

# Earth Observation

## Astronaut Photography and Satellite Imagery

### Learning Activity – Celebrating Diversity from Space Association of Space Explorers

Developed by Jennifer Duffer



#### Description

This lesson introduces students to the concept of astronaut photography and satellite imagery and how they can be used to observe and analyze Earth's surface. Students will engage in hands-on activities that promote scientific observation, digital literacy, and writing skills.

#### Grade Level

Grade 3

#### Duration

50 minutes

#### Learning Goals

1. Explain what astronaut photos and satellite imagery are and their purposes in Earth observation.
2. Analyze a provided astronaut photograph of Earth and identify key features.

3. Write a brief description of their observations using complete sentences.
4. Use visual sources to gather and analyze geographic information such as identifying landforms, water systems, and population.

### Standards Alignment

Next Generation Science Standards (NGSS): 3-ESS2-1 Earth's Systems

Common Core ELA Standards: CCSS.ELA-LITERACY.W.3.2: Write informative/explanatory texts to examine a topic and convey ideas and information clearly

## Materials

- Projector and screen for displaying images
- Printed satellite images (one for each student)
- Whiteboard and markers
- Writing paper and pencils
- Access to computers or tablets
- Access to Book Creator or other Presentation Software
  - You can access a Shared Book Creator Library and use the one book as a template to make your own. <https://bit.ly/AstroPhotosBookCreator>
  - Under the book click the books icon and copy. You can then move your copy to your own Book Creator Library. For further instructions go to <https://bit.ly/BookCreatorCopy>. Duplicate Pages until you have enough for each student. Insert the images you want students to analyze on the pages. Add a student's name to each page in order to "assign" them an image.

## Lesson Activities

### Introduction (10 minutes)

1. **Engage Students:** Begin with a question: "How and why do you think astronauts photograph Earth?" Allow students to share their ideas.
2. **Introduce astronaut photography of Earth:** Explain that the ISS orbits the Earth and astronauts take pictures of its surface, which helps scientists study the planet.
  - Play a few minutes of one of the videos from <https://www.earthmusictheater.org/Your-Playlist>
    - After the video begins, let students share their reactions and observations about the images they are seeing.
  - Show a few examples of still photos of Earth by astronauts (e.g., forests, cities, rivers) from <https://www.windowsonearth.org/EarthPhotoGallery> and discuss the landforms

### Direct Instruction (15 minutes)

1. **Explain Key Features:** Using the videos and pictures from the introduction, discuss important features visible in astronaut photography, such as landforms, bodies of water, and urban areas.
2. **Demonstrate Analysis:** Use a sample astronaut photography to model how to analyze it. Point out different features and ask guiding questions:
  - What colors do you see?
  - What shapes can you identify?
  - Is there anything unusual in the image?

## Guided Practice (15 minutes)

1. **Distribute Images:** Share access to your Book in Book Creator. Have students find the page with their name on it.
  - Optional Paper Based Activity: Hand out printed satellite images to each student.
2. **Observation Time:** Give students 5 minutes to observe their images silently.
3. **Group Discussion:** In pairs, have students discuss their observations and identify features in their images. Encourage them to use descriptive language.

## Independent Practice (10 minutes)

1. **Writing Activity:** Ask students to write a short paragraph describing what they see in their astronaut photos of Earth. They can write their paragraph first and then type it, or just directly type it onto their assigned page. They should include:
  - The main features they noticed. Students should include landforms they observe, if they can identify any clouds or weather patterns, any identifiable water systems, and note if the area is heavily populated or not.
  - Any questions they have about the image
    - Optional Paper Based Activity: Have students write their paragraph on the back of the image distributed during guided practice, or on their own sheet of paper.
2. **Share with Class:** Invite a few students to share their observations with the class.

## Conclusion (5 minutes)

1. **Recap:** Summarize the key points of the lesson. Reinforce the importance of astronaut photography in understanding our planet.
  - **Ask:** What did you learn about the role of astronaut photography in Earth observation?

## Differentiation Strategies

- For students who need additional support, provide sentence starters for the writing activity.
- Challenge: Provide students with multiple images of the same area that were taken at different times. Have students compare and contrast the differences between the pictures. Students can then use those observations to create a hypothesis about the cause of the differences. Are the changes due to natural or human factors?