



Which Substance is 'Inclined' to Experience More Friction? Experiment I

Annotation

This two- part lab incorporates food into a class demonstration and student worksheet of friction of a surface and friction of a substance, and the ways to minimize the effects of friction. Students time Experiment 1 and based on those results they form and test a hypothesis for Experiment 2. This lab best targets remedial classes that have trouble visualizing the effects of friction.

Hypothesis

The substance with the greatest viscosity will be the slowest.

Primary Learning Outcome

- Students should be able to demonstrate application of the scientific method
- Students should understand the effects of friction, how to minimize and increase it, and in what kind of real life situations either might want to be done
- Students should know how to collect, analyze, and average data

Assessed GPS

SCSh1
SCSh3
SCSh5
SCSh8
SP1
SPS8

Total Duration

5 minutes to set up
15 minutes to run demonstration (longer if each group does their own)
15-30 minutes to complete data table
5 minutes to clean up

Material and Equipment

1. 3 incline planes (set at 35°) with wax paper taped on. Be sure surface is smooth.
2. Karo syrup, vegetable oil, chocolate syrup, molasses, or three substance of similar viscosity
3. 6 stopwatches
4. 3 15 mL beakers

Procedure

1. Tape wax paper onto 3 incline planes (set at 35°) and place for demonstration
2. Into 3 15mL beakers pour 10mL of each substance into a beaker
3. Align bottom front edge of beaker with start of wax paper. All beakers will be poured at the same time on respective incline planes
4. Assign two timers to each incline plane, and designate one person to pour each substance
5. Have another person say "Go." Pour all three substances
6. Time begins when the tip of the beaker reaches the wax paper. Time ends when the substance first leaves the edge of the wax paper
7. Calculate and record needed data in the table. Equation needed: $\text{speed} = \text{distance} / \text{time}$

Lesson Material Attached

Title: Data Table for Which Substance is 'Inclined' to Experience More Friction? -Experiment I
Annotation: Student data table and questions based on observations and calculations of average speed.

Assessment

Students will be assessed base on accurate completion of the data table and follow up questions, but no grade will be given for accuracy of hypothesis.

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Data Page

Write here your hypothesis for experiment 1. Which substance will travel the slowest?: _____

Distance traveled= _____ cm

Substance	Trial 1		Trial 2		Average Speed
	Average Time	Speed	Average Time	Speed	

1) Calculate the speed of each substance in Trial 1 and record in the table.

2) Calculate the speed of each substance in Trial 2 and record in the table.

3) Calculate the average speed for each substance and record in the table.

4) Do the results match your hypothesis?