



Why God Loves Astronomy

God is the creator of the sun, moon, and all the stars in the sky. God gave us the lights in the sky to give us the rhythms of day and night, to help us mark the seasons of the year, and to give us light so we can see.

Recommended Reading

- ★ Genesis 1-2
- ★ *In the Beginning: Creation Stories from Around the World*, by Virginia Hamilton, p. 78-85 and 110-115 (the entire book is fantastic for learning more about creation myths from around the world, but the samples recommended above are strongly recommended)

ACTIVITY Shoe Box Planetarium

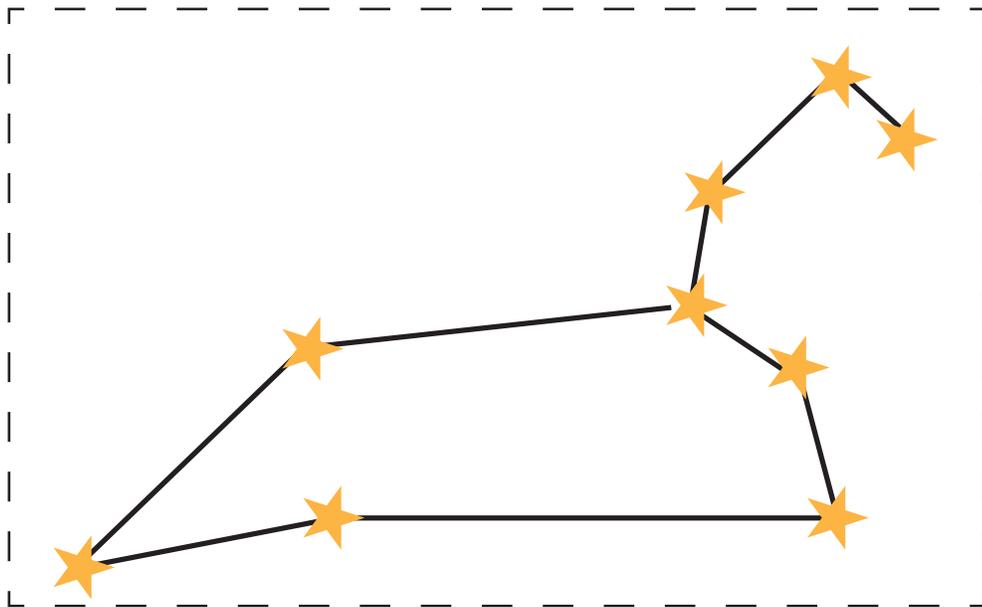
SUPPLY LIST

- Shoe Box
- Scissors
- Dark Paper
- Pen or pencil
- Straight Pin
- Tape
- Flashlight

MORE FUN: Look up more constellations that are visible in your area. Recreate them on a piece of paper the same way you did with Leo so you can project them on your wall!

INSTRUCTIONS

1. On one side of the shoe box, cut a hole just large enough to be able to insert a flashlight into the box.
2. On the other end of the shoe box, cut a 3" x 5" rectangular hole that you'll later be covering with a piece of dark paper.
3. Cut out the star guide of the constellation Leo below.
4. Tape the star guide to a piece of dark construction paper. Use a straight pin to push holes through the construction paper at the locations of each of the stars in the constellation Leo.
5. Cut the piece of construction paper to the right size to cover the rectangular hole in the box and tape in place.
6. Point the shoe box toward a blank wall. In a dark room, turn on the flashlight so you can see your constellation projected on the wall.



Lesson 1: Psalm 8:3-4a



When I look at your heavens, the work of
your fingers, the moon and the stars, which
you have set in place, what is man that
you are mindful of him?

Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).

Lesson 1: Psalm 8:3-4a



When I look at your heavens,
the work of your fingers, the
moon and the stars, which you
have set in place, what is man
that you are mindful of him?

Four sets of handwriting practice lines, each consisting of a solid top line, a dashed middle line, and a solid bottom line.

Lesson 1: Psalm 8:3-4a



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).

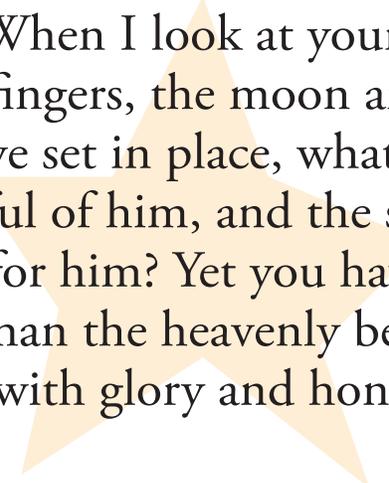
Question: What are the 5 reasons God created the lights in the sky?

Answer: (1) To give us the rhythm of **day and night**, (2) to give us signs for **navigation**, (3) to mark the **seasons** of the year, (4) to make calendars to mark **days and years**, and (5) to give us **light** to see.

LESSON 1

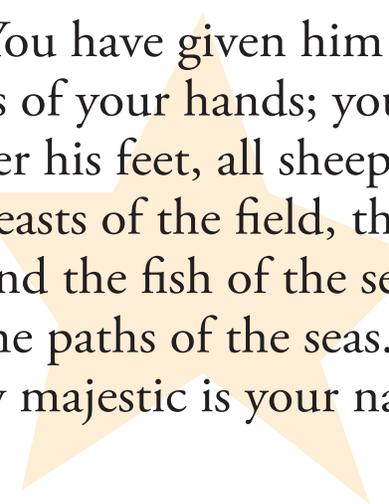
Psalm 8:1-2 O Lord, our Lord, how majestic is your name in all the earth! You have set your glory above the heavens. Out of the mouth of babies and infants, you have established strength because of your foes, to still the enemy and the avenger.

LESSON 1



Psalm 8:3-5 When I look at your heavens, the work of your fingers, the moon and the stars, which you have set in place, what is man that you are mindful of him, and the son of man that you care for him? Yet you have made him a little lower than the heavenly beings and crowned him with glory and honor.

LESSON 1



Psalm 8:6-9 You have given him dominion over the works of your hands; you have put all things under his feet, all sheep and oxen, and also the beasts of the field, the birds of the heavens, and the fish of the sea, whatever passes along the paths of the seas. O Lord, our Lord, how majestic is your name in all the earth!”

LESSON 1

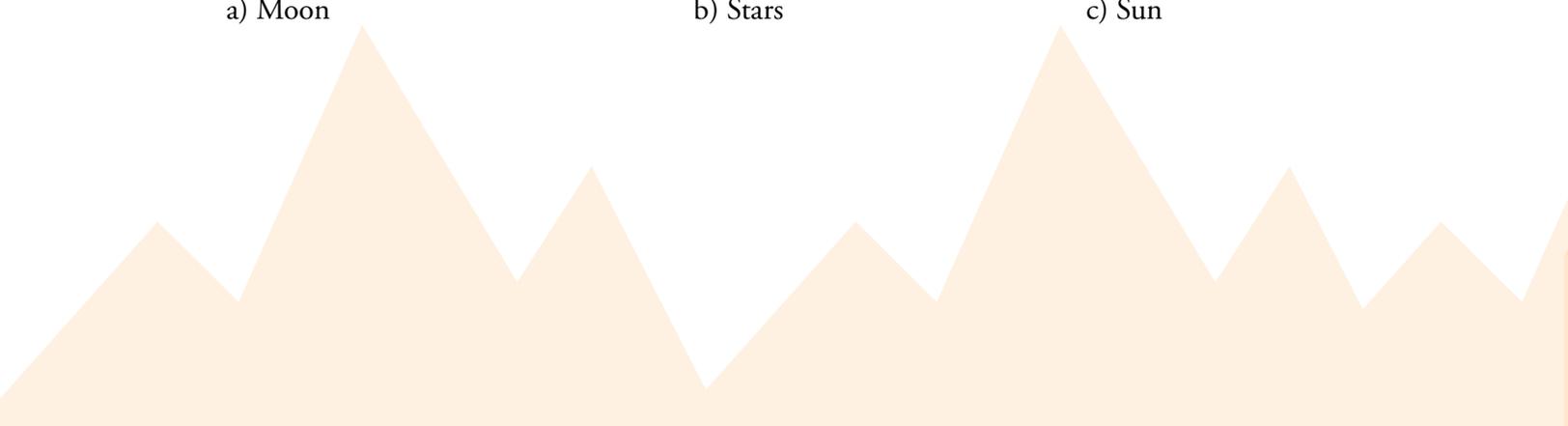


Why God Loves Astronomy

Lesson 1 Quiz



1. What is the scientific study of sun, moon and stars?
a) Astrology b) Astronomy c) Constellations d) Science
2. In Genesis 1:1-2, what did God create? _____
3. What is that one big similarity between the Babylonian creation story and Genesis?
a) War between the gods b) Sea monsters c) Deep waters
4. In what bible verse did God say, 'Let there be light'?
a) Genesis 1:3 b) Psalm 19:1 c) Revelation 21:8
5. Who wrote the story in Genesis? _____
6. Give one reason why God created light. _____
7. Official patterns of stars in the sky are called...
a) Constellations b) Celestial c) Astrology d) Asterisms
8. How many constellations are in the sky?
a) 99 b) 88 c) 77
9. What verses in the Bible talk about the reasons why God created the heavenly lights?
a) Psalm 19:1 b) Genesis 1:14-15 c) Psalm 8:1
10. What do we call the big ball of gas that is 93 million miles away that gives the earth warmth and light?
a) Moon b) Stars c) Sun





Who Moved the Sun

God designed the Earth to spin around on its axis. When the Earth does this one time, we call this a day. To help us organize our lives, we've divided a day into 24 hours.

Recommended Reading

- ★ *Sun Up, Sun Down: The Story of Day and Night*, by Jacqui Bailey and Matthew Lilly
- ★ *Tales of Ancient Egypt*, by Roger Lancelyn Green, p.3-49 (these are the most relevant pages, but the entire book is recommended)



ACTIVITY

Draw the Sun

SUPPLY LIST

- Easel or a portable hard surface
- A couple pieces of white drawing paper (large preferred)
- Pencil
- A bright sunny day

INSTRUCTIONS

1. Go outside some time after 11am. Face south if you are in the northern hemisphere. Face north if you are in the southern hemisphere.
2. Draw a picture of objects in front of you—trees, houses, mountains, etc.—and also draw where the sun is. Be sure not to look directly at the sun, but be careful to draw exactly where you see the sun in the sky (noting the objects it is directly near or over).
3. Note the place where you are standing or sitting. Place a marker on the ground so you can come back to that exact same spot.
4. Return to the same spot 2 to 3 hours later. Using a fresh sheet of paper, draw another drawing of the same view with all the objects in front of you. Draw where the sun is now.
5. If you've paid close attention to detail, your drawings should look very similar except for the position of the sun. If you're in the northern hemisphere, the sun should have moved from left to right in your drawings. If you're in the southern hemisphere, the sun should have moved from right to left in your drawings.

Lesson 2: Psalm 19:1-2



The heavens declare the glory of God, and

the sky above proclaims his handiwork.

Day to day pours out speech, and night to

night reveals knowledge.

Handwriting practice lines consisting of ten sets of three horizontal lines (top, middle, bottom) for tracing and independent writing.

Lesson 2: Psalm 19:1-2

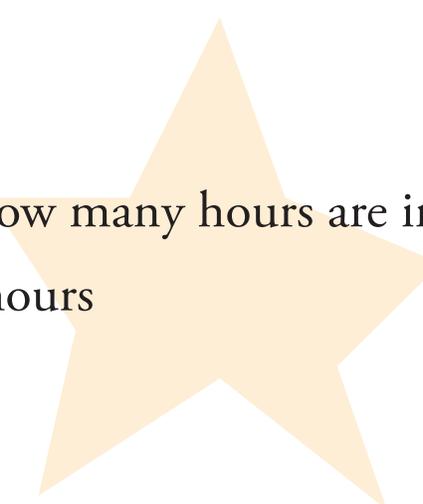


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Lesson 2: Psalm 19:1-2



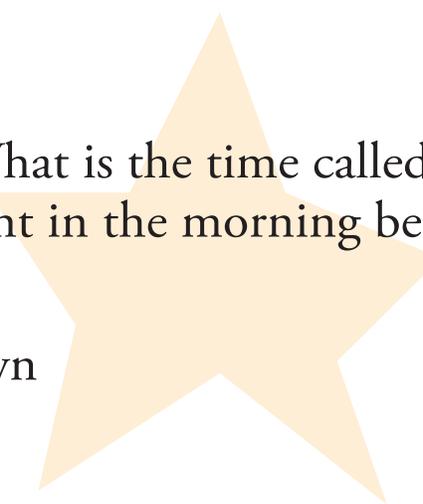
Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question: How many hours are in the day?

Answer: 24 hours

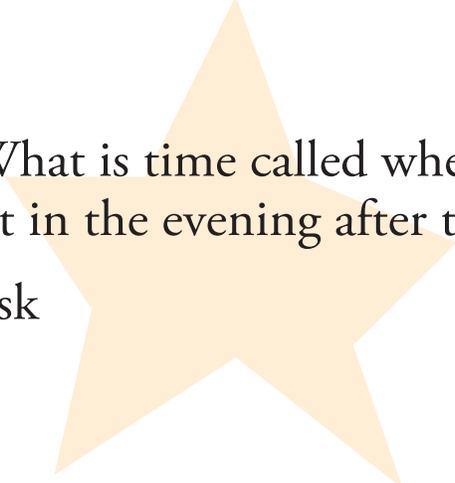
LESSON 2



Question: What is the time called when there's a little sunlight in the morning before the sun rises?

Answer: Dawn

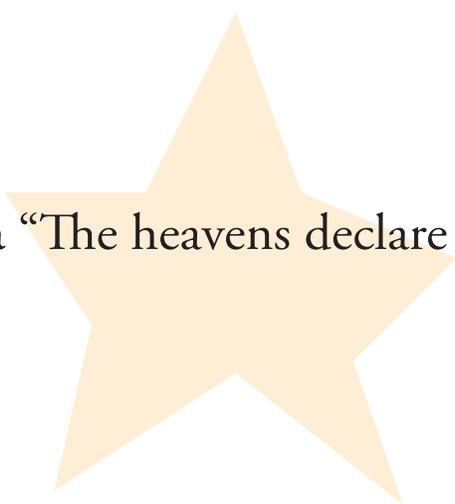
LESSON 2



Question: What is time called when there's a little sunlight in the evening after the sun sets?

Answer: Dusk

LESSON 2



Psalm 19:1a “The heavens declare the glory of God.”

LESSON 2



Blazing Summers, Freezing Winters

God designed the Earth to revolve around the Sun, which is our main source of light and heat. When the Earth goes around the Sun one time, we call this a year. Since the axis of the earth is tilted, there are times of year we get more sunlight and other times we get less sunlight, depending on where we are in our path around the Sun.

Recommended Reading

- ★ *The Reasons for the Seasons*, by Gail Gibbons
- ★ *The Shortest Day: Celebrating the Winter Solstice*, by Wendy Pfeffer
(not ideal for students in the Southern Hemisphere)
- ★ *The Longest Day: Celebrating the Summer Solstice*, by Wendy Pfeffer
(not ideal for students in the Southern Hemisphere)



ACTIVITY House Blueprint

Have you ever seen the blueprint of a house? A blueprint shows you an overhead view of what a house would look like if you took off the ceiling, allowing you to see how all the rooms are connected. We're going to make one for your house.

SUPPLY LIST

- Piece of white drawing paper
- Pencil
- Ruler
- Colored pencils or crayons
- A bright sunny day

INSTRUCTIONS

1. Draw a blueprint of your house. If you have more than one floor in your house, draw just one of the floors. Use a ruler or straight edge to draw straight walls, showing where each room is. Leave blank spaces where the doorways between rooms are. It doesn't need to be perfect, but try to make the big rooms bigger and the small rooms smaller.
2. After you finish the walls and doorways, use a different color, drawing lines over the walls where all the windows are.
3. In the morning, after the sun rises and starts shining in some of the windows, note on your drawing which windows are getting most of morning sunlight. In the middle of the day, around noon, note on your drawing which windows are getting most of the sunlight. At the end of the day before the sun sets, note which windows get most of the evening sun.
4. Try to figure out which direction each window faces. Based on the sunlight, which side of your house faces east or west, north or south.

Lesson 3: James 1:11



For the sun rises with its scorching heat
and withers the grass; its flower falls, and
its beauty perishes. So also will the rich man
fade away in the midst of his pursuits.

Blank handwriting practice lines consisting of four sets of three horizontal lines (top, middle dashed, bottom).

Lesson 3: James 1:11

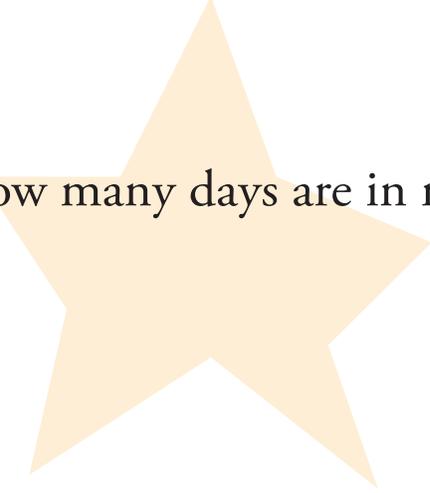


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Lesson 3: James 1:11



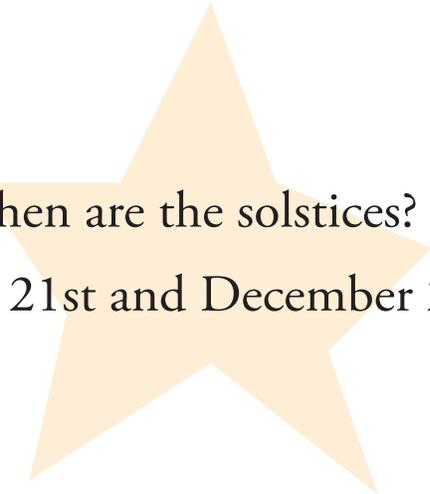
Handwriting practice lines for the lesson. The page contains ten sets of horizontal lines. Each set consists of a solid top line, a dashed middle line, and a solid bottom line, providing a guide for letter height and placement.



Question: How many days are in most years?

Answer: 365

LESSON 3



Question: When are the solstices?

Answer: June 21st and December 21st

LESSON 3



Spring Forward, Fall Back

As the Earth goes around the Sun, there are a couple days every year we have the same amount of daylight hours as we have nighttime hours. These days are called “equinoxes.”

Recommended Reading

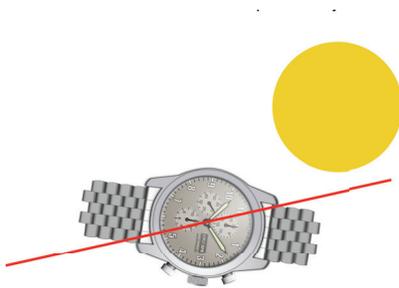
- ★ *Earth: Our Planet in Space*, by Seymour Simon
- ★ *We Gather Together: Celebrating the Harvest Season*, by Wendy Pfeffer
(not ideal for students in the Southern Hemisphere)
- ★ *A New Beginning: Celebrating the Spring Equinox*, by Wendy Pfeffer
(not ideal for students in the Southern Hemisphere)

ACTIVITY

Find North Without a Compass

SUPPLY LIST

- Wristwatch or small portable wall clock with hour and minute hands.
- A bright sunny day



NORTHERN HEMISPHERE INSTRUCTIONS

1. Adjust the time on your watch being sure it is accurate. If you're doing this activity during daylight saving time, adjust the clock back to standard time.
2. Place your clock on a level surface or flat on the ground.
3. Point the hour hand in the direction of the sun.
4. Count the number of minute marks between the hour hand and the number 12 on the clock. Now divide that number in half. (For example, if there are 6 minute marks between the hour hand and 12, half of this is 3.)
5. Using that number, count the number of minute marks from the hour hand up towards the number 12. Note where you stop. Draw a line from the center of the clock to that place on the clock. The line between the center and that place is your north-south line. North is the side of the line that points away from the sun.

SOUTHERN HEMISPHERE INSTRUCTIONS

1. Adjust the time on your watch being sure it is accurate. If you're doing this activity during daylight saving time, adjust the clock back to standard time.
2. Place your clock on a level surface or flat on the ground.
3. Align your clock so the number 12 points to the sun.
4. Count the number of minute marks between the hour hand and the number 12 on the clock. Now divide that number in half. (For example, if there are 20 minute marks between the hour hand and 12, half of this is 10.)
5. Using that number, count the number of minute marks from the hour hand up towards the number 12. Note where you stop. Draw a line from the center of the clock to that mark on the clock. The line between the center and that mark is your north-south line. North is the side of the line that points towards from the sun.



Lesson 4: Ephesians 4:26-27 ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

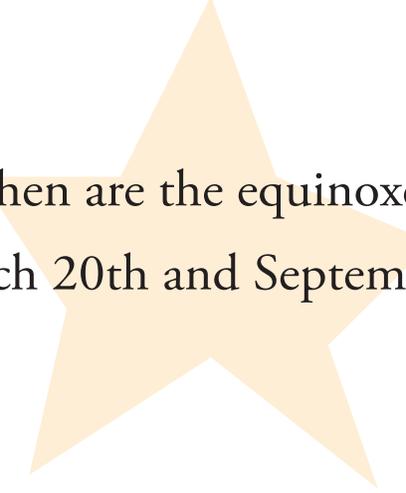
Be angry and do not sin;
do not let the sun go down
on your anger, and give no
opportunity to the devil.

Handwriting practice lines consisting of solid top and bottom lines with a dashed middle line, providing space for independent practice of the text above.

Lesson 4: Ephesians 4:26-27



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question: When are the equinoxes?

Answer: March 20th and September 22nd

LESSON 4



Hello Moon!

God gave the Earth a satellite we call the Moon. As the Moon revolves around the Earth, we can see more or less of the side of the Moon that is lit up by the Sun. We call these different shapes of the moon “phases.”

Recommended Reading

- ★ *Moonfinder*, by Jay Ryan
- ★ *Why Does the Moon Change Shape*, by Isaac Asimov



ACTIVITY Moon Phases Activity

SUPPLY LIST

- Styrofoam ball
- Pencil
- Bright light
- A very dark room

INSTRUCTIONS

1. Watch this video to understand how to do this 3D activity. It will give you a greater understanding of moon phases: experienceastronomy.com/moonphases

Lesson 5: Psalm 72:5,7



May they fear you while the sun endures,

and as long as the moon, throughout all

generations! In his days may the righteous

flourish, and peace abound, till the moon be

no more!

Handwriting practice lines consisting of four sets of three horizontal lines (top, middle, bottom) with a dashed midline, providing space for writing the text.

Lesson 5: Psalm 72:5,7



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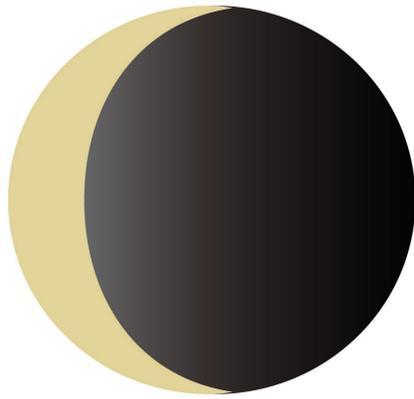
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be no more!

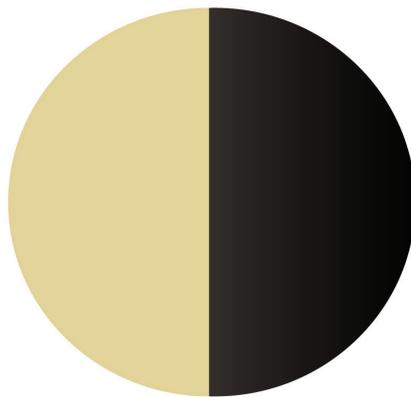
Lesson 5: Psalm 72:5,7



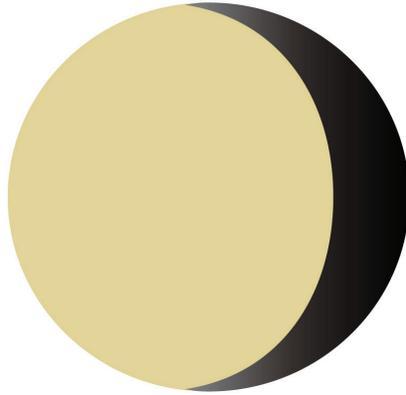
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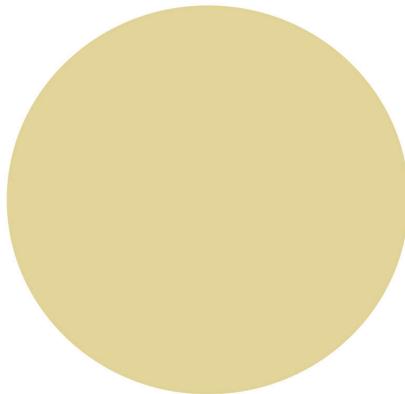
LESSON 5



LESSON 5



LESSON 5



LESSON 5



There Are Giants in the Sky!

On a dark night, you can see thousands of stars in the sky! For thousands of years, people have imagined the stars make shapes or pictures in the sky. We call these pictures “constellations.”

Recommended Reading

- ★ *Astronomy* (Eyewitness Books), by Kristen Lippincott, p.12-13 (this book will be used several times throughout the course)
- ★ *The Library of Constellations: Orion*, by Stephanie True Peters

ACTIVITY

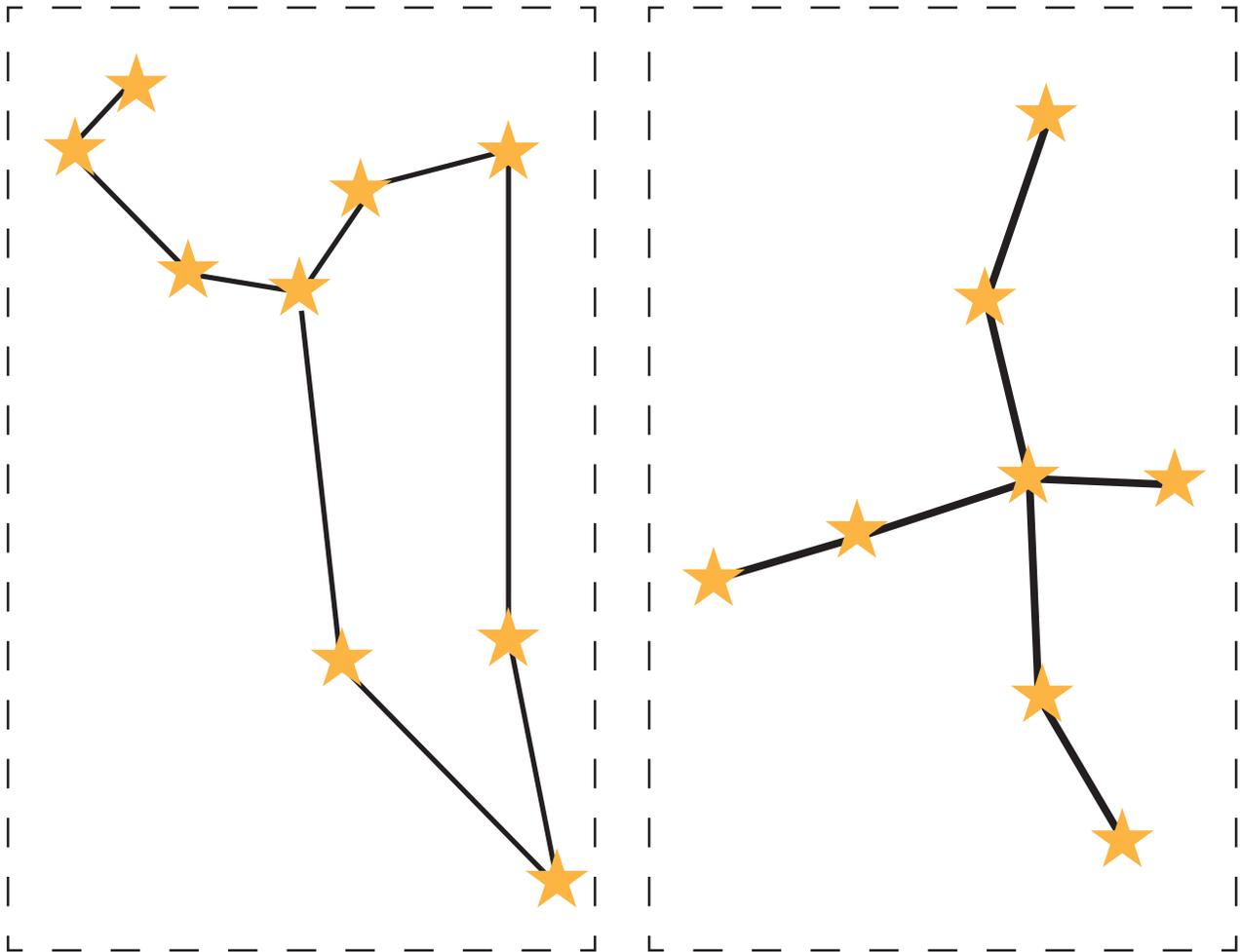
Make Marshmallow Constellations

SUPPLY LIST

- Mini-marshmallows
- Toothpicks

INSTRUCTIONS

1. Print off the constellation cards (Leo and Cygnus) below to use as a pattern for creating your own.
2. Use marshmallows for your stars, and use toothpicks as the lines between your stars. You may need to break or cut your toothpicks to make the pieces smaller. Get help from an adult to do this activity if needed.



Lesson 6: 1 Corinthians 15:41



There is one glory of the sun, and another
glory of the moon, and another glory of
the stars: for star differs from star in glory.

Handwriting practice lines consisting of ten sets of three horizontal lines (top, middle, bottom) with a dashed midline for letter height guidance.

Lesson 6: 1 Corinthians 15:41

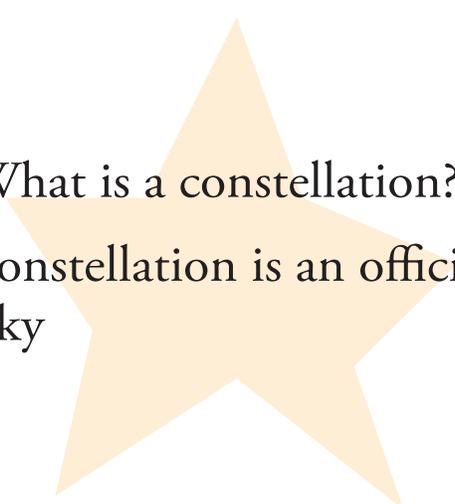


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the stars; for star differs
from star in glory.

Lesson 6: 1 Corinthians 15:41



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question: What is a constellation?

Answer: A constellation is an official pattern of stars in the sky

LESSON 6





From North Star to Southern Cross

God gave us the stars in the sky to serve as signs to help us find our way. Using certain stars in the sky, people can easily find north, south, east, and west.

Recommended Reading

- ★ *Where Am I? The Story of Maps and Navigation*, by A.G. Smith, p.46-49, 56-59 (entire book is good to read and includes a study of maps)
- ★ *The Library of Constellations: The Big Dipper*; by Stephanie True Peters (not ideal for students in the Southern hemisphere)
- ★ *A Walk Through the Heavens: A Guide to Stars and Constellations and their Legends* (4th edition), by Milton D. Heifetz and Will Tirion, p.14-17 (this is a great reference book that will teach students how to find major constellations; not for students in the southern hemisphere).

Recommended Reading (continued)

★ *A Walk Through the Southern Sky: A Guide to Stars and Constellations and their Legends* (2nd edition), by Milton D. Heifetz and Will Tirion, p.14-19 (this is a great reference book that will teach students how to find major constellations; not for students in the northern hemisphere).

★ *D'Aulaires' Book of Greek Myths*:

1. For those in the **northern hemisphere**, read the story of Perseus, p.114-122. Go outside about an hour after sunset, look for the constellation **Cassiopeia**. Use *A Walk Through the Heavens* (p.18-19) to help you locate the constellation.

2. For those in the **southern hemisphere**, read the story of the Golden Fleece, p.162-175. Go outside about an hour after sunset, look for the constellation **Carina**. You might also be able to see **Puppis** or **Vela**. Use *A Walk Through the Southern Sky* (p.20-21) to help you locate the constellation.



ACTIVITY

Northern and Southern Hemispheres

NORTHERN HEMISPHERE: FINDING THE BIG DIPPER

1. On a clear night, about 45 minutes after the sun sets, go outside and try to find the Big Dipper. You can find out what time the sun sets on this website: timeanddate.com/sun. Get help from an adult if you need it.
2. In the space provided, draw what the stars look like and see if you can also draw the point to which the north pole points in the sky (the star Polaris).
3. You also might need some help finding these stars, so go to this website: neave.com/planetarium. On this site, you can show what the sky looks like from any place on earth, any day of the year, any time of day or night. Ask for help from an adult if you have trouble. Once your computer screen shows what the sky looks like from your location on today's date at the right time, you can turn yourself to the north or south to look for the right stars. This will help you find the stars in the real sky.

SOUTHERN HEMISPHERE: FINDING THE SOUTHERN CROSS

1. On a clear night, about 45 minutes after the sun sets, go outside and try to find the Southern Cross. You can find out what time the sun sets on this website: timeanddate.com/sun. Get help from an adult if you need it.
2. In the space provided, draw what the stars look like and see if you can also draw the point to where the south pole points in the sky.
3. You also might need some help finding these stars, so go to this website: neave.com/planetarium. On this site, you can show what the sky looks like from any place on earth, any day of the year, any time of day or night. Ask for help from an adult if you have trouble. Once your computer screen shows what the sky looks like from your location on today's date at the right time, you can turn yourself to the north or south to look for the right stars.

Lesson 7: Job 9:8-9



Who alone stretched out the heavens and

trampled the waves of the sea; who made the

Bear and Orion, the Pleiades and the

chambers of the south.

Lesson 7: Job 9:8-9



Who alone stretched out the

heavens and trampled the

waves of the sea; who made

the Bear and Orion, the

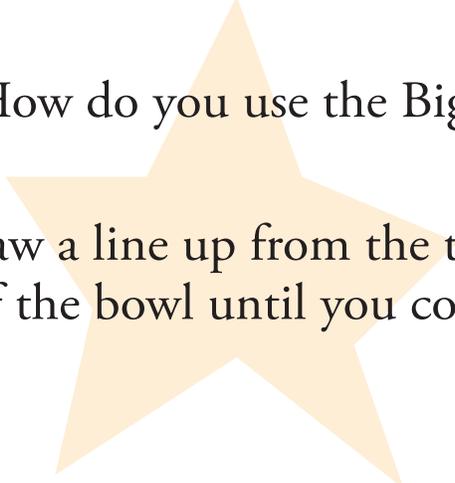
Pleiades and the chambers

of the south

Lesson 7: Job 9:8-9



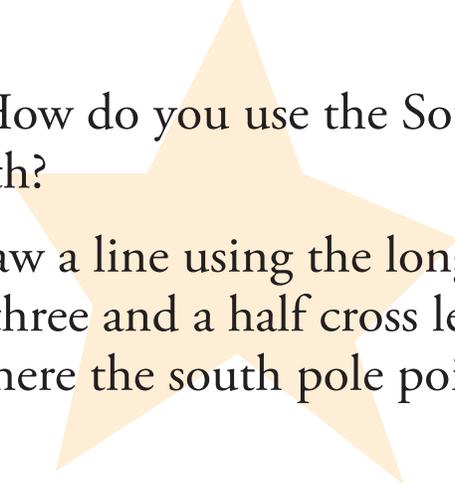
Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question: How do you use the Big Dipper to find north?

Answer: Draw a line up from the two stars at the end of the bowl until you come to the North Star.

LESSON 7



Question: How do you use the Southern Cross to find south?

Answer: Draw a line using the long pole of the cross about three and a half cross lengths. This is close to where the south pole points.

LESSON 7







From North Star to Southern Cross



Lesson 7 Quiz

1. The north star does not appear to move in the sky because our north pole is pointing towards it.
True False
2. What is the special name for all the stars that go around in the sky and never rise or set?
a) Constellation Stars b) Celestial Stars c) Circumpolar Stars
3. If you can find the north star, you will always know which way is north.
True False
4. There is a popular shape of stars in the northern hemisphere called the Big _____.
a) Orion b) Dipper c) Ursa
5. A popular constellation used in the southern hemisphere to find south is called the Southern _____.
a) Cross b) Orion c) Ursa
6. The biggest constellation in the sky is the Southern Cross.
True False
7. Give one country flag that has the shape of the Southern Cross. _____
8. The constellations and stars in the sky can give us direction.
True False





Stories in the Sky

In modern times, astronomers count 88 constellations, but many of these constellations go back to ancient times. There were many groups of people from long ago who told mythological stories about these shapes in the sky.

Recommended Reading

- ★ *Once Upon a Starry Night*, by Jacqueline Mitton and Christina Balit
- ★ *A Walk Through the Heavens: A Guide to Stars and Constellations and their Legends* (4th edition), by Milton D. Heifetz and Will Tirion, p.57-58, stories of Bootes and Canis Major (not for students in the southern hemisphere)
- ★ *A Walk Through the Southern Sky: A Guide to Stars and Constellations and their Legends* (2nd edition), by Milton D. Heifetz and Will Tirion, p.79-82, stories of Carina and Centarus (not for students in the northern hemisphere)



ACTIVITY Build a Planisphere

Follow the instructions on the following page to learn to make and use a planisphere: experienceastronomy.com/planisphere

Lesson 8: Job 38:31-32



Can you bind the chains of the Pleiades or

loose the cords of Orion? Can you lead forth

the Mazzaroth in their season, or can you

guide the Bear with its children?

Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).

Lesson 8: Job 38:31-32



Can you bind the chains of

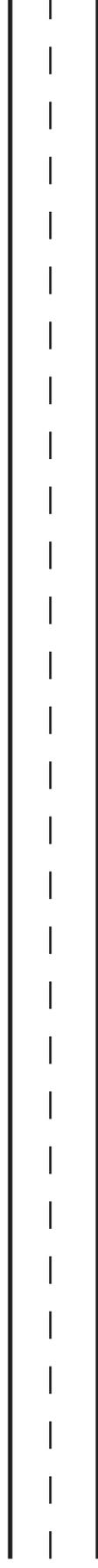
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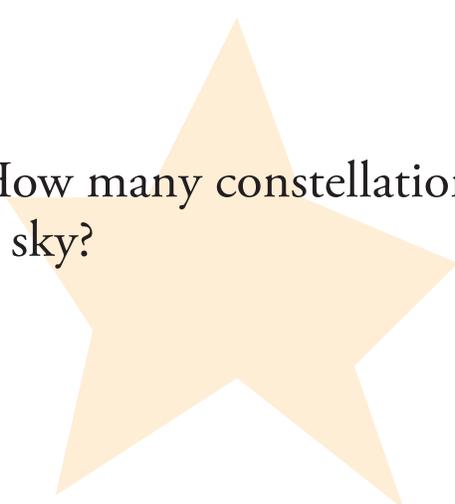
the Bear with its children?



Lesson 8: Job 38:31-32



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question: How many constellations are there in the whole sky?

Answer: 88

LESSON 8



More Stories in the Sky

There's a special group of 12 constellations called the Zodiac. These are special because, when standing on the Earth, these constellations seem to line up with the Sun in the sky at different times of the year as the Earth makes its way around the Sun.

Recommended Reading:

★ *D'Aulaires' Book of Greek Myths*

- *If you are completing this lesson in **August, September, or October:***
 - Read the story of the Muses and Orpheus, p.100-105, and then a little while after sunset look for the constellation Lyra.
 - Read the story of Hercules, p.132-147, and then a little while after sunset look in the sky for Hercules.
 - Read the story of Pan, p.90-91, and then a little while after sunset look in the sky for Capricornus.
 - Read the story of centaurs, p.96-99, and then a little while after sunset look in the sky for Centaurus.
- *If you are completing this lesson in **November, December, or January:***
 - Read the story of Perseus, p.114-122, and then look for the constellations Perseus, Andromeda, and Pegasus.



Recommended Reading, Cont.

- *If you are taking this lesson in **February, March, or April:***
 - Read the story of Europa, p.108-111, and then a little while after sunset look in the sky for the constellation Taurus.
 - Read the story of Artemis, p.44-49, and then a little while after sunset look in the sky for the constellation Orion.
 - Read the story of Hercules, p.132-147, and then a little while after sunset look in the sky for Cancer.
- *If you are completing this lesson in **May, June, or July:***
 - Read the story of Demeter, p.58-63, and then a little while after sunset look for the constellation Virgo.
 - Read the story of Hercules, p.132-147, and then a little while after sunset look for the constellation Leo.

★ *A Walk Through the Heavens: A Guide to Stars and Constellations and their Legends* (4th edition), by Milton D. Heifetz and Will Tirion (**not for students in the Southern Hemisphere**). Use the index to help you locate specific constellations studied above. It can help guide you as you look for the constellations in the sky.

★ *A Walk Through the Southern Sky: A Guide to Stars and Constellations and their Legends* (2nd edition), by Milton D. Heifetz and Will Tirion (**not for students in the Northern Hemisphere**). Use the index to help you locate specific constellations studied above. It can help guide you as you look for the constellations in the sky.



ACTIVITY

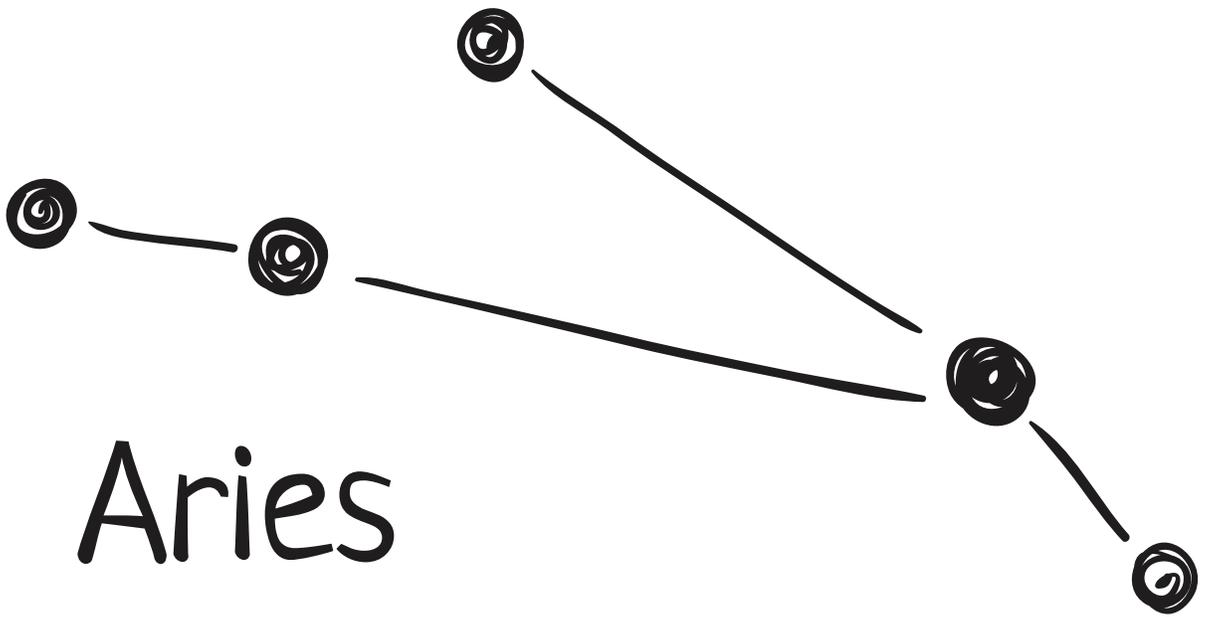
Zodiac Chalk Diagrams

SUPPLY LIST

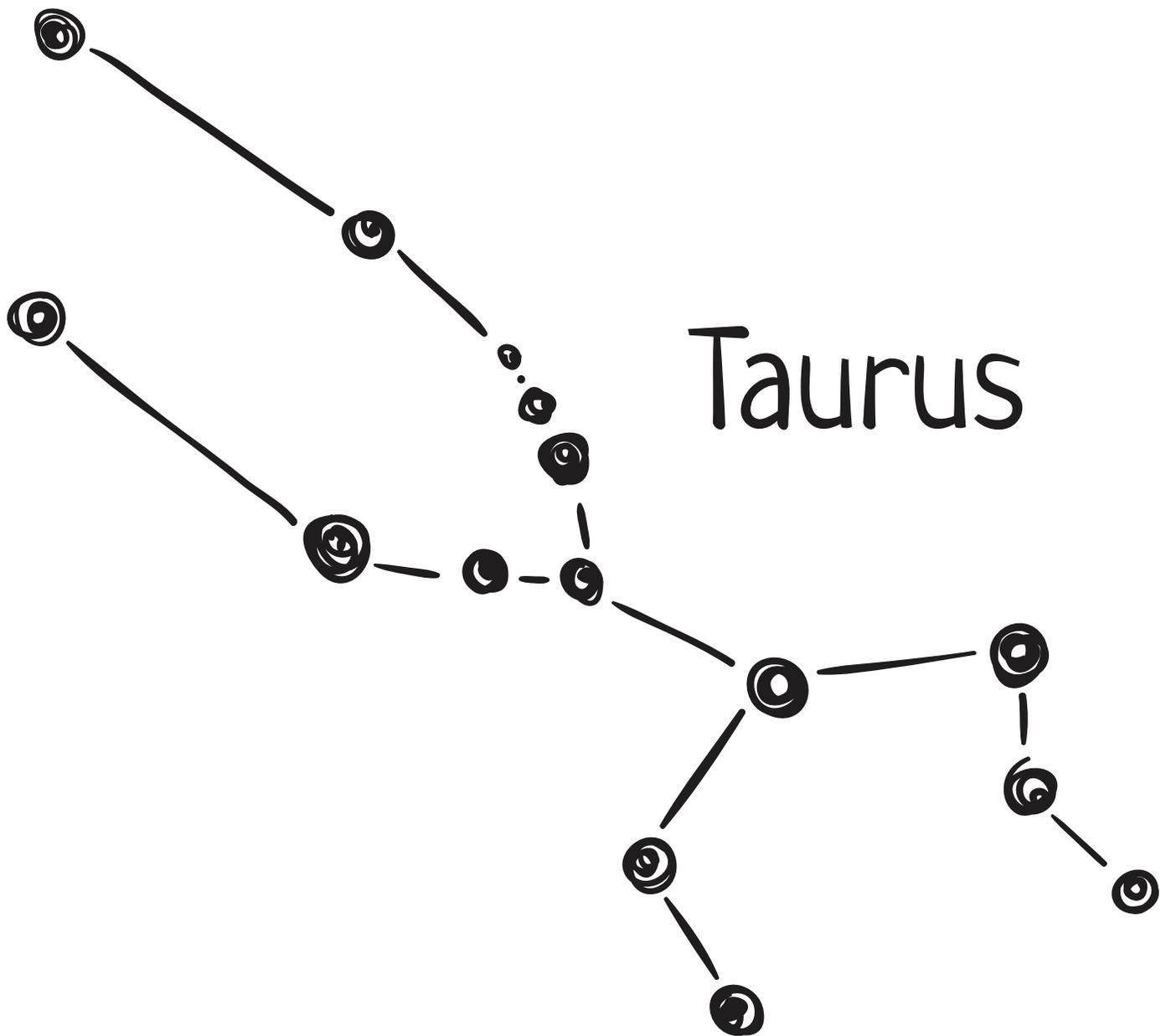
- Black construction paper
- White chalk
- Star stickers

INSTRUCTIONS

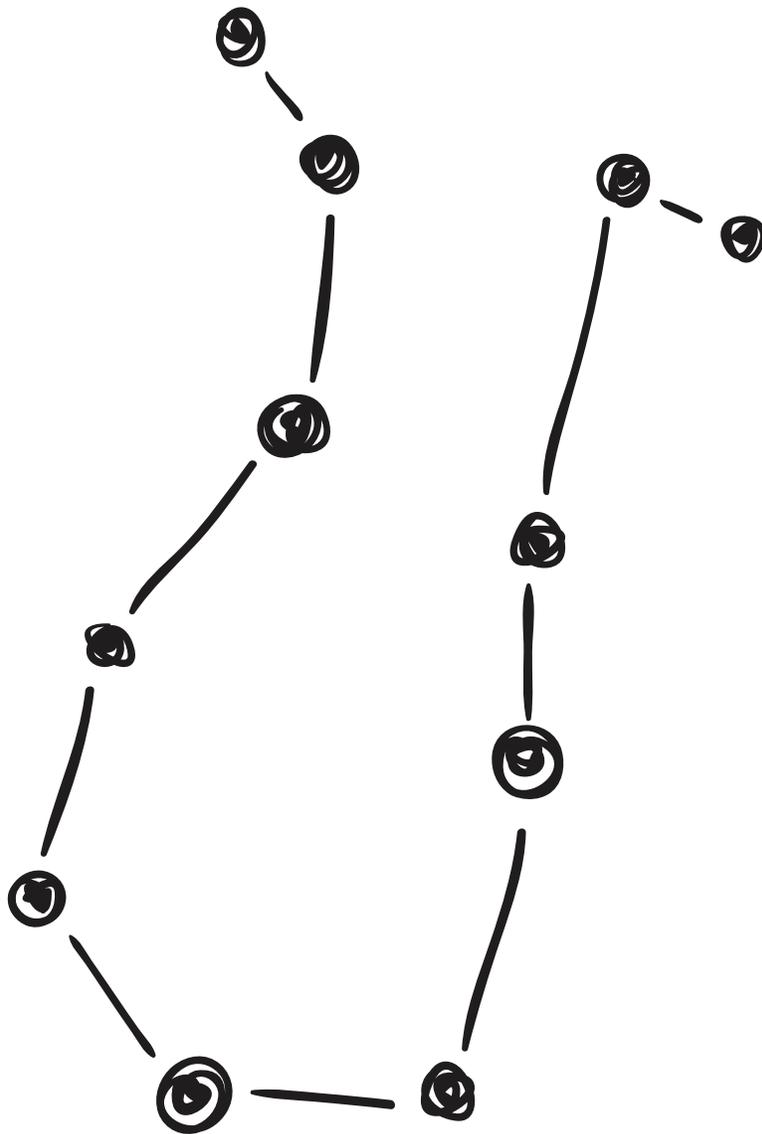
1. Use the zodiac constellation cards included as a template for drawing your chalk diagrams on black construction paper.
2. Arrange the star stickers on a piece of black construction paper so they resemble one of the constellations.
3. Use the chalk to connect the stars and label your constellation.

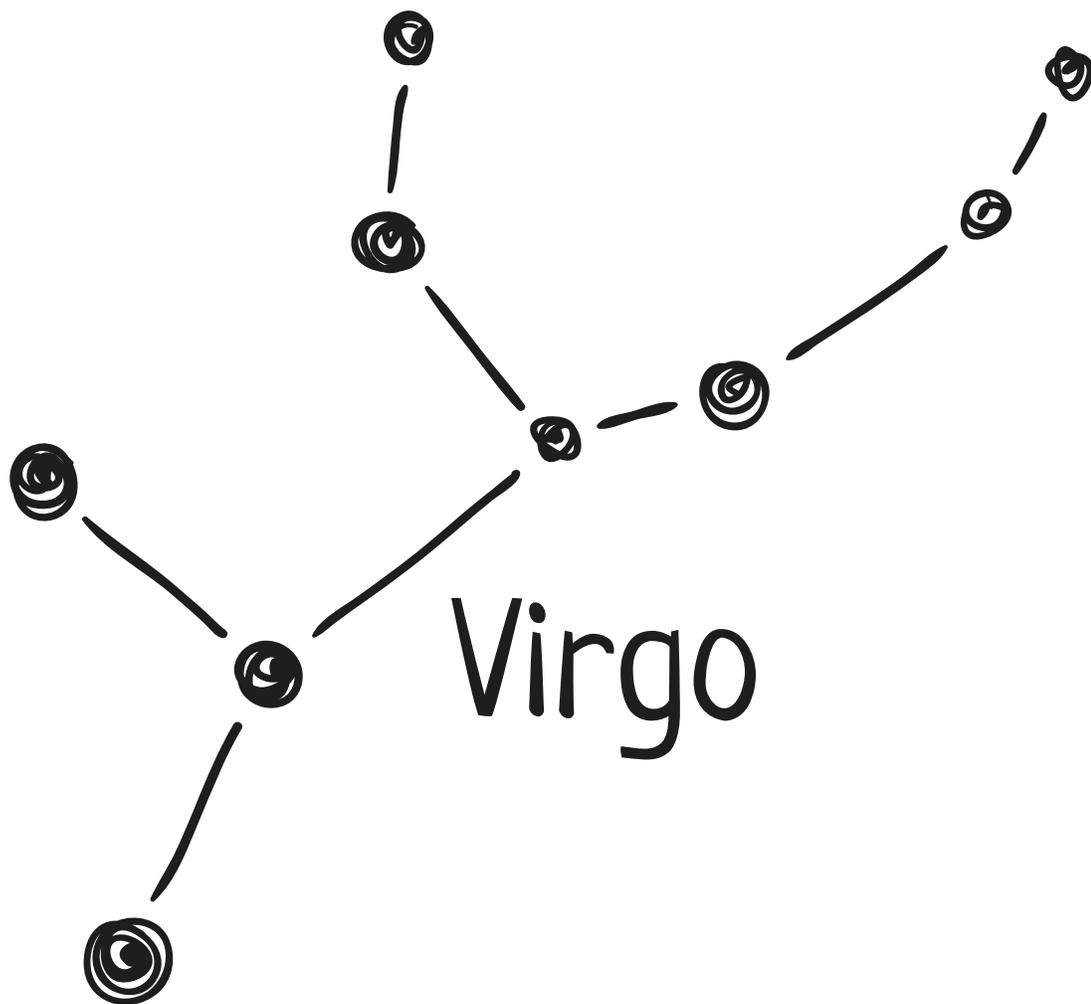


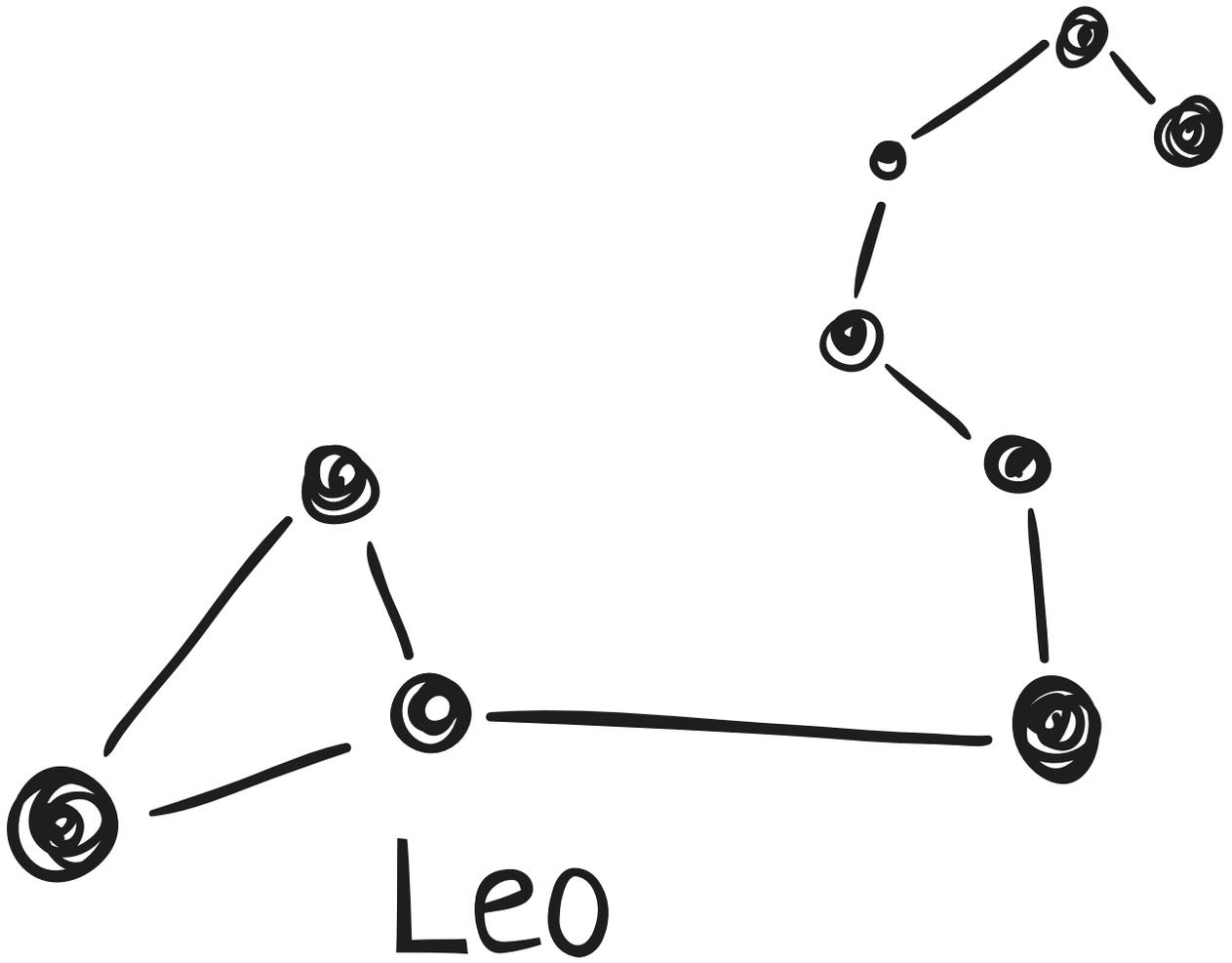
Aries

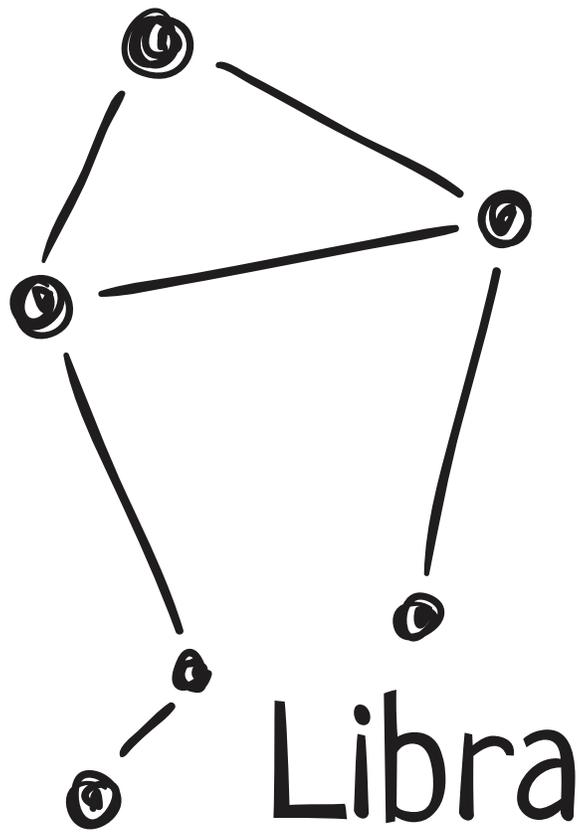


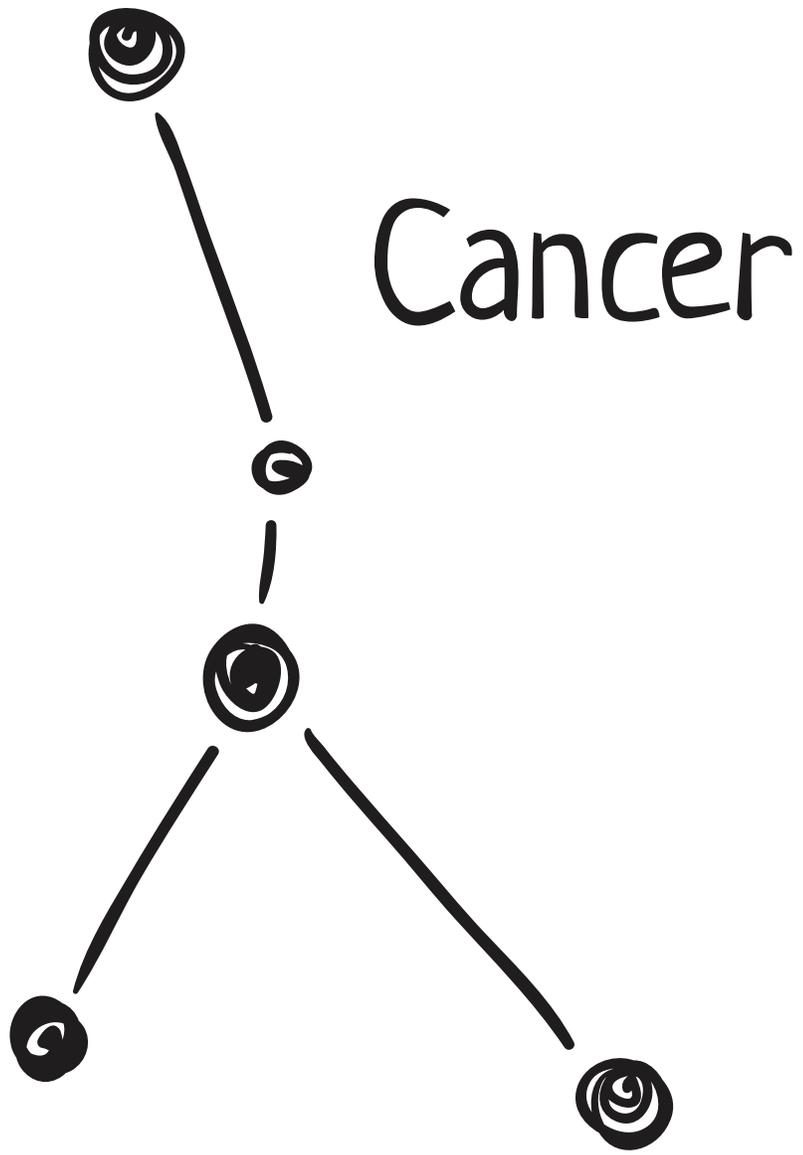
Gemini



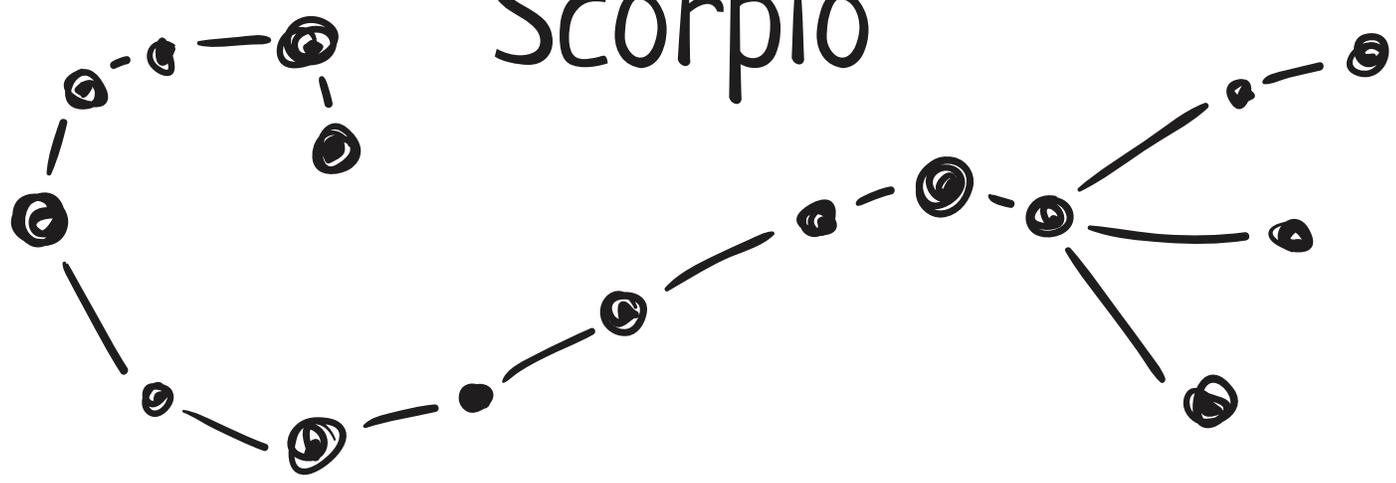


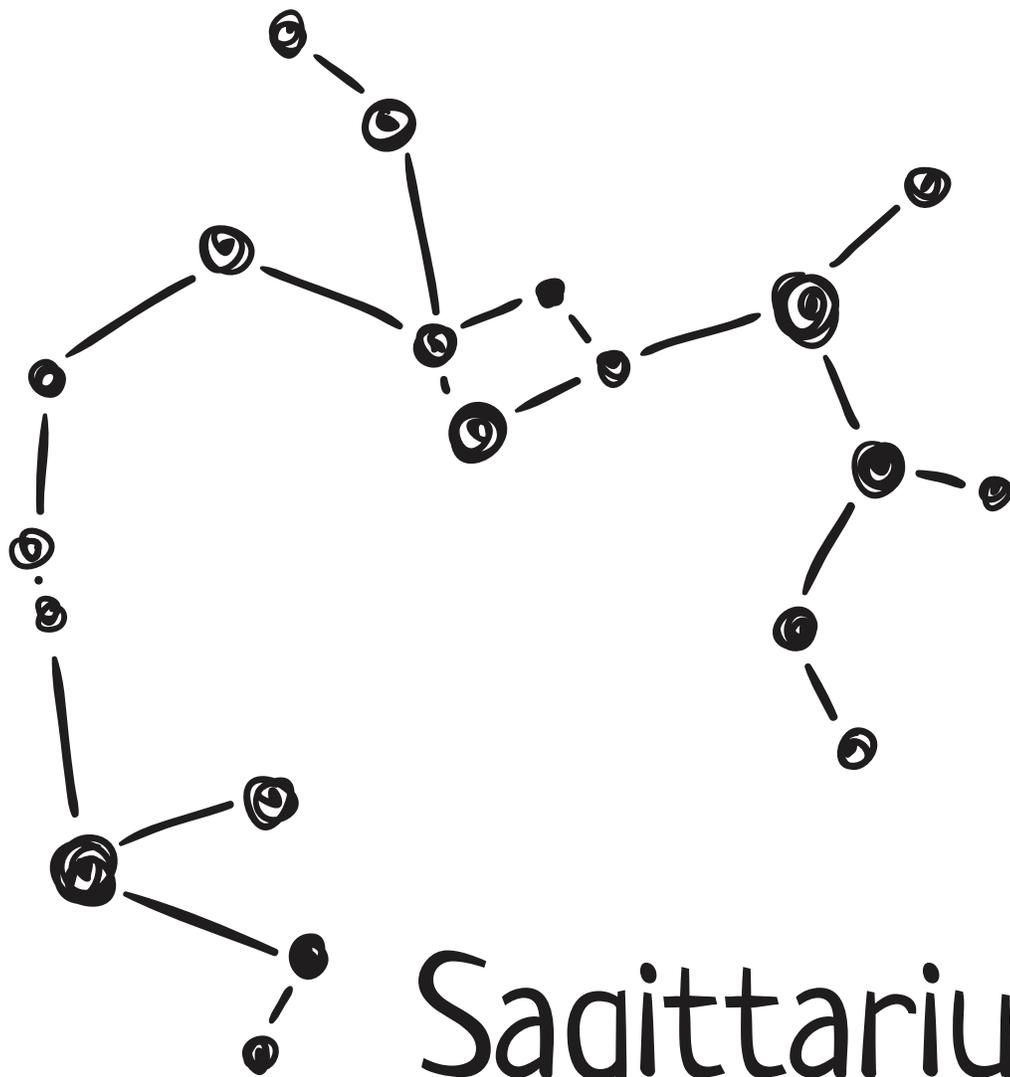




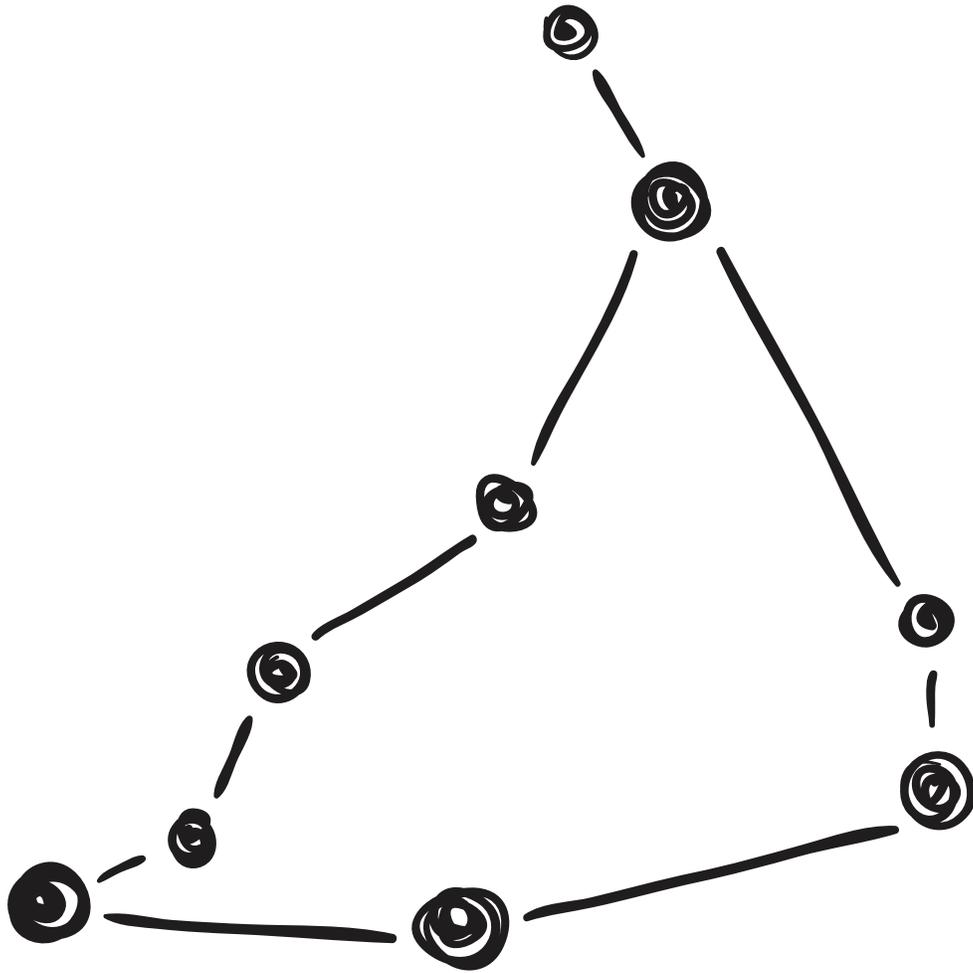


Scorpio

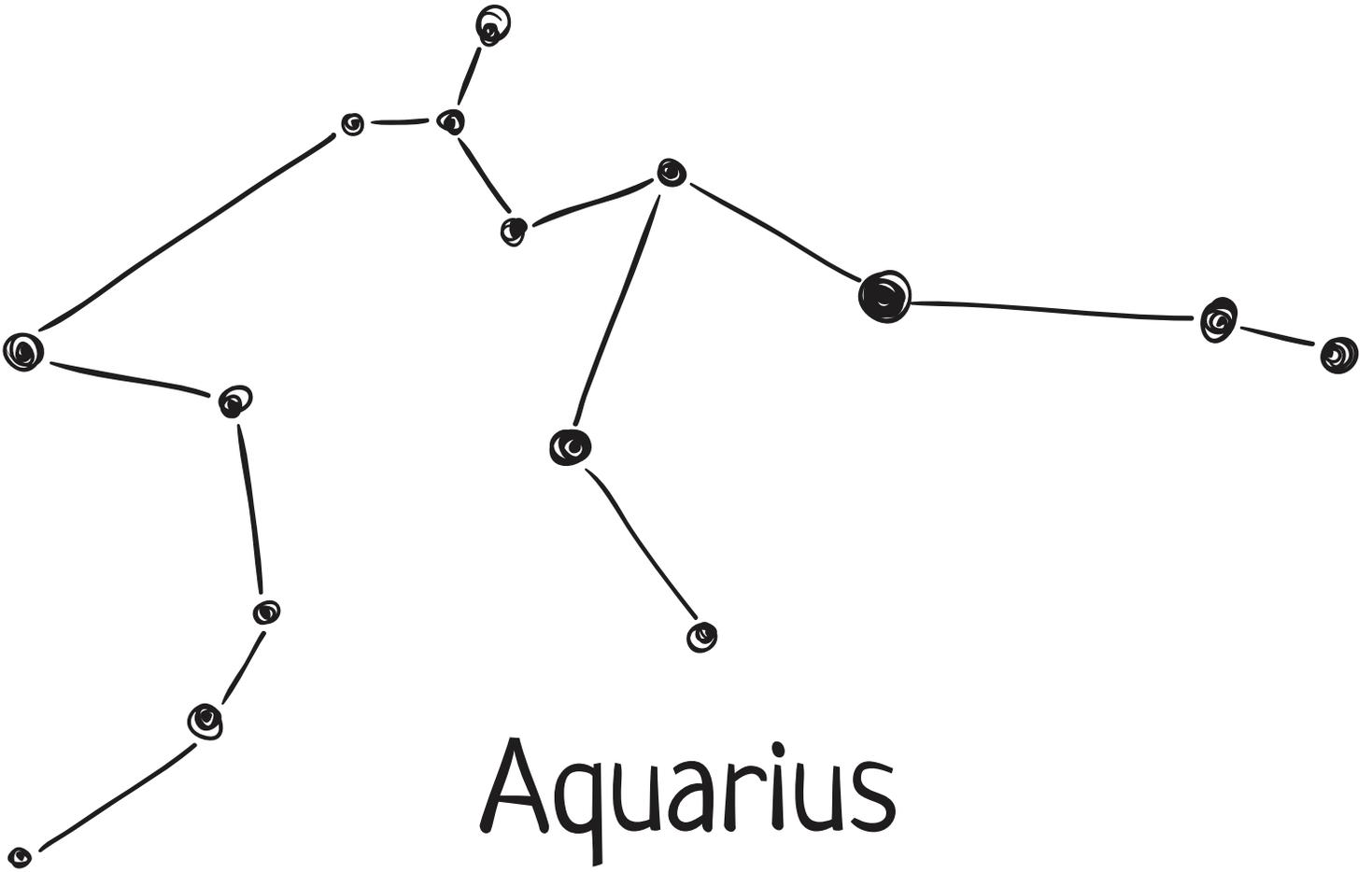




Sagittarius



Capricorn



Pisces



Lesson 9: Psalm 19:4-5



In them he has set a tent for the sun,

which comes out like a bridegroom leaving

his chamber, and, like a strong man, runs

its course with joy.

Handwriting practice lines consisting of ten sets of three horizontal lines (top, middle, bottom) for tracing or writing.

Lesson 9: Psalm 19:4-5

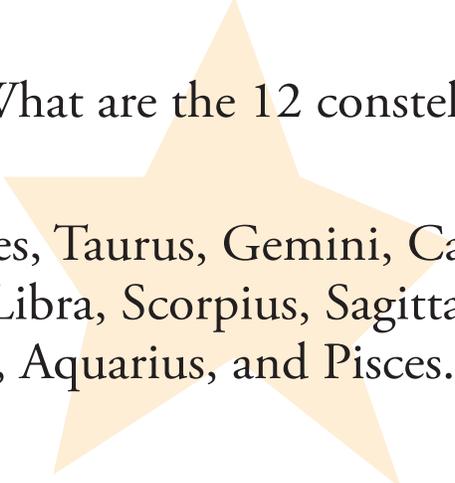


In them he has set a tent
for the sun, which comes out
like a bridegroom leaving his
chamber, and, like a strong
man, runs its course with joy.

Lesson 9: Psalm 19:4-5



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question: What are the 12 constellations of the zodiac?

Answer: Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpius, Sagittarius, Capricornus, Aquarius, and Pisces.

LESSON 9



Watch out for Wandering Stars!

In ancient times they were called the wandering stars—dots of light that moved differently than all the other stars in the sky. Today we call these dots of light “planets,” and we know they are not stars but large objects revolving around our star, the Sun.

Recommended Reading:

- ★ *Astronomy* (Eyewitness Books), by Kristen Lippincott, p.10-11.
- ★ *Ancient Mesopotamia*, by Allison Lassieur, p.12-29,80-93.



ACTIVITY

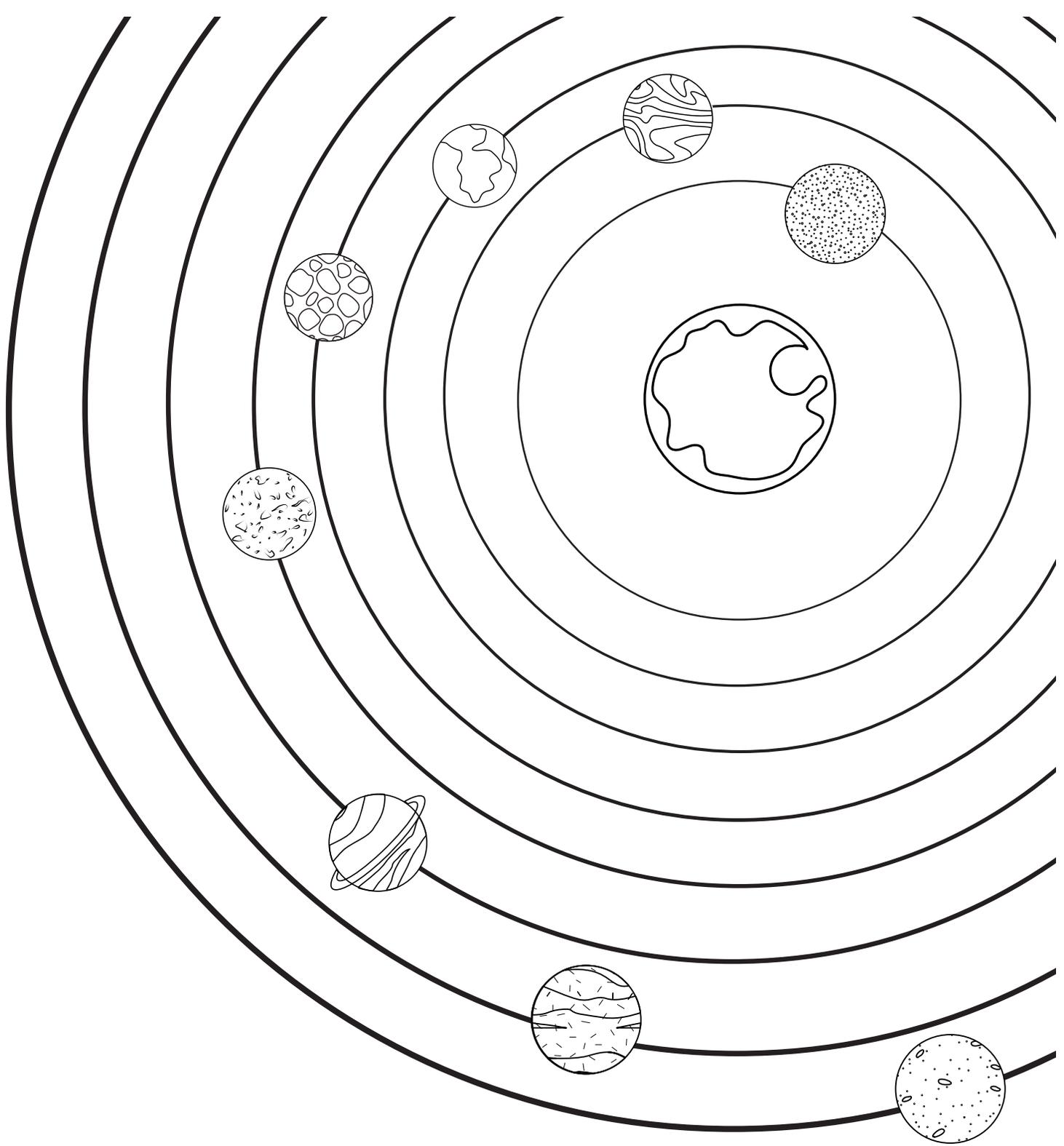
Create a Clay Model Solar System

SUPPLY LIST

- Clay
- Plastic Straws
- Paint and paintbrushes
- Toothpicks

INSTRUCTIONS

1. Make round balls out of clay to represent each of the planets. These do not need to be to scale—the giant planets like Jupiter are far too big to do this. Instead simply make 8 different balls:
 - The biggest should be Jupiter
 - Saturn should be slightly smaller
 - Neptune and Uranus (about the same size) should be slightly smaller
 - Earth and Venus (about the same size) should be smaller
 - Mercury and Mars (about the same size) should be slightly smaller
2. Make 8 round, semi-flattened discs out of clay to use as the base for each of your planets.
3. Using a toothpick, carve the name of a planet in each of these discs, or simply inscribe each planet with its first letter.
4. Insert a straw into each disc and then insert the corresponding planet into the top of the straw.
5. Allow your discs and planets to dry. The drying time will vary depending on the type of clay you're using and the weather.
6. After the clay is dry, spend time decorating your planets with paint. If possible, choose colors that fit the true colors of each planet:
 - Mercury: gray
 - Venus: pale yellow
 - Earth: blue
 - Mars: red or reddish-brown
 - Jupiter: orange
 - Saturn: gold
 - Uranus: pale blue
 - Neptune: pale blue



Solar System Coloring Sheet

Lesson 10: Deuteronomy 4:19



And beware lest you raise your eyes to

heaven, and when you see the sun and the

moon and the stars, all the host of heaven,

you be drawn away and bow down to

them and serve them.

Four sets of blank handwriting lines, each consisting of a solid top line, a dashed middle line, and a solid bottom line.

Lesson 10: Deuteronomy 4:19

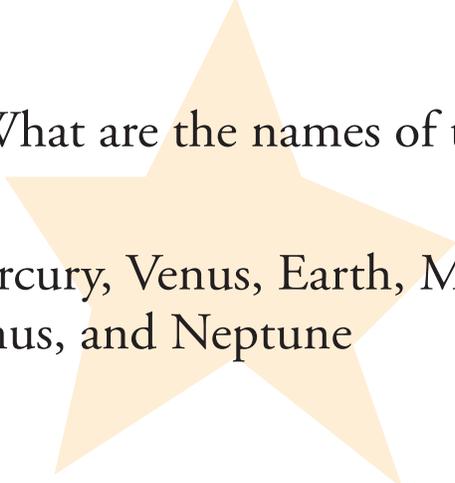


And beware lest you raise
your eyes to heaven, and
when you see the sun and the
moon and the stars, all the
host of heaven, you be drawn
away and bow down to them
and serve them.

Lesson 10: Deuteronomy 4:19



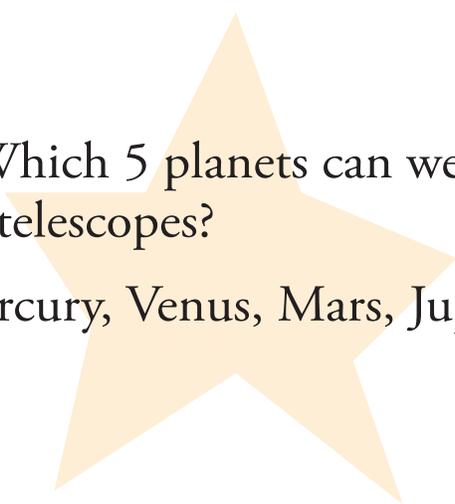
Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question: What are the names of the 8 planets in order?

Answer: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune

LESSON 10



Question: Which 5 planets can we see in the sky without telescopes?

Answer: Mercury, Venus, Mars, Jupiter, and Saturn

LESSON 10

Around the World

At first, people believed the world was flat, like a disk floating in the air. But hundreds of years before Christ, people started to believe the world was actually a sphere, like a ball. They knew this because as they traveled north or south, they saw new stars in the sky, showing they were not traveling on a flat surface but a curved surface.

Recommended Reading:

- ★ *Where Am I? The Story of Maps and Navigation*, by A.G. Smith, p.8-17
- ★ *Astronomy* (Eyewitness Books), by Kristen Lippincott, p.14-15
- ★ *The Librarian who Measured the Earth*, by Kathryn Lasky

ACTIVITY

Round Earth vs Flat Earth Demonstration

SUPPLY LIST

- Large Ball
- CD
- Lamp
- 2 figures for demonstration purposes (this can be almost anything—lego action figures, golf tees, or toothpicks would all work)

INSTRUCTIONS

Use the 2 demonstrations below to show your student how we can see the earth is round, not flat.

Parent Demonstration 1

1. Hold up the CD to your student so the shiny side faces them and ask them if it's round. Then flip the CD horizontally and ask if it's round. Tell them, "While this is round like a circle, it is not a sphere, like a ball." The CD is only round from a certain perspective.
2. Show your student a ball and ask if it's round. Turn it around in several directions and ask them if it's round. Tell them, "This ball is a sphere. It's round no matter how it's looked at."
3. Take one of the figures and tell your student it will represent a ship. Have them get close to the ball so their chin is touching it and their eyes are looking along the top of the ball. Start the figure on the top of the ball and move it away from their eyes along the surface of the ball, asking them to tell you when they can't see it anymore. Explain to them that when watching a ship sail out to sea, it appears the ship sinks into the water as it goes further and further.
4. Next, line the CD up with their eyes and move the figure across the CD. Ask if it appears the figure sinks or if they can they see the complete figure as it moves across the CD. Explain that if the world was really flat, it would never look like a ship is sinking below the horizon, but it does. This is one way we know the world is not flat.

Parent Demonstration 2

1. Carry the supplies over to a lamp.
2. Place the two figures on top of the CD. Have them lift the CD up and down, first below the lamp so the light falls on the top of the CD, then above the lamp so the light hits the bottom of the CD. Explain to them, "If the world was flat, then everyone would experience daytime at the same time and everyone would experience night time at the same time." See if your child can find a way to make it so the light only shines on one of the figures to demonstrate that this is impossible.
3. Place the ball in your hands, holding the two figures on opposite sides of the ball. Turn the ball so one figure is in darkness while the other has light. Then turn the ball the opposite way: so that one figure is in light while the other is in darkness. Explain to your student, "If the world is a sphere, some people would be experience daytime while other people would experience nighttime at the same time because the sun can only shine on one side of the earth at a time." Explain that if we made a phone call to the other side of the world at night, the people we spoke to would be experiencing daytime. This is another reason we know the world is a sphere.

Lesson 11: Job 26:7-8



He stretches out the north over the void and
hangs the earth on nothing. He binds up
the waters in his thick clouds, and the
cloud is not split open under them.

Handwriting practice lines consisting of ten sets of three horizontal lines (top, middle, bottom) for tracing or writing practice.

Lesson 11: Job 26:7-8

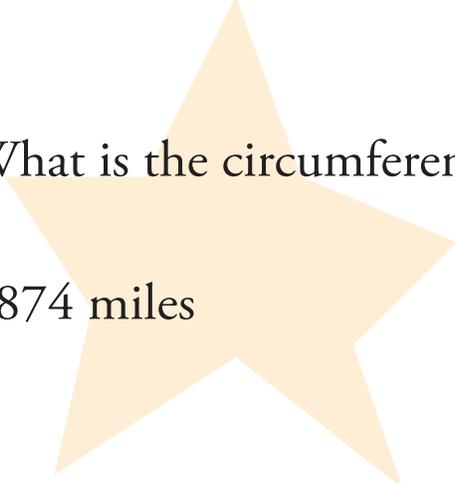


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the waters in his thick clouds,
and the cloud is not split
open under them.

Lesson 11: Job 26:7-8



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question: What is the circumference of the Earth?

Answer: 24,874 miles

LESSON 11



Blackout!

Solar eclipses are some of the most amazing events to witness in the sky. They happen when the Moon comes between the Sun and the Earth, blocking the Sun's light.

Recommended Reading:

- ★ *Solar and Lunar Eclipses*, by Ruth Owen, p. 4-9 and 16-29



ACTIVITY

Create an Umbra and Penumbra

SUPPLY LIST

- Dark room
- Small ball (like a ping-pong ball, golf ball, etc.)
- String
- Tape
- Lamp
- Small portable white surface (piece of paper, small white board, etc.)

INSTRUCTIONS

1. Go into a dark area. Tape the string to the ball and the other end of the string to the ceiling, or the top of a door frame, or anywhere that allows the ball to hang in mid-air without support.
2. Turn on the lamp, remove the shade, and place the light from the lamp on the same level as the ball, about 2 feet away.
3. Place the white surface about 6 inches from the ball in line with the light. Notice the shadow of the ball on the surface is crisp and easy to see.
4. Move the white surface away from the ball slowly until it is about 2-4 feet away. You'll start to notice the edges of the shadow become blurred.
5. That blurred area of the ball's shadow is the penumbra. This is the area of the shadow where some of the bulb's light is blocked, but not all of it. The area in the middle of the shadow is the umbra, where all of the light is blocked.
6. Notice the further away the surface is, the bigger the penumbra is.

Lesson 12: Jeremiah 31:35



Who gives the sun for light by day and
the fixed order of the moon and the stars
for light by night, who stirs up the sea so
that its waves roar—the Lord of hosts is his
name.

Handwriting practice lines consisting of four sets of three horizontal lines (top, middle, bottom) with a dashed midline for letter height guidance.

Lesson 12: Jeremiah 31:35



Who gives the sun for light

by day and the fixed order

of the moon and the stars

for light by night, who stirs

up the sea so that its waves

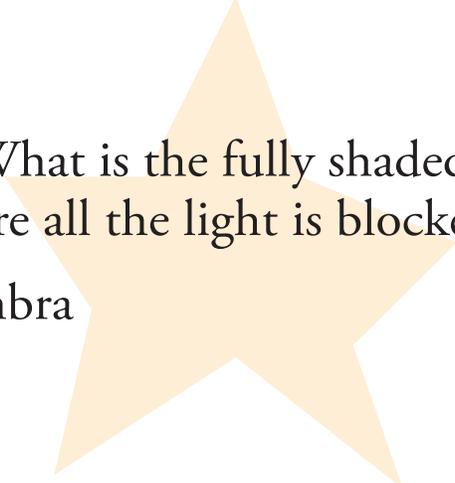
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Lesson 12: Jeremiah 31:35



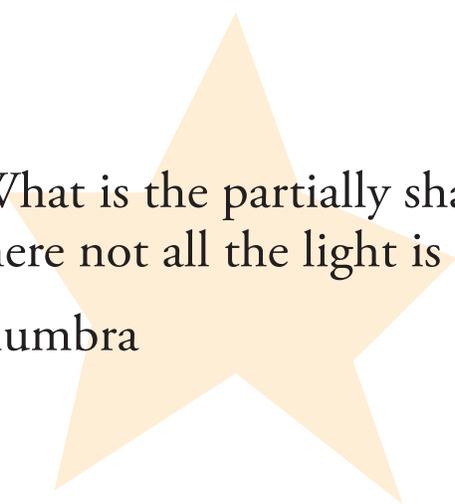
Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question: What is the fully shaded part of a shadow where all the light is blocked?

Answer: Umbra

LESSON 12



Question: What is the partially shaded part of a shadow where not all the light is blocked?

Answer: Penumbra

LESSON 12



13

Bye Bye Moon!

Lunar eclipses are wonderful nighttime events to witness. They happen when the Sun's light is blocked from hitting the Moon for a short time because the Earth gets in the way. The shadow of the Earth falls on the Moon.

Recommended Reading:

- ★ *Moontellers: Myths of the Moon from Around the World*, by Lynn Moroney
 - ★ *Solar and Lunar Eclipses*, by Ruth Owen, p.10-15
- 



ACTIVITY

Simulate a Lunar Eclipse

SUPPLY LIST

- Tennis Ball
- Ping Pong Ball
- Wood stick (5 ft long)
- Glue
- Large-beam flashlight

INSTRUCTIONS

1. Glue the tennis ball, which represents the earth, to the end of the stick. Glue the ping-pong ball, which represents the moon, to the other end of the stick. Allow the glue to dry.
2. In a dark room, or outside on a dark night, lay the stick on a flat surface. Shine the flashlight toward earth (tennis ball). Is any light reaching the moon (ping-pong ball)?
3. Change the moon's orbit by raising the stick at Earth's end. Shine the light from the same place. Adjust the stick's angle until the moon is completely dark. Earth has now totally eclipsed the moon!

Lesson 13: Psalm 89:36-37



His offspring shall endure forever, his
throne as long as the sun before me. Like
the moon it shall be established forever, a
faithful witness in the skies.

Handwriting practice lines consisting of ten sets of three horizontal lines (top, middle, bottom) for tracing and writing.

Lesson 13: Psalm 89:36-37

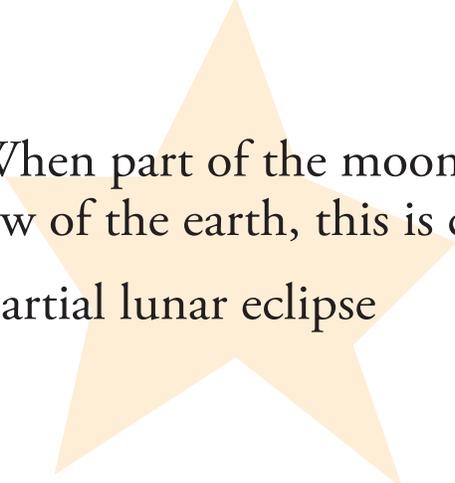


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forever, his throne as long as
the sun before me. Like the
moon it shall be established
forever, a faithful witness in
the skies.

Lesson 13: Psalm 89:36-37



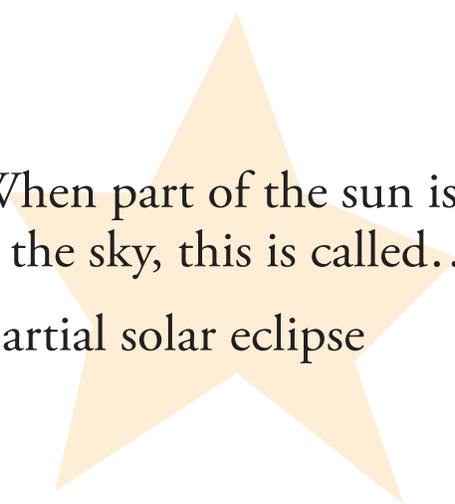
Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question: When part of the moon is covered by the shadow of the earth, this is called...

Answer: A partial lunar eclipse

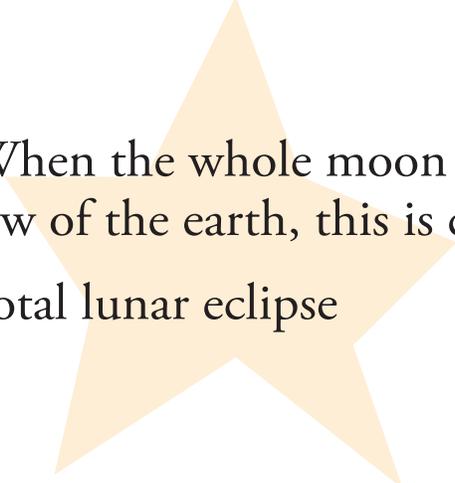
LESSON 13



Question: When part of the sun is covered by the moon in the sky, this is called...

Answer: A partial solar eclipse

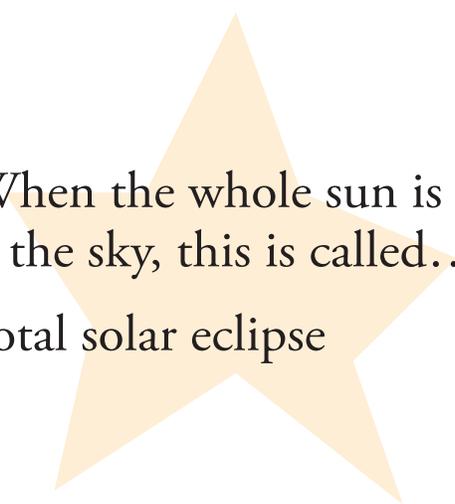
LESSON 13



Question: When the whole moon is covered by the shadow of the earth, this is called...

Answer: A total lunar eclipse

LESSON 13



Question: When the whole sun is covered by the moon in the sky, this is called...

Answer: A total solar eclipse

LESSON 13



14

Falling Rocks and Shooting Stars

Meteors are sometimes called “shooting stars,” but they aren’t stars at all. Instead, they are bits of rock slamming into the Earth’s atmosphere and burning up, creating big streaks of light in the sky. Sometimes parts of these rocks make it all the way to the Earth’s surface.

Recommended Reading:

★ *Meteors* (Space Science), by Simon Rose





ACTIVITY

Meteor Observation

INSTRUCTIONS

1. Go outside on a clear night sometime with your parents. Lay on your back on the ground or in a reclining chair.
2. Stare into the sky for 30 minutes and count how many “shooting stars” (meteors) you see in that time. They appear very quickly and then disappear, so be patient and look carefully. The darker your sky and the clearer the night, the more meteors you are likely to see.
3. After this, look at your calendar to see when the next meteor shower is due to happen. Use the Internet or the short list below to help you. Once you’ve noted the closest meteor shower, mark your calendar to go outside at night for 30 minutes to see if you can see any more meteors.
 - January 3 – Quadrantids
 - April 22 – Lyrids
 - May 6 – Eta Aquariids
 - August 13 – Perseids
 - October 21 – Orionids
 - November 18 – Leonids
 - December 14 – Geminids

Lesson 14: Hebrews 11:3



By faith we understand that the universe

was created by the word of God, so that

what is seen was not made out of things

that are visible.

Handwriting practice lines consisting of ten sets of three horizontal lines (top, middle, bottom) for tracing and writing.

Lesson 14: Hebrews 11:3

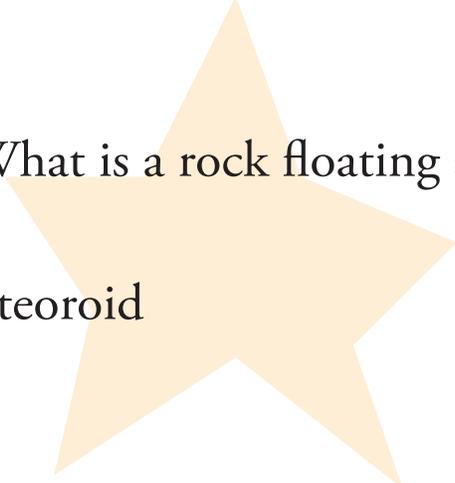


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Lesson 14: Hebrews 11:3



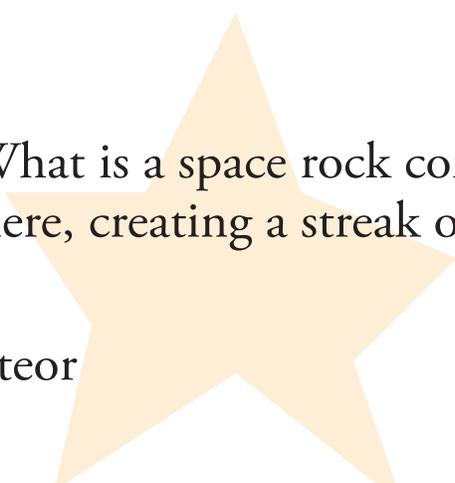
Handwriting practice lines consisting of ten rows. Each row contains three horizontal lines: a solid top line, a dashed middle line, and a solid bottom line.



Question: What is a rock floating around in space?

Answer: Meteoroid

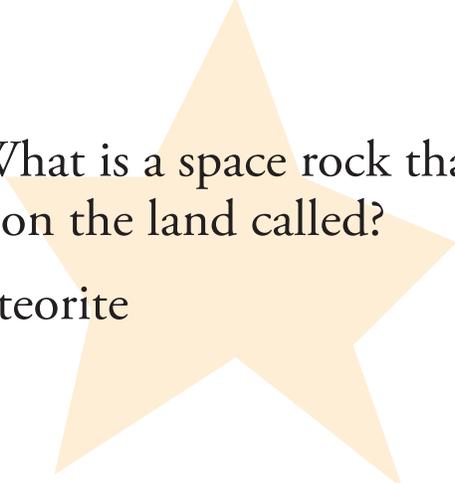
LESSON 14



Question: What is a space rock coming into our atmosphere, creating a streak of light, called?

Answer: Meteor

LESSON 14



Question: What is a space rock that lands in the water or on the land called?

Answer: Meteorite

LESSON 14



15

Galileo's Head was on the Block

Astronomers in the 1500s and 1600s made some very important discoveries about the Earth. They helped to show others the Earth was not the center of everything. Instead, the Earth and all the other planets revolve around the Sun.

Recommended Reading:

- ★ *Nicolaus Copernicus: The Earth Is a Planet*, by Dennis Brindell Fradin
 - ★ *Tycho Brahe: Pioneer of Astronomy*, by Don Nardo, p. 59-77 (or read the entire book for a very interesting biographical sketch of a famous astronomer)
 - ★ *Astronomy* (Eyewitness Books), by Kristen Lippincott, p. 18-19
- 



ACTIVITY

Outlining Orbits

SUPPLY LIST

- 8 1/2 x 11 inch sheet of white paper
- Piece of cardboard that's at least 8.5x11 inches
- Tape
- 2 pushpins
- 5 inch length of string tied into a loop
- Colored pencil or pen

INSTRUCTIONS

1. Fold your piece of paper in half, then fold it in half the other way. Open the paper up and use a pen or pencil to draw a line in the longest horizontal crease.
2. The spot where the unlined crease intersects with the line you drew is the mid-point. Label the mid-point "sun."
3. Put the paper on the cardboard or old magazine and tape down the corners so it doesn't slide around.
4. Attach a pushpin into the sun midpoint. Place a string loop around the pushpin.
5. Hold the pencil upright inside the loop of string until it's taut.
6. Move the pencil around inside the string loop to make a circle around the sun, holding it so the string stays taut the entire time. This creates the path of a circular orbit (which no planet has).
7. Now, push the other pushpin somewhere on the horizontal line you drew. It can be either to the left or right of the sun.
8. Place the string loop around both pushpins. Use a colored pencil or pen to draw an oval inside the string loop. This path shows an elliptical orbit, which every planet has.
9. Take the pushpins out, remove the string, and compare the two orbits. Notice how a planet traveling on this elliptical path wouldn't always be the same distance from the sun.

Lesson 15: Isaiah 40:22



It is he who sits above the circle of
the earth, and its inhabitants are like
grasshoppers; who stretches out the heavens
like a curtain, and spreads them like a tent
to dwell in.

Blank handwriting practice lines consisting of four sets of three horizontal lines (top, middle, bottom) for tracing or independent practice.

Lesson 15: Isaiah 40:22

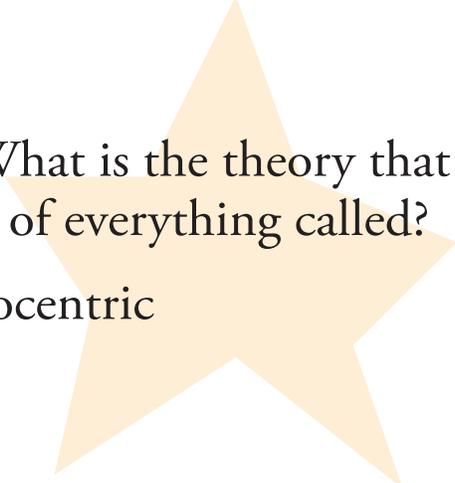


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Lesson 15: Isaiah 40:22



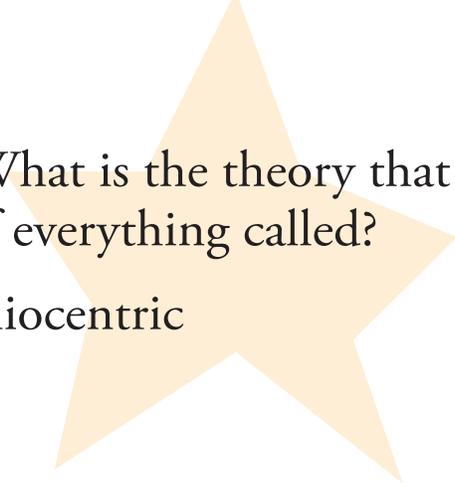
Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question: What is the theory that the earth is at the center of everything called?

Answer: Geocentric

LESSON 15



Question: What is the theory that the sun is at the center of everything called?

Answer: Heliocentric

LESSON 15



Galileo's Head was on the Block



Lesson 15 Quiz

1. A solar eclipse is an eclipse of the _____ .
2. What do we call the system of planets and other objects going around the sun?
a) Celestial Globe b) Solar System c) Zodiac
3. Name at least 1 constellation in the Zodiac. _____
4. Name at least 1 planet. _____
5. The earth is spinning around on its _____ .
6. When the earth revolves around the sun one time, what do we call it?
a) Month b) Year c) Day
7. We see different constellations at different times of the year because we are moving around the sun.
True False
8. The sun rises and sets at different places in the horizon because the earth's axis is tilted.
True False
9. When people thought the Earth was as the center of the universe, this was called the _____ model.
a) Heliocentric b) Geocentric c) Centric





16

Earth: Baby Bear's Porridge

What makes the Earth so special? Why do we find life on Earth, but we don't find life in other places in the solar system? This lesson explores some of the things that make the Earth so unique.

Recommended Reading:

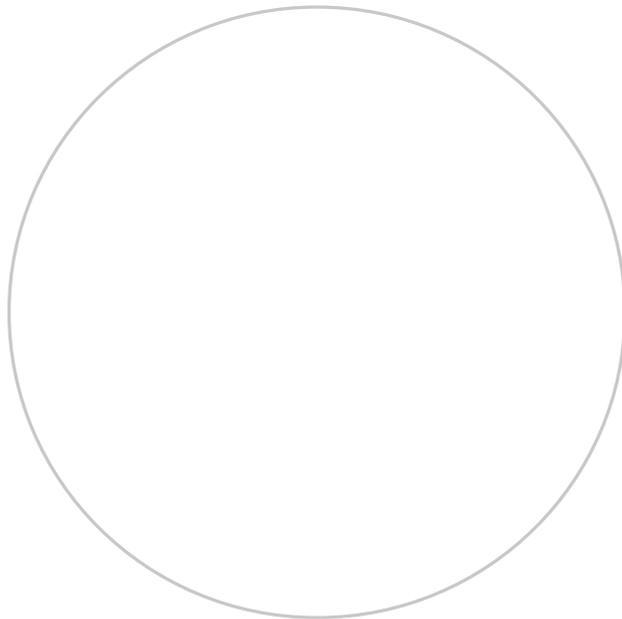
- ★ *The Earth* (True Books: Space), by Elaine Landau.
 - ★ *Our Solar System*, by Seymour Simon, p.22-27.
- 



FAST FACTS ABOUT EARTH

DRAW A PICTURE OF THE PLANET.

IS THIS PLANET A
TERRESTRIAL PLANET
OR GAS GIANT? (CIRCLE ONE)



DIAMETER _____

NUMBER OF MOONS _____

HOTTEST TEMPERATURE _____

COLDEST TEMPERATURE _____

LENGTH OF DAY _____

LENGTH OF YEAR _____

INTERESTING FACTS _____

ACTIVITY

Gravity on Different Planets

Gravity is the force of one object drawing itself to another. We are used to gravity here on Earth, but every other planet, moon, and dwarf planet also exerts gravity on objects. If you were to take an unopened can of soda to another place in the universe, the object would weigh less or more than it does here on Earth depending on the gravity in that place. In this activity, we'll demonstrate what an unopened can of soda would feel like on each of the planets and on Earth's moon.

SUPPLY LIST:

- Permanent marker
- Masking tape
- 8 clean, empty, 12 oz aluminum soda cans
- 1 full, 12 oz aluminum soda can
- 1,061 pennies

INSTRUCTIONS:

1. Use a permanent marker and write "Earth" on the bottom of an unopened can.
2. Label each of the empty cans with a permanent marker: Moon, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, and Neptune.
3. Fill the empty cans with the following number of pennies:
 - Moon: 23 pennies
 - Mercury: 53 pennies
 - Venus: 127 pennies
 - Mars: 53 pennies
 - Jupiter: 354 pennies
 - Saturn: 151 pennies
 - Uranus: 127 pennies
 - Neptune: 167 pennies
4. Use masking tape to cover the tops of each of the cans so the pennies can't come out.
5. See if your friends or family can guess which can goes with which planet or moon. You can tell them the unopened can represents Earth. Turn the can over to show them the label after they make their guess.

Lesson 16



"Of for a moment I gaze up at the wheeling
circle of stars, my feet no longer stand on
the Earth. I touch the Creator, and I drink
immortality." — Claudius Ptolemy

Handwriting practice lines consisting of ten sets of three horizontal lines (top, middle, bottom) for tracing and writing.

Lesson 16



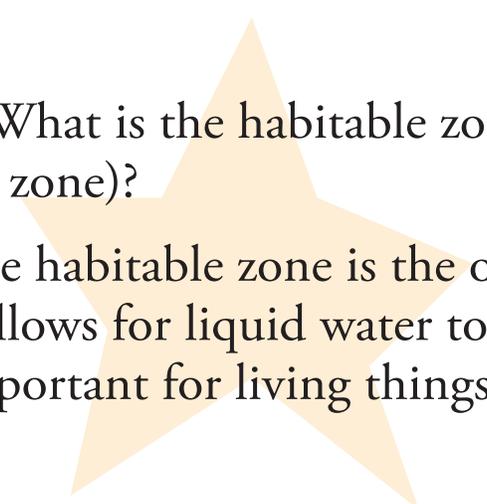
“If for a moment I gaze up
at the wheeling circle of stars,
my feet no longer stand on
the Earth. I touch the Creator,
and I drink immortality.”

Claudius Ptolemy

Lesson 16



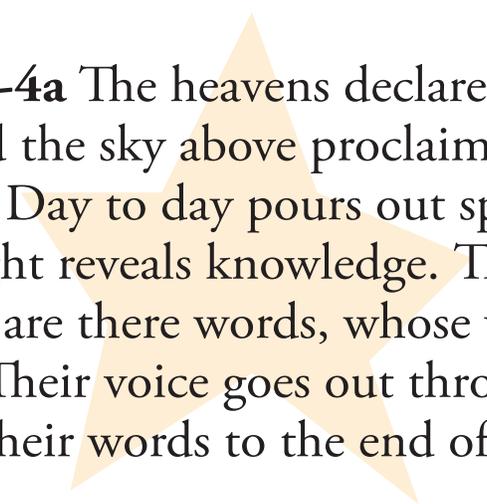
Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question: What is the habitable zone (Goldilocks zone)?

Answer: The habitable zone is the orbit around a star that allows for liquid water to exist, which is important for living things.

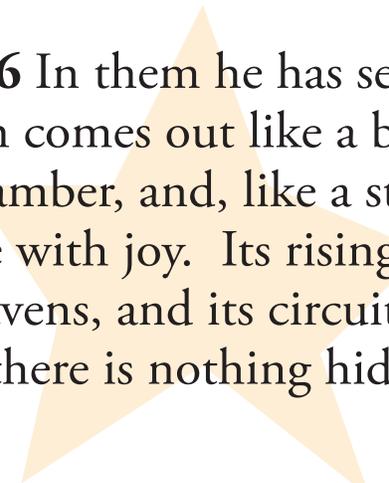
LESSON 16



Psalm 19:1-4a The heavens declare the glory of God, and the sky above proclaims his handiwork. Day to day pours out speech, and night to night reveals knowledge. There is no speech, nor are there words, whose voice is not heard. Their voice goes out through all the earth, and their words to the end of the world.

LESSON 16

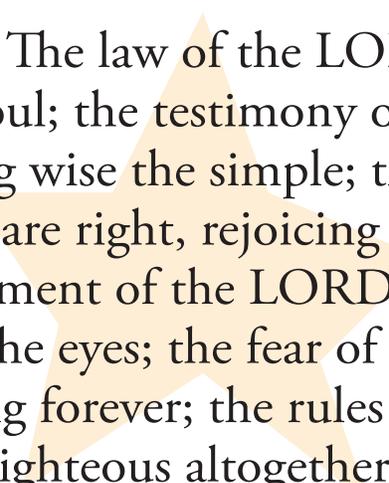
Card 1 of 5



Psalm 19:4b-6 In them he has set a tent for the sun, which comes out like a bridegroom leaving his chamber, and, like a strong man, runs its course with joy. Its rising is from the end of the heavens, and its circuit to the end of them, and there is nothing hidden from its heat.

LESSON 16

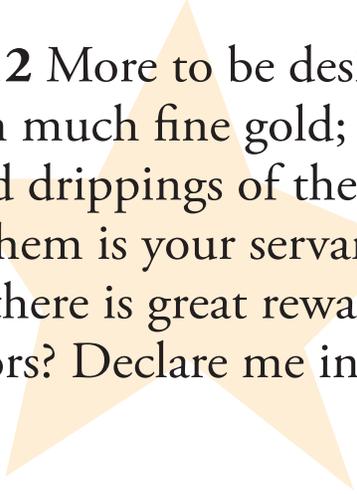
Card 2 of 5



Psalm 19:7-9 The law of the LORD is perfect, reviving the soul; the testimony of the LORD is sure, making wise the simple; the precepts of the LORD are right, rejoicing the heart; the commandment of the LORD is pure, enlightening the eyes; the fear of the LORD is clean, enduring forever; the rules of the LORD are true, and righteous altogether.

LESSON 16

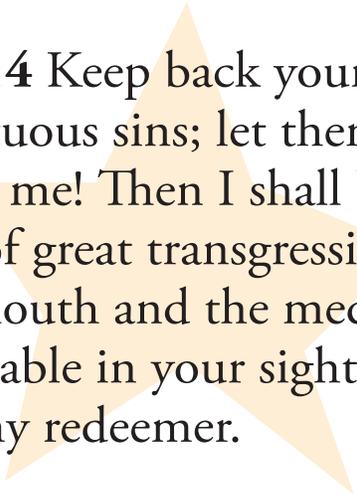
Card 3 of 5



Psalm 19:10-12 More to be desired are they than gold, even much fine gold; sweeter also than honey and drippings of the honeycomb. Moreover, by them is your servant warned; in keeping them there is great reward. Who can discern his errors? Declare me innocent from hidden faults.

LESSON 16

Card 4 of 5



Psalm 19:13-14 Keep back your servant also from presumptuous sins; let them not have dominion over me! Then I shall be blameless, and innocent of great transgression. Let the words of my mouth and the meditation of my heart be acceptable in your sight, O LORD, my rock and my redeemer.

LESSON 16

Card 5 of 5



17

The Man on the Moon

The moon is Earth's only natural satellite—close enough we can see what the surface looks like with just our eyes. This rocky world looks like a good place to set up a colony, but just how easy would it be?

Recommended Reading:

- ★ *The Moon* (True Books: Space), by Elaine Landau.
 - ★ *Our Solar System*, by Seymour Simon, p.29-31.
 - ★ *Mission Control, This is Apollo*, by Andrew Chaikin and Alan Bean (pick at least one chapter: Apollo 11, 12, 14, 15, 16, or 17).
 - ★ *Astronomy* (Eyewitness Books), by Kristen Lippincott, p.40-41.
- 



ACTIVITY

Mapping the Moon

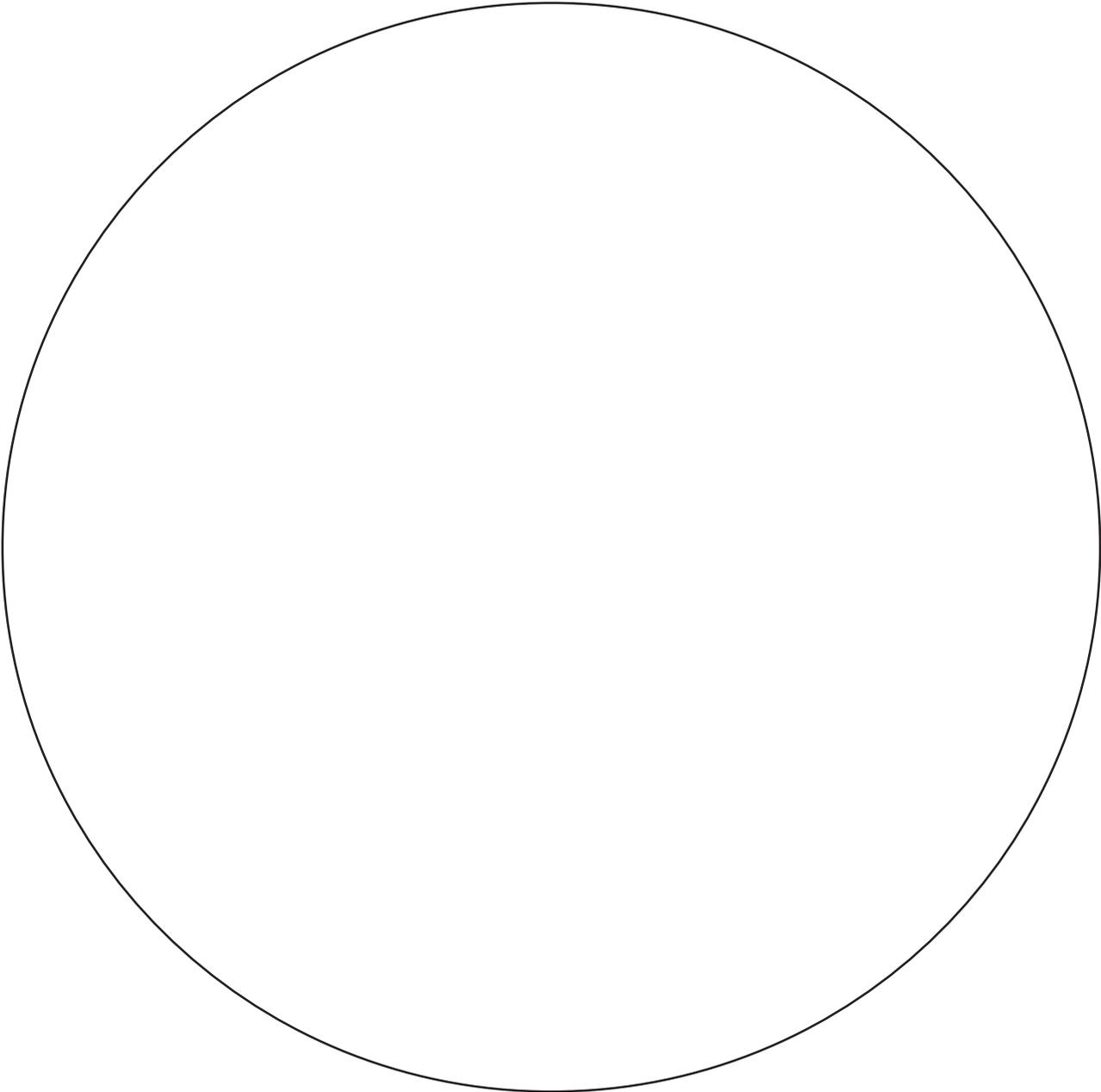
SUPPLY LIST:

- Binoculars (if you have them)
- Pencil
- Paper
- Moon phase calendar (go to TimeAndDate.com/moon/phases)

INSTRUCTIONS:

1. Note the dates for the next First Quarter moon and the next Third Quarter moon. The best time to draw the First Quarter moon will be about an hour after sunset. The best time to draw the Third Quarter moon will be about an hour before sunrise. If either day is too cloudy you can postpone until the next night.
2. Observe the moon during its First- or Third-Quarter phase on a clear night. You can observe the moon outside or through a window in a dark room.
3. If you have them, focus your binoculars on the moon and draw the half of the moon you see. Be sure to shade in the darker patches, the maria. Draw the highlands and craters as best you can.
4. Repeat this process during the opposite moon phase 2 weeks later to complete your moon map.

THE MOON



Lesson 17



"As sunlight striking the broad circle of the Moon, a borrowed light, circular in form, it revolves around the Earth, as if following the track of a chariot." — Empedocles

Handwriting practice lines consisting of ten sets of three horizontal lines (top, middle, bottom) for tracing or writing.

Lesson 17

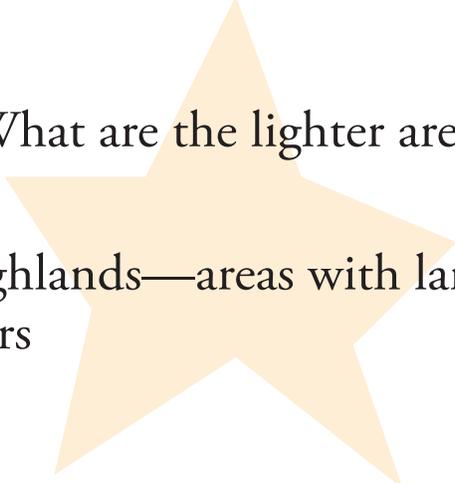


“As sunlight striking the
broad-circle of the Moon,
a-borrowed-light, circular
in-form, it revolves around
the Earth, as if following
the track of a chariot.”
Empedocles

Lesson 17



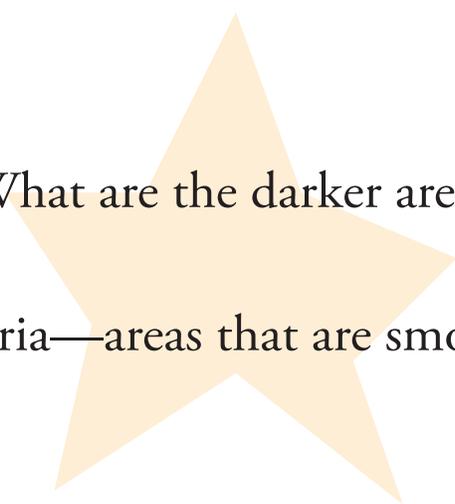
Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question: What are the lighter areas on the moon?

Answer: Highlands—areas with larger hills and a lot of craters

LESSON 17



Question: What are the darker areas on the moon?

Answer: Maria—areas that are smooth and flat

LESSON 17



18

Mr. Golden Sun

At the center of the solar system is a star that has 600 times more mass in it than all the planets combined! We call it the sun. Every second it puts out a lot of energy—and the secret to its energy is deep down in the core.

Recommended Reading:

- ★ *The Sun* (True Books: Space), by Elaine Landau.
 - ★ *Our Solar System*, by Seymour Simon, p.5-11.
 - ★ *Astronomy* (Eyewitness Books), by Kristen Lippincott, p.34-39
- 



ACTIVITY

Bleached Paper

In this activity we learn how the sun gives off a special kind of energy called ultraviolet (UV) radiation. UV radiation can cause colors in certain things to break down—this is called “bleaching.” Certain kinds of sunscreen are made to absorb UV radiation and turn it into heat energy. In this experiment we’ll see how sunscreen can protect paper from bleaching.

SUPPLY LIST:

- Two sheets of the same colored dark construction paper (blue or black)
- Sunscreen that goes on skin clear (not zinc oxide sunscreen)
- A sunny day

INSTRUCTIONS:

1. Lay one sheet of paper down flat.
2. Spray or rub down your hands with sunscreen.
3. Place your hands down firmly on the paper to create handprints.
4. Take the paper outside and place in direct sunlight on a flat surface. If it is windy, you may need something to weigh down the paper, but don't cover up too much of the paper.
5. Wait for several hours. Get the paper and bring it inside and compare it to the other sheet of paper that was not placed in the sun. Notice how much the paper has been “bleached” in the sun by comparing the colors. Notice also how the sunscreen protected part of the paper from being bleached.

Lesson 18



"I believe in Christianity as I believe that
the sun has risen: not only because I see
it, but because by it I see everything else."

C.S. Lewis

Handwriting practice lines consisting of four sets of three horizontal lines (top, middle, bottom) for tracing and writing.

Lesson 18



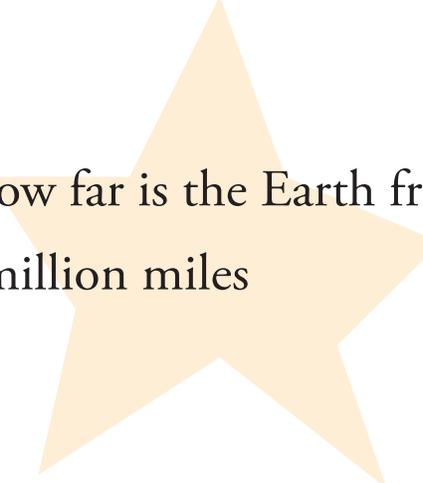
"I believe in Christianity as I
believe that the sun has risen:
not only because I see it, but
because by it I see everything
else." — C.S. Lewis

Four sets of blank handwriting lines, each consisting of a solid top line, a dashed middle line, and a solid bottom line.

Lesson 18



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question: How far is the Earth from the sun?

Answer: 93 million miles

LESSON 18



19

Mercury: The Swift Messenger

Close to the sun is a barren rocky world we call Mercury. The smallest of all the planets, Mercury is covered in big cliffs, deep craters, blazing hot days, and freezing cold nights. Could we set up a colony on such an extreme place?

Recommended Reading:

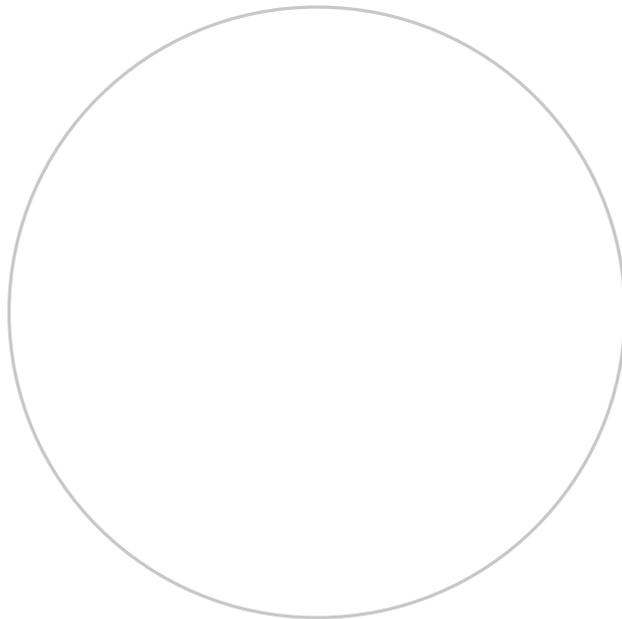
- ★ *Mercury* (True Books: Space), by Elaine Landau.
 - ★ *Our Solar System*, by Seymour Simon, p.12-15.
 - ★ *Astronomy* (Eyewitness Books), by Kristen Lippincott, p.44-45.
- 



FAST FACTS ABOUT MERCURY

DRAW A PICTURE OF THE PLANET.

IS THIS PLANET A
TERRESTRIAL PLANET
OR GAS GIANT? (CIRCLE ONE)



DIAMETER _____

NUMBER OF MOONS _____

HOTTEST TEMPERATURE _____

COLDEST TEMPERATURE _____

LENGTH OF DAY _____

LENGTH OF YEAR _____

INTERESTING FACTS _____



ACTIVITY

Hole-y Planet!

Craters are formed on a planet or moon when another object smashes into it. The size of that crater depends on how big the object is and how fast it is going. What the crater looks like depends also on what the surface is made of. The surface of every planet is different, with layers of sand, dirt, rock, and ice. In this experiment you'll make your own planet surface with different layers of material, dropping rocks from different heights.

SUPPLY LIST:

- 1 pan 8-12 inches long and 4 inches deep
- Enough flour to fill the pan about 3/4 full
- 2 small bottles of colored sugar
- 1/2 - 1 cup of cocoa powder (NOT hot chocolate mix)
- Flour sifter or fine mesh strainer
- Handful of small rocks or marbles of various sizes (no larger than 2 inches in diameter)
- Ruler or tape measure
- Newspaper or plastic wrap

INSTRUCTIONS:

1. For easy cleanup afterward, put a sheet of newspaper or plastic wrap on the bottom of your pan.
2. Fill your pan about half way full of flour. Then shake a thin layer of colored sugar over the entire surface of the flour, completely covering it with the sugar.
3. With the sifter, sift a layer of flour over the sugar layer. Fill your pan about 3/4 full.
4. Next, sift a layer of cocoa powder over the flour, being sure to completely cover the flour.
5. Drop a rock in the flour. You can see the different layers represented by the different colors. What happened? Which material flew the farthest when the rock hit? Which didn't travel as far?
6. Try dropping rocks of different sizes from the same height (measure the height with a ruler). What differences do you see in the craters?
7. Try dropping rocks of the same size from different heights. This represents objects traveling at different speeds. How are the craters the same or different?

Lesson 19



"I had rather be Mercury, the smallest
among seven planets, revolving round the
sun, than the first among five moons
revolving round Saturn."

Johann Wolfgang von Goethe

Lesson 19



"I had rather be Mercury,
the smallest among seven
planets, revolving round the
sun, than the first among
five moons revolving round
Saturn." Johann Wolfgang
von Goethe

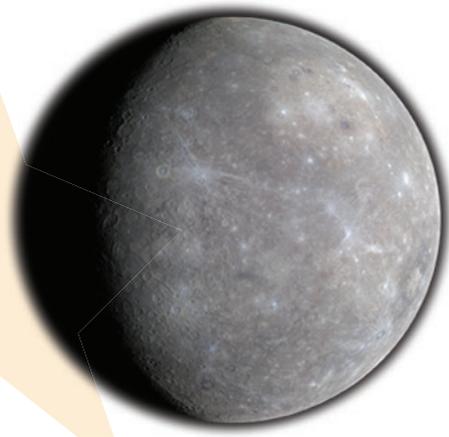
Lesson 19



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).

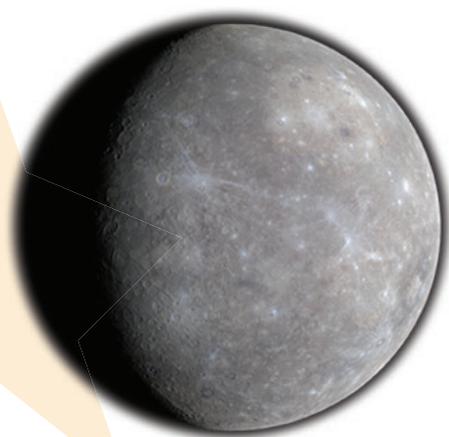
Question:

What is this planet?

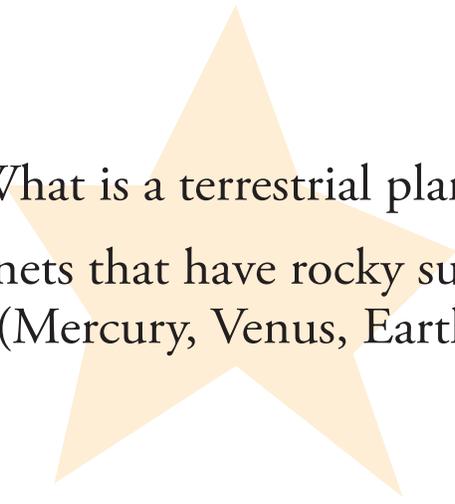


LESSON 19

Answer: Mercury



LESSON 19



Question: What is a terrestrial planet?

Answer: Planets that have rocky surfaces you can land on (Mercury, Venus, Earth, and Mars)

LESSON 19



Mercury: The Swift Messenger

Lesson 19 Quiz



- Mercury is the planet that is closest to the sun.
True False
- What is the other term used for the habitable zone?
a) Goldilocks zone b) Twilight zone c) Living Zone
- How wide is Mercury?
a) 20,555 miles b) 34 miles c) 3,032 miles
- Mercury is not a very rocky place.
True False
- What do we call a planet that is earth-like?
a) Terrain Planet b) Terrestrial Planet c) Topsy Turvy Planet
- How many Terrestrial Planets are there?
a) 4 b) 6 c) 8
- Name at least 1 terrestrial planet. _____
- How many days does it take for Mercury to spin around 1 time?
a) 24 Earth Days b) 365 Earth Days c) 59 Earth Days
- How many days does it take for Mercury to go around the sun?
a) 88 Earth Days b) 77 Earth Days c) 44 Earth Days
- What do we call the cliffs on Mercury?
a) Ropes b) Rupes c) Ruperts



20

Venus: Earth's Fiery Sister

The second planet from the sun—nearly the same size as the Earth—is covered in bright clouds, but beneath those clouds is a mysterious, terrifying world. If we drop beneath those clouds, will we find a planet suitable for a human colony?

Recommended Reading:

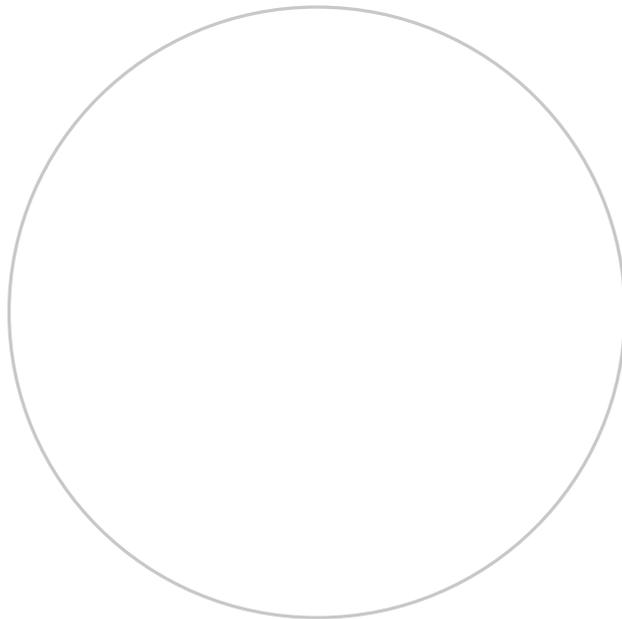
- ★ *Our Solar System*, by Seymour Simon, p.16-21.
 - ★ *Venus* (True Books: Space), by Elaine Landau.
 - ★ *Astronomy* (Eyewitness Books), by Kristen Lippincott, p.46-47.
- 



FAST FACTS ABOUT VENUS

DRAW A PICTURE OF THE PLANET.

IS THIS PLANET A
TERRESTRIAL PLANET
OR GAS GIANT? (CIRCLE ONE)



DIAMETER _____

NUMBER OF MOONS _____

HOTTEST TEMPERATURE _____

COLDEST TEMPERATURE _____

LENGTH OF DAY _____

LENGTH OF YEAR _____

INTERESTING FACTS _____



ACTIVITY

The Venus Greenhouse

Venus is not the closest planet to the sun but it is the hottest planet. Why is this? This is because the gasses in Venus' atmosphere are really good at trapping heat from the sun. In this activity you'll make a "mini-Venus" in a jar.

SUPPLY LIST:

- 2 quart-size mason jars with lids
- 2 thermometers (small enough to fit inside the jars with the lids on)
- 1 container of play dough
- 1 Tablespoon baking soda
- 2 Tablespoons vinegar

INSTRUCTIONS:

1. Complete this activity on a sunny day when the sun is highest in the sky.
2. Put one of the thermometers into a glass jar and twist the lid closed. Be sure you can read the thermometer insides the jar. Seal the jar around the edges by covering it completely with a layer of play dough.
3. Pour the baking soda into the second jar and put in the thermometer. As quickly as possible, pour in the vinegar and twist the lid closed so everything is trapped in the jar. Seal the jar around the edges by covering it completely with a layer of play dough. (When vinegar and baking soda mix, they create a gas called carbon dioxide, which is the same gas in Venus' atmosphere trapping all that heat from the sun.)
4. Take both jars outside and put them in a sunny spot. Take a temperature reading immediately. Continue to record the temperature in both jars every 10 minutes for 2-3 hours. What do you notice?
5. Be very careful opening the jar with the baking soda and vinegar when the experiment is over. If you have safety goggles, wear them when opening the jar just in case. Use a towel to twist the lid off, and do it very slowly—there's a lot of gas in there that wants to come out! Have an adult nearby to help you when opening the jar.

Lesson 20



"Sun is gold, and Moon silver we say, Mars
iron, Mercury we call quicksilver, Saturn
lead, and Jupiter is tin, and Venus copper,
by my father's kin!" — Geoffrey Chaucer

Handwriting practice lines consisting of four sets of three horizontal lines (top, middle, bottom) for tracing or writing practice.

Lesson 20



“Sun is gold, and Moon silver
we say, Mars iron, Mercury
we call quicksilver, Saturn lead,
and Jupiter is tin, and Venus
copper, by my father’s kin!”
Geoffrey Chaucer

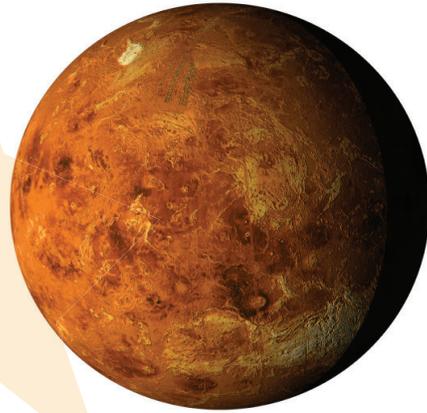
Lesson 20



A series of ten vertical writing lines. Each line consists of a solid top line, a dashed middle line, and a solid bottom line, providing a guide for letter height and placement.

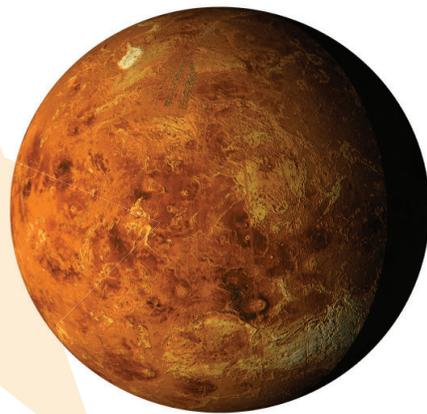
Question:

What is this planet?

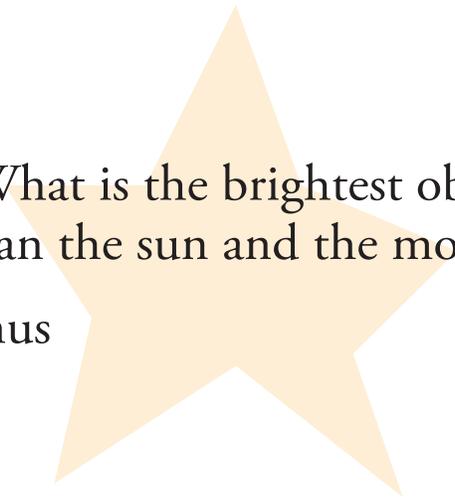


LESSON 20

Answer: Venus



LESSON 20



Question: What is the brightest object in the sky, other than the sun and the moon?

Answer: Venus

LESSON 20



Venus: Earth's Fiery Sister

Lesson 20 Quiz



1. How far is Venus from the Sun?
a) 1 million miles b) 67 million miles c) 524 million miles
2. Venus is the brightest object in our sky other than the sun and moon.
True False
3. Venus is spinning the opposite way the Earth is.
True False
4. How many days does it take for Venus to spin 1 time?
a) 1 Earth Day b) 43 Earth Days c) 243 Earth Days
5. Venus has a lot of carbon dioxide in the air that traps the heat from the sun.
True False
6. What is the hottest planet in the solar system?
a) Venus b) Sun c) Mercury
7. There is very little water on the surface of Venus.
True False
8. Venus is not a terrestrial planet.
True False
9. What is the very hot liquid rock inside the planet called?
a) Light b) Fire c) Magma





21

Mars: The Red Planet

Named after the Roman god of war, the planet Mars looks like a drop of blood in the sky. But as we get closer, we see this rusty, red planet is home to some record-setting surprises. Would this desert world be a good place to set up a home base?

Recommended Reading:

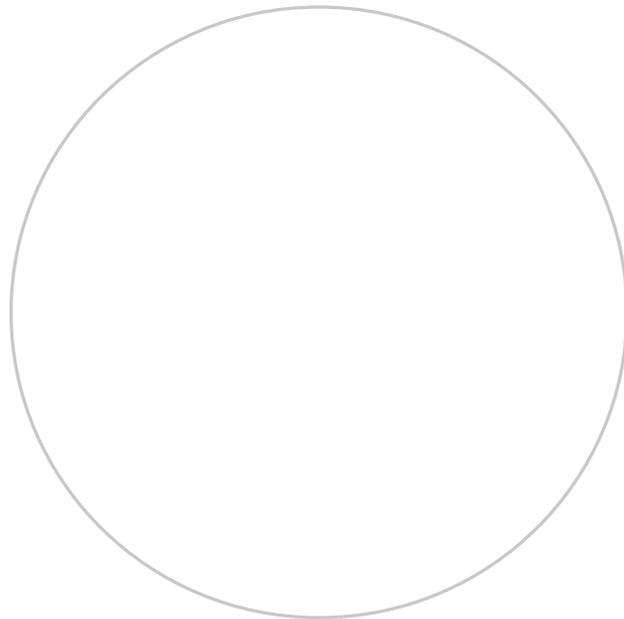
- ★ *Our Solar System*, by Seymour Simon, p.30-35.
 - ★ *Mars* (True Books: Space), by Elaine Landau.
 - ★ *Astronomy* (Eyewitness Books), by Kristen Lippincott, p.48-49.
- 



FAST FACTS ABOUT MARS

DRAW A PICTURE OF THE PLANET.

IS THIS PLANET A
TERRESTRIAL PLANET
OR GAS GIANT? (CIRCLE ONE)



DIAMETER _____

NUMBER OF MOONS _____

HOTTEST TEMPERATURE _____

COLDEST TEMPERATURE _____

LENGTH OF DAY _____

LENGTH OF YEAR _____

INTERESTING FACTS _____

ACTIVITY

Create a Mission Patch

SUPPLY LIST:

- Crayons, markers, or colored pencils

INSTRUCTIONS:

Space agencies design unique mission patches for every new mission. These are used for decorating documents and also get sewn into flight suits and jackets.

Look at a few examples of NASA mission patches, then create your own mission patch.

A large, empty rectangular box with a black border, intended for the student to draw their own mission patch.

Lesson 21



"The planets are stars which are not fixed

in the heavens like the rest, but move

along in the air." -- Sidore of Serrville

Handwriting practice lines consisting of ten sets of three horizontal lines (top, middle, bottom) for tracing and writing practice.

Lesson 21



“The planets are stars which
are not fixed in the heavens
like the rest, but move along
in the air.” — Isidore of Seville

Four sets of handwriting practice lines. Each set consists of a solid top line, a dashed middle line, and a solid bottom line.

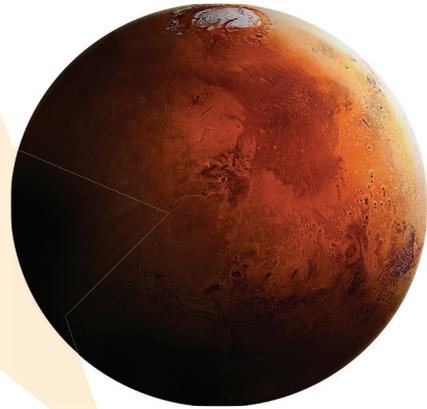
Lesson 21



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).

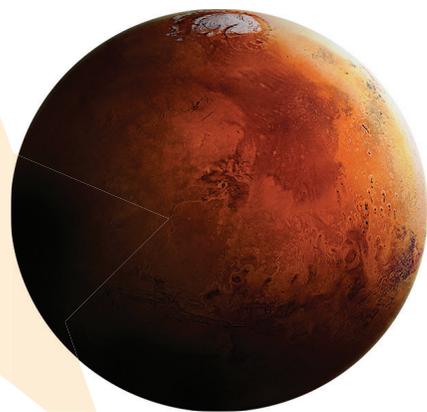
Question:

What is this planet?

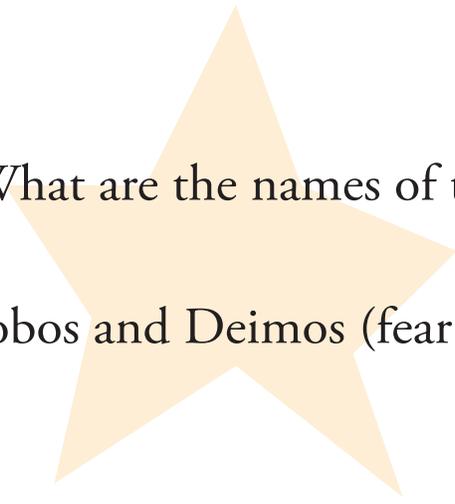


LESSON 21

Answer: Mars



LESSON 21



Question: What are the names of the moons of Mars?

Answer: Phobos and Deimos (fear and panic)

LESSON 21



22

Space Rock 'n' Roll

For many years, astronomers wondered why there was such a big space between Mars and Jupiter. It looked like a perfect place for a planet. Finally astronomers started seeing not just one planet but many, many space rocks. Today, we call it the Asteroid Belt.

Recommended Reading:

- ★ *Our Solar System*, by Seymour Simon, p.58-59.
 - ★ *Astronomy* (Eyewitness Books), by Kristen Lippincott, p.28-29.
- 

ACTIVITY

Walk to the Edge of the Asteroid Belt

SUPPLY LIST:

- 20-25 sheets of white copy paper
- Marker
- Tape
- Tape measure
- 1 - 18 inch piece of string
- Scissors
- Glue
- 1 container of play dough or modeling clay
- Small ruler that shows millimeters

INSTRUCTIONS:

1. Begin by taping sheets of copy paper together to make a square—use your tape measure to make sure it's at least 36 inches on each side.
2. Tape the piece of string (18 inches long) on the side to the marker. Tape the other side of the string to the middle of the square. Stretch the string out until it's taut and draw a circle that is 36 inches in diameter.
3. Cut out the circle. This will represent the sun in our model.
4. Next, use the play dough to make models of the planets. You'll be making each of these just a few millimeters. Use the following scale:
 - Mercury: 3 millimeters
 - Venus: 8 millimeters
 - Earth: a little bigger than 8 millimeters
 - Mars: a little bigger than 4 millimeters
5. Next, create signs on a piece of copy paper for Mercury, Venus, Earth, Mars, and the Asteroid Belt. Glue or tape each of your planet models to the sign.
6. Next, you'll be walking through the solar system—on a very small scale of course. Even though this is to a small scale, you'll still need about 640 feet of field or sidewalk to complete this activity.
7. Each “step” should be approximately 2 feet apart. Practice your step using a ruler or tape measure before you get started!
8. Begin by placing your sun at one end of your model.
9. Walk the following number of steps for each planet (remember to keep your “steps” about 2 feet apart). When you get to the spot for each planet, leave the sign and model there and then move on to the next spot.
 - Mercury: 62 steps from the Sun
 - Venus: 54 steps from Mercury
 - Earth: 45 steps from Venus
 - Mars: 84 steps from Earth
 - Asteroid Belt: 74 steps from Mars
10. When you get to the Asteroid Belt, look back and see how far you've come. If you were to walk to the very end of the Asteroid Belt you'd need to walk nearly another 300 steps! This gives you just a small glimpse at how large the solar system is.

Note: Hold on to your signs you made in this lesson. We'll be using them again in a few weeks when we will decrease our scale so we can walk to the very edge of our solar system!

Lesson 22



Great men are meteors designed to burn so

that earth may be lighted.

Napoleon Bonaparte

Handwriting practice lines consisting of ten sets of three horizontal lines (top, middle, bottom) with a dashed midline for letter height guidance.

Lesson 22



“Great men are meteors

designed to burn so that

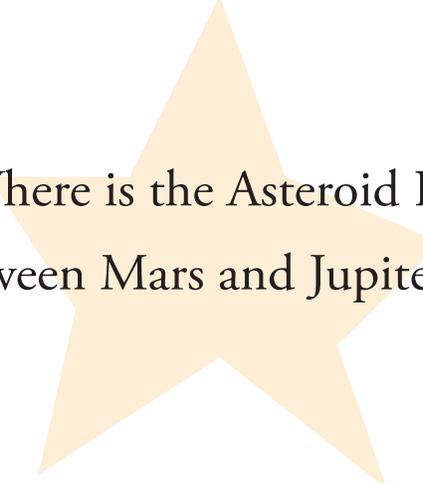
earth may be lighted.”

Napoleon Bonaparte

Lesson 22



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question: Where is the Asteroid Belt?

Answer: Between Mars and Jupiter

LESSON 22



23

Jupiter: By Jove! It's a Giant!

Ancient people named Jupiter after the king of the gods. Little did they know that Jupiter is the king of the planets in the solar system. It is the largest, fastest spinning planet—having more mass than all the other planets combined times two!

Recommended reading:

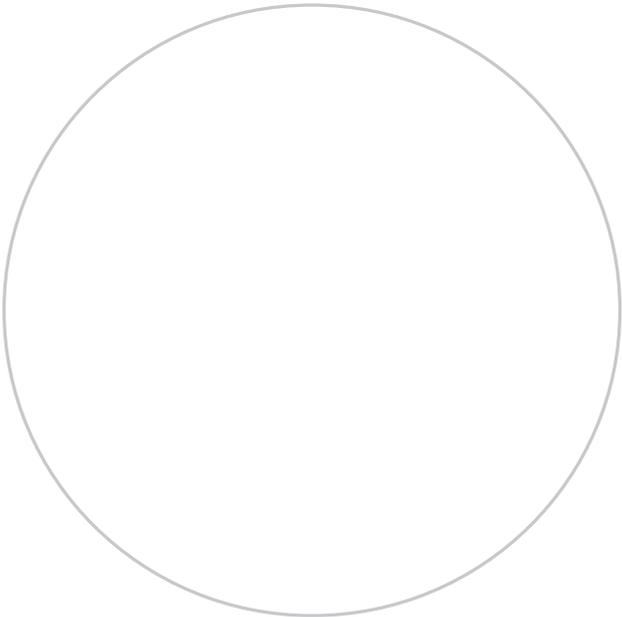
- ★ *Jupiter* (True Books: Space), by Elaine Landau
 - ★ *Our Solar System*, by Seymour Simon, p.36-41
 - ★ *Astronomy* (Eyewitness Books), by Kristen Lippincott, p.50-51
- 



FAST FACTS ABOUT JUPITER

DRAW A PICTURE OF THE PLANET.

IS THIS PLANET A
TERRESTRIAL PLANET
OR GAS GIANT? (CIRCLE ONE)



DIAMETER _____

NUMBER OF MOONS _____

HOTTEST TEMPERATURE _____

COLDEST TEMPERATURE _____

LENGTH OF DAY _____

LENGTH OF YEAR _____

INTERESTING FACTS _____

ACTIVITY Greetings from Earth

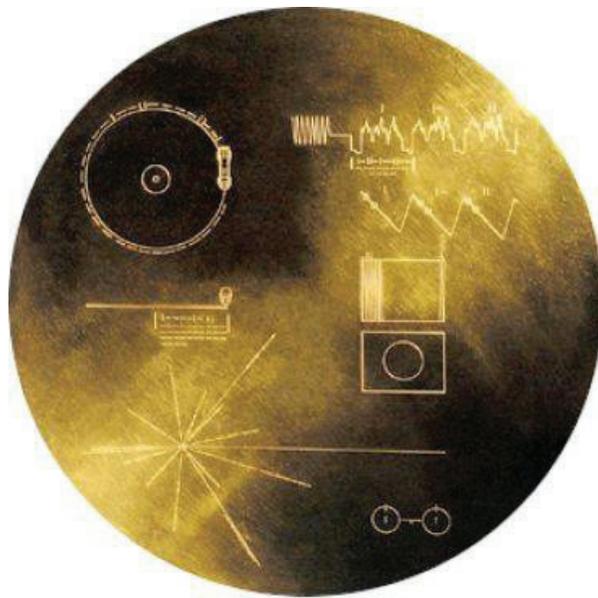
INSTRUCTIONS

NASA launched the two spacecraft to Jupiter and Saturn in the summer of 1977. Voyager I made it to Jupiter in March 1979, and Voyager 2 arrived in July of the same year.

These spacecraft have since continued into space away from our solar system. Scientists knew these space probes would go out into deep space, so they placed a golden record that contains images and sounds from Earth on each of them. If there happens to be any intelligent life in the universe beyond our solar system, and if these life forms find this probe, they may be able to look at these golden records and learn about Earth.

The records contain all kinds of sounds: sounds from nature (like thunder, wind, and animal noises), samples of music from around the world, and greetings in 55 different languages. There are photos of animals, plants, and places around the world; pictures of food, buildings, and people.

If you were sending a message into space to show aliens what Earth is like, what would you include? Make a list of up to 20 songs or sounds and 20 images. Work with your parent to find the best things to share with the universe.



Lesson 23



"Our sense of sight presents to us four

satellites circling about Jupiter, like the Moon

about the Earth."

Galileo Galilei

Handwriting practice lines consisting of multiple sets of three horizontal lines (top, middle, bottom) with a dashed midline for letter height guidance.

Lesson 23



“Our sense of sight presents
to us four satellites circling
about Jupiter, like the Moon
about the Earth.”

Galileo Galilei

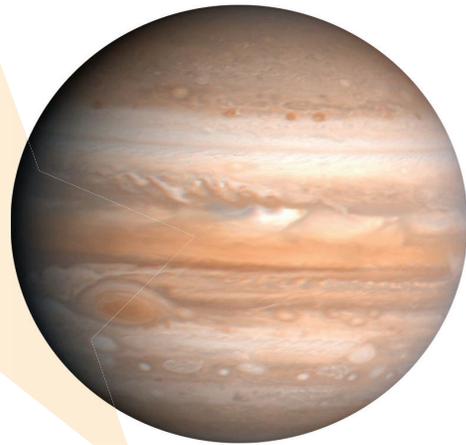
Lesson 23



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).

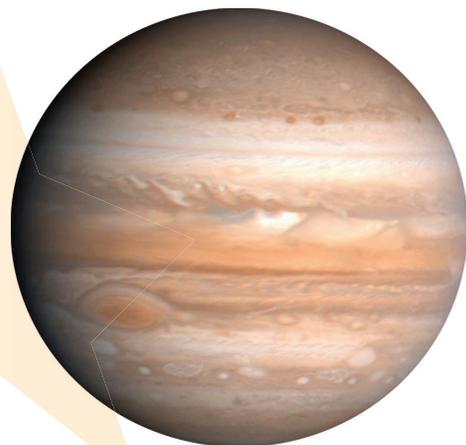
Question:

What is this planet?

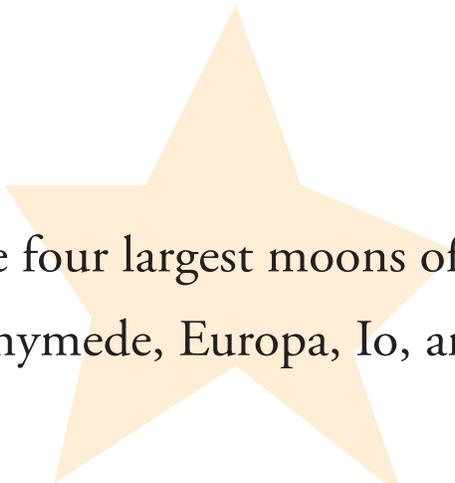


LESSON 23

Answer: Jupiter



LESSON 23



Question:

What are the four largest moons of Jupiter?

Answer: Ganymede, Europa, Io, and Callisto

LESSON 23



Jupiter: By Jove! It's a Giant!



Lesson 23 Quiz

1. How wide is Jupiter?
a) 88,846 miles b) 2,456 miles c) 46 miles
2. If Jupiter was hollow, more than 1,300 Earths could fit inside.
True False
3. How many hours does it take for Jupiter to spin 1 time?
a) 9 hours and 50 minutes b) 24 hours and 38 minutes c) 24 hours and 0 minutes
4. Jupiter is the slowest spinning planet in the whole solar system.
True False
5. Jupiter is a big bloated ball of gas.
True False
6. Jupiter is not a terrestrial planet. It's a...
a) Dwarf Planet b) Brown Dwarf c) Gas Giant
7. When hydrogen gets thick enough and hot enough, it starts to act more like a liquid and is very effective at moving around electricity. This is called...
a) Metallic Hydrogen b) Hot Hydrogen c) Lava Hydrogen
8. Jupiter is surrounded by more than 60 moons.
True False
9. Name 1 large moon around Jupiter. _____





24

Saturn: Put a Ring On it

Ancient people believed Saturn was the planet furthest away from the Earth as it moved slowly through the sky. But what they couldn't see was all of Saturn's beautiful rings that make it the most recognizable planet in the solar system.

Recommended reading:

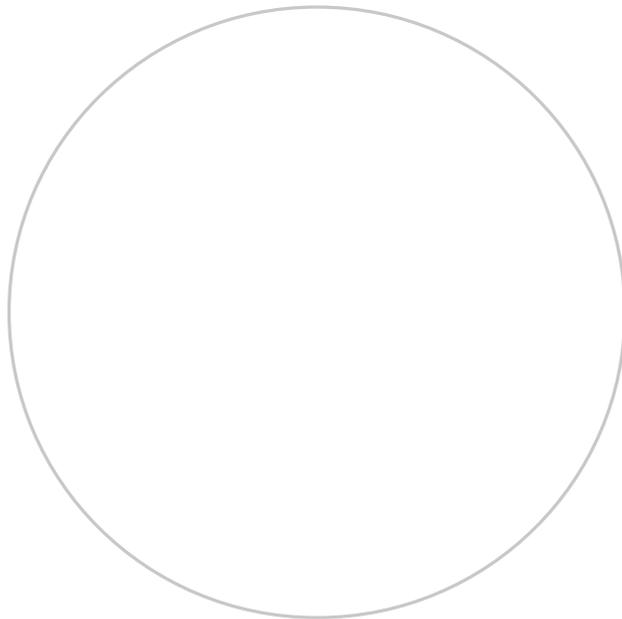
- ★ *Saturn* (True Books: Space), by Elaine Landau
 - ★ *Our Solar System*, by Seymour Simon, p.41-47
 - ★ *Astronomy* (Eyewitness Books), by Kristen Lippincott, p.52-53
- 



FAST FACTS ABOUT SATURN

DRAW A PICTURE OF THE PLANET.

IS THIS PLANET A
TERRESTRIAL PLANET
OR GAS GIANT? (CIRCLE ONE)



DIAMETER _____

NUMBER OF MOONS _____

HOTTEST TEMPERATURE _____

COLDEST TEMPERATURE _____

LENGTH OF DAY _____

LENGTH OF YEAR _____

INTERESTING FACTS _____



ACTIVITY

Build Your Own Saturn

SUPPLY LIST

- An unwanted CD or DVD
- 2-inch diameter styrofoam ball
- Glue
- 2 toothpicks
- Paintbrush
- Two or three different colors of glitter, preferably silver, gold, and yellow
- A sheet or two of newspaper

INSTRUCTIONS

1. Prepare for this project by placing a large sheet of newspaper on your work surface to catch any falling glitter.
2. Carefully cut the styrofoam ball in half using a sharp knife (you may need a parent's help).
3. Center the two halves of the styrofoam ball on the top and bottom of a CD and glue them down.
4. Stick the toothpicks into the bottom and top of the styrofoam ball. Use these as handles to help keep glue off your fingers.
5. Place a small amount of glue on the newspaper. Dip your paintbrush into the glue and paint a small circle on top of the ball. Sprinkle one color of glitter on the glue until the glue is covered.
6. Dip your paintbrush in the glue again and paint a ring of glue on the ball, going around the outside of the glitter circle you just created. Sprinkle another color of glitter on this circle of glue until the glue is covered.
7. Continue making glue circles on both the top and bottom half of the ball, alternating colors as you go.
8. Starting next to the ball, paint a small ring of glue on the CD, sprinkling glitter on the circle.
9. Continue painting glue circles and sprinkling with glue until the whole CD is covered.
10. After the glue has dried, you can use a paperclip and some string to hang the planet from the ceiling or a door frame.

Lesson 24



"There is not perhaps another object in the
heavens that presents us with such a variety
of extraordinary phenomena as the planet
Saturn."

William Herschel

Lesson 24



“There is not perhaps another
object in the heavens that
presents us with such a
variety of extraordinary
phenomena as the planet
Saturn.”

William Herschel

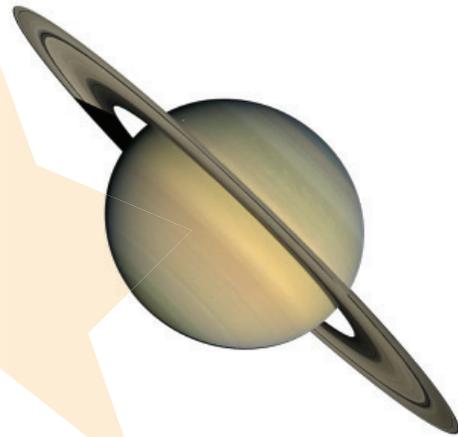
Lesson 24



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).

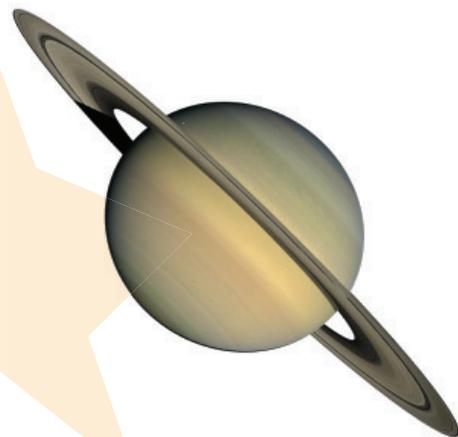
Question:

What is this planet?



LESSON 24

Answer: Saturn



LESSON 24

Question:

What is Saturn's largest moon?

Answer: Titan

LESSON 24

Question:

What is a gas giant?

Answer: A big planet made mostly of gas

LESSON 24



25

Uranus: A Topsy Turvey World

No one in the ancient world knew about Uranus. It's so dim in the sky, no one paid any attention to it. But when people saw it through their telescopes for the first time, they knew it was no ordinary light in the sky, but a new planet going around our sun.

Recommended reading:

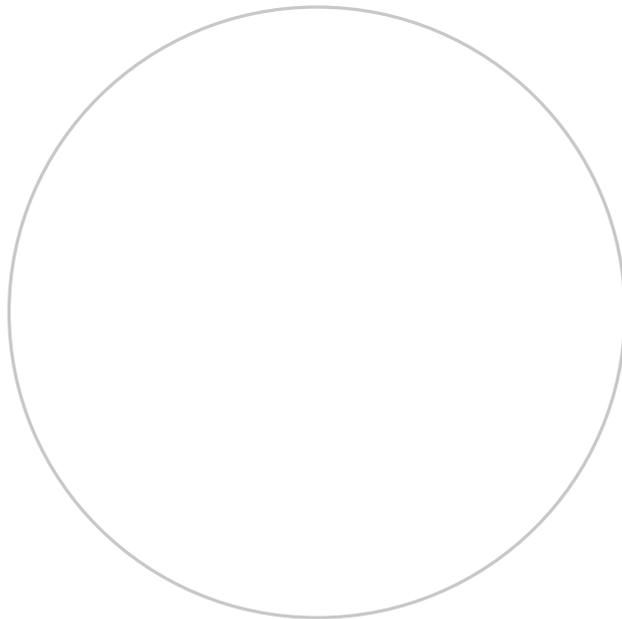
- ★ *Uranus* (True Books: Space), by Elaine Landau
- ★ *Our Solar System*, by Seymour Simon, p.48-51
- ★ *Astronomy* (Eyewitness Books), by Kristen Lippincott, p.54-55



FAST FACTS ABOUT URANUS

DRAW A PICTURE OF THE PLANET.

IS THIS PLANET A
TERRESTRIAL PLANET
OR ICE GIANT? (CIRCLE ONE)



DIAMETER _____

NUMBER OF MOONS _____

HOTTEST TEMPERATURE _____

COLDEST TEMPERATURE _____

LENGTH OF DAY _____

LENGTH OF YEAR _____

INTERESTING FACTS _____



ACTIVITY A Lifetime on Uranus

INSTRUCTIONS

Uranus takes about 84 years to go around the sun one time. This is about how long a lot of people live.

What was happening on Earth when Uranus was in the same position it is now, 84 years ago? What about when it was a quarter of the way around the sun? Half way? Three quarters of the way?

Use your subtraction skills (or a calculator, if you need help) to find out when Uranus was in these positions around the sun. With your parent's permission, go onto the Internet and look up those years. You might type in "important events in [year]" and see what comes up. Write down a really important event in each position.

For extra credit: if you know someone who is in their 80s or 90s, ask them if they know about any of these events and what they can remember.

84 years ago the year
was _____.

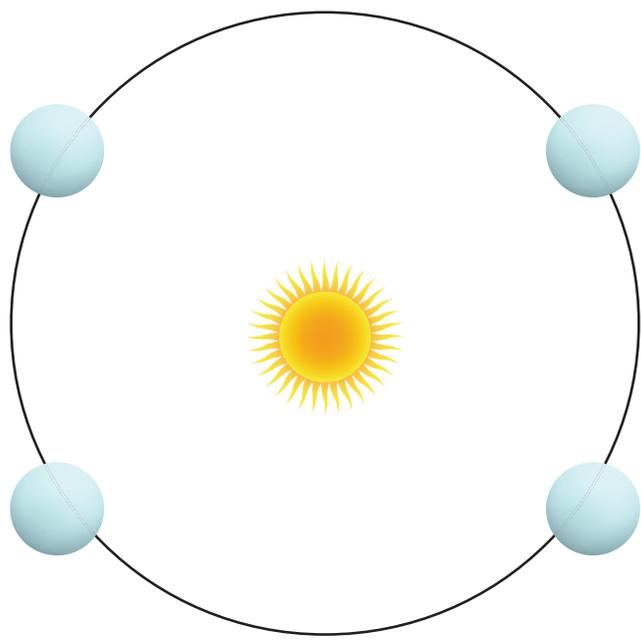
What happened?

21 years ago the year
was _____.

What happened?

63 years ago the year
was _____.

What happened?



42 years ago the year
was _____.

What happened?

Lesson 25



“Coelorum perripit claustra.

He broke through the barriers of the skies.”

William Herschel's Epitaph

Lesson 25



“Coelorum perrupit claustra.

He broke through the barriers

of the skies.”

William Herschel's Epitaph

Blank handwriting practice lines consisting of four sets of three horizontal lines (top, dashed middle, bottom).

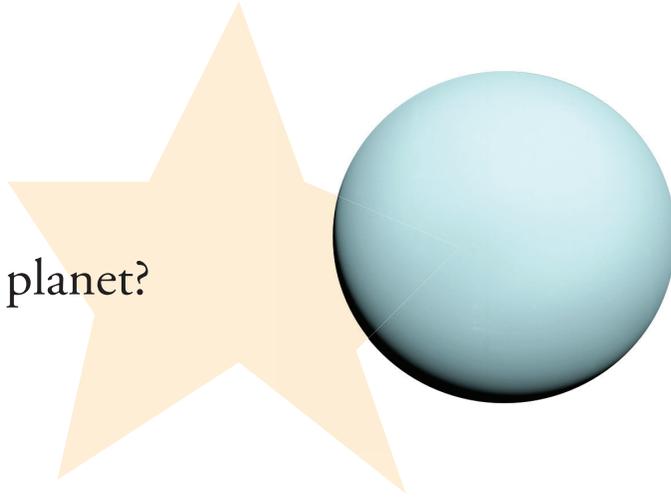
Lesson 25



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).

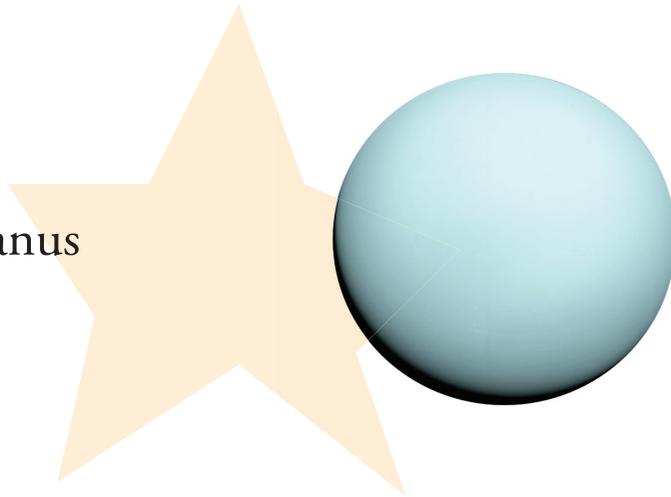
Question:

What is this planet?



LESSON 25

Answer: Uranus



LESSON 25

Question:

What is Uranus' largest moon?

Answer: Titania

LESSON 25

Question:

What is an ice giant?

Answer: A big planet made heavier elements and different types of ice

LESSON 25



Uranus: A Topsy Turvey World

Lesson 25 Quiz



- Who discovered Uranus and also said, “The undevout astronomer must be mad...”
a) William Herschel b) William Shakespeare c) William the Great
- How many years does it take for Uranus to travel around the Sun once?
a) 1 year b) 84 years c) 12 years
- More than 50 Earths could fit inside Uranus.
True False
- Uranus has the coldest atmosphere in the Solar System.
True False
- Uranus is what kind of planet?
a) Ice Planet b) Gas Giant c) Terrestrial
- How many moons does Uranus have?
a) More than 25 moons b) 4 moons c) 1 moon
- Name at least 1 major moon of Uranus. _____
- William Herschel discovered Titania and Oberon, two moons of Uranus.
True False
- Titania is the largest moon in the entire Solar System.
True False?





26

Neptune: The Blue Ice Giant

At first Neptune might look like a boring blue ball. But don't get too close, because Neptune is home to the fastest winds in the whole solar system. This frozen world is full of surprises.

Recommended reading:

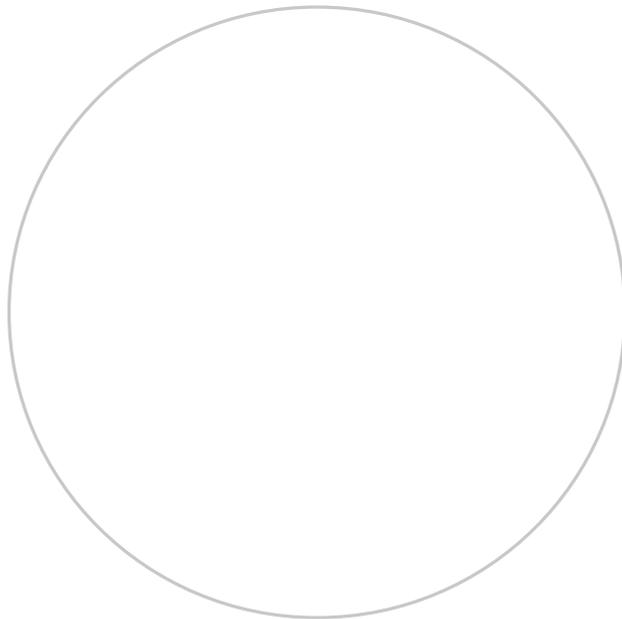
- ★ *Neptune* (True Books: Space), by Elaine Landau
 - ★ *Our Solar System*, by Seymour Simon, p.52-55
 - ★ *Astronomy* (Eyewitness Books), by Kristen Lippincott, p.56-57
- 



FAST FACTS ABOUT NEPTUNE

DRAW A PICTURE OF THE PLANET.

IS THIS PLANET A
TERRESTRIAL PLANET
OR ICE GIANT? (CIRCLE ONE)



DIAMETER _____

NUMBER OF MOONS _____

HOTTEST TEMPERATURE _____

COLDEST TEMPERATURE _____

LENGTH OF DAY _____

LENGTH OF YEAR _____

INTERESTING FACTS _____



ACTIVITY

Make a planet travel poster

SUPPLY LIST

- Poster board or larger sheet of paper
- Pictures of your chosen planet (to either cut out or copy by hand)
- Drawing and coloring supplies

INSTRUCTIONS

1. You've now looked at all 8 planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. Pick your favorite one (not including Earth) and design a poster telling other people about it.
2. Pretend you are trying to persuade people to visit this planet on a vacation. What would you tell them about the planet to make them want to go? What pictures would you show them?
3. Print or draw pictures of this planet on your poster and then write fun facts about that planet that would make someone want to visit, such as what the planet looks like, what is on the planet to see, if it has any interesting moons to visit, and what makes this planet different than all the other planets.

Lesson 26



"Astronomy compels the soul to look upward,

and leads us from this world to another."

Plato

Handwriting practice lines consisting of ten sets of three horizontal lines (top, middle, bottom) for tracing and writing.

Lesson 26



“Astronomy compels the soul
to look upward, and leads us
from this world to another.”
Plato

Four sets of blank handwriting lines, each consisting of a solid top line, a dashed middle line, and a solid bottom line.

Lesson 26



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).

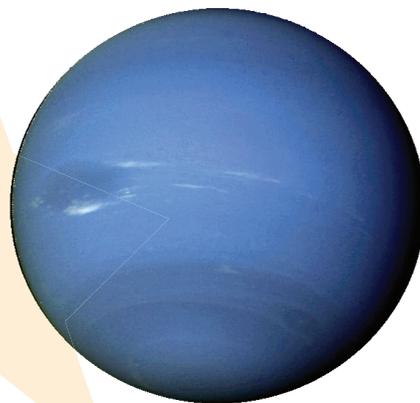
Question:

What is this planet?



LESSON 26

Answer: Neptune



LESSON 26

Question:

What is Neptune's largest moon?

Answer: Triton

LESSON 26



27

Ice, Ice Baby (Too Cold)

Beyond Neptune are millions of little (and big) chunks of ice in a region called the Kuiper Belt. This is an area full of dwarf planets, comets, and things called “cubewanos.” It’s an icy, cold place that will take us a long time to explore.

Recommended reading:

- ★ *Pluto: From Planet to Dwarf* (True Books: Space), by Elaine Landau
 - ★ *Beyond Pluto: The Final Frontier of Space* (True Books: Space), by Elaine Landau
 - ★ *Our Solar System*, by Seymour Simon, p.56-57, 60-61
- 



ACTIVITY

Walk to Kuiper Belt

SUPPLY LIST

- Tape measure
- A sidewalk that is at least 250 feet long
- Small rocks to weigh down your papers
- Create signs on pieces of copy paper for:
 - The Sun
 - Beginning of the Asteroid Belt
 - Jupiter
 - Saturn
 - Uranus
 - Neptun
 - Pluto
 - Eris
 - The Edge of the Solar System
- Add to these the signs you made from the activity in Lesson 22 (or make new ones if you want) for:
 - Mercury
 - Venus
 - Earth
 - Mars
 - End of the Asteroid Belt

INSTRUCTIONS

1. Place the Sun sign at one end of the sidewalk.
2. Using a tape measure, place Mercury 10 inches away from the sun, Venus 20 inches from the Sun, Earth 27 inches from the Sun, and Mars 41 inches from the Sun. (Use rocks to weigh down the papers so they don't blow away.)
3. Next, you're going to use your feet to measure the rest of the solar system. Each step should be about 2 feet apart. Practice your "step" using the tape measure before you get started.
4. Walk the following number of steps for each planet (remember to keep your "steps" about 2 feet apart). Leave the appropriate sign in each place
 - Asteroid Belt: The first sign for the beginning of the Asteroid Belt should be $\frac{1}{2}$ step from Mars. The second sign for the end of the Asteroid Belt should be 2 steps from Mars.
 - Jupiter: 4 steps from Mars
 - Saturn: 4 steps from Jupiter
 - Uranus: 10 steps from Saturn
 - Neptune: 11 steps from Uranus
 - Pluto: 9 steps from Neptune
 - Eris: 28 steps from Pluto
 - Edge of the Kuiper Belt: 58 steps from Eris
5. When you get to the edge of the solar system, look back and see how far you've come. This gives you just a small glimpse at how large the solar system is.

Lesson 27



"Our universe is a sorry little affair unless
it has in it something for every age to
investigate."

Lucius Seneca

Lesson 27



“Our universe is a sorry little

affair unless it has in it

something for every age to

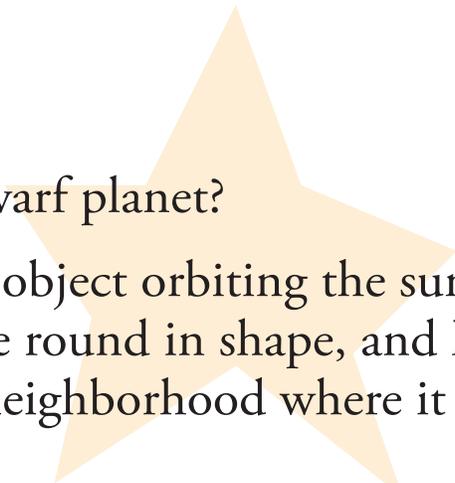
investigate.”

Lucius Seneca

Lesson 27



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question:

What is a dwarf planet?

Answer: An object orbiting the sun, big enough to be round in shape, and hasn't cleared the neighborhood where it lives

LESSON 27



28

Planets Galore!

When you think of planets, you probably think of the ones going around our sun. But there are thousands and thousands of other planets out there orbiting other stars. And we are discovering new “exoplanets” every year.

Recommended reading:

- ★ *The New Astronomy Book*, by Danny R. Faulkner, p.56-59
 - ★ *Exploring Exoplanets*, by Deborah Kops
- 



ACTIVITY

Imagine an Exoplanet

There are several planets scientists have found that might be habitable—this doesn't mean there is intelligent life on these planets, or any life at all. But these planets are interesting to imagine.

Below are the descriptions of 3 planets we know about. **Using the information given, pick one that is your favorite and draw a picture of what it might look like standing on the surface of the planet.**

- What would the land and sky look like?
- Does it have air to breathe?
- Oceans or lakes?
- What does the sky look like with its star and other planets close by?

TRAPPIST-1e

This planet is orbiting a much cooler star, which is dim and red. There are actually a number of planets orbiting this star, all very close. TRAPPIST-1e is a rocky world about the same size as the Earth. It orbits the star very fast: once every 6 Earth days. One side always faces the star and the other side is always faces away from it, making one side warm and the other side cold. The line between the warm half and the cold half might be a nice temperature.

Kepler 186-f

Kepler 186-f is just a little bigger than the Earth, but it gets much less light than the earth does. In fact, it gets only a third of the amount of light as earth gets, so it's probably much colder. Maybe its atmosphere is thicker and traps more heat, helping to keep the planet warm enough for life to exist. It is orbiting around a small, dim, red star, taking 130 days to get around it one time. It's star looks bigger than our sun does to us, but because it's a dimmer star, it would look like the sun just before sunset. There are four other planets closer than it is to its star.

Kepler 452-b

Kepler 452-b is what we call a “super Earth” because it's a little bigger than the Earth is, so you would feel twice as heavy there. The star it orbits looks a lot like our yellow sun, and takes 385 days to orbit (very similar to Earth taking 365 days). It gets a little more energy from its star than Earth does from the sun, so it could be a lot warmer. We don't know if it's a terrestrial planet (rocky like Earth), or a gas giant (like Jupiter), but it probably has a thick atmosphere.

Lesson 28



"The eternal silence of these infinite spaces

fills me with dread."

Blaise Pascal

Handwriting practice lines consisting of ten sets of three horizontal lines (top, middle, bottom) with a dashed midline for letter height guidance.

Lesson 28



The eternal silence of these
infinite spaces fills me with
dread.

Blaise Pascal

Lesson 28



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question:

What is an exoplanet?

Answer: A planet outside our solar system

LESSON 28



Planets Galore!

Lesson 28 Quiz



1. Astronomers believe that almost every star has at least 1 planet.

True

False

2. What do we call the planets outside the Solar System—the planets going around other stars?

a) Exoplanets

b) Planets

c) Interplanets

3. Name 1 method astronomers use to find exoplanets.

4. What do we call the invisible magnetic shield around the earth?

a) Magnet Force Field

b) Magnetosphere

c) Magnet Shield

5. What other planets in our solar system have strong magnetospheres?

a) Jupiter & Mars

b) Jupiter & Saturn

c) Saturn & Mars

6. What planets have weak magnetospheres?

a) Venus & Mars

b) Venus & Uranus

c) Mars & Uranus

7. What is the Habitable Zone or Goldilocks Zone?

8. There are other Exoplanets that are called Hot Neptunes.

True

False





29

The Immeasurable Heavens

We can see over 9000 stars in the night sky without using a telescope. When we use powerful telescopes we can see beyond these stars to see not just more stars but whole galaxies full of billions of stars. It's hard to imagine just how big the universe is.

Recommended reading:

- ★ *Galaxies* (True Books: Space), by Howard K. Trammel (mentions Big Bang briefly)
 - ★ *The New Astronomy Book*, by Danny R. Faulkner, p.64-71
- 



ACTIVITY

How Big Is the Universe

INSTRUCTIONS

1. Go to experienceastronomy.com/universe and follow the instructions for the online activity there.

Lesson 29



"Man must rise above the Earth to the

top of the atmosphere and beyond for

only thus will he fully understand the

world in which he lives."

Plato

Lesson 29



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).

Lesson 29



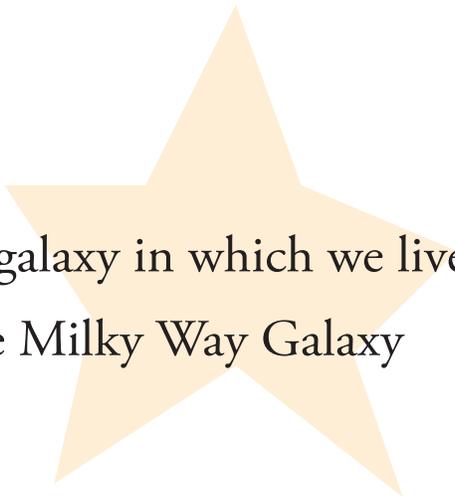
“Man must rise above the
Earth to the top of the
atmosphere and beyond—
for only thus will he fully
understand the world in which
he lives.”

Plato

Lesson 29



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question:

What is the galaxy in which we live?

Answer: The Milky Way Galaxy

LESSON 29



30

The Heavens Are the Lord's Heavens

Psalm 115:16 says, "The heavens are the Lord's heavens, but the earth he has given to the children of man." As amazing as the rest of the universe is, the more we explore it the more we learn: there is no place like home.

Recommended reading:

- ★ *The New Astronomy Book*, by Danny R. Faulkner, p.76-79
 - ★ *The Heavens Proclaim His Glory*, edited by Lisa Stilwell
- 



ACTIVITY

Our Planetary Neighbors

SUPPLY LIST

- Large poster board
- Drawing and coloring supplies
- Fast Facts pages from Lessons 16, 19, 20, 21, 23, 24, 25, and 26

INSTRUCTIONS

Using the information you've learned about our solar system throughout the last several lessons, draw an overhead map of the solar system on a large poster board.

1. Place the sun in the very center of the poster board.
2. Draw 8 concentric circles around the sun. These will be the orbits of the 8 planets.
3. Draw pictures of each planet in order, with Mercury the closest, then Venus, then Earth, and so on. (Don't worry about drawing the size or distances of these planets to scale. You won't be able to do that on a poster board.)
4. Label each planet correctly.
5. Write 2 or 3 interesting facts next to each planet. Use your Fast Facts sheets for some ideas, or start with some ideas listed below.
 - Mercury: "The smallest planet"
 - Venus: "The hottest surface"
 - Earth: "The living planet"
 - Mars: "The highest mountain"
 - Jupiter: "The biggest planet"
 - Saturn: "The greatest rings"
 - Uranus: "The coldest atmosphere"
 - Neptune: "The fastest winds"
6. Decorate your poster to make it fun!

Lesson 30



"It cannot be denied that astronomy

unfolds the admirable wisdom of God."

John Calvin

Lesson 30



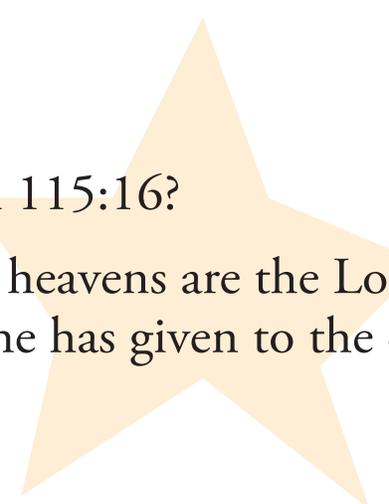
“It cannot be denied that
astronomy unfolds the
admirable wisdom of God.”
John Calvin

Four sets of blank handwriting lines, each consisting of a solid top line, a dashed middle line, and a solid bottom line.

Lesson 30



Handwriting practice lines consisting of ten sets of three horizontal lines (top solid, middle dashed, bottom solid).



Question:

What is Psalm 115:16?

Answer: “The heavens are the Lord’s heavens,
but the earth he has given to the children of
man.”

LESSON 30

