## Teacher Demonstration 1 - Density Tank

**Purpose:** To demonstrate how liquids of different temperatures will create layers because of their different densities when allowed to mix.

Learning Objectives:

- To visualize how liquids of different temperatures will layer based on density when allowed to mix.
- To apply what is being done in the tank to the layering of the earth's layers as they formed.

Procedure:

- Use the information from the demonstration to complete the section on the student handout.

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## Station 2 - Density Cubes

**Density Cubes**

**Materials:** 4 cubes (same volume: steel, aluminum, plastic, wood); Scale/Ruler (if needed)

**Procedure:**

1. Heft each cube and rank them from heaviest to lightest by feel. Rank with 1=lightest and 4=heaviest.
2. Weigh each cube and record its mass.
3. Measure side length if unknown. Calculate volume (side × side × side).
4. Calculate **density = mass ÷ volume.**
5. Fill out the table in the student handout on density cubes.

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## Station 3 – Liquid Layering

**Learning Objective:** Use density-based models to represent Earth's internal layers through observations and data collection.

**Liquid Layering**

**Materials:**

- Large test tube or graduated cylinder
- Corn syrup, dish soap, water, oil
- Spoon (for layering) (optional)

**Procedure:**

1. Slowly pour each liquid into the beaker in this order:
    a. Water - 60 mL
    b. Oil - 5 mL
    c. corn syrup - 10 mL
    d. dish soap - 20 mL
2. Pour each liquid carefully over the **convex (back) side of a spoon or angle the cylinder and pour down the side** to avoid overmixing.
3. Let layers settle and observe the order.
4. Fill out the table in the student handout on Liquid Layering.

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## Station 4 – Lava Lamp (Convection)

Read the background information before continuing.

**Lava Lamp**

**Materials:** Lava lamp, Power source, Observation worksheet
**Procedure:**

1. Observe the Lava Lamp, try to focus on one blob of wax, and watch it.
2. Answer the questions on the student worksheet.
3.

Deep inside Earth, heat causes mantle material to circulate. Hotter material rises because it is less dense, while cooler material sinks because it is denser. This process, called convection, is responsible for driving plate tectonics, volcanoes, and earthquakes. Since we can't look directly inside Earth, scientists rely on models to study these processes.

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# Teacher Demonstration 2 – Waves

**Purpose:** In this demonstration, the teacher will model **P-waves (primary)** and **S-waves (secondary)** using a **phone cord, spring, and rope** to explore how seismic waves travel through Earth—and how they reveal Earth's interior structure.

**Learning Objectives:**

- Model how **P-waves** and **S-waves** move through different materials.
- Observe the **differences in wave motion**.
- Connect wave behavior to **Earth's layers** and **seismic wave data**.

**Part 1: Modeling P-Waves (Primary Waves)**

1. Stretch **each material** between two group members standing about 2–3 meters apart.
2. One person gives a **quick push-pull motion** along the length of the slinky (in line with the cord).
3. Watch how the wave travels as a **compression** down the material.
4. Repeat and observe how the wave reflects at the end.

**Record**: What direction does the wave travel? How does it behave when it hits the end?

**Part 2: Modeling S-Waves (Secondary Waves)**

1. Use each material again, stretched tightly between two students.
2. One person gives a **quick side-to-side shake** (perpendicular to the material's length).
3. Watch the wave motion. You should see **side-to-side or up-and-down** movement along the rope.

**Procedure:**

- Use the information from the demonstration to complete the section on the student handout.
- Use any new information to help complete your Earth model rough draft.

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## Station 5 – Wave Simulation

Navigate to https://tinyurl.com/ymy928dh

Toggle "waves shown" to "shadow zones".

Press 'play' on the animation and explore how S & P waves travel after an earthquake.

Observe the waves going through the model of the inner Earth as well as the graph on the left.

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