

# GEOLOGY

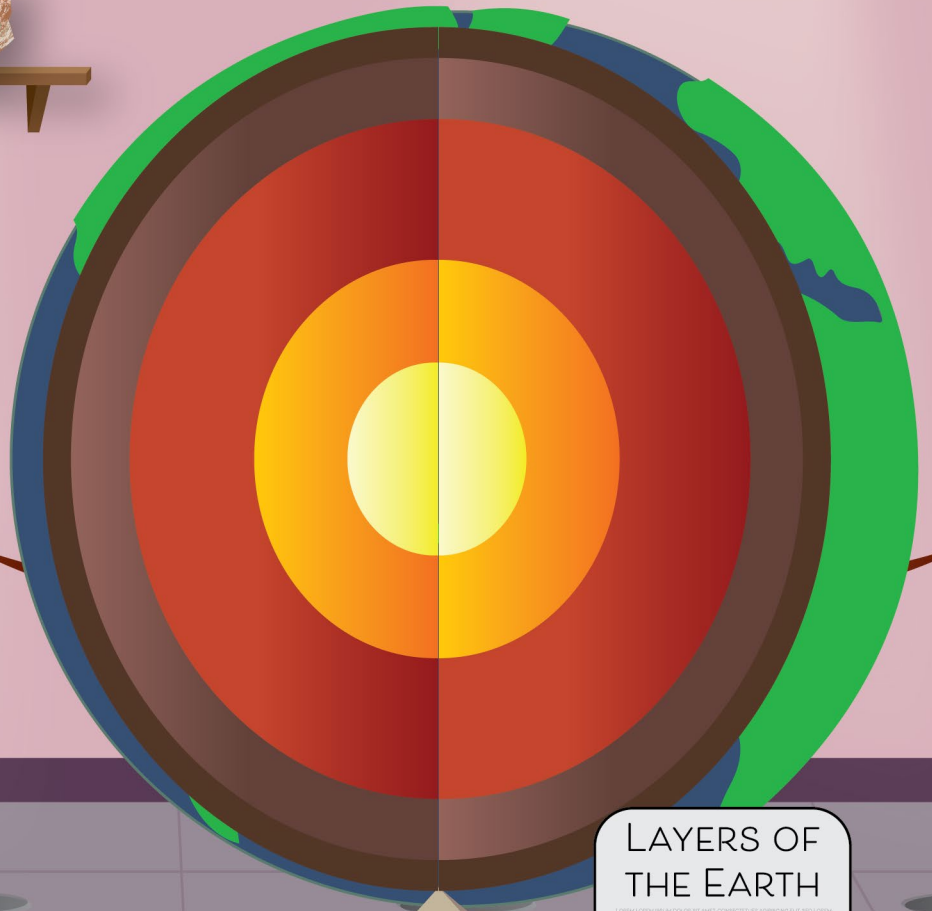
## The Center of the Earth

### TYPES OF ROCKS

#### IGNEOUS

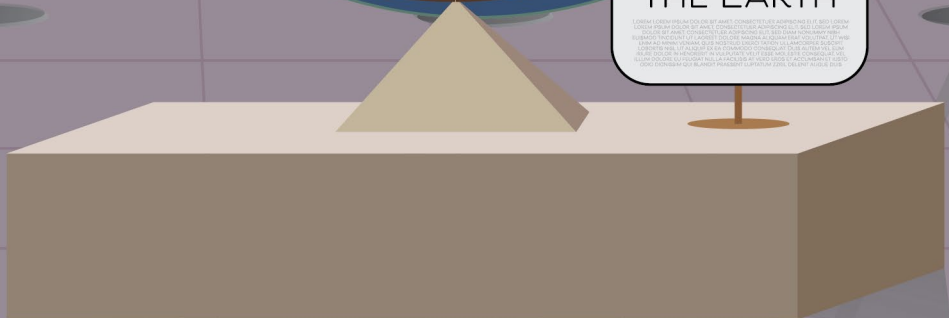
#### SEDIMENTARY

#### METAMORPHIC



### LAYERS OF THE EARTH

THE EARTH IS DIVIDED INTO THREE MAIN LAYERS: THE CRUST, THE MANTLE, AND THE CORE. THE CRUST IS THE OUTERMOST LAYER, THE MANTLE IS THE MIDDLE LAYER, AND THE CORE IS THE INNERMOST LAYER. THE CRUST IS MADE OF SOLID ROCK, THE MANTLE IS MADE OF HOT, PLASTIC ROCK, AND THE CORE IS MADE OF HOT, LIQUID METAL.



# The Center of the Earth

## NGSS

5-ESS2; MS-ESS3

## Objective

**The student will understand** the dynamic properties of the three layers of the Earth and what each layer consists of (in terms of general properties).

**The student will be able to** create a model of the Earth.

## Vocabulary

**Inner core:** The core of the Earth considered to be composed primarily of iron.

**Outer core:** Presumed to be liquid, or rather fast-moving magma.

**Lower mantle:** Located below the transition zone from the upper mantle, is composed primarily of simple iron and another mineral called magnesium silicate, in denser forms as depth increases.

**Upper mantle:** Presumed location on which the tectonic plates ride. Molten rock is believed to originate from this region of the mantle.

**Crust:** The part humans live right on top of. It consists of soil, rocks, and the sea floor.

## Background

The interior of the Earth consists of three basic parts: the crust, mantle, and core. The mantle and core are composed of two parts each: the upper and lower mantle and the outer and inner core, respectively. The crust is the surface that humans inhabit: it includes the soil, rocks, and seabed underneath us. The upper mantle below the crust is the site of tectonic plates. These plates are the cause of earthquakes, mountains, and volcanos. The lower mantle is made up of the elements of simple iron and magnesium silicate materials, which become more dense with gradual depth increases. Transitioning from the mantle to the core actually reveals a decrease in

earthquake wave velocity, but an increase in density, partially due to slow-moving rocks that move due to heat and pressure. The outer core is a faster moving magma that can cool and form igneous rocks that will join the lower mantle. The inner core is an iron ball that rotates very slowly and is responsible for our magnetic field.

## Materials

### For each group (2-3 students):

- A plastic cup
- Tin foil
- Red food dye (three drops per cup)
- Aloe vera
- Foam sheets
- Popsicle sticks
- Sprinkles
- Napkins or paper towels

## Procedure

1. Spread napkins or paper towels on the table or desk and place materials on top.
2. Crumple tin foil into a ball and place into the plastic cup.
3. Pour the Aloe vera on top of the tin (about  $\frac{3}{4}$  full).
4. Add three drops of red food dye onto the Aloe vera and mix with popsicle sticks until the mixture is a clear red color.
5. Place foam sheets on top of the Aloe vera, ensuring that the sheets overlap.
6. Scatter sprinkles on top of foam sheets.

## Guiding Questions

- What do you think the foam sheets and other materials will represent in the model of the Earth?
- What have you learned before today about the inside of the Earth?
- What metal makes up the core of the Earth?
- Optional extension question: Why do the foam sheets not sink through the Aloe vera? (Density, primarily)

## **Career/Future Application**

Environmental Scientist, Geologist, Geographer

## **Sources**

<https://pubs.usgs.gov/gip/interior/>

<https://www.nationalgeographic.org/encyclopedia/mantle/>