

Exploring Earth's Land Use from Space

Learning Activity – Celebrating Diversity from Space Association of Space Explorers

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Description

In this lesson, students will explore how Earth observation from orbit can be utilized to determine different types of land use on Earth. They will learn about various land uses such as residential, commercial, agricultural, and recreational areas. Through hands-on activities, students will analyze astronaut photos of Earth & satellite images and make observations about land use patterns in their local area and beyond.

Grade Level

Middle School

Duration

Two 90-minute class periods

Materials

- Access to astronaut photos of Earth and satellite images (<https://landsat.gsfc.nasa.gov/multimedia/>)
- Projector and screen for displaying images
- Printed worksheets for land use analysis
- Colored markers or pencils

- Large poster paper for group activity
 - Access to computers or tablets
- (optional)
- Earth Music Theater-55 Minutes of Glorious Earth video

Learning Goals

- identify different types of land use from astronaut photos of Earth and satellite images.
- analyze and interpret Earth imagery to determine land use patterns.
- engage in a hands-on activity to apply their understanding of land use.

NGSS Standard(s):

- NGSS MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
- NGSS MS-ESS2-3: Analyze and interpret data on the properties of water and its effects on Earth systems.

Lesson Activities

ENGAGE

Begin with a question: "What do you think the Earth looks like from space?" Students will be shown the Earth Music Theater video, and will be asked to make observations. While the video is playing, the teacher will write the "what I see" on the board. Pause the video at the 30 second mark, and ask the students what they see...and what they think the land is being used for. Write their ideas on the board. Continue playing the video and pause again at 1:30. Ask the class what changes they noticed, and how the land looks different in this other location on Earth. Have them provide a hypothesis for WHY they think it looks different. Teacher will inform students that they will come back to their responses later in the lesson, and introduce the concept of land use and its importance in understanding how we interact with our environment.

EXPLORE

Teacher will divide the students into small groups, and provide them with different astronaut and satellite images representing various land uses (residential, agricultural, industrial, recreational, etc.). The images can be printed off, or students can use the NASA LandSat gallery if they have computer access.

Each group will analyze their assigned image and provide responses to the following questions:

- What type of land use is visible?
- What features indicate this type of land use?
- How does this land use impact the environment and the community?

Students will have 15 minutes to work in their groups, and then each group will present their findings to the class.

EXPLAIN

Teacher will have a short whole group instruction about the different types of land use: residential, commercial, industrial, agricultural, recreational, and natural areas. Use astronaut and satellite images of each type of land use to provide a visual to learners about each type. Teacher will then start a discussion about how satellite and ISS imagery helps urban planners, scientists, and others make informed decisions about land use.

ELABORATE

Following the whole group instruction, students will return to their small groups and create their own land use Map. Each group will receive large poster paper and colored markers. On their poster, they will create a fictional area using different land uses (parks, housing, farms, etc.) and provide an explanation as to what this would look like from space. They will illustrate their maps based on the types of land use discussed. Each group will present their maps to the class, explaining the reasoning behind their land use choices and how those land uses can be viewed from satellites or the ISS.

EVALUATE

After all the groups have presented, the class will come back together and the teacher will re-address their ideas from the beginning of the class (or previous class period). Hold a discussion about what was learned and how their ideas of land use may have changed over the course of the lesson. The teacher will distribute an exit ticket with images from different areas for students to identify land use types, which will be used as a formative assessment. Groups will also submit their maps for assessment.