

MODELLING CLIMATE CHANGE: RADIATION FROM THE SUN AND EARTH

Climate scientists use the terms 'solar radiation' to refer to the electromagnetic radiation emitted by the Sun and 'terrestrial radiation' to refer to the electromagnetic radiation emitted by the Earth. In this activity, you will investigate how the very different temperature of the Sun and Earth affect the range of wavelengths of electromagnetic radiation they emit.

1. Use secondary sources such as the internet or books from the school library to find out the approximate average temperature of the Earth and the Sun. Record the information in a table like the one shown here.
2. You will now need to use a computer simulation that models the radiation given off by a hot object. Set the temperature to that of the Sun, using the value you found from your research. How does the solar radiation compare with the wavelengths of the visible spectrum?
3. Use the graph to read off the lowest and highest wavelengths, and the wavelength at the highest intensity, and record the values in a table like the one shown here.
4. Now repeat this, setting the temperature to that of the Earth. How does the terrestrial radiation compare with the wavelengths of the visible spectrum?
5. Use the graph to read off the wavelengths again and record the values in the table.
6. Use secondary sources to find a diagram of the electromagnetic spectrum and make a copy. Mark the range of wavelengths and maximum intensity of solar and terrestrial radiation. Add a key to your diagram.
7. Look carefully at your diagram. Which radiation has the longest wavelengths? How does this relate to energy?

Object	Average temperature (°C)
Earth	
Sun	

Object	Lowest wavelength (nm)	Highest wavelength (nm)	Highest intensity wavelength (nm)
Earth			
Sun			