Convection, Conduction, and Radiation

This meets Idaho Standard: HS-PSP-2.4 Students who demonstrate understanding can: Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).

Convection - moving currents of air or water that transfer heat. I remember this because if you use a convection oven, you need to allow lots of space around your food item so the air currents can move.

Conduction - when heat is transferred by two items touching. I remember this because if you put one end of a piece of metal into a bunsen burner, it will get hot at the other end. This is sort of like a conductor's baton.

Radiation - energy is transferred through the air. I remember this because radiation doesn't have to touch you to have an effect.

Convection

1. Make a beaker of salt water and fill a similar beaker with tap water.
2. Add a colored ice cube to each.
3. Observe what happens as the ice cube melts.
4. Do you see the dye mixing with the water?
5. What does this mean for glaciers if the sea water becomes more dilute?

Conduction

Click here for a video showing how to use the databot.

1. Heat a beaker of water to boiling on a hot plate.
2. Put a block of metal into the boiling water for several minutes.
3. While you are waiting, connect your phone to Vizeey and open a temperature experiment on the databot.

4. Fill a styrofoam cup with water

5. Determine the temperature of the water in the styrofoam cup. _____

6. Using tongs, transfer the block of metal to the styrafoam cup.

7. Continue to monitor the temperature until it stops changing.

8. How does the heat get transferred to the water?

Radiation

1. Mix 5 ml of saturated calcium acetate solution with 30 mL of ethyl alcohol in an evaporating dish.

2. Place the dish on a fire safe surface and light the gel.

3. Roast a marshmallow on a skewer. If the marshmallow touches the gel, it must be thrown away.

4. How does the heat get to the marshmallow?_____