



Oh Say Can You See?

There is a whole range of electromagnetic radiation (EMR) being emitted, absorbed, reflected, and transmitted through the various places that make up our environment. Whether its outdoors in a natural setting or inside in a human designed environment, EMR can be detected in a variety of ways.

Your Task:

Your team has been assigned the task of investigating the EMR spectrum in your immediate environment. Using a 1 m³ space of your choice, or assigned by your teacher, your team will use the three portions of the EMR to map your space, contrast and combine the information from each portion of the spectrum, and present your findings to the class.

To complete this task, you will need to:

- 1) Collect data from the visual, ultraviolet (UV), and infrared (IR) portions of the spectrum in your identified or assigned space. Available detectors include your eyes, hands, thermometers, spectrosopes, and UV beads (see note).
- 2) Make a map of the entire space from each portion of the visual, UV, and IR spectrum. The maps may include words, diagrams, symbols or a combination of some or all of these. It must be clear whether the objects in your space were emitting, reflecting, transmitting, or absorbing the different types of radiation.
- 3) Organize your data in chart(s) or other formats that help contrast and combine the information from your map.
- 4) Make an oral presentation that includes your data collection methods, and what you found out about your space based on your data and your knowledge of EMR. Your explanation should make it easy for another team to duplicate your work.

Note: The UV beads are available from Educational Innovations at www.teachersource.com. A 2oz pack containing about 240 reusable beads costs around \$7. It is suggested that you purchase all of the same color for comparison. The beads change to different shades in about 2 min., depending on the amount of UV. For more objective results, you can get free paint color strips that match the shade range of the beads and make a numerical scale. Alternatively, you can use "Sunprints" paper available from Science Kit and Boreal Laboratories at www.sciencekit.com. A package of 15 nonreusable sheets costs about \$8 and will take about 25 minutes to expose and fix. This is really a type of blueprint paper that you can make yourself from equal volumes of 10% ferric ammonium citrate and 10% potassium ferricyanide. For one class make 100mL of each solution, separately, just before using, and keep them in the dark. Then, still in the dark, mix them in a shallow glass container. Using tweezers, soak strips of white paper in the solution for one minute and drain. You can use them wet, or dry the strips in the dark and store in an opaque bag or aluminum foil. To use, expose the paper for 15 minutes, then rinse thoroughly with water. Blue areas indicate exposure to UV, while white indicates no evidence of UV. The use of other detectors, like IR "nightsopes", is limited only by availability and imagination.