Student Directions *Density*: How Does Density Relate to Mass & Volume and an Object’s Interaction with Water?

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**Learning Goals:**
Students will be able to use macroscopic evidence to:

1. Measure the volume of an object by observing the amount of fluid it displaces or can displace.

2. Provide evidence and reasoning for how objects of similar:
   a. mass can have differing volume
   b. volume can have differing mass.

3. Identify the unknown materials by calculating density using displacement of fluid techniques and reference tables provided in the simulation.

**Directions:**

1. Explain how you use the simulation to measure the volume that an object can displace. Also:
   a. What is similar or different from the volume that the blocks displace naturally? How might a scientist explain the behavior?
   b. Explain why you think the blue block on the “Same Mass” setting can be placed anywhere in the water.

2. Design experiments to demonstrate the learning goal #2. Provide tables for evidence and use specific examples from your data to provide the reasoning.

3. Design an experiment to identify the 5 Mystery blocks using the Table in the simulation.
   a. Write your procedure in paragraph form.
   b. Identify each block using specific evidence to support your conclusions.

4. Design an experiment and data table to find the density of a real object.
   a. Do several trials, calculating density for each trial.
   b. Calculate the deviation for each trial from the average like you did in the Precision and Accuracy Lab. (*hint: find the absolute value of (observed density – average density)*).
   c. Does your data show precision? Explain
   d. Does your data show accuracy? Explain

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