too dry, or too rocky.

2. Why should we try to conserve topsoil for growing crops?
The land available for farming is limited, and we should not waste it.

3. On which section of your model do you live?
Answers will vary, but most people live on one of the yellow wedges or on the green wedge.

Asking New Questions

1. Where else on Earth could people look to produce food?
Accept any reasonable answers. Possible answer: in the oceans; some people eat seaweed—maybe more people can learn to use products from the ocean.

2. What can we do to keep the green part of Earth from getting even smaller?
Answers will vary. Some might include planting windbreaks to stop wind erosion, rotating crops to return nutrients and minerals to the soil, and composting to add organic matter to the soil.