Name _____ Date _____ Class _____

Key Concept Builder

LESSON 1

Work and Power

Key Concept What must happen for work to be done?

Directions: *Put a check mark on the line before the each example that represents work being done on an object.*

_____ **1.** lifting a box off the ground

_____ **2.** carrying a box across a room

_____ **3.** carrying a box up a flight of stairs

_____ **4.** pushing a stalled car

_____ **5.** pushing against a sturdy stone wall

_____ **6.** holding a suitcase

_____ **7.** putting a suitcase on an overhead rack

_____ **8.** picking up a penny from a sidewalk

Directions: *On each blank line, write the word that correctly completes the sentence.*

9. When a force is applied to an object, no work is being performed on the object unless the object _____.

10. The unit of work, the newton-meter, is also known as the _____.

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LESSON 1

Work and Power

Key Concept What must happen for work to be done?

Work Equation

Work (in joules) = force (in newtons) × distance (in meters)

$$W = Fd$$

Directions: *Use the equation to calculate how much work is being done in each example.*

1. Sam lifts a brick weighing 10 N from the ground and places it on a ledge 1.5 m high. How much work has Sam done on the brick? _____

2. Tara pushes a 140-N chair 12 m across the basement floor. How much work has been performed on the chair? _____

3. Erik pulls a sled 25 m through the snow. The sled weighs 200 N. How much work has Erik done on the sled? _____

Directions: *Answer each question on the lines provided.*

4. If a leaf falls from a tree, has work been done on the leaf? Explain.

_____

_____

_____

5. What is the amount of force required to lift an object against the force of gravity equal to?

_____

6. What is the only part of an applied force that performs work on object?

_____

_____

_____

Name _____ Date _____ Class _____

Key Concept Builder

LESSON 1

Work and Power

Key Concept How does doing work on an object change its energy?

Directions: *Answer each question on the lines provided.*

1. How can doing work on an object increase its kinetic energy?

2. How can doing work on an object increase its potential energy?

Directions: *On the line before each item, write* K *if the work gives the object kinetic energy,* P *if it gives the object potential energy, or* B *if it gives the object both kinetic and potential energy.*

3. pushing a grocery cart _____

4. rolling a ball _____

5. carrying a suitcase to a higher floor _____

6. tossing a ball above your head _____

7. rowing a boat _____

Name _____ Date _____ Class _____

Key Concept Builder

LESSON 1

Work and Power

Key Concept How are work and power related?

Power Equation

$$\text{Power (in watts)} = \frac{\text{work (in joules)}}{\text{time (in seconds)}}$$

$$P = \frac{W}{t}$$

Directions: *Use the equation to answer each question.*

1. A task lasted 40 seconds and required 2,000 J of work to complete. How much power was used?

2. How much power is required to do 1,500 J of work in 60 seconds?

3. How much power is expended doing 1,800 J of work in 1 minute?

Directions: *On each line, write the term that correctly completes each sentence.*

4. Power is the rate at which _____ is done.

5. Power is also considered to be the rate at which _____ is transferred to an object.