**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Heating Land and Water Lab**

***Background Information:* In this lab you will model the difference in the heating of land and water when it is subjected to a source of radiation. You will assemble simple tools. Then you will observe and explain the results of the experiment and how they relate to the moderating influence of water on air temperatures near Earth’s surface**

***Problem:* How do the heating of land and water compare?**

***Materials:***

* **2 250 mL beakers**
* **Dry sand**
* **Tap water**
* **2 thermometers**
* **Hot plate**
* **Graph paper**
* **Colored pencils**

***Procedure:***

1. **Pour 200 mL of dry sand into one of the beakers. Pour 200 mL of water into the other beaker.**
2. **Place both beakers on the hot plate**
3. **Secure a thermometer just barely below the surface of the dirt and water.**
4. **Record the starting temperatures for the the dry sand and the water in the data table below.**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Starting Temperature °C** | **1 min**  **°C** | **2 min**  **°C** | **3 min**  **°C** | **4 min**  **°C** | **5 min**  **°C** | **6 min**  **°C** | **7 min**  **°C** | **8 min**  **°C** | **9 min**  **°C** | **10 min**  **°C** |
| **Water** |  |  |  |  |  |  |  |  |  |  |  |
| **Dry Sand** |  |  |  |  |  |  |  |  |  |  |  |
| **Damp Sand (will do after water and dry sand)** |  |  |  |  |  |  |  |  |  |  |  |

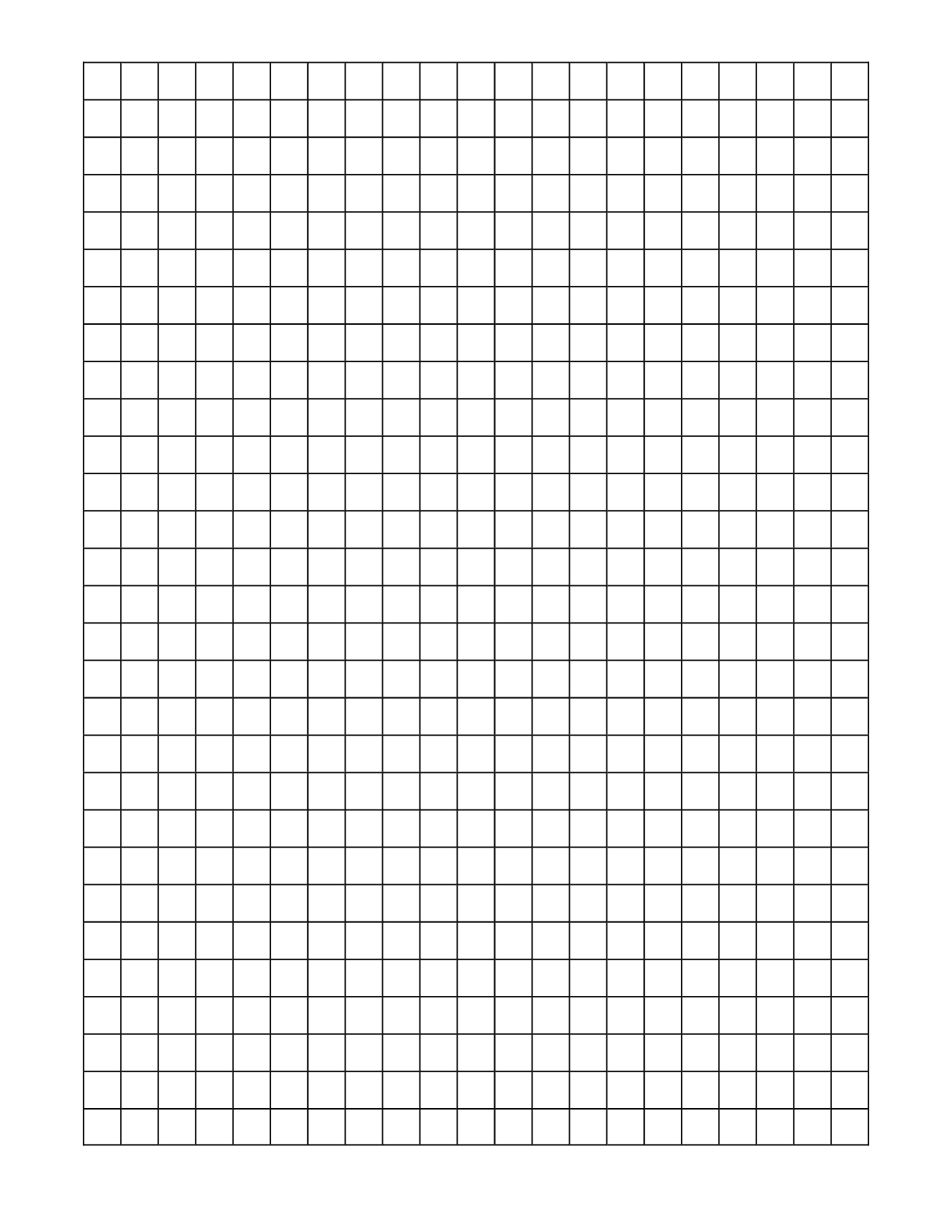
1. **Turn on the hot plate to the 5 setting (medium)**
2. **Observe and record the temperature at one minute intervals for 10 minutes**
3. **Repeat step 6 with damp sand (take your beaker of dirt and place new tap water from the sink in the sand—YOU WANT DAMP SAND NOT MUDDY WATER)**

***Graphing*:**

**Use graph paper to plot the temperatures of the water, sand, and damp sand against over the time observed (Y axis should be temperature, X axis should be time in 1 minute intervals) Use a different color for each line to connect the points for each material**

***Questions***

1. **How does the changing temperature differ for dry sand and water when they are exposed to equal amounts of heat radiation?**
2. **How does changing the temperature differ for dry sand and damp sand when they are exposed to equal amounts of radiation?**
3. **Which city do you think has the largest annual temperature range-San Diego, California or Oklahoma City, Oklahoma. San Diego is on the coast, and Oklahoma City is located in the interior of the country. Explain your reasoning.**

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