Name: _____ Date: _____ Period: _____ #: _____

ENERGY FOR TEMPERATURE CHANGES

To calculate the energy release or required to change the temperature of a substance without a phase change, we will use the following equation:

$$q = m \, c \, \Delta T$$

where,

q = _____ m = _____ c = _____ ΔT = _____

EXAMPLE
1. How many joules of heat are lost by 358 g of granite as it cools from 41.2°C to -12.9°C. The specific heat of granite is 0.803 J/g°C.

PRACTICE (must show three steps for credit)
2. How many joules of heat are required to raise the temperature of 100. g of iron from 22.0°C to 80.0°C? The specific heat of iron is 0.46 J/g°C.

3. How many joules of heat are required to raise the temperature of 150. g of silver from 10°C to 90°C? The specific heat of silve ir 0.24 J/g°C.

4. What is the specific heat of a metal if 849 joules are required to raise the temperature of a 300. g sample from 25.0°C to 48.0°C?

5. What is the specific heat of an unknown metal if 328 J are released when a 12.7 g sample is cooled from a temperature of 114.0°C to 85.0°C?

6. How much energy is required to change 25.0 g of ice from -25.0°C to 0°C? Specific heat of ice is 2.08 J/g°C.

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ENERGY FOR PHASE CHANGES

Some useful numbers:

$\Delta H_{fus} = 6.01$ kJ/mol
$\Delta H_{vap} = 40.7$ kJ/mol

Remember that　　　　$\Delta H_{sol} = (-\Delta H_{fus})$　　and　　$\Delta H_{cond} = (-\Delta H_{vap})$

EXAMPLE:

1. How much energy is needed to change 15.0 g of ice to liquid at 0°C?

2. How much energy is required to boil 150 g of water at 100°C?

3. How much energy is released when freezing 50.0 g of water?

PRACTICE

4. How much energy is released when 7.5 g of steam condenses?

5. If 32 g of liquid water is frozen, how much energy will be released?

6. When changing 30 g of water to steam at 100°C, how much energy is absorbed?

7. Melting 80.50 g of ice requires how much energy?