

# Making Work Easier

In science, **work** is defined as the result of a force moving an object across a distance. Pushing, pulling, and lifting are common forms of force. There are six simple machines that make work easier by reducing the size or changing the direction of the force needed:

A **lever** is a solid board or bar that rests on a fixed point. The fixed point is called a fulcrum. When one end of a lever moves down, the other end moves up. A lever reduces the amount of effort needed to lift a load.

The **wheel and axle** is made up of two circles. The larger circle is the wheel; the smaller circle is the axle. When one of the circles turns, the other circle also turns. The two circles multiply force to make work easier.

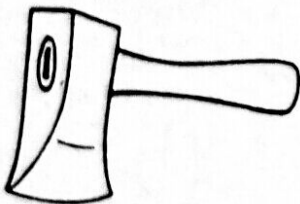
An **inclined plane** is a simple machine with a flat slanted surface. Inclined planes reduce the amount of force needed to raise a heavy load.

A **wedge** is a piece of metal or wood made up of one or more inclined planes. They can be used to push two surfaces apart or to lift a load slightly.

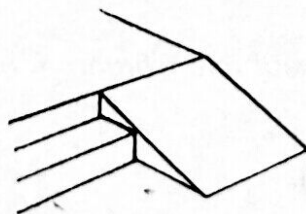
A **pulley** is made up of a wheel and a rope or chain. The rope or chain is wrapped around the wheel, and one end is attached to the load. The other end is pulled to move the load.

**Screws** twist into a surface easily but are difficult to pull out. The thread of a screw is actually an inclined plane wrapped around a pole.

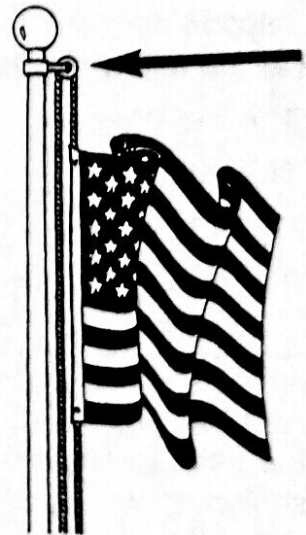
Many of the items we use each day involve a simple machine. Label the type of simple machine involved in each item below. Some terms will be used more than once.



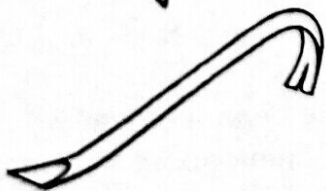
1. wedge



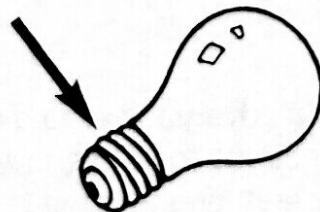
2. inclined plane



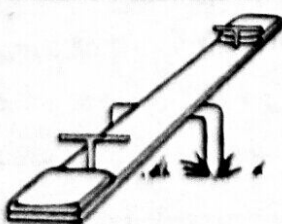
5. pulley



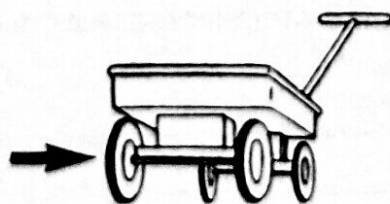
3. lever



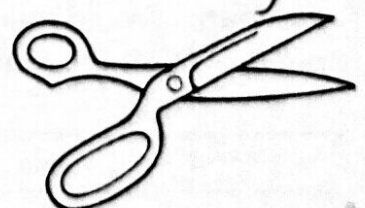
4. screw



6. lever



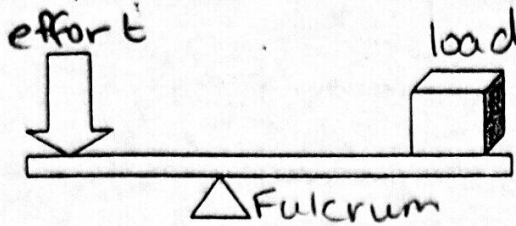
7. wheel and axle



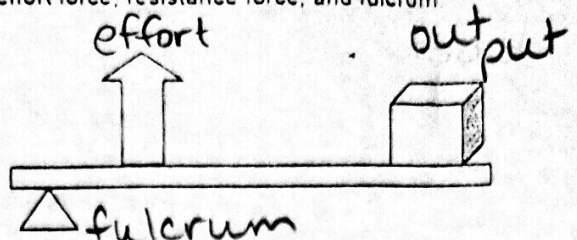
8. lever / wedge

# Worksheet Packet - Simple Machines

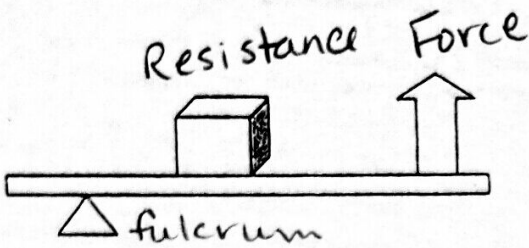
Identify the class of each lever shown below. Label the effort force, resistance force, and fulcrum.



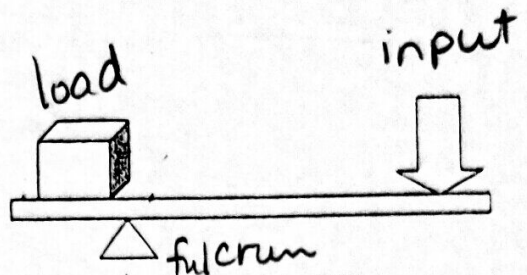
1. 1st class



2. 3rd class



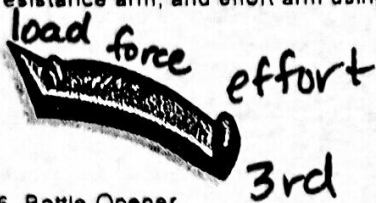
3. 2nd class



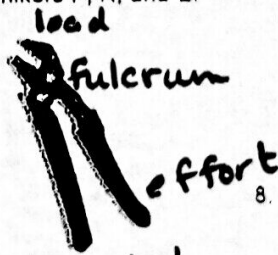
4. 1st class

5. Which of the above levers would be the most efficient at lifting a heavy block of granite? \_\_\_\_\_

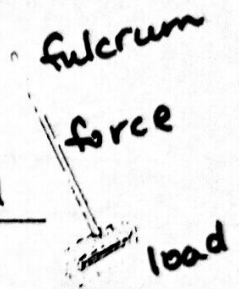
Identify the class of each level in the drawing. Draw a line to indicate the position of the fulcrum, resistance arm, and effort arm using the monikers F, R, and E.



6. Bottle Opener 3rd

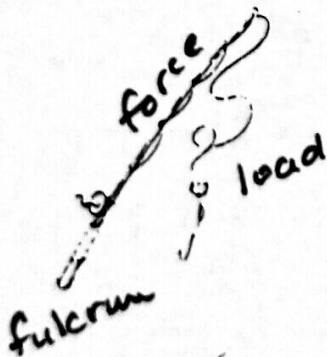


7. Pliers 1st



8. Broom 3rd

9. Fishing Pole 3rd

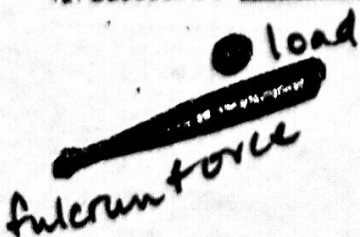


10. Seesaw 1st

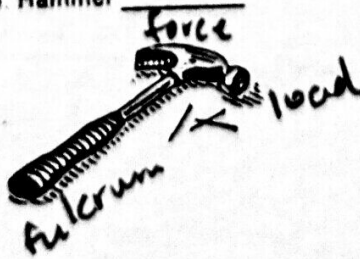
11. Wheelbarrow 2nd



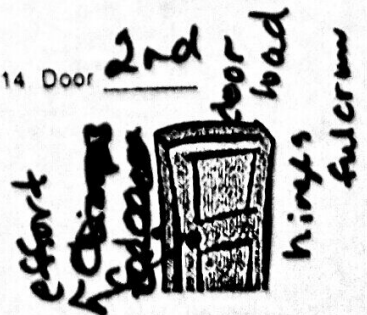
12. Baseball Bat 3rd



13. Hammer 3rd



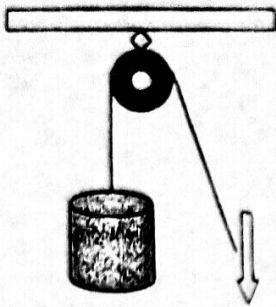
14. Door 2nd



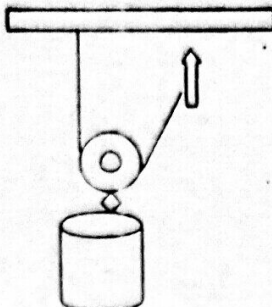


Label the type of pulley systems below:

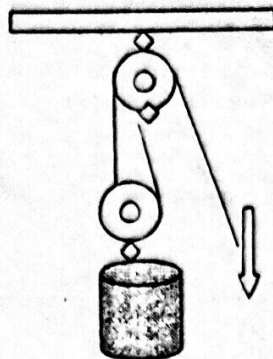
skip



15. \_\_\_\_\_



16. \_\_\_\_\_



17. \_\_\_\_\_

Label the type of simple machine: (lever, pulley, inclined plane, screw, wheel and axle, wedge)

18. Log Splitter

wedge

19. Corkscrew

screw

20. Zipper

wedge

21. Doorknob

wheel & axle

22. Stapler

lever

23. Staircase

inclined plane

24. Watch Gears

wheel & axle

25. Ski Run

inclined plane

Write WORK on the line provided if work is done, and NONE if no work is done:

26. no work Jeff is sitting in a gaming rocker chair reading instructions for his new system.

27. work Jeff tilts the chair back while going off a jump in his Wii Game.

28. work Jeff picks up his book bag

29. work Jeff carries his book bag on his back from his bus stop to his house

skip

Use the formulas below to solve the following problems:

work = force x distance

Work = Joules

30. How much work was done to kick a 6 N soccer ball 5 meters? \_\_\_\_\_ Joules

31. Two football players each applied 100 N of force to sack the QB and move him 3 meters downfield. How much work was done? \_\_\_\_\_ Joules

32. An inclined plane allows you to lift a heavy load by using ( more / less ) force over a greater distance

33. A fixed pulley changes the ( distance / direction ) of the force you exert.