Name Block \_\_\_\_ Binder Page # \_\_\_\_

**Goal:** **Students will be able to identify the method of heat transfer in a system.**

 **Students will** **know the direction of heat transfer.**

 **Students will be able to recognize the three methods of heat transfer in our**

 **atmosphere.**

**Task: You will move around the room from station to station and make observations about the method of heat transfer taking place.**

**Station 1: Lamp on thermometers and beads**

\*\*Record the temperatures of the thermometers and put them back in the beaker.

 Incandescent Temperature \_\_\_\_\_\_ Black Light Temperature \_\_\_\_\_\_

\*\*Record the color of the beads and put them back in the beaker.

 Incandescent Color \_\_\_\_\_\_ Black Light Color \_\_\_\_\_\_

\*\*What was the method of heat transfer?

\*\*Why do you think there was a difference in the color of the beads?

**Station 2: Beaker of Magic Fluid**

\*\*Use the flashlight (cell phone) to observe the fluid in the beaker. What do you see?

\*\*Observe the motion of the fluid in the beaker. Record observations below.

\*\*Was there any change in the movement after 30 seconds?

\*\*What is the method of heat transfer from the hot plate to the beaker?

\*\*What is the method of heat transfer within the fluid?

\*\*Wait 30 seconds and place 1 ice cube in the beaker. What happens?

**Station 3: Heat Transfer apparatus**

\*\*Record the temperatures of the thermometers in each calorimeter when you get to the station.

 Calorimeter A Temperature \_\_\_\_\_\_ Calorimeter B Temperature \_\_\_\_\_\_

\*\*What is the method of heat transfer between the two calorimeters?

\*\*Is the hot calorimeter heating the cold one or is the cold one cooling the hot one? (touch the metal bar to help answer this question)

\*\*Hold your hand an inch or two from the metal bar (above or below) and record the way heat is transferred to your hand.

**Station 4: Radiometer**

Observe the radiometer with the light off. Notice the alternating black and white fins. Turn the light on and notice what happens.

\*\*What type of heat transfer are you observing?

The fins spin away from the black toward the white because the black fins get hotter. \*\*Explain why using the word **albedo**:

The fins are in contact with the air, the hotter black fins cause the air molecules to move away faster and giving the fins more of a push in the opposite direction.

\*\*What method of heat transfer is happening between the fins and the air?

**Station 5: Melt the ice**

\*\*Pick up the two black spheres and make an observation about how they feel (temperature wise):

\*\*Predict which one will cause an ice cube to melt faster:

\*\*Does the ice melt faster on the metal or plastic square?

\*\*What is the method of heat transfer that is taking place?

\*\*Explain why the metal square melts the ice faster.

**Station 6: Spinning Angel**

**Please, please, please be careful with this angel. It belongs to the son of another teacher.**

\*\*Are the blades spinning for the same reason they spin in the radiometer? (If you have not done the radiometer yet, hold off on answering this)

\*\*Look at the blades and explain (use a diagram) why they spin the way they do.

\*\*What method of heat transfer is at work?

**Station 7:  Candle Chimney**

\*\*What happens to the smoke when it is held over the chimney?

\*\*What method of heat transfer is happening within the box?

\*\*Diagram the direction of air movement in the chimney and explain why it moves the way it does:

**Station 8: Container of Hot Water and Ice Water**

\*\*1. How do your hands feel after touching container 1 (ice water)?

\*\*2. How do your hands feel after touching container 2 (heated water)?

\*\*3. What was the method of heat transfer between the containers and your hands?

\*\*4. Use what you know about heat transfer to explain your observations for 1 and 2.

**Station 9: Lava Lamp**

\*\*1. What does the wax do in the lava lamp?

\*\*2. What method of heat transfer does this show?

\*\*3. What method of heat transfer is responsible for heating the wax?

\*\*4. Conduction does take place in the heating of the wax. Where can conduction be observed?

Demo at end: Convection of Hot and Cold Water

Which way was energy transferred in each station.

Demo: Radiation – Gas Bubbles!!