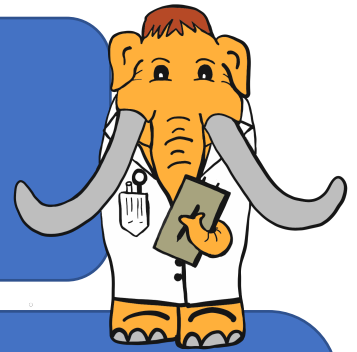


Science Saturday @ Home

Gravity - It Works!



Gathering Supplies:

- 2 of the same type of plastic bottles with lids.
- Water
- Balls or Marbles of different sizes
- Bowl of Flour or Sand

Will bottles that have different mass fall at different speeds?
Make sure to do this activity where it is safe to drop objects!

How To Steps:

1. First test to see if two bottle of the same size and mass will hit the ground at the same time. Remember **MASS** is how much matter or stuff is in an object. **Weight** is a measurement of the force on an object's mass by gravity. Take two matching empty plastic bottles. Find a place that it is safe to drop them on to the ground.
2. With one bottle in each hand, hold them out at arms length or a little higher. You want both of your hands to be at the same height from the ground.
3. Let go of both bottles at the same time. Could you hear them hit the ground at the same time? Not sure? Try it again, or have a family member drop the bottles while you watch.
4. Now see what happens when the bottles have different mass. Increase the mass of one bottle by filling it part way with water.
5. Now try dropping the two bottles again. Do the bottles with different mass hit the ground at the same time? You can keep trying with different amounts of water in each. Do you keep getting the same results?

Taking it further!

What effect do objects of different mass have when hitting the ground?

1. Take a bowl of flour or sand and place it on the ground. Remember to put it somewhere that can get messy if the flour spills.
2. From the same height, drop balls and marbles of different sizes and mass into the bowl.
3. Look at the craters that the balls make in the flour. Are some deeper than others? How does the mass of an object affect the type of craters it makes?



Did You Know?

When you drop an object it falls and lands on the ground. This is the force of gravity and it always seems to be working. When we jump we get pulled back down to the ground, and not finding ourselves floating up to the ceiling!

Gravity is the force that pulls objects towards the center of the Earth and stops things, and us, from floating around in the air. The force that causes objects in nature to fall has been studied by philosophers and scientists for years.

In the 1500's Galileo Galilei, a mathematics professor in Italy, used experiments to study the movement of objects. Through his experiments he found that objects fall at the same rate even if they have different mass. His writing called "On Motion of Objects" influenced another mathematician named Isaac Newton. Sir Isaac Newton explained how gravity affects all objects from an apple falling from a tree to the moon orbiting the earth in his theory of universal gravitation published in 1687 in his book called "Mathematical Principles of Natural Philosophy".

In your experiments you can see the force of gravity at work. You are also able to see that an object with greater mass will hit the ground with a greater force, creating a deeper crater in the flour, but still travel at the same rate as objects with less mass when dropped.