

Discovering Simple Machines: Inclined Plane, Wedge, Screw
PRE-TEST

DIRECTIONS: Answer the following questions in the space provided.

1. Name some ways inclined planes are used.

examples: ramps for loading trucks or wheelchairs, conveyor belts

2. How do inclined planes make work easier?

An inclined plane requires less force to move an object instead of having to lift it straight up.

3. If you had to move a heavy box up an inclined plane into the back of a truck, would it be better to have a short steep incline or a long gradual incline?

long gradual incline

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

Inclined planes and wedges both have sloped sides.

5. How does a wedge make work easier?

A wedge uses two inclined planes to change the force

6. Wedges are one of the most common simple machines. Name at least four wedges.

Axe, hatchet, teeth and nails

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

A screw is an inclined plane twisted around a cylinder

8. Name some ways screws are used.

examples: screws, augers

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VIDEO QUIZ

This is the video quiz for the video called “Discovering Simple Machines: Work and Energy.” Questions will appear at the end of the video. Write your answers on this sheet of paper.

1. Which of these is an example of an inclined plane?
 - a. an axe
 - b. a can opener D
 - c. a pencil sharpener
 - d. a ramp

2. Which of these is an example of a wedge?
 - a. an axe
 - b. a see saw A
 - c. a ramp
 - d. a rake

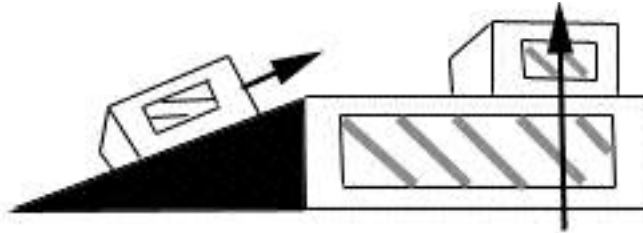
3. Which of these uses a screw?
 - a. an axe
 - b. a see saw D
 - c. a ramp
 - d. a vise

4. Which simple machine is like an inclined plane wound up?
 - a. screw
 - b. wedge A
 - c. lever
 - d. wheel and axle

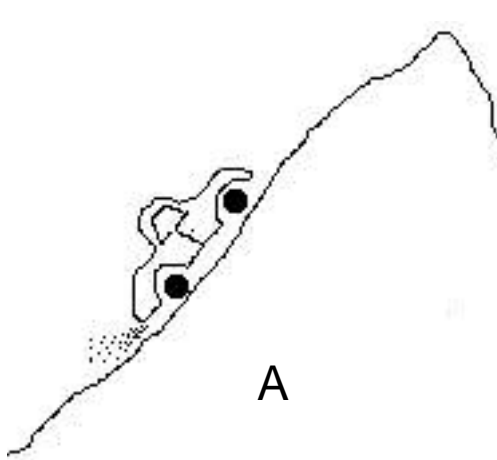
5. Which simple machine is like two inclined planes put together?
 - a. screw
 - b. wedge B
 - c. lever
 - d. wheel and axle

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INCLINED PLANE AND WEDGE FACT SHEET

Inclined planes and wedges are very common and useful simple machines. The inclined plane is a flat surface with one end higher than the other. A ramp is a good example of an inclined plane in use.



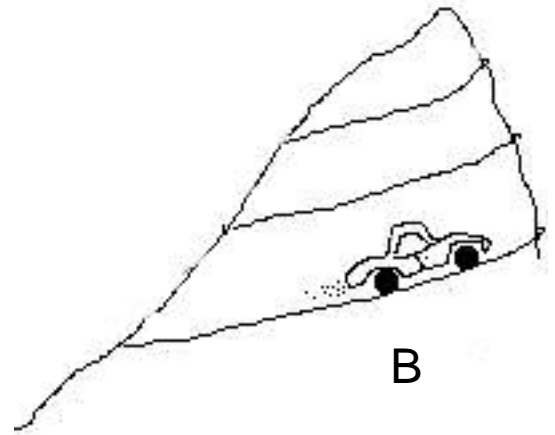
It is easier to push a heavy crate up a ramp than it is to lift it straight up to the platform.



A

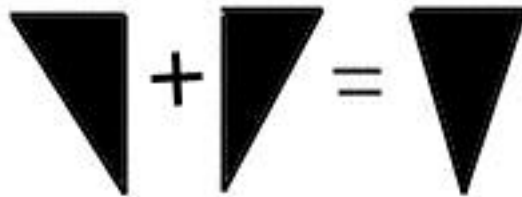
Picture A shows a car going up a mountain. Picture B shows the same mountain with a road at a gradual incline. Which would be easier on the car, A or B?

Circle your choice.



B

Two inclined planes put together form a wedge.



A wedge is a very handy simple machine. It is used on anything that can cut. Some examples are: razor blade, knife, ax.

DIRECTIONS: Make a list of as many things as you can that are wedges.

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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 (twenty cm) long
2. a book
3. a spring scale
4. twine
5. stairs

Procedures:

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.

Weight of book will vary

Reading on scale while lifting book will vary

Reading on scale while pulling up board will vary

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

Answers will vary, but students should have found that objects are easier to move on an inclined plane.

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INCLINED PLANES - EXPERIMENT CHALLENGE

DIRECTIONS: Develop a way to find out if the angle of an inclined plane makes a difference when sliding an object to a higher level. Fill in the materials you will use and write out the procedures for setting up your experiment. Then do the experiment and record your observations and conclusions.

Purpose: To test if the angle of the slant for an inclined plane makes a difference in the amount of effort and force applied.

Materials:

Student experiments will vary.

Procedures:

Observations:

Conclusions:

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STRENGTH TEST

DIRECTIONS: Perform this experiment to test the advantage of screws. Answer the questions in the observations and conclusion sections.

Purpose: To test and compare the use of screws and the use of nails.

Materials:

1. one nail and one wood screw about the same length
2. hammer
3. screwdriver
4. a piece of wood (2" x 4" or larger)

Procedure:

1. Use the hammer to hammer the nail into the board. Leave some of the nail above the surface of the wood.
2. Screw the screw into the wood with the screwdriver. Stop when about half an inch is above the wood.
3. Use the claw of the hammer to pull the nail out of the wood.
4. Now use the claw to pull the screw out.

Observations:

1. Which was harder to get into the wood?

student answers will vary

2. Which was harder to get out of the wood?

student answers will vary

Conclusion: When comparing nails and screws, which would probably hold two pieces of wood together with greater strength?



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POST-TEST

DIRECTIONS: Use the space provided to write answers to the following questions.

1. How do inclined planes make work easier?

Inclined planes reduce the amount of force needed to lift an object

2. Would a steep incline or a long gradual incline make the job of pushing a heavy object easier?

long gradual

3. How are inclined planes used?

ramps for loading or wheelchairs

4. How are wedges related to inclined planes?

wedges are made of two inclined planes

5. How do wedges make work easier?

Wedges use two inclined planes in order to reduce the force needed

6. Name at least four examples of wedges.

ax, hatchet, tooth and nail

7. How is a screw like an inclined plane?

A screw is a twisted inclined plane

8. Name some ways screws are used?

screws, augers