

Specific Heat

Name _____

Concepts:

- 1) Define Temperature and give the equation for it.

- 2) Define Heat and give the equation for it.

- 3) Define Thermal Contact.

- 4) Define Thermal Equilibrium.

- 5) Define Internal Energy.

Conceptual Questions:

- 6) If the speed of a molecule doubles what happens to the temperature?

- 7) What would happen to the average KE if the temperature went from 400 K to 200 K?

- 8) What would happen to the average speed of the molecule if the temperature went from 400 K to 200 K?

- 9) Why is something hot or cold?

- 10) What happens when an object gains potential energy due to gravity?

Problems involving heat:

Heat: $Q = mc \Delta T$ where Q is the amount of heat, m is the mass, c is the specific heat of the material and ΔT is the change in temperature ($T_f - T_i$). $4.187 \text{ joules} = 1 \text{ cal}$ or $4187 \text{ joules} = 1 \text{ kcal}$

Give your answers in terms of both calories and joules.

- 1) How much heat (energy) is needed to raise 100 g of water from 10°C to 60°C ?
- 2) How much heat is given off when 85 g of lead cools from 200°C to 10°C ?
- 3) If 2000 calories of heat are used to heat a substance, how many joules were used?
- 4) How much heat is given off when 85 grams of lead cools from 150°C to 20°C ?
- 5) What is the specific heat of a substance if 50 grams of the substance gives off 1200 cal of heat when it cools from 100°C to 50°C ?
- 6) How much heat does it take to raise 40 grams of silver from 100°C to 300°C ?
- 7) Aluminum is often used as a container for the purpose of measuring the amount of heat added to or given off by a substance. It is therefore necessary to also be able to calculate the amount of heat absorbed by the container. Therefore how much heat will a 40 gram calorimeter gain if its temperature is raised from 22°C to 100°C ?
- 8) If 800 cal are used added to iron, how much will the temperature increase? $m = 100 \text{ g}$.
- 9) If 800 cal of heat are added to water, how much will the temperature increase? $m = 100 \text{ g}$.
- 10) If 1500 cal of heat are added to copper and the initial temperature is 50°C , what will the final temperature be? $m = 100 \text{ g}$.