WORKSHEET: DENSITY FUNDAMENTALS

Density plays a key role in determining whether objects will sink or float in **fluids**. Gold sinks in water because gold is denser than water, and pine floats in water because pine is less dense than water. In fact, the **densities** of different substances are often compared to that of liquid water.

density of gold > **density** of water > **density** of pine

TURN AND TALK

With a partner, figure out how you would explain to a second grader why gold sinks and pine wood floats:

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The Densities of Liquid and Solid Water

Ice floats in liquid water, so ice must be less dense than liquid water.

The liquid water in this glass has a volume of 55 cubic centimeters and a mass of 55 grams. The ice cube floating in the water has a volume of 9.5 cubic centimeters and a mass of 8.74 grams.

Find the **density** of liquid water:

55g/55cm^3 = _____ g/cm^3.

The answer to the above question is no coincidence. A gram was originally *defined* as the mass of one cubic centimeter of pure water!

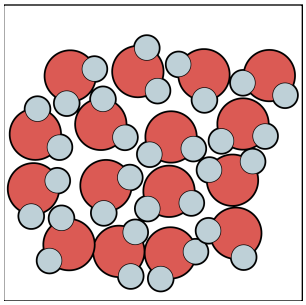
Now find the **density** of ice:

8.74g/9.5cm^3 = _____ g/cm^3

Ice is actually kind of a strange case. Usually, substances expand and become *less* dense when they are warmer, and shrink and become *more* dense when they are colder. Liquid water at room temperature, for example, is slightly more dense than hot water.

But when water freezes, it expands slightly and becomes less dense, as your calculation of the **density** of ice should show. Why? Well, when water molecules stop sliding past each other and form solid ice, they become organized in a way that actually spreads them apart slightly, so that there are fewer molecules per cubic centimeter. The white space in these illustrations represents empty space:

Liquid water



Ice