

Name:

Date:

1. What is the difference between temperature and heat?

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2. \_\_\_\_\_ is energy in motion. \_\_\_\_\_ is stored energy and  
\_\_\_\_\_ be measured. \_\_\_\_\_ can be measured.

3. When you heat a substance and the temperature rises, how much it rises depends upon  
its \_\_\_\_\_.

4. The definition of specific heat capacity is the amount of \_\_\_\_\_ required to do what?

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5. You can touch the aluminum pan of a TV dinner soon after it has been taken from the oven, but you will burn your hand if you touch the food it contains. Explain.

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6. Why doesn't the temperature of water (for example) continually increase as it is heated?

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questions continued on next page

Unit 8D Practice Problems 2 Heat Calculations

7. What equations must be used to calculate the heat associated with a phase change?

Why can't the specific heat equation be used? \_\_\_\_\_

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Use these charts as needed in the following calculations: You will need your own paper to complete your calculations.

Substance	Specific Heat (J/g °C)
H <sub>2</sub> O(l)	4.184
H <sub>2</sub> O(steam)	2.02
Al(s)	0.89
Fe(s)	0.45

Water
$\Delta H_{\text{fus}} = 334 \text{ J/g}$
$\Delta H_{\text{vap}} = 2260 \text{ J/g}$

8. How much heat is required to warm 275 g of water from 76 °C to 87 °C?
9. PCl<sub>3</sub> is a compound used to manufacture pesticides. A reaction requires that 96.7 g of PCl<sub>3</sub> be raised from 31.7 °C to 69.2 °C. How much energy will this require given that the specific heat of PCl<sub>3</sub> is 0.874 J/g °C?
10. A quantity of water is heated from 25.0 °C to 36.4 °C by absorbing 325 J of heat energy. What is the mass of the water?
11. A 500. g sample of an unknown metal releases  $6.4 \times 10^2$  J as it cools from 55.0 °C to 25.0 °C. What is the specific heat of the sample?

12. In a household radiator, 1000.g of steam at 100. °C condenses (changes from gas to liquid). How much heat is released?
13. How much heat is necessary to change a 52.0 g sample of water at 33.0 °C into steam at 110.0 °C? This problem requires several steps since temperature changes and a phase change takes place. Use the hints to solve.
- Solve for the heat required to increase the water temperature from 33.0° C to 100.0 °C. Stop here because the water will change phase at this temperature.
  - Solve for the heat required to change the water into steam (no change in temp).
  - Calculate the heat required to change the temperature of the steam from 100.0 °C to 110.0 °C.
  - To get the heat required for the whole process, \_\_\_\_\_ the calculated heats from above.