Sink or Float

All right. So when looking at Archimedes' principle and buoyancy, we're really trying to determine whether or not things are going to sink or float within a liquid. So when the weight of a submerged object is greater than the buoyant force, the object will sink. So in other words, if the object has more weight than what the buoyant force or the liquid can supply, the object will sink. Vice versa, when the weight of a submerged object is less than the buoyant force, the object will float because the buoyant force is able to support that weight.

So really, when we look at sinking or floating, density is the true key. So the mass of the object divided by the amount of volume of that object is key to floating or sinking. There are three simple rules that I want you to remember for sinking or floating. The first is that if an object is more dense than a liquid, it will sink. So if you place a very, very, very heavy rock in water, it's going to sink because water cannot support the weight or density of that rock.

If an object is less dense than liquid, then it will float. Take, for example, ice is less dense than water, therefore it floats in water. And then the third rule that I want you to remember is that objects with equal densities to the liquid will neither sink nor float. They're just going to stay in their original position.

So let's take, for example, a person on a raft. A person on a raft is actually having their mass spread out over a larger volume, which is the size of the raft, which is why rafts work in helping us float. If you were to actually put yourself into a cannonball shape or a smaller area, you would actually create more density, making yourself sink to the bottom of the water.

Let's take, for example, a fish as our second example here. And a fish is able to control whether or not it floats or sinks based on the amount of air that is within its body. So when it actually has a lot of air within its body, it's increasing the volume of its body, thus allowing it to float. However, when it breathes out or contracts, the air is let out, and it is able to then sink, the fish is, of course.

And then the last thing, which I found to be pretty interesting when I heard this, was that alligators will either hunt on the surface of the water or below the surface of the water. And to help them hunt on the bottom of the water, they will sometimes swallow as much as up to 5 pounds of rocks, which will then make the alligator more dense and allow it to stay on the bottom of the water surface. Whereas when it has no rocks in it, it's able to float and hunt above the surface of the water.