

NHU/NASA Summer Institute

Lesson Plan

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Date: 11/12/04

Lesson Plan Title	Solar System Mobiles
Grade Level	3 rd grade
Concept/Topic to Teach	The 9 planets in our solar system, and their relative locations and sizes compared to the sun.
Content Standards	<p>Earth sciences 4D: <i>Students know</i> that Earth is one of several planets that orbit the Sun.</p> <p>Science Investigation & Experimentation 5C: Use numerical data in describing and comparing objects, events, and measurements.</p> <p>Math Number Sense 3.1: Compare fractions represented by drawings or concrete materials.</p> <p>Measurement & Geometry 1.1: Choose the appropriate tools and units (metric and U.S.) and estimate and measure the length.</p> <p>Math Reasoning 2.1: Use estimation to verify the reasonableness of calculated results.</p> <p>Language Arts Listening & Speaking 1.5: Organize ideas around major points of information and 1.7: Use clear and specific vocabulary to communicate ideas.</p> <p>Speaking Applications 2.3: Make descriptive presentations that use concrete sensory details to set forth and support unified impressions of places and things.</p> <p>Art Creative Expression 2.2: Mix and apply tempera paints to create tints, shades, and neutral colors.</p>
General Goals	The students will work in small cooperative groups to

	assemble a solar system mobile that will accurately reflect the nine planets in our solar system and their correct locations in relation to the sun.
Specific Objectives	<ol style="list-style-type: none"> 1. Students will be able to recognize earth's place in our solar system. 2. Students will be able to identify and demonstrate the location of the planets in our solar system and list a few of their general characteristics. 3. Students will be able to identify how the sun's size compares to the other planets in our solar system. 4. Students will be able to compare the distances of each planet from the sun. 5. The students will understand and be able to describe how the planets in the solar system rotate around the sun and why each planet requires a different amount of time to do so.
Required Materials	5 sets of Styrofoam balls of various sizes, 5 sets of coat hangers, 2 rolls of fishing line, 2 sets of 10 bottles of tempera paint, paintbrushes, toothpicks, labels, planet research materials from NASA, books, Internet ready computers (optional), index cards, paper clips, pens, pencils, paper, and rulers.
Anticipatory Set	How long do you think it would take you to travel from our planet earth to another planet in our solar system? Which planet would you like to visit the most? Why?
Step-by-Step Procedures	<ol style="list-style-type: none"> 1. The teacher will read aloud to the students "The Magic School Bus: Lost in the Solar System". 2. The students will be divided into cooperative groups of 4 to construct a mobile model of our solar system and its nine planets that revolve around the sun. 3. Each group will be guided through developing a plan asking them how they will go about dividing up the tasks for this project. 4. Each group will submit a plan and a rough draft drawing (using research books and materials) of what the names of the nine planets are and where each is located in relation to the sun.

	<ol style="list-style-type: none"> 5. The groups will then be given their materials for building their solar system mobiles. 6. They will use different sized Styrofoam balls to show the relative size of each planet. 7. The teacher will assist each group in using the coat hangers (i.e. cutting, and bending) 8. Each group will demonstrate to the teacher which Styrofoam ball will be used for which planet and why. They will base this on sizes of each planet that are provided to them with their research materials. 9. They will paint and label each planet and the sun using tempera paints, toothpicks and address labels. 10. The teacher will then assist each group with cutting various lengths of fishing line for hanging each planet and in tying them to the mobile. 11. The students will place the planets in their relative distances from the sun using $1\text{cm} = 1$ Astronomical Unit (AU) as a conversion factor. 12. Each group will then research and list a few interesting facts about each planet on index cards. 13. Each group will then give an oral presentation on their mobile and the solar system. That is, they will inform the rest of the class on interesting facts they found and how the planets orbit the sun, which ones orbit faster and slower and why. 14. Finally, each student will be required to write in a daily journal of his or her activities and what they learn as they work on the project. 15. The teacher will then hang and display the student work in the classroom.
Plan for Guided Practice	The students will work in groups to plan, research, build, and discuss their mobiles while the instructor moves about the room observing each group and offering clarification and guidance as necessary.
Plan for Independent Practice	The students will work in groups to complete their mobiles. They will work cooperatively to plan and divide up the tasks of the project.

<p>Assessment (based on objectives)</p>	<p>Assessment of this project will be based on the accuracy of their mobiles as to if the planets are placed in the correct order in relation to the sun, and that their relative sizes and distances are accurately placed in relation to the sun. Moreover, they will be assessed on their written journal responses, and their oral presentations. Finally, the facts on each planet that they present and how they describe the movement of the planets will be assessed for accuracy as well as their oral responses to questions as they work on the project.</p>
<p>Adaptations (ELL students or special populations)</p>	<p>ELLs are working in cooperative groups. Therefore, this lesson is self-scaffolded. As a result, they are provided with language support within their group.</p>
<p>Extensions (for gifted students)</p>	<p>GATE students are assigned to heterogeneous cooperative groups. They can perform the research part of the project to find interesting facts of each planet.</p>