

Name: \_\_\_\_\_

Period: \_\_\_\_\_

## Heat Problems, Part Deux (Thermochemistry)

### Specific Heats:

Aluminum (s)	0.900 J/g °C	PCl <sub>3</sub> (s)	0.874 J/g °C
Iron (s)	0.470 J/g °C	CCl <sub>4</sub> (s)	0.856 J/g °C
H <sub>2</sub> O (s)	2.06 J/g °C	H <sub>2</sub> O (l)	4.18 J/g °C
H <sub>2</sub> O (g)	2.02 J/g °C	Cs (s)	0.246 J/g °C
Cs (l)	0.242 J/g °C	Cs (g)	0.156 J/g °C

### Melting Points:

H <sub>2</sub> O	0.0°C	Cs	28.5°C
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### Boiling Points:

H <sub>2</sub> O	100.0°C	Cs	671.0°C
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Find the answers the following questions. Show all of your work the same way you would for a test.

1. How much heat is required to raise the temperature of 40.0 g sample of solid PCl<sub>3</sub> from 20.0°C to 80.0°C?

Answer: \_\_\_\_\_

2. How much heat is required to raise the temperature of 8.77 g of solid cesium from -75.0°C to +25.0°C?

Answer: \_\_\_\_\_

3. How much heat is lost when a solid aluminum ingot with a mass of 4110 g cools from 660.0°C to 25.0°C?

Answer: \_\_\_\_\_

4. If an iron cube is given 4125 J of heat and its temperature rises from 10.0°C to 80.5°C, what is the mass of the iron?

Answer: \_\_\_\_\_

5. If 1250 J of heat are added to 42.5 g of iron, what will its final temperature be if it is currently at a comfortable 23.5°C?

Answer: \_\_\_\_\_

6. You have a sample of H<sub>2</sub>O with a mass of 250 g. How many Joules of heat energy are necessary to:

A) Warm the sample from -40.0°C to -15.0°C?

Answer: \_\_\_\_\_

B) Warm the sample from 15.0°C to 40.0°C?

Answer: \_\_\_\_\_

C) Warm the sample from 115°C to 140°C?

Answer: \_\_\_\_\_

7. A 45.0 g sample of Cesium metal is heated from 24.0°C using 3600 J of energy. What is its final temperature? Is this reasonable? Explain.

Answer: \_\_\_\_\_

Answer: \_\_\_\_\_

8. An 50.0 g sample of an unknown metal is heated to a temperature of 100.0°C and then dropped into 100.0 g of cold water whose temperature was 20.0°C. The water warmed up to 25.0 °C as the metal cooled to the same temperature.

A) How much heat did the water gain?

Answer: \_\_\_\_\_

B) How much heat did the metal lose?

Answer: \_\_\_\_\_

C) What is the heat capacity of the metal?

Answer: \_\_\_\_\_