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**Investigating the Temperature of Air**

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| **QUESTION/PURPOSE:** **Manipulated Variable (MV)** **Responding Variable(RV)**  How does the temperature of the ground (MV) affect the temperature of the air?(RV) | | |
| **HYPOTHESIS (IF, THEN, BECAUSE)** **:** **Manipulated Variable (MV)** **Scientific Reason (WHY)**  **Responding Variable (RV)** | | |
| **Manipulated Variable Units** | **Responding Variable Units** | **Controlled Variable(s) Units** |
| **PROCEDURES: Manipulated Variable (MV)**  **Responding Variable (RV)**  **Controlled Variable(s)**  **Repeated Trials**  **Logical Steps**    Step 1. Connect top and bottom parts of convection tube.  Step 2. Check to make sure thermometer and stop watch are working, Use °F.  Step 3. Record the zero temperature of all 3 thermometers. Thermometer A is the top thermometer. Thermometer B is the middle thermometer. Thermometer C is the bottom thermometer.  Step 4. Raise hand to let me know you are ready for the hot water  Step 5. Measure and record starting temperature of hot water on data sheet using the digital thermometer.  Step 6. Remove the digital thermometer and turn off.  Step 7. Cover the container with plastic wrap.  Step 8. Place convection tube over water, start stop watch.  Step 9. Record temperatures on thermometers A, B and C every 1 minute for 5 minutes.  Step 10. Measure and record the ending temperature of the water.  Step 11. Using the other convection tube, repeat steps 3-10 for the cold water, except:   * You may get your own ice-cold water from by the sink. * Do not cover the cold water dish. | | **MATERIALS Measuring Device**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |

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| **DATA TABLE: Title (Manipulated vs. Responding) Trials**  **Units Averages**  **Hot Water vs. the Temperature of Air**   |  |  |  |  | | --- | --- | --- | --- | | Time (minutes) | Temperature of Air (°F) | | | | Hot Water Cup Beginning Temperature (°F) \_\_\_\_\_\_ | | | | Thermometer A (top) | Thermometer B (middle) | Thermometer C (bottom) | | 0:00 |  |  |  | | 1:00 |  |  |  | | 2:00 |  |  |  | | 3:00 |  |  |  | | 4:00 |  |  |  | | 5:00 |  |  |  | |  | Hot Water Cup Ending Temperature (°F) \_\_\_\_\_\_ | | |   **Cold Water vs. the Temperature of Air**   |  |  |  |  | | --- | --- | --- | --- | | Time (minutes) | Temperature of Air (°F) | | | | Cold Water Cup Beginning Temperature (°F) \_\_\_\_\_\_ | | | | Thermometer A (top) | Thermometer B (middle) | Thermometer C (bottom) | | 0:00 |  |  |  | | 1:00 |  |  |  | | 2:00 |  |  |  | | 3:00 |  |  |  | | 4:00 |  |  |  | | 5:00 |  |  |  | |  | Cold Water Cup Ending Temperature (°F) \_\_\_\_\_\_ | | | |
| The cups of hot and cold water are models for what? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  The convection tubes are models for what? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  What was the effect of hot water on the air around and above the water: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  How much heat in °F did the cup of hot water gain/lose? (Circle one)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Describe the heat transfer between the container of hot water and the air. Explain your thinking.  Heat was transferred from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Explain:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  What was the effect of cold water on the air around and above the water: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  How much heat in °F did the cup of cold water gain/lose? (Circle one) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Describe the heat transfer between the container of cold water and the air. Explain your thinking.  Heat was transferred from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Explain:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  What is this experiment modeling? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |