



Chapter Review

Energy

Part A. Vocabulary Review

Directions: Match the description in the first column with the term in the second column by writing the correct letter in the space provided.

- | | |
|--|-----------------------------------|
| <u>F</u> 1. total amount of kinetic and potential energy in a system | a. energy |
| <u>A</u> 2. the ability to cause change | b. friction |
| <u>G</u> 3. stored energy due to position | c. kinetic energy |
| <u>C</u> 4. energy in the form of motion | d. law of conservation of energy |
| <u>D</u> 5. Energy cannot be created or destroyed | e. gravitational potential energy |
| <u>H</u> 6. unit used to measure energy in food | f. mechanical energy |
| <u>J</u> 7. energy stored in chemical bonds | g. potential energy |
| <u>I</u> 8. energy stored by things that stretch or compress | h. Calorie |
| <u>E</u> 9. energy stored by things that are above earth | i. elastic potential energy |
| <u>K</u> 10. SI unit of energy | j. chemical potential energy |
| <u>B</u> 11. causes some mechanical energy to change to thermal energy | k. joule |

Part B. Concept Review

Directions: Complete the following sentences using the correct terms.

- Velocity 1. The amount of kinetic energy a moving object has depends on its mass and its _____.
- Height 2. The potential energy of an object depends on its _____.
- Chemical 3. The energy stored in foods and fuels is _____ potential energy.
- Conservation of Energy 4. The law of _____ states that energy cannot be created or destroyed.
- Calorie 5. Nutritionists use the _____ to measure how much energy we get from foods.
- Law of Conservation of Energy 6. The conversion of potential energy to kinetic energy follows the _____.
- Friction 7. You convert kinetic energy into thermal energy when you rub two sticks together because of _____.

Chapter Review (continued)

Constant

8. The total energy of a system remains _____.

Gravitation Potential

9. An orange in a tree has _____ energy due to Earth pulling down on it.

Mechanical

10. A car engine changes chemical potential energy into the _____ energy of the moving car.

11. Use the equation $KE = \frac{1}{2}m \times v^2$ to calculate the kinetic energy of a 100 kg cart moving at a speed of 7 m/s?Given: $K = ?$ $m = 100 \text{ kg}$ $v = 7 \text{ m/s}$ Soln: $KE = \frac{1}{2}mv^2$

$$= \frac{1}{2}(100 \text{ kg})(7 \text{ m/s})^2$$

$$KE = 2450 \text{ J}$$

12. Use the equation $GPE = m \times 9.8 \text{ m/s}^2 \times h$ to calculate the gravitational potential of a 10-kg sack of groceries on a shelf 1 m above the floor?Given: $PE = ?$ $m = 10 \text{ kg}$ $h = 1 \text{ m}$ $g = 9.8 \text{ m/s}^2$ $PE = mgh$

$$= (10 \text{ kg})(9.8 \text{ m/s}^2)(1 \text{ m})$$

$$PE = 98 \text{ J}$$

Directions: Answer the following questions on the lines provided.

13. A hammer falls off a roof top and strikes the ground with a certain kinetic energy. If it fell from a roof twice as tall, how would its kinetic energy compare? Explain.

KE increases by a factor of 2X

14. Explain why a more streamlined car generally will have better fuel economy than a bulkier car that has the same mass.

less Air Resistance, Thus friction slowing it down.



Note-taking Worksheet

Energy

Section 1 The Nature of Energy

A. Energy is the ability to cause Change.

1. Kinetic energy—Energy in the form of motion.

a. The amount of kinetic energy an object has depends on its mass and its Velocity.

b. Kinetic energy = $\frac{1}{2}$ mass \times speed²

c. Joule—The SI unit used to measure energy

2. Potential energy—Energy stored in a motion less object, giving it the potential to cause change

3. Elastic potential energy—Energy stored by things that Stretch or compress

4. Chemical potential energy—Energy stored in Chemical Bonds between atoms

5. Gravitational potential energy—Energy stored by things that are above earth's surface

a. The amount of GPE an object has depends on its mass, the acceleration due to gravity, and its Velocity.

b. GPE = mass in kilograms \times 9.8 m/s² \times height in meters

Section 2 Conservation of Energy

A. Energy conversions—energy changing from one form to another

1. Fuels store energy in the form of Chemical Potential energy.

2. Mechanical energy—the total amount of potential and kinetic energy in a system

B. Law of Conservation of Energy—Energy may change from one form to another, but the Total Amount of energy never changes.

1. Example—As a swing moves back and forth, its energy continually converts from Potential to Kinetic and back.

2. If the energy of the swing decreases, then the energy of some other object must Increase by an equal amount.

3. Friction converts some of the mechanical energy into Thermal energy.

Note-taking Worksheet (continued)

C. Converting Mass into energy—You must think of mass as energy when discussing nuclear reactions. The total amount of mass and energy is conserved.

1. Nuclear Fusion—Two nuclei are fused together. Takes place in the sun.
2. Nuclear fission—Two nuclei are produced.

D. Conservation of energy in your body

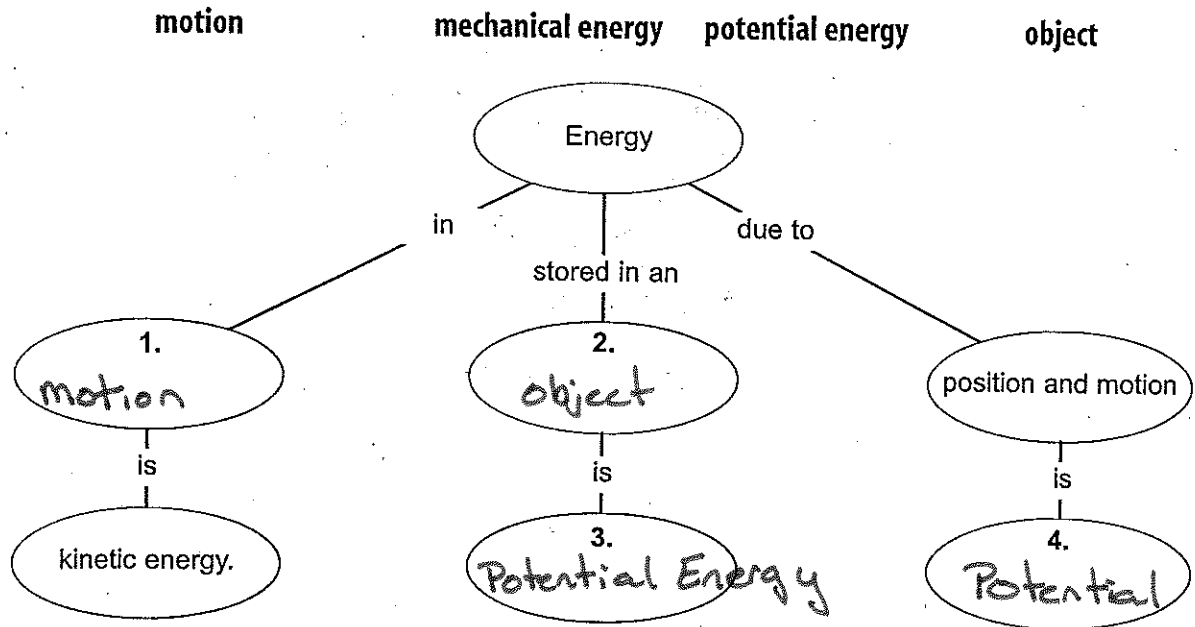
1. Chemical Potential energy from food that is stored in your body is used to fuel the processes that keep you alive.
2. The food Calorie is used to measure how much energy you get from various foods. One Calorie is equivalent to about 4,180 J.



Directed Reading for Content Mastery

Overview Energy

Directions: Complete the concept map using the terms in the list below.



Directions: Three forms of potential energy are gravitational, chemical, and elastic. Write the correct form in the spaces beside the items below. Note that one item has two forms of potential energy.

- Chemical 5. chocolate chip cookie
- elastic 6. pogo stick on impact
- Chemical 7. gasoline
- gravitational 8. bicycle at the top of a hill
- Elastic 9. stretched rubber band
- Chemical, gravitational 10. apple in a tree



Directed Reading for Content Mastery

Section 1 ■ The Nature of Energy

Directions: Draw a line from each type of energy on the left to the example of this type of energy on the right.

- | | |
|-----------------------------------|--|
| 1. kinetic energy | energy that is stored |
| 2. chemical potential energy | energy stored in a stretched spring |
| 3. gravitational potential energy | energy of a spinning bicycle wheel |
| 4. elastic potential energy | energy stored in food |
| 5. potential energy | energy stored in a boulder on a mountainside |

Directions: Use these words to fill in the blanks below. Words may be used more than once.

energy

more

less

potential

kinetic

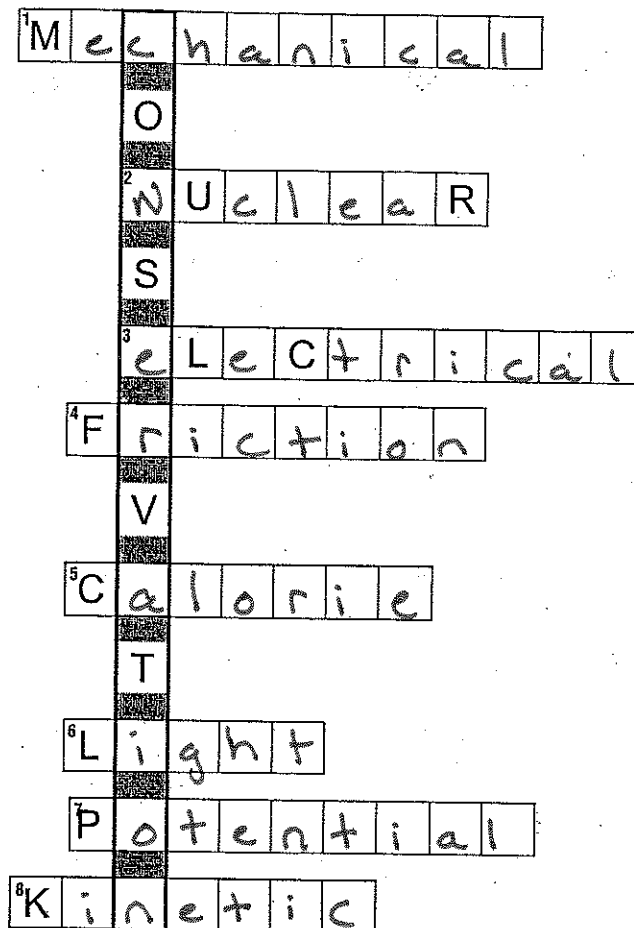
joule

chemical

6. Two baseballs have the same mass. The ball that is closer to the ground has more less gravitational potential energy than the other ball does.
7. Two trucks have the same velocity but different mass. The truck with the greater mass has more kinetic energy than the other truck does.
8. Energy is the ability to cause change.
9. A Joule is a unit of measure of all forms of energy.
10. When an object falls, some of its Potential energy changes to Kinetic energy.
11. The Potential energy of an object depends on its mass and weight.
12. The energy of food and other fuels is Chemical potential energy.


**Directed Reading for
Content Mastery**
**Section 2 ■ Conservation
of Energy**

Directions: Write the term that matches each description below on the spaces provided. The boxed letters should spell the answer to question 9.



1. Type of energy due to both the position and motion of an object
2. Type of reaction in which mass is transformed into energy
3. Type of energy transformed into thermal energy in a toaster
4. Force that acts between two sticks when they are rubbed together
5. Unit used to measure the amount of energy that people get from food
6. Type of energy transformed into chemical energy by plants
7. Type of energy that is greatest at the top of a swing's path
8. Type of energy that is greatest at the bottom of a swing's path
9. What law of energy has never been broken? Conservation

SECTION
2**Reinforcement****Conservation of Energy**

Directions: In each of the following situations, energy is changed from one form to another. Study each situation and identify the energy transformations in the space provided.

1. An electric blanket warms a bed on a chilly night.

electrical → heat (thermal)

2. A rock in Death Valley, California, becomes hot during a summer afternoon.

(light) Radiant Electromagnetic → Thermal

3. A deputy sheriff rides a horse while directing traffic.

Chemical → mechanical

4. A chandelier brightens a ballroom after a waiter moves a switch.

electrical → electromagnetic (light)

5. A swallow sitting on a fence sings a song for anyone who will listen.

Chemical → electromagnetic (sound waves)

6. A jet plane rapidly accelerates on the runway.

Chemical → mechanical

7. A walnut falls to the ground from a lofty branch on a walnut tree.

Potential → Kinetic

8. A placekicker sends a football through the uprights of a goalpost.

Chemical → Kinetic

9. A base runner slides safely into third base.

Chemical → Kinetic

10. A nuclear powered submarine transports its crew from New Orleans to Mobile.

Nuclear → Mechanical