Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Pd: \_\_\_\_\_ Ast: \_\_\_\_\_

**Thermal Energy Lab**

**Table 1: Vocabulary** - Find the definition in the thermal energy chapter of your textbook and copy it onto your lab handout. These definitions will be useful later in the lab.

1. Temperature (R6, *p.264*):
2. Thermal Energy (*R6, p.272*):
3. Heat (*R3, p.274*):
4. Conduction (*R2, p.277*):
5. Convection (*R2, p.278*):
6. Radiation (*R6, p.278*):

**Table 2: Purple Ice**

1. Record your observations about the setup (draw a diagram).
2. How does the placement of the heat source affect the temperature of the water?
3. Predict what will happen if you place a purple ice cube in the water (*Be more specific than, “it will melt”. How will it melt? Where will the purple-colored water go? Why?*)
4. Call the teacher over to place the green ice into the water. Observe the purple food-coloring as the ice cube melts. Record your observations. Describe the current in the dish (*you may want to draw another diagram*).

**Table 3: Lamp**

1. Record your observations about the thermometers. Include the air temperature of the classroom (use Celsius!).
2. Predict what will happen to the temperature of the air underneath a lamp when it is lit.
3. Turn on the lamp at your station. Place one thermometer one the table directly under the light, and place another on the table away from the light. Record your observations about the temperature of the air underneath the lamp vs. the temperature of the air away from the light.
4. Predict what will happen when you switch the thermometers (move the one that is in the light out of the light and vice versa).
5. Switch the thermometers and record your observations.
6. Once the thermometer gives a steady measurement, turn off the lamp and observe what happens to the reading on the thermometer. Record your observations.

**Table 4: Black Blocks**

1. Record your observations of block A and block B. Note properties like size, mass, shape, color, texture, etc…
2. Predict what will happen if you place one ice cube on each block. Which block will melt the ice faster? Explain your reasoning.
3. Place the black rubber ring on each block. Ask the teacher for ice cubes, then place one cube on each block inside the ring at the same time. Record your observations of the ice as it sits on each block.
4. Record your observations about how the blocks feel after the ice cubes have been on them. Is this surprising? Why?

**Table 5: Hand Bath** ***(NOTE: If the warm or cold water causes you pain, REMOVE YOUR HAND!)***

1. Touch the water in each bin. Record your observations about how the water in each container feels when you place your hand in it.
2. Predict how the room temperature water will feel to your hand if you move your hand from the cold water into the room temperature water, and from the warm water into the room temperature water.
3. Place the fingers of one hand in warm water and the fingers of the other hand in cold water for 30 seconds (or as long as you can stand). Then, quickly move both hands to the room temperature water. Does the room temperature water feel the same to each hand? Does it feel different? How? Record your observations.

**Reflection** **(to be completed at the END OF THE LAB)**

1. How is heat, the transfer of thermal energy between substances, related to the temperature of the substances?
2. Write an explanation for what you observed at **Table 2 with the green ice**. Try to use the vocabulary words from Table 1 in your explanation, and identify the type of heat transfer involved. You may find that drawing a diagram will help you explain this station.
3. Write an explanation for what you observed at **Table 3 with the lamp and thermometers**. Try to use the vocabulary words from Table 1 in your explanation, and identify the type of heat transfer involved. You may find that drawing a diagram will help you explain this station.
4. Write an explanation for what you observed at **Table 4 with the black blocks**. Try to use the vocabulary words from Table 1 in your explanation, and identify the type of heat transfer involved. You may find that drawing a diagram will help you explain this station.
5. Write an explanation for what you observed at **Table 5 with the hand baths**. Try to use the vocabulary words from Table 1 in your explanation, and identify the type of heat transfer involved. You may find that drawing a diagram will help you explain this station.