UNIT TITLE: The Solar System and the Flow of Energy

Unit goals:

- To identify objects in the solar system and explain how these objects interact.
- To understand the flow of energy to Earth.

Grade Level (K-16): Grades 6-8

General Subject Area(s): Earth and Space Science

Minimum time required for the unit: 4 weeks

Concepts learned across all unit modules:

- Students will learn to compare and classify the objects in the solar system.
- Students will learn the size, composition, and features related to those objects in the solar system.
- Students will learn about the flow of energy as it relates to objects in the solar system.

Standards addressed by unit modules:

- MSPP (Astronomy 2.8.8-2.8.11)
- Maryland Learning Outcomes (2.4-2.6)
- NSF Benchmarks- The Physical Setting: The Universe

Technology needed in unit modules:

- Internet connection
- Galaxsee software

Technology-enhanced instructional strategies employed :

- Telefield trips
- Computer-based simulations
- Teleresearch
- Telecollaboration
- Electronic portfolio development
- Parallel problem solving

Title of Each Module:

Module 1: The Classification of Objects in the Solar System Module 2: Explaining the Motion of Objects in the Solar System and the Flow of Energy

Unit Culminating Activity:

Designing a model of the solar system using compiled data from teleresearch in paired groups. Invent an Alien that would live on one planet in the solar system.

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MODULE # 1

Module Title: The Classification of Objects in the Solar System

Estimated time to complete: 3 hours

Module objectives:

- To develop a general overview of all the objects in the solar system
- To use technology resources
- To use thinking skills and creativity

Concept(s) learned in this module:

- Students learn to compare and classify objects in the solar system according to similarities and differences.
- Students learn planetary characteristics.

Standards addressed in this module: MSPP Standard 2.8.8

Technology-enhanced instructional strategies utilized in this module:

Web-based learning, computer-based simulations, teleresearch, telecollaboration, technology enhanced demonstrations, email, and word processing.

Components	Brief description of module activities	Student Grouping	Materials/ Technology
Engagement	Telefield trip to view the similarities and differences of objects in the solar system http://www.seds.org/billa/tnp/overview.html	Small groups	Galaxsee software, Web site URL's
Exploration	Students search for information about the size, composition, and surface features of objects in the solar system	Individual or pairs	Web sites, cd- rom, keypals Ask the Expert
Explanation	Students develop a summary of their research to post on blackboard web site. Discuss findings on discussion board.	Small groups and whole class	Internet and Blackboard access
Extension	Students discuss questions about the origination of the objects in the solar system and differences among them.	Whole class	Web Discussion Board
Evaluation	Students conduct a WebQuest. http://www.wam.umd.edu/~rhema/ Webquest.html	Individual	Internet access

MODULE OVERVIEW

Expected module outcomes: Students realize the differences and similarities of objects in the solar system. Students begin to understand the connectivity of objects in the solar system by a common source. Investigation is prompted.

Performance-based assessment of module outcomes:

Student WebQuests are scored using a rubric that is developed for this module.

MODULE # 2

Module Title: Explaining the Motion of Objects in the Solar System due to the Flow of Energy.

Estimated time to complete: 4 hours

Module objectives:

- Students learn that the location and motion of most objects in the solar system influence events on Earth.
- Students learn to explain that these events are due to the flow of energy.
- Students explain why days are longer in the summer and shorter in the winter.
- Students explain why the sun's daily path changes during the year.
- Students explain the order of the moon phases from one full moon to the next.

Concept(s) learned in this module:

- Phases of the moon are determined by its position relative to the earth and sun.
- The revolution of the Earth and objects in the solar system around the Sun accounts for seasonal variations and patterns.
- Energy is distributed over the solar system.

Standards addressed in this module:

- MSPP Standard (2.8.9, 2.8.10, 2.8.11)
- MLO (2.5,2.6)

Technology-enhanced instructional strategies utilized in this module:

Teleresearch, telecollaboration, computer-based simulations, technology- enhanced demonstrations/experiments, parallel problem solving, advanced web search strategies, and "Ask the Expert".

Components	Brief description of module activities	Student Grouping	Materials/ Technology
Engagement	Find web sites to show: 1)phases of the moon; 2) path of the sun as it changes during the year.	Small groups	Internet URL's Simulations
Exploration	What influences does the flow of energy have in our solar system? Give examples of what occurs on Earth. Observe and record on chart.	Small groups or pairs	Technology enhanced experiments
Explanation	Write a research paper about the changing events during moon phases and changing path of the sun. Discussion of research.	Individual; Whole class	Word processor; Email
Extension	If the Earth were tilted an extra 15 degrees by some event, what changes would or would not take place on Earth?	Pairs or small groups	Information exchanges; "Ask an Expert" (FAQ)
Evaluation	A rubric will be developed for this module to score the research paper	Individual	

MODULE OVERVIEW

Expected module outcomes: he motion and flow of energy from the sun changes the Earthhe phases of the moon move in a regular and predictable pattern.

Performance-based assessment of module outcomes: Research paper scored using rubrics developed for this module.