

Activity 7.1

Defining density

I like throwing stones into ponds or lakes or almost any water for that matter. I like to skim stones, or throw them at stuff floating in the water. Anyway, I was at a lake recently with some friends. I found a tree branch and threw it out into the water as far as I could. Then we each took three rocks and took turns seeing who could hit the floating branch. It was pretty fun. Then we found this really heavy branch that was really more like a log. It took two of us to lift it and throw it in. It made a huge splash but floated even though it was so heavy. As we threw rocks at it, I started to think that it seemed weird. This really heavy piece of wood floats and these rocks, which are so much lighter, sink. I know that wood floats and rocks sink but when you think about how the real heavy one floats and the much lighter ones sink, it seems strange.

Take a closer look

Do heavy things always sink and light things always float?

1. Do you think heavy things *always* sink and light things *always* float? _____

Give at least one example of a heavy object that floats and one example of a light object that sinks.

2. In the demonstration, you saw that the heavier wood floats and the lighter rock sinks.

Which do you think is more dense, the rock or the wood? _____

Why do you think that?

Activity 7.1

Defining density (*continued*)

Try this!

Which weighs more, wood or the same amount of water?

Procedure

1. Place the wood in a cup and look at the wood to see about how much space or volume it takes up.
2. Lift the cup to get a sense of the weight of the wood. Do you think the same volume of water would weigh more or less than the wood?
3. Pour an amount of water that you think is about the same volume as the wood into another cup.
4. Lift both cups to see which seems heavier, the wood or the water.



3. Which do you think weighs more, the wood or a similar volume of water?

4. Which do you think is more dense, the wood or the water?

You can measure a volume of water equal to the volume of the wood by using a more accurate method. This is called the *water displacement method*.

Student activity sheet

Name: _____

Activity 7.1

Defining density *(continued)*

Procedure

1. Label 2 cups **displaced water—wood** and **displaced water—rock**. You will also need two cups which are unlabeled.
2. Stand 1 unlabeled cup inside the larger container. Pour water into the cup until it is filled as high as possible without overflowing.
3. Gently place the wood in the water and slowly push it down until it goes just beneath the surface of the water. Water should overflow into the container.
4. Carefully remove the inside cup and put it aside. Then pour the water that overflowed into the cup labeled “displaced water—wood”. Remove the wood from the water and place it in an empty cup.
5. Lift the cup with the wood and the cup with the displaced water to see which feels heavier.



5. Which do you think feels heavier? _____

6. Explain why the water displaced by the wood has the same volume as the wood.

7. You or your teacher should weigh the wood and the water to see which one weighs more. Which one weighs more? _____

8. Since the wood weighed less than an equal volume of water, the wood is less dense than the water. Do you think the density of the wood compared with the density of water has anything to do with why the wood floats? _____

Student activity sheet

Name: _____

Activity 7.1

Defining density *(continued)*

Use the water displacement method to compare the weight of a rock to the weight of an equal volume of water.

Procedure

1. Stand an unlabeled cup inside the larger container. Pour water into the cup until it is filled as high as possible without overflowing.
2. Gently place the rock in the water. Water should overflow into the container.
3. Carefully remove the inside cup and put it aside. Then pour the water that overflowed into the cup labeled “displaced water—rock”. Pour the water out so that only the rock is left in the cup.
4. Lift the cup with the rock and the cup with the displaced water to see which feels heavier.



9. Which do you think feels heavier? _____

10. You or your teacher should weigh the rock and the water to see which one weighs more.

Which one weighs more? _____



11. Since the rock weighed more than an equal volume of water, the rock is more dense than the water. Do you think the density of the rock compared with the density of water has anything to do with why the rock sinks? _____