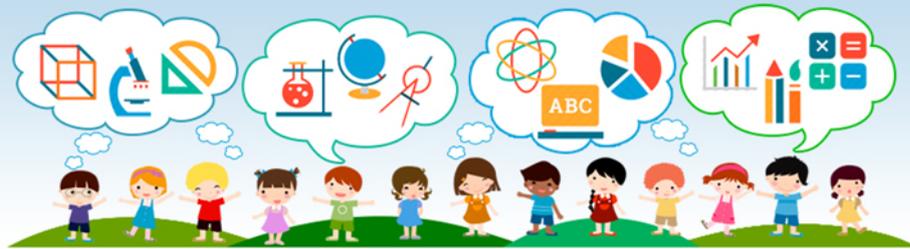
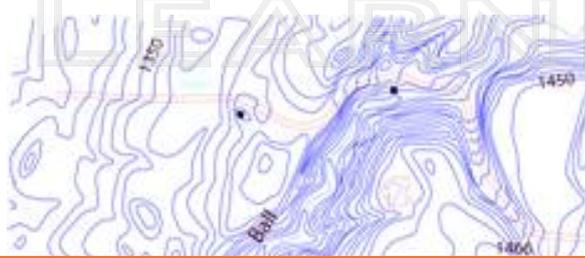


## LANDFORMS, ROCKS, AND SOIL

### Use a Special Map

When you want to see and understand landforms, the best type of map is a **topographic map**. A topographic map shows many features of the landscape, such as water, roads, and landmarks, but also uses contour lines to represent precisely the size, shape, and elevation of the land's features.



### PREVIEW

**What**

Landform  
mountain  
map of an area shows them all:

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Now let's review the basics—the things many landforms are made of – soil and rocks.

**Lesson Checkpoint:**  
*What is a topographic map?*

### Life-Giving Soil

**Soil** is the loose material that covers much of the Earth's surface. There are three main layers of soil, starting from the top: **topsoil**, which is the soil we walk around on and the soil in which the plants and trees grow, **subsoil**, and even deeper below is **bedrock**.

## What about Rocks?

**Rocks** are made up of many tiny pieces of minerals. **Minerals** are natural, nonliving crystals that make up rocks.

### Types of rocks:

**Igneous rocks** form when melted rock cools down and then hardens again. During the cooling stage, crystals form.

**Sedimentary rocks** form when layers of rock settle on top of each other and then harden together.

**Metamorphic rocks** form when solid rocks are pressed together and heated; the extreme heat can change the properties of the rocks being squeezed together.

### Lesson Checkpoint:

*Name one type of rock and how it's formed*

### The R

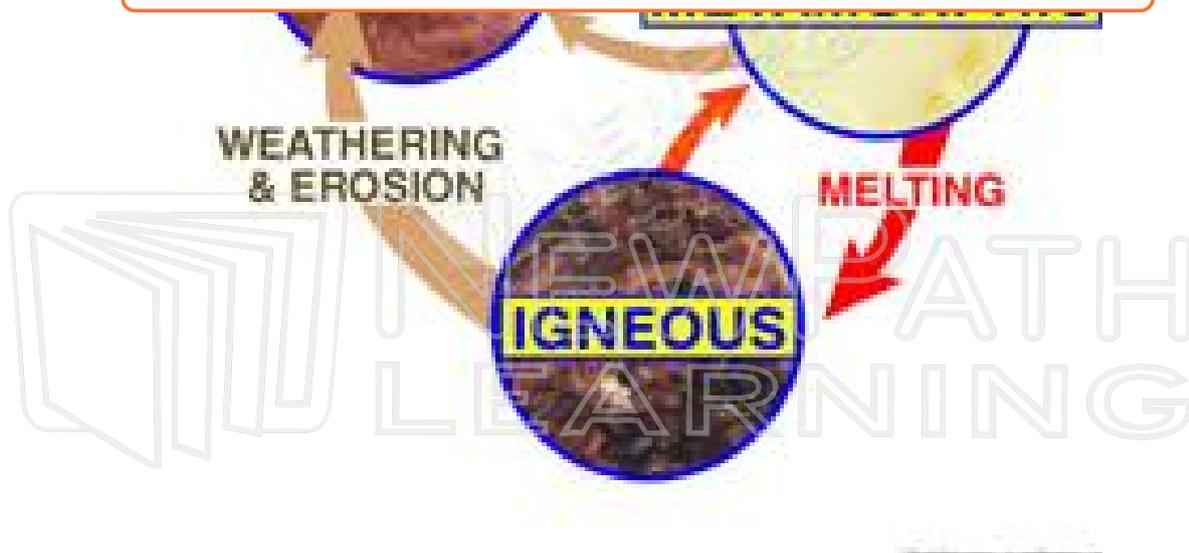
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## PREVIEW

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## Weathering and Erosion

**Erosion** is the wearing away of the earth's surface by rain, wind, snow, and ice. There are two kinds of erosion: **mechanical weathering** is the breaking of rock into small pieces because of such things like gravity, wind, rain, and ice. **Chemical weathering** is the changing of material in a rock through a chemical process.

Erosion can occur quickly, as in a landslide, or can happen slowly, as in a slow moving river. When water moves, in rivers, ocean currents, tides, and floods, it moves particles of soil and rock from one spot to another.

Rain causes erosion too! Rain can move soil downhill off of fields. Farmers obviously need soil to grow crops, so they try and do what they can to stop the erosion of their fields. Farmers plow across fields to do this. The spaces created by plow catch rainwater to keep it from rolling off of their fields and taking

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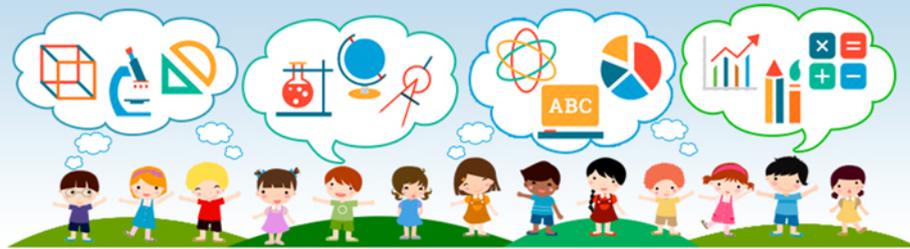
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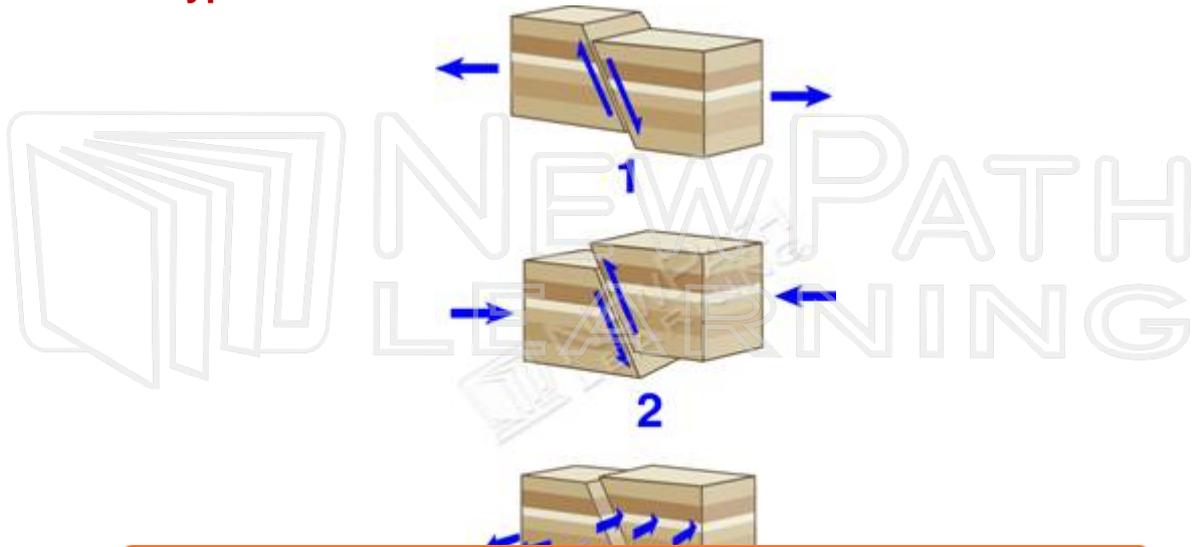
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## Faults

**Faults** are rock fractures or cracks in the Earth's crust which are caused by the movement or shifting of the Earth's surface.



**Different types of faults:**



#1 The  
#2 The  
#3 The

**Plate**

We know  
outer core  
the top  
the Earth  
Earth.  
the mantle  
ocean are called **oceanic plates** and the plates under land are called **continental plates**.



**PREVIEW**

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The area where one plate meets another plate is called a **boundary**. The pieces do move (very slowly of course)...they slide by, bump into, and scrape against each other. When the pieces move, they cause changes to the Earth. Slow changes caused by plate movements can occur over long periods of time, such as the formation of mountains. Plate movements can also cause **RAPID** changes to the earth....think **EARTHQUAKE!**

## How Do Earthquakes Happen?

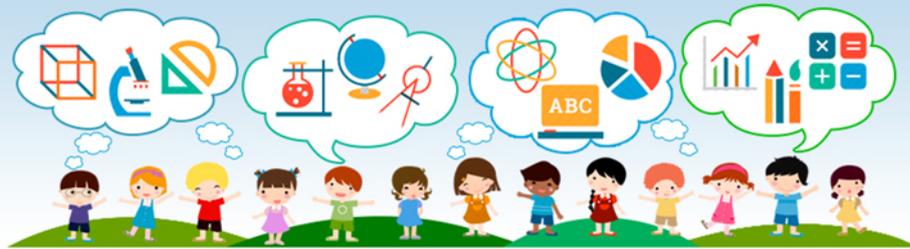
Earthquakes usually occur where two plates bump into each other. What most often happens to cause an earthquake is that two plates bump into each other and their edges get stuck together but the rest of the plates keeps moving. Soon the plate edges finally unstuck and an earthquake occurs due to the energy released as the plates unstuck. This energy shoots out in all directions causing seismic waves to shake the ground as the waves move to the Earth's surface.

The spot on the Earth's surface directly above where an earthquake occurs is called the **epicenter**.

*Lesson Checkpoint:  
Explain how earthquakes occur*

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**PREVIEW**

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*Lesson Checkpoint:  
What causes volcanoes to erupt?*