**Day 1 Lesson**

**What is the Electromagnetic Spectrum?**

[Instruction Screencast](https://drive.google.com/file/d/1wS2uKwqY-kJ81acKVOprPDuGGETdXUpK/view?usp=sharing)

**Intro**: This activity will help you prepare and formulate a response to this week’s Discussion Board and give you an overview of Electromagnetic Waves! (also called electromagnetic radiation, or electromagnetic light)

**Directions**: Choose a reading to learn about the Electromagnetic Spectrum and answer the questions below.

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| **Option** | **Summary** | **Difficulty** |
| [Reading 1](https://www.ducksters.com/science/physics/types_of_electromagnetic_waves.php) | The Basics. Easiest, simplest language to describe the electromagnetic spectrum. Choose this if you are still learning English or if science vocabulary tends to be difficult for you to learn. | At Grade Level - This reading covers standards that match what is expected for 8th grade science. |
| [Reading 2](https://imagine.gsfc.nasa.gov/science/toolbox/emspectrum1.html) | This reading is similar to the types of readings we do in science class. It’s 8th grade level language and goes into what the electromagnetic spectrum is and its uses. You can click links to learn more about each type. | At Grade Level - This reading covers standards that match what is expected for 8th grade science. |
| [Reading 3](https://science.nasa.gov/ems/01_intro) | This is a deeper dive into the EM spectrum and their applications to space science. You will need to click through multiple pages to learn about each type, and if you’re interested and have some time, you can learn a lot of stuff that we don’t have time to learn this year! | Above Grade Level - This reading goes above and beyond the 8th grade level standards, moving into some high school physics information.  |

**Questions:**

1. What is the electromagnetic spectrum?
2. What are the different types and their uses? (7 total - bullet points ok)

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| --- | --- |
| Type of EM radiation | Use or Application |
| Gamma ray | It has the highest frequency and the most energy of all EM waves. It is the shortest of all EM waves. It is ionizing which means its energy is so high that it can strike electrons out of their atoms. It can harm cells in organic matter, thereby it is used to destroy organisms such as cancer cells. It is also used by NASA for its scientific instruments to observe the Earth, our solar system, and the universe. |
| X-ray | It is ionizing which means its energy is so high that it can strike electrons out of their atoms. It is used in hospitals so that the doctors can observe broken bones. It is also used by NASA for its scientific instruments to observe the Earth, our solar system, and the universe. |
| Ultraviolet ray | Some ultraviolet waves are ionizing which means their energy is so high that they can strike electrons out of their atoms. They can harm cells in organic matter. It is also used by NASA for its scientific instruments to observe the Earth, our solar system, and the universe. |
| Visible light wave | It passes through the atmosphere. This is the only EM wave that the human eye can detect, other electromagnetic waves are not noticed by our eyes. It is used for screens (TV, cell phones, computers, etc.). It is also used by NASA for its scientific instruments to observe the Earth, our solar system, and the universe. |
| Infrared wave | It passes through the atmosphere. We feel it as heat. It is used in infrared sensors and also by NASA for its scientific instruments to observe the Earth, our solar system, and the universe. |
| Microwave | It can pass through clouds, thereby it is used to transmit satellite communication signals, and also to transfer cell phone calls and text messages. It is also used by NASA for its scientific instruments to observe the Earth, our solar system, and the universe. |
| Radiowave | It has the lowest frequency and the fewest energy of all EM waves. It is the longest of all EM waves. It is also used by NASA for its scientific instruments to observe the Earth, our solar system, and the universe. |

1. What makes them all different from each other? (like, what characteristic makes visible light different from infrared light? - short answer)

We can only see visible light. We can feel infrared light as heat. They all have different wavelengths and amounts of energy. Gamma ray is the shortest and it has the most energy, while radiowave is the longest and it has the fewest energy.

Now head over to Week 6 Discussion Board Question and apply your knowledge :)

Check out this [article](https://exoplanets.nasa.gov/what-is-an-exoplanet/how-do-we-find-life/) if you’re interested in how NASA is currently trying to search for signs of life in space!