

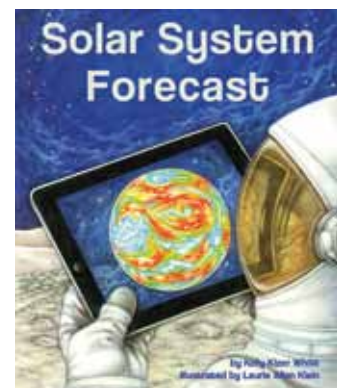
Teaching Activity Guide

Solar System Forecast



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How to Use This Activity Guide (General)

There are a wide variety of activities that teach or supplement all curricular areas. The activities are easily adapted up or down depending on the age and abilities of the children involved. And, it is easy to pick and choose what is appropriate for your setting and the time involved. Most activities can be done with an individual child or a group of children.

For teachers in the classroom: We understand that time is at a premium and that, especially in the early grades, much time is spent teaching language arts. All Arbordale titles are specifically selected and developed to get children excited about learning other subjects (science, geography, social studies, math, etc.) while reading (or being read to). These activities are designed to be as comprehensive and cross-curricular as possible. If you are teaching sentence structure in writing, why not use sentences that teach science or social studies? We also know and understand that you must account for all activities done in the classroom. While each title is aligned to all of the state standards (both the text and the For Creative Minds), it would be near impossible to align all of these activities to each state's standards at each grade level. However, we do include some of the general wording of the CORE language arts and math standards, as well as some of the very general science or social studies standards. You'll find them listed as "objectives" in italics. You should be able to match these objectives with your state standards fairly easily.

For homeschooling parents and teachers in private schools: Use as above. Aren't you glad you don't have to worry about state standards?

For parents/caregivers: Two of the most important gifts you can give your child are the love of reading and the desire to learn. Those passions are instilled in your child long before he or she steps into a classroom. Many adults enjoy reading historical fiction novels . . . fun to read but also to learn (or remember learning) about historical events. Not only does Arbordale publish stories that are fun to read and that can be used as bedtime books or quiet "lap" reading books, but each story has non-fiction facts woven through the story or has some underlying educational component to sneak in "learning." Use the "For Creative Minds" section in the book itself and these activities to expand on your child's interest or curiosity in the subject. They are designed to introduce a subject so you don't need to be an expert (but you will probably look like one to your child!). Pick and choose the activities to help make learning fun!

For librarians and bookstore employees; after-school program leaders; and zoo, aquarium, nature center, park & museum educators: Whether reading a book for story time or using the book to supplement an educational program, feel free to use the activities in your programs. We have done the "hard part" for you.

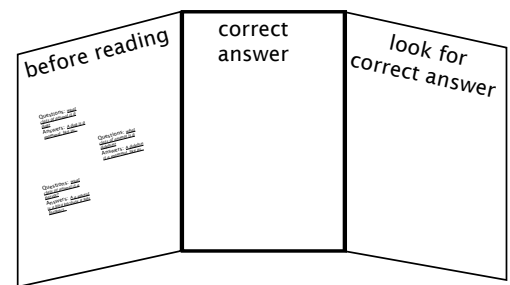
What Do Children Already Know?

Young children are naturally inquisitive and are sponges for information. The whole purpose of this activity is to help children verify the information they know (or think they know) and to get them thinking “beyond the box” about a particular subject.

Before reading the book, ask the children what they know about the subject. A list of suggested questions is below. The children should write down their “answers” (or adults for them if the children are not yet writing) on the chart found in Appendix A, index cards, or post-it notes.

Their answers should be placed on a “before reading” panel. If doing this as a group, you could use a bulletin board or even a blackboard. If doing this with individual children, you can use a plain manila folder with the front cover the “before reading” panel. Either way, you will need two more panels or sections—one called “correct answer” and the other “look for correct answer.”

Do the children have any more questions about the subject? If so, write them down to see if they are answered in the book.



After reading the book, go back to the questions and answers and determine whether the children’s answers were correct or not.

If the answer was correct, move that card to the “correct answer” panel. If the answer was incorrect, go back to the book to find the correct information.

If the child/children have more questions that were not answered, they should look them up.

When an answer has been found and corrected, the card can be moved to the “correct answer” panel.

Pre-Reading Questions

What is weather?

What are sunspots?

What are solar flares?

What is solar wind?

What is weather like on other planets?

- Mercury?
- Venus?
- Mars?
- Jupiter?
- Saturn?
- Uranus?
- Neptune?
- Pluto?

Do you think there's weather on any moons?

If the Earth's atmosphere is full of nitrogen and oxygen (we breathe the oxygen), do you think all the planets have a similar atmosphere? Why or why not?

Do other planets have clouds? If so, are they the same or different than clouds on Earth? If not, why not?

Do you think it rains on any other planets or their moons?

If it does rain, do you think it's a water-based rain like we have on Earth? Why or why not?

Can people travel to and live on other planets? Why or why not?

Comprehension Questions & Writing Prompts

Objective Core Language Arts, Speaking and Listening: Ask and answer questions about key details in a text read aloud or information presented orally or through other media.

Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.

Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

Retell stories, including key details, and demonstrate understanding of their central message or lesson.

Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.

What is the person doing in the first image? What's silly about what he (or she) is doing?

Why were all the flights to the planets cancelled?

Do you think solar flares really could affect plane travel? Why or why not?

Do you think there will ever be regular airport-type travel to other planets? Why or why not?

What happened to Mercury's atmosphere?

Why is Mercury so hot during the day?

What's in Venus' clouds?

Is it hot or cold on Venus?

Why is Earth called the "Goldilocks" planet?

What are dust devils?

If there are dust devils on Mars, do you think we could have them on Earth?

Who is reporting the weather from Mars?

What is the Great Red Spot on Jupiter?

How long has it been there?

How many planet Earths could fit into it?

What shape is the giant cloud at Saturn's North Pole?

What type of rain falls on Saturn's moon, Titan?

How long is a year on Uranus?

What's so silly about packing for spring break on Uranus?

How windy can it get on Neptune?

How does that compare to a tornado or hurricane on Earth?

What's happening to dwarf planet Pluto's atmosphere?

Who (or what) is the weatherman forecaster?

Observation Skills: Art Scavenger Hunt

Objective Core Language Arts Integration of Knowledge and Ideas: Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).

Distinguish between information provided by pictures or other illustrations and information provided by the words in a text.

Explain how specific aspects of a text's illustrations contribute to what is conveyed by the words in a story (e.g., create mood, emphasize aspects of a character or setting).

Use illustrations and details in a story to describe its characters, setting, or events.

Can you find these things in the art?

Alien weatherman button

Alien weatherman in a framed photograph

Alien weatherman on a magazine cover

Alien weatherman reflection

astronaut holding a weather balloon

basketball

canoe

clothespin

green flip flop

iPod

melted satellites

robot (based on the Spirit rover)

snowball

space shuttle

TV satellite dish

windsock

700 SPF sunscreen

Cross-Curricular Vocabulary Activities

Objective Core Language Arts:

Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade-level reading and content.

Identify new meanings for familiar words and apply them accurately (e.g., duck is a bird & the verb to duck). Use words & phrases acquired through conversations, reading/being read to, and responding to texts.

Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade-level topic or subject area.

Explain the function of nouns, pronouns, verbs, adjectives, and adverbs in general and their functions in particular sentences.

Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.

Use frequently occurring adjectives.

Vocabulary Game: This activity is a very general idea and is designed to get children thinking of vocabulary words that will then be used as the beginning vocabulary list for a science lesson.

Select an illustration from the book and give the children a specific length of time (five minutes?) to write down all the words they can think of about the particular subject. It is helpful to project an illustration on a whiteboard. Use eBook or book preview found at www.ArbordalePublishing.com.

The children's word list should include anything and everything that comes to mind, including nouns, verbs, and adjectives. At the end of the time, have each child take turns reading a word from his/her list. If anyone else has the word, the reader does nothing. However, if the reader is the only one with the word, he/she should circle it. While reading the list, one person should write the word on a flashcard or large index card and post it on a bulletin board or wall.

At the end, the child with the most words circled "wins." And you have a start to your science vocabulary list. Note: if a child uses an incorrect word, this is a good time to explain the proper word or the proper usage.

Glossary/Vocabulary Words: Word cards may be used (see Appendix) or have children write on index cards, a poster board, or on a chalkboard for a "word wall." If writing on poster board or chalkboard, you might want to sort words into nouns, verbs, etc. right away to save a step later if using for Silly Sentences (on the next page). Leaving the words posted (even on a refrigerator at home) allows the children to see and think about them frequently. The glossary has some high-level words. Feel free to use only those words as fit your situation.

Using the Words: The following activities may be done all at once or over a period of several days.

- Sort vocabulary words into nouns, verbs, adjectives, etc. and write what they are on the backs of the cards. When the cards are turned over, all you will see is "noun," etc. (these can then be used for the "silly sentences" on the next page).
- After the cards have been sorted, go over the categories to ensure that all cards have been placed correctly. (Mistakes are a great opportunity to teach!)
- Choose two words from each category and write a sentence for each word.
- Write a story that uses at least ten vocabulary words from the word sort.
- Have children create sentences using their vocabulary words. Each sentence could be written on a separate slip of paper. Have children (individually or in small groups) sort and put sentences into informative paragraphs or a story. Edit and re-write paragraphs into one informative paper or a story.

Silly Sentence Structure Activity: This "game" develops both an understanding of sentence structure and the science subject. Use words from the "word wall" to fill in the blanks. After completing silly sentences for fun, have children try to fill in the proper words by looking for the correct information in the book.

Word Bank

See Glossary for words in Spanish and the definition in English.

Adjective	Noun			Verb
big, bigger, biggest	ammonia	helium	satellite	bubble
bubbling	argon	hurricane	Saturn	compare
churning	astronomer	hydrogen	solar energy	revolve
cloudless	Atlantic Ocean	inner planets	solar flare	rotate
cloudy	atmosphere	Jupiter	solar system	spin
cold	atmospheric pressure	light	solar wind	survive
cool	aurora	Mars	space	swirl
dark	aurora borealis	Mercury	star	
dazzling	axis	methane	storm	
hot	bubble	middle	sulfuric acid	
huge	cloud	mile	Sun	
inner	core	moon	sunlight	
living	corona	Neptune	sunspot	
magnetic	dwarf planet	nitrogen	sunspots	
outer	Earth	nuclear reactor	telescope	
rocky	energy	orbit	temperature	
slanted	fahrenheit	oxygen	Uranus	
solid	forecast	planet	Venus	
stormy	gas	Pluto	water	
	heat	planet	water vapor	
			wind	

Cross Curricular: Silly Sentences

1. The _____ is the _____ at the center of the solar system.
noun noun
2. It looks so _____ to us _____ ed to other stars because it is the closest star to us.
adjective verb
3. It is a huge ball of _____ and _____ gas—you would not be able to stand on it.
adjective adjective
4. The _____ of the Sun (_____) is very hot and acts like an “energy factory” or _____. It creates the _____ and _____ that _____ things need to _____ on Earth.
noun noun noun adjective verb
5. _____s are cooler, _____ areas on the Sun’s surface caused by _____ storms. The _____ could fit into some sunspots!
noun adjective adjective noun
6. It takes less than _____ minutes for _____ and heat to reach the Earth—about _____ miles (150 million kilometers) away.
a number adjective noun a number adjective
7. Like the _____s, the Sun _____s on its _____.
noun verb noun
8. The Sun’s _____ _____ (_____) can only be seen during a total eclipse.
adjective noun noun

Word Search

Find the hidden words. Even non-reading children can match letters to letters to find the words! Easy—words go up to down or left to right (no diagonals). For older children, identify the coordinates of the first letter in each word (number, letter).

	A	B	C	D	E	F	G	H	I	J
1	B	A	C	K	I	S	E	W	O	R
2	E	T	O	P	W	Y	H	E	A	T
3	I	M	E	Q	U	N	O	A	J	S
4	F	O	R	E	C	A	S	T	C	I
5	R	S	O	L	A	R	A	H	A	T
6	X	P	L	A	N	E	T	E	L	V
7	T	H	O	T	S	T	O	R	M	Y
8	D	E	F	H	U	E	K	U	G	O
9	A	R	W	I	N	D	Y	G	A	S
10	L	E	M	A	O	Y	A	S	P	Z

ATMOSPHERE

CALM

FORECAST

GAS

HEAT

HOT

PLANET

SOLAR

STORM

SUN

WEATHER

WINDY

Language Arts: Shades of Meaning

Objective Core Language Arts Vocabulary Acquisition and Use:

Distinguish shades of meaning among verbs differing in manner (e.g., look, peek, glance, stare, glare, scowl) and adjectives differing in intensity (e.g., large, gigantic) by defining or choosing them or by acting out the meanings.

Correctly use frequently confused words (e.g., to, too, two; there, their).

Choose words and phrases to convey ideas precisely.

Select the correct word.

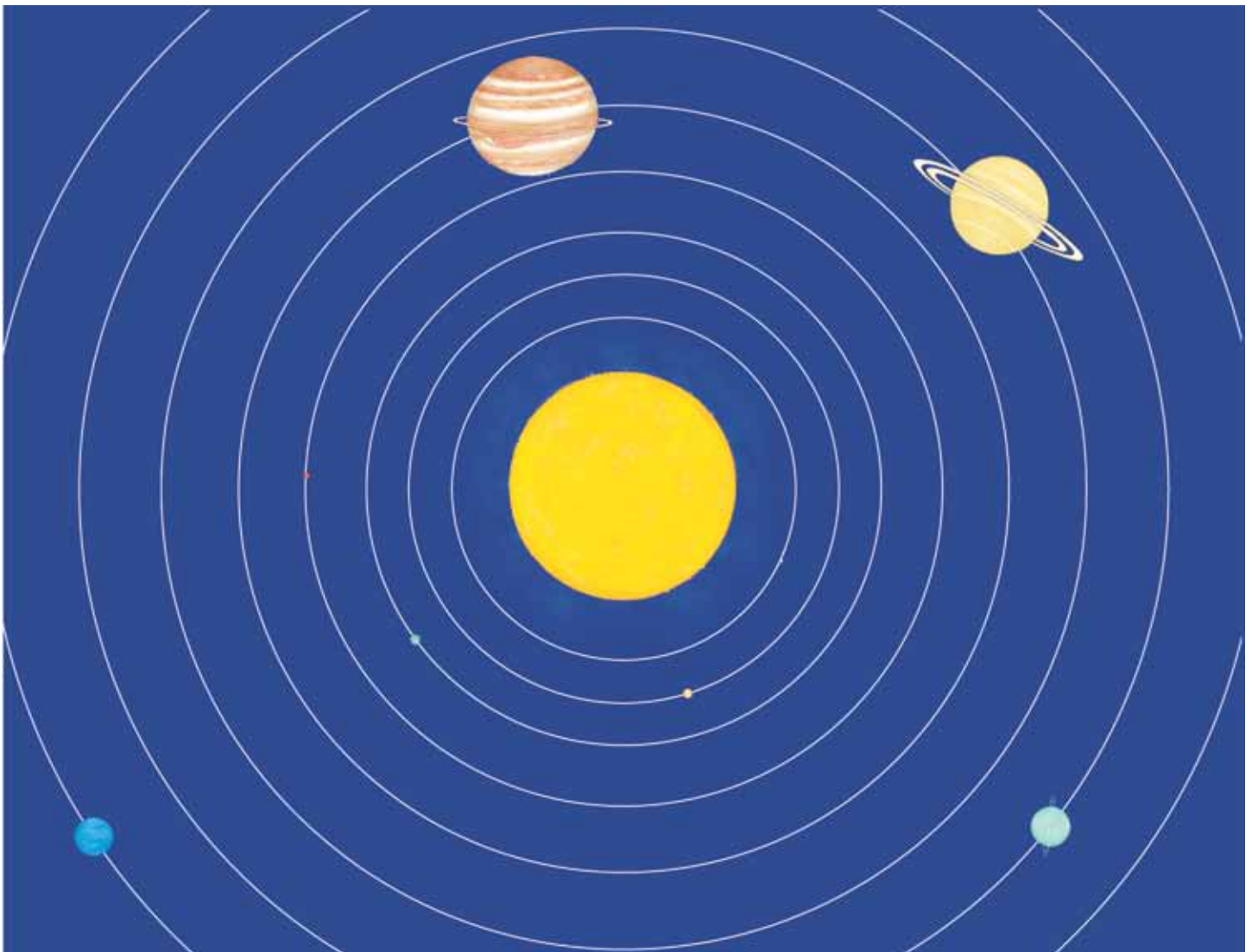
1. Most of Uranus' stormy whether/weather happens during the season changes—about every 21 Earth years.
2. The “Mercury girl” isn't sure whether/weather to pack a bathing suit or a ski suit.
3. We get our heat and light from the Sun/Son.
4. The Sun/Son is the center of our Solar System.
5. Gas shoots out of the dark wholes/holes and flies out on the solar wind.
6. The methane gas in its below-freezing atmosphere gives Neptune its beautiful blue/blew color.
7. Planets/Stars are huge balls of hot gases that give off energy including light and heat.
8. The inner/outer planets (Jupiter, Saturn, Uranus, and Neptune) are huge balls of gasses with rings.
9. The Sun is a huge ball of bubbling and churning gas—you would/would not be able to stand on it.
10. It takes more than/less than ten minutes for sunlight and heat to reach the Earth—about 93 million (93,000,000) miles (150 million kilometers) away from the Sun.

Our Solar System

All of the planets, dwarf planets, asteroids, and comets orbit around the Sun. This system is called the Solar System. The Sun (a medium-sized star) and planets are scaled to size in the image below. Can you find all the planets on their orbits? Which is the biggest? The smallest?

Planets in order from the Sun:

Mercury
Venus
Earth
Mars
Jupiter
Saturn
Uranus
Neptune



Atmosphere

Mercury's atmosphere has been blown away by the solar wind . . . but what does that mean? What IS an atmosphere?

What do you feel if you stand in front of a fan? You feel moving air. You can't see the air but you can feel it. Air is really our atmosphere. On Earth, our air or atmosphere is mostly made up of nitrogen and oxygen.

In nature, moving air is called wind. Sometimes there is a little wind (soft breeze) but other times, the wind is so strong (storms, hurricanes, tornadoes) that it can knock down buildings.

Our atmosphere is like a thin blanket or a protective shell that shelters us. It keeps meteorites from hitting us. It also blocks the Sun's ultraviolet rays that could burn us.



This photograph of the colorful layers of Earth's upper atmosphere was taken from the space shuttle, looking sideways across Earth's atmosphere. Image Credit: NASA



Using the information in the book, compare and contrast the atmospheres on other planets and moons.

The Greenhouse Effect

Venus' yellow clouds trap the Sun's heat, making it like a greenhouse and the hottest planet in our Solar System. Many people on Earth are worried about climate change or global warming here. What does that mean?

Most greenhouses are small buildings with glass walls and roofs. Greenhouses are used to grow plants and flowers when it would be too cold for those plants to grow outside. The glass lets in the sunlight (heat energy). Then the heat gets trapped inside, warming up the inside of the building.

Have you ever gotten into a car that has been sitting in the sun on a hot day? The windows of the car act like a greenhouse, warming the inside of the car.

Atmospheres do the same thing. Gases in the atmospheres are like the glass roofs in greenhouses. The sunlight and heat shine through the atmosphere during the day, keeping the planet (or moon) warm. As temperatures cool at night, some heat is released back out.

Scientists are trying to figure out if our Earth is warming because of changes in the atmosphere's gases caused by man, if this is a normal cycle, or a combination of both of the above.



Build a Solar Oven (STEM Activity)

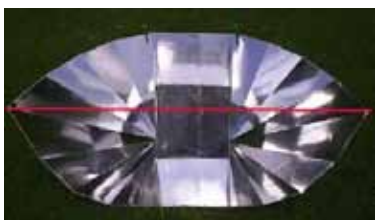
The Sun gives us the heat (warmth) and light that we need to survive. As humans, we have developed ways to create light and heat, in addition to what we get from the Sun. We use electricity to heat homes and to turn on lamps so we can see at night. We also use electricity or gas to be able to cook food. Did you know that there are people all over the world that use heat from the Sun to cook their food?

Objective: To build a solar cooker to warm or cook food. A solar cooker works along the same lines as a greenhouse. There are three main things to think about when building your solar cooker:

- You need to attract and funnel the sunlight to a cooking area. Aluminum foil is often used for this. The aluminum funnel area needs to be sturdy enough to stand up. A wide funnel area might not have to be moved as the Sun moves. A narrow funnel may need to be repositioned to catch sunlight as the Sun moves through the sky.
- The cooking area is where you will place your food. Dark colors (black) absorb light and convert it to heat. If you are warming something, you could use black construction paper. If you are cooking something, you could use a black or dark colored-pot with a tight fitting lid.
- Just as the glass in a greenhouse traps the heat, you will need something to trap the heat once you've funneled it to the baking area. You can use plastic bags covering the top of the solar cooker or around a pan for this.

For best results, use your solar cooker mid-day when the Sun is high in the sky. Overall, it will take twice as long to something in your solar cooker than in an oven.

What to cook? S'mores (graham crackers, chocolate bar & marshmallows), hot dogs, or quesadillas.



Science Journal (Vocabulary)

Sun

my definition

my drawing

Solar Flare

my definition

my drawing

Wind

my definition

my drawing

Atmosphere

my definition

my drawing

Understanding Size and Distance

If the Sun is a star, why does it look so much bigger than other stars in the night sky? Because it is closer to us than any of the other stars! Here's an easy experiment to learn how size appears to change because of distance.

What you'll need:

- An object that can be easily measured. This can be a large ball, a chair, or even a child.
- A measuring tape, yardstick and ruler.
- Something to write with and on.

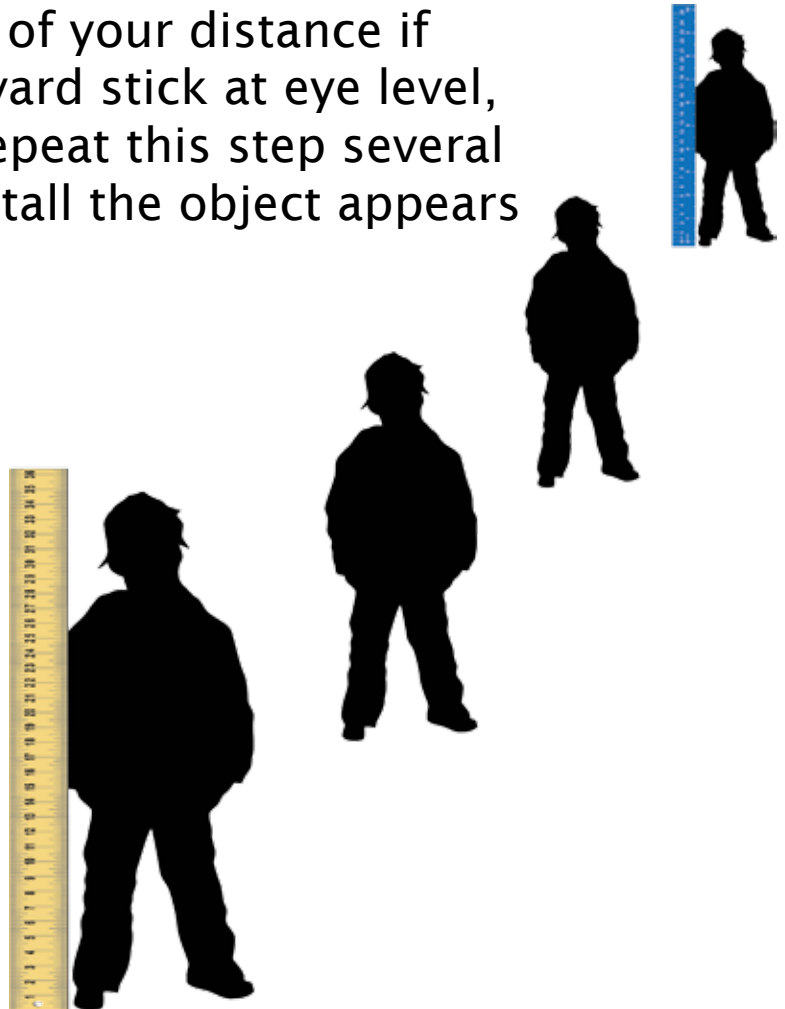
Standing right next to your object, measure how tall the object is and write it down.

Now step back from your object by a few feet (you can measure and keep track of your distance if desired). Holding a ruler or yard stick at eye level, measure the same object. Repeat this step several times, keeping track of how tall the object appears the further away it is.

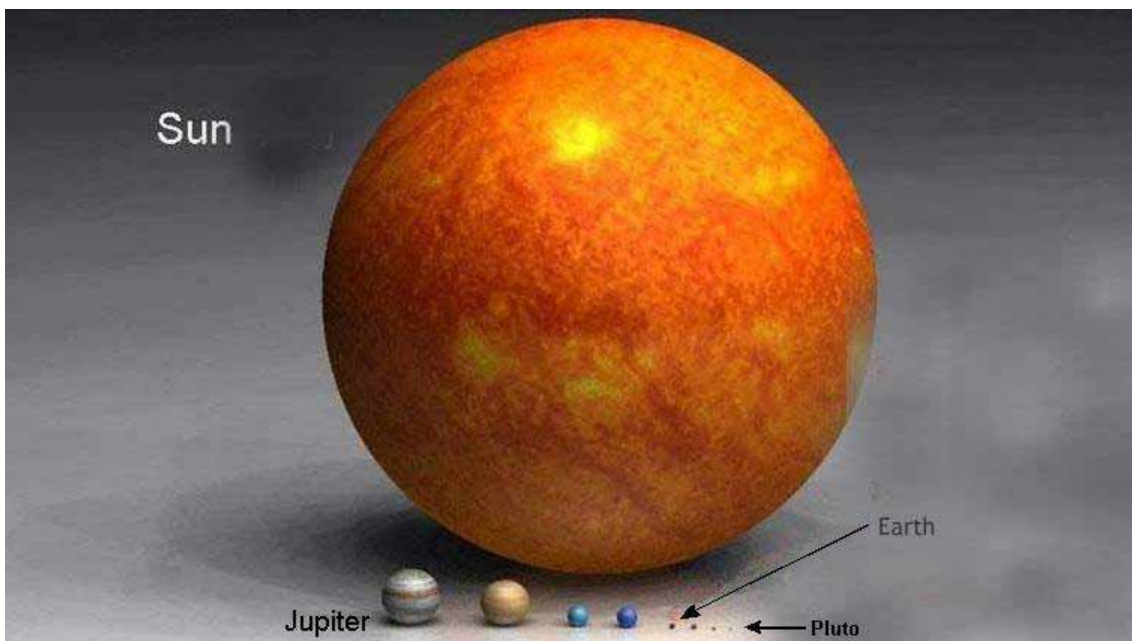
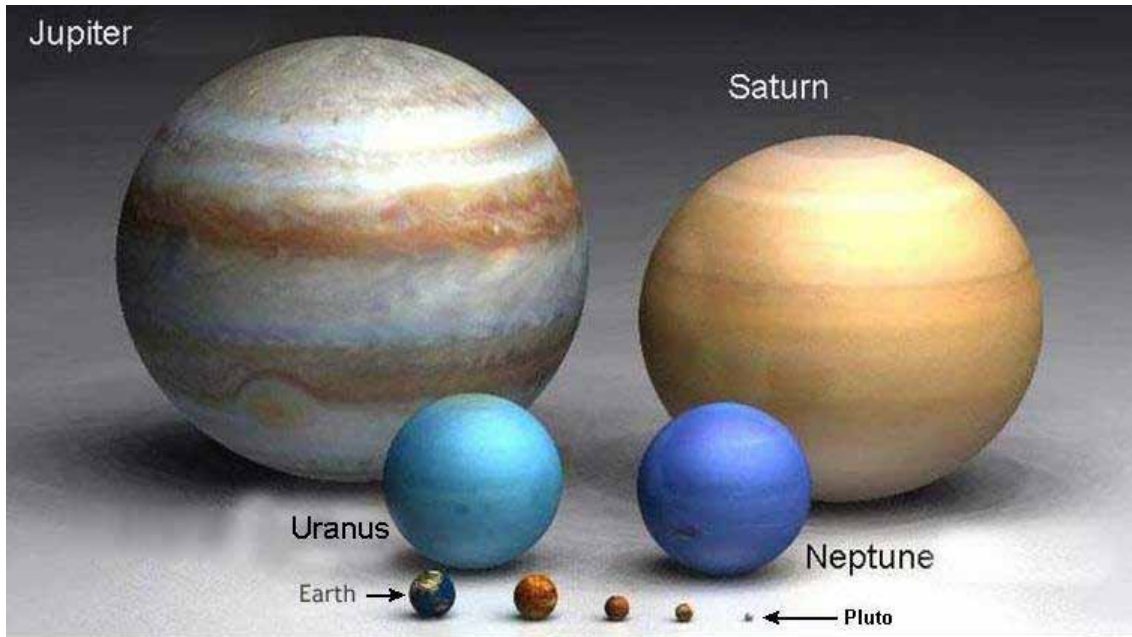
Does the object seem larger or smaller the farther away you are?

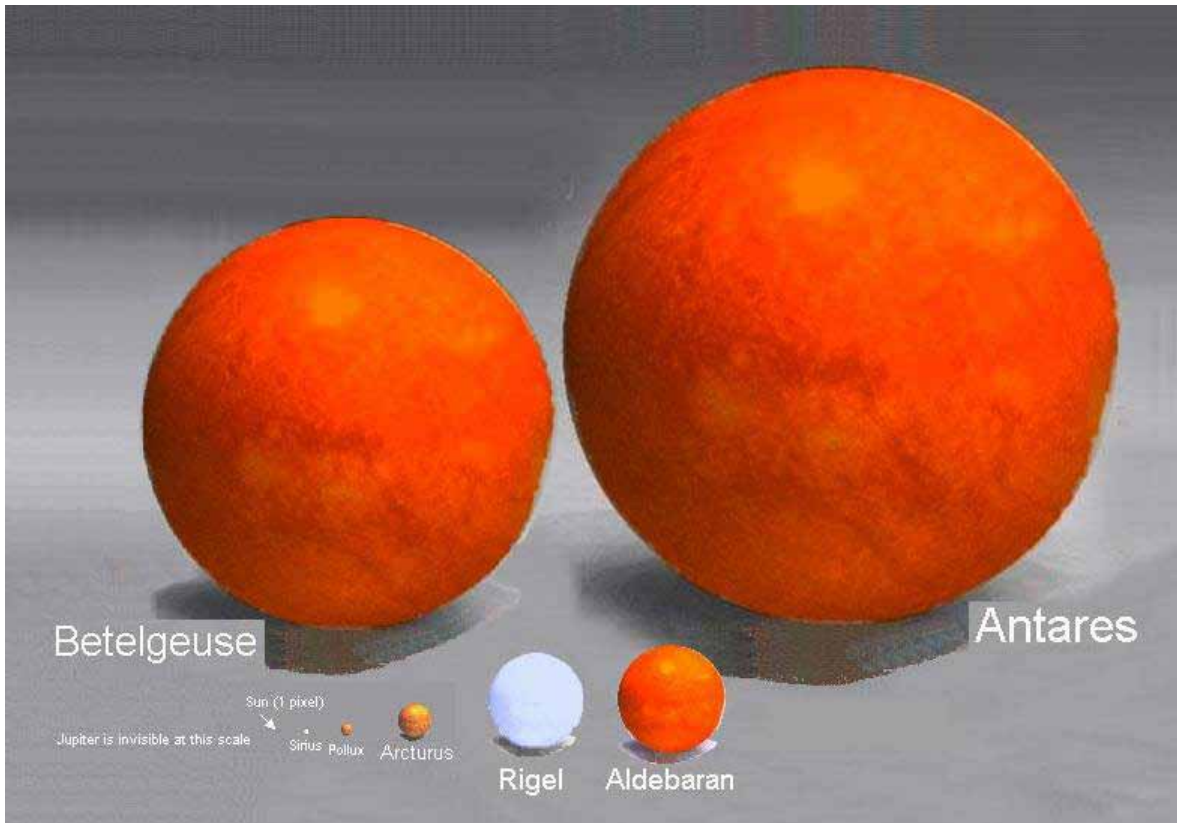
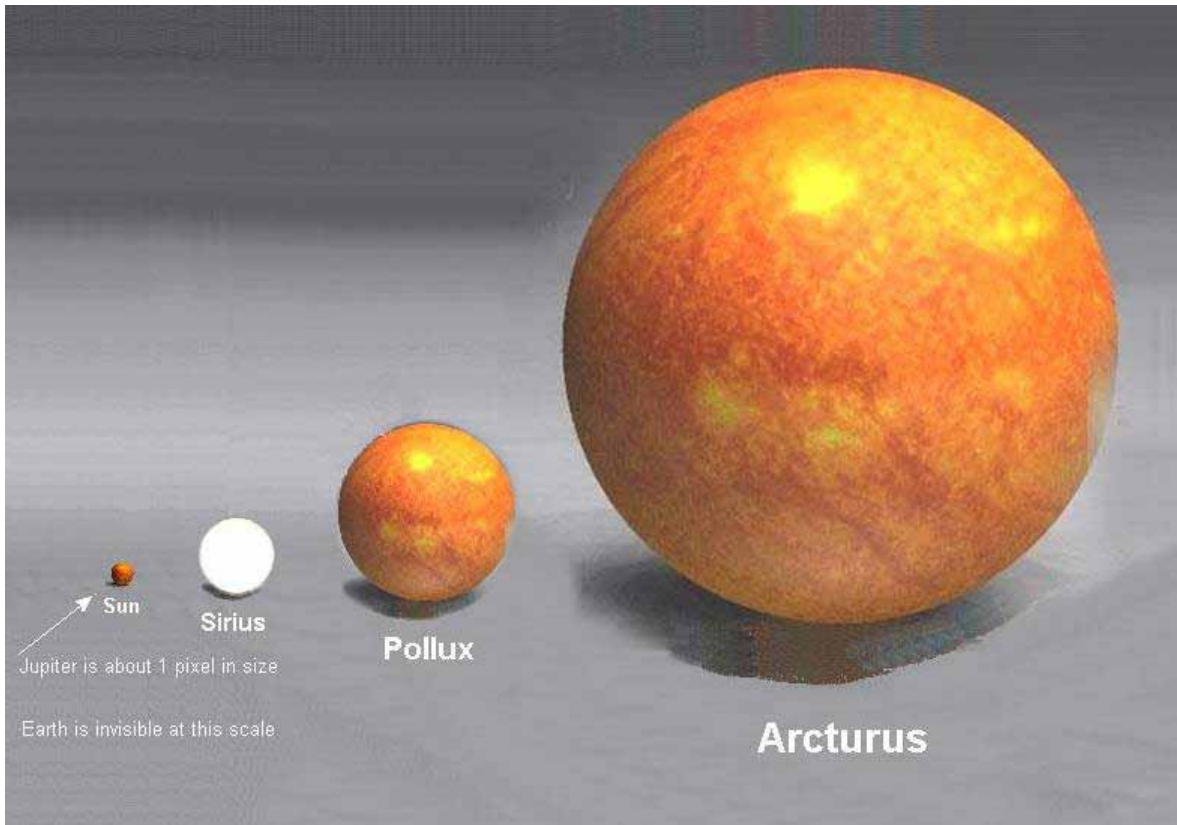
Did the size of the object actually change?

What changed to make the object appear differently?



The following images are found in several areas on the internet and are from an unknown source. Thanks to the original creator! This is a great size comparison of objects in and out of our Solar System.





Solar System Scale and Distance

This is a really fun project to do with a group of children, but you do need quite a bit of space. If at school, you might be able to do it in a hallway or on the playground. If at home, you will probably need to do it on a sidewalk or road without much traffic.

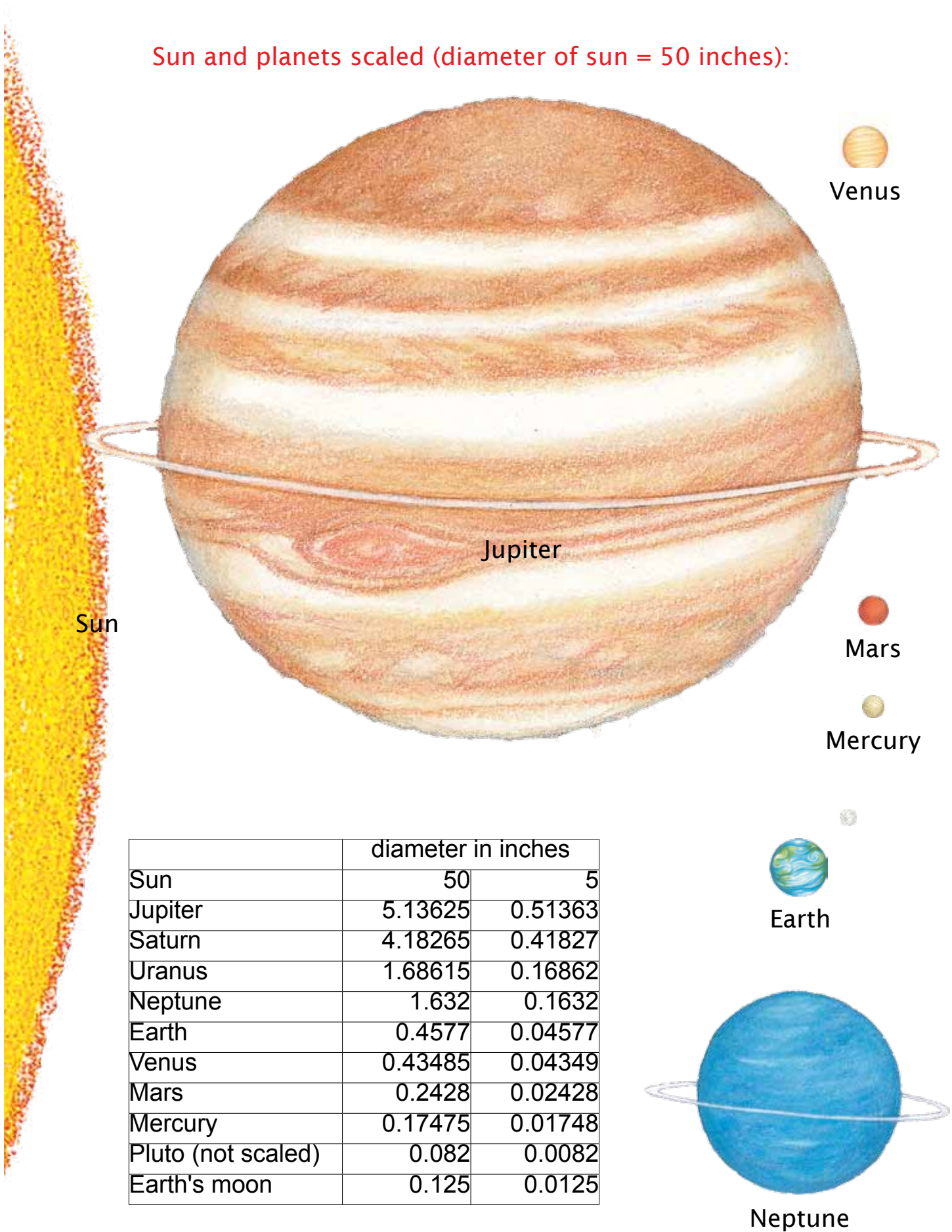
In order to scale the planets, we used the converter at Nine Planets and set the diameter of the Sun at 50 inches, as shown on the next page. However, with that scale, you would not be able to equate to the distance scale...unless it spreads for a few miles. To find a distance scale that would work, we re-scaled the planets down to ten percent.

If desired, find objects that are approximately the same size as the 10%-scaled planets to use for the distance scaling. Or use both copies of the scaled planets to “mark” the distances: the larger planets are more visible but the understanding of the size comparison is necessary to help understand the distance scale.

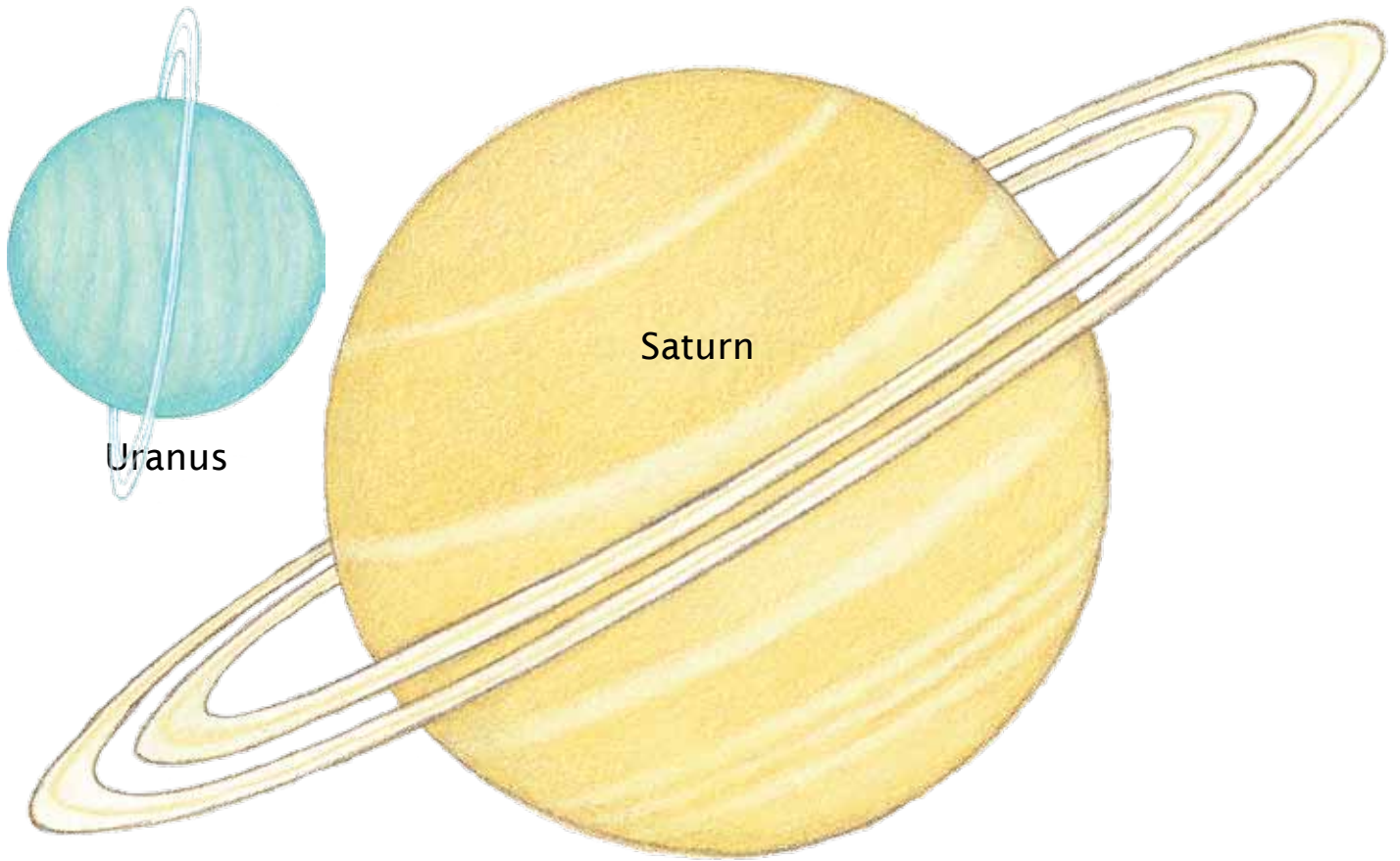
Using the chart below, you might want to round the measurements. Start with the sun and place it as your “start point.” Use a measuring tape or yardstick to measure out the rounded measurement for Mercury and place or mark your “Mercury” that distance away. Instead of measuring each planet from the sun, you can subtract the distance of the planet before it and just measure the difference.

Orbit Radius or distance from the Sun			
	kilometers	meters	feet and inches
Mercury	57,950,000	5.287	17 ft & 4.16 in
Venus	108,110,000	9.864	32 ft & 4.35 in
Earth	149,570,000	13.647	44 ft & 9.28 in
Mars	227,840,000	20.788	68 ft & 2.44 in
Jupiter	778,140,000	70.999	232 ft & 11.24 in
Saturn	142,700,000	130.202	427 ft & 2.08 in
Uranus	287,030,000	261.892	1347 ft & 0.59 in
Neptune	449,990,000	410.48	1770 ft & 0.75 in
	Round to:		Distance between
	feet	yards & feet	planets
Mercury			
Venus			
Earth			
Mars			
Jupiter			
Saturn			
Uranus			
Neptune			

Sun and planets scaled (diameter of sun = 50 inches):



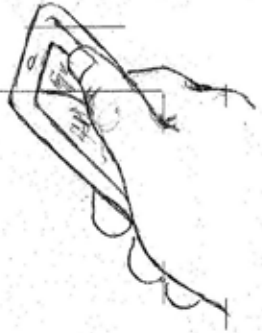
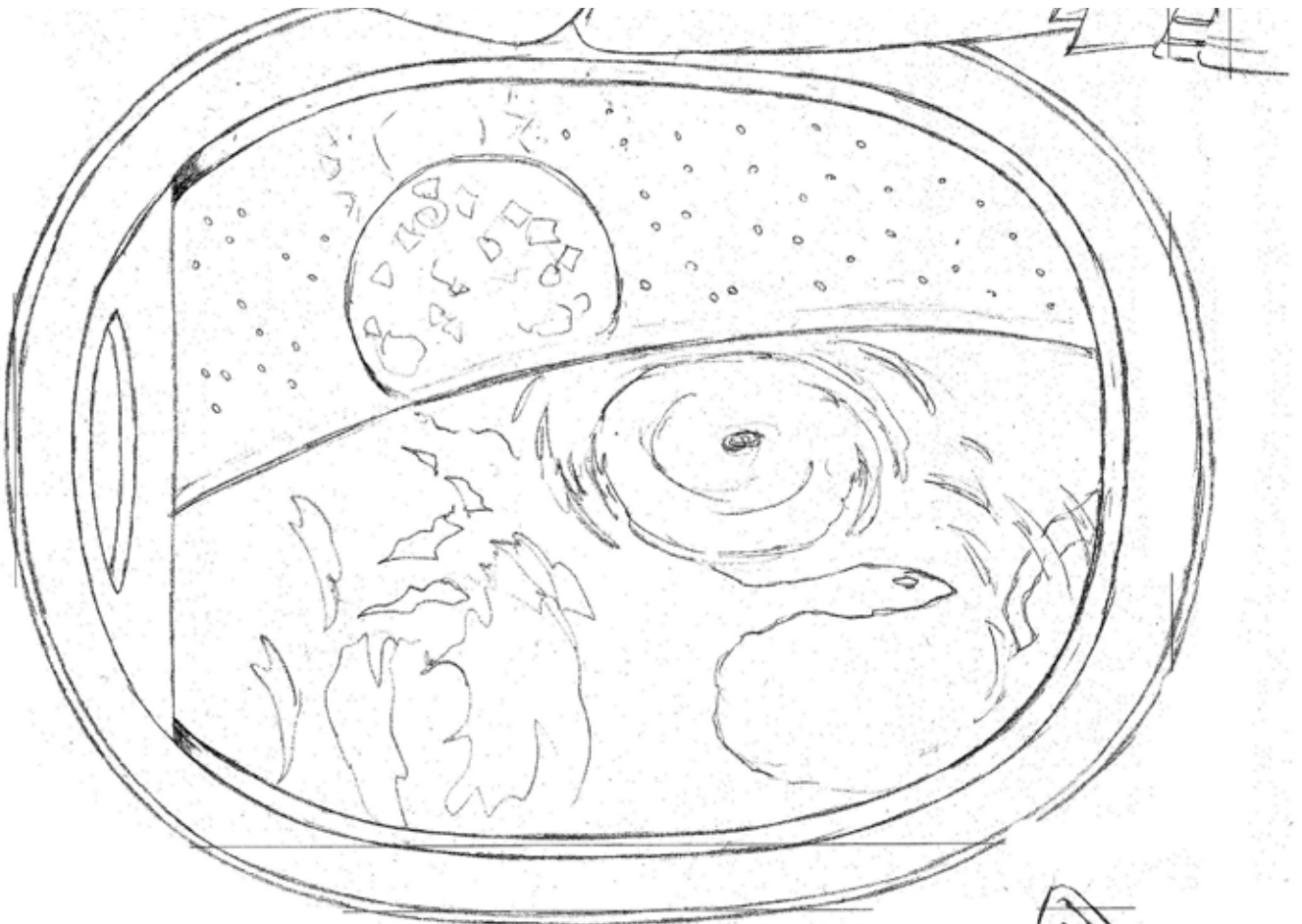
	diameter in inches	
Sun	50	5
Jupiter	5.13625	0.51363
Saturn	4.18265	0.41827
Uranus	1.68615	0.16862
Neptune	1.632	0.1632
Earth	0.4577	0.04577
Venus	0.43485	0.04349
Mars	0.2428	0.02428
Mercury	0.17475	0.01748
Pluto (not scaled)	0.082	0.0082
Earth's moon	0.125	0.0125



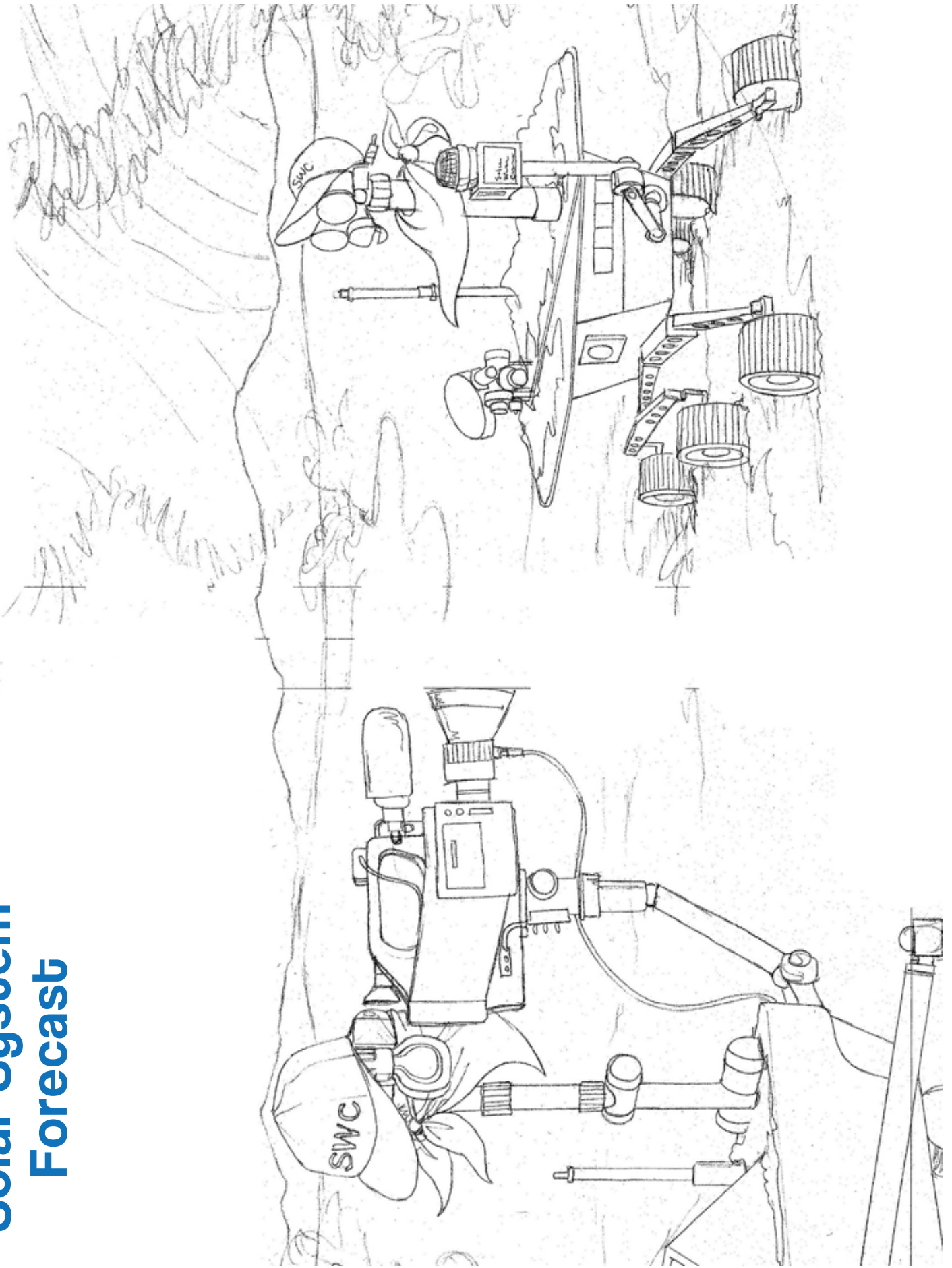
Sun and planets scaled for Sun at 5 inches:



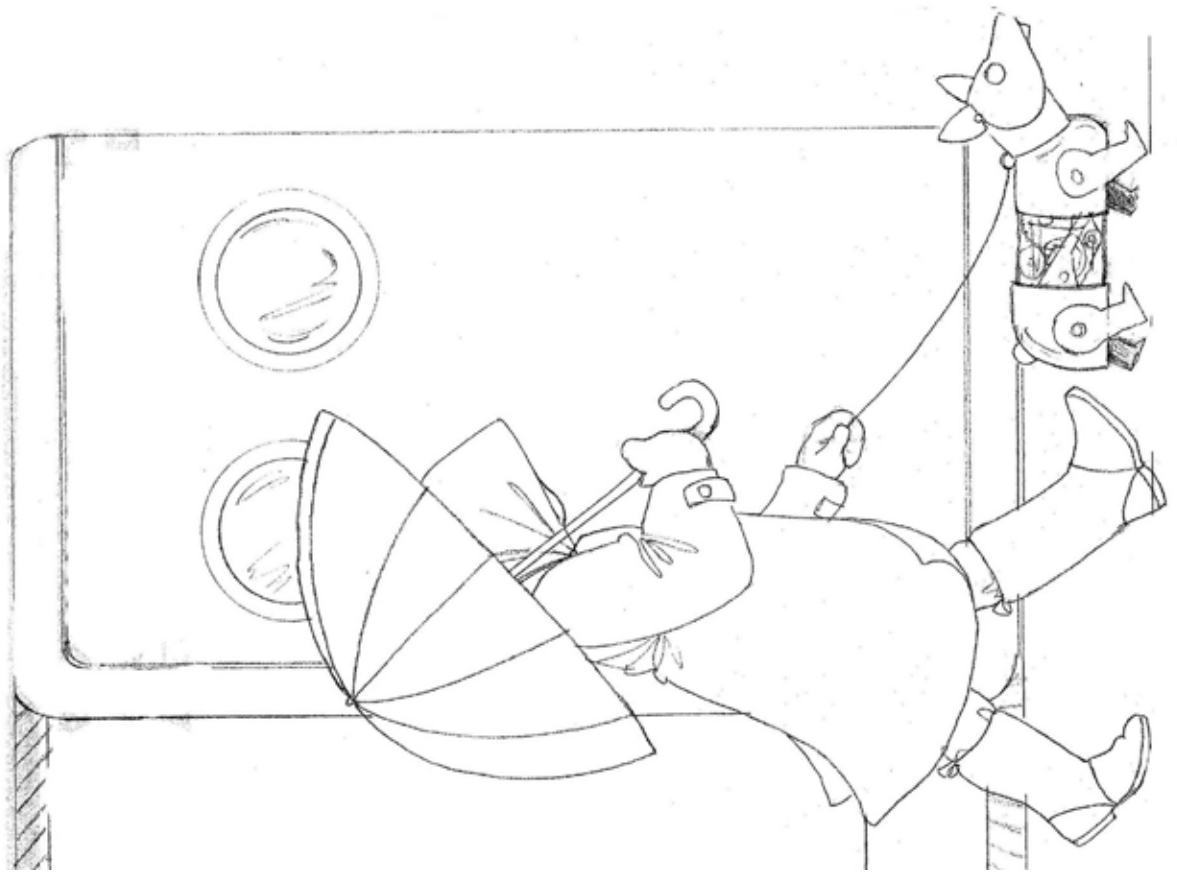
Solar System Forecast



Solar System Forecast



Solar System Forecast



Glossary

word	Definition	Part of Speech	Spanish
ammonia	a strong smelling gas often used for cleaning things	noun	amoníaco
argon	a gas in the air that does not produce a chemical reaction when mixed with other substances	noun	argón
astronomer	a scientist who studies the stars and moons found in outer space	noun	astrónomo
Atlantic Ocean	a large body of salt water that separates the Americas from Europe and Africa	noun	Atlántico
atmosphere	the air surrounding Earth, gases around each planet	noun	atmósfera
atmospheric pressure	the pressure exerted by the atmosphere at a given point; measured in millibars (avg = 1013.25 mb) or inches of mercury (avg = 29.92 Hg)	noun	presión atmosperhic
aurora	a glow in a planet's ionosphere caused by the interaction between the planet's magnetic field and charged particles from the Sun: seen on Earth as a green and red glow near the poles.	noun	aurora boreal o aurora austral
aurora borealis	also known as "Northern Lights," caused by the interaction between the solar wind, the Earth's magnetic field and the upper atmosphere (aurora australis) in Southern Hemisphere	noun	La aurora boreal
axis	(science) an imaginary line through a body, about which it rotates; (math) a horizontal or vertical line used to locate a point on a coordinate graph	noun	eje

word	Definition	Part of Speech	Spanish
big, bigger, biggest	large in size, height, or amount; Dolch Sight word, Pre-K, K	adjective	grande
bubble	a small ball or pocket of air or gas	noun	burbuja
bubble	fast moving balls or pockets of air or gas	verb	burbujear
bubbling	full of bubbles	adjective	burbujeante
carbon dioxide	one of many gases in Earth's atmosphere	noun	bióxido de carbono
carbon monoxide	an odorless gas that is very poisonous to humans	noun	monóxido de carbono
churning	mixed up, in a state of turbulence or agitation	adjective	agitado
cloud	visible collection of tiny water droplets or ice crystals in the atmosphere	noun	nube
cloudless	no clouds in the sky	adjective	despejado
cloudy	full of clouds, not clear	adjective	nublado
cold	opposite of hot; Dolch Sight word, grade 2	adjective	frío
compare	to look at similarities in properties of two or more objects	verb	comprar
cool	neither very warm nor very cold	adjective	fresco
core	an object's inside that is nearest its center	noun	núcleo
corona	the outer atmosphere of the Sun, only visible during an eclipse	noun	corona
dark	having a lack of light	adjective	oscuro
dazzling	shiny, bright	adjective	deslumbrante
dwarf planet	a celestial body that orbits our sun that is larger than a satellite (moon) but smaller than a planet	noun	planeta enano
Earth	the planet on which we live, third planet from the sun	noun	Tierra

word	Definition	Part of Speech	Spanish
energy	the ability to do work or cause a change; it can take many forms and can be converted from one form to another	noun	energía
Fahrenheit	a temperature scale based on 32° as the freezing point of water and 212° as the normal boiling point of water.	noun	grado Fahrenheit
forecast	a prediction of future, as in a weather forecast made by meteorologists.	noun	pronóstico
fragmentation	an organism's population or breeding ground broken into tiny piece, often caused by roads or development	noun	fragmentation
gas	a state of matter that has no definite shape or volume	noun	gas
heat	a form of energy that can cause temperature to increase	noun	calor
helium	often used in balloons, this gas is lighter than air	noun	helio
hot	having a high degree of heat or a high temperature	adjective	calor
huge	very large	adjective	gran, grande
hurricane	a tropical cyclone with sustained winds of 74 miles per hour (65 knots) or greater in the North Atlantic Ocean, Caribbean Sea, Gulf of Mexico, and in the eastern North Pacific Ocean.	noun	huracán
hydrogen	a gas that has no color or smell and is lighter than air	noun	hidrógeno
inner	inside, close to	adjective	interior
inner planets	the four rocky planets (Mercury, Venus, Earth, and Mars) whose orbits are closest to the sun	noun	planetas interiores

word	Definition	Part of Speech	Spanish
Jupiter	the fifth planet from the sun, largest planet in our solar system, named for the king of ancient Roman gods.	noun	Júpiter
light	brightness from the sun or man-made source, allowing one to see in the dark	noun	ligero, luz
living	having life, able to grow and reproduce, use food	adjective	viviente
magnetic	the property of a material to attract iron, cobalt, or nickel.	adjective	magnético
Mars	Fourth planet from the sun. Named for the Roman god of war. Other than Earth, Mars is the most explored planet in our solar system.	noun	Marte
Mercury	the closest planet to the sun	noun	Mercurio
methane	a gas often used for fuel	noun	metano
middle	the center of something	noun	parte central
mile	a customary unit of length; 1 mile = 1760 yards = 5280 feet.	noun	milla
moon	the natural satellite of the earth, orbiting it every 28 days and shining by reflected light from the sun; any natural body that revolves around a planet	noun	luna
Neptune	the eighth planet from the sun, named for the ancient Roman god of the sea	noun	Neptuno
nitrogen	a nonmetallic element necessary for the growth of organisms (especially plants)	noun	nitrógeno
nuclear reactor	a device to make and control a sustained nuclear chain reaction, usually used to make electricity	noun	reactor nuclear
orbit	an object's path as it goes around another object	noun	órbita

word	Definition	Part of Speech	Spanish
outer	on or around the outside of something, far from the center of something	adjective	externo
oxygen	a colorless and odorless gas that is needed by people and animals to live	noun	oxígeno
planet	a large ball of rock and/or gas that orbits a star (in our case, the Sun)	noun	planeta
Pluto	named for the Roman god of the underworld, used to be considered a planet but now considered a dwarf planet	noun	Plutón
revolution	the motion of the planets in their orbit around the Sun	noun	revolución
revolve	to move in a curved path around a center or axis	verb	girar en órbita
ring (planetary)	circle of ice around an outer planet (Saturn, Jupiter, Uranus, Neptune)	noun	anillo planetario
rocky	having lots of or made of rocks	adjective	de roca
rotate	to turn about an axis or a center	verb	rotación
satellite	any object, man-made or natural, that orbits another body.	noun	satélite
Saturn	sixth planet from the sun, second largest planet in our Solar System, known for its rings	noun	Saturno
slanted	at an angle	adjective	inclinado
solar energy	the energy produced by the sun	noun	energía solar
solar flare	a sudden explosion of intense high-energy radiation from a sunspot	noun	erupción solar
solar system	a system of planets and other bodies orbiting a star	noun	sistema solar
solar wind	like moving air in our atmosphere but carrying particles from the Sun through the Solar System	noun	viento solar

word	Definition	Part of Speech	Spanish
solid	a state of matter that has a definite shape and volume	adjective	sólido
space	the expanse in which the solar system, stars, and galaxies exist; the universe	noun	espacio
spin	to turn around quickly, 2) to make a thread	verb	girar
star	a huge ball of hot gases that gives off energy including light and heat	noun	estrella
storm	a violent disturbance of the atmosphere with strong winds and usually rain, thunder, lightning, or snow	noun	temporal
stormy	windy, rainy weather	adjective	tempestuoso
Sun	the star closest to Earth, the center of our solar system; a ball of hot, glowing gases giving Earth heat and light.	noun	sol
sunlight	light from the sun, gives heat and warmth	noun	luz del sol
sunspot	a dark area on the Sun's surface caused by magnetic storms	noun	mancha solar
sunspots	cooler, dark areas on the Sun's surface caused by magnetic storms	noun	mancha solar
survive	to remain alive or in existence	verb	sobrevivir
swirl	to move quickly in a circle	verb	arremolinarse
telescope	a scientific instrument that magnifies distant images	noun	telescopio
temperature	the warmth or coldness of something; measured with a thermometer	noun	temperatura
Uranus	the seventh planet from the sun, third largest planet in our solar system	noun	Urano

word	Definition	Part of Speech	Spanish
Venus	the second planet from the sun, named for the Roman goddess of love and beauty.	noun	Venus
water	a fluid necessary for the life of most animals and plants	noun	agua
water vapor	gas stage of water	noun	vapor de agua
wind	the natural movement of the air in the atmosphere	noun	viento

Answers

Find in the art

Alien weatherman button	Uranus
Alien weatherman in a framed photograph	Mercury
Alien weatherman on a magazine cover	Earth
Alien weatherman reflection	Introduction
astronaut holding a weather balloon	Neptune
basketball	Uranus
canoe	Titan
clothespin	Neptune
green flip flop	Mercury
iPod	Earth
melted satellites	Venus
robot (based on the Spirit rover)	Mars
snowball	Pluto
space shuttle	Jupiter
TV satellite dish	Titan
windsock	Neptune
700 SPF sunscreen	Mercury

Silly Sentences

The Sun is the star at the center of the solar system.

The Sun is over 4 billion (4,000,000,000) years old. That's a lot of birthday candles!

It is a medium-sized star. It looks so big to us compared to other stars because it is the closest star to us.

The Earth could fit in the Sun about 1 million (1,000,000,000) times!

You should not stare at the Sun directly as it could hurt your eyes.

It is a huge ball of bubbling and churning gas—you would not be able to stand on it.

The middle of the Sun (core) is very hot and acts like an “energy factory” or nuclear reactor. It creates the heat and light that living things need to survive on Earth.

If you've ever stood by a fire, you know that fire gives off heat and light too. Think of how hot the Sun must be to get that heat and light all the way to Earth! Do you think the planets closest to the Sun receive more or less heat and light than the planets that are far away from the Sun? Why?

Sunspots are cooler, dark areas on the Sun's surface caused by magnetic storms. The Earth could fit into some sunspots!

Solar flares are sudden explosions of intense energy coming out of a sunspot. These flares hit the Earth's atmosphere and can cause radio static and short-wave outages. Coronal Mass Ejections are billion-ton clouds of heated gas (called plasma) that travel at millions of miles per hour from the sun. When they hit Earth they can cause auroras and electrical power blackouts.

It takes less than ten minutes for sunlight and heat to reach the Earth—about 93 million (93,000,000) miles (150 million kilometers) away.

Like the planets, the Sun spins on its axis.

The Sun's outer atmosphere (corona) can only be seen during a total eclipse.

Word Search

	A	B	C	D	E	F	G	H	I	J
1		A						W		
2		T					H	E	A	T
3		M						A		
4	F	O	R	E	C	A	S	T	C	
5		S	O	L	A	R		H	A	
6		P	L	A	N	E	T	E	L	
7		H	O	T	S	T	O	R	M	
8		E			U					
9		R	W	I	N	D	Y	G	A	S
10		E								

ATMOSPHERE
 FORECAST
 HEAT
 PLANET
 STORM
 WEATHER

1,B
 4,A
 2,G
 6,B
 7,E
 1,H

CALM
 GAS
 HOT
 SOLAR
 SUN
 WINDY

4,I
 9,H
 7,B
 5,B
 7,E
 9,C

Shades of Meaning

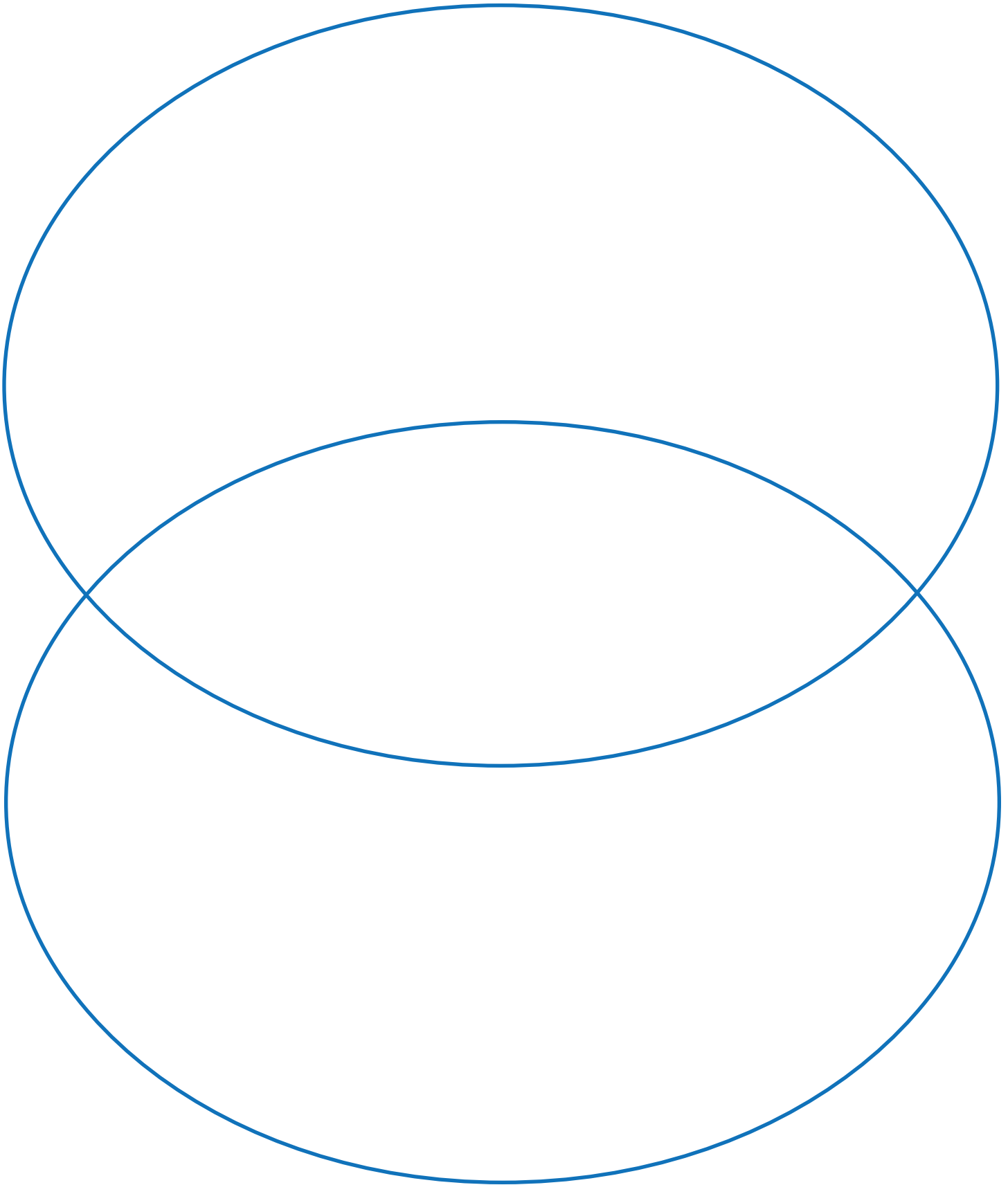
1. Most of Uranus' stormy **weather** happens during the season changes—about every 21 Earth years.
2. The “Mercury girl” isn't sure **whether** to pack a bathing suit or a ski suit.
3. We get our heat and light from the **Sun**.
4. The **Sun** is the center of our Solar System.
5. Gas shoots out of the dark **holes** and flies out on the solar wind.
6. The methane gas in its below-freezing atmosphere gives Neptune its beautiful **blue** color.
7. **Stars** are huge balls of hot gases that give off energy including light and heat.
8. The **outer** planets (Jupiter, Saturn, Uranus, and Neptune) are huge balls of gasses with rings.
9. The Sun is a huge ball of bubbling and churning gas—you **would not** be able to stand on it.
10. It takes **less than** ten minutes for sunlight and heat to reach the Earth—about 93 million (93,000,000) miles (150 million kilometers) away from the Sun.

Appendix A—“What Children Know” Cards

<p>Question:</p> <p>My answer:</p> <p>This information is correct! This information is not correct; can you find the correct information?</p>	<p>Question:</p> <p>My answer:</p> <p>This information is correct! This information is not correct; can you find the correct information?</p>
<p>Question:</p> <p>My answer:</p> <p>This information is correct! This information is not correct; can you find the correct information?</p>	<p>Question:</p> <p>My answer:</p> <p>This information is correct! This information is not correct; can you find the correct information?</p>

Appendix B—Venn Diagram

Compare and contrast two objects found in our solar system



Appendix F—Vocabulary Cards

Mercury

Venus

Earth

Mars

Jupiter

Saturn

Uranus

Neptune

Pluto

planet

moon

dwarf planet



Sun

solar flare

sunspot

weather

wind

atmosphere