

## Activity Sheet Answers

### Chapter 3, Lesson 4

#### Density—Sink and Float for Solids

#### ACTIVITY

1. Which weighs more, wax or an equal volume of water? Which is more dense, wax or water?

Water weighs more than an equal volume of wax. Water is more dense than wax.

2. Which weighs more, clay or an equal volume of water? Which is more dense, clay or water?

Clay weighs more than an equal volume of water. Clay is more dense than water.

3. Knowing the density of an object can help you predict if it will sink or float in water.

If an object is more dense than water, would you expect it to sink or float? If an object is less dense than water, would you expect it to sink or float?

If an object is more dense than water, it will sink. If an object is less dense than water, it will float.

#### EXPLAIN IT WITH ATOMS & MOLECULES

4. Water is made up of small molecules of oxygen and hydrogen. Water molecules are closely packed together. Wax is made of carbon and hydrogen atoms connected together in long chains. Explain on the molecular level why wax is less dense than water.

Wax is less dense than water because it is composed of carbon and hydrogen atoms, while water is composed of oxygen and hydrogen atoms. Oxygen atoms are heavier and smaller than carbon atoms. Also, the molecules of water pack together more tightly than the molecules that make up wax. This makes wax less dense than water.

Clay is made of oxygen and heavier atoms such as silicon and aluminum. Explain on the molecular level why clay is more dense than water.

Clay is more dense than water because it is composed of atoms like silicon and aluminum that have more mass than the oxygen and hydrogen atoms in water. These heavy atoms give clay more mass per unit volume, which means it is more dense than water.

## TAKE IT FURTHER

5. A giant log can float in water while a tiny grain of sand sinks. Explain why a heavy object like the log floats while a very light grain of sand sinks.

A log can float on water because it is lighter than an equal volume of water which means it is less dense than water.

A tiny grain of sand sinks because it is heavier than an equal volume of water which means it is more dense than water.

6. Remember that the density of water is  $1 \text{ g/cm}^3$ . Predict whether the following objects will sink or float.

| Will these objects sink or float? |         |               |
|-----------------------------------|---------|---------------|
| Object                            | Density | Sink or Float |
| Cork                              | 0.2–0.3 | Float         |
| Anchor                            | 7.8     | Sink          |
| Wooden Oar                        | 0.4     | Float         |
| Apple                             | 0.9     | Float         |
| Orange with peel                  | 0.84    | Float         |
| Orange without peel               | 1.16    | Sink          |

7. If a peach has a volume of  $130 \text{ cm}^3$  and sinks in water, what can you say about its mass?

If a peach has a volume of  $130 \text{ cm}^3$  and sinks in water, then its mass must be greater than 130 grams.

8. If a banana has a mass of 150 grams and floats in water, what can you say about its volume?

If a banana has a mass of 150 grams and floats in water, then its volume must be greater than  $150 \text{ cm}^3$ .