**Grade 8** **Kit:** **SEPUP:** **Investigation # 55 Vernier Labquest Extension**

**Title of Investigation:** Heating Earth Surfaces

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**Guiding Question:** How does the sun’s energy heat different earth surfaces?

**Objective:** Investigate how convection transfers energy/temperature in gases.

**Summary of Activity**: Students will simulate and record the different amounts of indirect and direct sunlight on the earth using a light source, light probe and globe.

**Science Standards:**

8.2.1 Recognize and demonstrate how the sun’s energy drives convection in the atmosphere and in bodies of water, which results in ocean currents and weather patterns.

**Assumption(s):** This extension is to be used in conjunction with lessons #56 and #59.

**Equipment used: (for each group)**

* Vernier LabQuest and Light Sensor (set at 0-600 and /or 0-6000) or TI Light Probe
* One earth globe; One Lamp; One pencil; Science notebook / graphing materials
* One map of the Earth including latitude and longitude:

**Description of Procedures, Notes (teacher manual):**

1. Students review geography lesson explaining latitude and longitude positions on the earth.
2. Students place a grounded light source approximately one meter from a globe tilted at a 23 degree angle.
3. Starting at one pole, one student holds the Vernier Light Sensor (set at 0-600 and /or 0-6000) or TI Light Probe on globe with the light sensor facing direct north.
4. Maintaining the probe at the same position and angle of the earth, slowly move the probe southwards, following the longitudinal line closest to the lamp.
5. Students record amount of sunlight at 90 degrees N, 60 degrees N, 30 degrees N, 0 (the equator), and 30 degrees S, 60 degrees S, and 90 degrees, S.
6. Record results.



Analyze Science questions.

**Science Questions:**

1. How does latitude affect the amount of sunlight the Earth receives?
2. Why is it hotter at the equatorial region than the polar regions of the Earth?
3. Considering the North Pole, the Equator, and the South Pole, where would you expect high or low pressure air pressure or global air pressure variations? Why?
4. How does this relate to winds? How does this relate to global wind distribution?
5. How does this relate to ocean currents?
6. Possible extensions: Why do we have seasons or does this help to explain the variations of seasons in the two hemispheres?