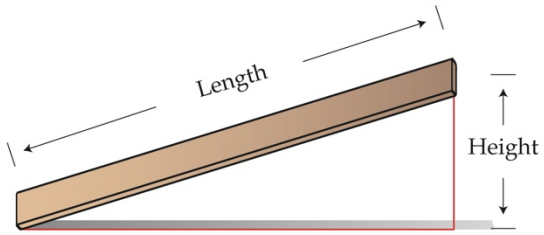
Name: Date: Class:

Tools and Equipment, Part I Activity – Inclined Plane Worksheet

$$\text{Mechanical Advantage} = \frac{\text{Input Distance}}{\text{Output Distance}} = \frac{\text{Output Force}}{\text{Input Force}}$$



$$\text{Mechanical Advantage} = \frac{\text{Input Distance}}{\text{Output Distance}} = \frac{\text{Slope Length}}{\text{Height}}$$

Instructions/Questions

A. Measure the length and height of Inclined Plane A (1st station):

Length: _____ (*cm*)

Height: _____ (*cm*)

1. What is the mechanical advantage based on these measurements? _____
2. What was the required force to raise the object?

   Without the inclined plane: (Output force) _____ (*g*)

   With the inclined plane: (Input force) _____ *(g)*
3. What is the mechanical advantage based on these measurements? _____

B. Measure the length and height of Inclined Plane B (2nd station):

Length: _____ (*cm*)

Height: _____ (*cm*)

1. What is the mechanical advantage based on these measurements? _____
2. What was the required force to raise the object?

   Without the inclined plane: (Output force) _____ (*g*)

   With the inclined plane: (Input force) _____ *(g)*
3. What is the mechanical advantage based on these measurements? _____

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C. Measure the length and height of Inclined Plane C (3rd station):

Length: _____ (*cm*)

Height: _____ (*cm*)

1. What is the mechanical advantage based on these measurements? _____
2. What was the required force to raise the object?

   Without the inclined plane: (Output force) _____ (*g*)

   With the inclined plane: (Input force) _____ *(g)*
3. What is the mechanical advantage based on these measurements? _____

D. Measure the length and height of Inclined Plane D (4th station):

Length: _____ (*cm*)

Height: _____ (*cm*)

1. What is the mechanical advantage based on these measurements? _____
2. What was the required force to raise the object?

   Without the inclined plane: (Output force) _____ (*g*)

   With the inclined plane: (Input force) _____ *(g)*
3. What is the mechanical advantage based on these measurements? _____

Results

1. Did you obtain different mechanical advantages for the different methods of measuring? If so, was the difference large?

   _____

   _____

2. Which inclined plane had the greatest mechanical advantage?

   _____

   _____

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Conclusions

1. Does calculating mechanical advantage just with the dimensions of the inclined plane really work? That is, does the calculation describe what really happens? Write a short paragraph explaining your answer.

2. If you are the engineer designing a ramp for a construction site to move a wheelbarrow a height of 100 feet, which inclined plane would you use? Why?

3. What are some possible sources of error in this experiment?