

## Why Do Life Jackets Float?

One of the first rules of water safety is to always wear your life jacket. Did you ever wonder how a life jacket, which weighs a lot less than you, can keep you afloat in the water?

Well, the answer has to do with buoyancy. First let's define some words that will help us understand this.

**Float:** 1) To rest on the surface of or be suspended in a fluid. 2) To stay at the top of the water without sinking to the bottom. The water holds or buoys an object.

**Buoyant:** 1) Capable of floating.

**Buoyancy:** 1) The tendency of a body to float or to rise when submerged in a fluid. 2) The power of a fluid to exert an upward force on a body placed in it.

### YOU BE THE SCIENTIST...

Now that you know what it means to be buoyant, what kinds of objects will float and why? Conduct the following experiment:

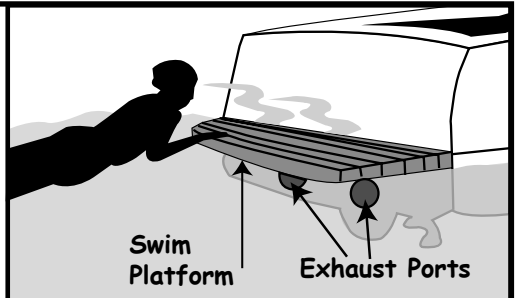
1. Predict which of the objects listed below will float.
2. Place the objects one at a time in a large bowl or pail filled with water.
3. Watch what happens.
4. Record what you see on the chart below.

Observation Chart (Fill in one arrow)	Predict		What Actually Happens?	
	Float	Sink	It Floats	It Sinks
1. Large metal paper clip	↑	↓	↑	↓
2. A pencil	↑	↓	↑	↓
3. A small, empty glass, or plastic bottle with cap	↑	↓	↑	↓
4. A piece of Styrofoam	↑	↓	↑	↓
5. An empty plastic 35 mm film canister	↑	↓	↑	↓
6. A 35 mm film canister filled with sand	↑	↓	↑	↓

Why do you think some objects sink while others float? Find out the answer on the back of this page...

**Q:** What is colorless, odorless, tasteless and can kill you even if you are wearing a life jacket?

**A.** Carbon Monoxide



Swim Platform      Exhaust Ports

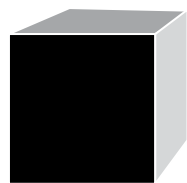
**Tip:** Don't sit on the swim step or "teak surf" behind a boat. The exhaust from the engine contains carbon monoxide and the fumes can kill you.

## Why Do Life Jackets Float? (Continued)

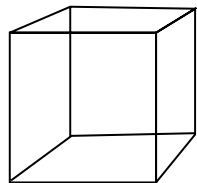
By now you have probably figured out that certain objects will float and others won't because of their buoyancy. Let's explain it like this: A body displaces (moves) water which pushes back and creates buoyancy. The more water you displace, the greater the force pushing back.

**Think about this:** A cubic foot of water weighs about 62 pounds. A solid cubic foot of wood weighs about 50 pounds. The solid block of wood will float because it can displace enough water to equal its own weight. Now try the same thing with a box made of wood that is hollow inside. Let's say it weighs about ten pounds. It will float much higher because it only has to displace ten pounds of water to float.

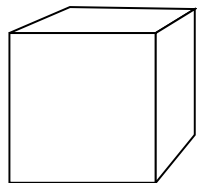
When you are in the water, you feel much lighter. That's because your body has displaced water that is pushing back and creating buoyancy. A life jacket is filled with a very light material, usually foam, that can displace a lot of water compared to its weight. A cubic foot of foam weighs about one pound. It will float on top of the water because it only has to displace one pound of water.



Solid block  
of wood  
50 pounds



Hollow Box  
10 pounds



Foam  
one pound

Because your body already has some buoyancy, a life jacket doesn't need to support all of your weight. It just needs to displace enough to keep your head above the water.

**So, that is how a life jacket works. It is very buoyant!**

## Water Safety

Test your safety knowledge. Complete the Safety Rules by using the words listed below. Write the correct letter in the space next to the rule.

- |  |                  |
|--|------------------|
| A. US Coast Guard-approved life jacket (PFD)                                     | G. A buddy       |
| B. Reach, Throw, Row, Don't Go   | H. Hypothermia   |
| C. Very deep or very shallow water, rock, broken glass, tree stumps and garbage. | I. Diving        |
| D. Properly fitted and properly fastened   | J. Swim          |
| E. Air Mattress, water wings, swim ring, inner tube                              | K. Learn to swim |
| F. Alcohol and drugs   | L. Swimming      |

- \_\_\_\_\_ Always swim with one of these.
- \_\_\_\_\_ A dangerous way to enter unfamiliar water.
- \_\_\_\_\_ Not a natural human activity, but people can learn to do this.
- \_\_\_\_\_ Dangers hidden beneath the surface.
- \_\_\_\_\_ The first rule of water safety.
- \_\_\_\_\_ Rules for wearing life jackets (PFDs).
- \_\_\_\_\_ Not a substitute for a life jacket or PFD.
- \_\_\_\_\_ Stay in a supervised and posted area when doing this.
- \_\_\_\_\_ These can lead to big problems when mixed with swimming or boating.
- \_\_\_\_\_ The most important piece of equipment to have on a boat.
- \_\_\_\_\_ When someone needs help to get out of the water you should:
- \_\_\_\_\_ When the body loses heat faster than it can produce it. Very low body temperature.

Answers: 1. G / 2. I / 3. J / 4. C / 5. K / 6. D / 7. E / 8. L / 9. F / 10. A / 11. B / 12. H