

Density Assessment: Instructions to the Teacher

- 1. Be sure to offer students enough time to fully complete the inventory. It takes time to think through the questions and draw good models.**
- 2. If students don't understand one of the questions, reword it for them, but do not offer more framing than the question currently has. One of the aims of the assessment is to see how students frame the questions and what variables they think are relevant.**
- 3. Don't call it the "Density Assessment" to the students, particularly when offering it as a pretest. They probably will know if it is in the context of a density unit, but let them decide that.**
- 4. Let students know that there are a small number of questions because each question will require them to think deeply and explain what is going on to the best of their ability. The first three questions ask them to draw models. They should draw their models first, and then write their explanation.**
- 5. For question number one, show the students the two metal cylinders (aluminum and copper or brass) that are used in the density unit.**



Name _____ Date _____

Instructions:

1. Answer each of the following questions to the best of your ability. You may not have studied some of the information that is being asked. Just answer based on what you think is right.
2. Draw a picture or model where it asks you to and include labels. Then write as complete an answer as possible so that we really know what your thinking is. Always draw your model first where it asks for a model.
3. Define any special terms that you use.
4. Answer every question, even those you are unsure about.
5. If you need extra space, use the back of the page.



1. You have two objects that are exactly the same size (volume). However, when you pick them up, one feels much heavier than the other. Explain what you think is going on to account for the difference in mass or "felt weight." Draw two models comparing the objects that show in as much detail as possible what causes the difference. Then give a written explanation of what is going on.

2. A person drops an object into a liquid to see if it will float. Draw a model showing the possible outcomes and WHY each could happen. Then give a written explanation of what determines what will happen.

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3. A chunk of gold is heated but not to the point where it melts. Draw a model showing, in terms of density, the gold before it is heated and the gold once it is heated. Then give a written explanation of what happens and why.

4. What happens to the volume of a solid object made of only one material when you cut that object in half?

Each half of the object has (Circle the answer.)

- a. half the volume of the original object before you cut it.
- b. twice the volume of the original object before you cut it.
- c. the same volume as the original object before you cut it.

5. What happens to the density of a solid object made of only one material when you cut that object in half?

Each half of the object is (Circle the answer.)

- a. half as dense as before you cut it.
- b. twice as dense as before you cut it.
- c. the same density as before you cut it.

6. What happens to the mass of a solid object made of only one material when you cut that object in half?

Each half of the object has (Circle the answer.)

- a. half the mass as before you cut it.
- b. twice the mass as before you cut it.
- c. the same mass as before you cut it.