

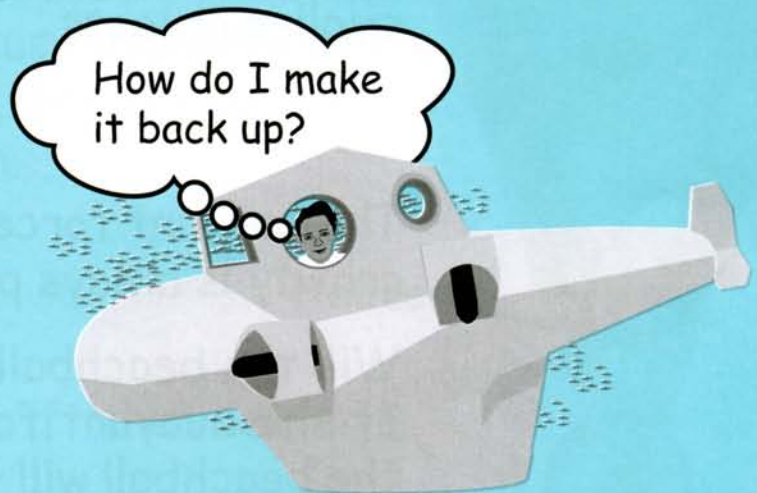
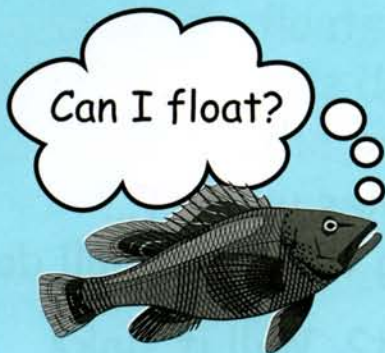
JUST FOR U.S.*

GRADES 4-5

* Understanding Science

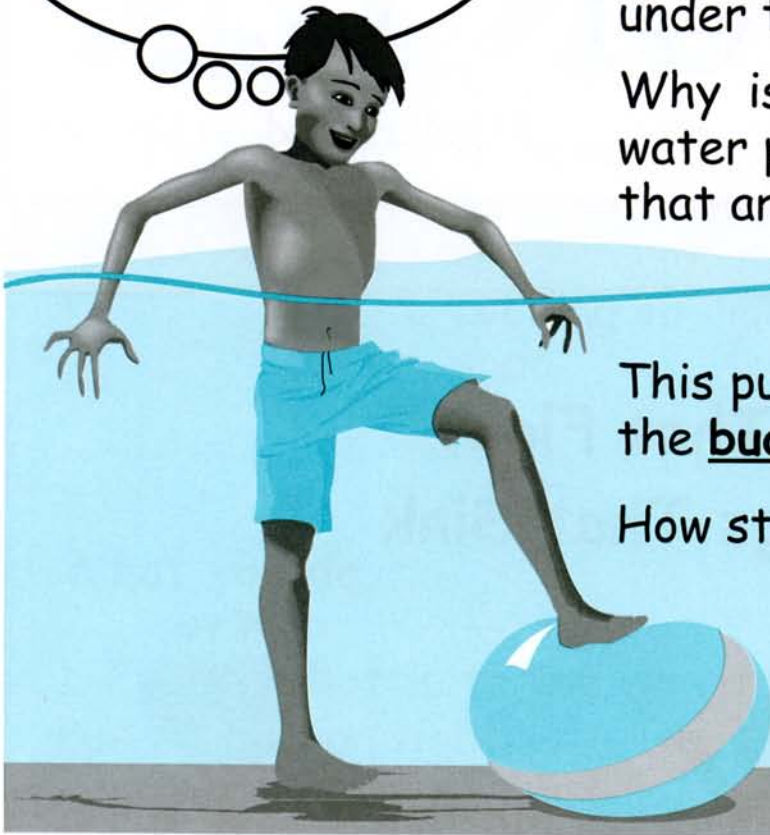
Volume 30 • Issue 2 2005 - 2006 Fernbank Science Center • DeKalb County School System ISSN 0742-6526

Things That Float and Things That Sink



Buoyancy

It's hard to keep this beachball under water!

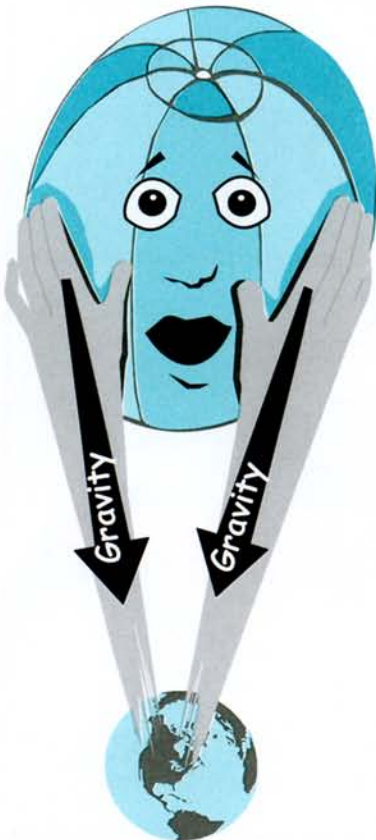
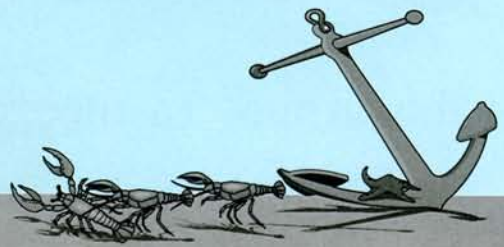


Did you ever try to hold a beachball under the water? It is very hard!

Why is it so hard? Because the water pushes up on all the objects that are in it.

This pushing force is called the buoyant force.

How strong is the buoyant force?



The buoyant force is greater for large objects, and less for smaller objects.

bowling ball

coin



The buoyant force pushes up BUT... gravity is always pulling the beachball down.

Will the beachball float? Will it sink?

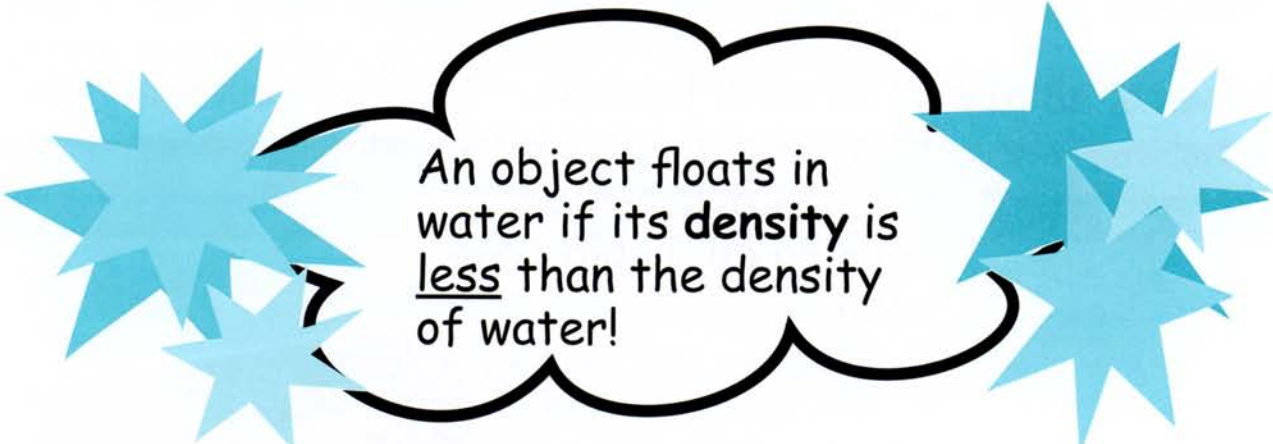
If the buoyant force is greater than gravity, the beachball will float. If the buoyant force is less than gravity, the beachball will sink.

Will it Float?

How can we predict if an object will float?

How do we know if the buoyant force is greater than gravity?

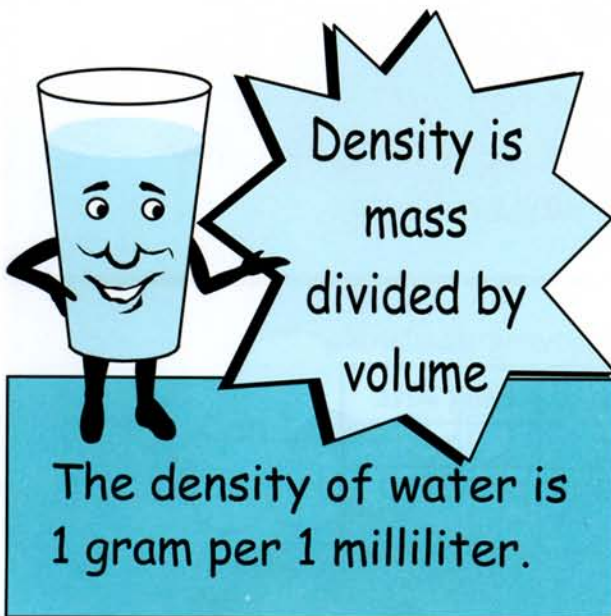
The answer involves **density**.



An object floats in water if its **density** is less than the density of water!

What is Density?

Density is a property of matter, like color or size. Both the mass and the size of an object affect the object's density.



What is **mass**? Mass is how much 'stuff' there is in an object.

What is **volume**?

Volume is an object's size. It is how much space something takes up.



Mass and weight are not the same!



Floating in the Air

Air is a gas that is all around us. It is made up of real stuff. It is made of particles so small you can not see them even with a magnifying glass or a microscope.

Air is a kind of matter, so it takes up space and has weight. Like all matter, air has density. The density of air is very small.

Things float in air if they are less dense than air.

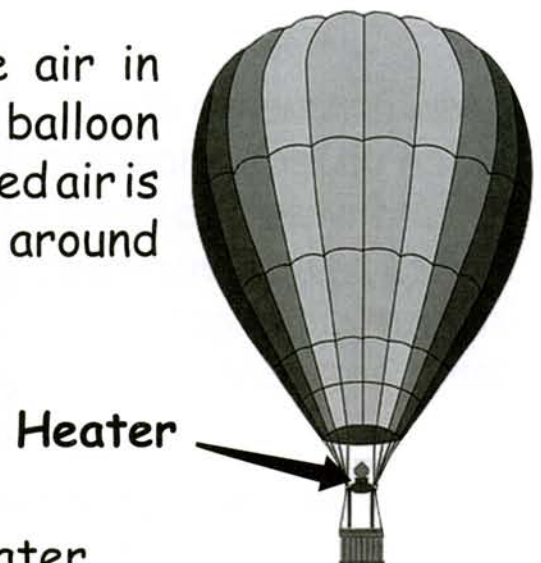
Rising Air Currents

Do you know what an air current is? You can not see it, but you can feel it. An air current is movement of air.



Air heated by a flame moves upward in an air current. The hot air is less dense, so it rises straight up!

The heater heats the air in this hot air balloon. The balloon floats because the heated air is less dense than the air around the balloon.

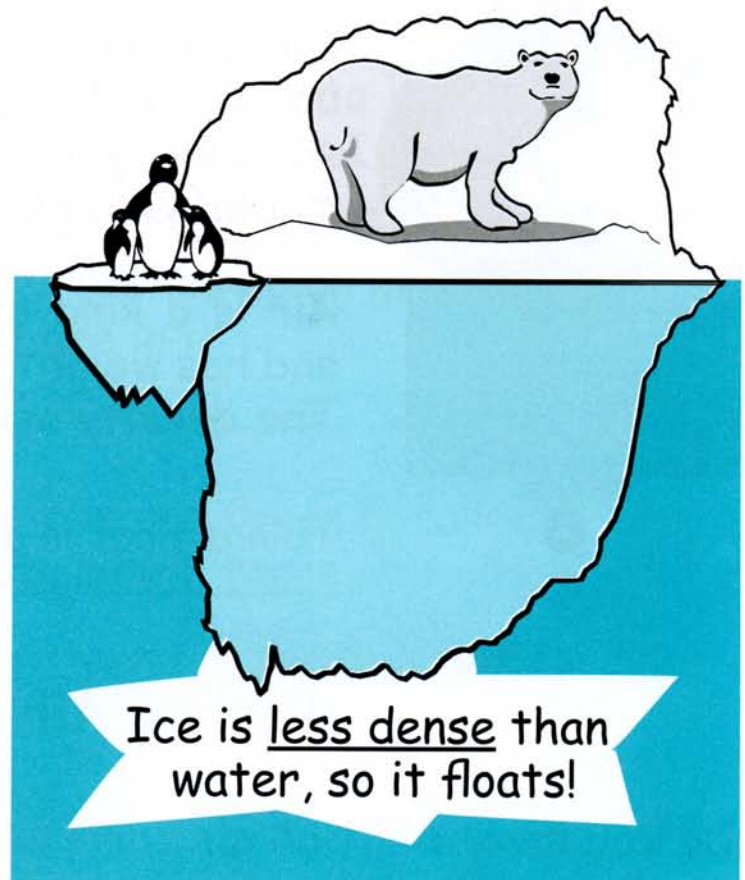


What would happen if the heater stopped working?

Floating on Water

Objects that float on the water take up space where water would be. As they go into the water, they begin to push the water away—they **displace** the water.

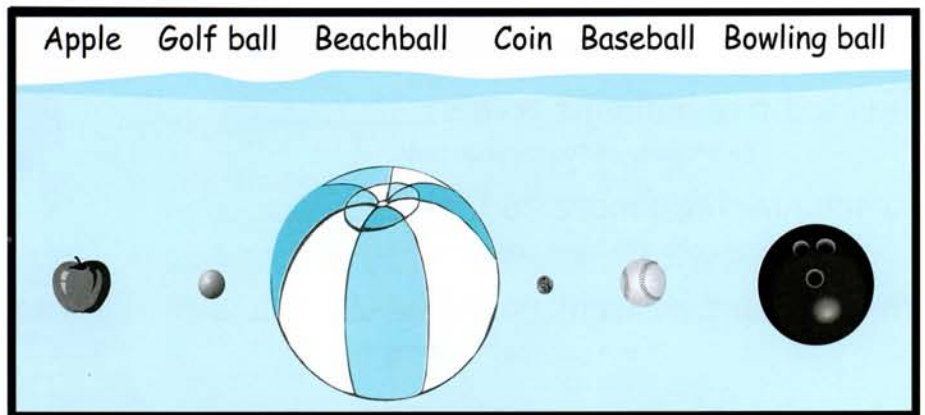
Objects sink until the weight of the displaced water is exactly equal to the weight of the object. Some part of a floating object is always above water.



Predicting What Will Happen

You can do this experiment in the bathtub. Look at the picture. Which objects will float? Which objects will sink?

Draw arrows to show which objects float (↑) and which objects sink (↓). Did everyone in your class get the same answers?



Circle the correct answer:

The objects that float are (more dense, less dense) than water
The object that sink are (more dense, less dense) than water.

Answer: Objects that float are less dense than water. Objects that sink are more dense than water.

Teacher's Page

EXPLORING DENSITY!

What you need..

1. Several empty plastic bottles with their caps
2. Several liquids: tapwater, really salty water, corn syrup, cooking oil, liquid soap, soda
3. A sink half full of tap water

Ask a grown-up to help!

What you do...

1. Fill each bottle to the very top with one of your liquids. Put the cap on tight.
2. Put the bottles into the sink.
Which bottles float? Do any bottles sink?
3. Which liquids are more dense than tap water? Which liquids are less dense than tap water? Does any liquid have the same density as tap water?

This issue addresses the following standards:



Science	Math	Lang Arts
GPS	QCC	GPS
4 S4CS1-5 S4P3	Meas 13,15	ELA4R1,3
GPS	QCC	GPS
5 S5CS1-5 S5P1	Meas 13,15	ELA5R1,3

Written by Michael Dowling and Linda Lögdberg.
Layout, illustrations and graphics are by Sheila Ward.

It is the policy of the DeKalb Board of Education not to discriminate on the basis of age, sex, race, color, religion, national origin, disability or handicap in its education programs, activities or employment