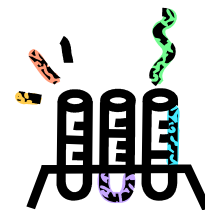




Mini-Lab 1-02: Sinking Suspicion



Purpose:

Do you know the difference between buoyancy and displacement? How would this difference affect a real situation like the one below?

Think about this:

You have a dream one night that you are in a small boat filled with rocks – that's it, just you and some rocks. The boat is in a large cylindrical tank which is filling with a poisonous gas. You have an oxygen tank that will last for about 10 minutes. You desperately need to escape through the hatch in the top of the tank, but you are only 6-feet tall and the hatch is 10 feet above your head. There are no ladders and the sides of the tank are as smooth as glass. You try to stack the rocks but because they are round, you can't really stand on them without knocking the pile down. What can you do? Is the situation a total loss or can you possibly escape?

Safety

- 1) Don't eat or drink anything in the lab.
- 2) Always wear eye protection.
- 3) Wear protective clothing (lab coats, etc.).
- 4) Don't play around – treat the lab with respect.

Questions

1. Write down your idea of how you could potentially escape, and then test your hypothesis in the lab.
2. Did your idea work?
3. What was the outcome of your test?
4. Explain your observations. Why did this particular outcome occur?
5. What is different about the situation when the rocks are in the boat, vs. when they are in the water?

WAIT! Do not write down an answer to the Final question until your Instructor tells you to.

6. **FINAL:** Can you escape? How could you do it and why does it work?



Instructor's Page

1-02: Sinking Suspicion

Source: SCALE-UP

Concepts: density, displacement

Materials: plastic weighing pans (boats), small pebbles (pea gravel), appropriate sized beakers, grease pencils, rulers

Hints: When the rocks are in the boat, they displace their mass. When they are in the water, they displace their volume. They should use the beaker as the “tank” and a weighing boat to simulate their boat. They have to raise the water level the equivalent of 4 feet in order to “escape”.

Discussion ideas: What if you had some super-dense material instead of rocks – would it change the outcome? Conversely, what if you had extremely low-density materials in the boat, would that change the outcome?

For More Information: