Glossopedia™

Learning Activity Guide

Solar System

www.globio.org/glossopedia/solarsystem

GLOBIO-created Learning Activity Guides are designed to simplify integration of Glossopedia based learning into classroom and extra-curricular activities and curriculum. Each activity is designed around the use of Glossopedia articles and subjects, incorporating technology into interdisciplinary instruction. Learning Activities are intended to be fun, inquiry-driven, and interesting; exciting for students and helpful to teachers.

Concepts

- The earth is part of a solar system with the sun, a star, at its center.
- There are many solar systems besides ours in the Milky Way galaxy.
- All solar systems contain planets and other space objects revolving around a star.

Activities

Extensions

Related Topics

- Stars
- Moon
- Sun
- Earth

Standards

LA A LS SI

SP G T

Standards Key available at www.globio.org/standards

Recommended Outside Links

- NASA Photo Journal: http://pds.jpl.nasa.gov/planets/
- Kid's Astronomy: http://www.kidsastronomy.com/
- Sky Scopes: http://www.skyscopes.com/nasa/astronomy.html

Vocabulary

- Galaxy
- Orbit
- Ellipse
- Gravity
- Mass
- Revolution
- Axis
- Atmosphere
- Astronomers
- Astronomy
- Telescope

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GLOBIO
Where Kids Discover the World™

Worksheet: Our Amazing Solar System

Time:
- 10-15 minutes

Materials:
- Glossopedia
- Worksheet: Our Amazing Solar System
- Pencils

Glossopedia:
- www.globio.org/glossopedia/solarsystem

Instructions:

- Give each student a copy of the worksheet, "Our Amazing Solar System." Ask them to complete the sheet as they read the Solar System article in Glossopedia. They must also read the interactive section, Fast Facts and photo captions.

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Our Amazing Solar System

Name:_____

1. Name 3 things that are in our solar system.

- _____
- _____
- _____

2. How old do scientists think the solar system is and how do they think it was "born?"

3. What is the shape of the orbit of most objects in the solar system? Draw that shape and compare it to something you might eat or play with?

4. What is the largest object in the solar system? How many Earths would fit inside of it?

5. Earth's rotation time is 24 hours and most people sleep 1/3 of it, or 8 hours every night. On what planet would you sleep the longest?

6. Which planets probably don't smell very good?

7. Give three reasons why poor Pluto got kicked out of the planet lineup.

- _____
- _____
- _____

8. If you were a space giant having a snowball fight, what would you throw? If you threw one into the sun, what would happen to it?

9. Who was the first astronomer to describe the position of the sun at the center of the solar system and why were people so angry?

10. Open a link to a planet in the Glossopedia interactive and read the information. Write three things that you learned about your planet.

- _____
- _____
- _____

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Classroom Observatory

Create a Solar System in the Classroom

Preparation:

- Cover a large bulletin board or wall space with dark paper, gift-wrap, or paper that students may paint a dark color for their space sky.
- View the interactive feature of the Glossopedia article, **Solar System** and write the names of space objects listed there on index cards. From the article **Stars** write the different types of stars on cards. Create more cards for the moon and the Milky Way Galaxy. You may also want to include star clusters, black holes, and dwarf planets.
- Ask students to open the Glossopedia article **Solar System**, and have them read the article, interactive, Fast Facts, and photo captions.

Discussion:

- Ask students to share some of the things they already know about space and write them on a large sheet of paper.
- Ask students what else they would like to know about space and write their answers.

Questions:

- Is there anything that is not part of the universe?
- Is there anything in the solar system that doesn't change?
- Do you think it is important to study space? Why/why not?
- What have you seen in the night sky that makes you curious?
- How can you find out about it?
- What do you think it was like to be an early astronomer?
- Would you like to be an astronomer someday?
- Where would you most like to visit in space?
- How does Earth's place in the solar system make life possible?
- Ask students to explain the difference between orbit and rotation and demonstrate the separate motions.

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Time:

- Two class periods

Materials:

- Glossopedia
- Large quantity of dark paper, gift-wrap, or roll paper
- Construction or other colored paper
- Colored markers, crayons, paint
- Glue, tape
- Glitter, metallic foil, star stickers, cotton, etc.
- Index cards
- Pencils or pens
- Scissors
- Drawing compasses
- Chart paper

Glossopedia:

- www.globio.org/glossopedia/solarsystem

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Directions:

- Explain to students that they will be creating a model of the solar system.
- Ask students how their model will be different from and similar to the real solar system.
- Explain that it will be important for them to try to accurately show the relative sizes of objects in the solar system. Since the sun contains 99% of all matter in the solar system, it will not be possible for the model to be exact.
    - *Note:* a separate activity to illustrate this would be for students to count 99 small objects, say marbles or paper clips, and compare the pile to only 1. That 1 item represents all the mass in the solar system that isn't the sun!
- Distribute the pre-labeled index cards to individuals or pairs of students. Instruct them to re-read the information about their particular space object in the interactive, article, and Fast Facts. Students assigned the moon will need to go to the Fast Facts section of the Glossopedia article, **Moon**. Students assigned star types will need to read the interactive feature of the article **Stars** and students assigned planets will use the **Solar System** interactive. Ask students to read and write important facts on their cards.
- Students must now measure the dimensions of their observatory wall. The most efficient layout of planets is along a diagonal transect, which will give more room for larger scale objects.
- Using the information in the relative planet size chart, have students calculate the best size to make their planets to fit the wall area.
- Show students how to use a compass to draw the correct diameter for their object. Students may use other criteria for determining sizes of objects not included in the chart. For irregularly shaped things like comets and asteroids, they should still practice using the compass for drawing, then manipulate the round form. The sun will not fit on the board, of course, so the student with the sun card will only make a small piece of it, possibly at the uppermost corner of the board. This student may practice using the compass on a small piece of paper, then think about other ways to draw a very large circle.
- Students may make their objects with the art supplies. Everyone can work on the background, using glitter, foil stickers, cotton (atmosphere, nebulae), etc.
- Instruct students to pin or tape the information cards next to their objects.
    - *Note*: Because accurate spacing of planets will not be possible within the area of the Observatory board, students may use relative placement based on the distance information for planets in the **Solar System** article. For this, they will need to calculate the distance between planets based on their distance from the sun. A separate activity (below) can help them understand relative distance.

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More Possibilities:

- The Classroom Observatory can be expanded and added to throughout a Space Study unit.
- Have students photograph the board as it grows and post pictures on the school web site.
- Students may also post photographs and facts about their space studies on a class blog.

Relative Planet Size Chart:

Object	Diameter			Radius		
Sun	900 cm	1,800 cm	2,700 cm	450 cm	900 cm	1,350 cm
Mercury	3	6	9	1.5	3	4.5
Venus	8	16	24	4	8	12
Earth	8	16	24	4	8	12
Moon	2.5	5	7.5	1.25	2.5	3.75
Mars	4	8	12	2	4	6
Jupiter	94	188	282	47	94	141
Saturn	78	156	234	39	78	117
Uranus	34	68	102	17	34	51
Neptune	32	64	96	16	32	48
Total distance without sun	**263.5 cm**	**527 cm**	**790.5 cm**	**Use radius for drawing with a compass.**		

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Far Out Planets

Preparation:

- Try this exercise for understanding relative distance in the solar system. The string can be pinned or taped at the bottom of the Classroom Observatory. You may also attach it diagonally from corner to corner to help guide object placement.

Directions:

- Together, using a different colored pen for each, have students write the names of the planets, the Asteroid Belt, and the Kuiper Belt (Pluto/dwarf planets) in the correct order on a large sheet of chart paper.
- Suggested colors:
    - Sun: Yellow
    - Mercury: orange
    - Venus: purple
    - Earth: blue
    - Mars: red
    - Asteroid belt: black
    - Jupiter: brown
    - Saturn: pink
    - Uranus: aqua
    - Neptune: green
    - Kuiper belt: gray (Pluto is considered the largest member of the Kuiper belt region)
- Divide students into small groups and give them the following instruction sheet.
- When they have completed the project, ask students to pin or tape their strings to the Classroom Observatory or a long sheet of paper and label the points.

More Possibilities:

- Students can continue to add information and artwork to their solar system throughout the study unit.
- Have students photograph the board as it grows and help them post pictures on the school web site.
- Space Blogging: Have students post photographs and facts about their space studies on a class blog.

Time:

- 10 minutes

Materials:

- Printed instructions
- Heavy string or pieces of paper tape: 4-6 pieces, each 2 meters long
- Tape or pins
- Colored pens in 9 colors
- Pencils
- Paper

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Far Out Planets

Instruction Sheet

- Mark one end of the string *yellow* for **Sun** and the other end *gray* for **Kuiper Belt**.
- Hold the yellow and gray ends together and mark with *aqua* at the fold point for **Uranus**.
- Hold the aqua and gray lines together and mark with *green* at the fold point for **Neptune**.
- Hold the aqua and yellow lines together and mark with *pink* at the fold point for **Saturn**.
- Hold the yellow and pink lines together and mark with *brown* at the fold point for **Jupiter**.
- Hold the yellow and brown lines together and mark with *black* at the fold point for **Asteroid Belt**.
- Hold the yellow and black lines together and mark with *red* at the fold point for **Mars**.
- Hold the yellow and red lines together and mark with *purple* at the fold point for **Venus**.
- Hold the yellow and purple lines together and mark with *orange* at the fold point for **Mercury**.
- Hold the orange and purple lines together and mark with *blue* at the fold point for **Earth**.
- Stretch out the string to see the relative distance of these space objects in the solar system!

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Extensions

Astronomic Mnemonic (ni - mon' - ik)

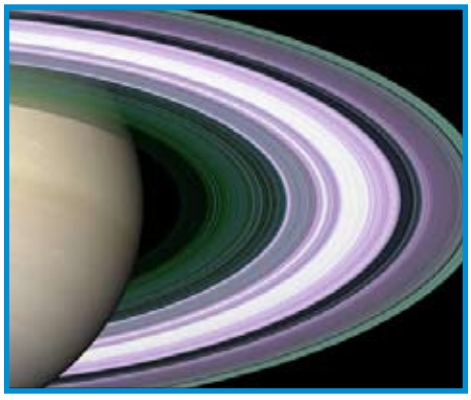
Background:

What is a mnemonic? It is a trick to help you remember something. A mnemonic can be a rhyme or song, for instance to help you remember the order of letters in the alphabet. Do you know any tricks that help you remember the order of the planets from the sun? Here are some sentences that people have made up to help them remember the first letter of each planet, which helps them remember its name. Some of these sentences include a letter "P" for Pluto. Since Pluto has been reclassified as a dwarf planet, there are also some that don't include Pluto.

Directions:

- Make up your own mnemonics to help you remember how the planets are arranged. You can decide as a class whether or not to include Pluto.
- Have a competition in your class and vote for the mnemonic that everyone likes the best. You can post it in your room, next to your Classroom Observatory, and share it on your class website or blog.

Mercury	My	My
Venus	Very	Very
Earth	Enormous	Excellent
Mars	Monster	Mother
Jupiter	Just	Just
Saturn	Sucked	Served
Uranus	Up	Us
Neptune	Nine	Noodles
Pluto	Planets	



If You Could Go There

Directions:

- Make an e-card using your computer.
- Choose a planet from the Glossopedia **Solar System** article interactive feature.
- Write something about the planet that you learned from the article and tell why you would like to go there if you could.
- Copy and paste a picture of your planet from Glossopedia onto your card.
- Invite a friend to visit that planet with you and email them the card.
- Print your card and send it to another friend through the mail.

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