INSTRUMENTS IN SPACE

OVERVIEW

Lesson Summary:

This lesson focuses on the Advanced Composition Explorer (ACE) satellite, which provides information that helps measure the sun's activity and Earth's magnetosphere. Managed by the National Aeronautics and Space Administration (NASA), the ACE satellite provides information that helps scientists forecast the aurora. Students build a cardboard model of the ACE satellite, then use mathematical equations and data from the Internet to measure solar wind velocity and density.

Objectives:

The student will:

- use mathematical formulas to calculate the speed of solar wind;
- construct a model of the ACE satellite;
- identify and understand the function of spaceborne instruments and sensors carried by the ACE satellite; and
- increase their awareness of science and technology.

GLEs Addressed:

Science

[5-8] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.

[11] SD3.2 The student demonstrates an understanding of cycles influenced by energy from the sun and by Earth's position and motion in our solar system by exploring causes and effects related to phenomena (e.g., the aurora, solar winds, Coriolis Effect).

[6] SE3.1 The student demonstrates an understanding of how scientific discoveries and technological innovations affect our lives and society by describing the various effects of an innovation on a global level.

Math

[6] F&R-3 The student demonstrates conceptual understanding of functions, patterns, or sequences by identifying or applying multiplication or division patterns to find missing values in a function (M4.2.2).

[7] F&R-6 The student demonstrates algebraic thinking by solving or identifying solutions to one-step linear equations of the form $x \pm a = b$ or $ax = b$, where a and b are whole numbers; translating a story problem into an equation of similar form; or translating a story problem into an equation of similar form and solving it (M4.3.5).

[7] PS-5 The student demonstrates the ability to apply mathematical skills and processes across the content strands by using real-world contexts such as science, humanities, peers, and community (M10.3.1 & M10.3.2)

[8] PS-5 The student demonstrates the ability to apply mathematical skills and processes across the content strands by using real-world contexts such as science, humanities, peers, community, and careers (M10.3.1 & M10.4.2).

Search Terms:

- Advanced Composition Explorer (ACE) satellite
- Earth's magnetosphere
- model satellite
- solar wind
- mathematics
- formula
- aurora
- Northern Lights