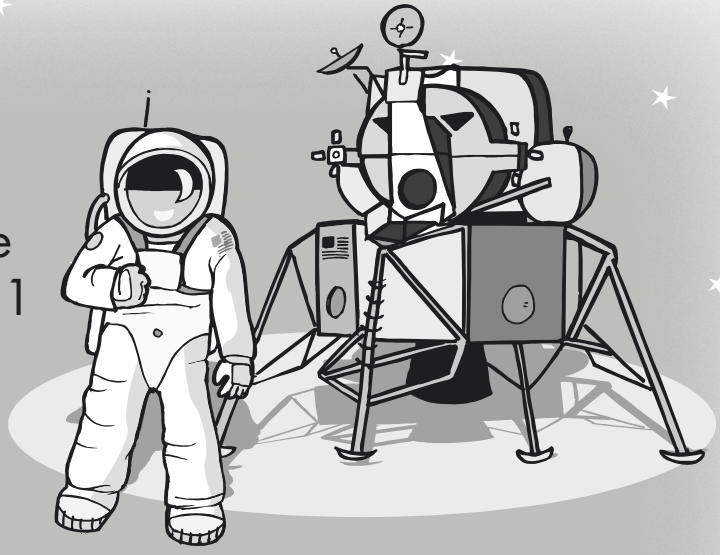
MEETS NATIONAL STANDARDS

Steven soars in to Space Science!

BY CAROLE MARSH

HHWHOOOOOO...



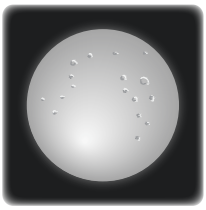
Neil Armstrong exhaled as he opened the door of the Apollo 11 lunar module. He stared at the craggy surface before him, brilliantly lit by the sun. His heart was pounding. Why? In just a few moments, he would be the first man to set foot on the surface of the moon!

Slowly, carefully, Neil lowered himself down the stairs. His movements were labored and clumsy in his puffy white spacesuit and huge boots. Neil stepped onto the last rung and glanced back at the earth. It's *sooooo* stunning, he thought, mesmerized by the radiant blue and white planet floating in the deep black of space. Its beauty was beyond description!

Back on that magnificent planet, millions of people held their breath, spellbound by the slow-moving, shadowy white figure on their televisions. Was it really happening? Was man truly going to walk on the moon? Right here? Right now?

Neil paused on the bottom step…and then gingerly planted his left boot into the powdery lunar dust. He uttered the words that are cemented in history: **"That's one small step for man, one giant leap for mankind."** The world would never be the same!

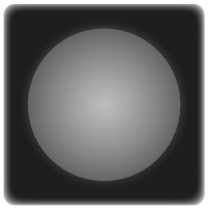
Moon footprint provided by NASA.



Following the Moon

Isn't a full moon beautiful? Have you ever wondered why there isn't a full moon every night? Remember that day and night occur when the earth spins on its axis. The moon doesn't spin on its axis, but circles the earth slowly. The light that the moon gives off is not its own. It reflects light from the sun.

As the moon slowly circles the earth, the varying amounts of light reflected from the sun make the moon appear to have different shapes. Those shapes are called "phases" of the moon.



A full moon occurs when the entire moon is illuminated. When only half of it shines, it's a quarter moon. A crescent moon looks like a wedge of cheese. When we can't see the moon because there is no reflected light, it is known as a new moon.

The first half of the moon's phases starts with a new moon. The moon grows larger each night until it is a full moon. Then the moon begins decreasing each night until there is no reflection. It's a new moon again! It takes about 15 days for a new moon to become a full moon.

Search It Out!

Find the following words in the word search below.

new moon	full moon	illuminate	quarter
reflection	axis	spin	phase

S	B	R	E	F	L	E	C	T	I	O	N	N	Y
U	D	Y	A	P	I	S	V	D	B	V	X	U	Q
H	F	E	S	U	V	R	P	O	K	F	J	G	E
S	U	D	I	W	A	W	F	P	Z	Y	O	G	T
I	L	U	A	K	W	X	U	P	C	F	M	Y	J
L	L	R	E	F	L	E	I	T	I	O	U	N	W
B	M	L	Q	C	Q	B	Y	S	I	X	N	N	X
I	O	R	U	O	A	N	Y	R	V	D	X	S	Z
Z	O	R	A	M	P	X	T	C	M	L	R	P	P
S	N	R	R	O	I	E	C	T	I	O	N	I	L
A	D	E	T	T	H	N	O	O	M	W	E	N	R
V	P	S	E	K	V	R	A	O	G	M	U	C	E
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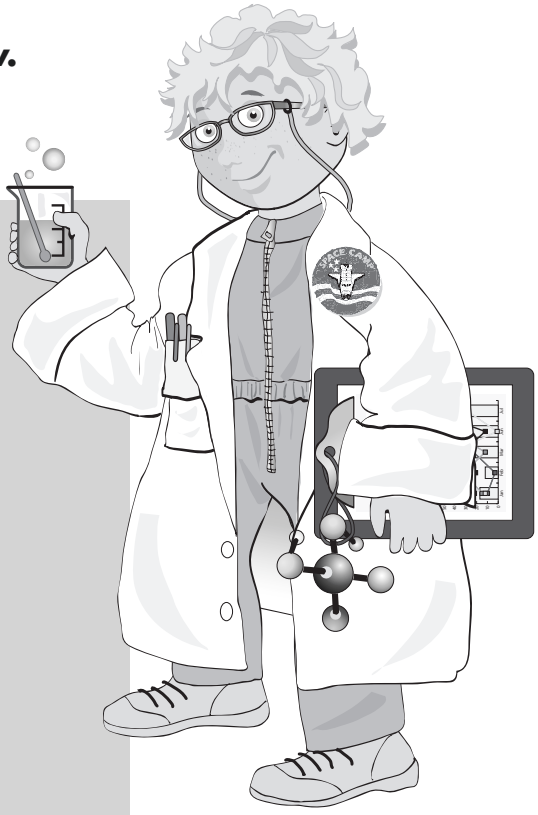
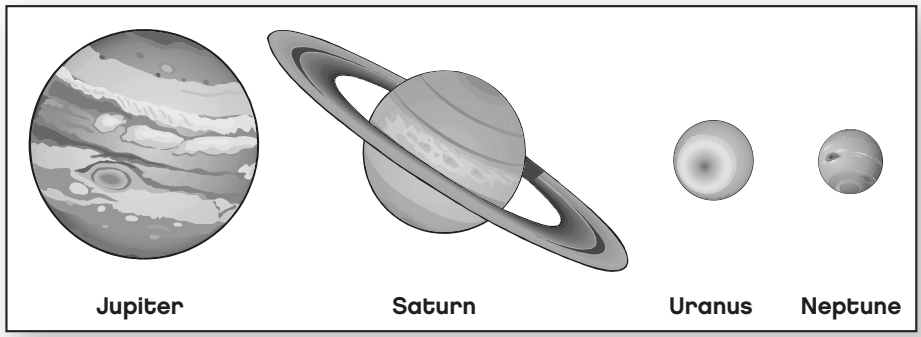


The Outer Planets

The outer planets—Jupiter, Saturn, Uranus, and Neptune—are outside of the asteroid belt between Mars and Jupiter. All four of these planets are made up of gas, and are often called the Gas Giants. **Saturn's** rings are most visible, but all four planets have rings of dust, ice, or rocks around them. They also have several moons. Don't try to land a spaceship on one of these planets, though! Because they are made of gas, they have no solid surface!



Jupiter is the biggest of the outer planets. About 1,300 Earths can fit into Jupiter. It has us beat in the moon department, too, with 63! Saturn has a mere 31 moons! Scientists still haven't figured out why **Uranus** rotates on its side, as if it just fell over. **Neptune** will blow you away—really! Winds on that planet gust up to 1,200 miles per hour. **HOLD ON!**

Word Bank:

Neptune	moons
Saturn	Mercury
Uranus	Venus
planets	Gas Giants
Jupiter	asteroids

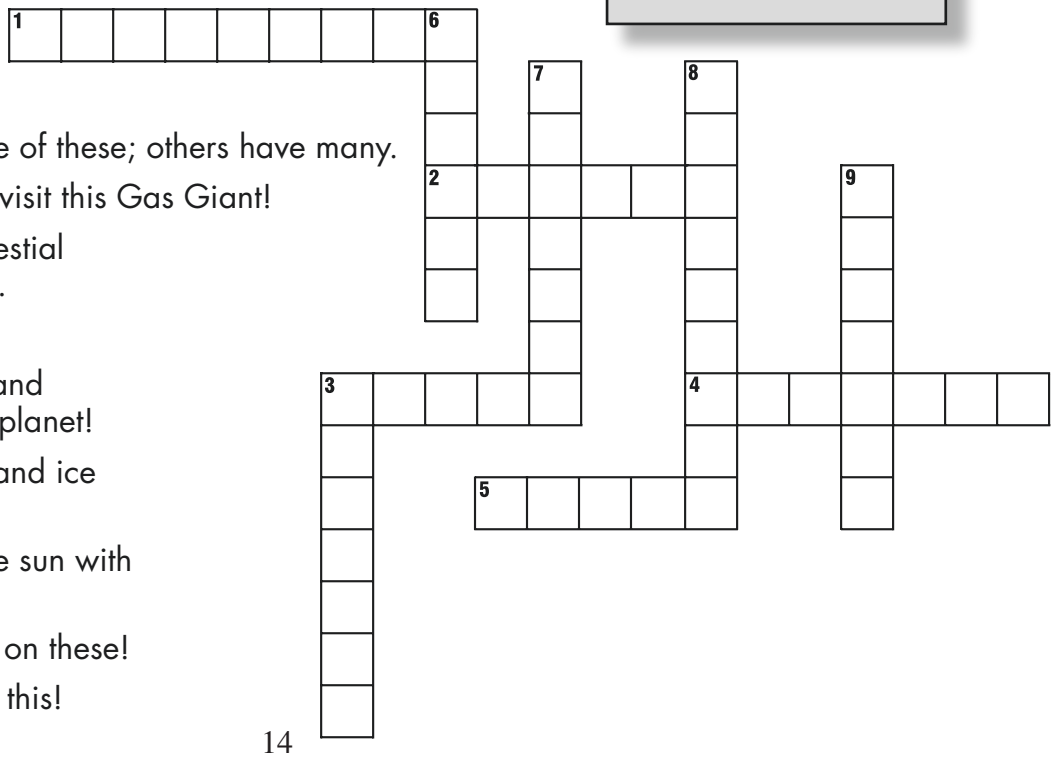
Planet Words! Can you solve the crossword puzzle?

Across

1. They're part of a belt, but not the kind you wear around your waist!
2. Maybe the winds from Neptune blew it over!
3. Some planets have just one of these; others have many.
4. Hold on to your hat if you visit this Gas Giant!
5. It's one of the brightest celestial bodies in the nighttime sky.

Down

3. You'll need your swimsuit and your parka if you visit this planet!
6. Its rings are made of dust and ice instead of gold!
7. You'll find these circling the sun with nothing in their path.
8. Don't land your spaceship on these!
9. 1,300 Earths make one of this!



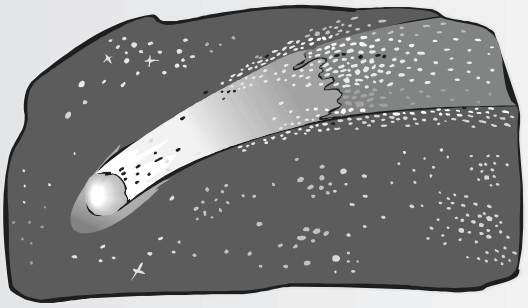
Checking Out the Night Sky

Looking through a telescope at the stars can be an amazing experience! Ancient Greeks loved to look at the stars. They noticed that the planets moved through the night sky, while all the stars stayed in place. (Remember, the planets are revolving around the sun.)

The ancient Greeks discovered Mercury, Venus, Mars, Jupiter, and Saturn. All of these planets can be seen without using a telescope. The famous astronomer Galileo used a telescope to find four of Jupiter's moons. Other **astronomers**—people who study the stars—found Neptune and Uranus.

After you complete the project below, and are looking at the sky, you'll be able to notice the difference between planets and stars yourself. Planets shine with a steady light, while stars twinkle.

See for Yourself!



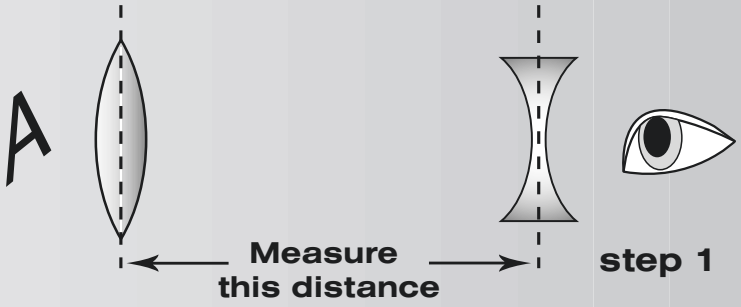
Do you want to see how the planets and stars look close up? **Follow the instructions below to build your own telescope!**

Materials needed:

- 2 cardboard tubes (should be longer than 12" and one needs to slide easily in and out of the other)
- hot glue gun (ask for an adult's help when using this)
- 1 large convex telescope lens (convex lenses are thicker in the center and thinner at the edge) You can use a lens from a small magnifying glass no bigger than the largest tube.
- 1 small concave telescope lens (concave lenses are thinner in the center and thicker at the edge) Check with an optical store for discarded eyeglass lenses.

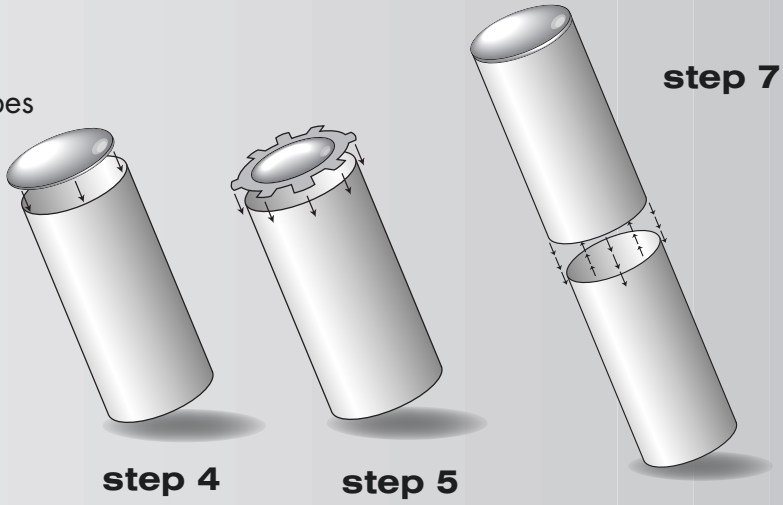
Instructions:

1. Find out how far apart the lenses need to be. This is how you do it: Look through the smaller lens as you hold the larger lens out in front of you. When you can focus on an object in the distance, measure the distance between the two lenses. Write it down.



2. Double that measurement.

3. Cut the length of the two cardboard tubes to that second measurement. Use the wider tube for the convex lens, and the narrow tube for the concave lens.



4. Before gluing the lens in place, make sure you center it in the middle of the tube opening. If the lens is too small to glue to the tube opening, cut out a circle of cardboard that is about one inch larger than the end of the tube. Cut a hole in that cardboard piece a little smaller than the lens. Glue the lens to the cardboard.

5. Place this piece on the end of the cardboard tube. Cut tabs in the excess cardboard around the outside of the tube. Fold these tabs down and glue the cardboard and lens to the tube.

6. For the eyepiece, repeat step 4 for the concave lens.

7. Stick the smaller tube into the larger one.

8. Steady your elbows on a solid surface and aim your telescope at the moon.

9. Slide it in or out until the moon comes into focus. Wow!! You have a telescope!

Hans Lippershey was an eyeglass maker from the Netherlands who invented the telescope and made it available for general use in 1603.

Galileo Galilei was an Italian astronomer born in 1564 who made improvements to the telescope and used it to extensively study the solar system.

Yuri Gagarin was a Russian astronaut who, on April 12, 1961, became the first person to blast into space.

John Glenn became the first American to orbit Earth in 1962. He later became a U.S. senator.

Sally Ride became the first American woman in space on June 18, 1983.

Space Circle

Space explorers come from all countries of the world. Match these pioneering men and women with their native homes! **Draw a line from the scientist to his or her home country.**

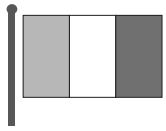
A. Hans Lippershey

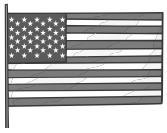
B. Galileo Galilei

C. Yuri Gagarin

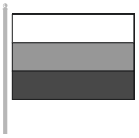
D. John Glenn

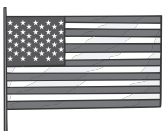
E. Sally Ride

1. ***Italy*** 

2. ***United States*** 

3. ***Netherlands*** 

4. ***Russia*** 

5. ***United States*** 

Answer Key

Page 10-11
1. orbits 2. 365; one year 3. tilted 4. Northern 5. half 6. equinox

Page 14
Across: 1. asteroids 2. Uranus 3. moon 4. Neptune 5. Venus
Down: 3. Mercury 6. Saturn 7. planets 8. Gas Giants 9. Jupiter

Page 15
1. b 2. b 3. b 4.c

Page 16
1. earth 2. sol 3. stars 4. fountains 5. hydrogen 6. helium 7. sunspots

Page 20
Orion – B; Gemini – D; Big Dipper – C; Scorpius – A

Page 23
patience, wisdom, mistakes, failure, encouragement, perseverance, time, optimism, brainstorming

Page 24
Hans Lippershey – Netherlands; Galileo Galilei – Italy; Yuri Gagarin – Russia; John Glenn – United States; Sally Ride – United States