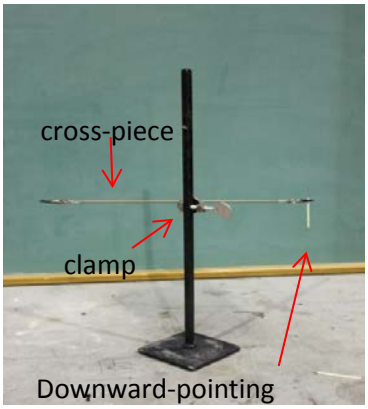
Handout H02-1. Experiment 1. Explain where the heat goes.

Name _____



Your objective is to describe the shape of the *heat plume* from a single, downward-pointing match. Set up your lab space:

- Place the metal tray on a heat-resistant surface.
- Set the support stand in the center of the tray.
- Attach the clamp to the stand.
- Attach the cross-piece to the clamp so it forms a "+" with the stand.
- Attach one match to an alligator clip so the tip points down.

Before beginning, read all of these directions together.

1. Plan your team roles:
   - **Observer:** Use your hand to detect how far from the burning match you can detect a change in temperature. This is the edge of the *heat plume.* Always start your observation from at least 30 centimeters **out from the burning match** and bring it in toward the flame until you detect a temperature change. This is the outer edge of the heat plume. ***The point is to detect heat, not to determine how much heat you can tolerate!!*** Check a ruler so you know how big 2 centimeters is. **Never** bring your hand closer than that to a burning match. **Never** place your hand directly under a burning match, in case the tip should fall off; instead, place your hand slightly off to the side.
   - **Measurer:** When the observer has detected heat, measure the distance from the flame to the observer's hand. Use a ruler, but do not place it close to or in the flame. If the observer does not detect heat from the match at the 2-centimeter distance, record the 2-centimeter point as your measurement.
   - **Igniter/Recorder:** Record the Measurer's data.
2. Figure out how to record your data. Design a data sheet.
3. When everyone is ready, use a separate match to light the downward-pointing match in the alligator clip. Make observations from one side. Record your data. Use the oven mitt to remove the burned match and insert a new one. Repeat this step until you have at least 2 measurements from each side of the flame, from beneath the flame, and from above it.
4. On a sheet of graph paper, or on the *GraphForDescribingHeatPlume,* make a sketch of your experimental set-up and graph your data. Then smoothly connect the points to show the approximate shape of the heat plume.
5. Underneath your sketch, answer these questions using complete sentences:

   a) When you burn a match in still air, where does most of the heat go? Use the results of your experiment in your explanation.

   b) How would you expect this pattern to change if there is a slight breeze in the air?