

Grade Level: Fourth Grade

Title of Lesson: Push or Pull/ Up or Down

Unit Title: Pendulums!

Performance Standard(s) Covered:

S4P3D

Students will demonstrate the relationship between the application of a force and the resulting change in position and motion on an object.

D. Demonstrate the effect of gravitational force on the motion of an object

Essential Question: What is the difference between dependent and independent variables?

Objective: Students will review the difference between independent and dependent variables.

Students will be given situations and decide which variable is independent and dependent.

Key Words and Terms: forces, pushes, pulls, friction, speed, newtons, gravity, gravitational force

Learning Activity

Abstract: Students will be put in groups and be given different string length to test. Groups will test 13cm, 15cm, 22cm, 45cm, 55 cm, and 120 cm and different coins. Students will record their data. They will take their pendulums and hang them on swing number line.

Materials Needed:

- Pencil
- Penny
- String of varies lengths
- Paper clip
- Tape
- Stopwatches
- Table
- Ruler
- Quarter
- Nickel
- Dime

These will be pre-packed into small Ziploc bags to decrease the set up time during class. The items inside the Ziploc bag will include: pencil, penny, several strings, paper clip, stopwatch, quarter, nickel, and dime.

Safety Concerns: The students should be very careful using the paper clip, could be used as a deadly weapon when unfolded.

Procedure:

1. The materials are passed out,
2. Each group will assemble their makeshift pendulums. Using the table for height the student will tie the paper clip on the end of a string the other end will be tie to a pencil that is taped to the desk. The penny is inserted into the paper clip as a weight then the trials of the different variables will be record on a worksheet.

3. The students will have to measure the string using a ruler. They will also get the chance to view the different is number of swing by using different masses (coins) on the pendulum.
4. Ask student why they think the swings for the dime was more and less for the quarter.

Notes and Tips:

One thing that can be altered is the amount of time given for this experiment. It may take a while for the student to set up their pendulum and it could be difficult having to change each variable.

References:

1. “ John Wiley & Sons, Inc.” written by Janice VanCleave