Feel The Summer

Heat

Hypothesis:

The blacktop would be hotter due to the material it is made from. The grass will be coolest.

Problem/Question:

Walking barefoot on a summer day is a childhood memory. Sometimes enjoyable and sometimes almost painful. Our question or problem is which surfaces on Earth make enjoyable barefoot memories and which do not? And why?

Energy from the Sun is very important to the Earth. The Sun warms our planet, heating the surface, the oceans and the atmosphere. This energy to the atmosphere is one of the primary drivers our weather. Our climate is also strongly affected by the amount of solar radiation received at Earth. That amount changes based on the Earth's **albedo**, that is how much radiation is reflected back from the Earth's surface and clouds.

Electromagnetic radiation from the Sun is absorbed by the soil and bodies of water, thus heating them. This is especially true when the angle of the sunlight is fairly perpendicular to the ground, as in the summer months.

In wintertime, the radiation from the Sun comes in at an angle and is not as readily absorbed. Also the days are shorter and often cloudy, so less sunlight hits the ground. Another factor is when there is snow on the ground, most of the sunlight is reflected back into space.

Heat and light are both different types of energy. Light energy can be converted into heat energy. **A black object absorbs all wavelengths of light and converts them into heat, so the object gets warm. A white object reflects all wavelengths of light, so the light is not converted into heat and the temperature of the object does not increase noticeably.**

Different wavelengths (colors) of light have different amounts of energy. **Violet light has more energy than red light.** If we compare an object that absorbs violet light with an object that absorbs the same number of photons (particles of light) of red light, then the object that absorbs violet light will absorb more heat than the object that absorbs red light.

The amount of heat absorbed is also affected by how light or dark an object is. **A dark object of a given color will absorb more photons than a light object of the same color, so it will absorb more heat and get warmer.**

Note about how the color of an object appears: The color an object appears is the complementary color to the color the object absorbs. If an object absorbs

yellow light, then it will reflect all of the other colors of light and it will look violet.

Materials:

Infrared Digital Thermometer

Asphalt

Grass

Black Mulch

Cement

Paper and pencil

Conclusion:

The Black Mulch had the highest temperature. We thought the black top (asphalt) would have the hottest surface. However we thought the grass would be the coolest and it was. Therefore, the surface of the asphalt did not absorb as much solar radiation as the Black Mulch did. The grass absorbed the least radiation with the (white) cement closely rating almost the same amount. Color played a major part in the heating of the surfaces.

Procedures:

1. Identify four separate surfaces to compare.
2. Use infrared thermometer and record data.
3. Collect readings
4. Analyze data.
5. Formulate conclusions