

Whatever Pulls Your Sled

Developed by:

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Discipline / Subject:

Science

Topic:

Friction

Grade Level:

7- 8

Resources / References / Materials Teacher Needs:

8" pieces of 2x4's

Screw in Eyes

Craft Sticks

Glue

Masses

Spring Scales

Strings

Wax Paper

Aluminum Foil

Plastic Wrap

Sand Paper

Meter Stick

Triple Beam Balance

Assorted Masses

Lesson Summary:

Students will test determine if the surface of an object will effect how much force it takes to pull that object. They will then determine the most efficient way to attach the string to the object to reduce the necessary force and finally they will adjust the take off and pull velocities to determine if they affect the force of the object.

Standard's Addressed: (Local, State, or National)

1. Plan and implement descriptive and simple experimental investigations including asking well-defined questions, Formulating testable hypotheses in experimental investigations, and selecting and using appropriate equipment and technology.

Construct simple graphs, tables, maps, and charts to organize, examine and evaluate data including the identification of patterns in collected information using frequency, range, percent, mean, and median and extrapolation of data to predict trends.

Organize, analyze, make inferences, and predict trends from direct and indirect evidence.

Communicate valid conclusions supported data.

2. Demonstrate and calculate how unbalanced forces cause changes in the speed or direction of an object's motion.

Learning Objectives:

1. The Learner Will plan and implement an experiment to lower the force necessary to move an object.

2. The learner will construct and utilize graphs and charts to show trends in the data collected.

Method of assessment for learning

Graphs
Race Day Results

Procedural Activities

Part 1... Determine how to reduce force to start and pull sled the sled.

Part 2... Slow vs fast ... Determine how to reduce force needed to start

Part 3... Determine how to reduce force needed to start and pull sled based upon load placement.

Part 4... Determine if area reduces force.

The student will determine the force needed to pull a sled helping them to assemble and set-up their model sleds for the race day.

Example of Lab Procedure for Step 1

1. Use the spring scale to slide the block of wood across the table. Record the force needed to move the block.

3. Put the block of wood on a piece of wax paper.

4. Use the spring scale to slide the block across the wax paper. Record the force in your data table.

5. Repeat with all other materials.

Create a procedure for steps 2-4 recording your data in an appropriate table.

Determine the set-up that will create the best sled for the race in classroom contest in 5 days. You will build a sled and place a known amount of mass on it. Groups that utilize the lowest forces win an ice cream party. Good Luck.

Materials Students Need:

8" pieces of 2x4's
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Glue
Masses
Spring Scales
Strings
Wax Paper
Aluminum Foil
Plastic Wrap
Sand Paper
Meter Stick
Triple Beam Balance
Assorted Masses

Technology Utilized to Enhance Learning:

Probeware if Available
Graphing Calculator

Other Information:

Modifications for Special Learners/ Enrichment Opportunities:

Some students may need more guidance than others. However, the value of working in teams is that everyone brings a strength to the table and can learn from each other. Enrichment is always there for open ended labs.