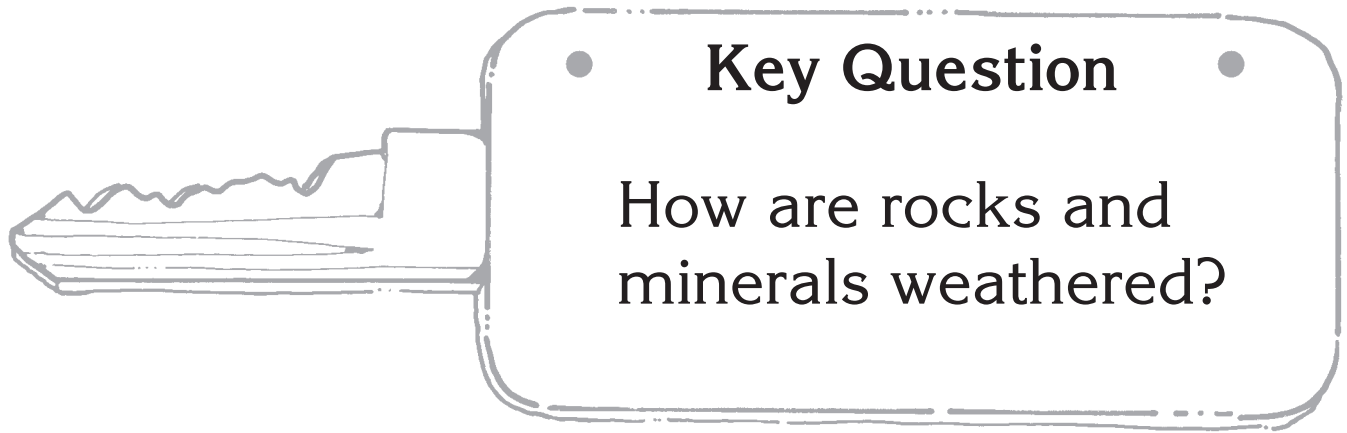




Chalk It up to Weathering



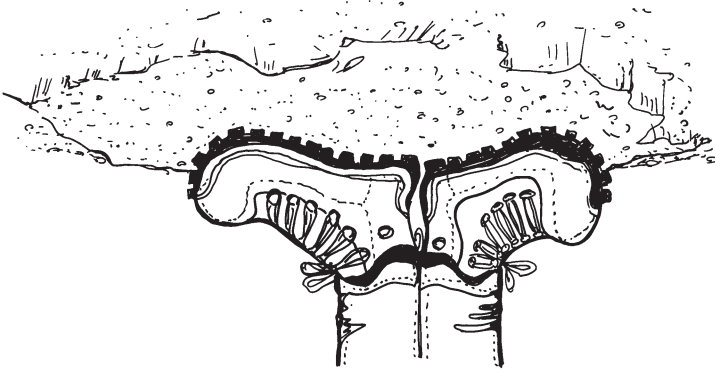
Key Question

How are rocks and minerals weathered?

Learning Goals

Students will:

- sort examples of weathering into categories of biological, chemical, and physical;
- observe and describe physical and chemical changes in the mineral calcite (chalk); and
- identify examples of changes in rocks and minerals.



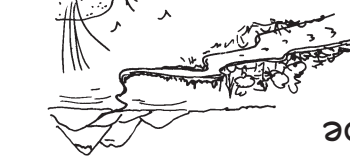
or even under your feet!



in a desert,



at the ocean,



in the river,

Today I could be

I sit on the edge of this mountain year after year.



I am a boulder huge and hard.

Reader's Review

My thoughts

Blank writing area for 'My thoughts' with a small cartoon boy illustration at the bottom right.

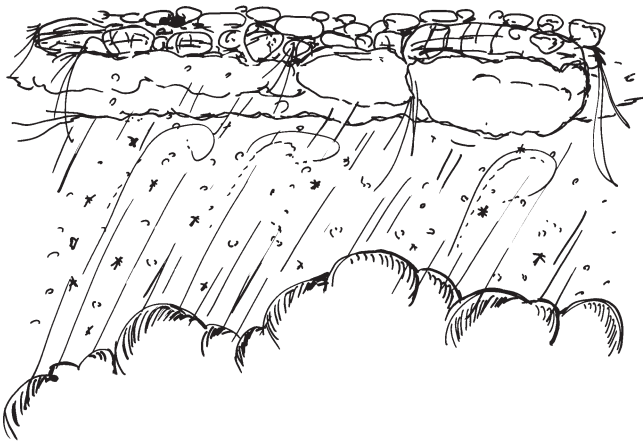
My questions

Blank writing area for 'My questions' with a small cartoon girl illustration at the bottom right.

Boulder to Bits



The rain, wind, snow, ice, plants, and animals keep wearing me away.



Years have passed to centuries. Centuries have passed to millenniums.

I was once a boulder huge and hard.



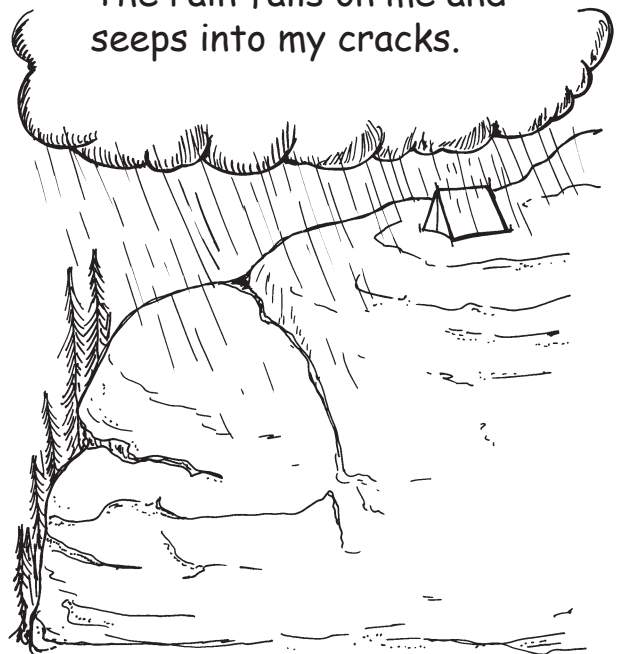
Now I am sand that blows in the wind and washes away with the rain.

I feel the ice making the cracks larger and larger.



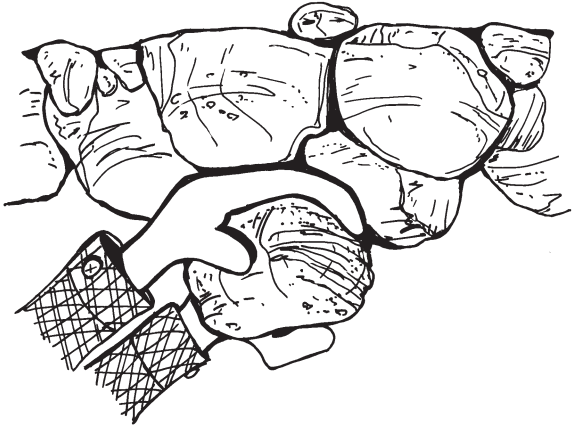
The ice and snow freeze me.

The rain falls on me and seeps into my cracks.



Rain washes away tiny loose pieces from my surface.

I am now small rocks.



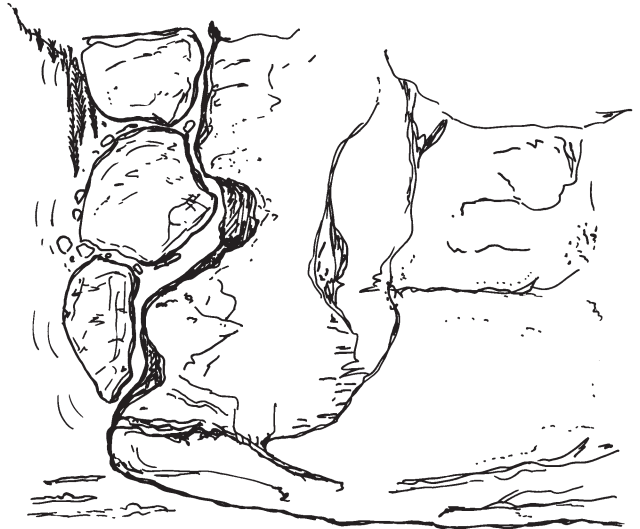
Hundreds of thousands of years pass. The rain, wind, snow, ice, plants, and animals keep wearing me away.

Hundreds of thousands of years pass. The rain, wind, snow, ice, plants, and animals keep wearing me away.



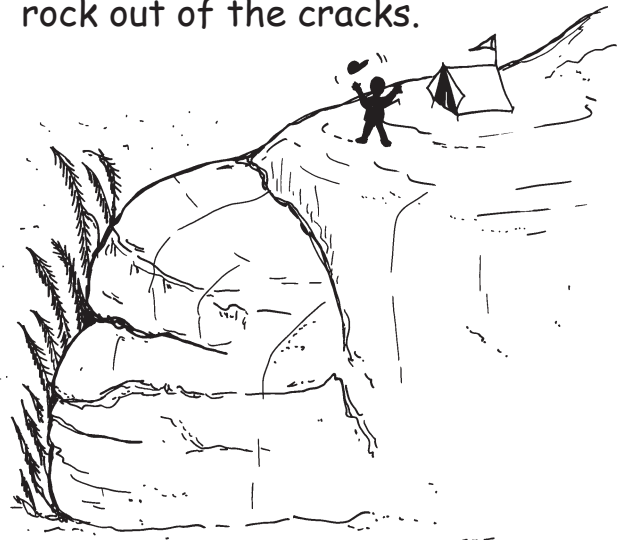
I am now pebbles that roll in the wind and wash away with the rain.

I am getting smaller year-by-year.



Larger cracks appear and parts of me fall away, rolling down the mountain.

When it is warm again, the rain washes the broken pieces of rock out of the cracks.



The wind blows the tiny pieces away.

The cracks are now large enough for animals to make their homes. I am cracking and breaking into smaller and smaller and smaller pieces.



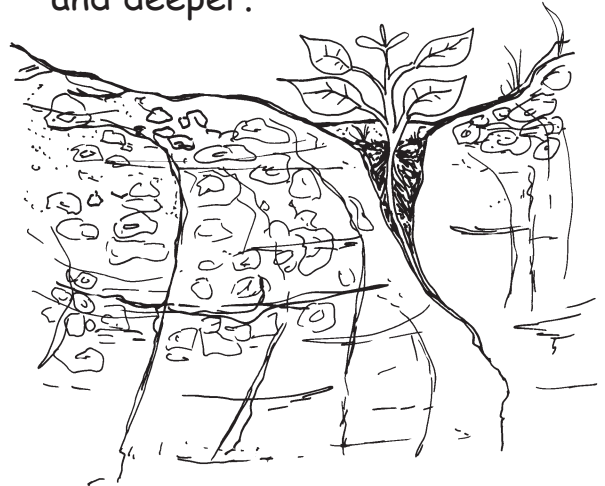
Animals make their homes around my base. They dig, scrape, and chip pieces of me away.

Hundreds of thousands of years pass. The rain, wind, snow, ice, plants, and animals keep wearing me away.



I am now a bunch of large rocks.

Plants grow in the cracks pushing their roots deeper and deeper.



I am getting smaller bit-by-bit.

Chalk It up to Weathering

Cut apart the sets of description cards and examples. Each group needs one set of each.



Animals

- burrowing animals dig and scrape on and around rocks

Animals

- burrowing animals dig and scrape on and around rocks

Water

- seeps inside cracks and pores of rock, then freezes and wedges rocks apart
- rivers tumble rocks
- rain, snow, ice, sleet

Water

- enters cracks and pores of rock, chemicals in water react with minerals in rock and dissolve or change them

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Air

- has oxygen that reacts with (oxidizes) minerals such as iron, aluminum, silicon, and copper

Air

- temperature changes from hot to cold, making rocks expand and contract, which weakens and cracks them

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- has oxygen that reacts with (oxidizes) minerals such as iron, aluminum, silicon, and copper

Air

- temperature changes from hot to cold, making rocks expand and contract, which weakens and cracks them

Wind

- blows sand and small rocks against larger rocks, chipping them away and smoothing them

People

- change rock by excavating, digging, mining, and construction

Wind

- blows sand and small rocks against larger rocks, chipping them away and smoothing them

People

- change rock by excavating, digging, mining, and construction

Plants

- tree roots and small plants grow into rocks and break them apart or enlarge cracks
- lichen grows on rocks and makes an acid that dissolves them

Acid Rain

- rain that has the pollutants nitrogen and sulfur, which combine to make a weak acid that dissolves minerals

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sidewalk cracks, potholes, smooth river rocks	sidewalk cracks, potholes, smooth river rocks	sidewalk cracks, potholes, smooth river rocks	sidewalk cracks, potholes, smooth river rocks
smooth rocks in deserts, pits in stone buildings	smooth rocks in deserts, pits in stone buildings	smooth rocks in deserts, pits in stone buildings	smooth rocks in deserts, pits in stone buildings
cracks on surface of rocks	cracks on surface of rocks	cracks on surface of rocks	cracks on surface of rocks
caves, statues, and buildings dissolving	caves, statues, and buildings dissolving	caves, statues, and buildings dissolving	caves, statues, and buildings dissolving
stone statues and concrete dissolving features	stone statues and concrete dissolving features	stone statues and concrete dissolving features	stone statues and concrete dissolving features
iron rusting, copper turning green	iron rusting, copper turning green	iron rusting, copper turning green	iron rusting, copper turning green
animal homes/burrows in and around rocks	animal homes/burrows in and around rocks	animal homes/burrows in and around rocks	animal homes/burrows in and around rocks
weeds in sidewalks, tree roots cracking sidewalks	weeds in sidewalks, tree roots cracking sidewalks	weeds in sidewalks, tree roots cracking sidewalks	weeds in sidewalks, tree roots cracking sidewalks
rock steps or paths worn down from walking, mines	rock steps or paths worn down from walking, mines	rock steps or paths worn down from walking, mines	rock steps or paths worn down from walking, mines
sidewalk cracks, potholes, smooth river rocks	sidewalk cracks, potholes, smooth river rocks	sidewalk cracks, potholes, smooth river rocks	sidewalk cracks, potholes, smooth river rocks
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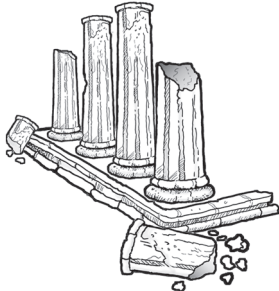



Chalk It up to Weathering

Weathering is the breaking down of rock into smaller and smaller pieces.

Put your cards into the chart where they belong. Match the examples to the descriptions. Put the descriptions in the correct category.

 Physical Weathering			
Examples			

 Chemical Weathering			
Examples			

 Biological Weathering			
Examples			



Chalk It up to Weathering

Look at the chalk and sandpaper with a hand lens. Draw and describe what you see.



Carefully scrape the chalk across the sandpaper three times.

Look at the chalk and sandpaper again using a hand lens.
Draw and describe the changes you see.

1. Which is harder—the chalk (calcite) or the sandpaper (quartz)? How do you know?
2. What caused the changes you observed?
3. How is this like weathering? How is it different?
4. What would happen if the wind blew sand against a chalk wall? How do you know?

Chalk It up to Weathering

Chalk is a soft sedimentary rock. It is made of calcite from the shells of microscopic marine algae. Vinegar is a weak acid.

What do you think will happen when you put a piece of chalk in a cup of vinegar? Write your prediction here.

Carefully observe your chalk. Describe its texture.

Put the chalk in a cup. Pour enough vinegar into the cup to cover the chalk. Draw and describe what you see happening.

After five minutes, take the chalk out and rinse it in water. Draw and describe the chalk.

Predict what will happen if you leave the chalk in the vinegar overnight. Find out! Draw and describe the chalk.

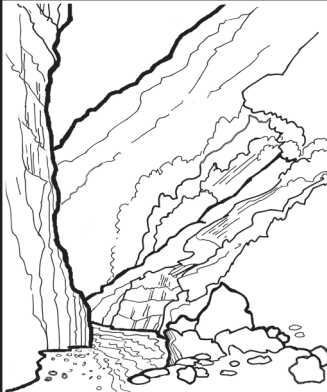
1. What caused the changes in the chalk?
2. How is this like weathering? How is it different?

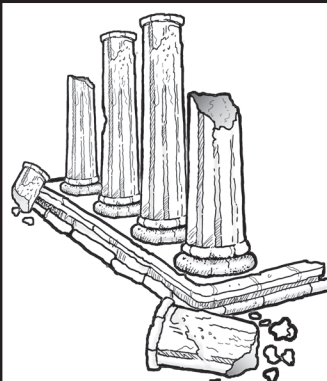


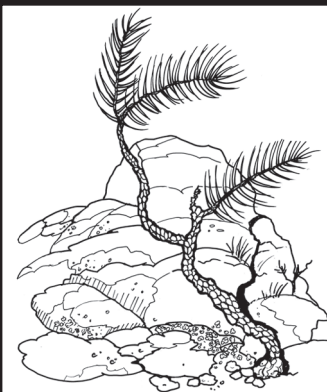
Chalk It up to Weathering

Weathering is the breaking down of rock into smaller and smaller pieces.

Find examples of different types of weathering where you live. Describe and draw the examples you find.

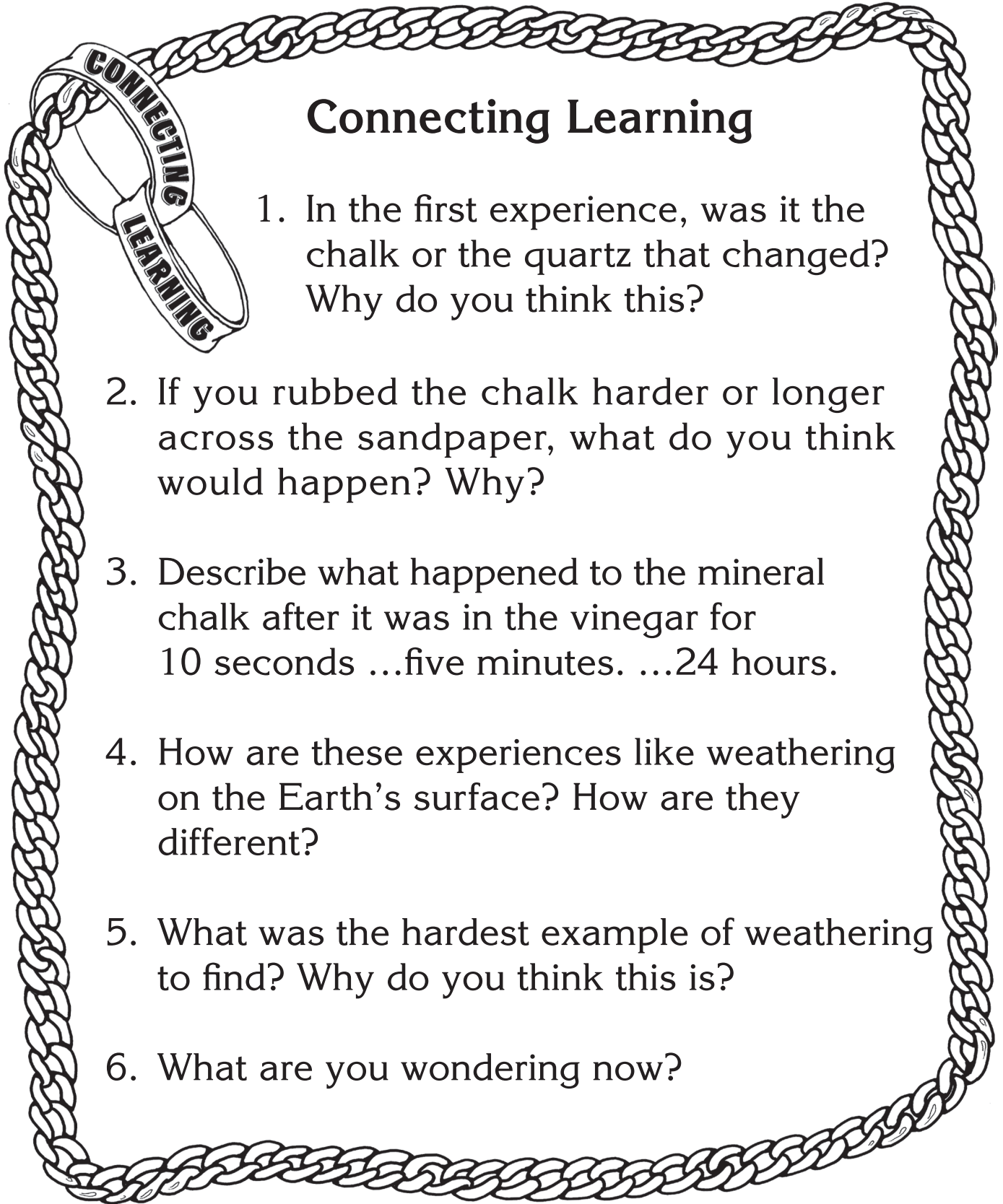
 <p>Physical Weathering</p>	<p>Water</p>	<p>Wind</p>	<p>Air</p>
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 <p>Chemical Weathering</p>	<p>Water</p>	<p>Acid Rain</p>	<p>Air</p>
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 <p>Biological Weathering</p>	<p>Animals</p>	<p>Plants</p>	<p>People</p>
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Chalk It up to Weathering



Connecting Learning

1. In the first experience, was it the chalk or the quartz that changed? Why do you think this?
2. If you rubbed the chalk harder or longer across the sandpaper, what do you think would happen? Why?
3. Describe what happened to the mineral chalk after it was in the vinegar for 10 seconds ...five minutes. ...24 hours.
4. How are these experiences like weathering on the Earth's surface? How are they different?
5. What was the hardest example of weathering to find? Why do you think this is?
6. What are you wondering now?