

Chapter 14 Work, Power, and Machines

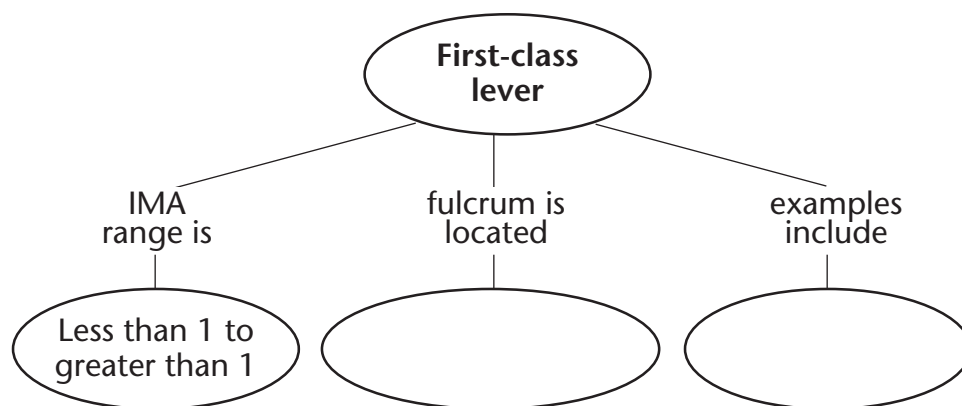
Section 14.4 Simple Machines

(pages 427–435)

This section presents the six types of simple machines. It discusses how each type works and how to determine its mechanical advantage. It also describes common uses of simple machines.

Reading Strategy (page 427)

Summarizing After reading the section on levers, complete the concept map to organize what you know about first-class levers. On a separate sheet of paper, construct and complete similar concept maps for second- and third-class levers. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.



Levers (pages 428–429)

1. A screwdriver used to pry the lid off a paint can is an example of a(n) _____.
2. The fixed point that a lever rotates around is called the _____.
3. To calculate the ideal mechanical advantage of any lever, divide the input arm by the _____.
4. Circle the letter of the characteristic(s) that distinguishes levers as first-class, second-class, or third-class.
 - a. relative positions of input force and output force
 - b. position of fulcrum
 - c. relative position of fulcrum, input force, and output force
5. Is the following sentence true or false? First-class levers always have a mechanical advantage that is greater than one. _____

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6. Is the following sentence true or false? All second-class levers have a mechanical advantage greater than one because the input arm is longer than the output arm. _____

Wheel and Axle (page 430)

7. Circle the letter of the sentence that describes how to calculate the IMA of a wheel and axle.
- Multiply the area of the wheel by the area of the axle.
 - Divide the diameter where input force is exerted by the diameter where output force is exerted.
 - Divide the radius of the wheel by the force exerted on it.

Inclined Planes (pages 430–431)

8. A slanted surface along which a force moves an object to a different elevation is called a(n) _____.
9. Is the following sentence true or false? The ideal mechanical advantage of an inclined plane is the distance along the incline plane divided by its change in height. _____

Wedges and Screws (page 431)

10. Does a thin wedge of a given length have more or less mechanical advantage than a thick wedge of the same length? _____

Pulleys (pages 432–433)

11. A simple machine consisting of a rope fitted into a groove in a wheel is a(n) _____.
12. Circle the letter of the correct answer. What determines the ideal mechanical advantage of a pulley or pulley system?
- the number of rope sections that support the load
 - the number of ropes threaded over the pulley
 - the number of rope sections that support the pulley

Compound Machines (page 435)

13. Is the following sentence true or false? A compound machine is a combination of two or more simple machines that operate together. _____