

Name: \_\_\_\_\_ Block: \_\_\_\_\_ Date: \_\_\_\_\_

### Directed Reading (20.2 and 20.3): What Is a Machine?

Circle the letter of the best answer for each question.

- \_\_\_\_\_ 1. Which of these is not an example of a simple everyday machine?  
a. chopsticks      b. wheelchair      c. scissors      d. wood
- \_\_\_\_\_ 2. If the machine changes the size of the force, what else must change?  
a. the input force      b. the output force      c. the distance the force is applied      d. the type of machine

input    machine    output    greater

3. A device that makes work easier by changing the size or direction of a force is called a(n) \_\_\_\_\_.
4. The work **you** do on a machine is called work \_\_\_\_\_.
5. The work done **by the machine** on an object is the work \_\_\_\_\_.
6. Work output can never be than \_\_\_\_\_ work input.

#### MECHANICAL ADVANTAGE

- \_\_\_\_\_ 7. What does mechanical advantage measure?  
a. the number of times force is multiplied      b. the amount of time the machine works  
c. the number of machines used      d. the amount of force needed
- \_\_\_\_\_ 8. Which of the following is the formula for finding mechanical advantage?  
a.  $MA = \text{input force} / \text{output force}$       b.  $MA = \text{output force} / \text{input force}$   
c.  $MA = \text{input force} / \text{output force} \times 100$       d.  $MA = \text{output force} / \text{input force} \times 100$
- \_\_\_\_\_ 9. What do you know about a machine with a mechanical advantage of more than 1?  
a. The input force is greater than output force.      b. The output force is greater than input force.  
c. The distance the object moves increases.      d. The distance the object moves decreases.
- \_\_\_\_\_ 10. What do you know about a machine when the force is increased?  
a. Force is applied more slowly.      b. Force is applied more quickly.  
c. Force is applied over a longer distance.      d. Force is applied over a shorter distance.

#### MECHANICAL EFFICIENCY

- \_\_\_\_\_ 11. What does mechanical efficiency compare a machine's work output to?  
a. work input      b. power      c. force      d. energy
- \_\_\_\_\_ 12. Which of the following is the correct way to calculate mechanical efficiency?  
a.  $(\text{work input} / \text{work output})$       b.  $(\text{work output} / \text{work input})$   
c.  $(\text{work input} / \text{work output}) \times 100$       d.  $(\text{work output} / \text{work input}) \times 100$

ideal machine    oil    friction

13. Machines aren't 100% because of \_\_\_\_\_.
14. A machine that had 100% mechanical efficiency would be a(n) \_\_\_\_\_.
15. To help lower friction, \_\_\_\_\_ can be put on moving parts.

#### TYPES OF MACHINES

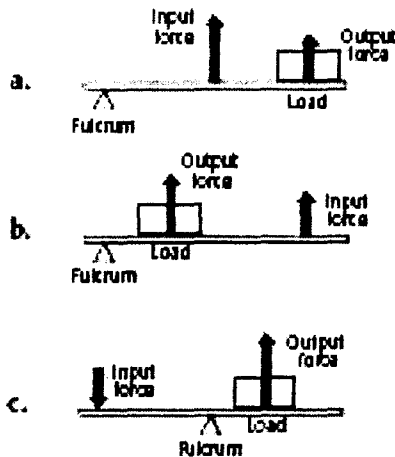
- \_\_\_\_\_ 1. What type of simple machine is a knife?  
a. lever      b. wheel and axle      c. wedge      d. inclined plane
- \_\_\_\_\_ 2. Which of the following is NOT a simple machine?  
a. the pulley      b. the fulcrum      c. the lever      d. the screw

#### LEVERS

- \_\_\_\_\_ 3. What is the fixed point on a lever?  
a. bolt      b. pivot point      c. fulcrum      d. wedge
- \_\_\_\_\_ 4. What do first-class levers always change the direction of?  
a. input force      b. output force      c. distance      d. fulcrum

**Match the description of the lever type to the diagram.**

- \_\_\_ 5. first-class lever
- \_\_\_ 6. second-class lever
- \_\_\_ 7. third-class lever



**PULLEYS**

- \_\_\_ 8. Which simple machine has a wheel that holds a rope?
  - a. lever      b. wedge      c. pulley      d. wheel and axle
- \_\_\_ 9. Which kind of pulley is attached to something that does not move?
  - a. fixed pulley      b. movable pulley      c. block and tackle pulley      d. simple pulley
- \_\_\_ 10. Which kind of pulley is attached to the object being moved?
  - a. fixed pulley      b. movable pulley      c. block and tackle pulley      d. simple pulley
- \_\_\_ 11. How do you find the mechanical advantage of a block and tackle pulley?
  - a. measure the amount of input force      b. measure the amount of output force
  - c. measure the length of the rope      d. count the number of rope segments

**WHEEL AND AXLE**

- \_\_\_ 12. What type of simple machine is a faucet?
  - a. lever      b. pulley      c. wheel and axle      d. wedge
- \_\_\_ 13. How do you find the mechanical advantage of a wheel and axle?
  - a.  $\text{radius of wheel} / \text{radius of axle}$       b.  $\text{radius of axle} / \text{radius of wheel}$
  - c.  $\text{radius of wheel} + \text{radius of axle}$       d.  $\text{radius of wheel} \times \text{radius of axle}$

**INCLINED PLANES**

- \_\_\_ 14. What type of simple machine is a ramp?
  - a. lever      b. inclined plane      c. pulley      d. wedge
- \_\_\_ 15. How do you find the mechanical advantage of an inclined plane?
  - a.  $\text{length of inclined plane} \times \text{height of inclined plane}$       b.  $\text{length of inclined plane} / \text{height of inclined plane}$
  - c.  $\text{length of inclined plane} + \text{height of inclined plane}$       d.  $\text{length of inclined plane} - \text{height of inclined plane}$

**WEDGES**

- \_\_\_ 16. What type of simple machine is a wedge?
  - a. pulley      b. lever      c. inclined plane      d. wheel and axle
- \_\_\_ 17. How do you find the mechanical advantage of a wedge?
  - a.  $\text{length of wedge} \times \text{greatest thickness}$       b.  $\text{length of wedge} / \text{greatest thickness}$
  - c.  $\text{length of wedge} - \text{greatest thickness}$       d.  $\text{length of wedge} + \text{greatest thickness}$

**SCREWS**

- \_\_\_ 18. Which of the following is an inclined plane wrapped around a cylinder?
  - a. screw      b. nail      c. wedge      d. ramp
- \_\_\_ 19. Which simple machine is a jar lid an example of?
  - a. nail      b. screw      c. wedge      d. ramp

**COMPOUND MACHINES**

_____ compound machines    wedge    mechanical efficiency
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- 20. Most compound machines have a low \_\_\_\_\_.
- 21. Machines that are made of two or more simple machines are called \_\_\_\_\_.
- 22. A can opener is made of a lever, wheel and axle, and a(n) \_\_\_\_\_.