

How

Nature

Breaks Down

Rocks By

Weathering

Weathering is a process nature uses to break down rocks. Nature breaks down rocks by the use of temperature change, water, wind, gravity, plants, animals, and dissolved acids in water.

- Temperature change can cause rocks to get hot and cold causing cracks to form and could eventually break them up.
- Temperature change can cause snow to melt, causing water to fill in the cracks in the rocks. Later, the water freezes and expands resulting in breaking the rocks apart.
- Running water can cause the rocks in a stream to hit against each other resulting in breaking them down and rounding them off.
- Wind can pick up sand and blow it into a huge sandstone rock and break it down.
- If expanding ice breaks off rocks on a cliff, the falling rock will break apart when it hits other rocks on the way down and then finally hit the ground breaking it apart.
- After soil fills in cracks in the rocks by the wind, the wind will also carry seeds and embed them in the soil. The seeds begin to grow. The roots will expand many years later and crack the rocks apart.
- Animals will dig holes in the ground exposing the inside of the hole to temperature change, freezing any water inside, and seeds growing plants inside to break up the rocks inside.
- As water is running down a hill, it dissolves minerals in the rocks causing the water to be acidic. As it is dissolving the minerals, it will also break down the rocks. The more acidic it is, the more it can break down the rocks.

Temperature Change

During the seasons of spring and fall, there are big temperature changes in the mountains from the morning temperature that is usually below freezing to the evening temperature that is well above freezing. The air in the afternoon might be cool but the direct sunlight on the rocks can be up to 100 degrees Fahrenheit on the surface of the rocks.

Experiment #1 The Expanding Brass Ball

1. You have a brass ring and brass ball. Slide the brass ball through the ring. What do you see happening?

It slips through easily.

2. Put the brass ball above a flame or a heating unit. Hold it above the heat for a couple of minutes. Twirl it while you are holding it. What do you think is happening to the brass ball?

It is expanding.

3. After two minutes, try to put the ball through the brass ring. What happened?

It doesn't go through.

4. Put the brass ball in ice water for a minute. What do you think is happening to the brass ball?

It is contracting.

5. Take the brass ball out of the ice water and put try to put it through the brass ring. What happened?

It goes through the brass ring again.

6. Explain why they brass ball did what it did.
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Experiment #2 Cracking the Glass

1. Examine the glass object that is given to you. Describe in words what you notice about it.

It is clear with no breaking inside.

2. Drop the glass object into the pan. Put the pan on the burner and turn on the burner. Let the pan heat up between 5 and 10 minutes. What do you think will happen to the glass object when it is heated?

It will expand a little.

3. Pour the glass object into a bowl of ice water. What do you think is happening to the glass object now?

It is contracting.

4. Take the glass object out of the ice water when it has cooled. Describe below what you observed happened?

It has many cracks inside, but we can't feel them.

5. Explain why the glass marble did what it did.
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Freezing Water

Whenever water runs into cracks of rock and the temperature drops below 32 degrees, it will freeze while in the rock. Water expands when it freezes. Therefore, it will break the rock apart.

Experiment #3 The Distorted Bottle

1. Here is a bottle with water in it. Describe how the bottled water feels when you press on it.

It is bendable. I can press in on it.

2. Inspect what it looks like on the outside.

It has all the detail of a bottle of water.

2. Inspect what it looks like on the inside.

It is very clear like water should be.

3. Put it in the freezer for 24 hours. What do you think will happen?

The water will freeze and expand.

4. Describe how it feels when you press on it.

It is very hard. It won't bend.

5. Inspect what it looks like on the outside.

The bottle is bulging out on the sides.

6. Inspect what it looks like on the inside.

The bottle is very foggy inside because air took the place of where it expanded.

7. Explain why the bottled water looks like this.

Experiment #4 Balloon Power

1. Put some liquid Plaster of Paris into a small cup. Now put a small water balloon into the plaster so the whole balloon is covered.
2. You are going to put this in the freezer for 12 hours. What do you think will happen?

The water in the balloon will freeze, expand and break the plaster.

3. Put the cup into the freezer for at least 12 hours.
4. Tear off the paper of the cup. Examine the outcome. Describe what happened.

The balloon pushed it way out of the plaster and broke the plaster.

5. Explain why this happened.

Water Abrasion

Whenever water is running downhill, the rocks in the water will knock into each other resulting in breaking the up the rocks.

Experiment #5 Striking Distance

1. Each of you has two rocks. Examine them as to what they look like.

They are rounded on the edges.

2. Why do you think they have the shape they have?

As they hit each other in the stream while they are rolling down the stream, they break of small pieces of sediments.

3. Take the two rocks and hit them together over a piece of white paper for a minute or two. Describe what you observed.

There are a lot of sediments on the desk.

4. Describe the comparison to this experiment to what really happens in a stream.

Experiment #6 Shake and Break

1. Examine the rocks placed in front of you. What kind of rocks do you see in the bottle?

They are igneous, sedimentary, and metamorphic rocks.

2. Now put the rocks in the bottle and then add water to the top of the bottle. Put the lid on the bottle. Shake the bottle as viciously as you can for about 3 minutes.
3. Look at the bottle. What does the bottle look like inside?

It has small sediments in the water and more on the bottom of the bottle.

4. Pour the contents of the bottle out into a filter with a bottle under the filter. Put water into the bottle to make sure all the contents of the bottle are put onto filter. Take the rocks out of the filter. Describe what you found in the filter.

All the sediments and chipped rock that came off the rocks.

5. Tell why this happened.

Wind Abrasion

Whenever the wind blows it carries with it sand and other sediments. These sediments hit objects that are stationary (not moving). When sediments hit these stationary objects, it can wear them down eventually to almost nothing.

Experiment #7 Stirring As The Wind

1. There is a small container of white salt and a piece of colored chalk in front of you. Examine both ends of the chalk. Describe what you see.

The chalk is really smooth.

8. You are going to stir the colored chalk in the salt. (Instead of having the salt blow and hit against the chalk you are going to do the opposite—use the chalk to stir the salt.) Stir the salt with the chalk for about three minutes. Describe what you see happening.

The salt is turning the color of the chalk.

9. Why is the salt doing this?

The salt is sharp and taking off pieces of chalk and adding it in with the salt to make it change color.

10. Look at the end of the piece of chalk. Describe what it looks like.

It is a little rougher than it was because it was being scraped by the salt.

11. Tell how this is like the wind carrying sand and hitting against an object.

Gravity Abrasion

Whenever parts of the rocks break off at the top of a mountain or on the edge of a cliff, the rocks will roll down because of gravity and finally hit the bottom. When the falling rock hits the ground or hits other rocks on the ground the falling can break apart.

Experiment #8 Hitting Rock Bottom

1. Get some large rocks about 5 inches in diameter. Examine each one for chips or marks. Put three or four on the ground.

With the others, drop each one, one at a time on the rocks on the ground. Examine each one after it is dropped. When all the rocks are dropped, describe what you notice about the rocks that were on the ground and the rocks that were dropped.

The rocks on the ground broke or chipped.

2. Tell why you think the rocks chipped or broke?

Root Expansion

Plants grow in the cracks of plants. The roots get larger and larger and break open the rock.

Experiment #9 Getting to the Root Of Things

1. Examine the beans and describe them.

The are small and hard.

2. Put some plaster in a cup. Stir the beans in the plaster. Let it sit over night. Describe what happened to the plaster.

The plaster broke apart.

3. Explain why this happened to the plaster.

Dissolving Rocks

Experiment #10 Rocks and Acids

1. Look at the piece of limestone with a hand lens. What do you see in the limestone?

There are little pieces of bones and shells or tiny reflections of the bones and shells.

2. Pour some vinegar in the glass jar. Put the limestone in the vinegar. Put on the lid. Wait twenty-four hours. Describe what you see at the bottom of the glass jar.

The limestone is beginning to fizz.

3. Explain why this happened.
