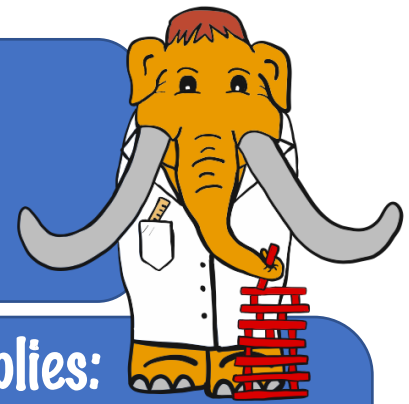


Science Saturday @ Home

Floating Coffee Filters



Gathering Supplies:

Coffee Filters
String Scissors
Tape Coins
Paperclip
Science Max Printable (optional)

How To Steps:

Let's use coffee filters to take a look at air resistance.

1. Take two coffee filters. Hold one of them up in the air and let go. What do you notice about the way the coffee filter drops? Does it want to always fall in the same position? Thanks to the shape of the coffee filter, with a flat bottom and wavy angled sides, it will always want to fall flat side down in pretty much a straight line.
2. Now take the other coffee filter and crumple it into a tight ball. You have just changed the shape property of the coffee filter. Remember that properties are how scientists describe something: like color, weight, or shape of an object. The color and weight of the two coffee filters are the same you are just changing the shape.
3. Now hold both the balled up coffee filter and the regular filter up high and drop them at the same time from the same height. Which filter will hit the ground first? Check out the Did You Know section to see if you can figure out what happened.

Now lets try turning the coffee filter into a parachute! Coffee filters are made of light but strong material, so see how much weight your coffee filter parachute can take.

1. Cut four pieces of string to the same length, about 1 foot long.
2. Flatten out your coffee filter and tape the end of each pieces of string to the filter. For the position of the tape on the coffee filter think north, south, east and west.
3. Pull the end of the strings together, making sure they are all the same length and tie them together in a knot and put a paperclip on the end for weight.
4. You can cut out a Max and tape him on to the paperclip or just tape coins with different weights onto the knot and drop your parachute to see how the coffee filter material helps slow their descent to the ground.

Max's Coffee Filter Parachute



Did You Know?

Melitta Bentz, a German housewife, invented the paper coffee filter in 1908. She wanted a material that would filter out the bitter tasting coffee grounds while still being strong enough, when wet, to hold the grounds when you throw them away. That year Melitta founded the coffee filter company that still bears her name even today! Coffee filters are made with long celluloid fibers from trees, that are overlapped just enough to make a material that allows hot water to slowly filter through coffee grounds but catches and absorbs the tiny grounds and oils that can cause coffee to have a bitter taste.

Why do coffee filters make great toy parachutes? They are lightweight, strong and shaped just right for great air resistance. Remember that air pressure is happening all around us, pushing in every direction on an object. This is one reason bubbles are round. The shape of a falling object creates air resistance. Think about what happened with the two different falling coffee filters. The ball falls fast because it has less air resistance compared to a regular filter. But what happens to an object that is falling and how can the shape of a parachute help slow the fall?

Objects falling through air experience a force called drag. Drag is the force of the air pushing against an object as it falls. The faster they fall, the stronger the drag. Eventually, the force of drag holding up the object will be equal to the force of gravity pulling it down, and the object will stop falling faster and faster- it has reached what is called terminal velocity. Meaning it is now falling at a constant speed. Objects with large surface areas, like parachutes, experience lots of drag and have a low terminal velocities helping them land softly on the ground!