

Chapter 3 Math

1. Are these data sets on chemical changes consistent with the law of conservation of mass?
 - a. A 7.5g sample of hydrogen gas completely reacts with 60.0g oxygen gas to form 67.5 grams of water.
 - b. A 60.6g sample of gasoline completely reacts with 243g of oxygen to form 206g of carbon dioxide and 88g of water.
2. A slice of pizza contains 285 Cal of nutritional energy. How many joules does it contain?
3. A 15.0 g iron nail is heated from 20.0°C to 85.0°C . How much heat is absorbed? The specific heat capacity of iron is $0.449 \text{ J/g}^{\circ}\text{C}$.
4. A 30.0 g piece of aluminum is allowed to cool from 75.0°C to 30.0°C . How much heat is released? The specific heat capacity of aluminum is $0.897 \text{ J/g}^{\circ}\text{C}$

Units of Energy

- Joules
- calories
- Calories

Energy Conversions: (memorize!)	
1 calorie (cal)	= 4.184 joules (J)
1 Calorie (Cal)	= 1000 calories (cal)
1 kilowatt-hour (kWh)	= 3.60×10^6 joules (J)

1. The combustion of a wooden match produces approximately 512 cal of heat. How many joules are produced?

Equations:

Temperature:

$$K = ^\circ C + 273.15$$

$$^\circ C = \frac{^\circ F - 32}{1.8}$$

_____ - energy is released
_____ - energy is absorbed

Specific Heat Capacity

$$q = m \cdot C \cdot \Delta T$$

q = heat

m = mass

C = specific heat capacity

ΔT = temperature change