## Warm-Up!

Answer these using proper Sig Figs:

2) 
$$100 \times 0.045 + 7,500 = 7504.5 7500$$

3) If d=vt, how fast (in miles per hour) can Tyler pitch if a ball he throws travels 60.5 ft in 0.95s?

64fx /mi 3600s 8 × 5,280ft × 1hr 445:/hr

#### Heat

The quantity of heat (q) that flows varies directly with the quantity of substance (mass or volume), the specific or volumetric heat capacity (C) and the temperature change ( $\Delta T$ ).

FORMULA: 
$$q = mC\Delta T$$
 or  $q = vC\Delta T$ 

In calculating q, the heat capacity constant (C) must correspond to the state of matter of the substance.

# Think. Pair. Share. $q = mC \triangle \Gamma$

## Question:

Would an increase in the mass of a sample make the heat requirement increase or decrease?

#### **Another Question:**

Would an increase in mass cause a larger or a smaller increase in temperature?

### Sample Problem

A system contains a 100.g sample of ice. 1250J of heat is added to the system.

- a) should the temperature of the ice go up of down?
- b) by how much does the temperature change?

#### Sample Problem #2

A certain sample of metal has an unknown heat capacity. If 756J of heat is lost, the temperature of 150.0g of the metal decreases from 17.5°C to 12.0°C. What is the heat capacity of the metal?

Capacity of the metal?

$$2 = -7565$$
 $m = 150.0$ 
 $T_{e} = 17.5$ 
 $m = 17.5$ 
 $m = 150.0$ 
 $m =$ 

#### Sample Problem #3

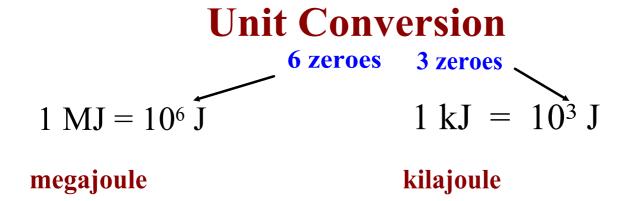
A sample of lead has a mass of 4.56 kg. After 76J of heat was added to the sample, the final temperature was 47°C.

- a) What was the initial temperature of the sample?
- b) Should the final temperature *always* be higher after heat is added?

$$m = 4.56kg = 4560g$$
 $2 = 765$ 
 $T = 47°C$ 
 $T = 47°C$ 

## Sample Problem #4

A 25.6g piece of aluminum at 75°C is placed in 4.56 kg of water. If the initial temperature of the water was 10°C, then what is the final temperature of both the aluminum and the water?



Ex. Convert 13000J to kJ and MJ.

Ex. Convert 41MJ to J and kJ.

If 2.50L of water at 22.0°C is given 18.90kJ of heat, what will be the final temperature?

**Today's Mission:** 

**Heat Worksheet** 

1) 31 200 J

7) 0.0456 J/g °C

2) -31 700 J

8) 424 g

3) 120°C

9) 2.60 J/g °C

4) 28°C

10) 6.21 J

5) 1100 J

11) 42.6 L

6) 14 900 J