# LAB REPORT: Deforestation/Desertification and Effect on Soil Temperature

Lab Partners:

Statement of the Problem:

* When fields or pastures are not covered with plant life, soil temperatures can increase because of direct exposure to sunlight. Dark soil can absorb more of the sun’s energy. Plant life doesn’t provide shade to cool the soil. Macro and micro-organisms that live in the soil have adapted to the conditions of the soil including lower temperatures. Elevating soil temperatures can make the soil habitat inhospitable for those organisms.
* When comparing two samples of lawn – vegetated and bare – which will register a higher soil temperature?
* Hypothesis:

Materials:

* Stakes
* Twine
* Scissors or shears
* Two soil thermometers
* Timer / watch
* Optional: high wattage lights or other heating element

Procedure:

1. Identify a patch of lawn or other plant covered area on school grounds or area with permission.
2. Mark out two patches of lawn that are each one square foot in area adjacent to each other. Use sticks, nails, or other material to mark the corners.
3. Insert a thermometer into the soil to record the soil temperature with the plant cover. Ensure that both patches provide a similar soil temperature reading to establish a baseline.
4. On one of the patches, use a pair of scissors or clippers and cut as much of the plant matter off as possible. Try to cut down to the roots of the plant or the surface of the soil. Do not pull the plants as you want to keep the soil intact.
5. Leave the marked patches to sit in direct sunlight for five minutes. Take a temperature recording of both marked areas. Repeat this procedure taking temperature recordings every five minutes for a total of 30 minutes. Note: if there is no direct sun, a similar experiment could be done using high wattage light bulbs that produce heat or another heating element positioned close to the surface of the soil.
6. Record your observations. Take photos throughout to document the experiment.

Data and Results:

|  |  |  |
| --- | --- | --- |
|  | **Plot 1** | **Plot 2** |
| **Soil Temperature Before Clipping** |  |  |
| **Soil Temperature 5 minutes after clipping plot 2**  |  |  |
| **Soil Temperature 10 minutes after clipping plot 2**  |  |  |
| **Soil Temperature 15 minutes after clipping plot 2**  |  |  |
| **Soil Temperature 20 minutes after clipping plot 2**  |  |  |
| **Soil Temperature 25 minutes after clipping plot 2**  |  |  |
| **Soil Temperature 30 minutes after clipping plot 2**  |  |  |
| **Notes and other observations** |  |  |

Conclusions:

1. Which soil sample recorded the higher soil temperatures? Why?

Research Solutions: Conduct research to answer the following questions.

1. How might deforestation and/or desertification affect soil temperatures?
2. How might increased soil temperatures affect the macro and micro organisms that live in the soil?
3. What are some procedures or methods that farmers and landowners can implement to protect soil in grazed pastures from getting too hot?
4. How will continued plant growth or restored plant growth create feedback mechanisms (positive results) that create and/or maintain homeostasis (hospitable temperature and environment) in the ecosystem of the soil?

Report:

 As a group, prepare a poster, PowerPoint, or other presentation to describe your experiment and your results to the rest of the class. Be prepared to make a 10-minute presentation and answer questions about your experiment and about deforestation and desertification’s effect on soil temperatures.