Toys in Space

Astronauts aboard the ISS perform several experiments in order to benefit humans on Earth and to prepare humans for long-term exploration into the solar system – from growing crystals for new medicines to testing new exercises to keep their bones and muscles strong. However, sometimes they just want to have a little fun with their experiments! The astronauts wanted to find out if microgravity affects the way toys work and operate in space! Earth's gravity pulls on you as you leap to slam dunk a basketball into a hoop. It also keeps your toy racecars on the track. What would happen to those toys and others if they were in space? That's what we want you and your child to discover along with the scientists in this activity.

In this activity, your child will predict how certain toys react in zero gravity compared to the way they behave on Earth.

What You Need:

- Toys in Space video (Can be ordered from NASA: http://catalog.core.nasa.gov/core.nsf/5f9c4a5adae3d29e8625670d004edb64/c4be9dec2fc10f2d86256e4400550766?OpenDocument, or viewed online at Lift Off to Learning: http://quest.nasa.gov/space/teachers/liftoff/toys.html)
- Gyroscope
- Ball and cup
- Small ball and hoop

What to Do:

- Ask your child to play and experiment with the ball and cup at station "A".
- Have your child make observations about the way the toy operates and why it operates in that manner.
- Ask your child to think about how that toy would work in space. Would it work the same or differently?
- After your child makes his/her observations and predictions, have him/her watch the video to learn how microgravity affected the toy.
- What happened? Were they surprised?
- Repeat these steps for stations "B" (Gyroscope) and "C" (small ball and hoop).
- Ask your child how might other toys be affected by the microgravity in space?

Why *Do* Things Float in Space?

Gravity is the attraction between two masses, such as between the Earth and Moon, or between the Earth and you. The farther away from the mass you are, and the smaller or less dense it is, the less it pulls on you. Many people think there is no gravity once you get as far away from Earth as its atmosphere. But Earth's gravity field extends beyond the atmosphere, and beyond the Space Station and beyond satellites and even beyond the Moon. In fact, Earth's pull is only 1/10th smaller on the Space Station than it is on Earth's surface.

If Earth's gravity still "pulls" on the Space Station, why don't people and things fall toward Earth? Why do they float? The Space Station – and everything in it - *is* constantly falling toward Earth, but it is also moving forward very fast – at 17,500 miles per hour. This combination keeps the Space Station in orbit around Earth. It is in constant "free fall." And everything on the Space Station is falling together – the astronauts, their equipment, pencils, and clipboards. Because they are all falling together at the same rate, they appear to float relative to each other.