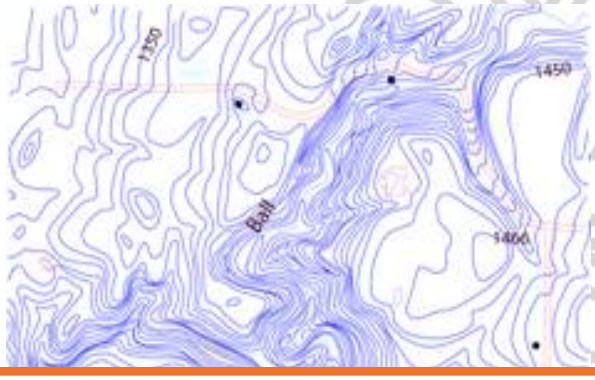
LANDFORMS, ROCKS, AND SOIL

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.



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What are Landforms?

Landforms are features that make up the Earth's surface. They include mountains, plateaus, canyons, deltas, hills, valleys, and more…A topographic map of an area shows them all!

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 the 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**.

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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 Rock Cycle

The rock cycle represents the process of rocks changing into different forms over long per anothe and back again.

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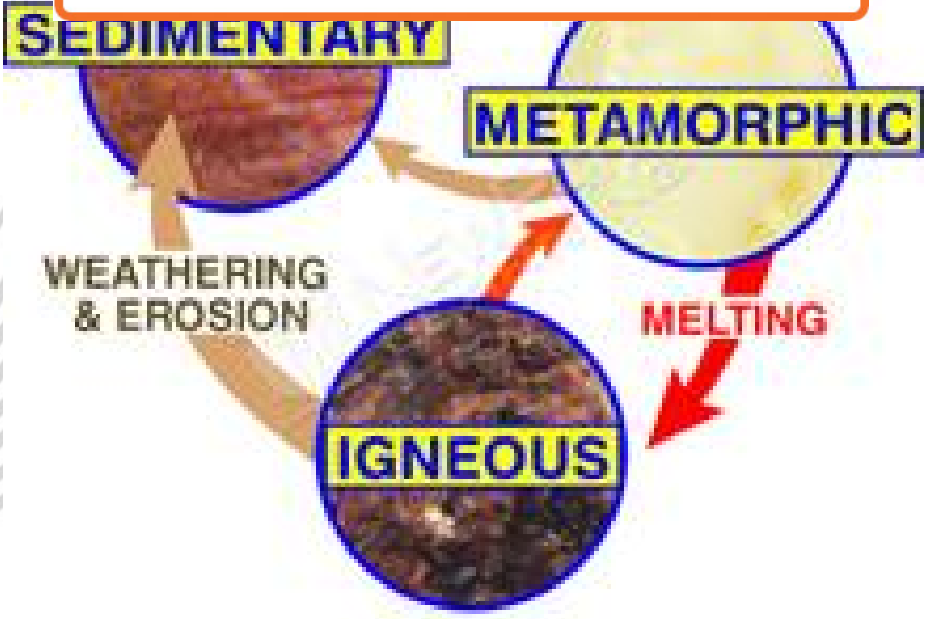

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Weathering and Erosion

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 soil and other particles with it.

Lesson Checkpoint:

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Deposition

Deposition is … When all that water tha… down, it no longer carries … begins to fall to the bottom of the river, ocean, or whatever water is carrying it.

Pieces of the Earth can move in other ways too!

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.

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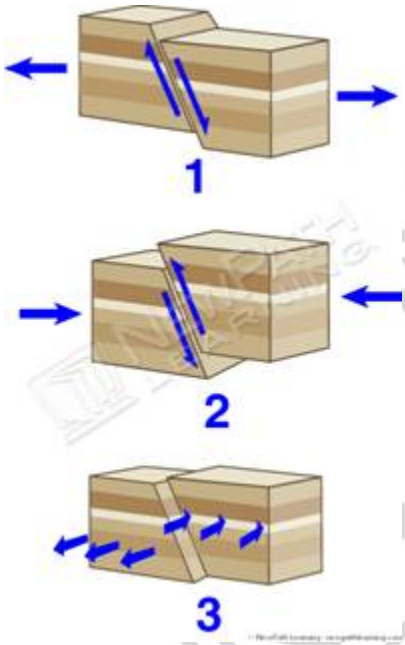
Different types of faults:



#1 The first fault in diagram is a **normal fault**.
#2 The secon
#3 The third

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Plate Tecto

We know that ntle, the outer core, ar e make up the top layer e that covers the Earth. It is more like puzzle pieces put together that cover the Earth. These pieces float on the top of on the hot liquid of the lower part of the mantle. These pieces are called **tectonic plates**. The plates under the ocean are called **oceanic plates** and the plates under land are called**continental plates**.

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!

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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 unstick and an earthquake occurs due to the energy released as the plates unstick. 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.

Volcanoes

A **volcano** is , ash, and gases erupt.

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Under the Ea These chambers are ers are channels urface. As magma move inside the magma cham . When the bubbles get bigger, the magma rises and rises until the magma is forced through the channels leading to the Earth's surface, causing the volcano to erupt. (*Note*: When magma is above the Earth's surface, it is then called lava.)

Lesson Checkpoint:
What causes volcanoes to erupt?

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