

**Passports: Adventures in Learning
A Traveler's Guide through the Solar System
Mercury & Venus
Curriculum Guide grades 3-6**

Objectives:

Language Arts

- Organize and apply factual information using a Venn diagram.

Science

- Understand that Mercury is far away from the Earth and much smaller than the Earth.
- Understand that Venus is far away from the Earth and about the same size as Earth.
- Define astronomy as the science that involves space and all the bodies in it.
- Describe the physical properties of Mercury and Venus.
- To model the planets' relative distance from the sun and describe the relationships among the objects in the solar system.

Mathematics

- Apply appropriate techniques, tools, and formulas to determine measurements.
- Understand measurable attributes of objects and the units, systems and processes of measurements.

Vocabulary:

Atmosphere – the layer of gas around a planet

Greenhouse Effect – The effect of the Earth's atmosphere, due to certain gases, in trapping heat from the sun; the atmosphere acts like a greenhouse

Rotation – The act or process of turning around a center or an axis (eg. one axial rotation of the earth occurs in 24 hours)

Revolution – the motion of one body around another (eg. The Earth revolves around the Sun one time a year)

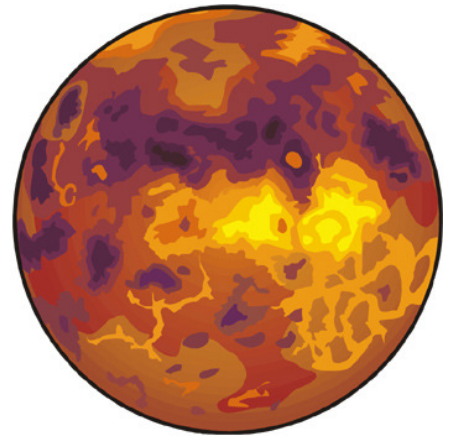
Density – the mass of a substance divided by its volume

Mass – The amount of material present in an object.

Orbit – a path described by one body in its revolution about another (as by the earth about the sun)

Planet – any of the large bodies that revolve around the sun in the solar system

Diameter – the distance across a circle through its center



Activity 1

Before participating in Mercury & Venus,
engage students in the following activity:

Using the KWL Chart provided below, have the students complete the sections “What I Know” and “What I want to Know” about Mercury and Venus.

Activity 2

Students will complete the KWL Chart section “What I learned” after participating in Mercury and Venus.

Activity 3 – Compare and Contrast Mercury and Venus

Materials:

1. paper
2. pencil

Procedure:

1. Have the students draw a Venn diagram and compare and contrast Mercury & Venus after participating in the Passport to Learning “Mercury and Venus.”



Activity 4 – Linear Model of the Solar System

Materials:

- adding machine tape (can use index cards, toilet paper, or a football field)
- calculator
- distance table – Student Sheet
- colored markers or pencils (colored stickers or planet stickers can be used)
- meter stick or ruler

Procedure:

1. Have the students calculate the distances of the planets from the Sun. See table on Student Sheet.
2. Have the students mark the Sun at the edge of their adding machine tape.
3. Students will then measure the distances of the planets and mark the adding machine tape accordingly. It is important to remind the students that they need to measure the distances FROM THE SUN each time – not from planet to planet.

**Below is a table of the distances depending on the size of the models you want the students to make

Scaled distances of the Nine Planets

		4m Model	10m Model	20m Model
		1 AU = 10cm	1 AU = 25cm	1 AU = 50cm
PLANET	AU			
Mercury	0.39	3.9 cm	9.8 cm	19.5 cm
Venus	0.72	7.2	18.0	36.0
Earth	1.00	10.00	25.0	50.0
Mars	1.52	15.2	38.0	76.0
Jupiter	5.20	52.0	130.0	260.0
Saturn	9.54	95.4	238.5	477.0
Uranus	19.2	192.0	480.0	960.0
Neptune	30.06	300.6	751.5	1503.0
Pluto	39.44	394.4	986.0	1972.0

Note: To find the scaled distance of any planet, multiply the distance in AU's by the scale factor.
EXAMPLE: If 1 AU = 10cm, Mars would be located $1.52 \times 10 \text{ cm/AU} = 15.2 \text{ cm}$ from the Sun.

Note: this model perpetuates the misconception that the planets are all aligned linearly. Please remind the students that this is just a model to show the distances of the planets from the Sun. It does not model the size of the planet nor the orbits.

Critical Thinking Skills:

What information did you learn about Mercury and Venus that surprised you the most? Explain why.

Websites:

<http://kids.msfc.nasa.gov/Puzzles/Age.asp>

<http://image.gsfc.nasa.gov/peotry/ask/askmag.html>

<http://www.thursdaysclassroom.com>

<http://amazing-space.stsci.edu>

<http://www.kidsastronomy.com>

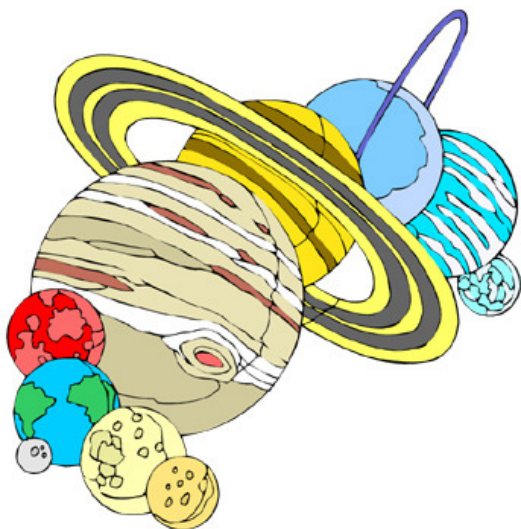
<http://www.kideclipse.com>

<http://solarsystem.nasa.gov/planets/profile.cfm?Object=Mercury>

Book Resources:

Mitton, J and Christina Balit. ***Kingdom of the Sun***. Here's a fun tour of our solar system. The author uses the names of the planets to compare them to the gods and goddesses whom they are named after and finds some great similarities. Great book for aspiring astronomers. ISBN 079227220X

Rabe, Rish. ***There's No Place Like Space***. Blast off for education fun and learn about the solar system. Beginners enjoy a whimsical, colorful view at the vastness of space, as well as venture with some of their favorite Dr. Seuss characters.



National Mathematics Standards:

Number and Operations – Understand numbers, ways of representing number, relationships among numbers, and number systems; proportion, estimation

Problem solving – representation of a real world situation with models

Algebra – Use mathematical models to represent and understand quantitative relationships.

Measurement – Use visualization, spatial reasoning, and geometric modeling to solve problems.

Using math in another subject and critical thinking using mathematics

National Science Standards:

Science as Inquiry – abilities necessary to do scientific inquiry; Understandings about scientific inquiry

Physical Science – Properties of objects and materials

Earth and Space Science – objects in the sky

Science and Technology – Understandings about science and technology; Abilities to distinguish between natural and objects made by humans.

History and Nature of Science – Science as a human endeavor

Nature of Science – Science process skills

KWL Chart

What I know about Mercury

What I want to know about
Mercury

What I learned about
Mercury

What I know about Venus

What I want to know about
Venus

What I learned about Venus

Linear Model of the Solar System - Student Sheet
Scaled distances of the Nine Planets

		If 1 AU = 10cm, then what is the distance of each planet?	
PLANET	AU	Calculations - Show work	Distance from the Sun
Mercury	0.39		
Venus	0.72		
Earth	1.00		
Mars	1.52		
Jupiter	5.20		
Saturn	9.54		
Uranus	19.2		
Neptune	30.06		
Pluto	39.44		