VIRGINIA AIR & SPACE CENTER

Program: **Balls, Ramps, And Rolling Things**

Post-Visit Activities

Grades K-2

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These activities are intended for use after your visit to the Virginia Air and Space Center. All of the activities can be tailored to your specific classroom needs, and the procedures listed are suggestions for teaching.

Activity 1: WORK

This program was designed to give students a concept of how work can be made easier by the use of certain **machines**. We introduced the students to "**forces"** and how those forces can either act against them or help them. These activities have been devised to give students some hands-on activities to experiment with these forces and work.

Students are encouraged to come up with definitions for the word "**work."** Have them give examples of "work." Work, in science, means "**movement."** It consists of two parts. One is the amount of **force (push or pull)** that is needed to move something. The other part is the **distance** over which the force needs to be applied. The formula for work is:
WORK = FORCE x DISTANCE. Distance is the space it moves. However, for the purposes of your age group, you only need to concentrate on the fact that work can be lessened by using a machine.

Prep: Set up a bowling lane in your classroom. You will need 5 to 6 bowling pins (if you do not have bowling pins you can use soda bottles), an assortment of different balls (different sizes, even tiny rubber bouncy balls), and masking tape to mark a line where your students should stand.

Have your students experiment with the assortment of balls to see what kind of force is needed to knock over all the pins. Treat it like an experiment and have your students analyze the force and distance put on the ball. Have them answer questions like:

1. Is the surface of the floor affecting how fast or slow the ball goes?
2. If so, is friction helping or hindering the momentum of the ball?
3. Does the ball's mass (weight) determine how many pins get knocked over?
4. Does the mass of the ball factor into how hard the force is when it hits the ball?
5. Does the distance you release the ball from have a factor on how many pins fall down?
6. Does the height from which you released the ball have a factor on how fast the ball rolls?

Your students will have a better understanding of how force is applied in all areas and activities. Ask your students to explain how their new found knowledge can help them in sports, experiments, chores, etc.

Extension: You can take this activity a step farther by getting out a tape measure or yard stick and measuring the distance the ball rolled before it hit the pins. You can also try bowling on different surfaces. What effects will a smooth surface verses a carpeted surface have on how many pins fall over?

Activity 2: Machines and Work

Ask your students, "What is a machine?" They will have tons of answers, and accept them all. Ask them, "Why do we have machines?" We have machines because they help us do work. Machines also help to make work easier. Have the students draw pictures of their favorite machines. Have them share their pictures with the rest of the class. Make sure they can explain what their machine does to help them.

Extension: Have your students identify all the different machines you have in your classroom. Have them identify each machine's function and what it does to make work easier.

Activity 3: Magnetism

A magnet is a body that attracts certain materials as a result of its surrounding field of force, which is produced by motion of its electrons and the alignment of its atoms. Magnets **attract** other magnetic materials. When this happens the "**unlike poles"** are facing one another. The magnet will "**repel**" when the like poles are facing one another.

Prep: You will need a couple of small magnets and a few compasses.

1. Explain to the students that the red end of the compass needle points north. To use a compass, it should be turned until the letter "N" on the compass scale lies beneath the red end of the needle.
2. Explain that the Earth's magnetic pole attracts the compass needle.
3. Have students experiment with what happens when they move a magnet around the compass.

This will not only give your students a better understanding of magnets, but it will also show your students how our Earth has magnetic poles.

Extension: Set up a small scavenger hunt out on the play ground, using the compass to give directions. Give your students instructions on where to begin and the directions to locate a specific playground equipment. For example: What piece of playground equipment is about 45 steps "NW" of the swing set?

RESOURCES

The following is a list of suggested websites that you may find helpful.

Websites

http://pbskids.org/curiousgeorge/parentsteachers/activities/pc_ramp_n_roll.html

http://www.nyu.edu/projects/mstep/lessons/magnets.html

http://homeschooling.gomilpitas.com/explore/machines4kids.htm

http://familyfun.go.com/parenting/learn/activities/feature/famf199611_learnproj1/famfun199611_machanic.html

http://42explore.com/smplmac.htm

Books

Let's Try It Out With Towers and Bridges. Simon and Schuster. 2003.

Machines At Work. Byron Barton. 1987.