

Heat Problems 2

Name:

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Density of water = 1 g/mL.

$$^{\circ}\text{C} = \text{K} - 273$$

kilo (k) = 1000

$$H = (m)(\Delta T)(c)$$

$$(\Delta T) = T_2 - T_1$$

$$\text{For water: } c = 4.2 \text{ J/g } ^{\circ}\text{C} = 1 \text{ cal/g } ^{\circ}\text{C}$$

1. If a 50.0 g chunk of iron is added to 700.0 mL of water and the temperature of the water rises by 7.0°C , how much heat did the iron provide to the water?
 - a. How much heat per gram of iron is this?
2. What is the temperature change (ΔT) if 5015 J of energy is absorbed by 88.5 mL of water?
3. If the temperature of 250.0 mL of water rises from 45°C to 77°C , as 44 g of liquefied wax freezes in the water, what is the amount of heat gained by the water?
 - a. What is the amount of heat lost by the wax?
 - b. What is the heat of crystallization of the wax?
4. A potato chip is lit on fire and placed under a container of water. If the container had 225 mL of water in it and the temperature of the water increased by 15°C , how much heat (calories) did the potato chip provide to the water?
 - a. How many calories per gram did the potato chips have if the chip had a mass of 7.3 g?

5. If an object has a starting temperature of 88°C and a final temperature of 375 K , its specific heat is $1.55\text{ J/g}^{\circ}\text{C}$, and it has an energy change of 58 J , what is the mass of the object?

6. What is the specific heat of a 585 g object if it gives off 7220 J of heat when the temperature changes by 66°C ?

7. How much heat is lost if an object has the following properties: $m = 125\text{ g}$, $T_1 = 16^{\circ}\text{C}$, $T_2 = 415^{\circ}\text{K}$, $c = 2.1\text{ J/g}^{\circ}\text{C}$.

8. If a liquid having a mass of 455 g and a specific heat of $0.78\text{ cal/g}^{\circ}\text{C}$ is subjected to 5560 calories of heating, what will its final temperature be, if its starting temperature is 11°C ?

9. 475 ml of water is cooled down with some ice. The temperature of the water went from 21°C to 2.0°C . In the end, there was a total of 541 ml of water. How many Joules of heat did the water lose?
 - a. How much heat did the ice gain?

 - b. What was the heat of fusion of the ice? (heat per gram needed to melt the ice)

10. What is the mass of a piece of ice, if it requires 3788 calories to heat the ice from 220°K to -11°C ? The specific heat of ice is $0.50\text{ cal/g}^{\circ}\text{C}$.