Tools and Equipment, Part I Activity – Inclined Plane Worksheet

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

Instructions/Questions

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

Length: ___________________ (m)

Height: ___________________ (m)

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: ___________________ (m)

Height: ___________________ (m)

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? __________

C Measure the length and height of Inclined Plane C (3rd station):
   Length: ________________ (m)
   Height: ________________ (m)
   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: ________________ (m)
   Height: ________________ (m)
   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?

   ____________________________________________________________
   ____________________________________________________________
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.

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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?

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

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