

Family Space Day Overview - Venus

Family Space Day is a three hour event. The activities are set up so that children and parents can select the order in which they undertake activities. Parents and children are encouraged to learn, play, and explore *together*.

Objectives of the Day

Children will:

- ⌘ learn about Venus' interior and atmosphere.
- ⌘ learn about the volcanos on Venus.
- ⌘ compare Venus' atmospheric pressure to Earth.

Activities

- ⌘ Station 1: Venus Posters
Children and their parents will view posters that provide information on what Venus is like.
- ⌘ Station 2: Edible or Non-Edible Venus
Children learn about the different layers of Venus by building either an edible or non-edible Venus.
- ⌘ Station 3: Play-Doh Venus Volcanos
Venus – like other planets and moons in our solar system - has volcanos at its surface. Children will learn how volcanos build up by a series of lava flows.
- ⌘ Station 4: Venus Pudding Volcanos
Some of the volcanos on Venus look like giant pancakes; they are round, flat-topped, and have steep edges. Scientists debate the composition of the lava that made these volcanos. Children will create volcanos with pudding and compare the viscosity between thick and thin lava flows.
- ⌘ Station 5: Paper Plate Venus and Earth
Children make a representation of Venus and Earth's layers and atmospheres using paper plates.
- ⌘ Station 6: Feeling the Pressure
Children experience the amount of pressure on Venus compared to Earth using bags of sand and Styrofoam cups.
- ⌘ Station 7: What's in the Box?
Children explore 6 different boxes to try to figure out what is being represented in each box.

- ⌘ Station 8: Venus and Earth Matching Game
Children recall what they've learned throughout the day by matching each statement to the planet it describes.

- ⌘ Station 9: Coloring Sheets and Games
Children relax and color and play simple games related to Venus.

- ⌘ Station 10: Reading Room
Children and their parents browse and read a selection of books about Venus (refer to book list for suggested reading).

Other Materials

- ⌘ *Facilitator Information – Venus*
- ⌘ *Explore Venus* – Book and website references for children and parents to take home
- ⌘ *All About Venus* – A fact sheet for children and parents to take home

Facilitator Information

(All you need to know about Venus to survive the day)

Taken from <http://solarsystem.nasa.gov/planets/profile.cfm?Object=Venus&Display=Overview>

At first glance, if Earth had a twin, it would be Venus. The two planets are similar in size, mass, composition, and distance from the Sun.

But there the similarities end. Venus has no ocean. Venus is covered by thick, rapidly spinning clouds that trap surface heat, creating a scorched greenhouse-like world with temperatures hot enough to melt lead and pressure so intense that standing on Venus would feel like the pressure felt 900 meters deep in Earth's oceans. These clouds reflect sunlight in addition to trapping heat. Because Venus reflects so much sunlight, it is usually the brightest planet in the night sky.

Although we cannot normally see through Venus' thick atmosphere, NASA's Magellan spacecraft used radar to image the planet's surface, and the Galileo spacecraft used infrared mapping to view mid-level cloud structure before continuing on its mission to Jupiter.

The atmosphere consists mainly of carbon dioxide, with clouds of sulfuric acid droplets. Only trace amounts of water have been detected in the atmosphere. The thick atmosphere traps the Sun's heat, resulting in surface temperatures over 470 degrees Celsius (880 degrees Fahrenheit). Probes that have landed on Venus have not survived more than a few hours before being destroyed by the incredibly high temperatures.

The Venusian year (orbital period) is about 225 Earth days long, while the planet's rotation period is 243 Earth days, making a Venus day about 117 Earth days long. Venus rotates retrograde (east to west) compared with Earth's prograde (west to east) rotation. Seen from Venus, the Sun would rise in the west and set in the east. As Venus moves forward in its solar orbit while slowly rotating "backwards" on its axis, the cloud-level atmosphere zips around the planet in the opposite direction from the rotation every four Earth days, driven by constant hurricane-force winds. How this atmospheric "super rotation" forms and is maintained continues to be a topic of scientific investigation.

About 90 percent of the surface of Venus appears to be recently solidified basalt lava – the same type of rock that makes up Earth's deep ocean floor and Hawaii. Based on the relatively few craters on the surface of Venus, scientists suggest that the planet was completely resurfaced by volcanic activity 300 to 500 million years ago. At that time, lava filled in the craters and other features on the surface of Venus, making the surface smooth. Venus has not had enough time – only 300 to 500 million years! – to accumulate lots and lots of craters on its surface.

Sulfur compounds, possibly attributable to volcanic activity, are abundant in Venus' clouds. The corrosive chemistry and dense, moving atmosphere cause significant surface weathering and erosion. Radar images of the surface show wind streaks and sand dunes. Craters smaller than 1.5 to 2 kilometers (0.9 to 1.2 miles) across do not exist on Venus, because small meteors burn up in the dense atmosphere before they can reach the surface.

More than 1,000 volcanoes or volcanic centers larger than 20 kilometers (12 miles) in diameter dot the surface of Venus. Volcanic flows have produced long, sinuous channels extending for hundreds of kilometers. Venus has two large highland areas: Ishtar Terra, about the size of Australia, in the north polar region; and Aphrodite Terra, about the size of South America. These straddle the equator and extend for almost 10,000 kilometers (6,000 miles). Maxwell Montes, the highest mountain on Venus and comparable to Mount Everest on Earth, is at the eastern edge of Ishtar Terra.

Venus has an iron core about 3,000 kilometers (1,200 miles) in radius. Venus has no global magnetic field, though its core iron content is similar to that of Earth.



Venus Posters

You and your child will start your day of Venus exploration by viewing a series of posters.

What You Need:

- ✘ 5 sheets of poster board in different colors
- ✘ Large print-outs of the questions and answers in the below boxes
- ✘ Cover sheets for the answers
- ✘ Color images related to the content
- ✘ Glue or tape to adhere the information to the posters

What to Do:

Each of the following should be made into a big, bold, colorful poster with related images. Make sure the answers to the questions are on the posters, but covered by a page labeled “lift me” that hides the answer.

Poster 1:

Venus and Earth are almost the same size, with Venus being just a little bit smaller than Earth!

Venus is the second closest planet to the Sun.

Is Venus closer to the Sun than Earth? Or farther away?

Answer: Closer!

Poster 2:

Both Venus and Earth have atmospheres ... but they are very different!

Earth's atmosphere has mostly nitrogen and oxygen with a little bit of carbon dioxide and some other gases. Most – not all! – living things need oxygen.

The atmosphere on Venus has no oxygen, but lots of carbon dioxide. Carbon dioxide is one of the gases important for keeping a planet warm. Venus has soooooooooooooooooooooo much carbon dioxide, that the atmosphere traps lots of heat – and the temperatures reach 900 degrees (F)!

Which is hotter on the surface, Earth or Venus?

Answer: Venus!

Poster 3:

All living things need liquid _ _ _ _ _.

Earth has lots of this flowing across its surface and filling its oceans and lakes.

Do you think Venus has liquid _ _ _ _ _ on its surface?
Remember the temperature at the surface of Venus!

Answer: Water! Venus is soooooooo hot, it has no liquid water at its surface!

Poster 4:

Both Venus and Earth have volcanos.

We know that many of Earth's volcanos are active – they erupt!

No one has ever seen a volcano on Venus erupt, but planetary scientists who study the more than 1000 volcanic areas on Venus report that the volcanos look fresh – their edges and surfaces have not been worn down by erosion from wind.

Another hint about volcanism on Venus comes from its surface. Its surface has relatively few craters on it – do you remember the cratered surface of Mercury? Scientists think that lava flows covered the surface of Venus recently.

Poster 5:

You can see Venus in the night sky! It looks like the brightest "star" – but it is a planet, of course.

"Venus" is the Roman name for the goddess of love. It was considered to be the most beautiful (and brightest!) planet in the heavens.

Possible Poster Images

Images can be found at:

Poster 1:

http://www.nasa.gov/images/content/145452main_iss012e19194.jpg

Poster 2:

<http://www.nasa.gov/audience/formedia/presskits/spacefood/factsheets.html>

Poster 3:

<http://liftoff.msfc.nasa.gov/academy/astronauts/sleep.html>

Poster 4:

http://www.nasa.gov/images/content/152964main_s121e07412_hi_res.jpg

Poster 5:

http://www.nasa.gov/mission_pages/shuttle/shuttlemissions/sts116/launch/sts116_summary.html

Edible or Non-Edible Venus

Venus is the second planet from the Sun and has the hottest surface conditions of any planet in the solar system. Its interior is believed to be similar to Earth – it has a core, mantle and crust - and it's covered by an extremely dense atmosphere made up mainly of carbon dioxide. Thanks to some space missions, we've discovered that Venus' surface has a few craters and over 1,600 major volcanos, mountains, large highland terrains and vast lava plains. Surface temperatures on Venus reach 900 degrees Fahrenheit! That's hot! That atmospheric pressure is 90 times that of Earth's and it's completely covered in sulfuric acid clouds.

In this activity, you and your child will create Venus and its atmosphere using either edible or non-edible items.

What You Need for the Edible Venus:

- ✘ 1 plate
- ✘ 1 Rice Krispie Treat (Venus' mantle/crust)
- ✘ 1 piece of saltwater Taffy (Venus' core)
- ✘ 1 cup of Cotton Candy (Venus' atmosphere)
- ✘ 5-10 mini chocolate chips (Venus' volcanos)
- ✘ Icing
- ✘ Popsicle stick
- ✘ Wet wipes



What You Need for the Non-Edible Venus:

- ✘ 1 Styrofoam ball
- ✘ Various craft items
- ✘ Cotton batting
- ✘ Glue and tape
- ✘ Scissors

What to Do for the Edible Venus:

- ✘ Flatten your Rice Krispie Treat on your plate.
- ✘ Place a piece of taffy in the center of the Rice Krispie—this is Venus' core.
- ✘ Form a ball with the Rice Krispie Treat—this is Venus' mantle and crust. Ask you child which part of the ball is the core.
- ✘ Using the icing, attach a few mini chocolate chips to the ball. Talk about the volcanos on Venus with your child.
- ✘ Cover the Rice Krispie Treat with cotton candy. Is Venus' atmosphere thick or thin? Can we see through the clouds?
- ✘ Wash up your hands and talk about Venus as you eat it up!

What to Do for the Non-Edible Venus:

- ✘ Using the Styrofoam ball as the planet, attach some of the craft items on the table to the ball to represent volcanos
- ✘ Cover the planet in cotton batting and tape or staple together
- ✘ Discuss Venus' composition and surface features

Parent Prompts:

What is Venus made up of? (Core, mantle, crust)

What is Venus' atmosphere made up mostly of? (Carbon Dioxide)

What are some surface features of Venus? (It has volcanos, some craters, valleys, plains, and mountains)

Play-Doh Venus Volcanos

Volcanic features are abundant on Venus. They include wide lava plains made from “lava flows,” lava channels, and several different types of volcanos. Scientists suspect that some volcanos are still active; however, clouds from volcanic eruptions cannot be seen with our instruments. Scientists examine the volcanic features using radar maps of the surface; the low amount of erosion and the few craters suggest that many of these volcanos are young.

Get ready to get messy! In this activity, you and your child are going to make lava flows on Venus!

What You Need:

- ✘ Cardboard dinner plate
- ✘ 3 balls of Play-Doh, each a different color and each about the size of your child’s fist
- ✘ Empty small cup with the upper half cut off, or soda bottle cap
- ✘ 2 teaspoons baking soda
- ✘ ½ cup of vinegar
- ✘ Paper towels
- ✘ Tape or glue
- ✘ Scissors
- ✘ Crayons
- ✘ Clear plastic straws
- ✘ Images of volcanos on Venus



What to Do:

- ✘ Tape the small, empty cup in the middle of the plate to represent the caldera (central depression where magma erupts). Make sure the cup opens upward and is taped securely.
- ✘ Pour a very small amount of baking soda into the cup.
- ✘ Time for the eruption! Add a small amount of vinegar to the baking soda – this will react with the baking soda and cause it to fizz and flow out of the caldera.
- ✘ Mark the edges of the “lava flow” on the plate with a crayon, then, use a paper towel to wipe up the vinegar.
- ✘ Next, put a thin layer of Play-Doh completely covering the area that the “lava flow” covered. This is your first (and oldest) lava flow.
- ✘ Repeat the above steps to create more lava flows using different colors of Play-Doh.
- ✘ When your child is finished, invite them to sample the layers. Have them “core” the volcano layers using the clear plastic straw.

Parent Prompts:

Which lava flow is the oldest – happened first? Youngest? How do you know?

Did the flows occur with one perfectly on top of the other?

How do earlier flows affect where later flows go?

Venus Pudding Volcanos

Like Earth, Venus has different types of volcanos.

Some are like the volcanos of Hawaii – gently sloping volcanos made of lava layer stacked on lava layer stacked on lava layer. These lava layers are thin and flat – by piling up, they make a “shield volcano.” (Note: The images we see of volcanos on Venus often are vertically exaggerated, so the volcanos appear steep sided)

Other volcanos on Venus are weird. These look like stacks of pancakes – circular, flat-topped, and with sharp edges. Volcanos like these do not occur on Earth and scientists debate what causes this shape to form.

Invite your child to experiment with different types of “pudding lava” to see if they can come up with a possible reason for the different types of volcanic features.

What You Need:

- ✘ 1 small package chocolate pudding mix
- ✘ 1 small package vanilla pudding mix
- ✘ 1 ½ cups of water
- ✘ 2 sandwich-size sealable bags
- ✘ Scissors
- ✘ 2 thick paper plates
- ✘ Trash can, trash bag or 2 additional plates (for the “messy” version)
- ✘ Lots of wet wipes or paper towels



What to Do:

Pour the chocolate pudding mix into the baggie. Add 1 ¼ cups of water to make a runny mixture. Carefully knead the baggie with your hands until mixed.

- ✘ Pour vanilla pudding mix into a baggie. Add ¼ cups of water to make a thick, stiff mixture. Carefully knead the baggie with your hands until mixed.
- ✘ Option 1 (very messy):
 - ✘ Punch a small hole, about a pencil width across, in the center of a paper plate.
 - ✘ Cut the corner off the chocolate pudding baggie, making a hole about a quarter inch long.
 - ✘ Push this corner of the baggie through the hole in the plate. Squeeze the pudding out of the “magma chamber” onto one of the paper plates and watch the “lava” flow across the surface of Venus. Be sure to do this over a trash can, trash bag or another plate.
 - ✘ Repeat with the second plate and the vanilla pudding “lava”.

- ⌘ Try to make volcanos with low gentle slopes, and volcanos with steeper slopes or sides.

- ⌘ Option 2 (less messy):
 - ⌘ Cut the corner off the chocolate pudding baggie, making a hole about a quarter inch long.
 - ⌘ Squeeze the pudding out of the “magma chamber” onto one of the paper plates and watch the “lava” flow across the surface of Venus.
 - ⌘ Repeat with the second plate and the vanilla pudding “lava”.
 - ⌘ Try to make volcanos with low gentle slopes, and volcanos with steeper slopes or sides.

Parent Prompts:

Which pudding “lava” is thinner or runnier? Which is thicker?

Do the different pudding lavas make different features?

Which pudding may be more like the lava that makes up the gentle flat surfaces of the shield volcanos on Venus?

Which pudding may be more like the lava that makes up the steep-sided pancake-like volcanos on Venus?

The runny pudding is more like the runny lava that builds the low shield volcanos we see on Venus and Earth. This type of lava makes basalt when it cools and crystallizes. The volcanic islands of Hawaii are made of this type of rock.

The thick pudding is more like the thick (viscous) lava that builds steep-sided volcanos like Mount St. Helens. (For parents: this type of lava is thicker because it has more silica and gases like water vapor). Some planetary scientists suggest that thicker lava made the pancake volcanos we see on Venus.

Paper Plates Earth and Venus

Why is our atmosphere so important? Because it does so much for us! It protects us from harmful radiation from the Sun, it has what we need to breathe, it is part of the water cycle and it moderates our temperatures. It also “filters out” small (less than a yard or meter across) small meteoroids and comets; they burn up as they travel through our atmosphere. We could not live without our atmosphere.

What about Venus’ atmosphere? It’s not like ours at all! It’s very, very dense and made up mostly of poisonous carbon dioxide. The clouds that completely cover the planet create sulfuric acid rain! It also traps the small amount of sunlight that makes it through the atmosphere. Because the sunlight isn’t released, it makes Venus very hot – 900 degrees Fahrenheit!

In this activity, you and your child will create a representation of Earth and Venus and their atmospheres.

What you Need:

- | | |
|--------------------|--------------------|
| ✘ Two paper plates | ✘ Cotton batting |
| ✘ Earth image | ✘ Blue cellophane |
| ✘ Venus image | ✘ Clear cellophane |
| ✘ Glue | ✘ Tape |
| ✘ Scissors | ✘ Hole punch |
| ✘ Cotton balls | ✘ String |

What to Do for the Earth Plate:

- ✘ Glue the Earth image to the paper plate making sure to leave the rim of the plate bare to represent the atmosphere.
- ✘ Glue cotton pieces to different areas of the Earth template to represent clouds.
- ✘ Cover the plate with the blue cellophane and tape on back to secure.
- ✘ Tape or glue “Our Blue Skies” to the back.
- ✘ Punch a hole in the top and bottom and secure a long string to the top to make a mobile.

What to do for the Venus Plate:

- ✘ Glue the Venus image to the paper plate making sure to leave the rim of the plate bare to represent the atmosphere.

- ❖ Glue cotton batting to different areas of the Venus template to represent the thickness of the clouds on Venus; once your child is done, he or she should not be able to see the surface of Venus!
- ❖ Cover the plate with the clear cellophane and tape on back to secure.
- ❖ Tape or glue the "Venus Poem" to the back.
- ❖ Punch a hole in the top and tie to the Earth plate to make a mobile!

Parent Prompts:

Which has a thicker atmosphere, Earth or Venus?
(Venus. Earth's atmosphere is very thin; less than the rim of the paper plate, if Earth were the size of the paper plate!)

How is the atmosphere of Venus different than the atmosphere of Earth?

How are they the same?

What does our atmosphere "do" for us?
Why is it so important to life on Earth?

Does any other planet have an atmosphere just like ours?
(No! Our atmosphere is the only one that is just right for us in the entire solar system!)



Our Blue Skies

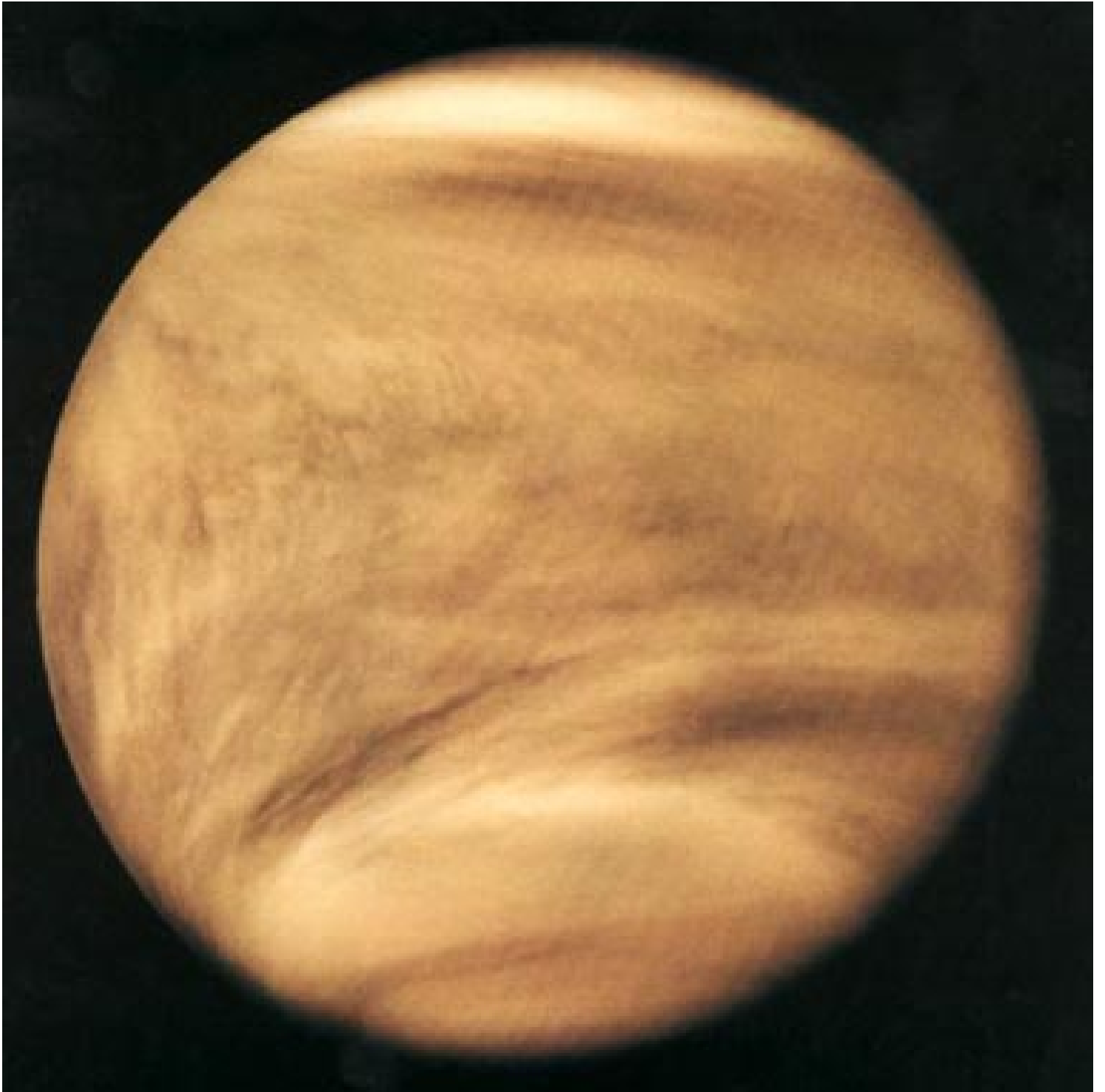


Our skies are so blue
The air way up there
Sends water our way
When its time for our share.

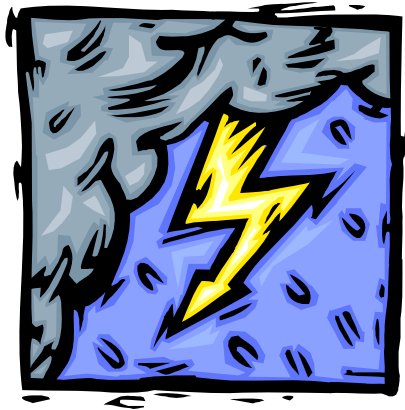
Our skies let through light
That the plants need to grow
But our air keeps out types
That will hurt us, we know.

The air moderates
The heat from the Sun
So we don't freeze at night
Or burn up with the dawn.

Our blue skies above
Are our atmosphere.
If we didn't have it
We wouldn't be here.



Heat Wave



Venus' air
is as thick as glue.
We cannot breathe it—
it's poisonous too.

The thick clouds trap
the light from the Sun,
Making Venus too hot
for us to have fun.

There water's all gas;
There are no oceans there.
Live on this planet?
We wouldn't dare!

Feeling the Pressure?

Venus and Earth are about the same size, mass, and density but the amount of atmospheric pressure on the two planets is very different! Venus has about 90 times more atmosphere than the Earth. All those gases press down on the surface; the amount of pressure crushed even reinforced robotic landers! The intense pressure on Venus is caused by its very, very dense atmosphere which is made up mainly of carbon dioxide. Thick clouds of sulfuric dioxide acid completely cover the planet.

In this activity, you and your child will compare the amount of atmospheric pressure between Earth and Venus using bags of sand!

What You Need:

- ❖ 1- 5 pound bag of sand labeled "Venus" and securely sealed
- ❖ 1- ¼ pound bag of sand labeled "Earth" and securely sealed
- ❖ 2 Styrofoam cups



What to Do:

- ❖ Place a Styrofoam cup on the floor
- ❖ With the help of an adult have your child hold the "Venus" bag over the cup and release/drop it onto the cup
- ❖ Discuss what has happened to the Styrofoam cup
- ❖ Place the other Styrofoam cup on the floor
- ❖ Have your child hold the "Earth" bag over the cup and release/drop it onto the cup
- ❖ Discuss what has happened to the Styrofoam cup

Parent Prompts:

What happened to the cup under the pressure of the "Venus atmosphere"? Why was the cup crushed? (the amount of pressure was too heavy for the cup to withstand)

What happened to the cup under the pressure of "Earth's atmosphere"? (the weight - or pressure - of the "atmosphere" was not enough to crush the cup. The Earth's atmosphere does put pressure on everything at its surface, but Earth's atmospheric pressure is less than the atmospheric pressure on Venus.)

Which planet has more atmospheric pressure? Why? (Venus; the atmosphere is heavy due to its thickness)

Radar Mapping: What's in the Box?

Venus has a very dense atmosphere that prevents anyone from seeing its surface. Scientists depend on remote sensing to tell them what Venus' surface is really like; they have mapped out the surface using radar. The Magellan mission orbited Venus and sent radio waves through the clouds; the ground reflected the signals back to the orbiter. The amount of time it took for the radio signal to bounce back indicated how far the ground was below the orbiter.

In this activity, your children will mimic this remote sensing by using a stick to measure the distance to a "planet surface" they cannot see, and creating their own map of that landscape.

What You Need:

- ❖ Several opaque boxes with a landscaped interior and holes in the top
- ❖ Solid items to serve as landscapes, like Styrofoam blocks or cones, Tupperware containers, plastic bottles, etc.
- ❖ Glue to secure the landscape if needed
- ❖ A wooden dowel for each box that is 6" longer than the box is tall
- ❖ A sheet to "Take Your Data"
- ❖ A sheet to "Make Your Map"
- ❖ Permanent markers in several different colors
- ❖ Crayons

How to Set Up Boxes:

- ❖ Copy paper boxes work well. Gather as many boxes as you would like the children to work through.
- ❖ Inside each of the boxes, create an uneven landscape using objects of different heights.
- ❖ On the lids of the boxes, create small holes (large enough for the wooden dowel to slide through easily). Create the number of holes for which you want the children to gather data (for example, a grid of 3 rows of 4 holes across the top of the lid). Number each hole a different number.
- ❖ Mark off the dowel in inches or centimeters. Color each increment a different color, with light colors and low numbers being at the bottom of the dowel and darker colors and higher numbers marking the top segments.

What to Do:

- ❖ Explain to your children that they are going to use the dowel to make a map of what's in the box.
- ❖ Place the dowel through the holes on the top of the box, beginning with the holes in Row 1.

- ⌘ While the dowel is in the box, check which number/color is just above the hole. Have your child record that information on the “Take Your Data” sheet. For instance, in “Row 1, position 1,” you might see that the number 8 (for 8 inches or centimeters) and color blue line up with the top of the box; your child would place a blue dot in the “Row 1” table in the first column (position 1) row, with the number 8 beside it.
- ⌘ Invite your child to repeat this step for the rest of the holes in the box.
- ⌘ After your child has completed their measurements, have them color boxes with the same number the same color – this is a little like painting by number. Often planetary scientists color maps of planetary surfaces such that low areas (higher numbers) are dark (purple, blue, green) and high areas (lower numbers; the dowel did not go far in the box) with lighter colors, like yellow, orange, red, and white.
- ⌘ Help your child make a key to the colors.

Parent Prompts:

What does the landscape in the box look like based on your measurements? Is it flat – did the dowels all go to the same distance? Are there high areas, like hills or mountains where the dowels did not go very far? Low areas like valleys?

Does your map show these high areas? Low areas?

What do you think would be different if you only had one dowel measurement?
Would you be able to say very much about the landscape?

What if you had hundreds of measurements?

How were you able to make a map of something that you couldn't see? (Using the stick to measure the height and depth of the “land.”)

Which planet have scientists mapped out using a similar technique, but with radio waves instead of a dowel? (Venus)

Magellan's radar map of Venus:



Radar Mapping -- Make Your Map

Row 1	○	○	○	○	○
Row 2	○	○	○	○	○
Row 3	○	○	○	○	○
	1	2	3	4	5

Map Key:

Venus And Earth Matching Game

Your child will recall what they have learned about Venus today!

What You Need:

- ✘ 1 Venus and Earth Matching Game Card
- ✘ Venus and Earth stickers

What to Do:

Invite your child to share what they have learned about Venus. Does it have volcanos? What would Venus be like if they lived there? How would it be different from Earth?

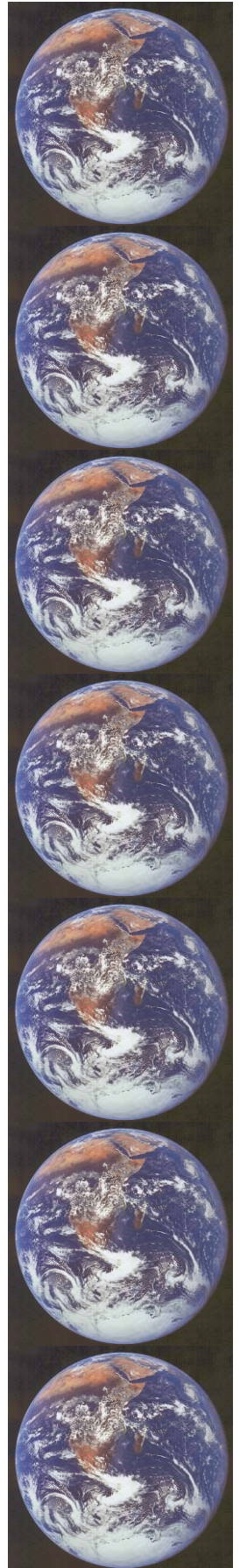
Help your child respond to the questions on the Venus and Earth Matching Game card. Place the appropriate planet sticker – or stickers - next to each question.

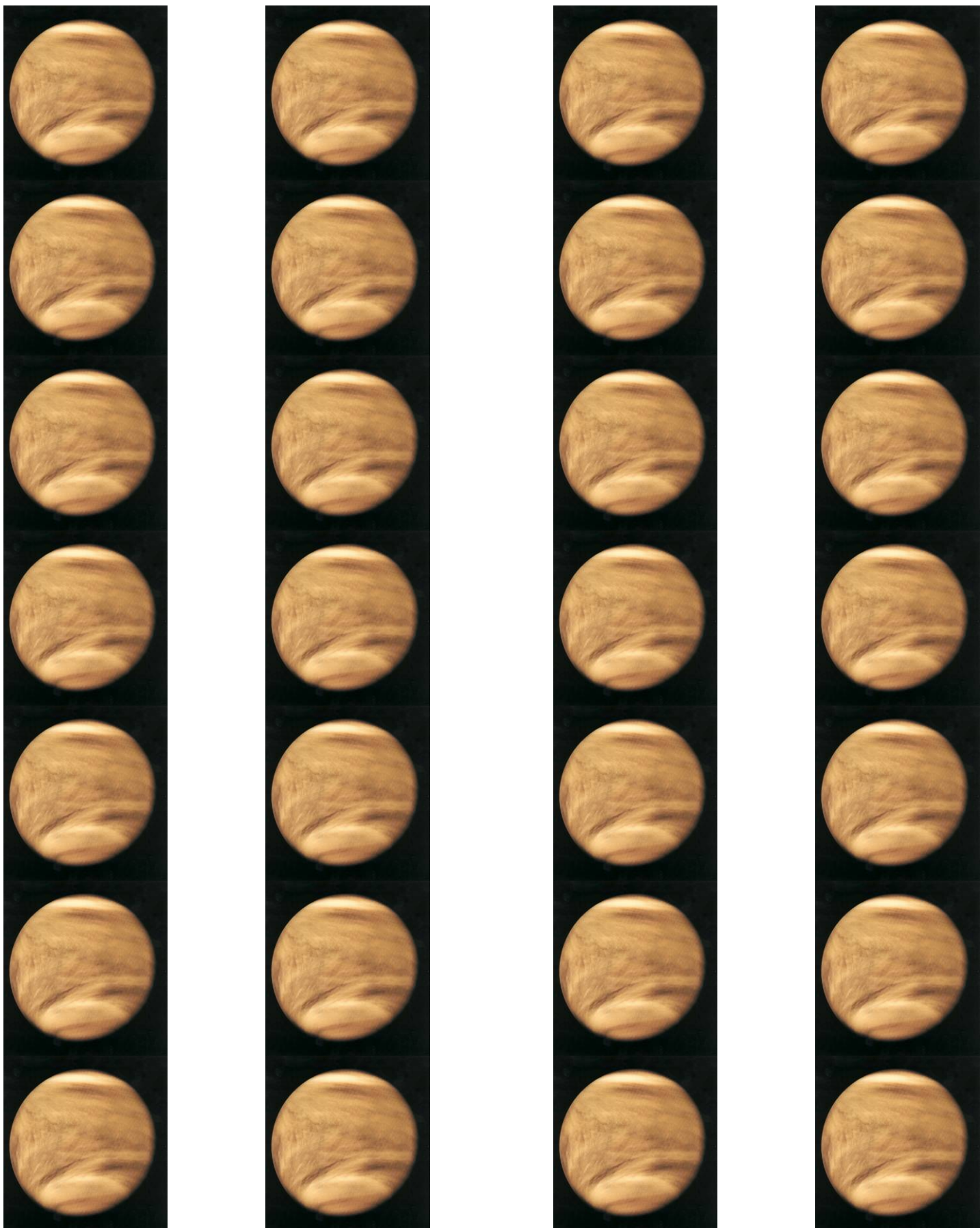


Venus and Earth Matching Game

Are you an expert on Venus now that you have seen the posters?
Let's see! Place the sticker of the correct planet next to each sentence. One of
the sentences gets both stickers!

While we are about the same size, I am a little, tiny, bit smaller!	Place Sticker Here
I have liquid water on my surface	Place Sticker Here
My atmosphere has oxygen - thank you, plants!	Place Sticker Here
My atmosphere has <u>lots</u> of carbon dioxide.	Place Sticker Here
It is <u>very</u> hot on my surface - 900 degrees!	Place Sticker Here
I am farther from the Sun.	Place Sticker Here
I have lots of volcanos ... kaboom!	Place Sticker Here
Scientists can't see my surface, so they use radar to study me.	Place Sticker Here





Coloring Sheets and Games

<http://www.enchantedlearning.com/subjects/astronomy/activities/coloring/Venus.shtml>

http://www.windows.ucar.edu/tour/link=/coloring_book/cb_venus_beg_edu.html&edu=elem

<http://www.edhelper.com/SolarSystem1062.htm>

<http://www.surfnetkids.com/games/transitvenus-ws.htm>

http://www.wordsearchfun.com/22432_venus_wordsearch.html

Explore Venus!

Websites

http://www.sciencemonster.com/planets_venus.html

Sciencemonster.com provides a site specifically devoted to the planet Venus. This is a great site for kids ages 7 and up. Topics include the movements and physical features of the planet Venus, findings about its climate and surface, statistics, habitability, how much you would weigh on Venus and much more.

<http://kids.msfc.nasa.gov/Sites/ExternSite.asp?url=http%3A%2F%2Fspacekids%2Ehg%2Enasa%2Egov%2Fosskids%2Fanimate%2Fvenus%2Ehtml>

NASAKids site devoted exclusively to the planet Venus. For ages 6-10. NASAKids provides Venus facts, imagery, mission information and more.

<http://www.dustbunny.com/afk/planets/venus/>

This Astronomy for Kids Venus site is for children ages 7 and up. The site offers Venus information, imagery, mythology, mission news, and a 'solve the Venus puzzle' section.

<http://www.enchantedlearning.com/subjects/astronomy/>

Enchanted Learning's *Zoom Astronomy* offers a wealth of information for all ages, allowing readers to "zoom" to the appropriate level for each topic. The user-friendly site provides information on Venus and all the planets, moons, smaller planetary bodies, and the origin of the solar system. There are numerous crafts, activities, and coloring pages offered as well.

Explore Venus!

Books

Venus. Margaret Goldstein. Lerner Publications Company. 2003. ISBN: 0-8225-4649-3.

This book is intended for early readers ages 4-6. A good introduction to Venus, describing its place in the solar system, its physical characteristics, its movement in space and other facts about Venus.

Venus. Tanya Stone. Benchmark Books. 2003. ISBN: 0-7614-1405-3. For ages 7-10.

Describes the observation of Venus throughout history, spacecraft missions sent to explore the planet, and information learned about physical conditions there.

Venus: A Shrouded Mystery. Isaac Asimov. Gareth Stevens. 1990. ISBN: 1-55532-365-0.

Asimov's book is intended for children ages 6-10. The topics covered include the physical characteristics of Venus, spacecraft missions, the greenhouse effect and a historical perspective of the planet.

Venus. Seymour Simon. Morrow Junior Books. 1992. ISBN: 0-688-10542-4.

Intended for children ages 6-10. The book describes the movements and physical features of the planet Venus and recent findings about its climate and surface.

All about Venus!

- ⌘ Venus is the second planet from the Sun and is the sixth largest planet. It is about 95% the diameter of Earth.
- ⌘ Venus has no moons.
- ⌘ A Venusian day is 243 Earth days long - longer than its year of 225 days!
- ⌘ Venus can be seen in the night sky with the naked eye. It is often called the “evening star” or “morning star” depending on its place in the sky – but it is a planet, not a star!
- ⌘ Venus is surrounded by a thick atmosphere – 92 times the atmospheric pressure at sea level on Earth - composed mainly of carbon dioxide.
- ⌘ The surface temperature of Venus is about 482° C (900° F) – hotter even than Mercury!
- ⌘ The carbon-dioxide-rich atmosphere traps heat from the Sun, and causes a “run-away greenhouse” effect responsible for Venus’ high surface temperatures.
- ⌘ Because Venus is so hot, there is no water at the surface or in the atmosphere. Interaction with the Sun has carried away the hydrogen component of water away from the planet.
- ⌘ Clouds over Venus contain sulfuric acid droplets.
- ⌘ Scientists think that Venus has active volcanos! There are more than 1000 volcanic regions on Venus.
- ⌘ Some of Venus’ volcanos have giant calderas (opening where the magma comes out) more than 100 kilometers (62 miles) in diameter.
- ⌘ At least 85% of the surface of Venus is covered with volcanic rock.
- ⌘ The surface of Venus has very few craters compared to Mercury or the Moon. This indicates its surface is relatively young; older surfaces like those on Mercury have many craters from billions of years of asteroid and comet impacts. Most of Venus’s surface may be only 300 to 500 million years old; (yes, this is “young” to geologists; our Solar System is 4.6 billion years old!).