

MASTERING CONCEPTS

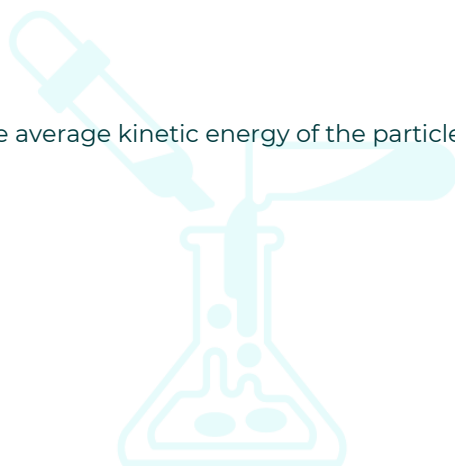
1. _____ is the ability to do work or produce heat.
 - a) Heat
 - b) Energy
 - c) Calorie
 - d) Joule

2. _____ is a form of energy that flows from a warmer object to a cooler object.
 - a) Heat
 - b) Calorie
 - c) Energy
 - d) Joule

3. _____ is a measure of the average kinetic energy of the particles in a sample of matter.
 - a) Calorie
 - b) Heat
 - c) Temperature
 - d) Joule

4. How does the chemical potential energy of a system change during an endothermic reaction?
 - a) increases
 - b) decreases
 - c) does not change
 - d) depends on the system

5. During an avalanche, the _____ energy of snow at a higher altitude is converted to _____ energy as the snow cascades down a mountain.
 - a) kinetic - potential
 - b) chemical - kinetic
 - c) potential - electrical
 - d) potential - kinetic



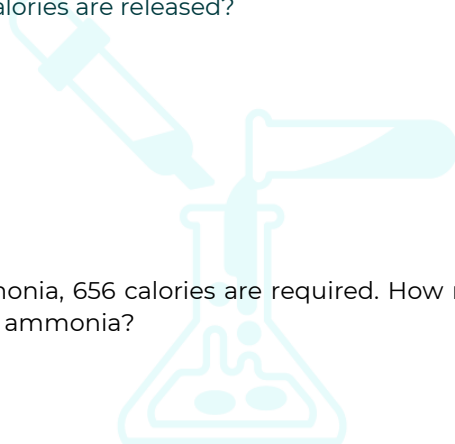
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6. How is the energy in gasoline converted and released when it burns in an automobile engine?
- a) Much is converted to work to move pistons in the engine; some is released as heat.
 - b) Much is converted to heat to move pistons in the engine; some is released as work.
 - c) Some is converted to heat to move pistons in the engine; much is released as work.
 - d) Some is converted to work to move pistons in the engine; much is released as heat.
7. How does the nutritional Calorie compare with the calorie?
- a) One nutritional Calorie equals 1 calorie.
 - b) One nutritional Calorie equals 1000 calories.
 - c) One nutritional Calorie equals 10 calories.
 - d) One nutritional Calorie equals 0.001 calories.
8. What is the relationship between the Calorie and a kilocalorie?
- a) One nutritional Calorie equals 10 kilocalorie.
 - b) One nutritional Calorie equals 1000 kilocalorie.
 - c) One nutritional Calorie equals 0.1 kilocalorie.
 - d) One nutritional Calorie equals 1 kilocalorie.
9. What quantity has the units $\text{J}/(\text{g} \cdot ^\circ\text{C})$?
- a) Heat
 - b) Specific heat
 - c) Energy
 - d) Temperature
10. $1 \text{ cal} = \underline{\hspace{2cm}} \text{ J}$.
- a) 1
 - b) 0.84
 - c) 4.184
 - d) 1000

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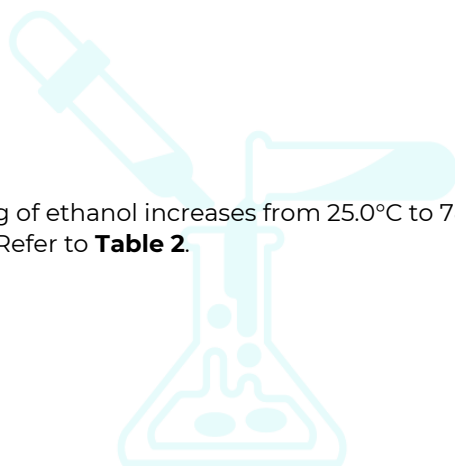
$1 \text{ J} = 0.2390 \text{ cal}$	$1 \text{ cal} = 4.184 \text{ J}$	$1 \text{ Calorie} = 1 \text{ kcal}$
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1. A food item contains 124 nutritional Calories. How many calories does the food item contain?
2. How many joules are absorbed in a process that absorbs 0.5720 kcal?
3. Ethanol is being used as an additive to gasoline. The combustion of 1 mol of ethanol releases 1367 kJ of energy. How many Calories are released?
4. To vaporize 2.00 g of ammonia, 656 calories are required. How many kilojoules are required to vaporize the same mass of ammonia?
5. One mole of ethanol releases 326.7 Calories of energy during combustion. How many kilojoules are released?
6. A 25.0-g bolt made of an alloy absorbed 250 J of heat as its temperature changed from 25.0°C to 78.0°C. What is the specific heat of the alloy?



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7. A breakfast of cereal, orange juice, and milk might contain 230 nutritional Calories. Express this energy in joules.
8. An exothermic reaction releases 86.5 kJ. How many kilocalories of energy are released?
9. The temperature of a sample of iron with a mass of 10.0 g changed from 50.4°C to 25.0°C with the release of 114 J. What is the specific heat of iron?
10. If the temperature of 34.4 g of ethanol increases from 25.0°C to 78.8°C, how much heat has been absorbed by the ethanol? Refer to **Table 2**.
11. A 155 g sample of an unknown substance was heated from 25.0°C to 40.0°C. In the process, the substance absorbed 5696 J of energy. What is the specific heat of the substance? Identify the substance among those listed in Table 2.
12. A 4.50 g nugget of pure gold absorbed 276 J of heat. The initial temperature was 25.0°C. What was the final temperature?



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13. Calculate the amount of heat absorbed when 5.50 g of aluminum is heated from 25.0°C to 95.0°C. The specific heat of aluminum is 0.897 J/(g·°C).

