MiSP Simple Machines / Inclined Plane Worksheet #1 L2

Name ______________________________ Date _____________

WEDGE-EASE (AIMS *MACHINE SHOP*)

Key Question: What isosceles triangle can you draw and view as a cross section to make the best knife blade?

Introduction:

A wedge is a simple machine that helps a person split, cut, or move things apart. A wedge is one moveable inclined plane or two inclined planes back-to-back. Axes, chisels, and knives are examples of wedges.

Procedures:

Your teacher will use three different wedges to move two heavy books apart. The wedges are all the same thickness but their angled surfaces or slopes are different lengths. The three wedges will be placed between the books. Weights will be added to the end of the wedge until the books move apart.

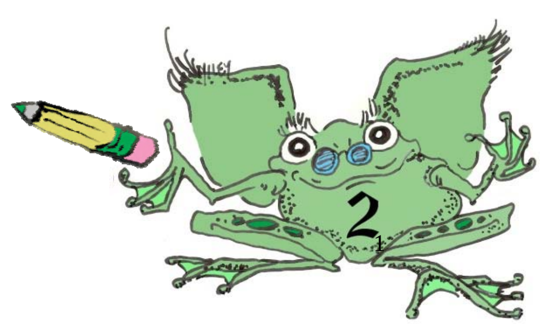
Record your Data:

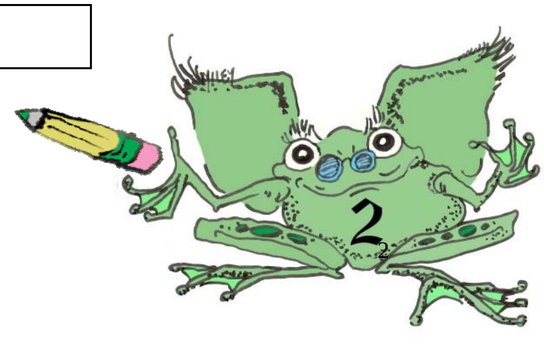
Wedge length	Wedge slope length (cm)	Mass needed to move the books apart (g)

Graph your data:

Graph the data on the next page.

- Label the *x*-axis.
- Label the *y*-axis.
- Connect the data points with straight lines.





Discussion Questions:

Wedge-Ease Connecting Learning (AIMS *Machine Shop*, pp. 214-215)

1. Which of the three wedges required the greatest amount of weight to spread the books apart? Which required the least amount?

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2. What relationship is there between the size of the wedge and the effort required to push it through something?

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3. How is this relationship [see your answer to #2 above] shown on the graph?

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4. What dimensions would you use to construct a wedge that requires the least amount of force to split something?

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5. If a wedge is 5 cm in length, how much force would it take to push through the books? How did you determine this?

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6. If you knew the force required to split the books was 220 grams, what must the length of the wedge be?

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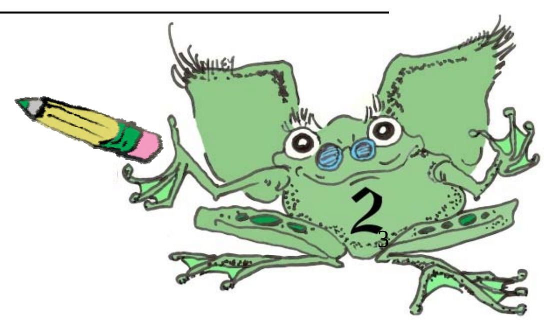

7. Use the information from the graph to calculate the unit rates of change (slopes) for the Wedge-Ease experiment for the two line segments on the graph.

Unit Rate of Change = $\dfrac{\Delta \text{ Mass needed to move the books (g)}}{\Delta \text{ Wedge Length (cm)}} = \dfrac{\Delta y}{\Delta x} = \dfrac{(y_2 - y_1)}{(x_2 - x_1)}$

Segment of Graph (wedge length)	Ordered Pair used for calculation (x_1, y_1) (x_2, y_2)	Δ Mass needed to move books (g) Δy	Δ Wedge Length (cm) Δx	**Unit Rate of Change (slope)** $\Delta y/\Delta x$
______ to ______ cm				
______ to ______ cm				

8. Compare the two unit rates of change calculated above. Why is the unit rate of change negative (-)? Which segment showed the greatest decrease in mass needed to move the books apart?

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