

Name:

Date:

Class:

Day 3: IMA/AMA, Hypotheses, and Calculations

Materials Needed:

- 1 3-lb weight (flat plate weight or bagged sand)
- 12-24" of string or thin rope
- 1 Newton scale/spring scale

Instructions:

1. Gather the necessary materials.
2. Watch this video (00:59 minutes): [How to use a spring scale](#).
3. Attach the string to the weight securely so it can be pulled easily.
4. Use the spring scale to gently pull the weight up the inclined plane on the **control surface**.
5. Record how many Newtons of force it takes to move the weight.
6. Discuss with your team which of the other five surfaces you think will be easier or harder to drag the weight across. Write down your predictions and reasoning (smoothness, texture, material).
7. Hypothesize how many Newtons it will take to pull the weight on each of the other five surfaces.
8. One at a time, repeat the test three times on each surface using the spring scale.
9. Record the average Newtons needed for each surface.
10. Calculate the difference between your prediction and the actual measurement for each surface.
11. Summarize your findings by discussing:
 - a. Which surfaces had the least and most friction.
 - b. How accurate your predictions were.
 - c. What factors (such as surface texture) affected the results.
 - d. What this tells you about friction and force.
12. Fill out Table B.

Table A: Hypotheses and All Measurements in Newtons

	Hypothesis	Actual Measurement	Difference
Control Surface	N/A		
Turf			
Carpet			
Bubble Wrap			
Vinyl Flooring			
Felt			

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Findings Summary - Were You Right/Wrong? Why? Justify.

Table B: Actual Mechanical Advantage Calculations (all measurements in Newtons)

	Resistance (Fr)	Effort (Fe)	AMA (Fr / Fe)
Control Surface			
Turf			
Carpet			
Bubble Wrap			
Vinyl Flooring			
Felt			