LESSON OVERVIEW

1. Read background material.
   • Art supplies
   • Personal log (journal)

2. Present Reproducible 3, “Lesson Scenario,” and then brainstorm
   Materials
   Place: Earth
   • Present their options, reasoning, and recommendations to the
   • Investigate options in many aspects of space flight.

Students will:
• Actively explore the potential resources available to space
• Reinforce information on asteroids and other small bodies in
• Deep space exploration. The class will brainstorm or investigate to
   identify useful resources, including water, that might be found on
   other planets. Could a house launch into orbit, as the poster
   depicts? Could it travel through space? Show students the poster,
   other planets. Could a house launch into orbit, as the poster
   shows? How much force is required to lift a house that far into space?

3. Brainstorm the
   • Advantages for each option (e.g., power from solar cells
   • Disadvantages for each option (e.g., power from solar cells
   • Investigate possible problems to be resolved through research. Teams
   • Source investigated, relevant data found, relevant
   • Ground support, vehicle design, maintenance, prospecting tools,

4. Once presentations are complete, distribute Reproducible 4,
   • Students present their results to the class.
   • Students present their results to the class.
   • Students present their results to the class.

5. Explore the team should reach consensus.

6. Plan the
   • Possible problems to be resolved through research. Teams
   • Identify useful resources, including water, that might be found on
   • Other planets. Could a house launch into orbit, as the poster
   • Other planets. Could a house launch into orbit, as the poster
   • How much force is required to lift a house that far into space?

7. Once presentations are complete, distribute Reproducible 4,
   • Take students' results to the class.
   • Take students' results to the class.
   • Take students' results to the class.

ADDITIONAL TEACHER RESOURCES
• www.Zathura.net
• www.nasa.gov
• www.scholastic.com/spacescience

LANGUAGE ARTS
• Strand A: Language Diversity
• Strand B: Expository Writing
• Strand C: Persuasive Writing
• Strand D: Content Area Writing
• Strand E: Listening and Speaking

SCIENCE
• Strand A: Science as Inquiry
• Strand B: Physical Science
• Strand C: Life Science
• Strand D: Earth and Space Science
• Strand E: Science in Personal and Social

SOCIAL STUDIES
• Strand A: Social Studies as Human Inquiry
• Strand B: Social Studies in Personal and Social

GREAT SWEEPSTAKES!
Visit www.Zathura.com
On November 16, 2005, author/illustrator Chris Van Allsburg and a
Kennedy Space Center Visitor Complex activity guide will
conduct a search for a school on behalf of the “Zathura” movie.
Kennedy Space Center Visitor Complex in Florida
Student Sweepstakes
Prizes include:
• Family Trip for Four to Kennedy Space Center Visitor Complex of Florida
• Plasma TV and DVD Player
• Classroom sets of Scholastic science books
• Zathura movie posters

Share This Program with a Colleague!
Printable version available online at www.scholastic.com/sweepstakes

Welcome to Space Science: Adventure Is Waiting, a dynamic education program for
all students in both science and language arts. Look inside for easy-to-teach,
national standards-based lessons and reproducibles, as well as a great sweepstakes
with amazing prizes (see the Take-Home pages)!

Developed in cooperation with both NASA and Scholastic, Space Science: Adventure Is Waiting
has been generously sponsored by Columbia Pictures. This program also
promotes inspiring images of the upcoming feature film Zathura. This adventure film is
based on renowned author/illustrator Chris Van Allsburg’s acclaimed children’s book,
published by Houghton Mifflin.

We hope you and your students enjoy this valuable program!

Columbia Pictures • NASA • Scholastic inc. • Houghton Mifflin
LESSON OVERVIEW

Advance Preparation

Materials

• Investigate options in many aspects of space flight.
• Plan an expedition or other large engineering project.

Students will:

Such as financing for the mission, criteria for crew selection, Earth

The students should learn that a large project requires the

planning various aspects of an asteroid prospecting expedition,

An asteroid. Teams of students are asked to take responsibility for

deep space exploration. The class will brainstorm or investigate to

Exploration Proposal

Objectives

In teams, students will research and document some of the

requirements for mounting an expedition to an asteroid.

The Stepping Stone to Beyond

Asteroid Resources:

Students can then visit

and encourage them to come up with questions the image raises.

...depicts? Could it travel through space? Show students the poster,

ADDITIONAL TEACHER RESOURCES

LANGUAGE ARTS

National Science Education Standards

1 and 2)

Activities

Lesson

http://www.ncte.org/about/over/standards/110846.htm

SOURCES:

www.scholastic.com/science

GREAT SWEEPSTAKES!

Visit and click “The Movie” tab to find out more. Enter for your chance to win a dynamic education program Is Waiting has been generously sponsored by Columbia Pictures. The program also provides inspiring images of the upcoming feature film Zathura. This adventure film is based on renowned author/illustrator Chris Van Allsburg’s acclaimed children’s book, published by Houghton Mifflin.

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Columbia Pictures • NASA • Scholastic Inc. • Houghton Mifflin

A Great Day at Kennedy Space Center

Free Teaching Guide & Poster

Space Science

ADDITIONAL TEACHER RESOURCES

• Lessons & Reproducibles
• Classroom Wall Poster
• Rational Standards Matrix
• Take-Home Pages

Welcome to Space Science: Adventure Is Waiting, a dynamic education program for students in both science and language arts. Look inside for easy-to-use, national-standards-based lessons and reproducibles, as well as a great sweepstakes with amazing prizes (see the Take-Home pages)! Developed in cooperation with both NASA and Scholastic, Space Science: Adventure Is Waiting has been generously sponsored by Columbia Pictures. The program also provides inspiring images of the upcoming feature film Zathura. This adventure film is based on renowned author/illustrator Chris Van Allsburg’s acclaimed children’s book, published by Houghton Mifflin.

We hope you and your students enjoy this valuable program!

Columbia Pictures • NASA • Scholastic Inc. • Houghton Mifflin

Student Sweepstakes!

Printable

• Family Trip for four to Kennedy Space Center Visitor Complex Florida
• Trophy in the Digital Reproducible
• Classroom units of space/science books

Printable version available online at www.scholastic.com/science

Count Your Classrooms Through NASA Digital Learning Matters®

On November 13th, 2005, ambitious students in your classroom can win a Family Trip for four to Kennedy Space Center and grand prize sweepstakes. To enter, just visit NASA Digital Learning Matters: http://www.nasaimpressions.org/education/sweepstakes.html

The children’s book Zathura, by Chris Van Allsburg
**Lesson Overview**

Aids in making decisions and planning based on the requirements for mounting an expedition to an asteroid. Aids in gathering information on asteroids and other small bodies in deep space. Reinforces information on asteroids and other small bodies in deep space. May familiarize themselves with basic information.

**Objectives**

- Students learn that a large number of asteroids and other small bodies in deep space have characteristics similar to those of the Moon and Mars. These objects are the stepping stones to beyond Earth orbit. These objects may be useful sources of water and other resources. Students will research, gather information, and present their findings.

**Materials**

- Art supplies
- Resource materials about space travel, space resources, deep space exploration

**Teaching with the Poster**

- The children’s book Zathura, by Chris Van Allsburg, is published by Houghton Mifflin. The movie Zathura, produced by Columbia Pictures, is based on the book. The film is coming to theaters this fall.
- The Stepping Stone to Beyond Asteroid Resources:
- About This Activity
- Exploration Proposal
- Requirements for mounting an expedition to an asteroid.
- The research should include a sources investigated, relevant data found, relevant conversations, meetings, etc.
- What fast would the crew be traveling? How long will it take to get there? How will the crew get there? How will the crew get home?
- How big will the crew be? How will the life support system run? How will the crew live? How will they get food? How will the crew get water? How will the crew get air? How will the crew get exercise? How will the crew have fun?
- The research should include a report on the following:
  - Sources investigated
  - Relevant data found
  - Relevant conversations, meetings, etc.

**Assessment Rubric**

- Aids in making decisions and planning based on the requirements for mounting an expedition to an asteroid.
- Aids in gathering information on asteroids and other small bodies in deep space.
- Reinforces information on asteroids and other small bodies in deep space.
- May familiarize themselves with basic information.

**National Standards and Benchmarks**

- Strand B: Physical Science
  - Understands that energy is transferred (electrical, heat, light, etc.) as it moves, interacting with objects in i.e. gravity, centrifugal force, and inertial forces
- Strand E: Science and Technology
  - Understands the potentiality of natural hazards
- Strand G: History and Nature of Science
  - Knows that science and technology have been practiced for a long time, that there is much more to learn about the Solar System and universe that needs to be researched, and in that, science will be involved.
- Strand H: Health and Safety
  - Knows about steps taken to avoid illnesses
- Strand I: Science and Technology in Context
  - Knows the importance of using scientific methods to solve problems

**ADDITIONAL TEACHER RESOURCES**

Visit www.nasa.gov page to access additional teacher resources that provide the connections between science and the arts.

**Assessment Guide**

- Meanประเมิน Detail ประเมิน Total
- 1. Students understand that asteroids are a stepping stone to beyond Earth orbit. Aids in making decisions and planning based on the requirements for mounting an expedition to an asteroid. Aids in gathering information on asteroids and other small bodies in deep space. Reinforces information on asteroids and other small bodies in deep space. May familiarize themselves with basic information.
  - Student demonstrates an understanding of the appropriate background material through appropriate skills and strategies. Student presents little scientific accuracy in supporting details in collaborative group presentations.
  - Student uses a lack of understanding of the appropriate background material. Student demonstrates a complete understanding of the appropriate background material through appropriate skills and strategies. Student presents little scientific accuracy in supporting details in collaborative group presentations.

- **Strand B: Physical Science**
  - Understands that energy is transferred (electrical, heat, light, etc.) as it moves, interacting with objects in i.e. gravity, centrifugal force, and inertial forces
  - Student demonstrates an understanding of the appropriate background material through appropriate skills and strategies. Student presents little scientific accuracy in supporting details in collaborative group presentations.
  - Student uses a lack of understanding of the appropriate background material. Student demonstrates a complete understanding of the appropriate background material through appropriate skills and strategies. Student presents little scientific accuracy in supporting details in collaborative group presentations.

- **Strand G: History and Nature of Science**
  - Knows that science and technology have been practiced for a long time, that there is much more to learn about the Solar System and universe that needs to be researched, and in that, science will be involved.
  - Student demonstrates a complete understanding of the appropriate background material through appropriate skills and strategies. Student presents little scientific accuracy in supporting details in collaborative group presentations.
  - Student uses a lack of understanding of the appropriate background material. Student demonstrates an understanding of the appropriate background material through appropriate skills and strategies. Student presents little scientific accuracy in supporting details in collaborative group presentations.

**Student Take-Home Pages**

1. Take-Home Pages
2. National Standards Matrix
3. Free Teaching Guide & Poster
4. Student Sweepstakes!
5. Prizes include:
   - Family Trip for four to Kennedy Space Center Visitor Complex in Florida
   - Double DVD of Zathura
   - Classroom sets of science/reading books
6. Share This Program with a Colleague!
7. Printables version available online at www.columbia.com/space

**Connect Your Classrooms Through NASA’s Digital Learning Network**

On December 12, 2005, AtlanticTeach kicked off a national teacher incentive program with NASA’s Langley Research Center and Scholastic, Inc., to connect classrooms around the world through a digital learning network.

**Scholastic**

Scholastic, Inc., is a leading educational publisher and media company. Over 175 million children, parents, and educators visit www.scholastic.com, the leading destination for children’s entertainment and education on the Internet, each month.

**NASA**

The National Aeronautics and Space Administration (NASA) is an independent agency of the United States government responsible for the civilian space program as well as aeronautics and aerospace research. It is headquartered in Washington, D.C. and was established as an agency within the Department of Commerce by the National Aeronautics Act of 1958. The agency’s mission statement is “To explore the universe and bring its wonders to the classroom.”
LESSON BACKGROUND

There are many cool objects flying around in space. Do you know the difference between an asteroid, a comet, and a meteorite? Try this activity to learn more!

Do asteroids ever explode? Yes! When an asteroid is hit by another asteroid or by a comet, it may break into smaller pieces. Sometimes, these pieces can hit Earth's atmosphere and create a spectacular sight called a meteor. Sometimes, many pieces create a spectacular sight called a meteor shower.

LESSON BACKGROUND NAME THOSE ASTEROIDS! BRAINSTORM

LESSON BACKGROUND

Read the sentences below to learn about three asteroids that were named after famous people. Use the Internet search to find out who these people were. Use the information to complete the sentences.

1. The asteroid 2266 Tchaikovsky is named after a
   composer. Tchaikovsky lived from 1840 to 1893. His
classical music includes symphonies, operas, and
chamber music. In 1888, he composed the music
to the ballet The Nutcracker.

2. The asteroid 2578 Saint-Exupéry is named after an
   author. Saint-Exupéry lived from 1900 to 1944. 
   He wrote several books, including the story The
Little Prince.

3. The asteroid 1983RD is named after Christa
   McAuliffe, who was
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   lived from 1948 to 1986.

LESSON BACKGROUND

Between an Asteroid, a Comet, and a Meteor, What's the Difference?

Asteroids are generally large, from 50 meters (164 feet) to 1,000 meters (3,281 feet) in diameter. They are dark, with a rough, uneven surface. An asteroid takes between 1 and 7 Earth years to orbit the Sun. A comet is also an icy body, but it's much smaller and has a cloud, or coma, of gas and dust around it. A meteor is a piece of rock or metal that enters Earth's atmosphere and passes through it at high speed. A meteor is also called a "shooting star".

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LESSON BACKGROUND

NAME THOSE ASTEROIDS!

BRAINSTORM

ACTIVITY

ACTIVITY

LESSON SCENARIO

There are many small objects flying around in space.

LESSON BACKGROUND

Did you know the difference between an asteroid, a comet, a meteor, and a meteorite? Try the activity below to learn more!

ACTIVITY

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BONUS!

Do you know the difference between an asteroid, a comet, a meteor, and a meteorite? Try the activity below to learn more!

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**Lesson Background**

Many meteorites are thought to be broken fragments of asteroids – some “meteors” or “shooting stars” are actually fragments of asteroids. Asteroids can be seen with a pair of binoculars, but telescopes are needed to view them in sufficient detail.

**Name Those Asteroids!**

Are you wondering why the asteroids are called asteroids? They are called asteroids because they are “small stars.” This term was first used by the British astronomer William Herschel in 1801, and it has been used ever since.

**Lesson Scenario**

National and international space agencies are cooperating to plan for human exploration of the outer Solar System. Three major missions are being planned: a mission to the moons of Jupiter, Saturn, Uranus, and Neptune to explore, collect samples, and search for clues to the radiations of the Solar System; a mission to send an asteroid probe to the nucleus of a comet; and a mission to the asteroids in the inner Solar System, just past the orbit of Mercury (beyond Mars in this lesson).

**Brainstorm**

Why do humans explore space? Why do people want to go to Mars? How important is space exploration for the future of the human species? How do space missions help scientists and technology? What are the possible economic benefits of space exploration? Where does the money for space exploration come from?

**ACTIVITY**

In groups of 4 or 5 students, you will be given a list of asteroids to name. Each asteroid has a different name assigned to it. The names are chosen by the person who finds the asteroid or by the person who discovers it. The asteroid 2266 Tchaikovsky is named after a Russian music composer who lived in the 19th century. The asteroid 3352 McAuliffe is named after Christa McAuliffe, a teacher who trained for the space shuttle program. The asteroid 10051 Luther is named after Dr. Luther, who helped develop the telescope.

**BONUS!**

The asteroid 29875 Brumbaugh is named after a rock musician who was killed in a car crash in 2002.

**Read the lessons below to learn about three asteroids that were named after famous people.**

**ACTIVITY**

Imagine some emergencies that might occur in flight. How might we plan to deal with these emergencies? What skills/programming would astronauts/robots need during each phase of a mission? Consider human and/or robotic crews.

**Where does the money for space exploration come from?**

What are the possible economic benefits of space exploration? Might a human base be easier to run than a space station in low-Earth orbit? What are the advantages/disadvantages of gender-related issues? What are the different physical chemicals in meteorites? What are the possible economic benefits of space exploration? How does exploration and navigation affect vehicle design?

**ACTIVITY**

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What are the possible economic benefits of space exploration? Might a human base be easier to run than a space station in low-Earth orbit? What are the advantages/disadvantages of gender-related issues? What are the different physical chemicals in meteorites? What are the possible economic benefits of space exploration? How does exploration and navigation affect vehicle design?
There are many small objects flying around in space. Do you know the difference between an asteroid, a comet, a meteor, and a meteorite? Try the activity below to learn more!

ACTIVITY

Asteroids Can Have Three Names!

An asteroid’s first name: When an asteroid is first found, it is given a temporary name, showing what number it is in the order the asteroids were discovered. As the asteroid’s orbit is known well, it is given a second name, which is actually a number followed by a name (for example: (1) Ceres). After being observed for a few years, it is given a permanent name by the Minor Planet Center. If it resembles a particular type of asteroid, it might be named after that type. For example, the asteroid named 1036 Ganymede is named after the most famous of Jupiter’s moons.

An asteroid’s second name: After the asteroid is discovered, it is given a second name, which is actually a number followed by a name (for example: (1) Ceres). After being observed for a few years, it is given a permanent name by the Minor Planet Center. If it resembles a particular type of asteroid, it might be named after that type. For example, the asteroid named 1036 Ganymede is named after the most famous of Jupiter’s moons.

An asteroid’s third name: Finally, an asteroid might be given a name that pays tribute to a person or an event. For example, the asteroid named 310541 McMath-Pierce is named after the person who discovered it.

Do You Know the Difference Between an Asteroid, a Comet, a Meteor, and a Meteorite?

An asteroid is a small object that orbits around the Sun. Most asteroids are found in the asteroid belt, which is a region between the orbits of Mars and Jupiter. Asteroids are made of rock and metal, and they are typically 5-100 kilometers in size. They are called “asteroids” because they resemble the ancient Greek word for star.

A comet is a small object that orbits around the Sun. Comets are made of ice, rock, and dust. When a comet approaches the Sun, the ice sublimates to form a coma, which is a fuzzy, cloud-like shell. A comet also has a tail, which is made of gases and dust that are pushed away from the Sun by the solar wind.

A meteor is a flash of light that we see in the sky. A meteor is also called a “shooting star.” A meteor is formed when a small object, such as a comet or an asteroid, enters the Earth’s atmosphere and burns up. A meteor is not a “throwing” star.

A meteorite is a piece of metal or rock that has fallen to Earth from space. Meteorites are formed when asteroids or comets break up in the Earth’s atmosphere. Meteorites are valuable because they contain materials that are useful in space exploration, such as iron and nickel.

ACTIVITY

BONUS!

What types of support teams (on Earth or other home base) are necessary to a mission to an asteroid?

Where does the money for space exploration come from?

What are possible economic benefits of space exploration?

How does navigation and rotation affect vehicle design?

What skills and programming would an astronaut need during each phase of a mission to an asteroid?

What kind of emergency procedures might an astronaut need to deal with in-flight?

Imagine some emergencies that might occur in flight. How might we plan to deal with them?

What are the different abilities of human crews and robotic instruments (e.g., comparison, initiative, adaptability, hardiness, need for life support)?

What are the advantages/disadvantages of gender-related crews?

What are the advantages/disadvantages of human crews and robotic instruments (e.g., comparison, initiative, adaptability, hardiness, need for life support)?

What are possible economic benefits of space exploration?

How does navigation and rotation affect vehicle design?

What skills and programming would an astronaut need during each phase of a mission to an asteroid?

What types of support teams (on Earth or other home base) are necessary to a mission to an asteroid?
Lesson Overview

1. Read background material.

Advance Preparation

- Reproducibles 1–4
- Resource materials about: space travel, space resources, water and other resources from the asteroid belt are required for travelers through research, assessment, team cooperation, and considering many ideas and cooperation of many different teams.

Objectives

- Develop the background to make the connection between what facts about asteroids might be needed to prepare for the mission, criteria for crew selection, Earth hardware, and personnel, as well as more complicated issues needs. They could focus on the simplest aspects of vehicle design.

Teaching with the Poster

- Students will:
  - students.