

Mission Possible: Looking at Explorations and Sensational Creations in Outer Space!

Grade Level: Third Grade

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Length of Unit: Eight Lessons and a Culminating Activity

I. ABSTRACT

This is an eight lesson unit designed to immerse students into concepts regarding astronomy and space exploration contained in the third grade Core Knowledge Sequence. This unit will provide a basis for students to explore the basic phenomena of the universe. They will observe different components of outer space and the affects of gravitational pull between objects. A multi-sensory approach will be used to engage students in their learning of the galaxies, stars, constellations and phenomenas, planetary motion in our solar system, asteroids, meteors and comets and space explorations. Students will augment and solidify their knowledge through experiments, reading, writing, math, science, social studies and technology. To show deep understanding of their new learning, students will create and share projects that are “out of this world!”

II. OVERVIEW

A. Concept Objectives

1. Understand that there are many kinds of interactions in systems.
2. Understand that evolution is the study of patterns and processes that all contribute to the evolution of the universe.

B. Content covered from Core Knowledge Sequence

1. The “Big Bang”
2. The universe: an extent almost beyond imagining
3. Galaxies: Milky Way and Andromeda
4. Our solar system
 - a. Sun: source of energy (heat and light)
 - b. The nine planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto
5. Planetary motion: orbit and rotation
 - a. How day and night on earth are caused by the earth’s rotation
 - b. Sunrise in the east and sunset in the west
 - c. How the seasons are caused by the earth’s orbit around the sun, tilt of the earth’s axis
6. Gravity, gravitational pull
 - a. Gravitational pull of the moon (and to a lesser degree, the sun) causes ocean tides on earth
 - b. Gravitational pull of “black holes” prevents light from escaping
7. Asteroids, meteors (“shooting stars”), comets, Halley’s comet
8. How an eclipse happens
9. Stars and constellations
10. Orienteering (finding your way) by using North Star, Big Dipper
11. Exploration of space
 - a. Observation through telescopes
 - b. Rockets and satellites from unmanned to manned flights
 - c. Apollo 11, first landing on the moon: “ One small step for man, one giant leap for mankind.” Space shuttle

- C. Skill Objectives
 1. Hypothesizing
 2. Predicting
 3. Observing
 4. Classifying
 5. Comparing and Contrasting
 6. Interpreting Data
 7. Drawing Conclusions

III. BACKGROUND KNOWLEDGE

- A. For the teacher
 1. Hirsch, E.D. Jr. *What Your Third Grader Needs to Know*
 2. Darling, David *Comets, Meteoroids and Asteroids: Rocks in Space*
 3. Hirst, Robin *My Place in Space*
- B. For the student
 1. Sims, Lesley *The Sun and Stars*
 2. Cole, Joanna *The Magic School Bus Lost in the Solar System*
 3. Cole, Joanna *The Magic School Bus Out of this World*

IV. RESOURCES

- A. Beasant, Pam *1000 Facts About Space*
- B. Krupp, EC *The Big Dipper and You*
- C. Milliken, Linda *Hands on Science: Solar System Activity Book*
- D. Thompson, CE *Glow in the Dark Constellations*
- E. Levy, David *The Nature Company Stars and Planets*

V. LESSONS

Lesson One: What did the Big Bang Create?

- A. *Daily Objectives*
 1. Concept Objectives
 - a. Understand that there are many kinds of interactions in systems.
 - b. Understand that evolution is the study of patterns and processes that all contribute to the evolution of the universe
 2. Lesson Content
 - a. "The Big Bang"
 - b. The universe: an extent almost beyond imagining
 - c. Galaxies: Milky Way and Andromeda
 3. Skill Objectives
 - a. The students will know that the natural world includes Earth material and objects in the sky.
 - b. The students use logical reasoning to make sense of his/her world.
- B. *Materials*
 1. *The Sun and the Stars* by Lesley Sims, pg. 22
 2. Popcorn
 3. Hot Air Popper
 4. *1000 Facts About Space* by Pam Beasant, pg. 10-11
 5. *Stars* by Seymour Simon
 6. *Stars and Planets* by Usborne, pg. 4-5
 7. *My Place in Space* by Robin Hirst
 8. Appendix A: My Place in Space
 9. *Hands on Science Solar System* by Linda Milliken, pg.5

C. *Key Vocabulary:*

1. galaxy- n. a large cluster of billions of stars and clouds of gas and dust, held together by gravity.
2. Big Bang Theory- n. the theory that the universe was formed as the result of a massive expansion of matter and energy
3. Milky Way- n. a spiral galaxy that contains earth, the solar system and the sun
4. Andromeda galaxy- n. a neighboring galaxy to the Milky Way

D. *Procedures*

1. Teacher asks the students about what they see when they look at the sky at night. The students brainstorm how many stars are in the sky, if they can be traveled to, counted, where the stars come from, and how close they really are to us.
2. Teacher introduces the Big Bang theory by reading p. 22 of the *Sun and Stars* book. Teacher and students review responses given before the theory was read.
3. Students modify responses based on information read about the Big Bang theory.
4. Teacher sets up popcorn popper to demonstrate how the Big Bang happened billions of years go.(Use pg. 5 of Solar System activity book)
5. As the popcorn popper pushes popcorn all over the floor, the students must observe everything they see, hear or smell.
6. Teacher asks the class how the Big Bang Theory experiment is like what they just read.
7. The teacher picks up a piece of popped popcorn and tells the students that one piece of popped popcorn represents one galaxy (i.e. The Milky Way.(which is the galaxy that we live in) and that all the remaining popped popcorn represent other galaxies in the universe.
8. Teacher asks students how many galaxies they think might be in the universe (many billions)
9. Teacher picks up a larger piece of popped popcorn and tells the students that this piece represents the Andromeda galaxy. This galaxy is the closest galaxy to the Milky Way. It can be seen with a naked eye.
10. Discuss the sequence of the Big Bang with the students. Pass out sentence strips to 4 cooperative groups. Each sentence strip will contain one aspect of the Big Bang theory. Each group is to illustrate their sentence and share it with the class (Group 1: Big Clump Group 2: Explosion Group 3: Milky Way is one galaxy formed. Group 4: Different types of Galaxies are formed (i.e.Spiral, flattened, circle shape and irregular shaped).
11. Students share sequence of the Big Bang theory with the class. Teacher closes lesson by asking students what is their place in space and reading the book, *My Place in Space*.
12. Students will use Appendix A to write a letter to someone in another galaxy telling them how to get to their home. The student must write about which galaxy, solar system, planet, continent, country, street and house in which they live.

E. *Assessment/Evaluation*

1. Teacher will evaluate students' ability to explain and illustrate the Big Bang theory in cooperative groups.
2. Teacher will evaluate students' written directions in Appendix A to determine whether students know their place in space.

Lesson Two: Is the Sun at the Center of the Solar System?

A. Daily Objectives

1. Concept Objectives
 - a. Understand that there are many kinds of interactions in systems.
 - b. Understand that evolution is the study of patterns and processes that all contribute to the evolution of the universe.
2. Lesson Content
 - a. Our solar system
 - i. Sun: source of energy (heat and light)
 - ii. The nine planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto
3. Skill Objectives
 - a. The students will know that the natural world includes Earth material and objects in the sky.
 - b. The students use logical reasoning to make sense of his/her world.
 - c. Students speak appropriately to different audiences for different purposes and occasions.
 - d. Students communicate clearly by putting thoughts and feelings into spoken words.
 - e. Students use writing as a tool for learning and research

B. Materials

1. *The Planets in Our Solar System* by Franklyn Branley.
2. *The Sun* by Seymour Simon
3. *Stars and Planets* by David Levy, pg. 14-31
4. The Solar System displayed on the wall in order from the sun (planets are not labeled)
5. Appendix B: Planet Fact cards
6. *Mars* by Seymour Simon
7. *Earth* by Seymour Simon
8. *Venus* by Seymour Simon
9. *Uranus* by Seymour Simon
10. *Mercury* by Seymour Simon
11. *Neptune* by Seymour Simon
12. *Pluto* by Gregory Vogt
13. *Saturn* by Seymour Simon
14. *Jupiter* by Seymour Simon
15. Index cards with planet names
16. Scissors

C. Key Vocabulary

1. solar system- n. a place where the sun and all the objects that orbit it such as planets and moons
2. planet- n. a body in space which moves around a star such as the sun

D. Procedures

1. Teacher reviews the previous lesson by asking students about the beginning of the universe and the forming of the galaxies. Ask students about their “home galaxy.”(The Milky Way)
2. Ask students what the center of the solar system is (the sun) and the role the sun plays in relation to each planet in the solar system. (Do all the planets receive the same amount of light and heat etc?)
3. Discuss characteristics of the sun. Have students share things they know about the sun. Teacher writes students responses.

4. Teacher reads *The Sun* by Seymour Simon. The teacher asks students to draw a sun and write as many facts as they can about the sun after listening to the book. Students share facts. The students should come up with at least 5 facts. (i.e. The sun is the center of the Solar System. It is an average sized star. It is about 4 1/2 billion years old. It has lived about half its life. It is made mainly of hydrogen and helium. Earth and 8 other planets revolve around it. It is the closest star to the Earth. It is 93 million miles away. The sun's energy is made mostly at its core where the temperature reaches nearly 30 million degrees Fahrenheit. Scientists believe that the sun has enough hydrogen in its core to burn for another 5 billion years. On the surface its temperature is 11,000 degrees Fahrenheit.) Teacher charts five facts about the sun and places them under the sun displayed on the wall.
 5. Introduce the solar system. Again, show students the display of the unlabeled solar system on the wall. Pass out 9 index cards. Each card will have a planet name. Students will place the name under the planet they think it belongs to.
 6. Review the names that were placed under each planet. Tell students that they will discover whether they were right or wrong by researching information on the 9 different planets.
 7. Teachers puts students into four groups of 5. Each group of students will be responsible for coming up with 5 facts about their planet. All facts must be written on the Fact Sheet (Appendix B). The students will only be researching the inner planets: Mercury, Earth, Mars and Venus. Students will cut apart their fact cards after they have written five facts for their planet.
 8. Groups share 5 facts about these planets. Each group will tape their fact cards under each planet displayed on the wall. Class will check to see if they labeled the planets correctly in the beginning of the lesson. When the first four planets have been shared, the teacher questions them about their distance from the sun. The teacher asks students what they notice about the distance between the four planets and the sun (they are close to it) Tell students these are known as the inner planets.
 9. Teacher puts 4 students into 5 groups to research the outer planets. Again, each group will be responsible for sharing 5 facts with the class about their planet.
 10. Students place their five facts under each planet displayed on the wall. Again, the teacher questions the students about the affects the sun has on these last 5 planets.
 11. The teacher asks the students what these last five planets might be called. (The outer planets)
 12. Students will make a class book about the solar system. Students will work in pairs to write and illustrate one planet in the solar system.
 13. Students will bring in articles or of recent exploration or space magazines and share with the class.
- E. *Evaluation/Assessment*
1. Students will be evaluated by sharing their findings of the sun and the planets in the solar system with the class.
 2. Partners will be evaluated on their description and illustration of one planet in the solar system.

Lesson Three: How Do Planets Move in the Solar System?

A. *Daily Objectives*

1. Concept Objectives
 - a. Understand that there are many kinds of interactions in systems.
 - b. Understand that evolution is the study of patterns and processes that all contribute to the evolution of the universe.

2. Lesson Content
 - a. Planetary motion: orbit and rotation
 - b. How day and night on earth are caused by the earth's rotation
 - c. Sunrise in the east and sunset in the west
 - d. How the seasons are caused by the earth's orbit around the sun, tilt of the earth's axis
3. Skill Objectives
 - a. The students will know that the natural world includes Earth materials and objects in the sky.
 - b. The students use logical reasoning to make sense of his/her world
 - c. Students solve problems by collecting, organizing and displaying sets of data.

B. Materials

1. *The Planets in Our Solar System* by Franklyn Branley
2. *The Sun* by Seymour Simon
3. Appendix C: pg. 22 from *Hands on Science: Solar System* by Linda Milliken
4. Globe
5. Yellow Hula-Hoop
6. Science journals

C. Key Vocabulary

1. orbit – n. the path of any object whose motion is controlled by the gravitational pull of another object. Planets, asteroids, meteoroids, and comets orbit the sun.
2. rotation – n. a planet spinning on its axis rotates. A single rotation equals one day.
3. Earth's axis- n. imaginary line that goes around the North and South Pole of Earth

D. Procedures/ Activities

1. Teacher reviews previous lesson by reading class book on solar system.
2. Teacher asks students about their motion throughout the day.
3. Ask students how things in the solar system are constantly in motion? (by orbiting)
4. Introduce activity on page 22 (Appendix C) from the Solar System activity book using 9 students. These nine students make a circle. The rest of the class will observe in an outer ring. After the game has been played once, the observers will switch with the participants. During the activity, teacher goes over the meaning of each key vocabulary term. (orbit, rotation, revolution)
5. Teacher asks how long it takes the earth to rotate once? (24 hours). How long does it take for the earth to make one revolution? (1 year or 365 days)
6. Students will compare orbit times using Earth as a benchmark by referring to the solar system display on the wall. (Students discuss which planets take the longest time/ shortest time to orbit the sun)
7. Teacher has students think of what else might rotate and revolve in the solar system (the moon around the earth.) Question class about what is seen when looking up in the sky (moon or sun).
8. Ask students why there is a sun in the daytime and a moon in the evening hours.
9. Have one student stand up and face the teacher. Turn out the lights. Teacher shines a flashlight on the child who faces the teacher. Ask students what they notice. The student standing, then turns away from the teacher.
10. Ask students what they notice. Class discusses how night is when the earth is facing away from the sun and day is when earth is facing toward the sun. Review the terms sunset and sunrise.
11. In a circle have students hold hands (place a yellow Hula-Hoop in the middle of the circle to represent the sun) Students walk around the "sun" counterclockwise. Once students end up where they began, teacher tells the students they have completed one revolution.

12. With the students still in a circle, teacher gives a globe of the earth to person one (who is in the season of winter). Students pass it counterclockwise. As the “earth” completes $\frac{1}{4}$ of its revolution discuss how it is spring. As it reaches $\frac{2}{4}$ of its revolution, discuss how it is now summer. As the “earth” reaches $\frac{3}{4}$ of its revolution, discuss how it is fall. As it reaches student one again, state that the season is now winter again.
13. Arrange students into 5 groups. Each group must come up with cheers or chants that demonstrate their knowledge gained throughout this lesson(i.e. Earth spins like a top...It rotates and never stops ---with finger whirling....AND Earth also orbits the sun in 365 days a revolution is done).
14. Students will illustrate and diagram their chants or cheers in their science journals.

E. Evaluation/Assessment

1. Students will illustrate and diagram the Earth’s orbit and revolution in the solar system.
2. Students will be able to describe the differences between revolution and rotation.

Lesson Four: What Holds the Universe Together?

A. Daily Objectives

1. Concept Objectives
 - a. Understand that there are many kinds of interactions in systems.
 - b. Understand that evolution is the study of patterns and processes that all contribute to the evolution of the universe.
2. Lesson Content
 - a. Gravity, gravitational pull. Gravitational pull of the moon (and to a lesser degree, the sun) causes ocean tides on earth Gravitational pull of “black holes” prevents even light from escaping
3. Skill Objectives
 - a. The students will know that the natural world includes Earth materials and objects in the sky.
 - b. The students use logical reasoning to make sense of his/her world.
 - c. The students select and use writing processes for assigned writing.

B. Materials

1. *Facts About Space* by Pam Beasant
2. *The Stars* by Seymour Simon
3. *Journey Into a Blackhole* by Franklin Branley
4. “Inside the Magic School Bus” Movie by Joanna Cole
5. *Stars and Planets* by Christopher Maynard, pg. 29

C. Key Vocabulary

1. gravity- n. force by which all objects pulls all other objects
2. Black holes- n. The last stage in the life of a galaxy or a massive star. When they collapse they keep on collapsing until even light cannot escape from them.

D. Procedures/Activities

1. Review cheers, solar system wall display and parts of the universe by playing “Guess Who.” Teacher initiates game by saying I do this in 24 hours by rotating. Who am I? (Earth)
2. After reviewing previous lessons, ask students what is gravity and how does it affect the solar system. Write students responses on the board.
3. Before showing the movie “ Magic School Bus inside the Solar System,” tell students to observe how gravity is used in the video and how it affects the solar system.
4. Show “Magic School Bus..” video.

5. After the movie, students are given three minutes to write down as many facts about gravity or affects gravity had on the objects in the solar system. Students share responses with students around them.
6. Teacher and students discuss whether their first predictions about gravity were correct. Make changes to the list on the board if needed.
7. Teacher has students discuss with a partner what our solar system would be like without gravity? (Everything would fly everywhere.)
8. Discuss with class how nine planets orbit the sun, and how the moon only orbits the planet Earth.
9. Ask students what makes the tides on the seashores. Discuss that while the moon is orbiting the planet Earth, the gravitational pull between the Earth, sun and moon causes tides to change. Just like a day ends in a twenty-four hour period so do the tides change from high to low in a twenty-four hour period.
10. Show students a picture of a black hole using p. 29 of the *Stars and Planets* book.
11. Have students brainstorm what kind of gravitational pull a black hole might have. Chart student's responses.
12. Introduce the book *Journey Into a Blackhole*. Read the book to the students. Refer back to the ideas stated by the students before the book was read. Students modify responses.
13. Teacher informs the students that a "black hole" whirled into her home. The teacher shares her narrative story on the overhead with the students. She focuses on the detail of the story and how it has an introduction, events and a conclusion.
14. Teacher asks the students to think imagine what would happen to the "loose" objects in the room if a black hole entered the classroom.
15. Students will write a narrative story, in their science journal, about the events that would take place and the things the black hole would devour.

E. Evaluation/ Assessment

1. Students will describe what happens when there is gravitational pull from one object to another.
2. Students will write a narrative story using correct punctuation and grammar.

Lesson Five: What is an Eclipse?

A. Daily Objectives

1. Concept Objectives
 - a. Understand that there are many kinds of interactions in systems.
 - b. Understand that evolution is the study of patterns and processes that all contribute to the evolution of the universe.
2. Lesson Content
 - a. How an eclipse happens
3. Skill Objectives
 - a. The students will know that the natural world includes Earth materials and objects in the sky.
 - b. The students use logical reasoning to make sense of his/her world

B. Materials

1. Appendix D: *Hands on Science: Solar System* by Linda Milliken page 32
2. *Eclipse Darkness in Daytime* by Franklin Branley
3. A large Spotlight
4. 2 butcher paper circles – 1 six-inch circle and 1 thirty-six inch circle
5. yarn
6. scissors
7. large paper clip

8. large black construction paper
 9. Yellow, blue and white construction paper
 10. Glue
- C. *Key Vocabulary*
1. eclipse – n. when an object moves in front of another object to block it's light
 2. shadow – n. a definite area of shade cast upon a surface by an object blocking light rays
- D. *Procedures/Activities*
1. Review gravitation by throwing a Nerf ball in the classroom.
 2. Ask students why it traveled toward the person the teacher tossed it to.
 3. (Students should say it's because of the gravitational pull) Review how gravity keeps the solar system in order. Tell students they are going to find out in about objects that fly through space.
 4. Introduce eclipses by asking students to remember a time when they were on the beach sitting under a large umbrella. Ask them why they were using the umbrella (to avoid the rays of the sun). Ask students what blocking the sun with the umbrella creates. (a shadow)
 5. Teacher discusses how the umbrella blocking the sun's light is an example of an eclipse
 6. Introduce and read *Eclipse: Darkness in Daytime* by Franklyn Branley.
 7. Use page 32 from Solar Activity book (Appendix D) how an eclipse occurs. Have class discuss observations of the eclipse presented.
 8. Teacher tells students they will make a visual of each eclipse.
 9. Pass out one large black sheet of construction paper and one 8 ½ x 11" sheet of yellow, blue, and white to each student.
 10. Students are to cut out one sun from the yellow (remind students that the sun should be the largest circles made), one Earth from the blue (this should be medium sized), and one white moon (this should be the smallest circle). Students will use black paper length-wise.
 11. They are to make an eclipse using one sun, one moon, and one earth.
 12. After students have glued pieces, they will write which is the one shadowing and which is the one being shadowed.
- E. *Evaluation /Assessment*
1. Students will make an eclipse.
 2. Students will identify parts of an eclipse.

Lesson Six: What are Constellations?

- A. *Daily Objectives*
1. Concept Objectives
 - a. Understand that there are many kinds of interactions in systems.
 - b. Understand that evolution is the study of patterns and processes that all contribute to the evolution of the universe.
 2. Lesson Content
 - a. Stars and constellations
Orienteering (finding your way) by using the North Star, Big Dipper
 3. Skill Objectives
 - a. The students will know that the natural world includes Earth materials and objects in the sky.
 - b. The students use logical reasoning to make sense of his/her world.
 - c. Students select and use writing processes for assigned writing.

B. Materials

1. Science Journal
2. *The Big Dipper and You* by EC Krupp
3. Four black umbrellas
4. Four packages of glow in the dark stars
5. Four packages of colored foil star stickers
6. Black construction paper
7. *The Sun and Stars* by Lesley Sims pages 14-15
8. *Glow in the Dark Constellations* by CE Thompson
9. Sentence strips that sequence the life of a star.
10. *The Stars* by Seymour Simon

C. Key Vocabulary

1. orienteering- n. finding your way
2. North Star- n. only star that doesn't seem to move. It is above the Earth's axis. It shows the north direction in the sky. This helped travelers to navigate.
3. Big Dipper- n. biggest and visible star group that circles around the North Star

D. Procedures/Activities

1. Teacher asks students about the star we have studied in class (the sun).
2. Ask students how stars are formed and what they are made of.
3. Teacher passes out 6 sentence strips to each of the five groups of students. Students will sequence the life of a star (Each strip will have one of these sentences on it: Stars are born in giant clouds of gas. Gravity pulls gas and dust particles together. It squeezes them, and they heat up. The gas gets really hot. It sets off a nuclear reaction like a super bomb. A star is formed.).
4. Students from each group will share the sequence they arrived at in their group.
5. Teacher reads pages 14-17 from *The Sun and the Stars* or read *The Stars* book.
6. After the teacher has read, students are asked to evaluate their sentence strips to see if they still agree with how they have chosen to sequence the life of a star.
7. One group will share their group's sequence with the class. Class will decide whether the sequence is in order or not. If needed, adjustments can be made.
8. Teacher shares how all stars come in different shapes and sizes.
9. Teacher asks students about what a group of stars is called. (constellation) Explain how each child represents a star and our classroom of stars represents a constellation.
10. Have students share constellations they know and teacher writes responses on board.
11. Teacher introduces constellation stations without telling the names of the constellations. (Station #1 is Big Dipper, Station #2 is Little Dipper, Station #3 is Orion, Station #4 is Leo) Instruct students to document observations made at each station. Students are also to spin the umbrella and observe and write what happens.
12. In groups of 4 or 5, students receive an open umbrella with a constellation pattern attached to the underside of it.
13. Students lie on their back, head to head in a circle, holding the open umbrella above them.
14. Students observe the constellation and share what they see. (They might say what it is called and what shape it forms.)
15. Students will also spin the umbrella and observe what happens to the constellation.
16. Students put down the umbrella and use science journal to document observations.
17. Students will rotate through each station documenting observations.
18. Teacher reviews the name of the constellation and the shape it represents.

19. Begin by using page 10 from *Glow in the Dark Constellations* to discuss the Big Dipper, page 12 to discuss the Little Dipper, page 14 to discuss Orion, and page 18 to discuss Leo.
20. Read *The Big Dipper and You* to further show students the purpose of constellations. Focus on the key vocabulary terms.
21. After reading and discussing both books, students will be asked to create their own constellation as Romans did long ago.
22. Teacher models activity by showing her constellation and sharing her story on the overhead. Point out the characters, the problem and the solution used.
23. Pass out black paper and colored foil sticker stars to students. Have them brainstorm a story and constellation pattern. Sketch the constellation in their science journal.
24. Students transfer sketch onto black paper using colored star stickers to outline their constellation.
25. Students use a telescope to “stargaze” that evening. Students record observations and share them with class.

E. Evaluation /Assessment

1. Students will create a constellation and write a story using characters, conflict, and solution.
2. Students will be able to sequence the life of a star.
3. Students will be able to participate cooperatively in a group setting while completing several tasks.

Lesson Seven: What Rocks in Space?

A. Daily Objectives

1. Concept Objectives
 - a. Understand that there are many kinds of interactions in systems.
 - b. Understand that evolution is the study of patterns and processes that all contribute to the evolution of the universe.
2. Lesson Content
 - a. Asteroids, meteors (“shooting stars”), comets, Halley’s comet
3. Skill Objectives
 - a. The students will know that the natural world includes Earth material and objects in the sky.
 - b. The students use logical reasoning to make sense of his/her world.
 - c. Students communicate clearly by putting thoughts and feelings into spoken words.
 - d. The students express ideas through original artworks, using a variety of media with appropriate skill. The students will know that the natural world includes Earth materials and objects in the sky.

B. Materials

1. *Magic School Bus Out of This World* by Joanna Cole
2. *Stars and Planets_* by David Levy, pg. 34-39
3. *Comets, Meteors and Asteroids* by David Darling
4. *Space, Stars, Planets and Spacecraft* by Sue Becklake, pgs.38-39
5. *The Planets in Our Solar System* by Franklyn Branley, pgs11-13
6. Tempera paint: Black, silver, and white
7. Paint brushes
8. Brown clay
9. Rocks
10. Pipe Cleaners

11. Tissue Paper
12. Yarn
13. Cocoa Krispies

C. *Key Vocabulary*

1. asteroids- n. largest kinds of space rocks that usually travel within the asteroid belt. These rocks formed during the time that the solar system formed.
2. meteors- n. small pieces of rock or dust that burn up as they pass through the earth's atmosphere. They are also known as shooting stars.
3. comets- n. objects are made of frozen gases, dust and pieces of rock that move around the sun in very long, narrow orbits. They grow a tail when they come in close contact with the sun.
4. Halley's Comet- n. comet named after a scientist named Edmond Halley. He saw a comet in 1682 and predicted that its orbit could bring it past Earth every 76 years. He was right. The last time it was seen was in 1986.

D. *Procedures/ Activities*

1. Review constellations from previous lesson and ask students to share their constellation creations.
2. Teacher uses the solar system display on the wall to point out the gap that exists between the inner and outer planets. Ask students what separates Mars from Jupiter.
3. Teacher shares with class that an asteroid belt separates the inner and outer planets in the solar system. Using pg. 38 in the *Space, Stars, Planets and Space Crafts* book, show students the asteroid belt.
4. Have students brainstorm what might be within this asteroid belt.
5. Introduce the asteroid term using pages 36 and 37 from *Stars and Planets*.
6. The teacher tells students that there are other rocks in space. Introduce the book *The Magic School Bus Out of this World*. Tell the students that they will be listening for information on asteroids as well as the other rocks that exist in the solar system.
7. Teacher reads *The Magic School Bus Out of this World* and discusses the different space rocks mentioned in the book. (Make sure the students discuss meteors, comets, and asteroids)
8. After reviewing the different types of space rocks, introduce the items displayed on five tables around the room.(clay, gray, black and white paint, paint brushes rocks, pipe cleaners, tissue paper)
9. Teacher will instruct the students to make a space rock that was learned about in this lesson. Students will choose to make a comet, meteor or asteroid. Remind the students that their rock must resemble the characteristics of the rocks read earlier.
10. Four students will work at each table to construct and create their space rock.
11. In a circle, each student will bring their space rock to share with the rest of the class. The class will classify each rock as a meteor, asteroid or comet. After all rocks have been classified and shared, the teacher will ask students what they notice about all the rocks in each group. The characteristics stated will be written on 3 colored butcher papers. Each colored paper will represent an asteroid (black), a meteor (silver) and a comet (white).
12. Students will write a story about how they created their space rock.

E. *Evaluation /Assessment*

1. Students will be able to classify objects in space as asteroids, meteors or comets.
2. Students will be able demonstrate their understanding of a space rock by creating one with different art media.

Lesson Eight: What is Explored in Space?

A. Daily Objectives

1. Concept Objectives
 - a. Understand that there are many kinds of interactions in systems.
 - b. Understand that evolution is the study of patterns and processes that all contribute to the evolution of the universe.
2. Lesson Content
 - a. Exploration of space
 - b. Observation through telescopes
 - c. Rockets and satellites from unmanned to manned flights
 - d. Apollo 11, first landing on the moon : « One small step for man, one giant leap for mankind
 - e. Space shuttle
3. Skill Objectives
 - a. The students will know that the natural world includes Earth material and objects in the sky.
 - b. The students use logical reasoning to make sense of his/her world.
 - c. Students will apply critical thinking skills to organize and use information acquired from a variety of sources including electronic devices.

B. Materials

1. Appendix E: Exploration Scavenger Hunt
2. Computer
3. Web site: www.kidsastronomy.about.com/kids/kidsastronomy/mbody.htm

C. Key Vocabulary

1. telescope- n. an instrument that makes distant objects appear clearer
2. rocket- n. an object that rises a space craft in the air
3. satellite- n. an object that revolves around a planet or placed into orbit
4. Apollo 11- n. the first mission that landed men on the moon
5. space shuttle - n. vehicle that takes off like a rocket, orbits like a satellite and lands like a glider
6. Nicolaus Copernicus- n. published a book stating that the sun was the center of the universe
7. Mae Jemison- n. first African-American woman in space

D. Procedures/ Activities

1. Review rocks in the universe. Ask students how scientists might study them in outer space.
2. Inform students that today they will be scientists and discover information about space equipment, explorers and the Apollo 11 mission.
3. Teacher passes out Appendix E: Exploration Scavenger Hunt and reads over the entire assignment before taking the students to the computer lab.
In the computer lab, the students need to log on to Netscape Navigator and type in.
4. Students will use this web site to conduct all research.
5. When students have completed the entire assignment, they will share their findings with the entire class.
6. Students will log off on computers and return to their classroom to create a book about the knowledge they have gained from the astronomy unit (Students must write and illustrate 10 facts)
7. Students will share their books with their kindergarten book buddies.

E. Assessment/ Evaluation

1. Students will use technology to research information.
2. Students will write using proper grammar, spelling and punctuation.

VI. CULMINATING ACTIVITY

- A. The culminating activity of this unit is the students' own sensational creation. They will bring in astronomy projects to share with other students. The students will set up an astronomy gallery for other students in the school to visit.
- B. The students will be assessed by how well their project demonstrates the knowledge gained throughout the unit.
 - 1. Written report- 25 points
 - 2. Project presentation- 25 points
 - 3. Project creation- 25 points
 - 4. Detailed and Organized- 25 points
- C. Extensions
 - 1. A guest speaker will be invited from the air force base to share how the government explores space.
 - 2. Students will go on a scavenger hunt while on a field trip at the Scobee Planetarium.

VII. HANDOUTS/WORKSHEETS

- Appendix A--My Place in Space Letter (Lesson 1)
- Appendix B--Planet Fact Cards (Lesson 2)
- Appendix C--Orbit Game (Lesson 3)
- Appendix D--Eclipse Activity (Lesson 5)
- Appendix E--Internet Scavenger Hunt (Lesson 8)

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Mission Possible: APPENDIX A: Lesson 1

Write a letter to someone in another galaxy explaining how to get to your home from their galaxy. Be sure to include which galaxy, solar system, planet, continent, country, street, and house in which you live.

Dear _____

Your friend,

PLANET FACT CARDS

Mission Possible: APPENDIX B: Lesson 2

PLANET NAME:

PLANET NAME:

PLANET FACT:

PLANET FACT:

PLANET EXPLORER:

PLANET EXPLORER:

PLANET NAME:

PLANET NAME:

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PLANET EXPLORER:

Adapted from: p. 19 Hands on Science: Solar Activity Book by Linda Milliken Edupress EP124

ORBIT

Mission Possible APPENDIX C: Lesson 5



An orbit is the path of any object whose motion is determined by the gravitational pull of another object. Planets, asteroids, meteoroids, and comets orbit the sun.

Rotation and revolution involve the movement of the planetary orbits. A planet spinning on its axis is rotating. A single rotation equals 24 hours. One trip around the sun is called a revolution because it takes one year to complete.

Classroom Activity

Objective:

Students will be able to understand the difference of rotation, revolution and orbit.

Materials:

- Large area space in the classroom
- Several balls of similar sizes

Directions:

1. Discuss rotation and revolution. Spin a ball in place. This is a rotation. Hold a ball and walk in a circle. This is revolution. Spin a ball in the palm of your hand while walking in a circle. This is an orbit.
2. Sit down about 3 feet apart to form an oval around a center object, the sun. Spin a ball while rolling it around the circle from student to student.
3. Form a larger circle around the first one. At a signal, spin and move the ball around each circle. Add more circles and repeat activity. Ask students what they notice about the different speeds.

Adapted from: p. 22 Hands on Science: Solar System Activity Book by Linda Milliken
Edupress EP124



Eclipses.....

Mission Possible: Appendix D: Lesson 5

An eclipse occurs when then the shadow of one object in space falls on another object or when an object moves in front of another to block its light.

Classroom Activity:

Objective:

Students will understand how an eclipse happens.

Materials:

- Large spotlight
- Two butcher paper circles with these diameters. Moon- 6 inches Earth – 36 inches
- Yarn
- Scissors
- Large paper clip

Directions:

1. Cut circles the sizes shown above.
2. Tie a paper clip to the end of a 4 foot length of yarn. Hang the yarn from the ceiling.
3. Set the spotlight in the center of the room. Position it so it is directly opposite the paper clip.
4. Clip the Earth to the yarn. Tape the moon to the wall directly behind the Earth. Students are to observe what they see. Reverse the positions. Ask students what role does size play in the shadowing effect of an eclipse?



Adapted from: p.32 Hands on Science: Solar System Activity Book, by Linda Milliken Edupress EP124



Mission Possible- APPENDIX E: Lesson 8

You will use the website: www.kidsastronomy.about.com/kids/kidsastronomy/mbody.htm to discover information about space equipment, space explorers, and the Apollo Mission 11.

1. Log onto Netscape Navigator and type in the website address above (This is the homepage).
2. Look to the left side of the screen and click on "Planes and Rockets."
3. Scroll down and click on "Rockets, Shuttles, and Satellites."
4. Read the page and answer the following questions.
 - What is the purpose of space shuttles and satellites?

- What do satellites look like?

5. Click on "Next Page" at the bottom of the screen and read the page.

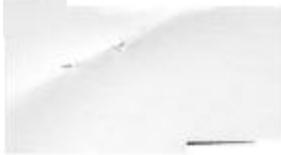
- How do satellites get into space?

What is the purpose of the experiment they suggest for you to try?

6. Scroll to the bottom of the page and click on "Space Shuttle Clickable Map."
7. Click on the part of the space shuttle outlined in red called "Crew Cabin."
8. Read the page entitled "Crew Cabin" and list three daily activities that crewmembers must perform.

9. Click "Back" four times to the Home Page. Click on "Astronomy" on the left side. Scroll down and click on "StarChild". Once there, click on "Level 1: Space Stuff."

10. Click on "Who's Who in Space." Find and click on Nicolaus Copernicus. Read the page. Write three important facts about this person.



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11. Click on "Back". Find and click on "Mae Jemison." Read the information and write three important facts about her.

12. Click on "Back" 3 times. You are now at the StarChild home page.
13. Click on "Level 1: Glossary." Once there, click on the "T" at the top of the page. Define telescope and write three things that we use today that function like it.

14. Click "Back" 3 times and on the left side, click on "The Moon." Once there, click on "Apollo Missions." Click on the blue diamond next to the number 11.
15. Click on "Mission Overview", read the information, and answer the question below.
 - What was the purpose of Apollo 11?

16. Click on the second picture, read information and answer the following question.
 - What type of a mission was Apollo 11 (manned or unmanned)? What does this mean?

17. Click "Back" and then click on the fourth picture. Read the information and answer the following questions.
 - Who was the first man to walk on the moon?
 - Who was the second man to walk on the moon?

18. Click on "Back" and then click on the fifth picture. Read the information and write 2 things you learned below.

19. Click on "File"; scroll to "Exit" and click.