**Uneven Heating of Earth Lab**

***Objectives for this lesson***

* + Observe and record the rates at which equal volumes of soil, sand, air and water heat and cool.
  + Graph and analyze the heating and cooling rates of soil and water.
  + Explain what happens to energy from the sum when it reaches the earth.
  + Read and interpret a data table.

***Introduction***

Have you ever walked barefoot on a sidewalk I the early summer? The concrete probably felt hot against your feet. However, if you jumped into a pool on the same day, you might have felt cold. How could this be?

Part of the explanation has to do with the way the earth’s surfaces receive and give off heat. All the surfaces on the earth absorb some of the sun’s energy and give off heat to the air as they coo—but they do it at different rates. Did you know that the earth’s surfaces heat and cool differently? In this lesson, you will investigate the rates at which soil, water, sand, and air heat and cool. In later lessons, you will see that this uneven heating affects the circulation of air on the earth and helps create storms.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Earth Material | Temperature (°C) | | | | | | | | | | |
| O min | 2 min | 4 min | 6 min | 8 min | 10 min | 12 min | 14 min | 16 min | 18 min | 20 min |
| Air |  |  |  |  |  |  |  |  |  |  |  |
| Water |  |  |  |  |  |  |  |  |  |  |  |
| Sand |  |  |  |  |  |  |  |  |  |  |  |
| Soil |  |  |  |  |  |  |  |  |  |  |  |

***Answer the following questions:***

1. How would you describe the heating and cooling rates of soil, water, sand, and air in this investigation?
2. Which material held its heat longer?
3. What factors may have influenced your results?
4. Can you explain why concrete in early summer feels hot under your feet and water in a pool feels cool?