

FORMS OF ENERGY

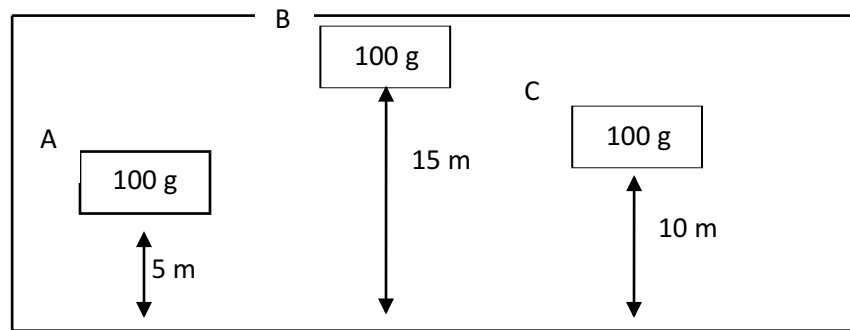
You will need your text for part of this assignment. Information can be found on pgs. 446-452

1. Define **potential energy**:

2. Potential energy is also referred to as **gravitational potential energy**, or GPE, due to the force of gravity acting on an object. This means that the potential energy of an object increases when the object is raised to a higher level. Therefore, if an object's mass and height are known, you can calculate potential energy using the formula:

Potential energy = mass X gravity X height, or $PE = mgh$.

Based on this information, which of the objects below has the greatest potential energy? _____



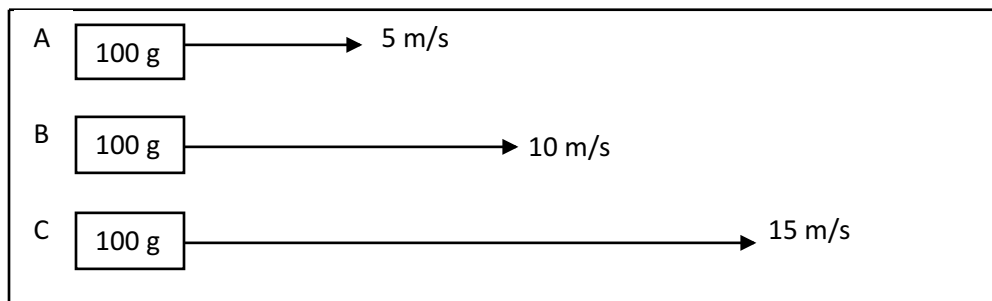
3. Using the formula from #2, calculate the potential energy (PE) for each. (**SHOW THE SETUP**)

A)

B)

C)

4. Kinetic energy is referred to as energy in motion. The kinetic energy of an object depends on the object's mass and velocity and can be determined using the formula: **Kinetic energy = $\frac{1}{2}$ mass X velocity²**, or **$KE = \frac{1}{2} mv^2$** . Based on this information, which of the objects below has the greatest kinetic energy? _____



5. Using the formula from #4, calculate the kinetic energy (KE) for each. (**SHOW THE SETUP**)

A)

B)

C)

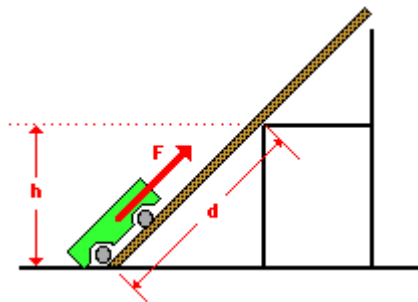
Match each form of energy below to its correct definition.

- | | |
|-----------------------------------|--|
| _____ 6. Elastic potential energy | A) stored in chemical bonds. |
| _____ 7. Mechanical energy | B) energy of an object that is stretched or compressed |
| _____ 8. Thermal energy | C) energy stored in the nucleus of an atom |
| _____ 9. Chemical energy | D) energy of motion and position of everyday objects |
| _____ 10. Electrical energy | E) heat energy created from motion of atoms |
| _____ 11. Electromagnetic energy | F) energy associated with electric charges |
| _____ 12. Nuclear energy | G) travels through space in the form of waves |

Read each statement/example below, and tell which type of energy it is describing.

13. Stretching a rubber band. _____
14. A speeding train or a ball rolling. _____
15. Hydrogen atoms within the sun. _____
16. Lightning bolts. _____
17. Energy stored in wood that allows it to burn. _____
18. Visible light waves and x-rays. _____
19. A piece of iron glowing red from being heated. _____

Calculate – Use the diagram below to complete 20a – 20c.



20a) A cart is loaded with a brick and pulled at constant speed along an inclined plane to the height of a chair seat. If the mass of the loaded cart is 3.0 kg and the height of the chair seat is 0.45 meters, then what is the **potential energy** of the loaded cart at the height of the chair seat?

20b) If a force of 14.7 N is used to drag the loaded cart (from previous question) along the incline for a distance of 0.90 meters, then how much **work** is done on the loaded cart?

20c) If the cart is let go from a distance of 1 m and it slides down the ramp at 0.5 m/s, what is the **kinetic energy** of the cart?

Chapter 15 Energy

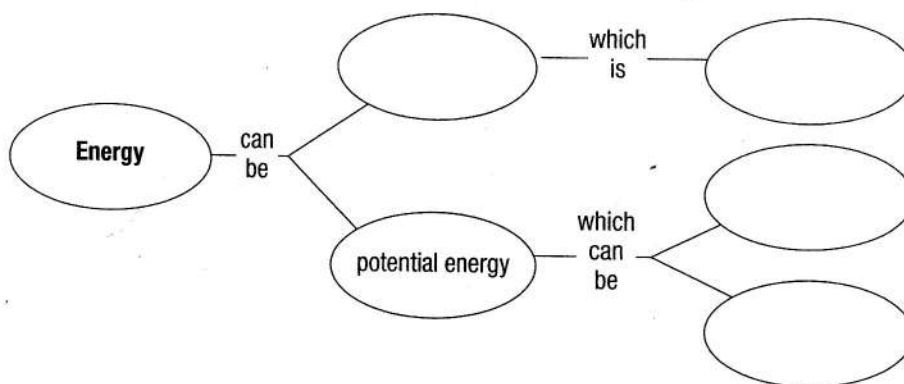
Section 15.1 Energy and Its Forms

(pages 446–452)

This section describes how energy and work are related. Kinetic energy and potential energy are defined, and examples are shown for calculating these forms of energy. Examples of various types of energy are discussed.

Reading Strategy (page 446)

Building Vocabulary As you read, complete the concept map with vocabulary terms and definitions from this section. 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.



Energy and Work (page 447)

1. What is energy? _____
2. When work is done on an object, _____ is transferred to that object.
3. Circle the letter of each sentence that is true about work and energy.
 - a. Energy in food is converted into muscle movement.
 - b. Energy is transferred when work is done.
 - c. Both work and energy are usually measured in joules.
 - d. One joule equals one meter per newton.

Kinetic Energy (pages 447–448)

4. The energy of motion is called _____.
5. Is the following sentence true or false? You can determine the kinetic energy of an object if you know its mass and its volume.

6. Write the formula used to calculate an object's kinetic energy.

7. Calculate the kinetic energy of a 0.25-kg toy car traveling at a constant velocity of 2 m/s. _____

Chapter 15 Energy

Potential Energy (pages 448–450)

8. What is potential energy? _____

9. Is the following sentence true or false? The work done by a rock climber going up a cliff decreases her potential energy.

10. An object's gravitational potential energy depends on its _____, its _____, and the acceleration due to gravity.
11. Is the following sentence true or false? Gravitational potential energy of an object increases as its height increases.

12. The potential energy of an object that is stretched or compressed is known as _____.
13. Complete the table about potential energy.

Potential Energy		
Type	Description	Example
Gravitational		
	Stretched or compressed objects	

Forms of Energy (pages 450–452)

For numbers 14 through 19, write the letter of the form of energy that best matches the description.

- Descriptions**
- _____ 14. Energy stored in gasoline, coal, and wood
 - _____ 15. The sum of an object's potential energy and kinetic energy, excluding atomic-scale movements
 - _____ 16. Produces the sun's heat and light
 - _____ 17. Travels through space in the form of waves
 - _____ 18. Produces lightning bolts
 - _____ 19. Increases as atoms within an object move faster

- Forms of Energy**
- a. mechanical energy
 - b. chemical energy
 - c. electrical energy
 - d. thermal energy
 - e. nuclear energy
 - f. electromagnetic energy