12 Heat Capacity of an Unknown Lab (1762648)

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Instructions

Materials: Hot water bath, unknown metal sample, tongs, tap water, insulated cup,
thermometer, Vernier wireless temperature probe, Vernier Graphical Analysis App,
iPad, large graduated cylinder.

Procedure:

1. Measure 250.0 mL of tap water with a large plastic graduated cylinder and pour the
water into an insulated cup.
2. Measure the temperature of the water in the cup and record the temperature.
3. Bring the cup over to the hot water bath and transfer the hot metal into the cup with
tongs.
4. Gently swirl the cup and record the temperature of the water in the cup until a
maximum is reached. Record the maximum temperature.
5. Record the temperature of the hot water bath.
6. Dry the metal and find its mass.
7. Dispose of the water into the sink and return the metal to the instructor.

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1.   Question Details   Lab Partners [1837468]   _

Enter the name(s) of your lab partner(s). (If you worked by yourself, enter "none").

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2.   Question Details   Unit 12 Temperature and Heat [1732985]   _

Temperature is a measure of the [_____] (three words) of particles in a sample of matter.

[_____] is the transfer of energy between two samples of matter because of differences in their temperatures.

[_____] (two words) is the amount of energy required to raise the temperature of one gram of a substance by one degree Celcius.

The [_____] is the SI unit of heat.

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3. Question Details   Unit 12 Specific Heat Rank [1733158]   -

Rank the following from lowest to highest specific heat.(do some research online; pay attention to the units)

lowest   [-   ◊]

[-   ◊]

[-   ◊]

[-   ◊]

[-   ◊]

[-   ◊]

highest [-   ◊]

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4. Question Details   Unit 12 Specific Heat of a Metal Lab Data [1733000]   -

a. Enter the experimental mass(from the balance) of the metal: [4.0 ✓] [_____] g

b. Enter the temperature of the water in the cup: [4.0 ✓] [_____] °C

c. Enter the initial temperature of the metal: [4.0 ✓] [_____] °C

d. Enter the final temperature of the metal and water in the cup: [4.0 ✓] [_____] °C

e. Enter the volume of water in the cup: [4.0 ✓] [_____] mL

f. Calculate the mass of the water in the cup (assume the density of water = 1.000 g/ml): [4.0 ✓] [_____] g

g. Enter the change in temperature of the water in the cup: [4.0 ✓] [_____] °C

h. Enter the change in temperature of the metal: [4.0 ✓] [_____] °C

i. Calculate the heat gained by the water: [4.0 ✓] [_____] J

j. Calculate the specific heat of the metal:(use your original data, not the rounded answer from letter i.) [4.0 ✓] [_____] J/g°C

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5. Question Details   Percent Error Specific Heat Lab [1742500]   -

Enter the specific heat of the unknown again:
[4.0 ✓] [_____] J/g°C
This question is a check of accuracy. A red X will probably appear, which means that your answer is not exactly correct. The
number of points deducted is a reflection of how close you are to the accepted value.

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6.   Question Details   Water Heat capacity [1711336]

Water has such a high heat capacity because

○ water has a higher density than most metals.

○ much of the heat that is added to water is converted to kinetic energy.

○ water is not very dense like metals and therefore doesn't conduct heat as readily.

○ much of the added energy is required to break hydrogen bonds.

○ none of the energy is stored as potential energy.

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7.   Question Details   dls.121.8.5 [309494]

Given the following heat capacities and that each sample had the same mass, which would require the greatest amount of heat energy to reach a temperature of $100^{\circ}C$?

○ All of the choices require the same amount of heat energy.

○ aluminum, 0.90 j / (g$^{\circ}$C)

○ ammonia, 4.70 j / (g$^{\circ}$C)

○ silver, 0.24 j / (g$^{\circ}$C)

○ water, 4.184 j / (g$^{\circ}$C)

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8.   Question Details   High specific heat [3583808]

Which of the following describes a material with a high specific heat?

○ It takes a lot of energy to change the temperature of the material.

○ It is a material that melts at a high temperature.

○ It is a material that rapidly cools, giving up its heat.

○ It is a material that melts at a low temperature.

○ It takes very little energy to change the temperature of the material.

○ It is a material that changes temperature very rapidly when heated.

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9.   Question Details   Final T heat question [3594796]

Suppose a piece of iron with a mass of 30.4 g at a temp of 100.0 °C is dropped into an insulated container of water. The mass of the water is 155.9 g and its temperature before adding the iron is 20.0 °C. What will be the final temp of the system? (Specific heat of iron is 0.449 J/g°C). [4.0]✓ [   ]°C

Assignment Details

Name (AID): **12 Heat Capacity of an Unknown Lab (1762648)**   **Feedback Settings**

Submissions Allowed: **5**   Before due date

Category: **Homework**   Question Score

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