

Float the Boat

Materials

- Container of water
- Modelling clay
- Marbles



Instructions

1. Roll modelling clay into a ball and ask the children if they think the ball will float or sink.
2. Drop the ball into the container of water and note that it sinks.
3. Ask the children to suggest how to make the modelling clay float. Someone might suggest using a small piece of modelling clay. Tear off a tiny piece, drop it in the water, and observe that the tiny piece of modelling clay sinks in the water.
4. Mould the modelling clay into a boat shape that will float on the water.
5. Ask the children if they think the boat will still float if marbles are added. How many marbles can be added before the boat will sink?
6. Test the prediction, adding one marble at a time until the boat sinks.

What happens?

Whether or not an object floats or sinks depends on the density of the object compared to water. Density is the amount of mass in a given volume, and a useful way to think of it is that high density objects are heavy for their size, and low density objects are light for their size. A ball of modelling clay has a higher density than water, so it tends to sink in water. When it is in the shape of a boat, the shape encloses some air, so the overall density of the boat is less than the density of water, so the boat floats.

Another way of thinking about this is that the force of gravity is pulling down on the modelling clay to make it sink, and the 'buoyant force' from the water is pushing up on the clay to make it float. The buoyant force pushing up on the boat is greater than the buoyant force on the ball because the boat is pushing down on a larger area of water, or 'displacing' a larger volume of water.

Watching a tiny piece of modelling clay sink in water demonstrates that the density of a material, rather than its size, determines whether it will sink or float.

Health and safety considerations

Modelling clay and marbles can be choking hazards for children under the age of 3.