

PLANETS VOCABULARY

Remote Sensing

Compiled here is a list of terms used in both the Remote Sensing Engineering and Science Series. Series-specific vocabulary is listed in each respective guide. This list encompasses all these and more. Vocabulary is organized by the activity in which it is first used, however, terms are repeated when they first appear in the Science Series.

Engineering Prep Activity 1 - What is Engineering? (P1)

Antenna - An antenna is a rod, wire, or other device most commonly used to transmit or receive radio, cell phone, or television signals. The plural of antenna is antennae.

Constraint - Ways that you or your design are limited

Criteria - Things that you or your design needs to do

Design - To plan or make something that doesn't exist yet

Engineer - Someone who uses his or her creativity and knowledge of math and science to design technologies that solve problems

Engineering Design Process - The steps that engineers use to design technologies that solve a problem

Engineering Prep Activity 2 - What is Technology? (P2)

Remote Sensing - Collecting information from a distance, without being in contact

Technology - Anything designed by humans to solve a problem

Engineering Activity 1 - Looking Beyond (A1)

Investigate - To observe or examine by asking questions and figuring out answers



Electromagnetic Spectrum - The entire range of wavelengths or frequencies of light, which is also called electromagnetic radiation.

Light Receiver - Anything that detects light

Light Source - Anything that creates light

Periscope - A remote sensing technology that uses mirrors to change the path of light in order to see over or around an object.

Spectroscopy - The study of how electromagnetic radiation (light) interacts with matter. In other words, what happens when light hits something. Measuring how much light of different wavelengths is reflected from a substance can tell us what the substance is made of.

Engineering Activity 2 - Secret Messages (A2)

Minerals - Naturally occurring, solid, crystalline chemical compounds that are the “building blocks” of rocks

Optical filters - A technology that manipulates light and color to help reveal visual information.

Engineering Activity 3 - Taking Shape (A3)

Landform - A natural feature of a planet’s surface, such as a hill, valley, mountain, canyon, or crater.

Laser / laser pulse - A device that generates an intense beam of light. A laser pulse is a short burst of that intense light beam.

LiDAR - (Light Detection And Ranging): A remote sensing technology that uses lasers to map the shape of a landscape.

Pixel - A square area that represents one piece of an image. Lots of pixels together form an image.

Spatial Resolution - The number of pixels you have per area. High resolution would mean you have more pixels per area and a sharper, more detailed image.

Topography - The arrangement, elevation, or height, of the landforms in an area

Engineering Activity 4 - Create a Device (A4)

Data - Information collected through scientific investigation

Iron - A metallic chemical element (symbol Fe) that is often found in volcanic minerals

Magnesium - A metallic chemical element (symbol Mg) that is often found in volcanic minerals

Engineering Activity 5 - Improve (A5)

Communicate (in engineering) - To share information, data, or ideas. It's important to communicate as engineers so that our designs can be improved. It's important to communicate as scientists so our data and ideas can be used to discover new things.

Improve (in engineering) - To make a device better than the first build. Examples include something being smaller, lighter, more durable, faster, able to do more things, or collect more kinds of data.

Graph - A diagram that shows the relationship of two different kinds of data.

Infographic - A visual image or diagram that shows data or information in an easy to understand way.

(No content for Engineering Activity 6)



Science Activity 1 - Remote Sensing & Mars (S1)

Area of Interest - This is a term scientists use to identify a location they would like to learn more about.

Atmospheric Pressure - The pressure exerted by the weight of the atmosphere. In other words, the combined weight of all the gas molecules and particles in the air above pushing down.

CTX - CTX stands for Context Camera, which is a camera on the Mars Reconnaissance Orbiter. It provides a big-picture view of the area around smaller areas of interest that are studied by other higher resolution cameras.

Ejecta - Material that is blown out from a meteorite impact or an explosive volcano

Evidence - Information or data that supports an idea or scientific claim

Geologic history - Refers to all the geologic events that have happened on a planetary body since its formation. For example, the formation and evolution of volcanoes, impact craters, canyons, and life.

Graben - An elongated block of a planet's crust that is displaced downward relative to the blocks on either side, as in a rift valley.

Habitability / Habitable Environment - The ability of an environment to support life as we know it. This requires liquid water, relatively neutral pH, moderate temperatures, and an energy source that life can use (e.g. the sun, hydrothermal vent, certain minerals, etc.)

HiRISE - HiRISE stands for High Resolution Imaging Science Experiment. It is a high resolution camera on the Mars Reconnaissance Orbiter.

Impact Crater - A round bowl-shaped hole in the ground formed from the impact of an object on the surface of a planetary body.

Landform - A natural feature of a planet's surface, such as a hill, valley, mountain, canyon, or crater.

Science Activity 1 - Remote Sensing & Mars (S1) continued

Mars Reconnaissance Orbiter (MRO) - A spacecraft that orbits Mars and has many different instruments that collect different kinds of data, which began operating in 2005.

Minerals - Naturally occurring, solid, crystalline chemical compounds that are the “building blocks” of rocks

Remote Sensing - Collecting information from a distance

Rover - A robotic vehicle designed to move across the surface of a planetary body, usually to take photos and make scientific measurements.

Sediment - Pieces of rocks and minerals that have been broken off larger rocks by erosion. Erosion is typically caused by water or wind.

Sedimentary Rocks - Rocks that are formed from the compaction of accumulated sediment.

Spatial Resolution - The number of pixels you have per area. High resolution would mean you have more pixels per area and a sharper, more detailed image.

Viking (Spacecraft and Data) - NASA's Viking program, launched in the 1970s, consisted of 2 space probes that orbited and landed on Mars, and for the first time collected images from Mars' surface.

Visible Light - The wavelengths, or frequencies, of light visible to the human eye. Represented by the colors of the rainbow, visible light is a small part of the whole electromagnetic spectrum.

Visual Data - Images collected using visible light that show what a human observer would see.

Volcanic Rocks - Rocks that formed from a volcano by cooling and hardening from lava or volcanic ejecta.



Science Activity 2 - Landing Site Topography (S2)

Contour - A line on a map that represents a constant elevation. Imagine filling a landscape with water. The places where the water touches the landscape would be a contour line.

Laser - A device that generates an intense beam of light.

LiDAR - (Light Detection And Ranging): A remote sensing technology that collects data from lasers to map the shape of a landscape.

MOLA - The Mars Orbiter Laser Altimeter, or MOLA, is an instrument on the Mars Global Surveyor (MGS), a spacecraft that launched in 1996. MOLA is the instrument that collects LiDAR data.

Terrain - An area of land with regard to its landforms

Topography - The arrangement, elevation, or height of the landforms in an area.

Science Activity 3 - Mineral Fingerprinting (S3)

Absorb (in spectroscopy) - To take in or soak up light.

Absorbance - A measure of the amount of light absorbed by a material. It is different for different colors (or wavelengths) of light.

Carbonates/ Carbonate Minerals - Minerals that contain the carbonate anion (1 Carbon and 3 Oxygen atoms bonded together). Carbonates typically form in the presence of liquid water.

Clay Minerals - Minerals that are hydrated (they contain water) and have layered crystal structures. Clays usually form from water interacting with other minerals.

CRISM - The Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) is an instrument (spectrometer) on the Mars Reconnaissance Orbiter.

Electromagnetic Spectrum (EMS) - The entire range of wavelengths or frequencies of light, which is also called electromagnetic radiation.

Science Activity 3 - Mineral Fingerprinting (S3) continued

Filter (Optical) - A technology that manipulates light and color to help reveal visual information.

Fingerprint (Spectral) - This refers to the unique curve on the spectral graph of a particular substance. Just like fingerprints are unique enough to identify a person, the curve of a spectral graph is unique enough to identify a substance.

Infrared - Infrared light is part of the electromagnetic spectrum that we cannot see. Its wavelengths are longer than visible red light.

Reflectance - A measure of the amount of light reflected by a sample, a mineral for instance.

Spectra, Spectrum - Bands of different wavelengths of light separated their components, like rainbows. Spectra is plural and Spectrum is singular.

Spectral Data, Spectroscopic Data - A graphical representation of how much light of different wavelengths are reflected or absorbed. Can be used to remotely identify different materials.

Spectrometer - A tool used to collect spectral data by measuring the intensity of light reflected or absorbed at different wavelengths.

Spectroscopy - The scientific study of how light (or electromagnetic radiation) interacts with matter.

Sulfates / Sulfate minerals - Minerals that contain the sulfate anion (1 Sulfur and 4 Oxygen atoms bonded together). Sulfates typically form from evaporated water.

Wavelength - The distance from the top of one wave to the next. Light (electromagnetic radiation) travels in waves. High energy light like gamma rays and ultraviolet light have short wavelengths compared to visible light that we can see. Lower energy light like infrared light and radio waves have longer wavelengths than visible light that we can see.

