

Skywatchers

4th
Grade



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Certificate of Completion

Answer Sheets

** Has an Answer Sheet*

SKY WATCHING VOCABULARY

A. Read each vocabulary word out loud. Then write it three times on the blank line.

PHYSICS a branch of science that deals with the properties of matter and energy
.....

ASTRONOMY a branch of science that deals with outer space and the physical universe
.....

ORBIT the curved path of an object in space around a star, planet or moon
.....

ROTATE to move in a circular path around an axis, or center
.....

LIGHTYEAR an astronomical unit of measurement, describing the distance light can travel over one year: 5.8 trillion miles (5,800,000,000,000 miles)
.....

CONSTELLATION a group of stars that forms a recognizable pattern or shape, traditionally named after mythical figures or signs of the zodiac
.....

FORCE in physics, an influence that changes the motion of an object, or that produces motion in a stationary object
.....

NORTHERN HEMISPHERE

the topmost half of our globe; everything north of the equator

.....

EQUATOR

an imaginary line at the center of the globe, equal distances from the north and south poles; latitude 0°

.....

LUNAR

relating to the moon

.....

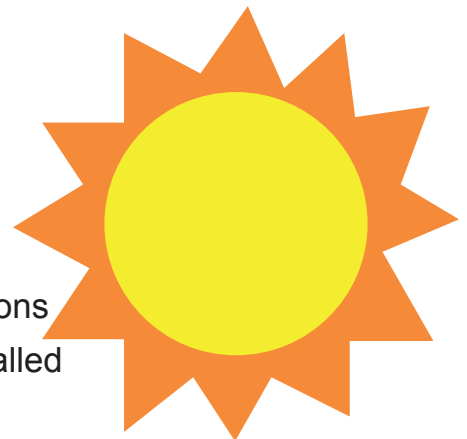
SOLAR

relating to the sun

.....

B. Match the words given on the previous activity with the sentences below.

1. A _____ is not a measurement of time, but a measurement of distance.
2. When you live below the _____ you can't see the same stars as people who live in the Northern hemisphere.
3. You will see a _____ eclipse when the moon aligns exactly between Earth and the Sun, casting a shadow.
4. Comets and asteroids are small rocky, icy masses that _____ around the sun.
5. Ursa Major, or the big dipper, is one of the most well-known _____.
6. _____ is the study of matter and energy, and how they interact.
7. Pisces, Cancer, Aries, and Orion are some of the constellations located in the sky north of the equator, which is an area also called the _____.



SKY WATCHERS

STORYTELLING VS SCIENCE

Storytellers and myth makers have been watching the skies as long as anyone can remember. Scientists have been watching the skies too, but in different ways. You probably know a lot about what makes them different. See what you know by filling in the blanks below.



	STORYTELLER	SCIENTIST
TOOLS THEY USED IN THE PAST		
TOOLS THEY USE IN THE PRESENT		
QUALITIES OR CHARACTER TRAITS		
WHY DO THEY DO WHAT THEY DO?		

CRITICAL THINKING :

Do you think scientists and storytellers are more similar to or different from each other? Write your answer in complete sentences. Write at least three sentences.



SKY STORIES: SUN GOD



Long ago, before humans had access to advanced science technology, they told stories to explain natural phenomena such as thunder and lightning, or the sun's path across the sky. In Greek mythology it was believed that the god Helios was in control of the sun.

STORY OF HELIOS

Helios was born as a son of the Titan gods. His sisters were Selene, the moon, and Eos, the dawn. He was best known for being the god who drove his chariot of the sun across the sky every day, with the help of his four fire horses. Over time, the name Helios was used less and less, and Apollo the god of music and knowledge also began to represent the sun.





WORD SEARCH

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

TIP:



HELIUM

TIME

HELIOS

CHRONOLOGY

OLYMPUS

HERA

OLYMPIC

HERO

SKY STORIES: MAYAN MOON RABBIT



Long ago, before humans had access to advanced science technology, they told stories to explain natural phenomena such as thunder and lightning, or the phases of the moon. Ancient Mayans had many different beliefs about where the moon came from.

THE MAYAN MOON

According to legend, the world was created when two hero twins rescued their father from the underworld. After they defeated the gods of the underworld, the twins rose up into the sky to become the sun and the moon. Their father became the god of maize (corn) and he rose to create the first sunrise.

Mayans thought of the moon as a female symbol. The crescent moon symbolized a young girl, and the waning moon symbolized a grandmother. When the moon was full, they saw a rabbit in the moon. This connects to other stories of how when the moon was first created, the gods threw a rabbit at its face to dim the light.

The Mayans also believed that the goddess of birth and fertility, Ix Chel (EET-chel), was also a goddess of the moon.





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

TIP:



LAST QUARTER

MAIZE

LEGEND

FULL MOON

MAYANS

CRESCENT

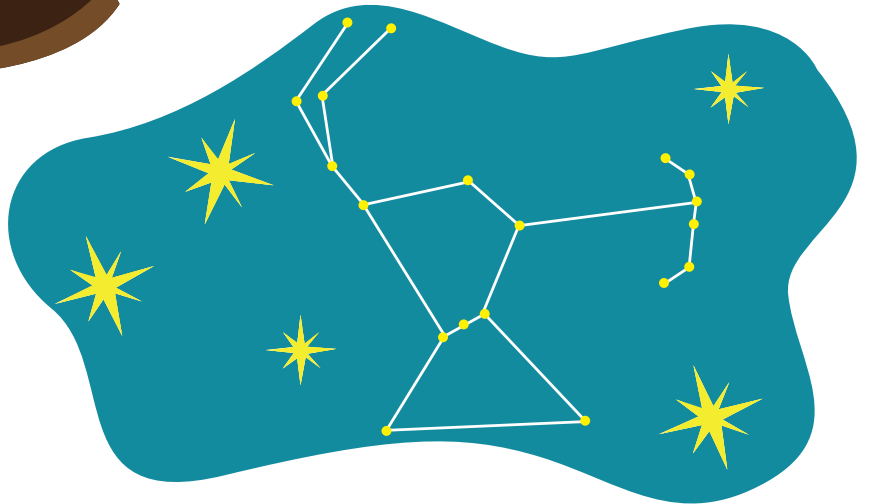
WANING MOON

GIBBOUS

SKY STORIES: ORION



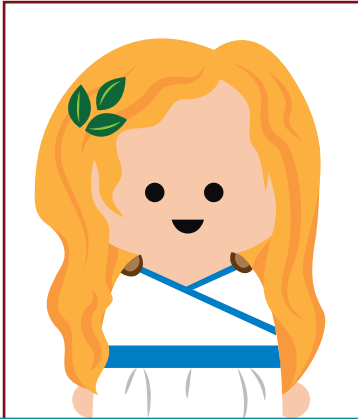
Long ago, before humans had access to advanced science technology, they told stories to explain natural phenomena such as thunder and lightning, or the stars in the sky. Greek and Roman mythology tell stories of how Orion was made into a constellation.



STORY OF ORION

Orion was the son of Neptune. He was a great hunter who had the power to walk on the sea. The moon goddess and huntress Artemis was in love with Orion, but her brother Apollo was not pleased. One day, when Orion was wading in the sea up to his head, Apollo challenged Artemis, saying that she could not hit the teeny black spot on the sea. Of course, she did, but realized too late that it was her love, Orion. So Artemis placed him in the stars where he can still be seen today, with the protection of Sirius, the Dog Star.

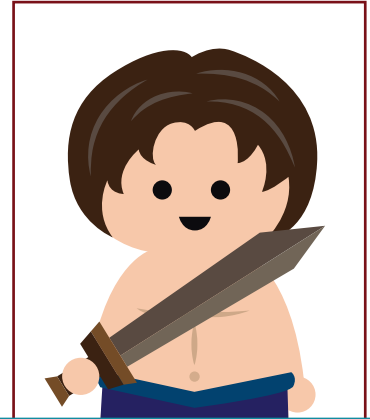
IDENTIFY THE THREE MAIN CHARACTERS OF THE STORY



Describe her trait:



Describe his trait:



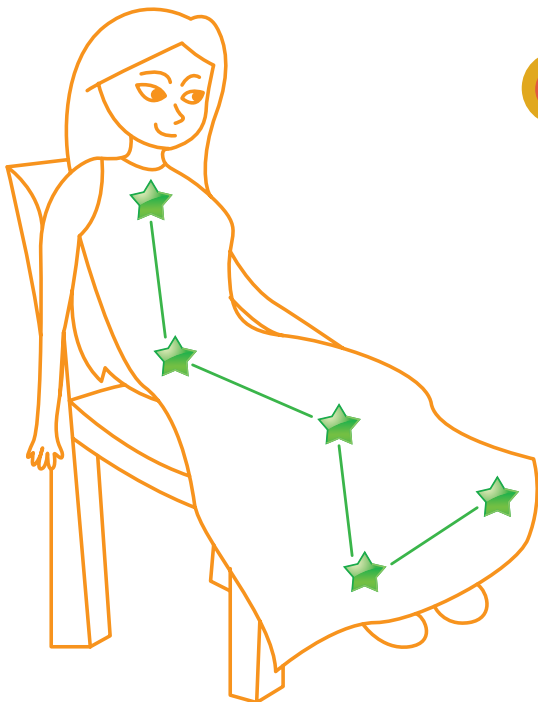
Describe his trait:

DRAW THE STORY OUT

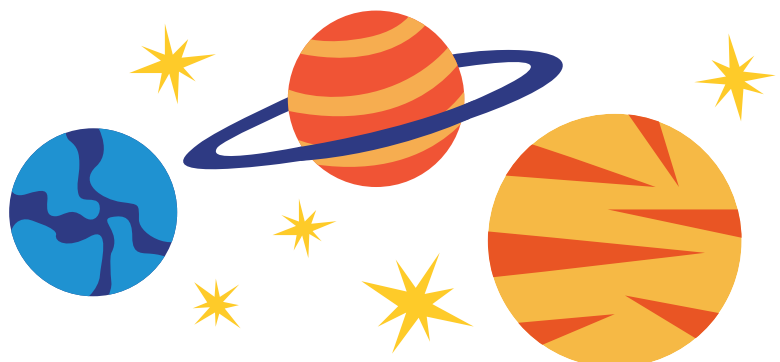
CASSIOPEIA, THE QUEEN ALWAYS VISIBLE IN THE NORTHERN SKY



Cassiopeia was a very vain queen. She thought she and her daughter Andromeda were more beautiful than the sea nymphs, and she would brag about it. When the sea nymphs complained to Poseidon, the god of the sea, he sent a monster named Cetus to their kingdom. Queen Cassiopeia and King Cepheus were forced to sacrifice their daughter to the monster. But just before she was eaten, a hero named Perseus saved her. All of these characters are constellations you can see in the sky.



Eventually, the gods were so frustrated with Cassiopeia's vanity that they hung her upside-down in the sky, as a reminder to everyone else to not be boastful. We can see the constellation Cassiopeia as a "W" shape in the sky.

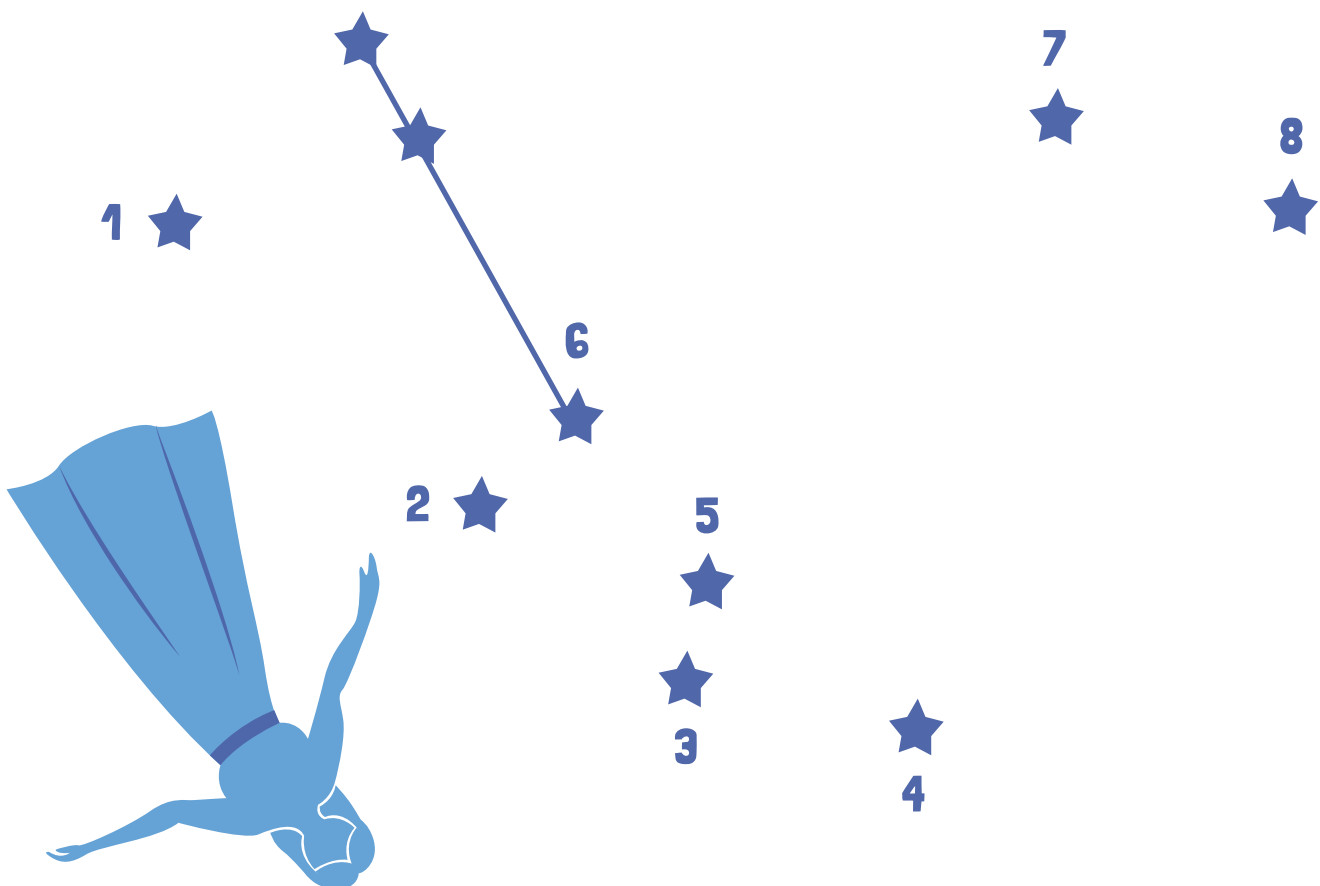


ANDROMEDA

VISIBLE IN THE NORTHERN SKY DURING FALL

- After she was freed from the sea monster, Cetus, Andromeda kept her parents' promise to Perseus and married him. She left her country to live with her new husband who later became the king of Tiryns and Mycenae. The goddess Athena placed the image of Andromeda among the stars as a reward for keeping her parents' word.

CONNECT THE STARS IN ORDER TO CREATE ANDROMEDA



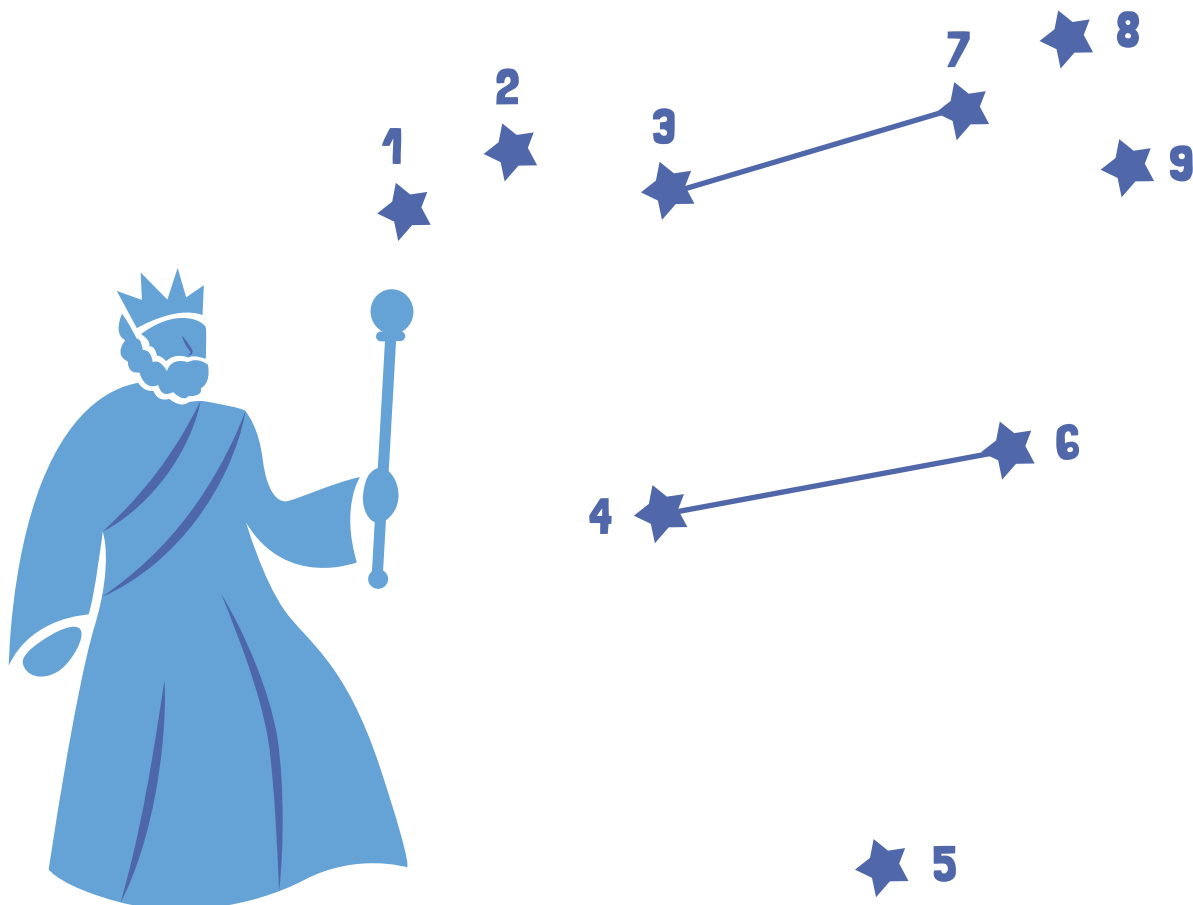
- Andromeda is a “V” shaped constellation that lies right next to Pegasus, which leads some to believe that at one time, some of these stars used to be part of the winged horse.

CEPHEUS

ALWAYS VISIBLE IN THE NORTHERN SKY



- Cepheus, also known as the King, was married to the beautiful Cassiopeia, and together they had a lovely daughter, Andromeda. Although his name is most well-known in connection with his daughter, Cepheus was placed in the sky of his own right.
- The stars of the Cepheus constellation form a shape approximately like a box with a triangle on top. When fainter stars visible to the naked eye are included, Cepheus can be interpreted as looking like a king with a crown.

CONNECT THE STARS IN ORDER TO CREATE CEPHEUS

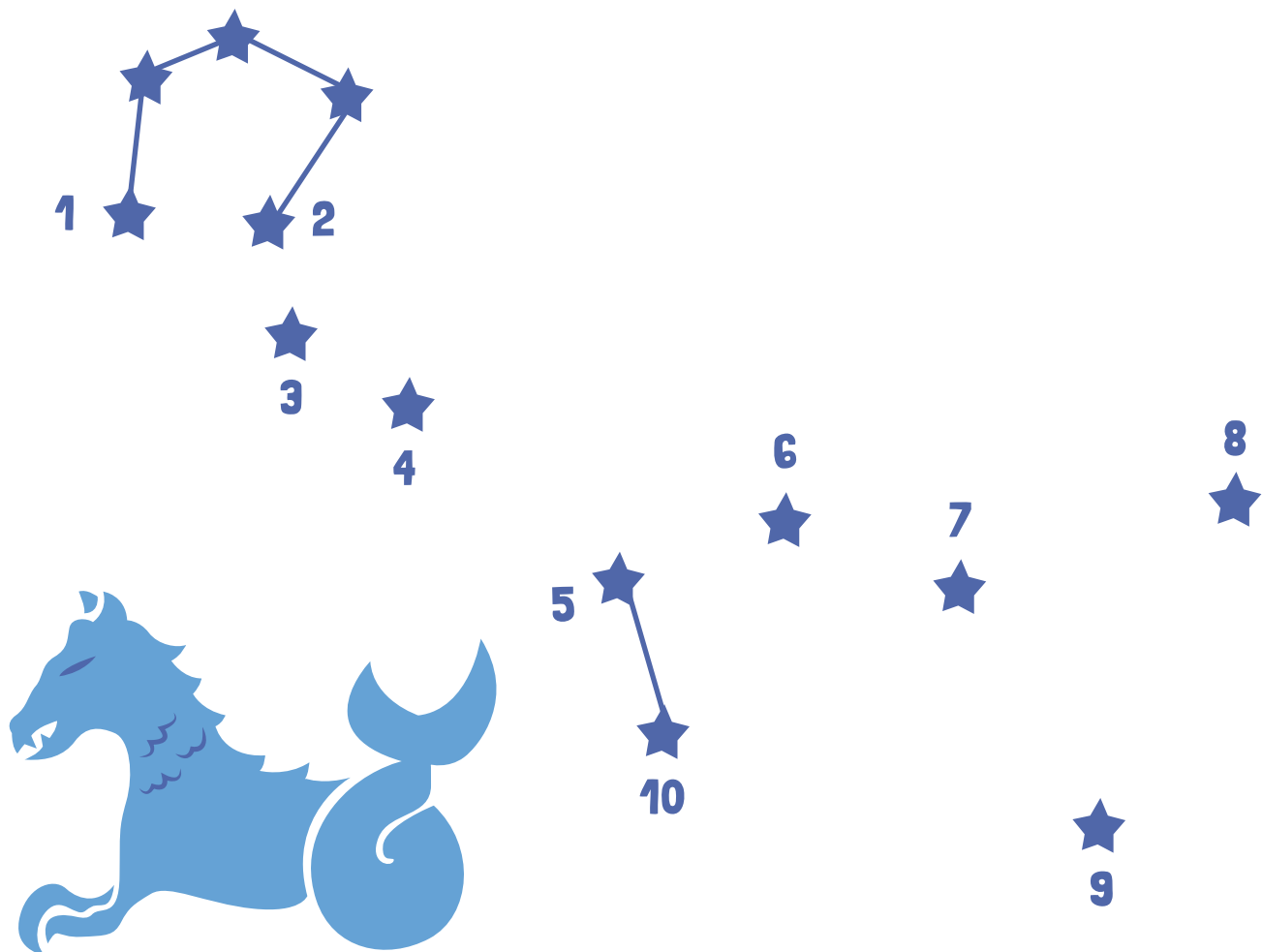


CETUS

VISIBLE IN THE NORTHERN SKY DURING WINTER

-  Cetus, or the Whale, represents the sea monster that almost ate Andromeda. It is one of the largest constellations known.
-  This constellation lies in the region of the sky called the Water, which is home to many other water-related constellations such as Pisces (the Fishes), Hydra (the Water Serpent) and Aquarius (the Water-Bearer).

CONNECT THE STARS IN ORDER TO CREATE CETUS

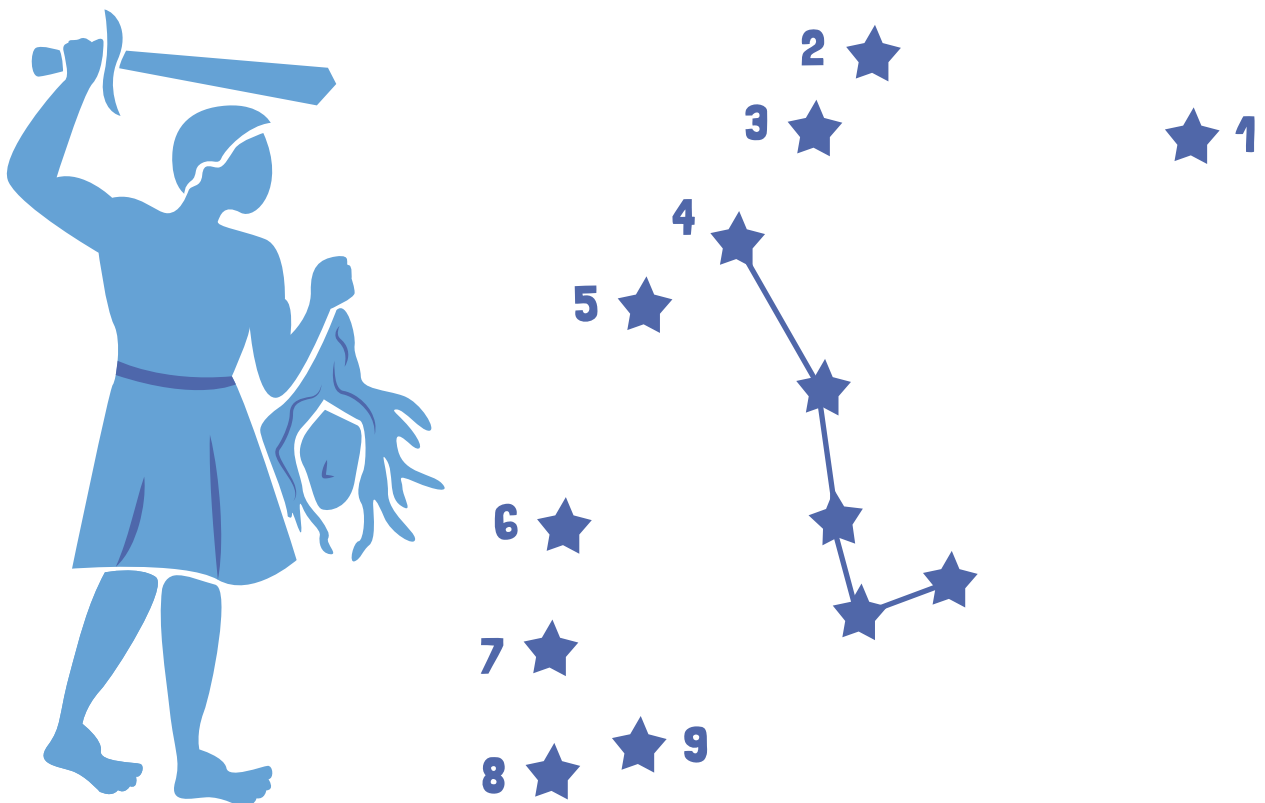


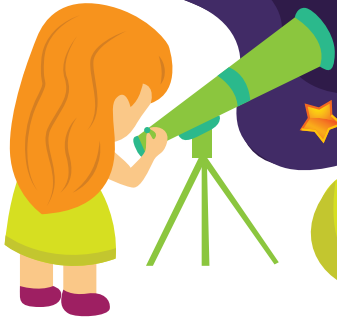
PERSEUS

VISIBLE IN THE NORTHERN SKY DURING WINTER

- Perseus, the hero, is known for beheading the snake-headed Medusa, to save the princess Andromeda from the giant sea monster.
- The location of Perseus lies in the main path of the Milky Way and can easily make out the human figure with a triangular body, legs and hands. In one hand, he appears to be holding the weapon, while in the other he appears to be holding Medusa's head.
- It is also home to the annual Perseid's meteor shower which is visible every August.

CONNECT THE STARS IN ORDER TO CREATE PERSEUS



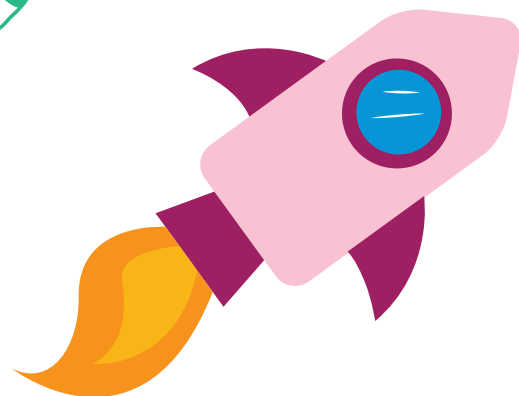
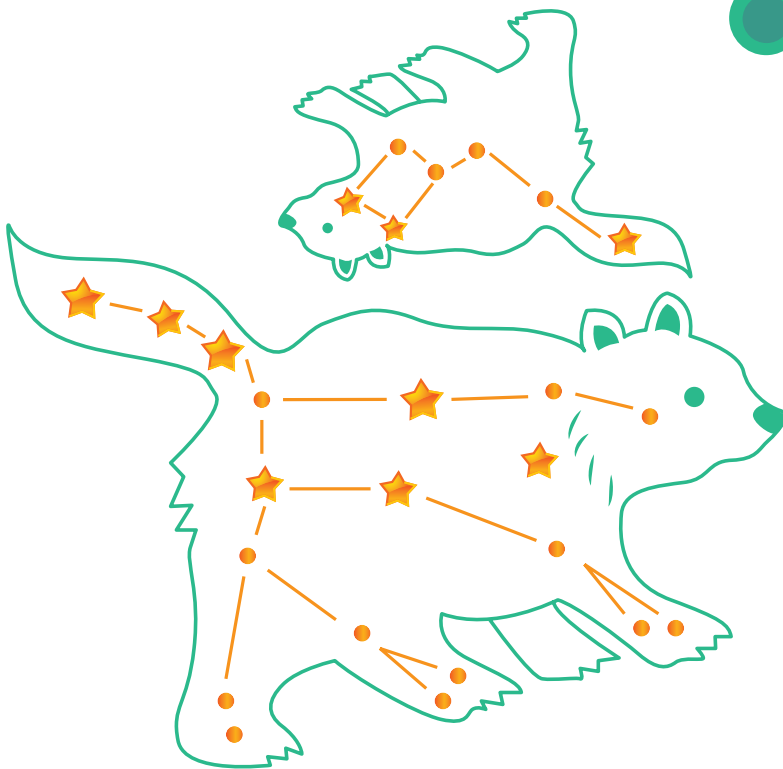


URSA MAJOR AND URSA MINOR: ALWAYS VISIBLE IN NORTHERN SKY

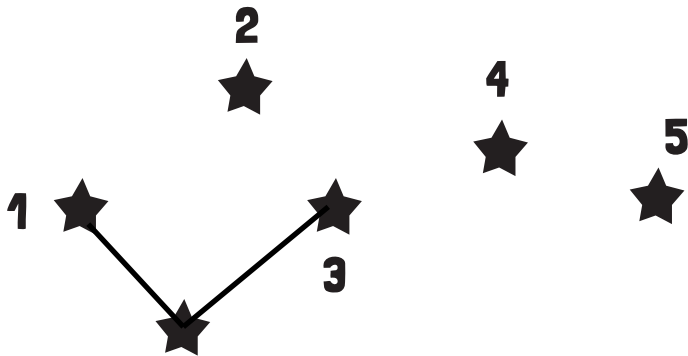
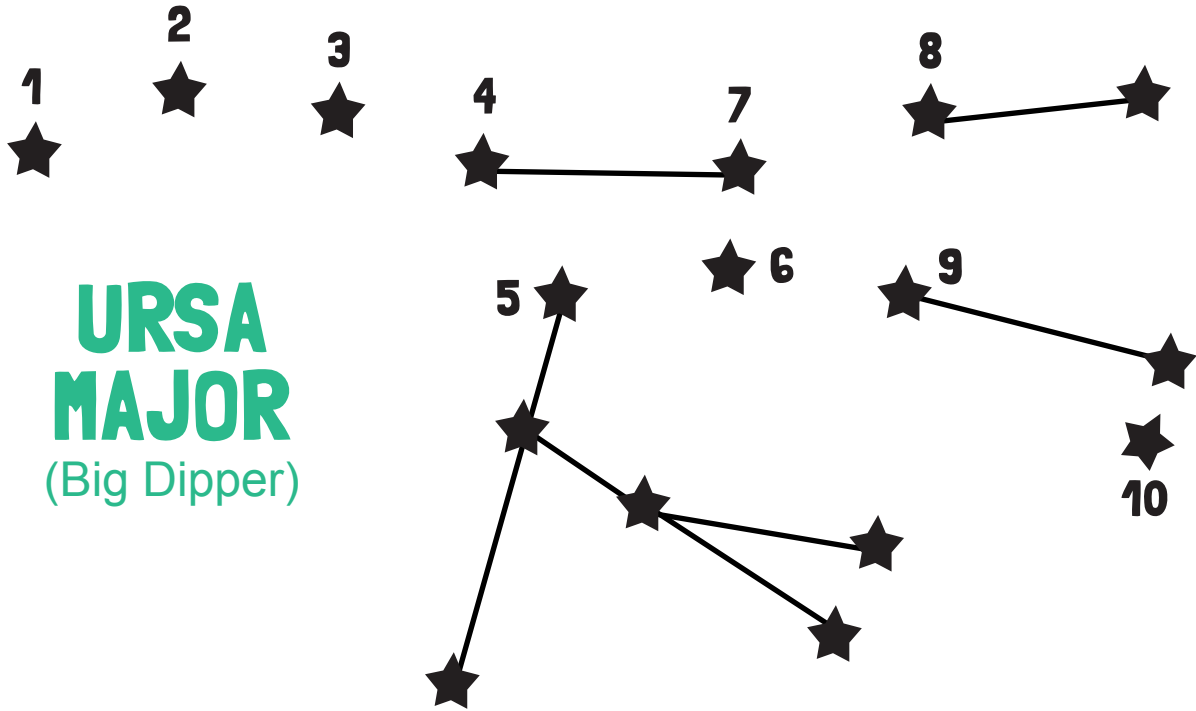
Not all constellations can be seen by everyone on Earth. Because of the way Earth spins on its axis people who live in the northern hemisphere can see different constellations than people in the southern hemisphere.

Ursa Major, the “big bear”, and Ursa Minor, “little bear”, are two of five constellations that can be seen all year long from Earth’s northern hemisphere because they are so high in the sky.

The famous constellation the Big Dipper makes up a large part of Ursa Major. Can you see where stars within the “great bear” form to make what looks like a ladle, or water dipper? Similarly, the Little Dipper makes up a large part of Ursa Minor.



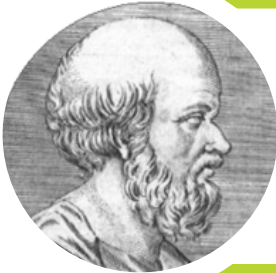
**CONNECT THE STARS IN ORDER TO CREATE
URSA MAJOR AND URSA MINOR**



NORTH STAR

Also called Polaris, it's the handle of the Little Dipper.

FAMOUS SKY WATCHERS: SCIENTISTS



Eratosthenes (276-195 B.C.)

This Greek mathematician was the first person to accurately measure the circumference of Earth. He determined that Earth was about 25,000 miles around. He was very close! (It's in fact, closer to 24,901 miles.)

Claudius Ptolemaeus / Ptolemy (100-170 A.D.)

This ancient Greek astronomer theorized that Earth was the center of the universe, with the Sun, Moon, planets, and stars revolving around it. Called the Ptolemaic System, this theory was viewed as fact for the next 1,400 years, until Copernicus.

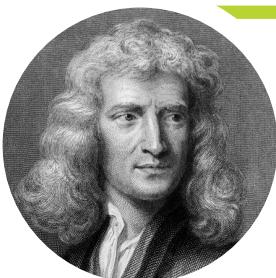
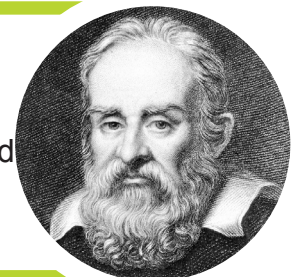


Johannes Kepler (1571–1630)

This German scientist made a breakthrough discovery that the orbits of the planets are elliptical (oval) instead of round. Before Kepler's findings, other astronomers thought orbits of planets were perfect circles.

Galileo Galilei (1564–1642)

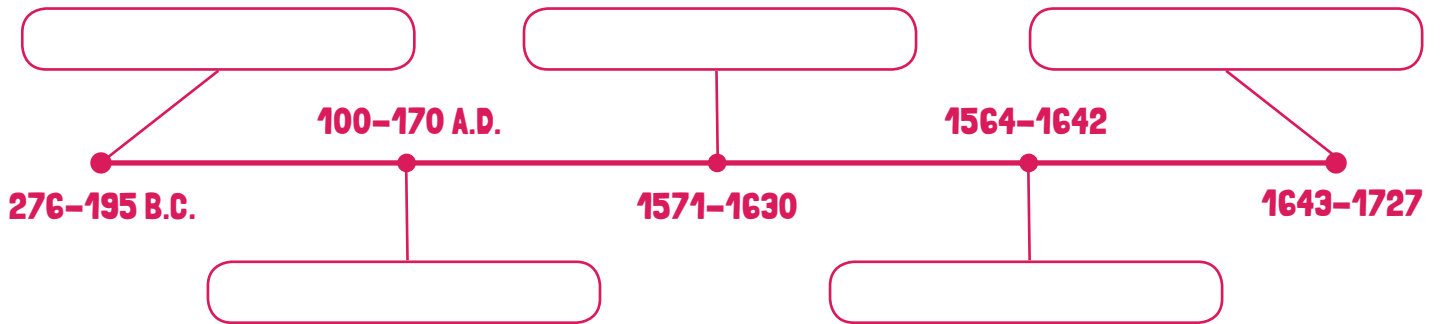
Galileo invented a telescope that magnified things more than other telescopes at the time. With it he discovered four satellites around Jupiter, and looked at Earth's own moon. This helped him prove Copernicus's theory that all the planets orbit the Sun.



Sir Isaac Newton (1643–1727)

This British mathematician and physicist is famous for confirming the principle of gravity. He used his theory of gravity to explain how the Moon is held in orbit around Earth. He theorized that the force (gravity) that caused an apple, or anything that takes up space, to fall to the ground had the same effect on the Moon. But the farther away particles are from each other the weaker that force becomes.

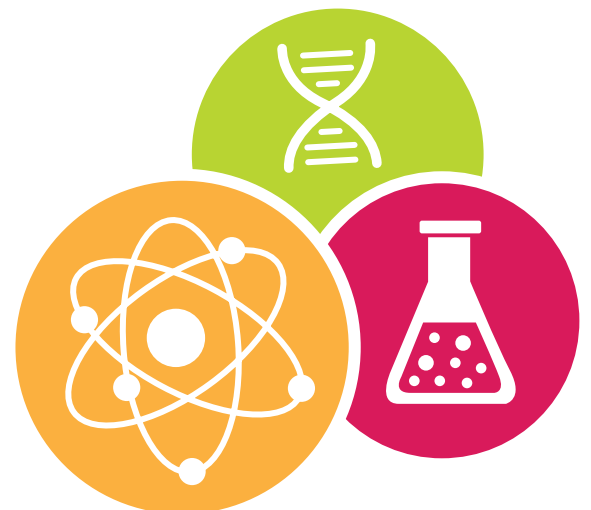
TIME LINE: Fill in names of scientists at correct date.



WORD SEARCH: Hidden in the puzzle below are last names of the scientists. Find and circle them. Tip: ← ↑ → ↓ ✓

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

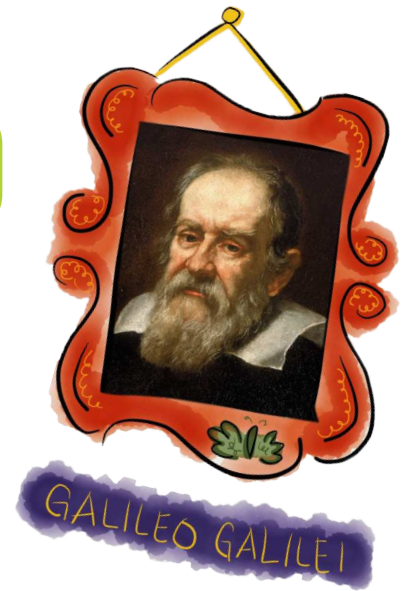
- KEPLER
- GALILEI
- PTOLEMAEUS
- NEWTON
- ERATOSTHENES



UNDERSTANDING GRAVITY:

HOW OBJECTS FALL

Galileo discovered that things fall at the same rate no matter how heavy they are. Try this activity to see Galileo's discovery in action. Then show your friends. No one will believe you until they see it with their own eyes.



● WHAT YOU NEED:

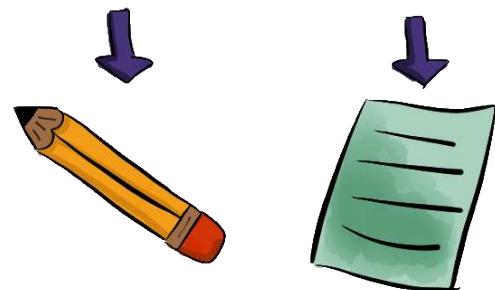
PENCIL

A PIECE OF PAPER

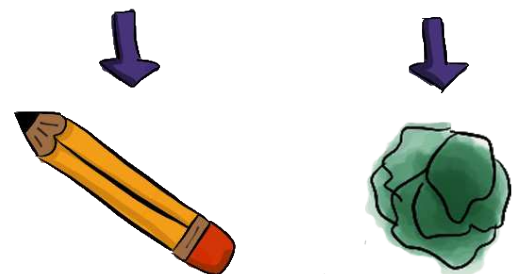


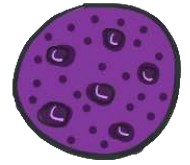
● PROCEDURE:

Hold a pencil in one hand and a piece of paper in the other. Drop them at the same time. Which one falls faster?



Now crumble the piece of paper into a tight ball and drop the pencil at the same time again. Now what has happened? Why did this happen?



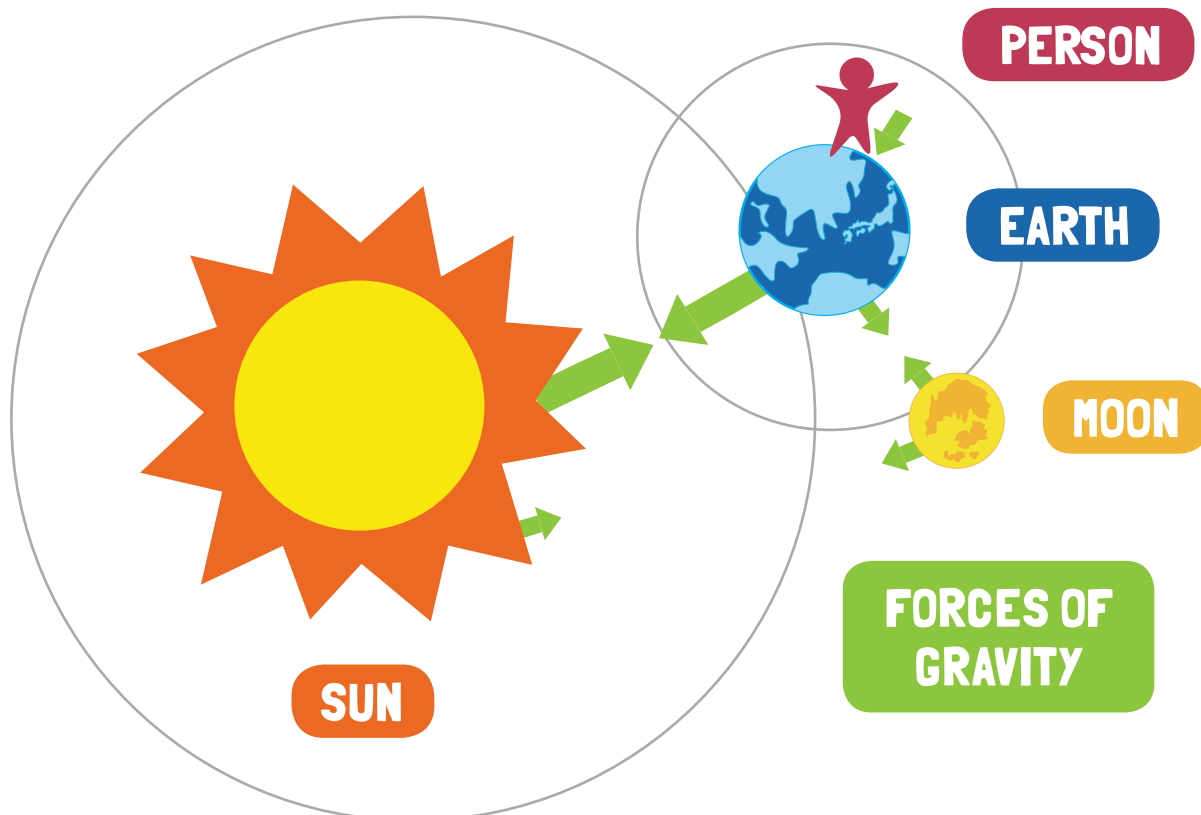


UNDERSTANDING THE PULL OF GRAVITY

Gravity is the force that causes things to drop to earth. It is also the force that keeps planets in their orbits. Every physical object has a gravitational pull, including you!

There are two major factors that determine the strength of an object's gravitational pull:

- 1 Its mass, which can also be thought of as how much matter it's made of or how easily it can be moved by a force. (The sun has a big gravitational pull because it is so massive; you have almost no gravitational pull because you are so small and not made up of as much stuff compared to the Earth and Sun.)
- 2 How close the things are together. Stars in other parts of the universe have almost no pull on us, but the Sun has a huge pull because it is close.



CALCULATE YOUR WEIGHT ON DIFFERENT PLANETS!

Your mass will always stay the same but your weight depends on gravity. You will weigh less on the moon because it is smaller (has less gravity) than you would on the sun.

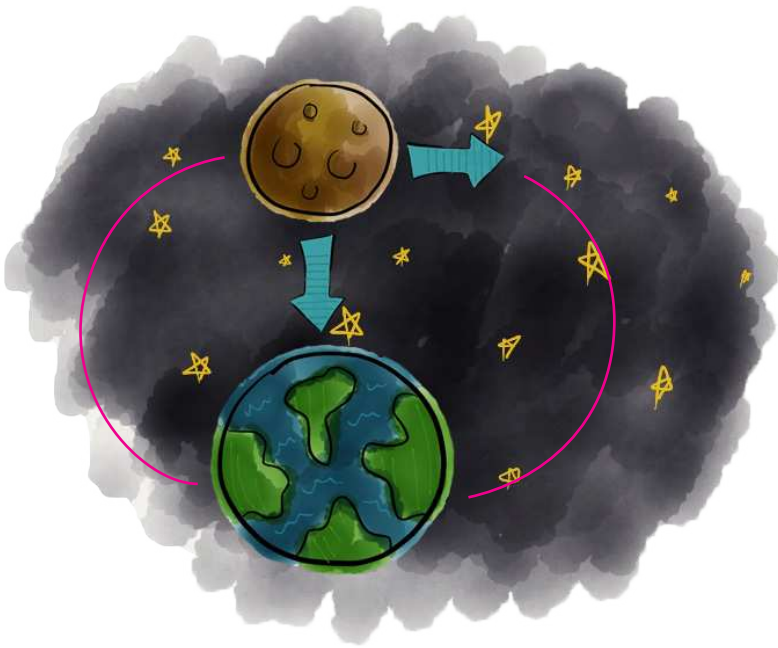
Calculate your weight using a calculator on the planets and Earth's moon. Multiply the gravity of each celestial body by your Earth weight.



CELESTIAL BODIES	YOUR EARTH WEIGHT	PLANET'S GRAVITY	YOUR WEIGHT
MERCURY		0.378	
VENUS		0.907	
EARTH		1	
MOON		0.166	
MARS		0.377	
JUPITER		2.36	
SATURN		0.916	
URANUS		0.889	
NEPTUNE		1.12	
PLUTO		0.059	

WHAT KEEPS THE MOON IN ORBIT?

It may not look like it but the moon is moving forward through space. If there were no Earth near it the moon would just keep moving forward at the same speed.



But Earth's gravity pulls at the moon; not only does this slow it down a bit it keeps the moon falling toward earth.

The next time you hit a tetherball think about this. You are putting it in motion by hitting it straight ahead. What makes it orbit the pole? The pull of the string, that's what. Without the string the ball would go straight ahead and it would be like playing volleyball not tetherball.



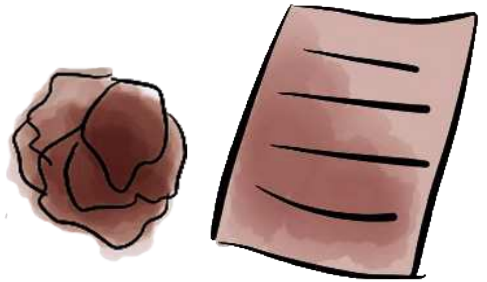
BUT WHY DOESN'T THE MOON SLOW DOWN LIKE A TETHERBALL?

THE ANSWER IS INERTIA!

Inertia is the tendency of things that are moving to keep moving and things that are still to stay still. There is only one reason things stop on Earth and they don't stop in space. Resistance. Even the air has some resistance.

★ HERE IS A SMALL EXPERIMENT WITH GRAVITY:

Take two pieces of paper. Crumple one up in a ball. Don't do anything to the other one. You are going to drop each one from as high up as you can hold it and then observe what happens. First, predict.



What will happen when you drop the crumpled up paper? Write down your prediction here: _____

What will happen when you drop the flat sheet of paper? Write your prediction here: _____

Now drop each of them and describe what you saw below:

The crumpled paper _____

The flat sheet of paper _____

★ **THE GRAVITY ON EARTH AFFECTS OBJECTS THE SAME WAY, BUT WIND RESISTANCE CAN CHANGE THIS. IF YOU FOLD A THIRD PAPER INTO AN AIRPLANE AND DROP IT NOSE FIRST DOES IT FALL ANY FASTER THAN THE OTHER TWO SHAPES?**

DRAW ELLIPTICAL ORBITS: DIFFERENCE BETWEEN



All planets and the moon travel in orbits that are more like ovals than perfect circles. These are called elliptical orbits. In this activity you will draw both a perfect circle and an ellipse so that you understand the difference.

WHAT YOU NEED:



string
or yarn



pins

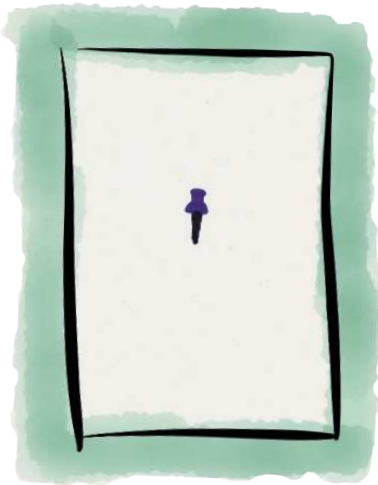


pencil or pen

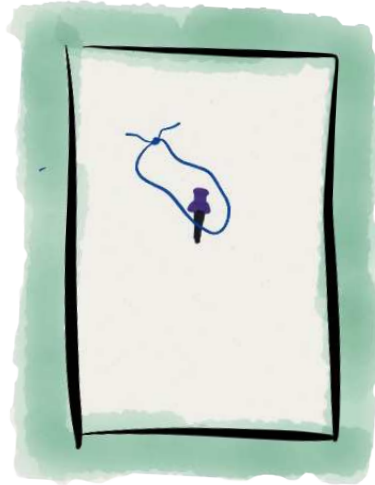


papers

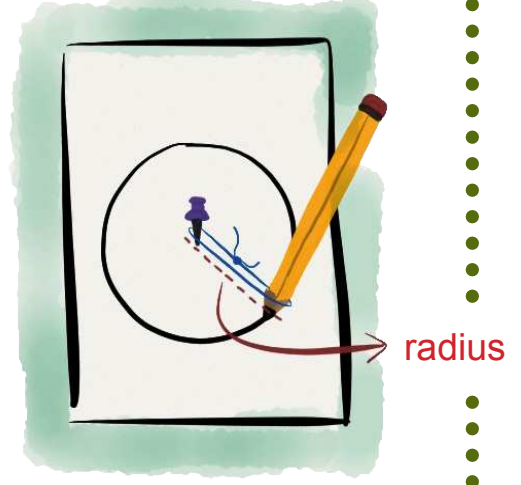
DRAW A CIRCLE



1 Put a pin in the center of a paper.

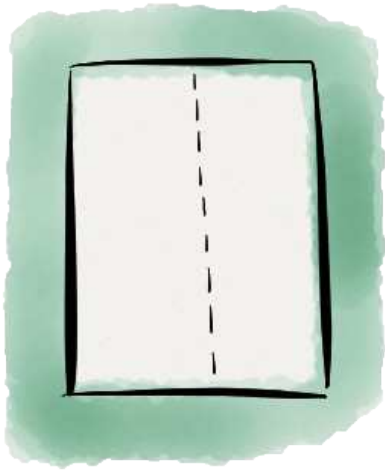


2 Make a loop with some string or yarn.

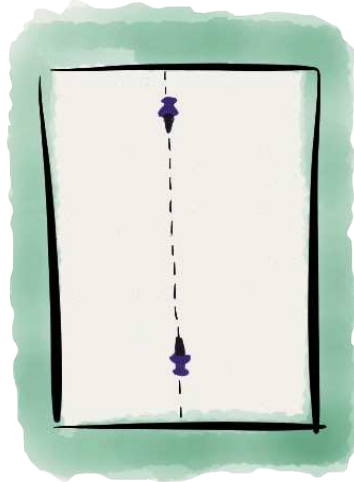


3 The string should be no longer than the width of the paper. (The length of the loop will be the **radius** of the circle.)

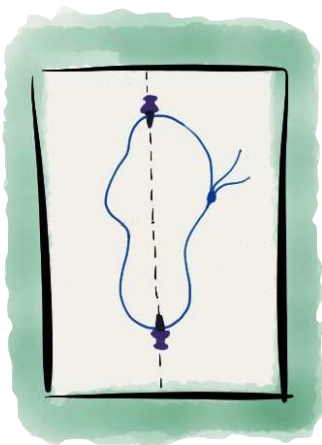
DRAW AN ELLIPSE



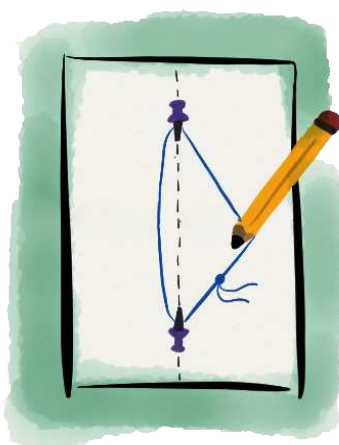
1 Fold a paper in half lengthwise, then lay it flat.



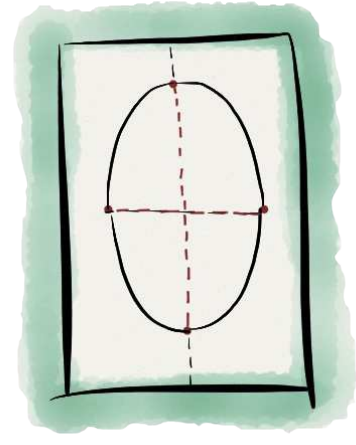
2 Put a pin near the top on the fold and another near the bottom in the fold.



3 Loop a string around the two pins, but not too tightly.



4 Use the string as a guide, running a pencil along the string pulling it taut.



5 When you have gone around the entire loop, you will have drawn an ellipse.

WATCHING THE MOON: THE MOON ILLUSION



Have your kids noticed how much bigger the moon looks when it's low in the sky? What's going on? The moon isn't changing size or getting closer. This is actually just an optical illusion which is also referred to as the *Moon Illusion*. The moon takes up just about the same proportion of our field of vision no matter how high or low it is relative to the horizon.

There are no accepted explanations but many theories are available to justify this same size phenomenon and one of them is called the *Ebbinghaus illusion* (also known as Titchener circles). It is an optical illusion in which the Moon appears larger near the horizon than it does while higher up in the sky. This optical illusion also occurs with the sun and star constellations.



**WHICH CENTRAL CIRCLE IS BIGGER?
THE LEFT ONE OR THE RIGHT ONE?**

**THE ANSWER IS THEY ARE BOTH THE
SAME SIZE, BUT LOOK DIFFERENT
BECAUSE OF THE CIRCLES THAT
ARE AROUND THEM.**

ACTIVITY:

Here's a simple activity you can do to show your kids that the moon is always the same size. All you need is a paper clip and a clear night when the moon is low in the sky.

1. Help your child unbend the paper clip, then twist it into a U shape.
2. When the moon is low in the sky, go outside and have her hold the paper clip at arm's length in the direction of the low, large-looking moon. Show her how to use the paper clip like a pair of calipers, bending it so the tips are touching the top and bottom of the moon to record its apparent diameter.
3. Wait an hour or more for the moon to climb higher in the sky.
4. Go back outside and have your child hold her paper clip calipers at arm's length again. What does she see? The moon should fit within the paper clip exactly.

EXPLORING THE PHASES OF THE MOON

Every day the moon looks a little different. People have sometimes believed the phases of the Moon are caused by Earth's shadow or even that the Moon itself glows, but that's not so. What causes the phases of the Moon? Try this activity to see what's at work.

WHAT YOU NEED:



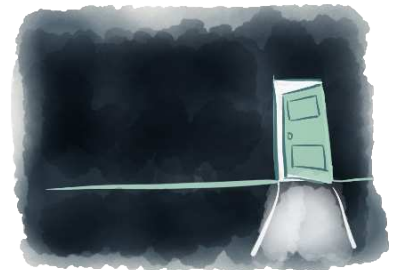
**large ball
a foam craft ball
stuck on a pencil
works, too**



**dark
marker**



**desk lamp or
a table lamp
with its shade
removed**



dark room

WHAT YOU DO:

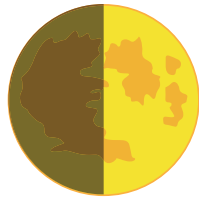
1. The ball represents the Moon and you will represent Earth. The same side of the Moon always faces Earth. Mark the side of the ball with a dot. Keep the dot facing you.
2. Place the lamp on a table and turn it on while keeping the rest of the room dark. The lamp is going to be the Sun for this activity.
3. Stand far away from the light and face it. Hold the ball straight out in front of your face so that it blocks out light from the lamp. With your head, the ball and the light lined up like this you just created a solar eclipse! Remember that a solar eclipse happens when the Moon passes between the Sun and Earth, and it blocks the light from the Sun. If you move the ball down or up a bit you can see that the side of the ball facing you is dark. This is called a "new moon."
4. Turn a little to your left still holding the ball away from you. You should see a small sliver of light on the right side of the ball. This is called the new crescent or waxing crescent moon.
5. Turn to the left until the ball is lit up halfway. This is the first quarter moon. It's called that because the Moon has traveled one quarter of the way around Earth.

- Keep turning around in a circle until *you* are halfway around (facing the opposite direction from where you started). The whole side of the ball facing you should be lit up. That's a full moon! If your head is blocking the light then you just made a lunar eclipse. Raise the ball up a little to see a full moon.
- Keep going slowly around until you're back where you started.

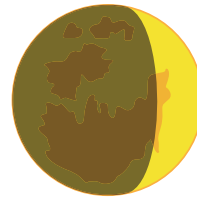
PHASES OF THE MOON



Waxing Gibbous



First Quarter



Waxing Crescent



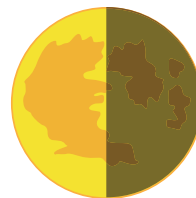
New Moon



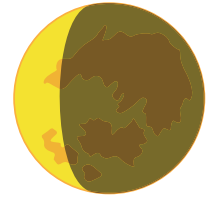
Full Moon



Waning Gibbous



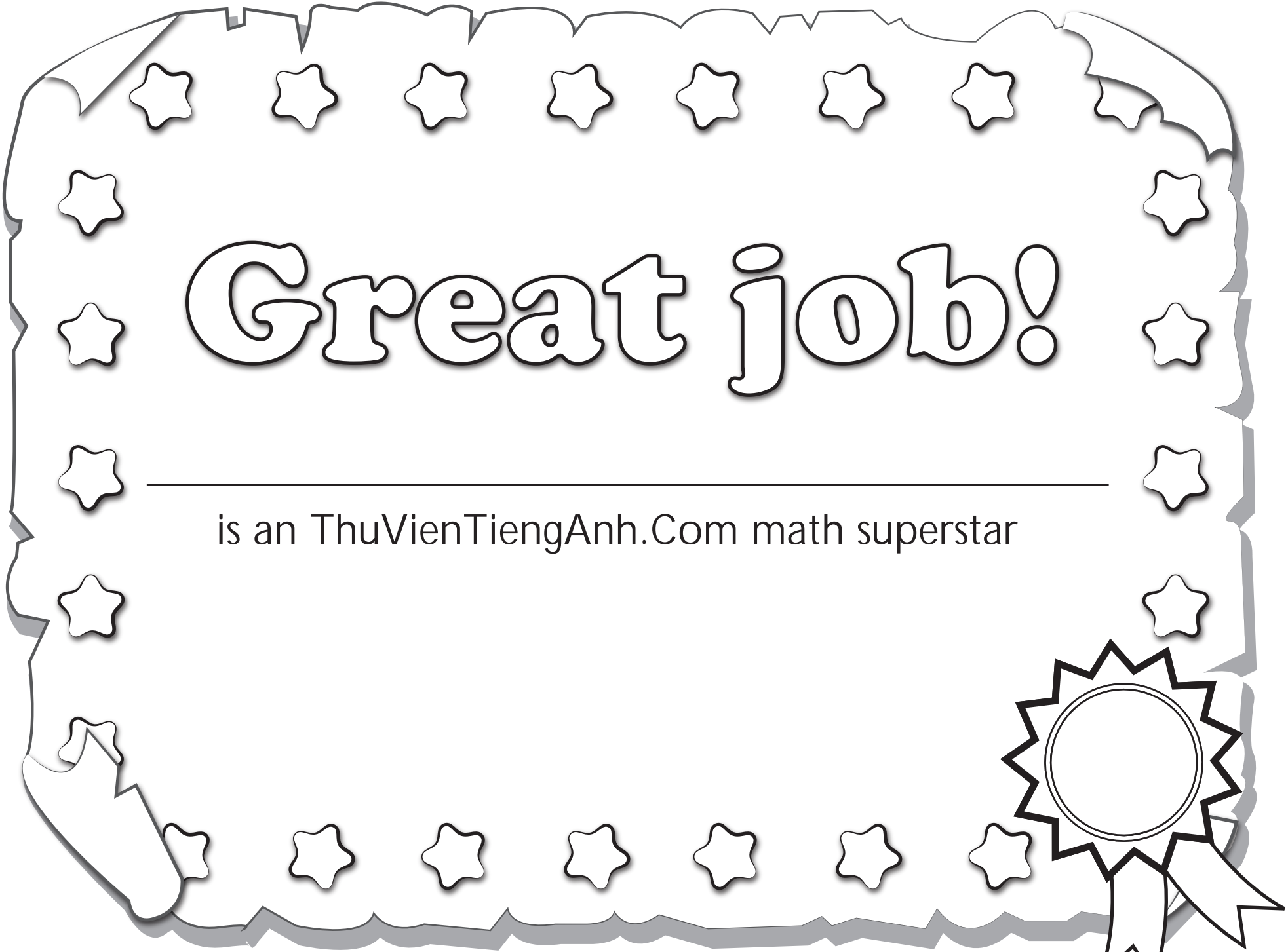
Last Quarter



Waning Crescent

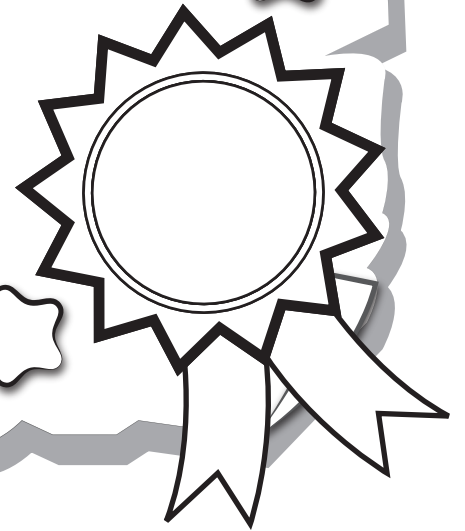
HOW ENLIGHTENING

The light we see coming from the Moon is sunlight reflected off of its surface. The Sun always illuminates half of the Moon, but from Earth we see this at different angles as the Moon rotates and moves around our planet. It takes about 30 days for the Moon to go once around Earth. Depending on where the Moon is in that trek different amounts of sunlight will hit it every day. We've broken these changes up into phases and named them. What we call the new moon is when the Moon is on the same side of the Earth that the Sun is on. The Moon blocks some of that light which is why it looks dark. When the Moon is on the other side of Earth from the Sun, then the Moon is fully lit up and that's why we call it a full moon.



Great job!

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Answer Sheets

Skywatchers

Space Vocabulary For Kids

Sky Stories: Sun God

Sky Stories: Mayan Moon Rabbit

Famous Sky Watchers: Scientists

Answer Sheet

NORTHERN HEMISPHERE

the topmost half of our globe; everything north of the equator

.....

EQUATOR

an imaginary line at the center of the globe, equal distances from the north and south poles; latitude 0°

.....

LUNAR

relating to the moon

.....

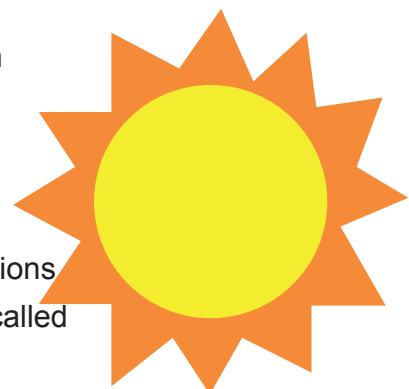
SOLAR

relating to the sun

.....

B. Match the words given on the previous activity with the sentences below.

1. A lightyear is not a measurement of time, but a measurement of distance.
2. When you live below the equator you can't see the same stars as people who live in the Northern hemisphere.
3. You will see a solar eclipse when the moon aligns exactly between Earth and the Sun, casting a shadow.
4. Comets and asteroids are small rocky, icy masses that orbit around the sun.
5. Ursa Major, or the big dipper, is one of the most well-known constellations.
6. physics is the study of matter and energy, and how they interact.
7. Pisces, Cancer, Aries, and Orion are some of the constellations located in the sky north of the equator, which is an area also called the Northern Hemisphere.



Answer Sheet



WORD SEARCH

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

TIP:



HELIUM

TIME

HELIOS

CHRONOLOGY

OLYMPUS

HERA

OLYMPIC

HERO

Answer Sheet



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

TIP:



LAST QUARTER

MAIZE

LEGEND

FULL MOON

MAYANS

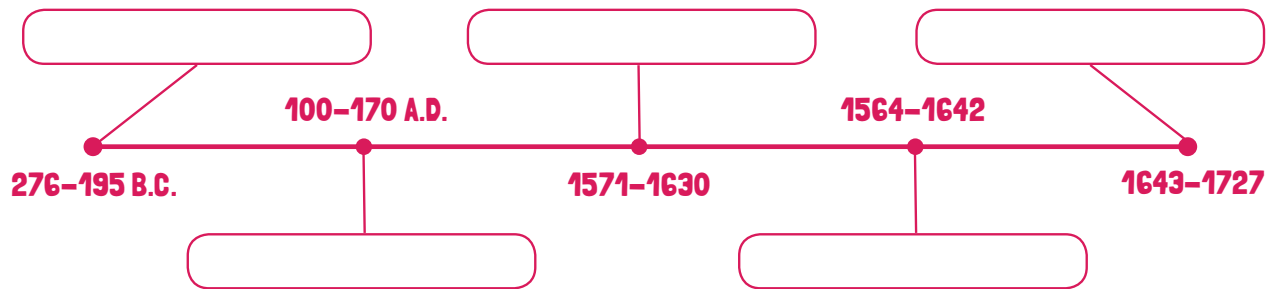
CRESCENT

WANING MOON

GIBBOUS

Answer Sheet

TIME LINE: Fill in names of scientists at correct date.



WORD SEARCH: Hidden in the puzzle below are last names of the scientists. Find and circle them. Tip: ← ↑ → ↓

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

- KEPLER
- GALILEI
- PTOLEMAEUS
- NEWTON
- ERATOSTHENES

