Using Satellites to Study Amazon Deforestation

Background
The Amazon rain forest covers an area of 2.3 million square miles (6 million square km), roughly one-third of the area of South America. Such a huge rain forest is important, not only to South America, but also to the rest of the world. The rain forest is home to millions of species of plants and animals, and it affects climate, oxygen production, and the carbon cycle around the world.

Because of the Amazon’s global importance, many people around the world are concerned about its deforestation, or destruction of the forest. Determining the extent and rate of deforestation has become more and more urgent. In an area so vast, the only way to study deforestation is to use satellites. Scientists have studied satellite images of the Amazon region for more than 30 years, but recent advances in satellite technology have made it possible to determine the extent of deforestation more quickly and accurately than ever before.

For Investigation
Conduct research to learn more about the use of satellite imagery to study deforestation in the Amazon region. The Web site of the National Aeronautics and Space Administration (NASA), www.nasa.gov, contains a wealth of information about satellite monitoring of the Amazon rain forest, as well as many actual images of deforestation. As you conduct your research, look for answers to the following questions:

1. **Identifying** What are the main causes of deforestation in the Amazon region?

2. **Calculating** About how much of the Amazon rain forest is being cleared each year?
3. **Explaining** What is the role of Landsat satellites in monitoring deforestation?

4. **Defining** What is “MODIS,” and how is it used to study deforestation?

5. **Identifying** On MODIS images, what do red dots indicate?

6. **Evaluating** Why is fire a particular concern in the region?

7. **Drawing Conclusions** How does selective logging add to the problem?

8. **Explaining** How do satellites “see” through clouds and smoke?
Activity

Locate satellite images that show deforestation in the Amazon region. Find out how to interpret the images. How can you distinguish undisturbed forests from deforested areas? What do the patterns of deforestation in the images indicate? Incorporate some of these images into a multimedia presentation about the Amazon rain forest. Use the images to describe the impact of deforestation and how satellites help monitor the extent of deforestation in the region.

Assessment Checklist

Assess your presentation using the checklist below:

☐ Informative and interesting and followed a logical order
☐ Pace was appropriate, with a balance of narration and visual images
☐ Visual images were well chosen and illustrated the impact of deforestation
☐ Narration was well researched and helped explain the visual images
☐ Narration and images worked together to demonstrate the importance of satellites in monitoring deforestation

GOING FURTHER

- During times of drought, the risk of fire in the Amazon region increases. How are satellites used to help fight fires in the Amazon? Locate and print images that illustrate how satellite imagery can identify fires.
- It has generally been assumed that the rain forest is a carbon "sink"—a reservoir of carbon—because the rain forest vegetation takes in carbon dioxide and converts the carbon into tree trunks, branches, and leaves. However, the rain forest also releases carbon back into the air and water. Conduct research to learn more about the role of the rain forest in the global carbon cycle. How have satellites aided researchers who study the carbon cycle? Write a brief report about what you learn.
- Imagine that you are a farmer who lives near the Amazon rain forest. You understand that the rain forest is important, but you need more farmland in order to survive. Prepare and present a monologue in which you describe the conflict you might feel between your own needs and the long-term needs of the rain forest.