

## Mass / Volume/ Density for Elementary School Science Night

### **Materials:**

- Large plastic tub
- Water
- One foam football and one pig-skin football (or two other objects of similar shape and volume but different weights)
- Small balloons
- Three small clear plastic containers (like something you would pack a sandwich in for lunch)
- Tin or aluminum foil
- Small, dense weights (keys, batteries, magnets, etc.)
- Electric scale
- Paper towels, etc. for clean-up
- Optional: laptop and slides

### **Preparation:**

- Fill the large tub with water. Be careful not to get the scale excessively wet so as to avoid electric shock.
- Leave one of the sandwich containers empty. Fill the second with just enough water that it barely floats. Fill the third with enough water and/or one of the small weights so that it clearly sinks.
- Fold some tin foil into a boat-like shape that will float. Take the small weights and wrap them in some tin foil such that you form a small ball that weighs the same amount as the tin foil boat. Unfortunately, as most tin foil will not sink, no matter how densely packed, this is a bit of a trick. However, for the purposes of demonstration lead the children to believe that this ball is simply crumpled tin foil.
- Optional: create some slides representing mass and volume and density as extra visual aids.

### **Presentation:**

1. Begin by introducing yourself and the topic of discussion, density. Remember that these are young children, so use simpler words and be friendly.
2. Tell the children that you will first explain mass. Show the children the footballs and ask them to guess which one is lighter. If you are presenting for one child, ask her to feel each football in her hands and confirm which weighs more. If you are presenting for multiple children, ask one to hold one football and one to hold the other, then switch. The children should be able to confirm that the foam football is lighter. Explain that the foam football weighs less because it has less mass, and the pig-skin football weighs more because it has more mass.
3. Show the children the scale and make sure that they know that a larger displayed number means an object has more mass. Weigh each football on the scale, again emphasizing that the foam football has less mass, and the pig-skin football has more mass.
4. Tell the children that you will now explain volume. Blow up two balloons to different sizes and ask the children which takes up more space. Alternatively, blow up one balloon to full size and gradually deflate the balloon. Explain

that volume is how much space something takes up, relating the concept to the balloons.

5. Tell the children that you will now explain density. Density is the relation of how much mass something has to how much volume it takes up. Show them the three sandwich containers, emphasizing that they have the same volume. Ask the children to guess which container will float and which will sink. Encourage them to lift, weigh, and consider each container. If necessary or if time allows, weigh each container. Based on their feedback place each container in the large tub of water. Again, explain why each one floats, sinks, or only partially floats, relating the experiment to density.
6. Show the children the tin foil boat and the small tin foil ball. Lead the children in such a way that they explain to you that the two objects have different volume. Encourage them to weigh the objects on the scale, and emphasize that they have the same mass. Ask the children to explain why each object will float or sink. Allow the children to place each in the water and explain why their hypothesis was correct or incorrect.
7. Wrap-up and make sure that the children understand the concept.
8. Clean up.