Energy and Work

Match the items in Column I with the terms or phrases in Column II. Write the letter of the correct term or phrase in the blank on the left.

**Column I**

1. work
2. energy
3. mechanical energy
4. potential energy
5. kinetic energy
6. law of conservation of energy

**Column II**

a. total amount of kinetic and potential energy in a system
b. energy may change from one form to another, but it cannot be created or destroyed under ordinary conditions
c. stored energy
d. transfer of energy through motion
e. energy in the form of motion
f. the ability to cause change

Use the definitions of kinetic energy and potential energy to decide what kind of energy each example listed below has. Write KE for kinetic energy and PE for potential energy.

Kinetic energy is energy in the form of motion. Potential energy is stored energy. The amount of potential energy in a sample of matter depends on its position or condition.

1. a moving skateboard
2. a rock at the edge of a cliff
3. a glass of milk
4. gasoline
5. a basketball passing through the hoop
6. a dry cell of a battery
7. an acorn hanging from an oak tree
8. a person climbing a ladder
9. a piece of celery
10. blowing wind

Complete the chart below by listing each of the examples of potential energy above in the correct column.

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<thead>
<tr>
<th>Gravitational Potential Energy</th>
<th>Chemical Potential Energy</th>
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In each of the following statements, the italicized term has been scrambled. Unscramble the term and write it on the line provided.

1. A measure of the average kinetic energy of the particles in a sample of matter is an object’s __________.

2. The total energy of the particles in a material is __________.

3. Energy that flows from something with a higher temperature to something with a lower temperature is __________.

4. Thermal energy includes both kinetic energy and __________.

5. As the temperature of a material increases, the particles move faster and their average __________ becomes greater.

For each group of three terms, write a sentence that explains how the terms are related. Underline the terms in your sentences.

1. thermal energy, particles, energy

   __________________________________________________________________________________

2. temperature, particles, kinetic energy

   __________________________________________________________________________________

3. heat energy, temperature, flow

   __________________________________________________________________________________

4. joules, heat, work

   __________________________________________________________________________________

5. thermal energy, kinetic energy, potential energy

   __________________________________________________________________________________
Write the vocabulary term from this section that best completes each statement in the space provided.

1. When waste thermal energy significantly changes the temperature of the environment, it is called ____________________________.

2. In some factories, water is cooled by fans or by evaporation before being released into the environment by ____________________________.

Use the words in the box to fill in the blanks.

| temperature | 25°C | buildings | pollution | heat | plants |
| factories   | hours | raising   | ocean     | species | fish  |
| animals     | lake  | increases | equipment | thermal |

Thermal ____________________________ is a problem caused when waste ____________________________ energy raises the ____________________________ of the environment. Power plants and ____________________________ use water to cool their ____________________________ and ____________________________. Dumping this water, after ____________________________, the temperature, into a nearby river, ____________________________, or ____________________________, adds ____________________________ and may cause problems for ____________________________ and ____________________________. Animals especially sensitive to ____________________________ in water temperature are _____________________________. Some ____________________________ of fish will die within ____________________________ in water warmer than ____________________________.
In the blank, write the term that best completes each statement.

1. The amount of energy it takes to raise the temperature of 1 kilogram of a material 1 Celsius degree is called ____________________________.

2. Another term used for specific heat is ____________________________.

3. Specific heat is measured in ____________________________ per kilogram per degree Celsius.

4. Specific heat can be used to measure changes in ____________________________.

5. Thermal energy is the ____________________________ energy of the particles that make up a material.

6. In the equation $Q = m \times \Delta T \times C_p$, the symbol $\Delta$ means ____________________________.

7. A measure of the average kinetic energy of the particles in a sample of matter determines the matter’s ____________________________.

8. The transfer of energy from something at a higher temperature to something at a lower temperature is called ____________________________.

9. In the equation $Q = m \times \Delta T \times C_p$, the change in thermal energy is shown by ____________________________.


11. Work and heat both involve ____________________________ of energy.