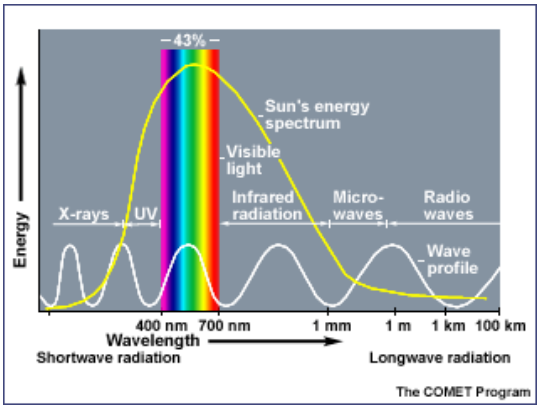
Bellringer

1. How does radiation transfer heat energy? Does it need a medium to travel through?
2. What determines the amount of energy an object will absorb?

Learning Objectives:

I can experiment with different surfaces to see that different physical characteristics change the way surfaces absorb and release heat from the sun.

Radiation is the transfer of heat energy by electromagnetic wave motion. The transfer of energy from the sun across nearly empty space is accomplished primarily by radiation. Radiation occurs without the involvement of a physical substance as the medium. The sun emits many forms of electromagnetic radiation in varying quantities.



About 43% of the total radiant energy emitted from the sun is in the visible parts of the spectrum. The bulk of the remainder lies in the near-infrared (49%) and ultraviolet section (7%). Less than 1% of solar radiation is emitted as x-rays, gamma waves, and radio waves.

The amount of energy absorbed by an object depends upon the following:

- The object's absorptivity, which, in the visible range of wavelengths, is a function of its color
- The intensity of the radiation striking the object

Darker-colored objects absorb more visible radiation, whereas lighter-colored objects reflect more visible radiation. That's why we usually choose light-colored clothing on really hot days.

Every surface on earth absorbs and reflects energy at varying degrees, based on its color and texture.

In this activity, students will investigate how different surfaces absorb heat and apply their experience with the surfaces to interpret real-world situations.

Heating Cycle										
Surface material	Start time	Start temp.	Temperature every 2 minutes							
			1	2	3	4	5	6	7	8	9	10

Cooling Cycle										
Surface material	Start time	Start temp.	Temperature every 2 minutes							
			1	2	3	4	5	6	7	8	9	10

1. Make two data tables to record the time and temperature of your experimental pie pan of science! Examples seen above:
2. Position the lamp about 12 inches above them.
3. Place a thermometer into each pie pan, securing it so it measures the temperature just under the surface of the substance in the pan.
4. Record the starting temperatures on the data table.
5. Turn on the lamp and record the temperature of each substance every 2 minutes for 20 minutes.
6. At the end of 20 minutes, turn the lamp off.
7. Continue to record temperatures for each substance every 2 minutes for 20 more minutes.