Cups of sand, dry soil, and moist soil

1. The lamp should already be on.
2. Predict which of the 3 cups will be warmest and which will be coldest.
3. Pick up the remote thermometer and pull the trigger.
4. Eventually, it will show you the temperature of the object you are pointing at.
5. In the display, the units of the temperature are shown by a C or F at the far right. If yours is not in F (Fahrenheit), press the F button on the remote thermometer.
6. Press the red button to turn on the laser pointer. A triangle will appear along the upper edge of the display. The thermometer samples the temperature of an area centered on the laser dot. The size of the area sampled depends on how far away the thermometer is.
7. Hold the remote thermometer about 6 inches above each of the cups, pointing the laser dot at the top center of each cup. Record the temperature of the sand, dry soil, and moist soil.
8. Explain what you observe. Comment on the quality of your prediction.
9. Leave the lamp on for the next person.

Surface Composition and Temperature (Cups of sand, dry soil, and moist soil)

Summary – This activity investigates the response of different surfaces to identical heating. Generally, darker surfaces will be warmer than lighter surfaces, and dry surfaces will be warmer than moist surfaces.

Materials Needed

- 3 containers (large yogurt containers work well): one with dry soil, one with moist soil, and one with dry sand
- Heat lamp and stand that allows the heat lamp to shine directly down onto the top of the cups
- Infrared thermometer

Scientific Questions

How does the composition of a surface affect its temperature when heated?

Possible Hypothesis

- Surface composition has no effect on temperature
- Dark surfaces will be warmer than light surfaces for the same heating
- Light surfaces will be warmer than dark surfaces for the same heating
- Wet surfaces will be warmer than dry surfaces for the same heating
- Dry surfaces will be warmer than wet surfaces for the same heating

Set up

- Containers should be placed adjacent to one another in a triangular pattern so that each receives the heat of the lamp equally.
- Heat lamp should be placed about 12 inches above the containers and shine directly down onto the tops equally.

Notes

- Results may vary, especially if the heat lamp shines on the containers for an extended amount of time.