Environmental Science Institute
THE UNIVERSITY OF TEXAS AT AUSTIN

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Stellar Safari: Jupiter

Lesson Plan for Grades: 6th – 8th
Length of Lesson: 2 hr 30 min

Authored by: UT Environmental Science Institute
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Subject area/course: Science, Astronomy, Space

Materials:

- Pens, markers, posters, tape, construction paper and other assorted materials
- Computers with Internet Access
- Calculators

TEKS/SEs:

§112.18. Science

(3) Scientific investigation and reasoning. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and knows the contributions of relevant scientists. The student is expected to:
   (B) use models to represent aspects of the natural world such as a model of Earth's layers
   (C) identify advantages and limitations of models such as size, scale, properties, and materials

(11) Earth and space. The student understands the organization of our solar system and the relationships among the various bodies that comprise it. The student is expected to:
   (A) describe the physical properties, locations, and movements of the Sun, planets, Galilean moons, meteors, asteroids, and comets

§112.19. Science

(3) Scientific investigation and reasoning. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and knows the contributions of relevant scientists. The student is expected to:
   (B) use models to represent aspects of the natural world such as a model of Earth's layers
   (C) identify advantages and limitations of models such as size, scale, properties, and materials

(9) Earth and space. The student knows components of our solar system. The student is expected to:
   (A) analyze the characteristics of objects in our solar system that allow life to exist such as the proximity of the Sun, presence of water, and composition of the atmosphere

§112.20. Science

(3) Scientific investigation and reasoning. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and knows the contributions of relevant scientists. The student is expected to:
   (B) use models to represent aspects of the natural world such as a model of Earth's layers
   (C) identify advantages and limitations of models such as size, scale, properties, and materials

(8) Earth and space. The student knows characteristics of the universe. The student is expected to:

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(A) describe components of the universe, including stars, nebulae, and galaxies, and use models such as the Herztsprung-Russell diagram for classification

Lesson objective(s):

- Students will be able to research collaboratively on the internet at teacher-approved sites
- Students will understand that Jupiter is the largest planet in the solar system, and show its size compared to other members of the solar system

Differentiation strategies to meet diverse learner needs:

- ELL students and students with learning disabilities should have multiple forms of instruction including visual and written instruction sheets as well as verbal instruction and demonstration

ENGAGEMENT (20 minutes)

- Working in teams, students will do some research about Jupiter in particular. Groups will present a poster with the following information:
  - Three interesting facts about Jupiter.
  - Use one of the terms from the word bank list, provide a definition for the class and integrate it in their facts about Jupiter
    Moons Orbit Diameter Axis Rings Jovian
- A list of reference websites is provided in the student worksheet. Additional websites from reliable sources can be used with the teacher's approval
- Teacher introduces the project for this lesson: working in teams they will create models of the solar system so they can see to see the relative size of Jupiter

EXPLORATION (30 minutes)

- Teams will work in finding information about the solar system. Each team needs to create a model that represents planets relative size. Each team needs to find the size of all the stars/planets listed in the worksheet.
- Teams must then select a scale for creating their model. Encourage teams to be creative with their scales but stay within reasonable boundaries. Using calculators, each team should complete the attached worksheet with how they will scale their model. Teams will use this information in a 3-minute class presentation.
  - Teacher walks around the room asking questions about what the students are doing.
  - Teacher listens to student ideas as they talk to each other.
  - Teacher provides support to students as needed (without providing the answer).

EXPLANATION (30 minutes)

- Each team does a short 3-minute presentation about the scale they will use and give an example of how the scale will work for one of the planets.
  - Teachers encourage students to explain concepts in their own words.
  - Teachers provide important ideas that students provide.
  - Teachers introduce vocabulary, formal labels or definitions as needed.

ELABORATION (1 hours 10 minutes)

- Teams will now create their scaled models. Models can be drawings or anything more complex using the materials provided. Each team must use the scales they selected when creating their models.
- Models will be evaluated by other teams during a gallery walk using the rubric provided. Each team must

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evaluate at least three other models in the gallery walk. Models should include:
  - Sun and planets clearly labeled and in correct order
  - Scale used must be clearly explained
  - Actual size of the star/planet must be included
    - Teachers ask student to use the new vocabulary appropriately.
    - Teachers encourage students to incorporate real world connections.

EVALUATION (throughout)

- Students will be evaluated on their posters and models using the rubrics provided.
  - Teachers ask questions that provide insight into student progress.
  - Teachers observe students as they create posters and look for evidence of understanding.

SOURCES AND RESOURCES

- Dr. Donald Blankenship's *Hot Science – Cool Talks* #57, "Beginning the Search for Life on the Outer Planets" www.hotsciencecooltalks.org
- "On Jupiter", Lesson Plan, Discovery Education: www.discoveryeducation.com/teachers/free-lesson-plans/on-jupiter.cfm
- Jupiter Resources:
  - Space Facts, "Jupiter Facts", www.space-facts.com/jupiter
  - Jupiter Facts for Kids, www.sciencekids.co.nz/sciencefacts/planets/jupiter.html
  - Hot Science Cool Talks #57, www.hotsciencecooltalks.org
- Solar System Resources:
  - Nine Planets – Solar System Tour: www.nineplanets.org
  - NASA, "Planets, Moons and Dwarf Planets", www.nasa.gov/content/planets-moons-and-dwarf-planets

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STUDENT HANDOUT: JUPITER FACTS (30 minutes)

Working in teams of 3 - 4, research some interesting facts about Jupiter. Your team will present a poster with the following information:

- Three interesting facts about Jupiter.
- Use one of the words from the word bank list, integrate it in your description about Jupiter and provide a definition for the class.

Moons **Orbit** **Diameter** **Axis** **Rings** **Jovian**

Present your 3-minute presentation of your poster. Your poster will be evaluated using the following rubric:

1	2	3	4
Poster only includes one fact about Jupiter. No term from the word bank is included.	Poster only includes two facts about Jupiter. No term from the word bank is included.	Poster only includes three facts about Jupiter. Term from the word bank is included but it is not applied to facts about Jupiter.	Poster includes three facts about Jupiter. Term from word back is included and it is included in the Jupiter facts.

Select a Term from the Word Bank and Provide a Definition
List THREE Facts About Jupiter
1. 2. 3.

References:

- Space Facts, “Jupiter Facts”, www.space-facts.com/jupiter
- Jupiter Facts for Kids, www.sciencekids.co.nz/sciencefacts/planets/jupiter.html
- Hot Science Cool Talks #57, www.hotsciencecooltalks.org

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STUDENT HANDOUT: SOLAR SYSTEM DIMENSIONS (30 minutes)

Working in teams of 3 - 4 research the dimensions of the solar system and fill out the information under the "Actual Size (diameter column). Then, select a reasonable scale.

Our team will use the following scale:

______________ miles = ____________ in

Next complete "Scaled Size" column. Your team will use this information to create a scale model of the solar system.

Star/Planet	Actual Size (diameter)	Scaled Size
Sun		
Mercury		
Venus		
Earth		
Mars		
Jupiter		
Saturn		
Uranus		
Neptune		

References:

- Nine Planets – Solar System Tour: www.nineplanets.org
- NASA, "Planets, Moons and Dwarf Planets", www.nasa.gov/content/planets-moons-and-dwarf-planets

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STUDENT HANDOUT: Gallery Walk – Model Evaluations

Team: ____________________

1	2	3	4
Sun and/or planets are not clearly labeled or missing. No scale is included. Actual sizes of planets are missing.	Sun and/or planets are clearly labeled but not in order. No scale is included and/or actual sizes of planets are missing.	Sun and/or planets are clearly labeled and in order. Either the scale or the actual size of the planets is missing.	Sun and/or planets are clearly labeled and in order. Scale is clearly labeled. Actual sizes of the planets is included.

Comments:

Questions:

Team: ____________________

1	2	3	4
Sun and/or planets are not clearly labeled or missing. No scale is included. Actual sizes of planets are missing.	Sun and/or planets are clearly labeled but not in order. No scale is included and/or actual sizes of planets are missing.	Sun and/or planets are clearly labeled and in order. Either the scale or the actual size of the planets is missing.	Sun and/or planets are clearly labeled and in order. Scale is clearly labeled. Actual sizes of the planets is included.

Comments:

Questions:

Team: ____________________

1	2	3	4
Sun and/or planets are not clearly labeled or missing. No scale is included. Actual sizes of planets are missing.	Sun and/or planets are clearly labeled but not in order. No scale is included and/or actual sizes of planets are missing.	Sun and/or planets are clearly labeled and in order. Either the scale or the actual size of the planets is missing.	Sun and/or planets are clearly labeled and in order. Scale is clearly labeled. Actual sizes of the planets is included.

Comments:

Questions: