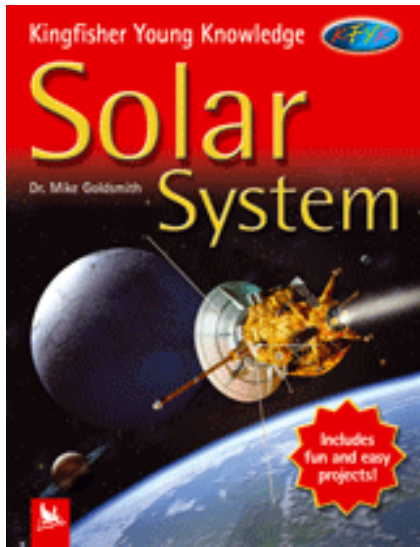


A Teacher's Guide



Solar System

by Dr. Mike Goldsmith

- Discussion
- Vocabulary
- Science
- Language Arts/Writing
- Language Arts/Science/Foreign Language

Discussion

Begin your study of *Solar System* by Dr. Mike Goldsmith with a discussion about what your students know about the solar system. Questions can include:

- How many planets are in our solar system?
- What is the only star in the solar system?
- What is the earth's closest neighbor in space?
- What are the two furthest planets from earth?

As the children give their answers, start creating a **KWL** chart to keep track of the many things they know and would like to know about the solar system. As the class reads the book, refer back to the **KWL** chart and add new things they learn.

Sample KWL Chart:

<i>Solar System</i>		
What we k now about the solar system	What we w ould like to learn about the solar system	What we l earned about the solar system
The solar system is made up of nine (ten?) planets.	Is there life on any other planet?	Scientists believe there may have been life on Mars because there used to be valleys filled with water.

Standards:

Language Arts:

- Generates questions about topics of interest
- Uses a variety of sources to gather information
- Makes contributions in class and group discussions
- Relates new information to prior knowledge and experience

Vocabulary

Highlighted vocabulary words are found at the bottom of the pages in the book. Additional words from the text that you should focus on are:

gas (page 11)
sunscreen (page 11)
erupt (page 24)
far side of the moon (page 18)
chemical (page 25)

ridges (page 30)
craters (page 30)
tapestry (page 38)
whitish (page 39)
drift (page 42)

Standards:

Language Arts/Reading:

- Uses word reference materials to determine the meaning and pronunciation of unknown words
- Uses a variety of context clues to decode unknown words

Science

The solar system is enormous. Unimaginably huge! But you can give your students a sense of the size of the solar system and interplanetary distances with this activity. If you have a space the size of a football field, you can make a model that is 330 feet from the Sun to Saturn. From end to end a football field is 360 feet (300 feet from goal line to goal line plus the end zones). Explain to your students that you would need up to four football fields in length to include the planets Uranus, Neptune, and Pluto in your model.

Make signs on oak tag for each of the bodies in our solar system. Each sign should have the name printed clearly and a scaled drawing. Use chart 1, which shows scaled diameters, to draw the sun and the planets. The units are in inches and millimeters. For Mercury, and Mars, use a dot the size of a period. For Venus and the Earth, double the size of the dot. For the Sun, Jupiter, and Saturn, we've included the scaled size in millimeters. (It will be easier to use.)

Divide the class into seven groups; each group to be one of the planetary bodies in the model. Using chart 2, place the group with the Sun's picture on the goal line. Then send the other groups out. They can use yardsticks or tape measures to find where they should stand. If these things are not available, we've added the number of "giant" steps they can use to pace off the distances. The Saturn group should be standing at the end of the end zone. When everyone is in place, they can see how far they are from each other and the size of each planet.

If you have limited space, you can make a smaller model of the entire solar system indoors in the school hallway in just 100 feet using chart 3.

Chart 1

Body	Approximate Diameter in Miles	Scaled Diameter in Inches
Sun	865,000	3.843 (about 97.5 mm)
Mercury	3,029	0.013 (small dot or period)
Venus	7,519	0.033 (large dot)
Earth	7,926	0.035 (large dot)
Mars	4,223	0.019 (small dot or period)
Jupiter	89,000	0.394 (10 mm or 1 cm)
Saturn	75,000	0.333 (8.45 mm)

Chart 2: 330 foot scale from the Sun to Saturn

Body	Distance for the sun (miles)	Scaled Distance	Giant Steps
Sun	0	0	0
Mercury	36,000,000	13ft 4in	4 ½
Venus	67,000,000	24ft 10in	8
Earth	93,000,000	34ft 5in	11 ½
Mars	141,000,000	52ft 5in	17 ½
Jupiter	484,000,000	178ft 11in	60
Saturn	1,783,000,000	328ft 1in	110

For the hallway model, represent the Sun and the planet with nametags and use the chart below:

Chart 3: 100 foot scale from the Sun to Pluto

Body	Scaled Distance
Sun	0
Mercury	11in
Venus	1ft 10in
Earth	2ft 6in
Mars	3ft 10in
Jupiter	13ft 2in
Saturn	24ft 2in
Uranus	48ft 7 in
Neptune	76ft 2in
Pluto	100 ft

Standards:

Science/Astronomy:

- Understands the spatial relationship between the Sun, the Earth, and the other planets
- Knows that the planets in space are separated from one another by vast distances
- Knows that planets look like stars

Mathematics:

- Understands the basic properties of the concept of measurement

Cooperative Learning:

- Contributes to the overall effort of a group

Language Arts/Writing

In 1972, a team of scientists placed a plaque containing a pictorial message aboard the Pioneer 10 spacecraft. The message was meant to tell about the origin of the spacecraft in the unlikelyhood that it was found by some intelligent life form out in space millions of years in the future. What would your students have put in that message? What would they want someone from another solar system to know about them? Have your students discuss what is important to them and to their families. What do they think is important to humankind? Then ask each one to write about what they would place in the "space-time bottle." Their entries can be in paragraphs, letters, poems, photographs, or pictures. The children should share their responses with each other.

Standards:

Language Arts/Writing:

- Writes in a variety of forms or genres
- Uses the general skills and strategies of the writing process

Language Arts/Listening and Speaking:

- Participates in group discussions

Language Arts/Science/Foreign Language

Play planetary linguistics with your class and learn the names of the planets in a number of foreign languages. Below you'll find a chart of the names of the bodies in the solar system in English and three other languages: French, Spanish, and Italian. You will notice that some of the planet names are recognizable in any of the languages.

First, say the names aloud as a model for your students. Have them repeat what you say, then practice until they feel comfortable saying the words.

Then, hand out thirty 4x6 blank index cards to the class. Depending on the number of students you have, some children might get more than one card. Assign each student the name of a planet in a specific language. Each student should refer to the chart and copy the name on his/her card clearly. In the upper right hand corner of the card, he/she should write the name of the language.

To help them remember the name of the planet, ask them to decorate the card(s) with a pictures. Collect the cards and mix them up. Distribute all of the cards randomly back to the class. Again, how many cards each student gets depends on the size of your class. At a signal, they should arrange themselves in the correct order of the planets from the Sun to Pluto. If a child has more than one card he/she should say the planet closest to the Sun then move to the next group. When they are ready, starting from the Sun, they should each take turns saying the planetary name and the language it is in. You can repeat this as many times as you like and see how fast the students can group themselves in the correct order.

Name of the Planets in Many Languages

English:	Sun	Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
French:	Soleil	Mercure	Vénus	Terre	Mars	Jupiter	Saturne	Uranus	Neptune	Pluton
Italian:	Sole	Mercurio	Venere	Terra	Marte	Giove	Saturno	Urano	Nettuno	Plutone
Spanish:	Sol	Mercurio	Venere	Tierra	Marte	Júpiter	Saturno	Uranu	Neptuno	Plutón

If some children in the class speak other foreign languages, they can add those languages to the chart.

Standards:

Foreign Language:

- Uses vocabulary for a wide range of topics

Cooperative Learning:

- Works with others to produce a common goal