Name _____ Date _____ Period _____

ZornScience
zornscience.org

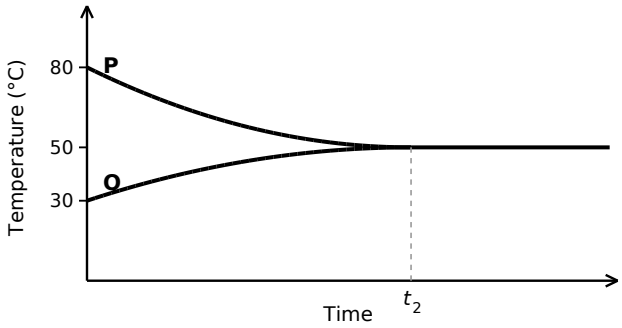
6.3 Heat Transfer and Thermal Equilibrium

AP Chemistry

Answer in complete sentences. Use particles, collisions, and kinetic energy in your explanations.

1. Explain the difference between heat and temperature. Use particles in your answer.

2. Samples P and Q are placed in contact in an insulated container. The graph shows their temperatures over time.



(a) Which sample's particles had the greater average kinetic energy at the start?
(b) Describe the direction of energy transfer and how it happens.
(c) What is true about the particles of P and Q after time t_2?
(d) Is energy still being transferred after t_2? Explain.

3. In problem 2, P cooled by 30°C and Q warmed by 20°C. No energy escaped the container. How can the temperature changes be different when the energy lost by P equals the energy gained by Q?

CC BY-NC-SA 4.0 | zornscience.org

4. Container 1 holds $N_2(g)$ at 400 K and container 2 holds $CO_2(g)$ at 400 K.

(a) Which gas has the greater average kinetic energy?

(b) Which gas has particles with the greater average speed? Justify your answers.

5. 100.0 g of water at 20.0°C is mixed with 100.0 g of water at 60.0°C in an insulated cup. Predict the final temperature and explain your reasoning using energy transfer.

6. Each statement is false. Rewrite it so that it is true.

(a) “Cold flows from the ice into your hand.”

(b) “At thermal equilibrium, the particles stop colliding.”

(c) “A hot pan contains more heat than a cold pan.”

(d) “Two objects at thermal equilibrium have the same total energy.”

CC BY-NC-SA 4.0 | zornscience.org