Name _____

Inclined Plane, Wedge, Screw
PRE-TEST

DIRECTIONS: Answer the following questions in the space provided.

1. Name the six simple machines.

2. Describe how a wedge is related to an inclined plane?

3. Give a definition for the term wedge.

4. How is a screw related to an inclined plane?

5. Why do roads wind around hills or mountains instead of traveling straight up?

6. How do we calculate the mechanical advantage of an inclined plane?

7. Give some examples of wedges?

8. How do screws provide a better hold than nails?

9. What is the definition for a machine?

10. Someone wants to slide a 100 pound crate up an incline to a loading dock 4 feet above the ground. The incline is 20 feet long. How much effort will it take to slide the crate up the incline?

Name _____

Inclined Plane, Wedge, Screw
VIDEO QUIZ

DIRECTIONS: Use this worksheet to answer the questions that follow the video presentation.

1. Name the six simple machines.

2. Why do roads wind around hills and mountains instead of traveling straight up?

3. Which simple machine is defined as any tool that cuts?

4. Why is a screw a better choice than a nail when it comes to holding furniture together for a long time?

5. Which simple machine is the screw related to?

6. To be considered a machine a tool must do one or more of what three things?

7. True or False. The mechanical advantage of an inclined plane is determined by dividing the length of the incline by the height of the incline.

8. Name some examples of inclined planes in use around our homes and communities.

9. Name some wedges typically found around the home.

10. Name some ways screws are used around the home.

Name _____

Inclined Plane, Wedge, Screw
INCLINED PLANES

Directions: Try this experiment to see how inclined planes are helpful.

Purpose: To show that inclined planes help people move things.

Materials:
1. a piece of wood at least eight inches long
2. a book
3. a spring scale
4. twine
5. stairs

Procedure:
1. Tie the twine around the book so that the spring scale can be used to lift it.
2. Lift the book straight up as if you were lifting it to the first step on a staircase.
3. Record the reading on the spring scale as you lift the book.
4. Now place the piece of wood so that one end is on the step and the other is on the floor.
5. Slide the book up the board with the spring scale and record the reading from the scale.

Observations: Fill in the box below.

Mass of book   Reading on scale with incline

Conclusion: Does the inclined plane give people help when moving objects from one height to another?

Name _____

Inclined Plane, Wedge, Screw
ALL WRAPPED UP

Directions: A screw is actually an inclined plane wrapped around itself. Do the following experiment to see how a screw and an inclined plane are related. Answer the questions in the Observations and Conclusion sections.

Purpose: To make a screw from an inclined plane.

Materials:
1. paper pattern on this page
2. scissors
3. pencil
4. tape

Procedure:
1. Use your scissors to cut out the paper pattern of the inclined plane shown on this page.
2. Place a pencil along A to C edge of the pattern.
3. Tape the pattern to the pencil.
4. Roll the pencil towards the B corner keeping the bottom edge C to B nice and even.
5. When you get to the B corner, tape it to the pencil.
6. Now hold the pencil with the paper screw around it between the thumb and a finger of your left hand. Start at point A. Slowly turn the pencil with your right hand and allow your finger and thumb to trace the path left by the paper edge.

Observations: What happens as your thumb and finger trace the paper edge?

Conclusion: How are an inclined plane and a screw related?

Name _____
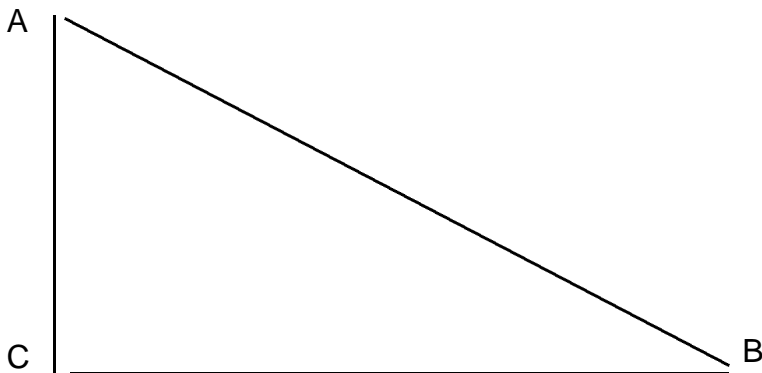
Inclined Plane, Wedge, Screw
MECHANICAL ADVANTAGE OF AN INCLINED PLANE

The mechanical advantage (M.A.) of an inclined plane is the length of the incline divided by its height. The longer the incline the greater the mechanical advantage. That means the longer the incline the less force or effort needed to move an object up the incline.

M.A. = Length/Height
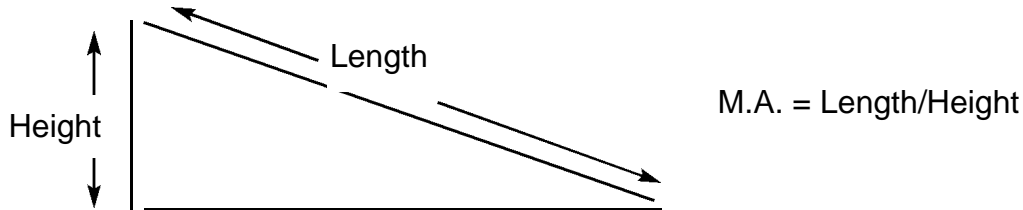
Example: A man is using an 8 foot board to slide things into the back of his truck. The truck is 2.5 feet from the ground. What is the mechanical advantage of this incline?

Solution: Length of incline = 8 feet
Height of incline = 2.5 feet
M.A. = 8 ft. / 2.5 ft.
M.A. = 3.2
This means the effort is multiplied by 3.2 when using this inclined plane.

Directions: Try some mechanical advantage problems. Show work.

1. A road winds around a mountain at an incline. The road is 4.5 miles long and the mountain is 2 mile high. What is the mechanical advantage of this inclined plane?

2. Stairs are actually inclined planes. You can find the mechanical advantage of a staircase in your home by following these directions. (A tape measure will be easier to use than a meter stick or yardstick).
   a. Measure the height of a stair.
   b. Count the number of stairs in the staircase.
   c. Multiply the number of stairs times the height of each step and you have the height of the inclined plane.
   d. Use the tape measure to measure from the very top of the stairs to the exact bottom. The tape should run right along the steps as if the tape were forming an incline.
   e. Now you have the height and length of the incline, you can solve the rest.

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Name _____

Inclined Plane, Wedge, Screw
QUIZ

Directions: Answer the questions in the space provided.

1. Name the six simple machines.

2. How is a wedge related to an inclined plane?

3. Describe how a wedge is defined.

4. How is a screw related to an inclined plane?

5. How is the mechanical advantage of an inclined plane determined?

6. A man wants to move a crate to a loading dock 3 feet from the ground. He is using a 9 foot board as a ramp. If the crate weighs 90 pounds how much effort is needed to move it along the board?