# Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ UGA myID \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Temperature Changes and Specific Heat Capacities**

Two objects can absorb the same amount of thermal energy but reach different final temperatures due to their different specific heat capacities. Specific heat capacity is the amount of energy needed to raise the temperature of 1 gram of a substance by 1°C. Specific heat capacity is an intensive property, so substances can be identified by their specific heat capacities.

Twenty grams of water at ten degrees Celsius had 1,673.6 J of energy applied, which raised its temperature to thirty degrees Celsius.The picture on the left is ten grams of water at ten degrees Celsius. 836.6 J of energy was applied, then the ten grams of water had a temperature of thirty degrees Celsius.

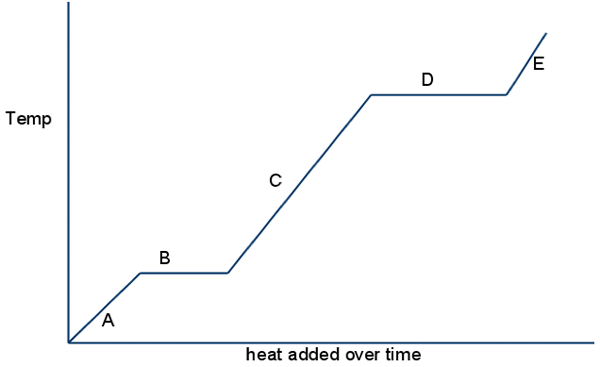
Compare the top and bottom pictures to answer questions 1 through 5.

1. By how much does the energy transferred change between the top and bottom pictures?
   1. 2x
   2. 3x
   3. 4x
2. By how much does the mass change?
   1. 2x
   2. 3x
   3. 4x
3. Is ΔT the same (a) or different (b)?
4. Are the specific heat capacities the same (a) or different (b)?
5. Are mass and heat transferred proportional (a) or inversely proportional (b)?

Ten grams of water had 1,672.6 J of energy applied, which raised its temperature to fifty degrees Celsius.Ten grams of water had 836.8 J of energy applied, which raised its temperature to thirty degrees Celsius.

Compare the top figure to the bottom figure to answer questions 6 through 8.

1. Which two variables change in this example?
   1. Mass (m)
   2. Change in temperature (ΔT)
   3. Heat transferred (q)
   4. Specific heat capacity (C)
2. By how much do they change?
   1. 2x
   2. 3x
   3. 4x
3. Are they proportional (a) or inversely proportional (b)?



Use the heating curve to answer questions 9 through 11.

1. Which letters represent phase changes? Select any that apply.
2. Which letter represents the boiling point of this substance?
3. Which letter represents the solid phase?
4. The amount of energy needed to heat 2.00 g mercury from 50.0°C to 90.0°C is 11.28 J. What is the specific heat capacity of mercury?
5. A 6.75 g sample of gold (specific heat capacity = 0.130 J/g °C) is heated using 42.5 J of energy. If the original temperature of the gold is 25.0 °C, what is its final temperature?