Name _____ Class _____ Date _____

Skills Worksheet Chapter 8 – Work and Machines

Directed Reading A

Section: Work and Power

_____ 1. What is the transfer of energy to an object using a force that causes the object to move in the direction of the force?
- a. movement
- b. power
- c. work
- d. force

WHAT IS WORK?

_____ 2. Which of the following is considered work?
- a. throwing a bowling ball
- b. doing homework
- c. watching television
- d. trying to push a box, but not moving it

3. One way you can tell that the bowler has done work is that when the ball is moving, it has _____ energy.

4. When a bowling ball has kinetic energy, the bowler has transferred _____ to the ball.

5. What two things need to happen for work to be done on an object?

_____

_____

_____

_____

HOW MUCH WORK?

6. Why is it the same amount of work for a hiker to climb straight up a cliff and to walk up a slope?

_____

_____

_____

_____

7. The formula used to calculate work is:

work = _____ × _____.

8. The unit used to express energy is the _____.

9. Work is the transfer of _____ to an object.

10. Increasing the amount of work done can be accomplished by increasing what two things?

_____

_____

POWER: HOW FAST WORK IS DONE

_____**11.** What is the rate at which work is done or energy is transformed called?

a. force
b. power
c. work
d. energy

_____**12.** What is the equation used to calculate power?

a. $t = \frac{P}{W}$
b. $P = \frac{W}{t}$
c. $t = \frac{W}{P}$
d. $W = \frac{t}{P}$

_____**13.** What is the unit used to express power called?

a. joule
b. inch
c. watt
d. meter

_____**14.** One watt is equal to

a. one joule per hour.
b. one joule per minute.
c. one joule per day.
d. one joule per second.

15. Name the two things that power measures.

_____

_____

16. In what two instances does power output become greater?

_____

_____

17. If you sand a shelf by hand, the energy needed is the same as if you sanded it with an electric sander, but the power output is _____.

18. How does a powerful engine affect the performance of a car?

_____

_____

_____

_____

Name _____ Class _____ Date _____

Skills Worksheet

Directed Reading A

Section: What Is a Machine?

MACHINES: MAKING WORK EASIER

_____ 1. What is a device that makes work easier by changing the size or direction of force?
- a. a machine
- b. a load
- c. an engine
- d. a computer

2. Name three examples of everyday machines.

_____

_____ 3. What type of common machine is a screwdriver that is used to pry off the lid on a paint can?
- a. a pulley
- b. a wheel
- c. a lever
- d. a screw

4. The work you do on a machine is called _____.

5. The work done by a machine on an object is called _____.

6. Work output can never be greater than _____.

7. Why do machines need less force to do the same amount of work?

_____

8. When a screwdriver is used to open a can, both the size and direction of the _____ change.

9. A ramp will decrease the size of the input force needed to lift a box and _____ the distance over which the force is exerted.

10. When a machine changes the size of the force, the _____ through which the force is exerted must also change.

MECHANICAL ADVANTAGE

_____ 11. What is the number of times a machine multiplies force called?
- a. output force
- b. input force
- c. mechanical advantage
- d. work output

_____**12.** Which of the following is the formula for finding mechanical advantage?

a. *MA = input force ÷ output force*
b. *MA = output force ÷ input force*
c. *MA = input force ÷ output force × 100*
d. *MA = output force ÷ input force × 100*

13. A machine that has a mechanical advantage of greater than 1 has an output force that is _____ than the input force.

14. A machine that has a mechanical advantage of less than 1 reduces the output force but can increase the _____ an object moves.

MECHANICAL EFFICIENCY

_____**15.** What is the quantity that measures the ratio of work output to work input called?

a. mechanical work
b. mechanical efficiency
c. mechanical force
d. mechanical energy

_____**16.** Which of the following is the equation for finding mechanical efficiency?

a. *mechanical efficiency = work input ÷ work output*
b. *mechanical efficiency = work output ÷ work input*
c. *mechanical efficiency = work input ÷ work output × 100*
d. *mechanical efficiency = work output ÷ work input × 100*

17. When a machine drills holes in metal, some of the work input is used to overcome _____ between the metal and the drill.

18. What would a machine that had 100% mechanical efficiency be called?

_____

19. Why is it impossible to build an ideal machine?

_____

20. What do some machines use to lower friction between moving parts?

_____

Name _____ Class _____ Date _____

Skills Worksheet

Directed Reading A

Section: Types of Machines

1. A knife is actually a very sharp _____.
2. What are the six simple machines that all other machines are made from?

_____

_____

_____

LEVERS

_____ 3. A simple machine with a bar that pivots at a fixed point is a(n)
- **a.** wedge.
- **b.** lever.
- **c.** knife.
- **d.** screw.

_____ 4. What is the fixed point on a lever called?
- **a.** bolt
- **b.** pivot point
- **c.** fulcrum
- **d.** wedge

_____ 5. What do first-class levers always change the direction of?
- **a.** input force
- **b.** output force
- **c.** distance
- **d.** fulcrum

_____ 6. When you use the claw end of a hammer to remove a nail, what type of simple machine are you using?
- **a.** wedge
- **b.** first-class lever
- **c.** screw
- **d.** pulley

7. The three classes of lever are based on the location of what three features?

_____

_____

_____

8. Where are the fulcrum, the load, and the input force located in a first-class lever, a second-class lever, and a third-class lever?

_____

_____

_____

9. In a second-class lever, why must you exert input force over a greater distance?

_____

_____

10. Why is the output force always less than the input force in a third-class lever?

_____

_____

PULLEYS

_____11. Which of the following simple machines has a grooved wheel that holds a rope or cable?
- **a.** lever
- **b.** wedge
- **c.** pulley
- **d.** wheel and axle

_____12. Which type of pulley is attached to something that does not move?
- **a.** fixed pulley
- **b.** movable pulley
- **c.** block and tackle
- **d.** simple pulley

_____13. Which type of pulley is attached to the object being moved?
- **a.** fixed pulley
- **b.** movable pulley
- **c.** block and tackle
- **d.** simple pulley

_____14. What determines the mechanical advantage of a block and tackle?
- **a.** the amount of input force
- **b.** the amount of output force
- **c.** the weight of the rope
- **d.** the number of rope segments

15. How does a fixed pulley affect force?

_____

_____

16. How does a movable pulley move?

_____

_____

17. Describe a block and tackle.

_____

_____

WHEEL AND AXLE

_____**18.** A faucet is what type of simple machine?

a. lever
b. pulley
c. wheel and axle
d. wedge

19. What does a wheel and axle consist of?

_____

_____

20. How do you find the mechanical advantage of a wheel and axle?

_____

_____

INCLINED PLANES

_____**21.** inclined plane

_____**22.** screw

_____**23.** wedge

a. a simple machine that consists of an inclined plane wrapped around a cylinder

b. a simple machine that is made up of two inclined planes and that moves

c. a simple machine that is a straight, slanted surface, which facilitates raising a load

24. How do you calculate the mechanical advantage of an inclined plane?

_____

25. Name three examples of a wedge.

_____

_____

_____

26. How do you find the mechanical advantage of a wedge?

_____

27. What happens when a screw is turned?

_____

28. The longer the spiral on a screw is and the closer together the threads are, the greater the screw's _____.

COMPOUND MACHINES

29. A machine that is made of more than one simple machine is

a(n) _____.

30. What three simple machines make up a can opener?

_____

_____

_____

31. Why is the mechanical efficiency of most compound machines lower than most simple machines?

_____

_____

32. Name two compound machines.

_____

_____

33. Why is it important to reduce friction on compound machines?

_____

_____

_____