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DIY ACTIVITY

MAKE YOUR OWN LAVA LAMP GRADES 3-5

OBJECTIVES

- Follow a series of directions that includes making precise measurements using scientific instruments.
- Observe a chemical reaction and resulting changes in matter, including matter seemingly changing states.
- Compare weight measurements as evidence for conservation of matter.

PROCEDURE

WATCH GENERATION GENIUS CONSERVATION OF MATTER VIDEO AS A GROUP.

1. Using the funnel, fill the bottle about $\frac{1}{4}$ full with water.
2. Add 5–6 drops of food coloring. Swirl the water in the bottle to mix.
3. Next, using the funnel, fill the rest of the bottle with vegetable oil
4. Use the scale to weigh bottle and its contents, the balloon, and two of the fizzy tablets all together. Put all these items on the scale at the same time and record the total weight.
5. Then break up the tablets into small pieces so they will fit into the mouth of the bottle. Drop the pieces into the bottle. Immediately stretch the balloon over the top of the bottle to seal it.
6. Observe what happens. Blobs of colored water are pushed upward through the oil, creating a lava lamp effect.
7. When the tablet pieces have disappeared, weigh the bottle with balloon still on it. The weight should be the same as the first recorded weight.

WHAT IS GOING ON HERE?

Initially, the colored water sits below the oil in the bottle. Oil is less dense than water so it floats on top. When the fizzy tablets are added, they undergo a chemical reaction with the water, producing bubbles of CO_2 (carbon dioxide). CO_2 is less dense than both water and oil, and so rises to the top, dragging blobs of colored water along. These blobs rise to the top and then fall again when the gas is released. The balloon inflates due to the CO_2 collecting at the top of the bottle. There is too much gas to fit inside the space left in the bottle so it pushes out into the balloon. No gases escape the bottle/balloon system, so the weight before and after the reaction takes place are the same, resulting in matter being conserved.

MATERIALS NEEDED

- Funnel
- Clear bottle
- Water
- Vegetable oil
- Food coloring
- 2 fizzy tablets (such as Alka-Seltzer®)
- Scale
- Balloon*

Activity Duration: 20 minutes

FURTHER EXPLORATION

Determine how much matter was converted to gas. When building your lava lamp add a step where the weight of the bottle, oil, water, and balloon are weighed and recorded. You can also weigh and record the weight of just the tablets. Then, after the reaction has finished, remove the balloon and reweigh the bottle, oil, water, and balloon. Subtract this weight from the weight of all the materials (step 4 above). Is the difference equal to the weight of the fizzy tablets? How much gas escaped (original weight of tablets minus the difference you just calculated). Where did the gas go when the balloon was removed? (It escaped into the surrounding air).

 *Be aware of possible latex allergies.

