What Is the Difference Between Temperature and Heat?

Worksheet

Temperature is a measure of the average kinetic energy of particles in a substance, while heat (Q) is the thermal energy transferred between objects due to a temperature difference, calculated as Q = mcT.

$$Q = m \cdot c \cdot \Delta T$$

Questions

1. What is the SI unit of heat?

A) Celsius
B) Kelvin
C) Joule
D) Watt

2. Which quantity measures the average kinetic energy of particles?

A) Heat
B) Temperature
C) Pressure
D) Volume

3. 1 kg of water (c=4186 J/kgC) is heated by 10C. How much heat is absorbed?

A) 418.6 J
B) 4186 J
C) 41,860 J
D) 4,186,000 J

4. During melting, what happens to temperature as heat is added?

A) It rises steadily
B) It stays constant
C) It drops
D) It rises then falls

5. How much heat is needed to raise the temperature of 2 kg of water (c = 4186 J/kgC) by 30C?

6. A 0.5 kg iron block (c = 450 J/kgC) absorbs 9000 J of heat. Find its temperature change.

7. 50 g of aluminum (c = 900 J/kgC) cools from 80C to 20C. How much heat did it release?

8. Define: What is temperature?

9. Define: What is heat?

10. Define: What is specific heat capacity?

Answer Key

1. C) Joule - Heat is a form of energy, measured in joules (J).
2. B) Temperature - Temperature reflects the average kinetic energy of particles.
3. C) 41,860 J - Q = mcT = 1418610 = 41,860 J.
4. B) It stays constant - During a phase change, added heat goes into breaking bonds, not raising temperature.
5. Q = mcT Q = 2 4186 30 Q = 251,160 J 251.2 kJ
6. Q = mcT T = Q/(mc) T = 9000/(0.5 450) T = 9000/225 = 40C
7. m = 0.05 kg, T = 80 20 = 60C Q = mcT = 0.05 900 60 Q = 2700 J released
8. A measure of the average kinetic energy of particles in a substance.
9. Thermal energy transferred between objects due to a temperature difference.
10. The amount of heat needed to raise 1 kg of a substance by 1C.