Forces of the Solar System

Summary

This can be used as a demonstration and discussion activity or it can be used as a student activity. It uses water balloons to show the effect gravity will have on different sizes of objects in our solar system. It also shows how inertia works.

Time Frame

1 class periods of 30 minutes each

Group Size

Small Groups

Materials

- Student worksheet
  (attached)
  1 package of large round Balloons (water or regular, regular work fine if you don't fill them completely)
  string
  outdoors or open area.

Instructional Procedures

You will need to prepare the balloons ahead of time. The balloons need to vary in size and in the amount of air and water in them as outlined below.
Fill 3 balloons just with air: one small, one medium, one large.
Fill 3 more balloons a quarter of the way full of water, and then fill them with air so they are the same size as step 2: small, medium, and large.
Fill 3 more balloons halfway to three-quarters of the way full of water (before air is in them), and then fill them with air so they are the same size as steps 1 & 2: small, medium and large.
Tie a string (2-3 feet long) to the top of each balloon. Place the balloons in a box so that the students will not see them before hand.
Ask for 3 brave student volunteers to help you with a demonstration.
Hand out student sheets if you are using them.
Have all the students walk outside with their sheet, something to write with, and something to write on. Have them form a large circle outside. The 3 volunteers should stand in the middle of the circle spread away from each other.
Give the 3 volunteers the balloons with just air in them first. Have them spin the balloons above their heads slowly at first, then speeding up. As they do so, the other students should record any changes in the shape of the balloons on their sheets.
Collect the balloons with just air in them and give the 3 volunteers the balloons filled a quarter of the way with water. Have them spin the balloons above their heads slowly at first, then speeding up. Again the other students should draw any changes in the shape of the balloons on their sheets.
Collect the balloons again and give the 3 volunteers the balloons filled ½- ¾ filled with water. Have them spin the balloons above their heads slowly at first, then speeding up. Again the other students should draw any changes in the shape of the balloons on their sheets.
When all the students are done drawing, have them fill in their hypothesis of what direction they think the balloons would go if they were released.

Have the 3 volunteers spin the balloons high over their heads quickly. This time have them let go of the string, one volunteer at a time, so that if a student misses it the first time, they have 3 opportunities to see it and draw it.
Students will draw what direction the balloons traveled on their papers.
Discuss the forces of gravity and inertia that were just demonstrated.
Have the students collect the balloons and head back inside.
You can also change other variables in this lab. Make the balloons different sizes, with different amounts of water, make the strings different lengths, etc.

***** Note: If you are reusing the balloons for multiple classes it is a good idea to check the strings after each class to make sure they haven't become loose or frayed.

Assessment Plan

Scoring Guide

:

1. Students draw out pictures for the lab…… 4
2. Students correctly answer the analysis questions…… 4
3. Students participate and pay attention during lab…… 4

Answers to questions:

Gravity and inertia
Gravity is the force of attraction between all objects in the universe.
The sun because it has the most mass.
The more water in the balloon, the more mass it has.
Student opinion, answers will vary.

6.

Bibliography

Lesson Design by Jordan School District Teachers and Staff.

Authors

Utah LessonPlans