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ORANGE YOU INTERESTED IN BUOYANCY?

MATERIALS

WHAT YOU'LL NEED

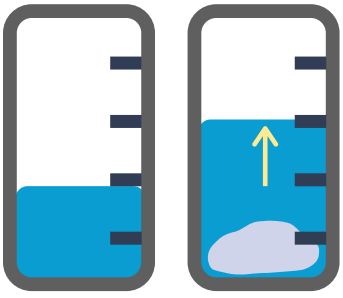
- Orange
- Large container (large enough for an orange to fit in)
- Water

LEARNING CORNER

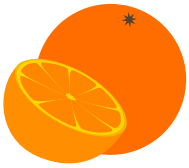
Buoyancy: An upward force that helps an object to float in a fluid.

Density: The compactness of a substance.

Displacement: How much fluid is pushed away when an object is placed in it.



When life gives you oranges, try experiments with buoyancy! Using water and a healthy snack, explore displacement and how it helps things float.



BIG QUESTION

How can we demonstrate buoyancy with oranges?

Step by step activity instructions on next page.

BONUS QUESTIONS!

Think of a trip to the pool. What device helps you float in a pool? How does it work?

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PREPARE YOUR WATER

Fill up 3/4 of your container with water.

MAKE A HYPOTHESIS

Make a hypothesis about your orange. Will it sink or float in the water? Why?

EXPERIMENT

Place the orange in the water. What happens?

Try to poke or push the orange to the bottom. What happens?

REMOVE THE ORANGE

Remove the orange from the water. Peel the skin.

MAKE A HYPOTHESIS

Make a hypothesis about your unpeeled orange. Will it sink or float in the water? Why?

EXPERIMENT

Place the unpeeled orange in the water. What happens?

In this experiment, we changed the orange's density to affect its buoyancy

What if we changed the water's density? **Try this next:** Put an egg in water to see if it floats! Remove the egg and add salt to the water. Repeat the experiment and add more salt each time. What happens?

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WHAT HAPPENED?

An object's buoyancy is determined by **Archimedes' Principle** (any object in a fluid is acted upon by an upwards force equal to the weight of the fluid displaced by the object).

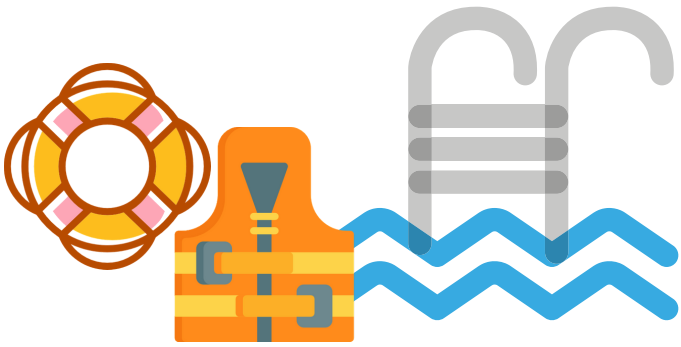
When the orange is placed in the water, there are two forces at work:

- **Gravitational force** which pulls the orange down
- **Buoyant force** which pushes it upward

In the case of the **unpeeled orange**, the peel has tiny pockets of air in the peel that make it less dense and help it displace more water so it floats.

In the case of the **peeled orange**, the orange is lighter but it does not displace enough water without its peel.

Another way to think about it: Imagine you are in a pool. What device helps you float? A life jacket or a pool float! These devices contain air pockets that help displace more water so you can float instead of sink.



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