E-Labs Electromagnetic Spectrum (S.W.A.T.)
Pre-mission Lesson (Approx 2- 45-50 min classes)

I. Introduction

The material contained within this lesson plan is meant to be used as preparation for the Electromagnetic Spectrum (S.W.A.T.) e-Lab. As part of this pre-lab lesson, students will:

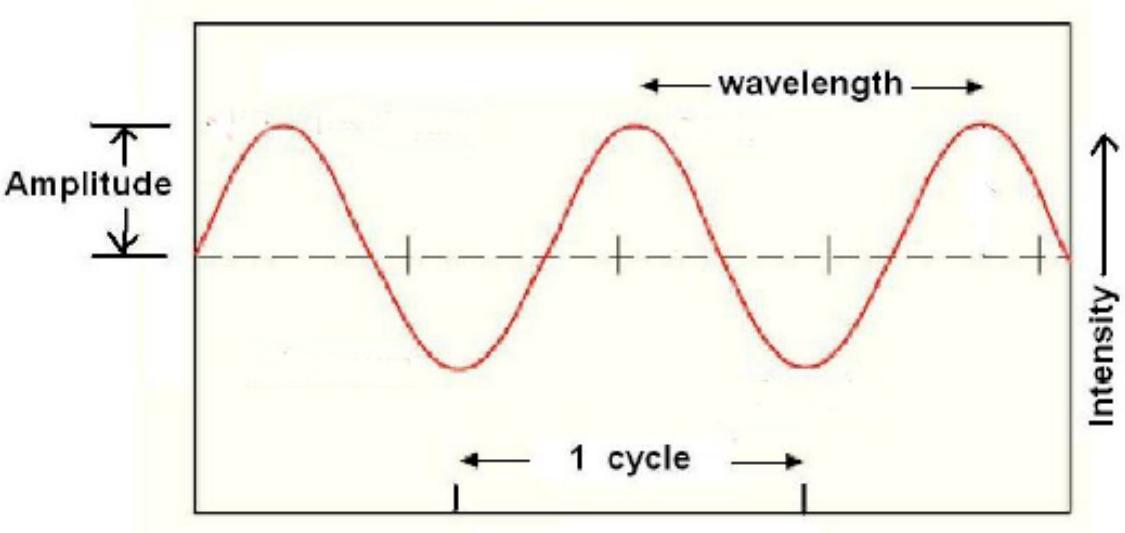
- **A.** Be able to describe the electromagnetic spectrum.
- **B.** Give some examples of waves and where they come from.
- **C.** Identify ways in which waves can be helpful or harmful.

II. Objective:

Students will be introduced to the electromagnetic spectrum and wave properties. They will complete a spectrum scramble activity, and fill in the first page of their science journal that will be used during the video conference.

III. Key Vocabulary:

- **Amplitude-** the height of a wave.
- **Electromagnetic spectrum-** waves that have both an electric and magnetic component and can travel through matter or a vacuum. The seven different types include radio waves, microwaves, infrared, visible light, ultraviolet, x-rays, and gamma rays.
- **Frequency-** number of crests that pass a given point within one second.
- **Radiation**- energy transmitted as electromagnetic waves.
- **Wave-** a disturbance that travels through a medium from one location to another location transferring energy.
- **Wavelength**- the length of a wave from crest to crest.



IV. Materials:

- Electromagnetic Spectrum PowerPoint
- Spectrum Scramble pieces (can be cut out ahead of time to save class time)
- Glue
- Bulletin board paper
- S.W.A.T. Journal (one for each student)
- Prism and flashlight (if available)

V. Lesson Sequence:

A. Engage.

A. Darken the classroom if necessary and shine the flashlight at a piece of white paper. Ask students to describe the light. Then ask them to predict what will happen if you shine a flashlight at the prism. Align the flashlight, prism, and paper so that a rainbow shows on the white paper. Discuss with the students what is happening. Enforce the point that the prism is not creating new light; it is simply showing us what makes up the white light. Explain to students that there are many waves, like these light waves, that we can't see in our day to day lives and that in this lesson we will be learning about them.

B. Explore and Explain

B. Project the Electromagnetic Spectrum PowerPoint and read through the information with students. Throughout the slides, ask students to give examples of waves that they are familiar with. Ask them if they know how waves can be harmful also.

C. Elaborate

C. Give each student a copy of the "What are Waves?" Reading passage. Read this together either as a class, or divide students into groups to read aloud.

D. As a whole class or in small groups, have students use the information from the PowerPoint and the reading passage to assemble to cut Spectrum Scramble pieces into a workable electromagnetic spectrum. (See included key if needed)

E. Display the completed spectrum(s) somewhere in the classroom in which the E-lab will be taking place so that students will be able to refer to it throughout the mission.

D. Evaluate

F. After completing the puzzle, have students copy the information into the first page of their S.W.A.T. Journal. Make sure students do not lose their journal before the e-lab.