

The Physics of Sunburn and Electromagnetic Waves

(Parents' Guide)

Key Concepts

- UV light, visible light, and radio waves (among other types of light) are all electromagnetic (EM) waves.
- An EM wave is comprised of oscillating electric and magnetic fields.
- EM waves travel at the speed of light (because they are light!) and can travel through space.
- Key differences between the various types of light are their wavelength, frequency, and energy
- UV light is harmful to skin because of its high energy and frequency.

Online materials included in this lesson:



Video on the physics of sunburn:



Beach UV bead lab



Graphic organizers



Word puzzles for vocabulary practice



Quiz and review questions

Scientific Terms and Vocabulary:

- Waves
- Electromagnetic Waves
- Radiation
- UV Rays
- Radio Waves
- Infrared Rays
- Visible Light
- X-Rays
- Gamma Rays

- ROYGBIV
- Wavelength
- Frequency
- Light Energy
- Sine Wave

Investigation Questions to discuss before the video and lab:

- What causes sunburn?
- What are UV rays?
- What are electromagnetic waves?
- What are some types of electromagnetic waves?

Summary of the video:

A young girl named Jade is at the beach. She sees an extremely sunburnt man and wonders what caused his sunburn. Through a series of interviews and investigation questions, she finds that UV rays are the culprit. This leads to another question, "What are UV rays?" With the help of a physics leader, Jade discovers what UV rays are. Together they explore the electromagnetic (EM) spectrum and ultimately the characteristics of UV rays that cause sunburn. As Jade's question is answered, she learns about frequency, wavelength, energy of EM waves, types of EM waves, and sun damage to the skin.

Review questions for after the video

- What did you learn that you didn't know before?
- What surprised you?
- What do you want to know more about?

Material for further exploration

Characteristics of UV radiation - <http://www.epa.gov/sunwise/doc/uvradiation.html>

What is UV radiation? - http://www.sunsmart.com.au/ultraviolet_radiation/understanding_uv

EM Spectrum Overview - http://imagine.gsfc.nasa.gov/docs/science/know_l1/emspectrum.html

Electromagnetic Energy - http://missionscience.nasa.gov/ems/01_intro.html

Infrared Waves - http://missionscience.nasa.gov/ems/07_infraredwaves.html

Electromagnetic Spectrum Video - <http://www.youtube.com/watch?v=cfXzwh3KadE>

Science of Sunburn - <http://www.livescience.com/38039-what-causes-sunburns.html>

Electromagnetic spectrum and waves - <http://www.youtube.com/watch?v=cjw5FJd5d0Q>