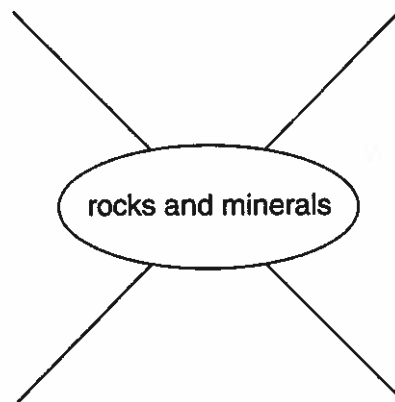


Name: \_\_\_\_\_

## Rocks and Minerals Mind Map

Fill in the mind map below with all of the information that you know about rocks and minerals. You will be returning to the mind map throughout the chapter to add any new information that you learn.



Name: \_\_\_\_\_

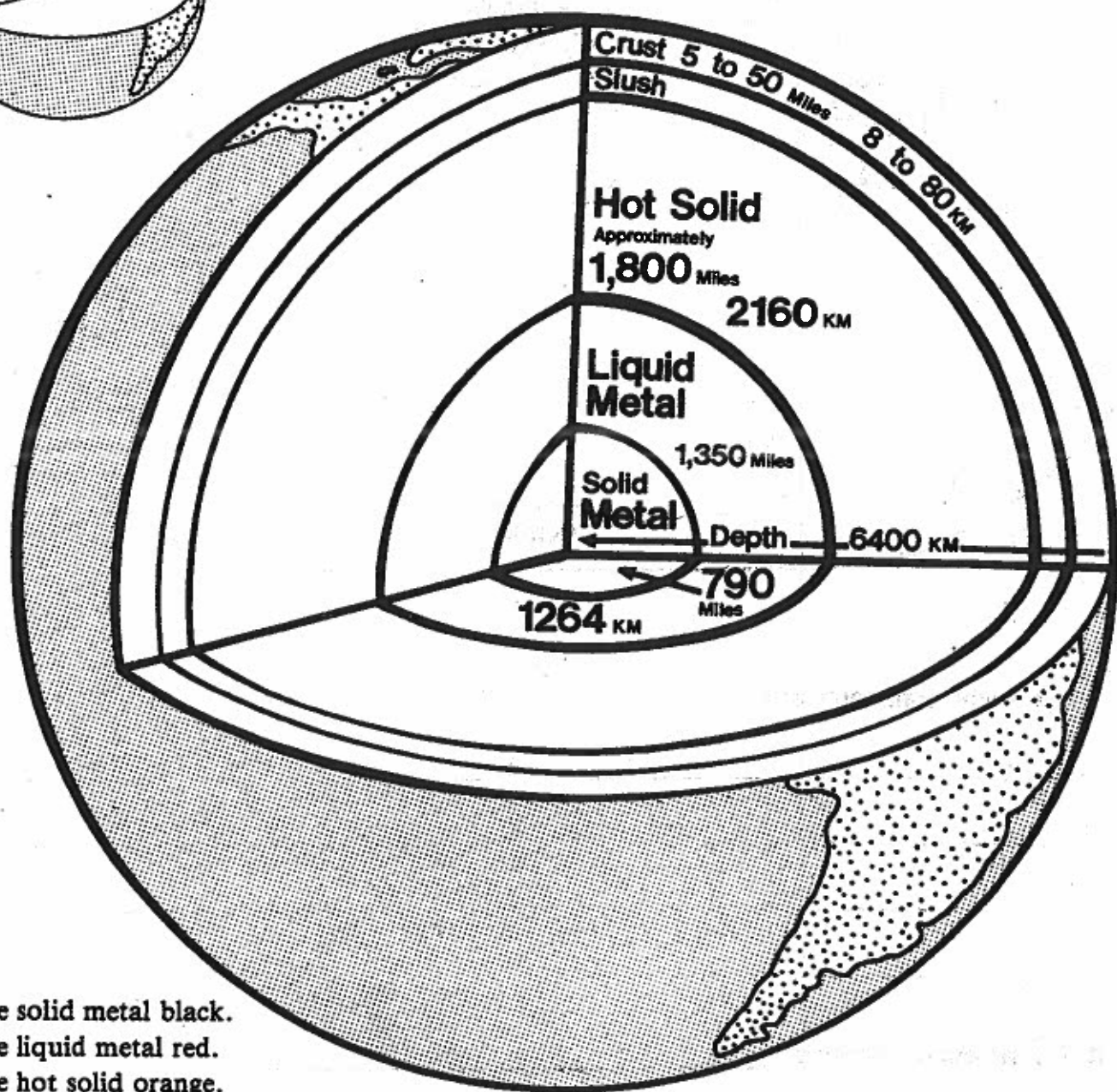
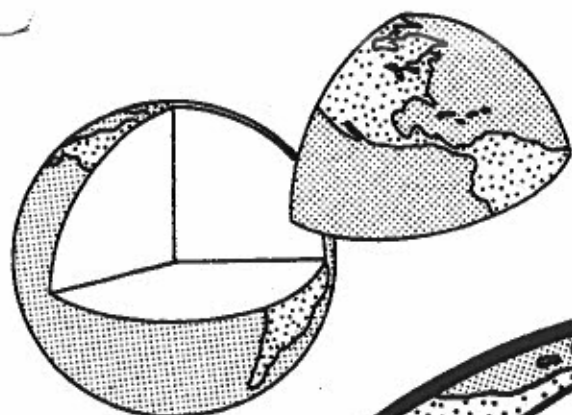
## Amazing Rock Formations

Use the table below to record the places where you have seen interesting rock formations. Then include an explanation of why these formations stand out in your mind, along with a description and any other information about it that you know.

<b>Rock Formation Location</b>	<b>Why It Stands Out</b>	<b>Description</b>	<b>Other Information</b>

# INSIDE THE EARTH

The center of the earth is very hot because of all the pressure on it. The deeper it is, the hotter it gets. Rocks that are 100 kilometers or so deep are melted. Metals like iron, silver, tin, and gold are melted, too. The pressure near the center of the earth is so great that metal which is hot enough to be melted is pressed into a solid in spite of its heat.



- Color the solid metal black.
- Color the liquid metal red.
- Color the hot solid orange.
- Color the surface blue where there's water.
- Color the slush yellow.
- Color the crust brown.
- Color the surface green where there's land.

# Recycling Rocks



**Igneous**  
Rock formed from melted igneous, sedimentary, or metamorphic rock.



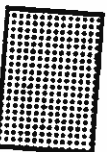
**Metamorphic**  
Igneous, sedimentary, or metamorphic rock which has been changed by heat and pressure.

**Sedimentary**

Rock made from compressed pieces of sediment.



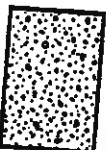
Recycling the Earth's Crust



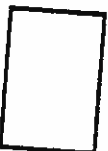
Metamorphic rock



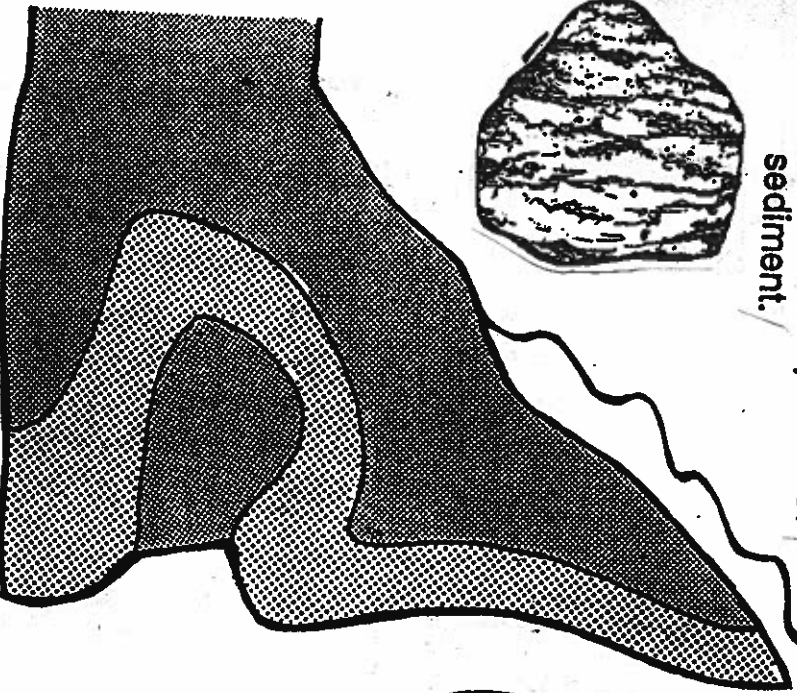
Igneous rock



Sedimentary rock



Lava (melted rock)

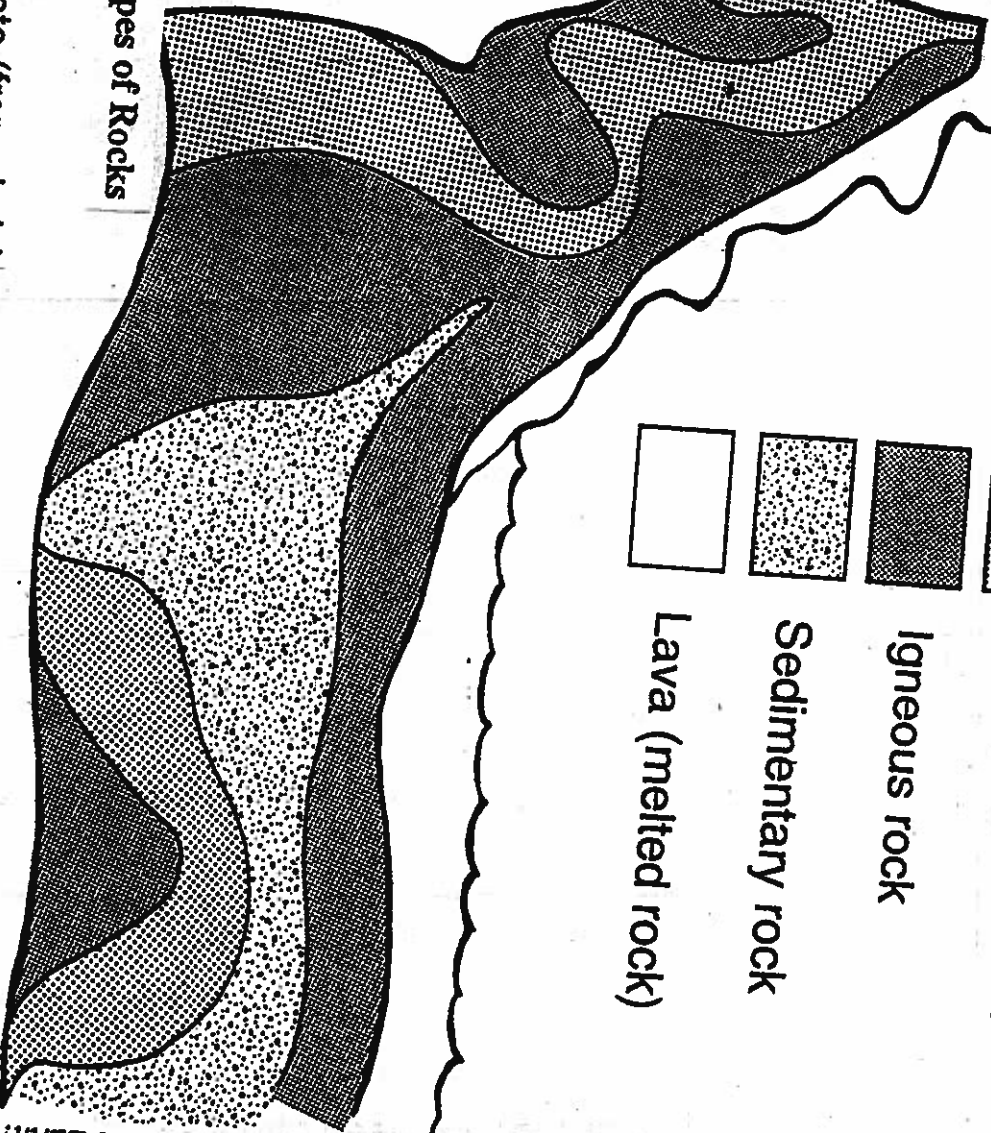


Examples of the Three Types of Rocks

Igneous—obsidian, pumice, and granite

Metamorphic—marble (from limestone) and slate (from shale)

Sedimentary—sandstone, limestone, and shale



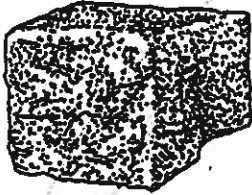
What Is Inside the Earth?

Note: Quartz is found in all three of these types of rocks.

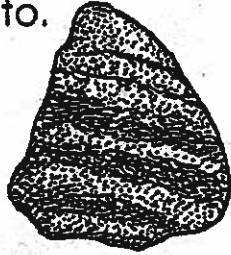
# Recycling

Name \_\_\_\_\_

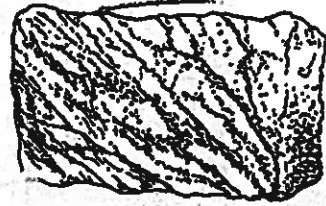
There are three main groups of rock: igneous rock, metamorphic rock, and sedimentary rock. Each of the rocks pictured on this page belongs to one of these groups. Fill in the definitions. Then, in the space below each picture, tell which group each rock belongs to.



granite



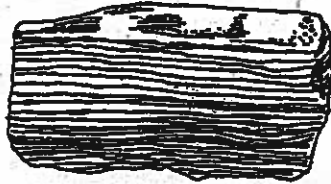
gneiss



marble



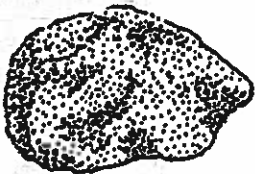
limestone



shale



basalt



sandstone



slate



obsidian



conglomerate

Kind of Rock	Definition
Igneous	
Sedimentary	
Metamorphic	

## WORD BANK

Match

## DEFINITIONS

igneous  
metamorphic  
sedimentary

layers of loose material which solidified  
cooled magma  
rock that has been changed into a  
new rock

Name \_\_\_\_\_ Date \_\_\_\_\_

## Everyday Uses for Rocks

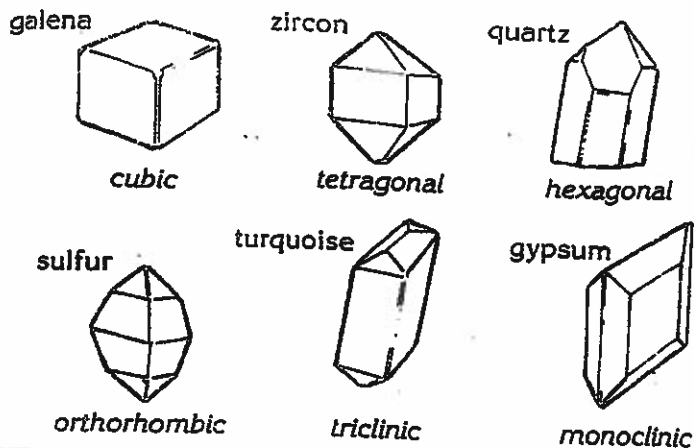
Directions: Match the rock or mineral on the left with its use on the right.  
Write the letter on the blank.

- |                      |  |
|----------------------|--|
| _____ 1. pyrolusite  | A: used in roofing and ceramics; helps plants to grow; a family of rocks   |
| _____ 2. talc        | B: used in fireworks, matches, and stink bombs; found naturally in eggs; yellow color                                    |
| _____ 3. malachite   | C: contains manganese that is used in railroad tracks and purple glass; named for fire                                   |
| _____ 4. dolomite    | D: ore of aluminum; the aluminum is used in cans and airplanes; forms in round shapes called concretions                 |
| _____ 5. feldspar    | E: ore of zinc; the zinc is used in pennies; looks like other rocks  |
| _____ 6. coal        | F: used in pencils and to unstick locks; related to diamonds   |
| _____ 7. marble      | G: used to make statues and in grand buildings; India's Taj Mahal is made from it  |
| _____ 8. sulfur      | H: used as a food preservative and to melt ice on roads; it's salt   |
| _____ 9. bauxite     | I: used in talcum powder to keep babies dry and for fingerprint dusting; very soft                                       |
| _____ 10. sphalerite | J: used in paint, jewelry, and fancy boxes; ore of copper; green   |
| _____ 11. halite     | K: used to make electricity; once burned in stoves; light in weight  |
| _____ 12. graphite   | L: used in cinder blocks and concrete; there are mountains in Italy made mostly of this rock; sometimes it's fluorescent |

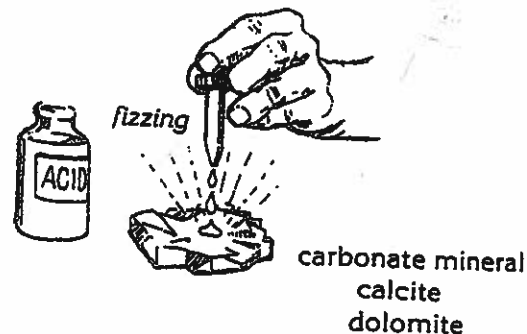
# Minerals and Their Identification

Minerals are natural substances that have definite crystal structure and chemical composition

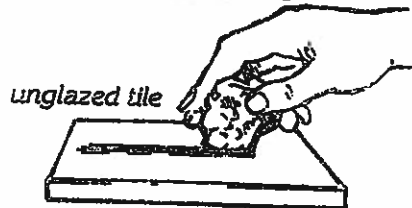
## Crystal Shape



## Acid Test



## Streak Test



### Streak Color

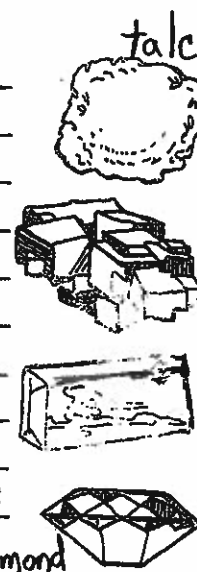
lead gray  
green  
yellow-brown  
red-brown  
black-green  
scarlet  
light blue

### Mineral

galena  
olivine  
limonite  
hematite  
pyrite  
cinnabar  
azurite

## Hardness Test

1. \_\_\_\_\_ softest
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_ hardest



1. Write the names of the ten minerals in the correct order on the hardness scale at the top of the page.
2. How can the streak test be used to identify the two iron minerals, limonite and hematite? \_\_\_\_\_
3. Both calcite and quartz can be found as clear crystals. What tests can be used to correctly identify them? \_\_\_\_\_
4. a. What is the softest mineral? \_\_\_\_\_  
b. What is the hardest mineral? \_\_\_\_\_
5. Which mineral has a cubic crystal shape and a lead gray streak? \_\_\_\_\_
6. Glass has a hardness of about 5.5. Which minerals will scratch it? \_\_\_\_\_

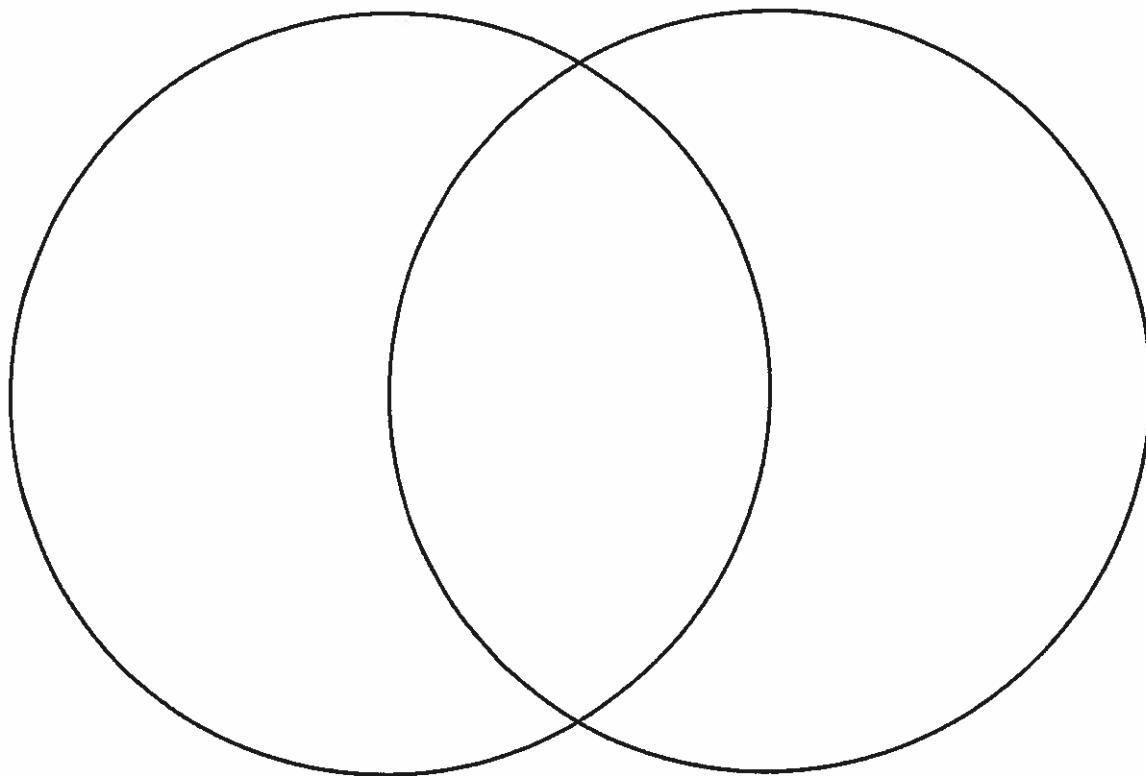
Name: \_\_\_\_\_

## Grouping Rocks and Minerals

A table is one way to group rocks and minerals. A Venn diagram is another way to show the similarities and differences between them. Use one or both methods to group your rocks and minerals.


Rocks

Minerals





**SOLIDS, LIQUIDS & GASES****MATTER AND PHYSICAL PROPERTIES**

A **solid** is a form of matter which keeps a definite shape. The molecules in a solid are always moving, just as they are in liquids and gases. The molecules in a solid are closer together and move more slowly. Most solids have molecules arranged in patterns like crystals. That is why solids are rigid and keep their shapes. Solids can change shape by having a force act on them such as hammering, sawing, and drilling.

Solids can be described and identified by their **physical properties**: color, texture, hardness, odor, and luster (how they reflect light).

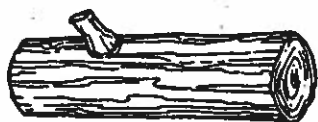
Describe a piece of classroom chalk by its physical properties.

Determine those physical properties by using your senses.

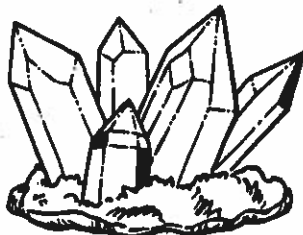
solid	color	texture	hardness	odor	luster
chalk					

Choose two other solids and describe them this way.

Some physical properties of solids can be determined by using special tools and laboratory tests. A magnet can be used to find out if metals are magnetic. The melting point of a substance is a physical property. Many substances have very high melting points, which help to identify them. Substances must be heated in a laboratory to reach high temperatures. Each kind of substance has a definite specific gravity, a number which compares the weight of its volume with an equal volume of water. A solid which cannot be identified by its physical properties can be identified by its chemical properties. Chemical properties can be determined by testing in a chemistry laboratory.



wood



quartz

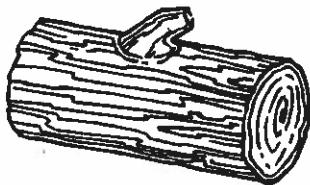


copper

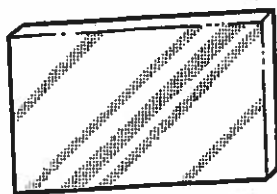
# SOLIDS AND PHYSICAL PROPERTIES

Determine these physical properties of matter by using your senses. Write a word to describe each picture. Check your science text, if necessary

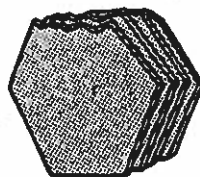
## TEXTURE



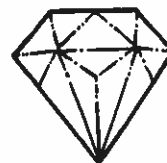
tree bark



glass



mica



diamond

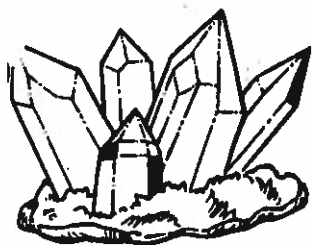
1. \_\_\_\_\_

2. \_\_\_\_\_

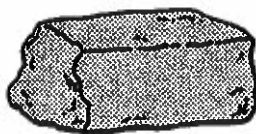
3. \_\_\_\_\_

4. \_\_\_\_\_

## LUSTER



quartz



clay

5. \_\_\_\_\_

6. \_\_\_\_\_

## ODOR



sulfur

7. \_\_\_\_\_

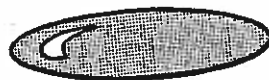
## COLOR



gold



coal



mercury



copper

8. \_\_\_\_\_

9. \_\_\_\_\_

10. \_\_\_\_\_

11. \_\_\_\_\_

# Properties challenge

name: \_\_\_\_\_

**Directions:** look around the classroom to identify what item or material is being investigated. Follow the properties clues.

1. State: solid
2. Colour: red and white
3. Texture: smooth, silky, flat and 2 dimensional
4. Hardness: not hard, flimsy, made of strong fibers, is a material
5. Odor: none
6. Luster: not shiny, is dull, not see through

Take 3 guesses of what I could be:

- 1.
- 2.
- 3.

**Your turn:** Pick something in class and provide clues for partner:

1. State:
2. Colour:
3. Texture:
4. Hardness:
5. Odor:
6. Luster:

Get partner to take 3 guesses from your clues

## Properties of Matter and Materials

Sample name and illustration	State: solid, liquid, or gas	Colour:	Texture	Hardness	Odor (smell)	Luster or shine

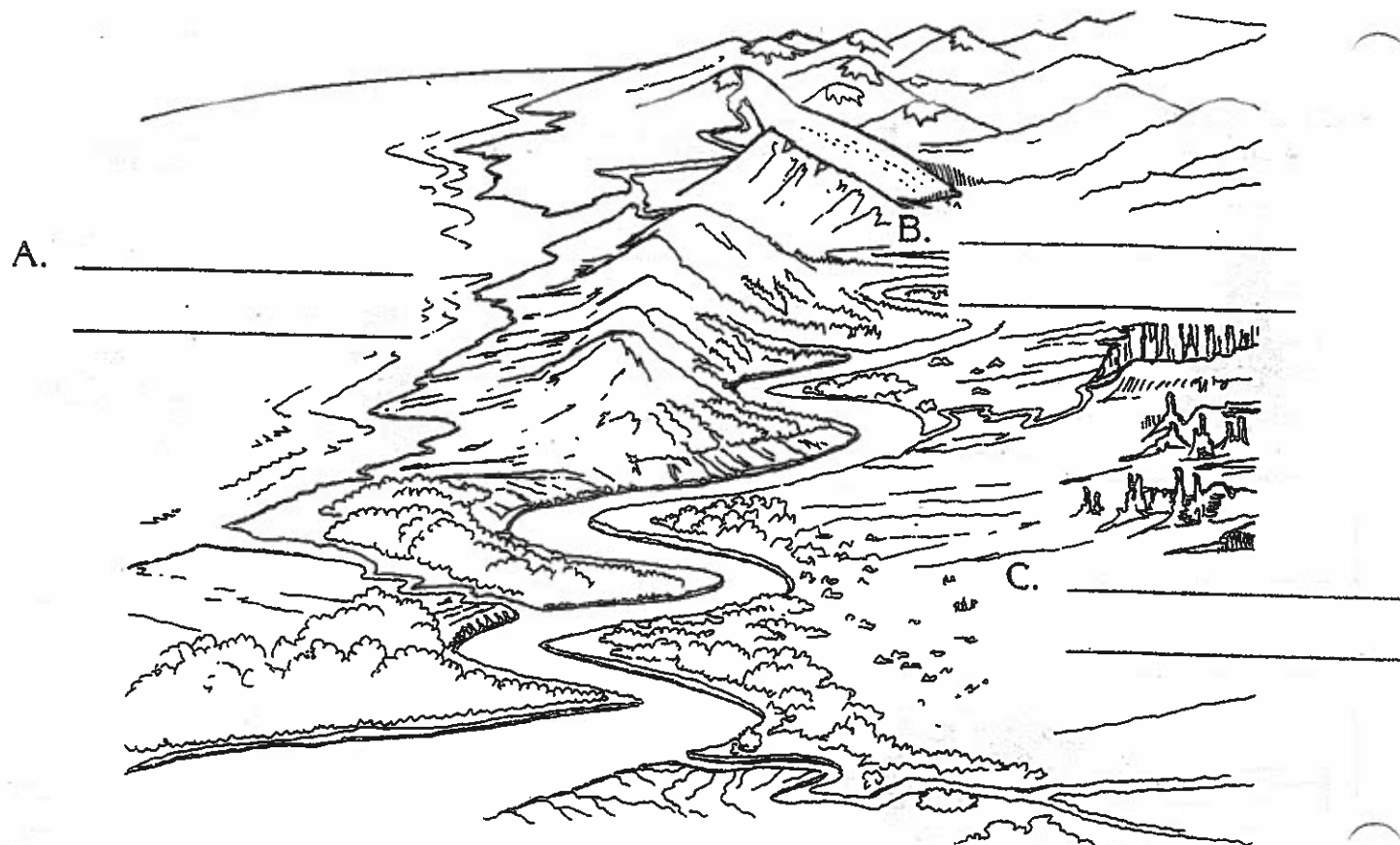
Observations: compare the three forms of matter. Why is their properties important for the purposes for which they are used?

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# Erosion

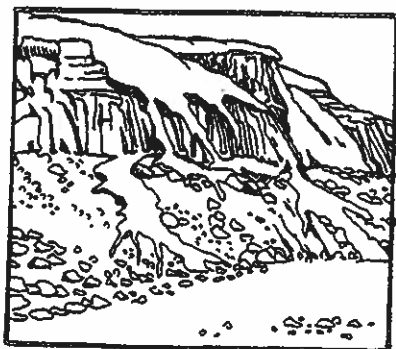
*Erosion* is the continuous wearing away of land by wind, water, and ice.



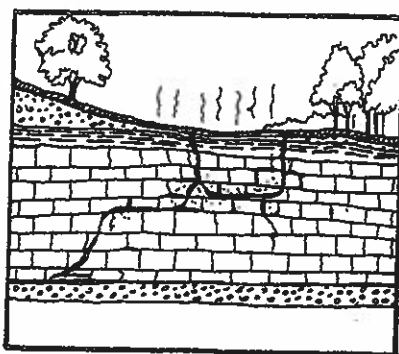
1. On lines A, B, and C write in the names of the three agents of erosion. Then name a geological feature associated with each type.
2. a. Which agent is responsible for most erosion action? \_\_\_\_\_  
 b. Name the two major kinds of this type of erosion action. \_\_\_\_\_
3. Which erosional agent is responsible for each of these geological features?
  - a. Garden of the Gods, Colorado \_\_\_\_\_
  - b. Mississippi River delta \_\_\_\_\_
  - c. Florida ocean beaches \_\_\_\_\_
  - d. glacier valleys \_\_\_\_\_
  - e. dunes in White Sands National Park, New Mexico \_\_\_\_\_
4. Describe how blowing sand can cause erosion. \_\_\_\_\_  
 \_\_\_\_\_
5. How can erosion by flooding water be prevented? \_\_\_\_\_  
 \_\_\_\_\_

Explain why sloping land erodes more easily than flat land. \_\_\_\_\_  
 \_\_\_\_\_

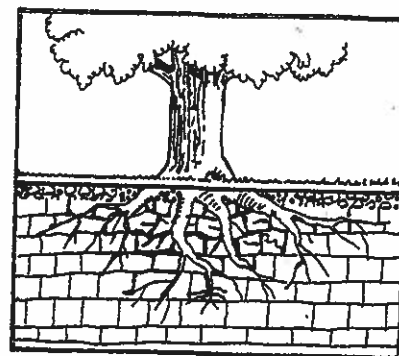
# Weathering



A. \_\_\_\_\_



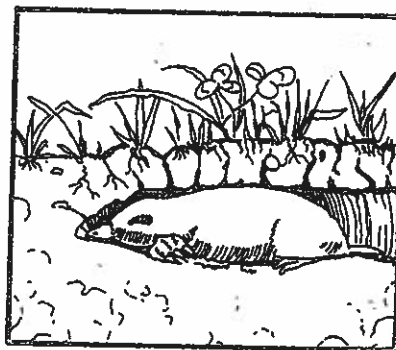
B. \_\_\_\_\_



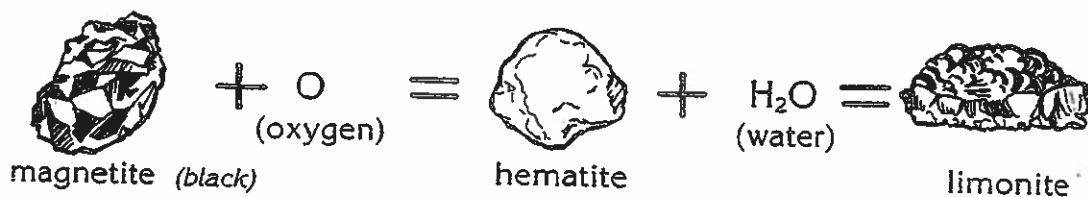
C. \_\_\_\_\_



D. \_\_\_\_\_



E. \_\_\_\_\_



F. \_\_\_\_\_

G. (\_\_\_\_\_)

H. (\_\_\_\_\_)

1. Locate and label on lines A—F the following weathering processes:  
 wedging of plant roots      lichen growth      frost action      oxidation  
 burrowing animals              carbonic acid result
2. On lines A—F, after each process write M if the process is mechanical weathering or C if it is chemical weathering.
3. On lines G and H write in the color of the oxidized rocks.
4. Fill in the missing words: The breaking of rocks into smaller pieces is called \_\_\_\_\_ . Three natural forces that can cause the breaking of rocks into smaller pieces are \_\_\_\_\_ , \_\_\_\_\_ , and \_\_\_\_\_ .
5. A rock begins to \_\_\_\_\_ as soon as it is exposed to the weather.

Name \_\_\_\_\_

Date \_\_\_\_\_

For the student:

1. Write a good definition for each of these words:

weathering \_\_\_\_\_

erosion \_\_\_\_\_

deposition \_\_\_\_\_

2. What are three agents of erosion?

3. What evidence do scientists have that erosion works slowly over long periods of time?

4. What is an example of erosion that works very rapidly?

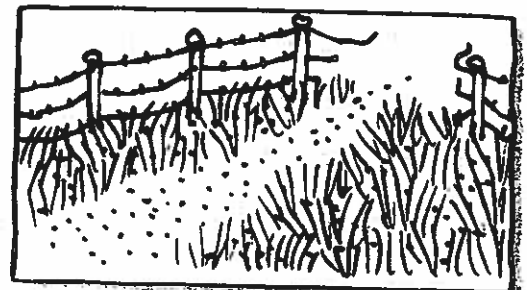
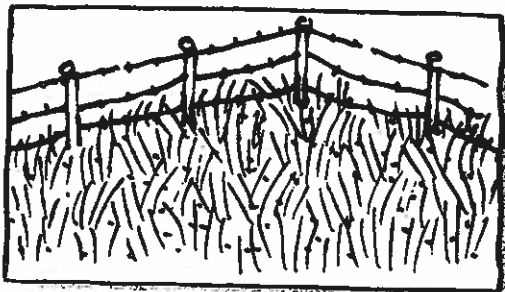
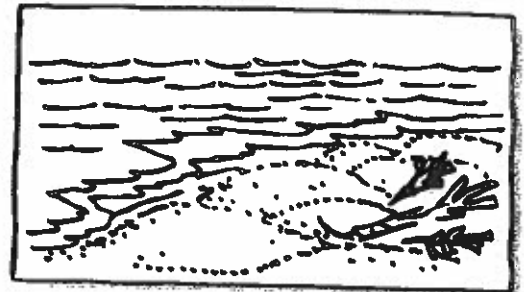
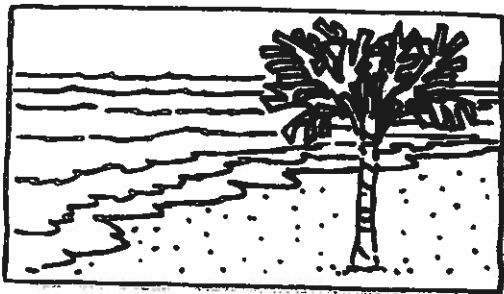
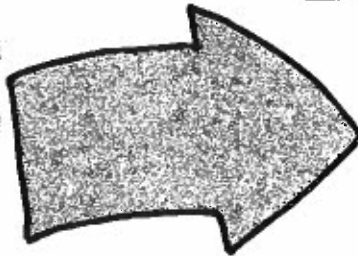
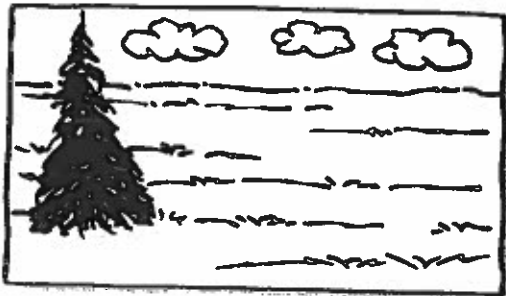
5. What are some devastating results of a flood for the area's inhabitants?



Name \_\_\_\_\_

- erosion • weathering
- deposition

## What Caused the Change?





Name: \_\_\_\_\_

## Comparing Weathering and Erosion

In the two-column table below, compare and contrast weathering and erosion. Think about how each of these processes impacts the world around you. Use the information from pages 178 and 179 in your student book to help you complete the table.

Weathering	Erosion

Name: \_\_\_\_\_

## How Is Soil Different?

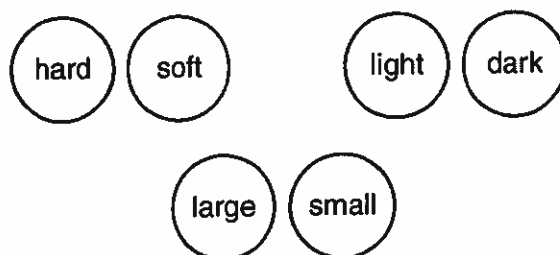
Over time, rocks break down into smaller pieces. Along with other materials, these small pieces of rocks form soil. How does soil differ from place to place?

### What You Need

- newspaper
- soil samples from different places
- tweezers
- marker

### What You Will Do

1. Cover your work area with newspaper.
2. Choose one of the soil samples and spread it out on the newspaper.
3. Think about ways you could sort the soil particles into two groups. Draw two circles on the newspaper with a marker and label them to show how you plan on sorting. You could choose one of the following pairs of describing words, or you could come up with your own way to sort the soil particles.



4. Use tweezers to move the pieces of soil into the appropriate circle.
5. Repeat these steps for another soil sample. Choose a soil sample that looks different from the first one you chose.

### What Did You Find Out?

1. How are the soil samples the same? How are they different? Write your observations.

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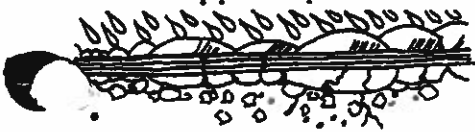
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# Soil

Soil, composed of weathered rock and humus, is the material on the earth's crust that supports plants.



Rain, ice, thawing, and freezing break down rocks and some mineral particles.



Simple plants and animals begin to live on weathered rock.



Lichens produce acid; organisms die and deposit organic matter (humus).



Top layer of soil is formed and is able to support plant roots.



Cover of vegetation is formed; soil contains minerals.

Soil conservation is essential for man's survival today and in the future.

## Ways to Conserve Soil

### Contour plowing

Cultivated rows run sideways, rather than up and down, on hillsides. This slows down the water as it flows down hillsides.

### Strip cropping

Different crops are grown on the same piece of land. A large area of corn grows next to a large area of ground cover (alfalfa). The next year the crops grown in these areas are reversed. The ground cover crop catches and holds any soil washed away from the other crop.

### Terracing

Step-like ridges are built, arranged sideways on a hill. This holds and slows down water and soil being carried away.

### Shelter belt

Rows of trees are planted close together to help force wind movement upward, away from the ground.

1. Soil is made of \_\_\_\_\_ and \_\_\_\_\_.
2. Name three weathering forces that help change rocks into soil. \_\_\_\_\_
3. Fill in the missing words: The remains of dead plants and other organisms are called \_\_\_\_\_. Plants grow well in soil containing a rich supply of \_\_\_\_\_. Simple plants that produce a rock-breaking acid are called \_\_\_\_\_.
4. Name three ways food growers can save our soil through conservation. \_\_\_\_\_  
\_\_\_\_\_
5. Which form of soil conservation would be suited for:  
a large area of windy, level, open plains? \_\_\_\_\_  
holding water for growing rice on the side of a hill? \_\_\_\_\_
6. Why is it essential that soil conservation be practiced throughout the world? \_\_\_\_\_  
\_\_\_\_\_

Name: \_\_\_\_\_

## Methods to Prevent Erosion

Use the organizer below to record the information you find while researching methods to prevent erosion used around the world.

Location/Country	Method Used to Prevent Erosion (Draw Or Describe)	How Does This Method Prevent Erosion?

## Lab : Observing Borax Snowflakes as Minerals

Date: \_\_\_\_\_ Name: \_\_\_\_\_

**Purpose:** To observe, compare and describe the properties of crystal formation in minerals by creating a snowflake made of borax soap and hot water.

**Hypothesis:** I predict that crystals will form on a pipe cleaner when mixing with borax soap with boiling water.

### Materials:

-a pipe cleaner	-pencil	-1 cup of boiling hot water
-large glass jar	-string	-3 tablespoons of borax soap
(wide mouth jar)	-food colouring	-measuring spoons/cups

### Procedures:

- 1) The first step of making borax crystal snowflakes is to make the snowflake shape. Cut a pipe cleaner into three equal sections.
- 2) Twist the sections together at their centers to form a six-sided snowflake shape. The snowflake should fit inside the jar.
- 3) Tie the string to the end of one of the snowflake arms. Tie the other end of the string to the pencil. You want the length to be such that the pencil hangs the snowflake into the jar.
- 4) Fill the wide mouth jar with 1-3 cups of boiling water.
- 5) Add borax, 1 tablespoon (1 per cup of water) at a time to the boiling water, stirring to dissolve after each addition. It is okay if some of the borax is undissolved at the bottom.
- 6) Add 2 drops of food colouring.
- 7) Hang up the pipe cleaner snowflake into the jar so that the pencil rests on top of the jar and the snowflake is completely covered with liquid and hangs freely without touching the sides of the jar.
- 8) Allow the jar to sit undisturbed location overnight.
- 9) Refer back to your hypothesis and in your conclusion restate whether your prediction was correct.

### Conclusion:

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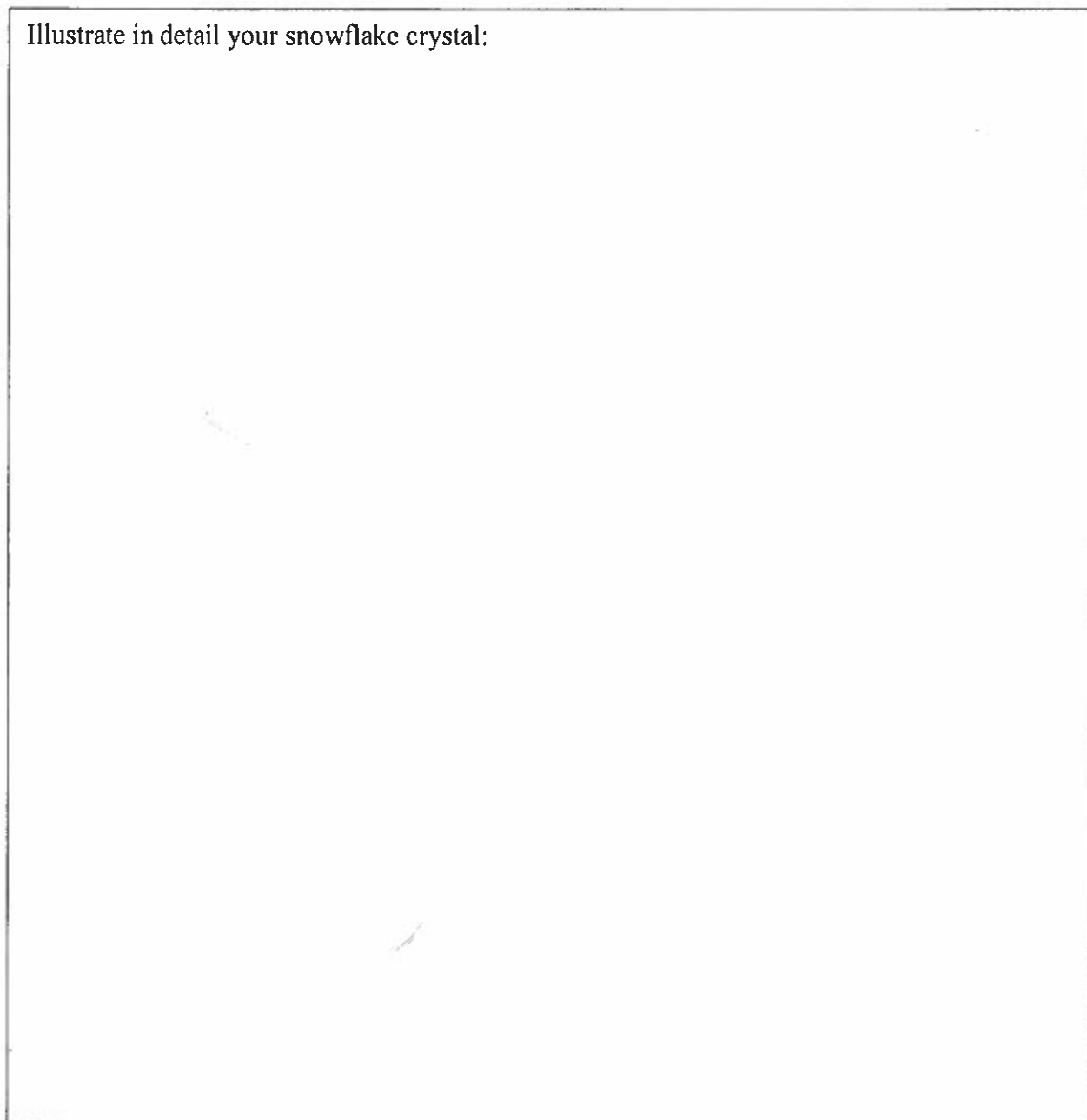
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Group members:

Illustrate in detail your snowflake crystal:



**Observations** (tell in detail what happened and restate results):

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## Lab# Observing Rocks Found in Our Community

Name & Partners:

Date:

**Purpose:** To observe, compare and describe the properties of each rock and to identify whether they are igneous, sedimentary or metamorphic rocks.

**Hypothesis:** I predict that the three rocks I found are:

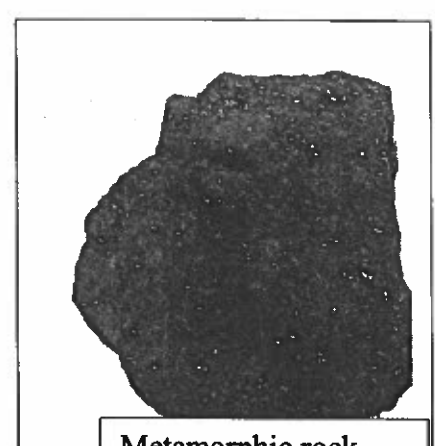
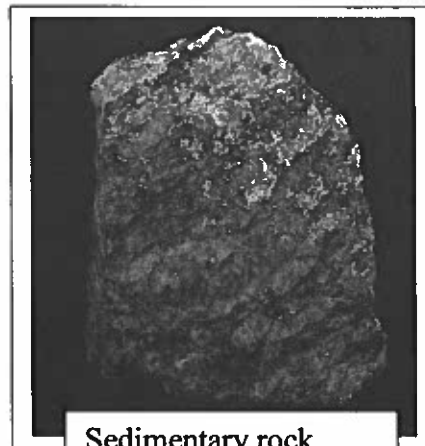
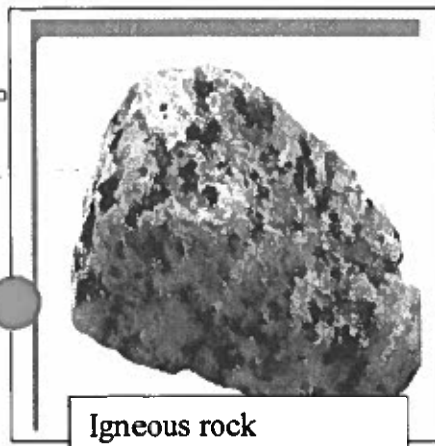
1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_

### Materials:

- 3 rocks from school yard
- pencil
- magnifying glass
- colouring tools
- resources text or computers

### Procedures:

- 1) Collect 3 different looking rocks from our school playground
- 2) Document where you found them and their purpose (décor, landscaping, part of soil, playground structure etc)
- 3) Illustrate and describe the features and properties: describe in sentences the appearance of each of the rocks: shape, colour, texture, crystal shape, size, texture and dullness or shininess.
- 4) Predict a classification of what kind of rock it would be igneous, metamorphic, or sedimentary rock.
- 5) Explain your hypothesis (striations or layers, smooth, jagged or fractures, colours or shapes) for rock type
- 6) Complete the table and research either computer or textbook to see if your prediction is correct.
- 7) Refer back to your hypothesis and in your conclusion restate whether your prediction was correct



- ☐ Observations: document and fill out the table

	Rock 1	Rock 2	Rock 3
Illustrate, draw, and colour			
Describe properties: size, shape, texture, luster features, etc			
location where was it found & what used for			
Predict: igneous, sedimentary or metamorphic Why?			
Check: prediction correct? √ or X			

**Conclusion:**

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# Lab #: Identifying Minerals using Streak and Crystal Shape tests

Date: \_\_\_\_\_ Name & Partners: \_\_\_\_\_

Purpose: To observe and compare the properties of minerals using the acid test, crystal shape and streak test.

Hypothesis: I predict that minerals \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ can be identified by their properties using a streak test and crystal shape test.

## Materials:

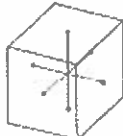
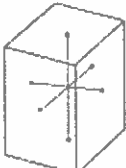


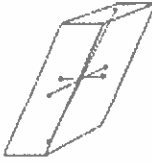

- porcelain tiles
- magnifying glass
- vinegar
- eye dropper
- mineral samples; sulfur, feldspar, sodalite, sphalerite, halite, quartz


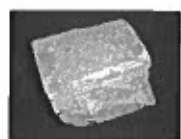


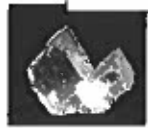
## Procedures:

- 1) Observe the shape of each mineral to identify crystal shape : cubic, hexagonal, orthorhombic, etc document findings.
- 2) Rub minerals across a porcelain tile and observe the colour streak, document results.
- 3) Test minerals for carbonate crystals by putting drops of vinegar on the mineral surface. Note whether there is carbon present if a crust or flakes develop on the mineral surface. Document results.
- 4) Refer back to your hypothesis and in your conclusion restate whether your prediction was correct and explain.

## Observations:

Neatly document the chart for the following: Crystal shape test

cubic	tetragonal	hexagonal	orthorhombic	monoclinic	triclinic
					
examples: halite galena	examples: zircon chalcopyrite	examples: quartz calcite	examples: sulfur staurolite	examples: mica gypsum	examples: feldspar rhodochrosite

<div data-bbox="203 199 324 262">sulfur</div>  <div data-bbox="194 304 324 346"><b>Minerals</b></div>  <div data-bbox="227 483 341 535">feldspar</div>  <div data-bbox="462 472 552 525">quartz</div>  <div data-bbox="690 315 795 367">sodalite</div>  <div data-bbox="665 493 763 546">halite</div>	<div data-bbox="812 189 1023 231"><b>Crystal Shape</b></div> <div data-bbox="836 262 917 346"></div> <div data-bbox="844 357 909 388">cubic</div> <div data-bbox="958 252 1023 357"></div> <div data-bbox="950 357 1039 388">tetragonal</div> <div data-bbox="1071 252 1136 357"></div> <div data-bbox="1063 357 1136 388">triclinic</div> <div data-bbox="1169 262 1282 346"></div> <div data-bbox="1169 357 1266 388">orthorhombic</div> <div data-bbox="876 399 966 514"></div> <div data-bbox="876 514 974 546">hexagonal</div> <div data-bbox="1023 388 1096 514"></div> <div data-bbox="1006 514 1112 546">monoclinic</div> <div data-bbox="1153 388 1226 514"></div> <div data-bbox="1161 514 1234 546">trigonal</div>
sulfur	
sodalite	
quartz	
feldspar	
halite	

**Mineral Streak Test:** illustrate the mineral sample, predict what colour it will leave as a streak, then scrape the mineral across a pocelin tile, document what colour it streaked

	Draw and colour the mineral sample	Predict what colour the streak will be	What colour was the streak?
Sample 1: sulfur			
Sample 2: pyrite			
Sample 3: sphalerite			
Sample 4: malachite			

Conclusion:

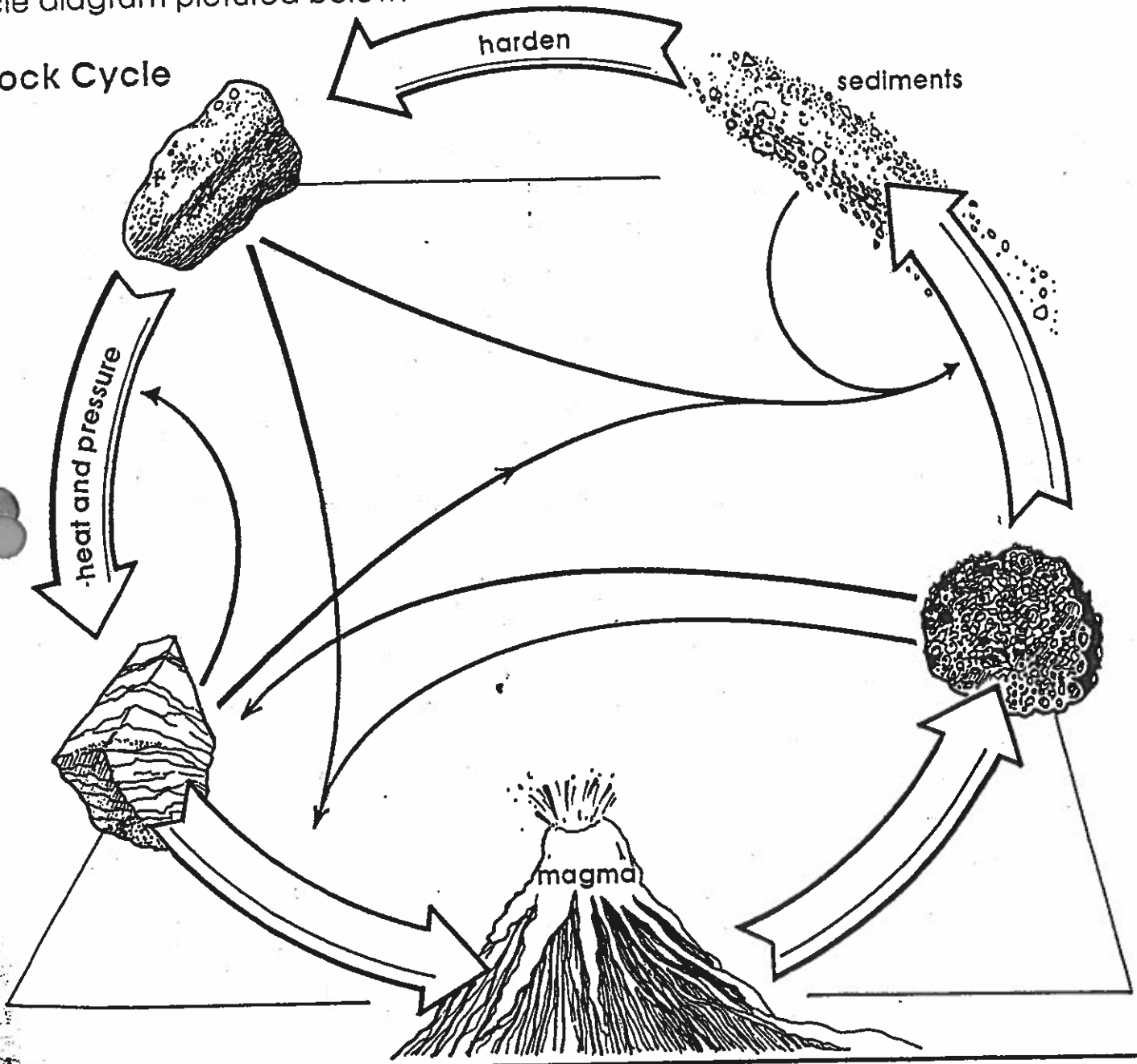
# the Rock Cycle

Name \_\_\_\_\_

With the help of heat, pressure, and weathering, one kind of rock can be changed into a new kind of rock. For example, beautiful marble is formed from limestone, and slate comes from shale and clay.

The changing of rocks is an ongoing cycle. There is no true beginning, but it might be easier to understand by beginning with magma. Complete the rock cycle diagram pictured below.

Rock Cycle



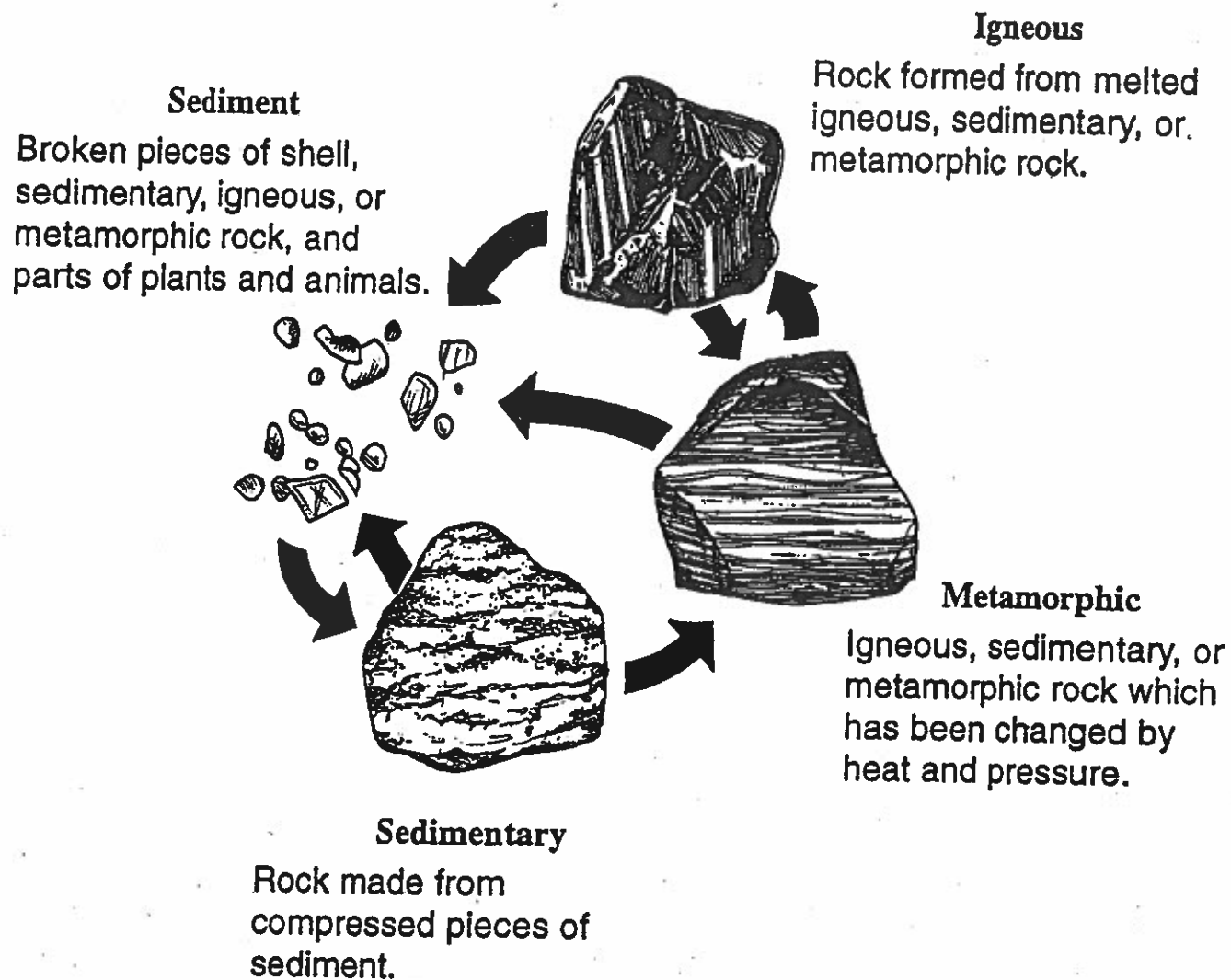
## WORD BANK

- sedimentary rock melting
- igneous rock weathering
- metamorphic rock cooling and hardening

# Recycling Rocks *(cont.)*

## The Rock Cycle

### Examples of the Three Types of Rocks



### Examples of the Three Types of Rocks

**Igneous**—obsidian, pumice, and granite

**Metamorphic**—marble (from limestone) and slate (from shale)

**Sedimentary**—sandstone, limestone, and shale

**Note:** Quartz is found in all three of these types of rocks.