Physical Science 20 Heat Review

Key Terms

Thermal energy
Temperature
Temperature scale
Heat
Specific heat capacity
Conduction
Convection
Radiation
Calorimeter
Heat of fusion
Heat of vaporization

Key Concepts

Kinetic theory of matter
States of matter
Transfer of heat
Heat capacity
Conservation of energy
Thermal equilibrium
Changes of state – heat of fusion/vaporization
Thermal expansion

Review Questions

1. What are the three states of matter? Explain how they differ using kinetic theory of matter.
2. Discuss how temperature differs from heat.
3. What has more thermal energy: a 355 mL can of pop, or a 2 L bottle of pop, both at 288 K? Why?
4. What are the three modes of heat transfer?
5. You touch a wooden tabletop and a metal table leg. Which one feels cooler? Why?
6. What type of system does a calorimeter model? If a piece of gold is cooled, then placed in a calorimeter filled with water, explain what happens using the concept of conservation of energy.
7. Why is there no temperature increase or decrease during changes of state?
8. Why do railroad tracks have gaps in them?
9. How is water different from other substances when it comes to volume expansion?
10. a. Convert 50°F to Kelvin.
    b. Convert 22°C to Kelvin.
11. How much heat is needed to raise the temperature of 50.0 g of water from 4.5°C to 83.0°C?

12. A 10.0 kg piece of zinc at 71.0°C is placed in a container of water. The water has a mass of 20.0 kg and a temperature of 10.0°C before the zinc is added. What is the final temperature of the water and the zinc?
13. How much heat is added to 10.0 g of ice at -20.0°C to convert it to steam at 120.0°C?
14. A metal bar of length 8.024 m undergoes a temperature increase of 123°C. Its length increases by 0.020 m. Determine the metal's coefficient of linear expansion during the temperature change.
15. Coffee having a volume of 272 mL completely fills a cup made of Pyrex glass. The coffee and cup are at 21°C, and are placed in a microwave oven and heated to 89°C. Assuming coffee and water have the same coefficient of volume expansion, find the volume of coffee that overflows from the cup.