Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_

**CLASSWORK: Heat, Thermal Energy, and Temperature**

**Part A: Inquiry Demo**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Time (min) | Temperature of Beaker A (°C) | Beaker A observations | Temperature of Beaker B (°C) | Beaker B observations |
| Initial |  |  |  |  |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |

**Predict & Explain:**

Beaker A has 100 mL of water at room temperature. Beaker B has 500 mL of water at room temperature. If both beakers are placed on a hot plate at the same time will the temperature change at the same rate in each beaker, or will it be different? Explain your thinking.

**Observe:**

**Analysis Questions:**

1. Which beaker, Beaker A or Beaker B, holds more grams of water?
2. Did both beakers receive the same amount of energy from the hot plate? Explain your reasoning.
3. Did the beakers change temperature at the same rate? If not, which one changed temperature the fastest?

**Part B: Notes – Heat vs. Temperature**

*What is the difference between thermal energy, heat, and temperature?*

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Thermal Energy** | **Heat** | **Temperature** |
| **Definition** |  |  |  |
| **Symbol** |  |  |  |
| **Common Units** |  |  |  |

**Temperature is related to** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Example:**

**Heat:**

**Examples:** Draw an arrow showing the direction of heat transfer in each of the following scenarios:

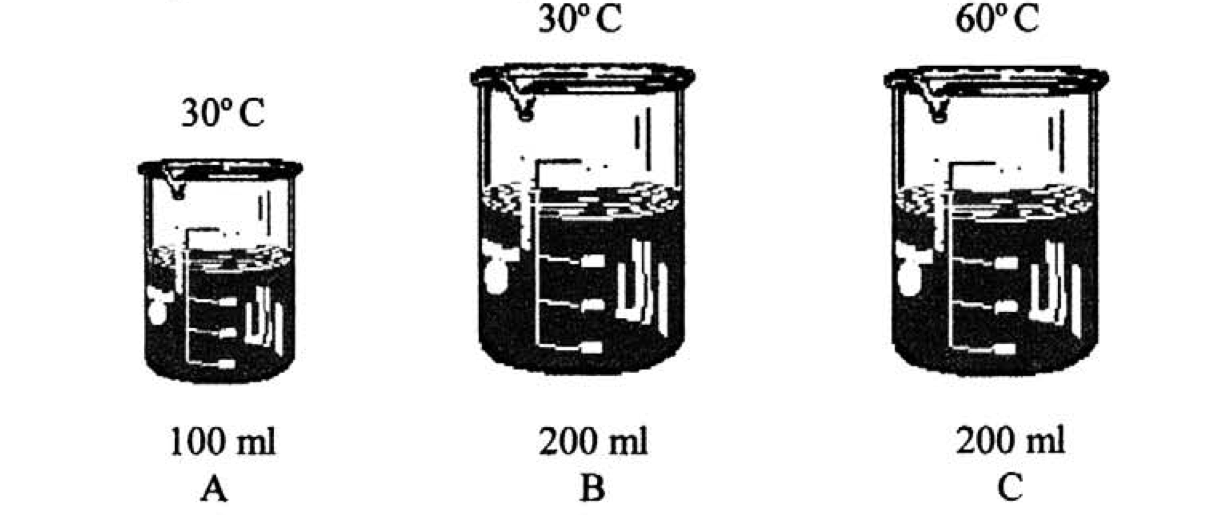
a. water with ice cubes b. beakers on a hot plate c. person running in the

winter



**Practice Questions:**

*Use the following diagram to answer questions 1-3.*



1. In which container(s) is heat the greatest? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. In which 2 containers is the motion of molecules the same? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Compare the motion of the molecules from beaker A to beaker C. *Hint: Think back to the demo with food coloring in class.*
4. Fill out the following table. If there is a heat transfer between example A and B draw and arrow between the two pictures showing the direction of the heat transfer.

|  |  |  |  |
| --- | --- | --- | --- |
| **A** | **B** | **How do the temperatures compare?** | **How do the thermal energies compare?** |
| Beaker of Water    50 mL; 50 °C | Beaker of Water    50 mL; 100 °C |  |  |
| Beaker of Water    50 mL; 50 °C | Beaker of Water    25 mL; 50 °C |  |  |
| Aluminum Cube  15 cm3 ; 25 °C | Aluminum Cube  45 cm3 ; 25 °C |  |  |
| Aluminum Cube  15 cm3 ; 82 °C | Aluminum Cube  15 cm3 ; 62 °C |  |  |