Specific Heat Capacities of some common substances

Substance	Specific Heat Capacity (J/g°C)
Water (l)	4.184
Water (s)	2.03
Water (g)	2.0
Aluminum(s)	0.89
Iron(s)	0.45
Mercury(l)	0.14
Co[illegible](s)	0.71
Si[illegible]	0.24
Gold(s)	0.13

$$Q = Cp\ m\ \Delta T$$

1. Calculate the joules of energy required to heat 454 g of water from 5.4 °C to 98.6 °C.

2. a). What quantity of energy (in joules) is required to heat a piece of iron weighing 1.3 g from 25 °C to 46 °C?

b) What is the answer in calories?

3. A 1.6-g sample of metal that has the appearance of gold requires 5.8 J of energy to change its temperature from 23 °C to 41 °C. is the metal pure gold?

4. If 21.5-g of iron are heated to 100. °C and then dropped into an insulated container of water (mass of the water is 132 g and its Temperature is 20°C), what will be the final temperature of the water? *Hint:* heat lost by iron = heat gained by water

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Chapter 3

STUDY GUIDE

3.3 ENERGY

Answer the following questions.

1. Recall that ordinary salt is a compound of sodium and chlorine. List several systems that can be defined in a shaker full of salt.

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_____

2. What is heat?

_____

3. What is a joule?

_____

4. How is the calorie related to the joule?

_____

5. Contrast endothermic and exothermic reactions.

_____

6. What is specific heat?

_____

Solve the following problems.

7. How many joules are in 1.11 Calories?

8. An average baked potato contains 164 Calories. Calculate the energy value of the potato in joules.

9. How much heat is lost when a 4110-g metal bar whose specific heat is 0.2311 J/g · C° cools from 100.0°C to 20.0°C?

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10. What is the specific heat of copper if a 105-g sample absorbs 15 200 J and the change in temperature is 377°C?

11. What is the final temperature of a system of iron and water if a piece of iron with a mass of 25.0 grams at a temperature of 75.0°C is dropped into an insulated container of water at 35.5°C? The mass of the water is 150.0 grams. The specific heat of iron is 0.449 J/g·C°, and the specific heat of water is 4.184 J/g·C°.