Revised 6/00

Lesson #31

Introduction to Toys in Space

Grade Level: **K-2**

Teachers, this is a basic lesson plan you may modify at your discretion.

Modifications to video: There have been several changes to the lesson plan since the video was made. This lesson plan reflects the latest changes made as a result of suggestions from teachers who have presented the lesson during the daytime program. Please continue to send us your ideas!

Overall educational objective: To introduce children to the concept of gravity on earth and in space.

Associated Standard and CORE objective:

3000-0102 Make observations using a combination of senses (sight and touch) and communicate those observations.

Materials list:

1 - Toys in Space classroom video: **This video stays in the blue box at the end of the day.**
(This video contains a brief introduction to the toys in space project and to microgravity. Following the introduction there are short segments demonstrating how each toy works both on earth and in space. The order of the toys shown on the video is as follows: (1)Clacker, (2)Jacks, (3)Magnetic Wheel-O, (4)Top, (5)Rattle-back, (6)SpringJumper.)

30 - Toy boxes, each containing the following toys:

1 Clacker	1 Top
1 Ball with 6 jacks	1 Rattle-back
1 Large Magnetic Wheel-O	1 Spring Jumper

Lesson activities:

1. Explain to students that there is a force called gravity that holds us on the ground. Explain that in space this force is very weak. This is why astronauts float while they are in space. There is not enough gravity to hold them on the floor of the space shuttle.

2. Show the class video introduction to the students. Give the students about 3 minutes to try the first toy. Then ask the students to predict how the toy will act in space where there is very little gravity.

Now show the atronauts playing with that toy. Ask the students to describe how the toy acted. Did it act differently in space? Or did it act the same as on Earth. Repeat this process with all of the toys.

Facts: The STS-54 shuttle took different toys with them to demonstrate how mechanical objects perform differently in a simulated zero gravity (micro-gravity) condition. The students have six of these toys to try out for themselves. Gravity forces are critical for the operation of some devices, yet the Newtonian laws of motion still apply in space.

Safety Factors: Warn the students not to overwind or drop the toys. Toys with moving parts should be kept away from the faces of the operators and their neighbors. You may need to adjust the seating to provide adequate spacing.

Please make your students aware that this lesson relates to the following:
Career Field: SCIENCE
Occupations: **Astronaut**: Working with the National Aeronautics & Space Administration (NASA), astronauts man the various space projects. NASA primarily seeks candidates with a military background, jet aircraft flight experience, and engineering training.

Several Requirements:

1. Have at least a bachelor's degree from an accredited institution in engineering, biological science, physical science, or mathematics.
2. Have three years of related professional experience following the degree.
3. An advanced degree is recommended but could be substituted with additional years of work.
4. Must be between 5'4'' and 6'4''.
5. Have at least 1000 hours pilot-in-command time in a jet aircraft.
6. Be able to pass a NASA Class I Space physical or an equivalent exam.

Mechanical Engineer: They plan and design tools, engines, machines, and other mechanical equipment. They design and develop power-producing machines such as internal combustion engines, steam and gas turbines, and jet and rocket engines. They also design and develop power-using machines such as refrigeration and air-conditioning equipment, robots, machine tools, materials handling systems, and industrial production equipment.

Education: Bachelor's Degree

Physicist: They explore and identify basic principles governing the structure and behavior of matter, the generation and transfer of energy, and the interaction of matter and energy. Some use these principles in theoretical areas, such as the nature of time and the origin of the universe; others apply their physics knowledge to practical areas such as the development of advanced materials, electronic and optical devices, and medical equipment. They design and perform experiments with lasers, cyclotrons, telescopes, mass spectrometers, and other equipment. They attempt to discover laws that describe the

forces of nature, such as gravity, electromagnetism, and nuclear interactions. They also find ways to apply physical laws and theories to problems in nuclear energy, electronics, optics, materials, communications, aerospace technology, navigation equipment, and medical instrumentation.

Education: Doctor of Philosophy

Review Questions:

1. Do the laws of motion still apply in space?

2. How did micro-gravity (lack of gravity) affect the toys? Examples:_____

3. What would spilled milk look like in space?

Junior Engineering, UMC 3735, Utah State University, Logan, UT 84322-3735
Phone: (435) 797-8000 **Fax:** (435) 797-8005
E-mail: jreweb@ext.usu.edu **URL:** juniorengineering.usu.edu