NTTI Media-Rich Lesson

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NAME

UP! UP and AWAY
LESSON TITLE

Eighth Grade
GRADE LEVELS

Three Fifty-Minute Class Periods

TIME ALLOTMENT

OVERVIEW

All Aboard!
What is the origin of the solar system? It is generally agreed that it condensed from a nebula (mist, clouds of gas or dust in interstellar space)?

Our solar system consists of the sun, nine planets (and their moons), an asteroid belt, many comets, and meteors. The sun is the center of our solar system: the planets, their moons (sixty one), the asteroids, comets, and other rocks and gas all orbit the sun.

The nine planets that orbit the sun are (in order from the sun): Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto. A belt of asteroids (minor planets made of rock and metal) lies between Mars and Jupiter. The inner planets (those planets that orbit close to the sun: Mercury, Venus, Earth, and Mars) are quite different from the outer planets (those planets that orbit far from the sun: Jupiter, Saturn, Uranus, Neptune, and Pluto. The inner planets are relatively small, composed mostly of rock, and have few or no moons. The outer planets are mostly huge, m, mostly gaseous, ringed, and have many moons. The exception is Pluto, which is small, rocky, and has only one moon.
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The activities presented in this lesson will provide students with a through and comprehensive knowledge of our solar system. In this lesson students will learn a description of the solar system components along with the features, characteristics and motions of the planets. The lesson can be integrated across curriculum using real world applications, explorations into outer space, and conducting research. Students will apply

writing poetry, essays, and mnemonics to planet's descriptions as well as their names. Students will become engaged with inquiry processes in mathematics and science, using skills of recording and analyzing data, experimenting, and measuring. In social studies, the students will process information by developing time lines of the solar system's history, space exploration history, and spacecraft's history. The students will integrate technology in their work (products) throughout the lessons' activities, with the use of graphs, charts, pictures of planets and a powerpoint presentation. Cooperative group presentations will include technology to illustrate real life space exploration. Students will conduct research through websites as well as their links to gather data for a profile chart on each planet.

Subject Matter

Language Arts, Mathematics, Science, Social Studies, and Writing

Learning Objectives

Students will be able to:

- Distinguish between outer and inner planets in reference to distance from the sun
- Collect and record data to construct a profile chart
- Identify and name the components of our solar system
- Research current references and internet sites to gather data and analyze planets in the solar system
- Retrieve specific information from a comprehensive data table

Standards

Language Arts Grade 8
http://www.glc.k12.ga.us/standards

Standard 49
Students will be able to select relevant information about a topic from various sources.

Standard 68
Students will be able to expand writing skills

Mathematics Problem Solving Grade 8
Topic: Research, Investigation, Data Analysis
http://www.glc.k12.ga.us/standards

Standard 4
Students will be able to use computer software and applications to research, investigate, and analyze data and to represent this information using charts, graphs, or other presentation forms.

Science Grade 8
1. Topic: Scientific Inquiry Process
http://www.glc.k12.ga.us/standards

Standard: Uses process skills of observing, classifying, measuring, predicting, and inferring. Also uses skills of recording, analyzing, formulating models, and experimenting.

Topic: Astronomy
http://www.glc.k12.ga.us/standards

Standard: Describes the components of the solar system.
21.1 Describes features, characteristics and motions of the planets

Social Studies Grade 8
54. Topic: Information Processing
http://www.glc.k12.ga.us/standards

Standard: Develops and interprets charts, tables, timelines, graphs, diagrams, and other graphic aids.

72. Topic: Time and Chronology
Standard: Places related events in chronological order.

Media Components

Web Sites

Planets Webquest

Precise introduction description of the solar system with its component parts
http://mercury.nineplanets.org

Zoom Astronomy is a user support site where numerous resources are attainable.
http://www.enchantedlearning.com/subjects/astronomy/activities

NASA'S links to space exploration
http://edu.larc.nasa.gov/connect

Presents one historical view of the solar system's origin
http://seds.lpl.arizona.edu/nineplants/history.html

An overview of the solar system
http://www.csc.tcd.ie/~tass/tnp/nineplanets

Videos

PBA : Passport to the Solar System #101 “Solar Systems”

Other Technology

Computer (internet) downloads of sounds
Websites:

Materials

Per Group/Classroom

- Colored markers
- Metric rulers
- Meter sticks
- Graph paper
- Computers
- Hand-out #2: Assignment Sheet for Product 1(Research) and Product 2 (Powerpoint Presentation)
- LCD Monitor
- T V and VCR
- Media center
- Tag-board paper
- Web sounds downloads (NASA Space Rockets Take-Off, 2001 Space Odyssey)
- Posters/pictures solar system, planets, asteroids, comets
- Bulletin board display of solar system
- Track Light of Red/Blue

Per Student

- Hand-out #1: Solar System Components (Video: A Family Portrait)
- Rubric Research 1
- Rubric Powerpoint Presentation

Prep For Teachers;

The teacher provides information and investigations that are designed to help students learn about the current information on the solar system building from the past knowledge and information. Before teaching this lesson, make certain that all of your Web sites are bookmarked on all computers to be used to teach this lesson. Preview video of Passport series, Solar System #101 “Solar System”.

When using media, provide students with a **FOCUS FOR MEDIA INTERACTION,** a specific task to complete and /or information to identify during or after viewing of video segments, Web sites, or other multimedia elements. Provide students with specific tasks during or after the media are used. Provide students with prior experience in the use of cooperative grouping and collaborative skills such as, think-pair-share, teambuilding, communication, leadership, etc. Assign group roles (materials collector, recorder, facilitator/problem solver, etc.). Prepare and setup "Space Stations" that focus on media interaction, hands-on activities, and problem solving. It is a good idea for the teacher to perform a trial run on the "Space Stations" before the lesson is taught. Gather materials for profile data chart development activity and powerpoint presentation. A word wall displayed in the classroom with terms of the solar system is beneficial to students' learning.

Prepare the hands-on elements of the lesson by:

1. Copying the following sheets, one per student: Hand-out #1 (Space ship Ride),Hand-out #2 Solar System Components, Rubric (Research) and Rubric (Powerpoint)

2. Copying the following the following sheets, one per group: Hand-out #2, Assignment Sheet Product 1(Research) and Product 2(Powerpoint Presentation) Directions -Computer, tagboard, markers, meter sticks and 31/2 floppy diskette/CD.

Introductory Activity

Step 1

Lights are on as students enter the classroom and take their seat. At the start of instruction, the classroom is darkening slightly. The sounds of, NASA Space Rockets Take-Off, 2001 Space Odyssey, and a flashing track light of colors (red and blue), that rotates, engage the student's interests. Sounds are lowered but lights continue to flash. The teacher gives an introduction and overview of the lesson to be taught. Using whole class instruction, the teacher describes we are going to take a vacation in the solar system. Teacher narrative: "Today students, we are taking a trip, a rocket ride vacation. Our trip is to outer space where we will visit and explore the current nine planets. We will stop and collect asteroids between Mars and Jupiter. Since the solar system is three dimensional and is mostly empty space, we will rest, eat, sleep, plan, inventory supplies, and chat between planet visits. Remember, you must wear your space fashions at all times. It will be cold." (Ends Narrative) Pictures of planets and solar system are displayed around the room for a source of reference. Then the above sounds, Rollercoaster, Spaceship Launching, 2001 Odyssey, are replayed with the rotating light flashing. Students are encouraged to close their eyes and imagine riding a

rollercoaster spaceship through our solar system. Teacher narrative, “Raise your hands, move about in your seats but limit the yells. Provide your students with a **FOCUS FOR MEDIA INTERACTION,** asking them to image a ride in outer space, visiting the planets and identify positions of planets in our solar system. **PLAY** clip until you see a screen that shows planets animation with no **SOUND.**

Sounds and flashing lights are stopped and lights are on. Distribute Hand-out #1 (Space ship Ride) to each student. Discussion is conducted using the Space ship Ride activity.

Step 2

Distribute Hand-out #2 (Solar System Components) to each student. Provide your students with a **FOCUS FOR MEDIA INTERACTION,** asking them to focus on the planets in the Solar System with reference to their position, and distinguish Rock/Terrestrial Planets and Gas Giant Planets. Students view video Passport to Solar System #101, “Solar System” Program 1 to gather a whole picture of the solar system components. **START** video and **PLAY** until the screen shows "Family Portrait" **PAUSE,** ask student to identify the component parts of the Solar System. **PLAY** until the screen shows "Gas Giants", **STOP. REWIND, REPLAY** and allow students to write and discuss answers. **PLAY** until the narrator says Pluto is remote.

SOLAR SYSTEM COMPONENTS

Video: A Family Portrait: Solar System (Program 1)

ACTIVITY SHEET

Complete the activities and questions below from the video.

1. What are the component parts of the solar system? List them.
2. Write the name of the Rock/Terrestrial Planets (INNER PLANETS). Where is their position in reference to sun?
3. Fill-in each planet's position as the video presents its description. Write two-three brief descriptions of each planet.

SUN

(ROCK/TERRESTIAL PLANETS)

1._____

Descriptions:

a.

b.

c.

2._____

Descriptions:

a.

b.

c.

3._____

Descriptions:

a.

b.

c.

4._____

Descriptions:

a.

b.

c.

4. Why are asteroids unique in their origin? How do they separate the planets?

5. What are the "Gas Giant" Planets? Explain their name. Where are they located in reference to the sun?

("GAS GIANT PLANETS")

5._____

Descriptions:

a.

b.

c.

6._____

Descriptions:

a.

b.

c.

7._____

Descriptions:
a.
b.
c.

8._____

Descriptions:
a.
b.
c.

9._____

Descriptions:
a.
b.
c.

6. Describe the dominant force affecting each planet's position in the solar system.
7. Compare/contrast Rock Planets and Gas Giant Planets.

Activity 2

Students are placed in cooperative groups of three (teacher selection).Roles (materials manager-A's, recorder/reporter B's, and facilitator/problem solver-C's) are assigned to each group member. Each group has a planet to explore through research, using internet website:
http://www.enchantedlearning.com/subjects/astronomy/toc.shtml

Distribute Hand-out #3. Provide your students with a **FOCUS FOR MEDIA INTERACTION,** asking them to develop a profile chart on each planet. The assignment (Product 1) is Research, (figure 1 rubric). Product 1 is to include the following on a profile data chart of each planet.

- Planet's name
- Position in the solar system
- Planet's size, mass, and gravity at the surface
- Planets' orbit, length of year, and day
- Planets' distance from sun

Product 2 is (Powerpoint) presentation). A powerpoint presentation is to include but not limited to data chart information (figure 2 rubric).

SOLAR SYSTEM

Research Part 1

The Following is a Rubric For Assessing Student Work: Profile Data Chart:
Figure 1

	Beginning 0-69	Developing 70-82	Accomplished 83-91	Excellent 92-100	Score
Research Part 1 (the planet's name, position in the Solar System, its size, mass, gravity at the surface, orbit, length of year and day)	Does not cover all appropriate topics	Covers some of the appropriate topics.	Covers mosbvt of the appropriate topics.	All appropriate topics covered well. Also includes additional facts.	

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Activity 1

Rubric For Assessing Student Work: Powerpoint Presentation - Planets

Figure 2

	Beginning 1	**Developing 2**	**Accomplished 3**	**Excellent 4**	**Score**
Presentation	Illegible, Unorganized No graphics	Almost Illegible One graphic	Legible Graphic illustration	Well organized Many illustrations	
References	No references	A single, Reference Incomplete citation	Several references With incomplete, citations	Many references, Listed in Appropriate format	
Spelling/ Grammar	Many spelling/grammatical errors	A few errors (3)	1 or 2 errors	Spelling and Grammar perfect	

Culminating Activity

Closure to the lesson focuses on the objective below:
Retrieve specific information from a comprehensive data table.

ACTIVITY 1

Using globes, a variety of spheres (balls), and a large wattage light bulb to provide sunlight, explain and illustrate a model of such phenomena as: seasons on your planet (cooperative group assignment).

Cross Curricular Extensions

Language Arts/Writing

The lesson is generated through writing short stories of life on other planets than earth. Students write poetry from information on planets.
Social studies
Student will design timelines of planet's origin. Continental drifts on the planet earth will provide an inquiry approach.
Mathematics
Students will focus is on calculations using equations and formulas of a year on each planet. In math classes students will determine the diameter and radius of planets as well as use scientific notation in planet's distances.

Science

In science classes students will analyze and interpret data to create a scale model of the sun and planets in terms of size and distance. Extending the activity, students can plot the sun and planets to scale.

Community Connections

Invite speakers affiliated with space involvement to give presentations to classes. Interview astronauts and others involved with space exploration and give an oral report to class.