

X Marks the Spot

Grades: 5th-12th Grade

Duration: 30 Minutes

Program Description

This program discusses the concept behind imaging techniques for X-ray astronomy. X-ray pictures are false-images, meaning the signal is converted into a visible counterpart. Students will gain an idea of what a pixel is and see how they are grouped together to form a picture.

Louisiana GLEs:

Science:

Grade 6

1. Generate testable questions about objects, organisms, and events that can be answered through scientific investigation (SI-M-A1)
2. Identify problems, factors, and questions that must be considered in a scientific investigation (SI-M-A1)
12. Use data and information gathered to develop an explanation of experimental results (SI-M-A4)
14. Develop models to illustrate or explain conclusions reached through investigation (SI-M-A5)

Physical Science

Grade 6

6. Compare forms of energy (e.g., light, heat, sound, electrical, nuclear, mechanical) (PS-M-C1)
31. Compare types of electromagnetic waves (PS-M-C3)

Math:

Grade 6

6. Compare positive fractions, decimals, and positive and negative integers using symbols (i.e., <, =, >) and number lines (N-2-M)
13. Use models and pictures to explain concepts or solve problems involving ratio, proportion, and percent with whole numbers (N-8-M)

Key Terms:

Electromagnetic spectrum – the range of light consisting of both its visible and invisible forms and determined by the wavelength of the light

Pixel – smallest division of a picture (refer to grid paper)

Refraction – the bending of light as light passes from one medium to another

ROY G BIV – an acronym listing the order of colors of a the visible spectrum, also known as the color of the rainbow; the letters stand for: red, orange, yellow, green, blue, indigo, violet; they are listed from least energetic (red) to the most energetic (violet), or, from the longest wavelength (red) to the shortest wavelength (violet)

spectrum – the “fingerprint” of light from elements on the periodic table; the distribution of either visible or invisible light; spectrum can also refer to a range in the electromagnetic spectrum

Visible Spectrum – the range of light visible to the human eye; also known as visible light, and is located between infrared and ultraviolet on the electromagnetic spectrum

X-ray – range of invisible light past the far end of ultraviolet light; highly energetic form of light

Connections to Permanent Exhibits:

Night Viewer – Looking through the tinted windows doesn't reveal much, but the eyepiece attached to the night vision camera unveils the object's identity.

Satellite Images – These are pictures taken from satellites monitoring Earth, some of which show Earth viewed as an infrared image.

Filtered Earth – This is a trio of exhibits depicting locations of Earth viewed through different parts of the electromagnetic spectrum

Electromagnetic Spectrum – This picture provides a general look at the different parts of the electromagnetic spectrum

Crab Nebula – This picture shows the same object imaged through different parts of the electromagnetic spectrum. Notice each view provides different information on the structure and energetic of the Crab Nebula

Web Resources:

Cool Cosmos NASA

This website deals mainly with infrared, but it also contains a multitude of activities and information pertinent to other parts of the electromagnetic spectrum. <http://coolcosmos.ipac.caltech.edu/>

Chandra X-ray Observatory NASA/Harvard

This website has information ranging from beginners to advanced for X-ray astronomy. <http://chandra.harvard.edu/>

Pre-Visit Activities

Post-Visit Activities