

Chapter 14 Work, Power, and Machines

Section 14.1 Work and Power**(pages 412–416)**

This section defines work and power, describes how they are related, and explains how to calculate their values.

Reading Strategy (page 412)

Relating Text and Visuals As you read, look carefully at Figures 1 and 2 and read their captions. Complete the table by describing the work shown in each figure. 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.

Figure	Direction of Force	Direction of Motion	Is Work Done?
1	Up	None	No
2A	Horizontal	Horizontal	Yes
2B	Diagonal	Horizontal	Yes
2C	Up	Horizontal	No

What Is Work? (pages 412–413)

- In science, work is done when a(n) force acts on an object in the direction the object moves.
- Circle the letter of the best answer. Is work being done on a barbell when a weight lifter is holding the barbell over his head?
 - No, because the weight lifter isn't moving.
 - Yes, because the weight lifter is exerting force.
 - No, because the barbell isn't moving.
- Is the following sentence true or false? A vertical force does work on an object that is moving in a horizontal direction. false

Calculating Work (pages 413–414)

- In science, work that is done on an object can be described as the force acting on the object multiplied by the distance the object moves.
- Circle the letter of the correct form of the work equation to use when determining the distance an object moves as a result of a force applied to it.
 - Distance = Force \times Work
 - Distance = $\frac{\text{Force}}{\text{Work}}$
 - Distance = $\frac{\text{Work}}{\text{Force}}$

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6. The SI unit of work is the _____ **joule** _____.
7. Circle the letter of the amount of work done when a 1 newton force moves an object 1 meter.
- 1 newton per second
 - 1 joule**
 - 1 watt

What Is Power? (page 414)

8. Is the following sentence true or false? Power is the rate of doing work.
- _____ **true** _____
9. Circle the letter of each sentence that is true about power.
- You can increase power by doing a given amount of work in a shorter period of time.**
 - When you decrease the force acting on an object, the power increases.
 - When you do less work in a given time period, the power decreases.**

Calculating Power (page 415)

10. Circle the letter of the word equation that describes how to calculate power.
- Power equals work divided by time.**
 - Power is a relationship between work and time.
 - Power equals the rate of work.
11. The SI unit of power is the _____ **watt** _____.
12. Circle the letter of the expression that is equivalent to one watt.
- one joule per meter
 - one newton per second
 - one joule per second**

James Watt and Horsepower (page 416)

13. Circle the letter of the quantity that is approximately equal to one horsepower.
- 746 J
 - 746 W**
 - 7460 N/m