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SPACE – THE STARS

ABOUT THIS PLAN:

In this plan, I use videos by Crash Course Kids. The videos cover many topics and are about 10 minutes in length. I recommend reading the entire lesson plan before starting the lessons and activities.

After you have completed this lesson plan; you can continue space exploration with NASA. We went on a field trip to NASA JPL in California. There they provided us with Educator Resources. You can order your FREE materials by sending in a written request, placing a phone call, or visiting JPL.

Address: 4800 Oak Grove Drive, Mail Stop 180-109

Pasadena, CA 91109-8099

Phone: 818-393-5917

Website: <http://www.jpl.nasa.gov/edu/teach/>

MATERIALS NEEDED:

1. Internet access
2. Computer/Laptop
3. Printer
4. Scissors
5. Tape
6. Flashlight
7. Construction paper – many colors
8. Needle
9. Dark room
10. “4 mil” black plastic sheet – optional
11. Duct tape/utility tape – optional
12. Large black plastic trash bag – 30 gallons or larger – Optional
13. Box fan - optional
14. Crayons or markers
15. Free lesson plan from <http://www.jpl.nasa.gov/edu/teach/activity/inflatable-planetarium/> - optional
16. Glue
17. Glitter
18. Scissors
19. Round head fastener
20. 3 pieces of card stock (1 yellow, 1 blue, and 1 any color)
21. Scissors
22. Round head fastener (2)
23. Styrofoam balls or a solar system kit that includes Styrofoam balls
24. Paint

25. Paint brushes
26. Wire or pipe cleaners. If you are using wire make sure that it is strong enough to hold the balls. The one I ordered could not hold up the balls so I switched to the pipe cleaners.
27. Hot glue gun (to glue pipe cleaners to the balls).

GRADE LEVEL:

Grades 1-5 and homeschool.

WHERE TO FIND US:

YouTube· www.youtube.com/kid2kidtutorialshd · Website· www.kid2kidtutorials.com · Twitter · www.twitter.com/Kid2Kidtutorial · Instagram · www.instagram.com/Kid2Kidtutorials · TPT· www.teacherspayteachers.com/Store/Kid2Kid-Tutorials

OBJECTIVES/GUIDE/LESSON PLAN:

1. SIZE OF THE UNIVERSE

WATCH VIDEO:

Space Out: "So... how big is the Universe? It's big... really big... no, bigger than that... it's big. In this episode of Crash Course Kids, Sabrina gives us some perspective on this whole Universe thing and how we fit into it."

ACTIVITY:

1. Do the activity [Sizing up the Universe](#).
2. 2nd Activity – after the online activity have your students draw or [Cut outs – planets and moon](#). The cut outs I have provided are as close to scale as I could get them. They just give a visual representation of the planets and the moon. I did not include the sun.
 - o Draw planets to scale
 - Measure and cut out the planets. The table below is in inches.

This picture does not have all the planets, I think we are missing Jupiter and the sun. Sun was too large and the kids were not willing to cut out a 2-foot planet.



- Measure the diameter in inches and use a compass to draw a circle with the desired diameter. The sun is huge, I skipped cutting out the sun. I just gave my kids an example of what 218" looks like.

Description	Size in inches	Size in relation to the Earth
Sun	218.1	10906%
Mercury	0.8	38%
Venus	1.9	95%
Earth	2.0	100%
Moon	0.5	27%
Mars	1.1	53%
Jupiter	22.4	1121%
Saturn	18.9	945%
Uranus	8.0	401%
Neptune	7.8	388%
Pluto *dwarf planet	0.4	18%

- o Math lesson
 - Option 1- You can add in a math lesson by having the students; [Convert miles to KM](#), [Convert Km to Miles](#), or [Find the PERCENTAGE IN Comparison to Earth](#).

Table 1

Description	Size in km	Size in Miles	Size in relation to the Earth
Sun	695,500	432,200	10906%
Mercury	2,440	1,516	38%
Venus	6,052	3,760	95%
Earth	6,378	3,963	100%
Moon	1,737	1,080	27%
Mars	3,397	2,111	53%
Jupiter	71,492	44,423	1121%
Saturn	60,268	37,449	945%
Uranus	25,559	15,882	401%
Neptune	24,764	15,388	388%
Pluto *dwarf planet	1,180	733	18%

- Option 2- Convert the table above into inches. I did this by making earth 100% at 2 inches. I then used Excel to create a table that showed the other planets, sun, and moon in relation to earth. My younger son inputted numbers until the percentage matched the table and my older son did the math on paper.

How to create the tables:

1. Use table 1 as your guide
2. Now create a similar table with Earth at 2 inches and at 100%. In an Excel spreadsheet input the percentage of the other planets, sun, and moon in comparison to earth.

Description	Size in inches	Size in relation to the Earth
Sun		10906%
Mercury		38%
Venus		95%
Earth	2.0	100%
Moon		27%
Mars		53%
Jupiter		1121%
Saturn		945%
Uranus		401%
Neptune		388%
Pluto *dwarf planet		18%

- a. Input the following formula (under "size in inches") for each planet, sun, and moon: $H6 * I2 - H6$ is the cell with 2. I2 is the cell with the suns percentage. Do this for the rest. Mercury would be I3.

Once the table is complete play around with the size of Earth and see what happens. Change it from 2 inches to 5 or to 0.5.

Sample: make sure to put an = sign before the H (=H6*12).

Description	Size in inches	Size in relation to the Earth
Sun	H6*12	10906%
Mercury	H6*13	38%
Venus	H6*14	95%
Earth	2.0	100%
Moon	H6*15	27%
Mars	H6*16	53%
Jupiter	H6*17	1121%
Saturn	H6*18	945%
Uranus	H6*19	401%
Neptune	H6*110	388%
Pluto *dwarf planet	H6*111	18%

2. THE STARS AND CONSTELLATIONS

WATCH VIDEOS

1. [Star Personalities](#): "Down here, on Earth, if you look up at the night sky, it seems like all the stars up there look the same. Or maybe at least similar. But, it turns out that stars are very different and we shouldn't stereotype them. Some are bigger, some burn through their hydrogen faster, some are one color, and some are another color. In this episode of Crash Course Kids, Sabrina chats about their difference and tells us what those differences mean. "

2. [Super Stars](#): "So, you know about stars. But what if those stars formed a super group like The Avengers? Well, then you have a Constellation! In this episode of Crash Course Kids, Sabrina chats about stars, constellations, and how humans have used constellations to tell stories for a really long time. "

ACTIVITY:

1. [Inflatable Planetarium](#) – this one project is cool.
2. Constellation with a flashlight - materials
 - o Black construction paper
 - o Needles to make holes
 - o Flashlight
 - o Tape
 - o Scissors

Trace the outline of the flashlight (front part) on to construction paper. Cut out the paper and draw your constellation. Put in holes with a needle, tape to flashlight, and shine on the wall or roof.



3. EARTH'S ROTATION, ZODIAC CONTELLATIONS, AND ECLIPTIC

WATCH VIDEOS

1. **Constellation Location**: "Let's say you're looking for a specific constellation in the sky, but can't find it? That could be because you're on the wrong part of the planet to see it. In this episode of Crash Course Kids, Sabrina talks about how the Earth's rotation and axis can affect what we see in the night sky. "
2. **The Zodiac Constellations**: "We've talked about constellations; groups of stars in the night sky that we assign names to. But there are a certain group of special constellations called The Zodiac that Sabrina is going to chat about. Gemini, Sagittarius, Scorpio? You've heard of them and now is your chance to get to know them a little more."
3. **The Ecliptic**: "So, what is the Ecliptic? Well, it has to do with the Zodiac constellations and our sun and how they move in relation to one another. It's kind of cool! In this episode, Sabrina chats about this imaginary line called the Ecliptic and its cycle in the sky."

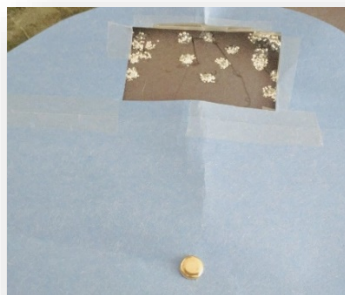
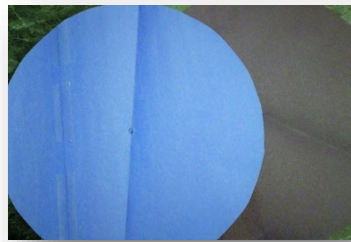
ACTIVITY:

[Video of our constellation](#)



1. Constellations

- Materials
 - Black and blue construction paper
 - Glue
 - Glitter
 - Scissors
 - Round head fastener
- We taped (I suggest you glue them together or just use larger construction paper) two pieces of construction black paper together and two pieces of blue construction paper together. Then cut both into large circles (same size).
- Draw out the constellation on the black paper, dot on glue, sprinkle on glitter.
- Let glue and glitter dry. Cut a hole on top of the blue circle. Then fasten the blue circle on top of the black circle. Place the fastener in the middle. The blue circle will now spin around the black circle displaying one constellation at a time. You can have the students color in the blue circle so it looks like earth.



4. THE SUN AND EARTH'S ROTATION AROUND THE SUN

WATCH VIDEOS

1. [Here Comes the Sun:](#) "Every hear of "Sol"? Sure you have! It's our Sun! It sits at the center of our 8 planet solar system, providing us with heat and light. But how does that energy

get to us? In this episode of Crash Course Kids, Sabrina chats about the sun; what it is, how it works, and how the energy gets to us here on Earth."

2. [Earth's Rotation and Revolution](#): "So, have you ever wondered why we have seasons? Or maybe where the sun goes when it's night time? *Hint: It doesn't actually go anywhere* In this episode of Crash Course Kids, Sabrina talks about the Earth's rotation and revolution and how these things contribute to night and day and how Earth's tilt gives us seasons. "

ACTIVITY:

[Our video on Earth's Rotation activity](#)



1. Earth rotation around the sun – materials and directions
 - 3 pieces of card stock (1 yellow, 1 blue, and 1 any color)
 - Scissors
 - Round head fastener (2)
 - Glue
 - Cut out a large and small circle. The large one will be the sun and the small will be the earth.
 - Cut out a long rectangle.
 - Attach the earth to the rectangle with a fastener
 - Cut out a medium sized circle
 - Glue the other side of the rectangle to the medium sized circle
 - Attach medium sized circle to the sun with a fastener
 - Move the earth around the sun



5. THE SEASONS

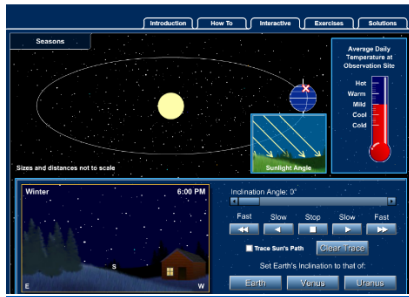
WATCH VIDEOS

1. [Following the Sun](#): "Have you ever wondered why your shadow is longer sometimes and shorter others? It turns out it all has to do with that marvelous big ball of light in the sky; The Sun!"
2. [Seasons and the Sun](#): "Ever wonder why we have seasons? A lot of people think it's because the Earth gets further away from the sun in winter, and closer in the summer. But, it's actually more interesting than that. In this episode of Crash Course Kids, Sabrina talks about how the Earth's tilt is responsible for Winter, Spring, Summer, and Fall."

ACTIVITY:

1. Complete [The Seasons](#) worksheet

2. Online interactive activity [Seasons Interactive](#)



6. PHOTOSYNTHESIS

WATCH VIDEOS

1. [Why No Polar Pineapples](#): "Plants are amazing. Really! Photosynthesis is an incredible thing. But it also means that some plants can't live everywhere. They need to get the right amount of sunlight for the right amount of time. In this episode of Crash Course Kids, Sabrina chats about how the tilt of the Earth makes for both prime and not-so-prime growing conditions for things like pineapples."
2. [Vegetation Transformation](#): "Have you ever seen a magic trick where one thing changes to another thing? Well, that's nothing compared to what plants can do through a process called photosynthesis. In this episode, Sabrina talks about how photosynthesis works!"

ACTIVITY:

1. Complete the [Photosynthesis](#) worksheet
2. Play the [photosynthesis game](#).



7. A STAR OR PLANET AND STARS BRIGHTNESS

WATCH VIDEOS

1. [Seeing Stars](#): "So you know what a star is, right? Well, if you don't, you should. We've talked about that big one in the sky a few times: The Sun! But there are a lot of bright

dots in the night sky and not all of them are stars. Today, let's play a game of "Star or Not a Star" to learn a little more about everything that's up there."

2. **Glow On:** "So, have you ever wondered why some stars are brighter than others? You might think it's because they're closer to us, but that's not the whole story? In this episode of Crash Course Kids, Sabrina chats about how stars glow and how astronomers judge their brightness. Also, she talks about a really, really, really big star."

ACTIVITY:

1. Discuss the differences between a star and planet. Ask the students to name some stars and planets.
2. Grab 2 flashlights. Make sure they are different in size and power.
 - o Have the students stand in a dark room, you will stand behind them.
 - o Turn on the flashlights and shine them on a wall.
 - o Ask the students which one is brighter (do not let them see the flashlight).
 - o Move one flashlight further back and ask again which one is brighter and which one is closer to the wall.
 - o Move the other one back and bring the 2nd one closer to the wall.
 - o Now give the kids a chance to play around with the flashlights.

8. ORBITS

WATCH VIDEOS

1. **Everything Revolves Around You:** "So, why doesn't the moon just crash into the Earth? And why doesn't the Earth crash into the Sun? What are orbits exactly and why do they happen? Well, it has to do with gravity and velocity. In this episode of Crash Course Kids, Sabrina talks to us about how these things work and why we don't need to worry about the moon colliding with us."
2. **Orbits are Odd:** "Last week we talked about the orbits of the Earth and our Moon. But today we're going to go a little bigger... well, a lot better. Did you know that there is a massive Black Hole at the center of our Galaxy? Or that Pluto's orbit is really... weird?"

ACTIVITY:

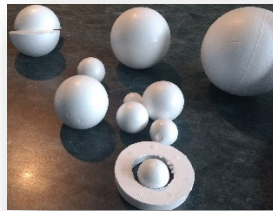
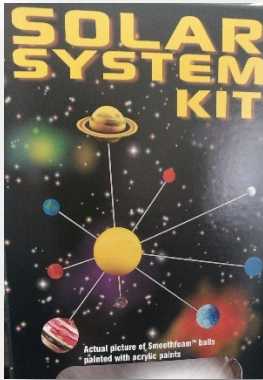
1. Build planets orbiting the sun, watch our video [HERE](#).

Materials:

- Styrofoam balls or a solar system kit that includes Styrofoam balls
- Paint
- Paint brushes
- Wire or pipe cleaners. If you are using wire make sure that it is strong enough to hold the balls. The one I ordered could not hold up the balls so I switched to the pipe cleaners.

- Hot glue gun (to glue pipe cleaners to the balls).

Watch our video linked above to see instructions on how to put this together.



2. Online [Orbit simulator](#)



9. WEATHER (SPACE AND OTHER PLANETS)

WATCH VIDEOS

1. [Weather in Space \(the Rocky Planets\)](#): "Do other planets have weather? It turns out that, yes, they do! But, the weather isn't all the same on other planets because of things like atmosphere. In this episode of Crash Course Kids, Sabrina takes us on a tour of the weather on the rocky planets in our solar system."
2. [Gas Giants Weather](#): "Last time, we learned that there is in fact weather on other planets. But those were the rocky planets, like Earth. What about the big Gas Giants? What's the weather like there? In this episode of Crash Course Kids, Sabrina takes us on a virtual tour of the Gas Giants and shows us what kind of weather we can expect."

ACTIVITY:

Read <http://solarsystem.nasa.gov/galleries/solar-system-temperatures>

1. Complete worksheet [Planetary Weather](#)

10. LIFE ON OTHER PLANETS

WATCH VIDEOS

1. [Life on Other Planets](#): "Have you ever wondered if there is anyone (or anything) else out there in the universe? Well, you're not alone. But what would alien life look like? And what would their food chains and food webs look like? In this episode of Crash Course Kids, Sabrina gives us some ideas about what we might find out there... some day."
2. [Planetary Plants](#): "So we know what life needs here to work, and we've talked a little about what life COULD look like on other planets. But what about plant life? What could plant life look like on other planets? In this episode of Crash Course Kids, Sabrina chats to us just about that."

ACTIVITY

Pick a planet and find out what the atmosphere and weather is like on that planet. Write a story or draw a picture of what life would be like on that planet. You can also make up a planet.

OTHER LESSON PLANS:

Additional lesson plans can be found on [Teachers Pay Teachers](#).

1. Subtraction
2. Archaeology and Early Humans
3. Engineering Process
4. Life Science
5. Bill of Rights
6. Addition
7. The Ancient World

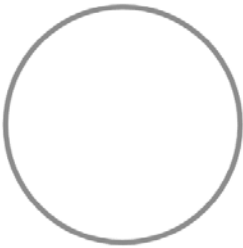
WORKSHEETS

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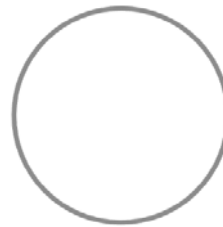
CUT OUTS – PLANETS AND MOON

Color and cut out the Sun, moon, and planets. If you do not want to color over the text, leave as is. The sizes are in relation to the diameter of the earth

1: Earth (about 1")



2: Venus (about .95")



3: Mercury (about 0.4")



4: moon (about 0.3")



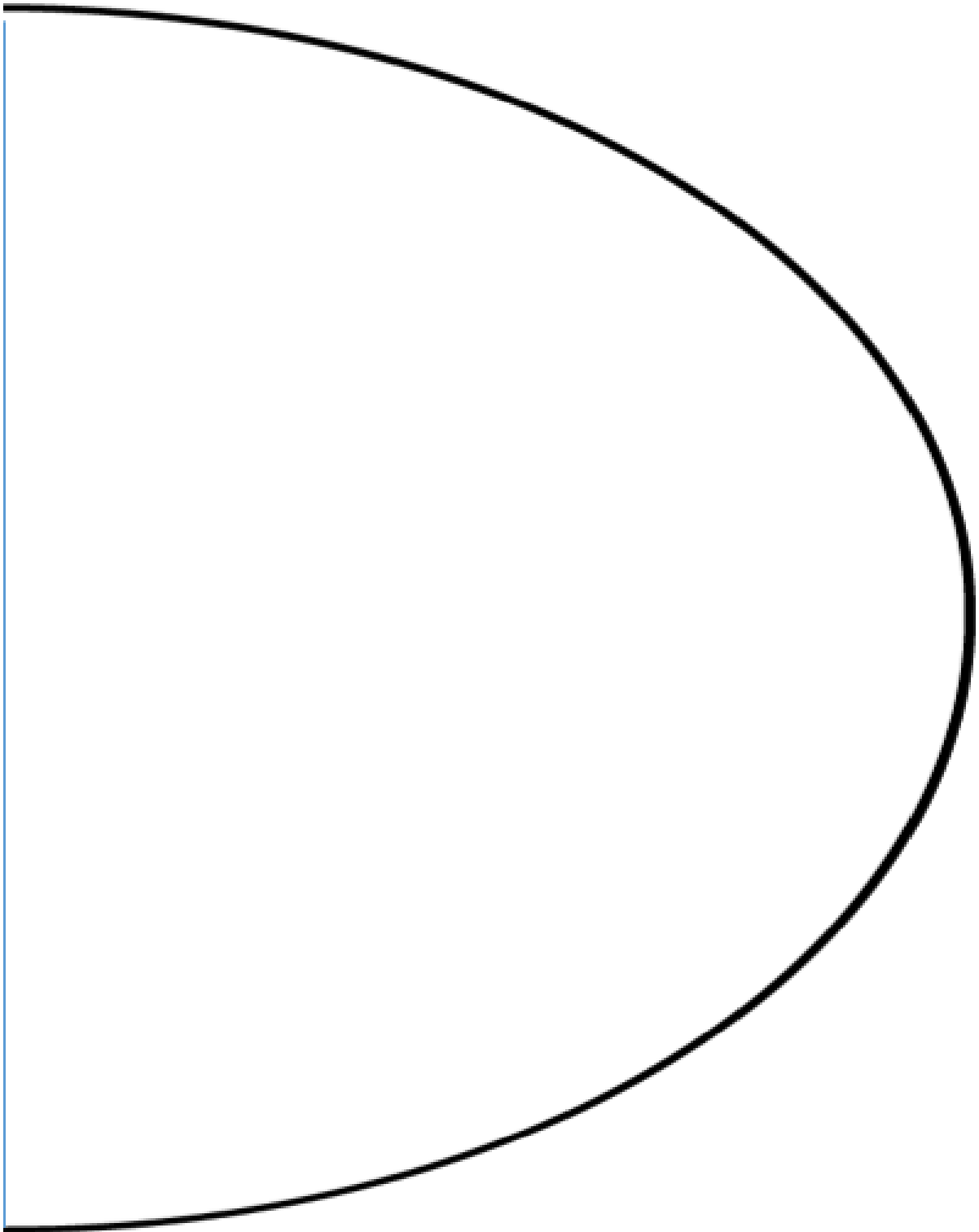
5: Mars (about 0.5")



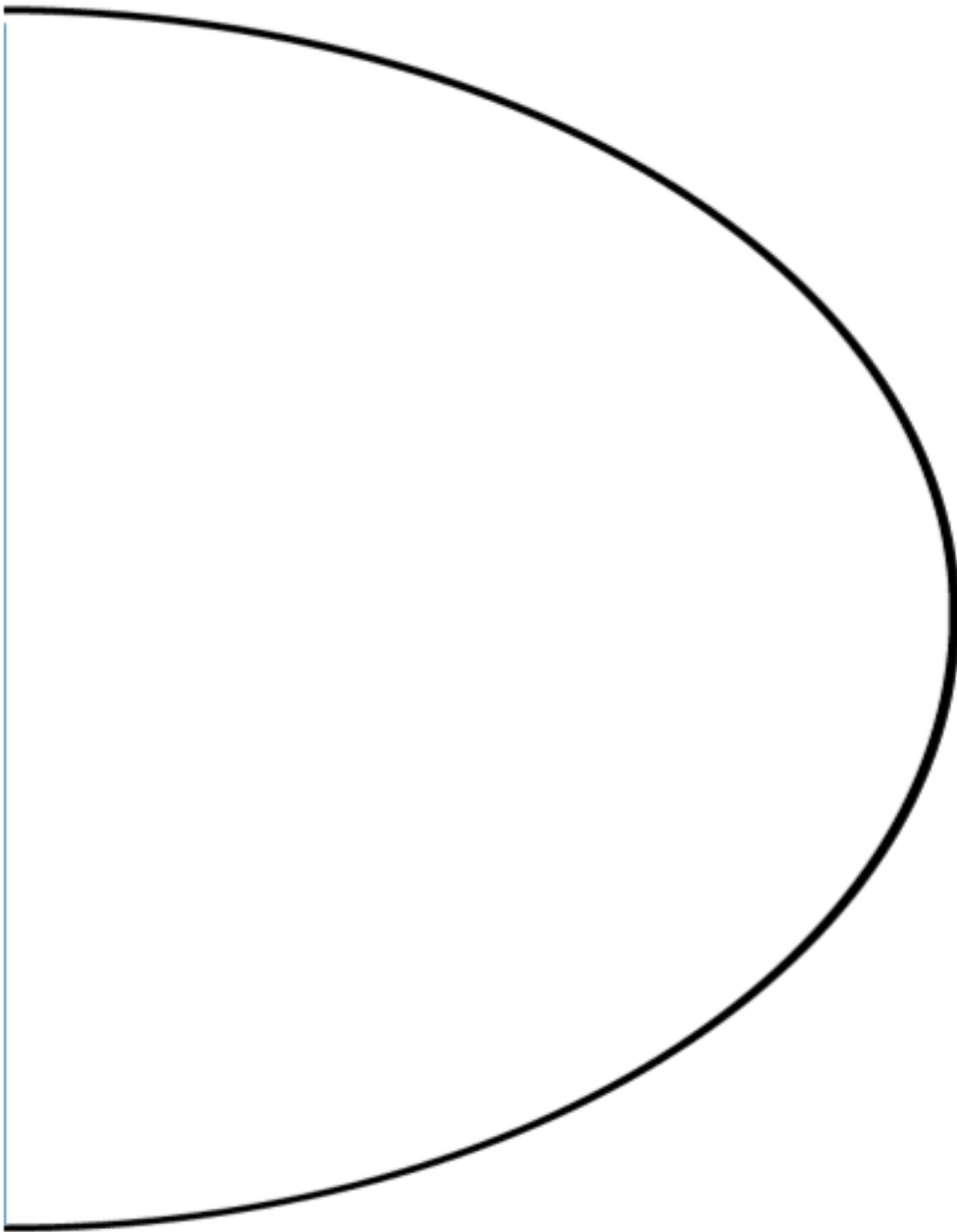
6: Pluto - dwarf planet (about 0.2")



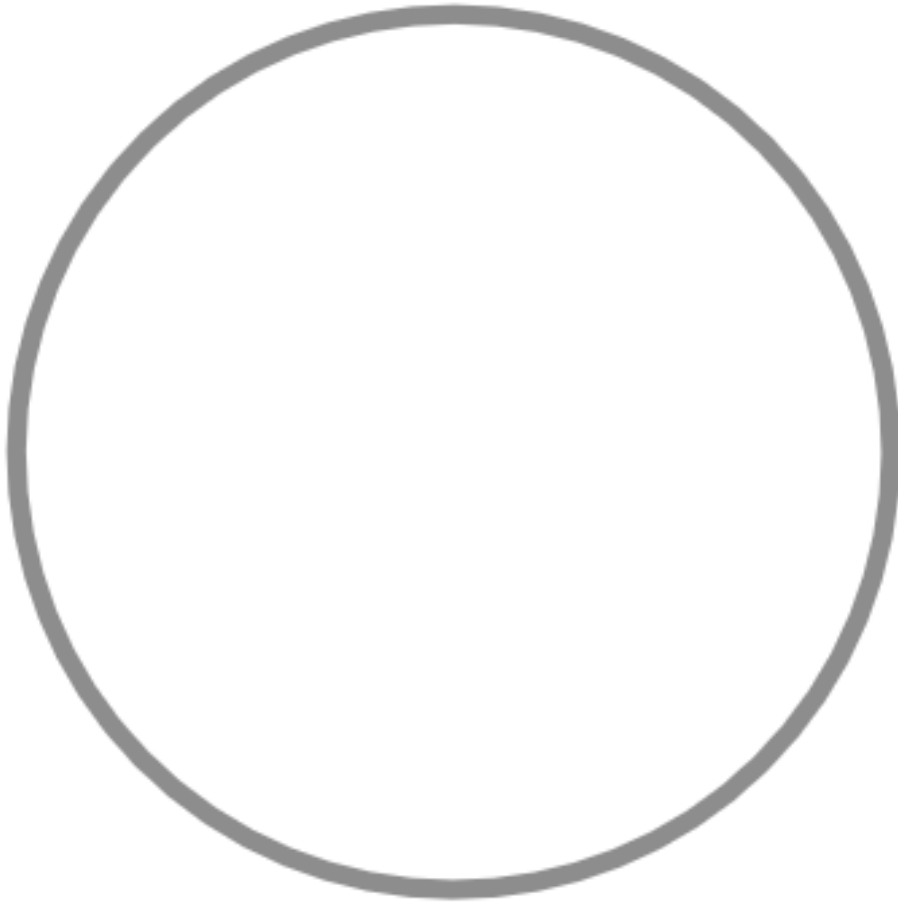
7: Jupiter (half of Jupiter at 5.5"). Cut out two of these and glue them together.



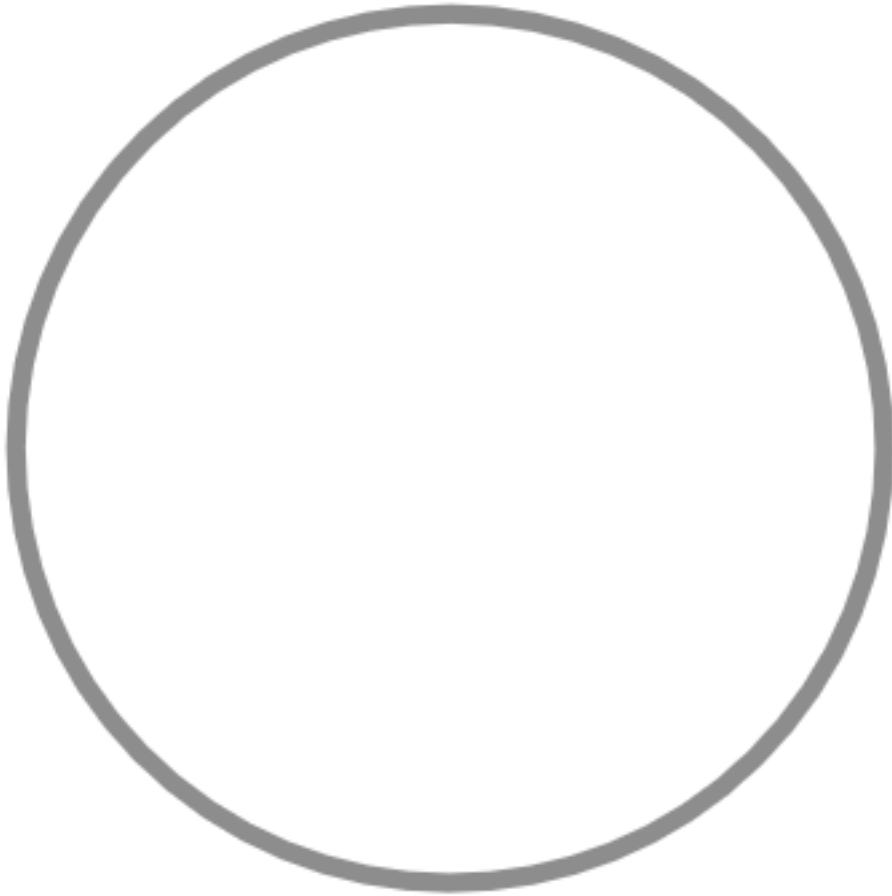
8: Saturn (half of Saturn about 4.5") Cut out two and glue together



9:Uranus (about 4")



10: Neptune (about 3.9")



CONVERT MILES TO KM

Description	Size in Miles	Size in Km	Size in relation to the Earth
Sun	432,200		10906%
Mercury	1,516		38%
Venus	3,760		95%
Earth	3,963		100%
Moon	1,080		27%
Mars	2,111		53%
Jupiter	44,423		1121%
Saturn	37,449		945%
Uranus	15,882		401%
Neptune	15,388		388%
Pluto *dwarf planet	733		18%

CONVERT KM TO MILES

Description	Size in km	Size in Miles	Size in relation to the Earth
Sun	695,500		10906%
Mercury	2,440		38%
Venus	6,052		95%
Earth	6,378		100%
Moon	1,737		27%
Mars	3,397		53%
Jupiter	71,492		1121%
Saturn	60,268		945%
Uranus	25,559		401%
Neptune	24,764		388%
Pluto *dwarf planet	1,180		18%

FIND THE PERCENTAGE IN COMPARISON TO EARTH

Description	Size in km	Size in Miles	Size in relation to the Earth
Sun	695,500	432,200	
Mercury	2,440	1,516	
Venus	6,052	3,760	
Earth	6,378	3,963	100%
Moon	1,737	1,080	
Mars	3,397	2,111	
Jupiter	71,492	44,423	
Saturn	60,268	37,449	
Uranus	25,559	15,882	
Neptune	24,764	15,388	
Pluto *dwarf planet	1,180	733	

THE SEASONS

Fill in the seasons. *The gray areas are not facing the sun.







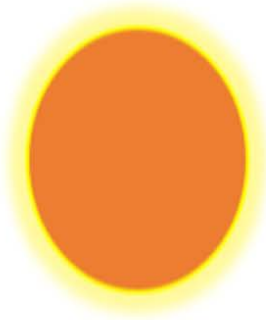


SEASONS - ANSWERS



Spring

Summer



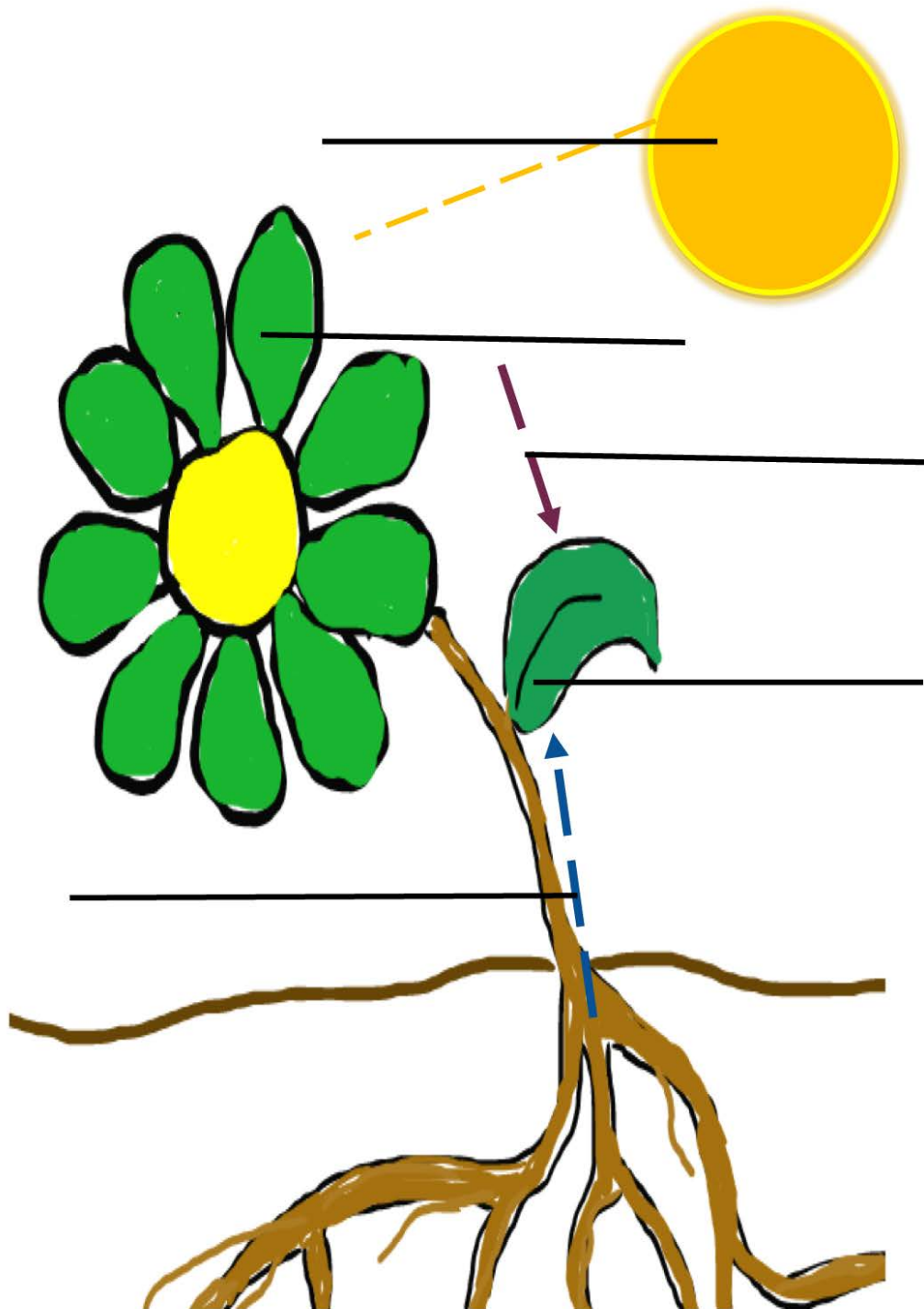
Winter



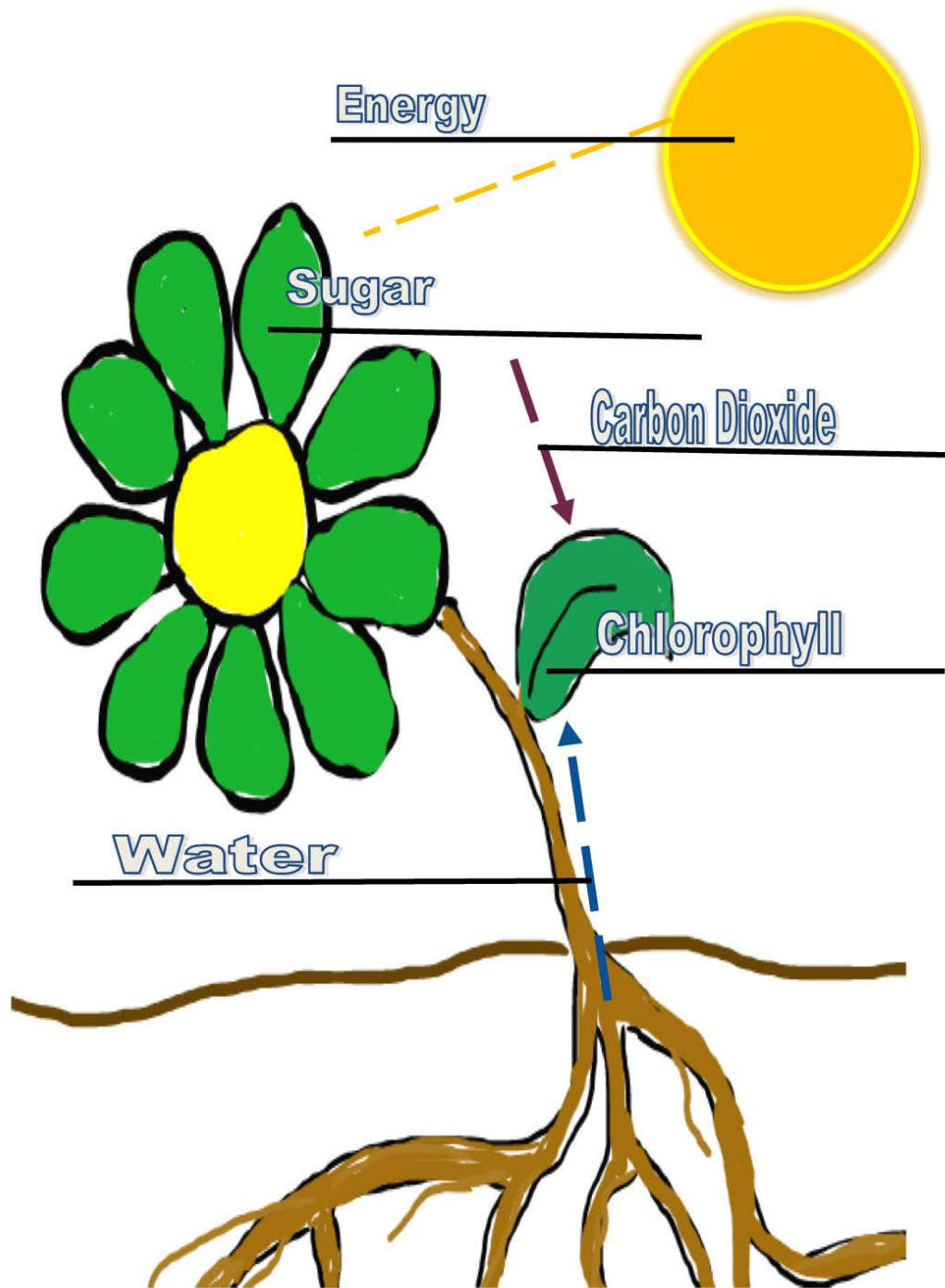
Autumn



PHOTOSYNTHESIS



PHOTOSYNTHESIS - ANSWER

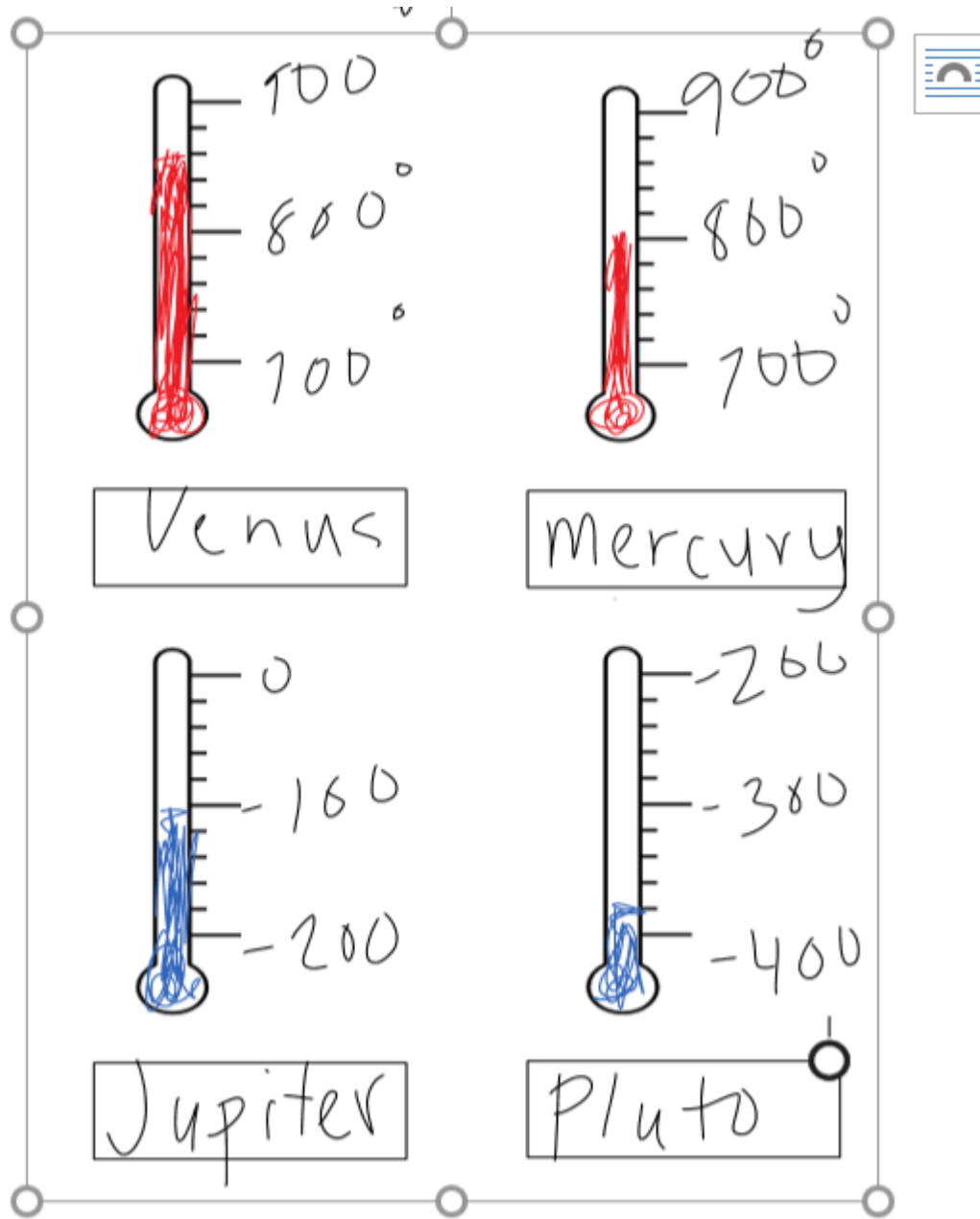


PLANETARY WEATHER





PLANETARY WEATHER - EXAMPLE



QUIZ ALSO ON [KAHOOT](#)

1. In which galaxy is the earth located? _____.
2. How do we measure space? _____.
3. What is the observable universe? _____.
4. Which star is closest to earth? _____.
5. What is 93 billion light years across? _____.
6. Stars that produce less energy glow what color? _____.
7. The hottest stars glow which color(s)? _____.
8. The sun glows what color? _____.
9. A group of stars that form a pattern are called what?
_____.
10. Name 2 constellations. _____, _____.
11. Draco means _____.

12. How many constellations make up Zodiac? _____.

13. Name 3 constellations that make up Zodiac _____,

14. How long does it take for sunlight to travel to earth? _____.

15. All living things need _____.

16. How many days does it take the Earth to revolve around the sun? _____.

17. What are the four seasons? _____,

_____ , _____,

_____.

18. Stars are mostly made up of what two gases? _____ and

_____.

QUIZ- ANSWERS

1. In which galaxy is the earth located? ___**Milky Way**_____.
2. How do we measure space? ___**Light - Year**_____.
3. What is the observable universe? ___**The parts we can see in any direction**_____.
4. Which star is closest to earth? ___**The Sun**_____.
5. What is 93 billion light years across? ___**The observable universe**_____.
6. Stars that produce less energy glow what color? ___**Red**_____.
7. The hottest stars glow which color(s)? ___**Blue_or Blue-White**_____.
8. The sun glows what color? ___**White or Yellow (both acceptable)**_____.
9. A group of stars that form a pattern are called what? ___**Constellations**_____.
10. Name 2 constellations. ___**Orion**___, ___**Rigel**_. List of all constellations [HERE](#).
11. Draco means ___**the Dragon**_____.
12. How many constellations make up Zodiac? ___**13**_____.

13. Name 3 constellations that make up Zodiac List of all 13 [HERE](#).

14. How long does it take for sunlight to travel to earth? about 8 minutes.

15. All living things need Energy.

16. How many days does it take the Earth to revolve around the sun? about 365 days.

17. What are the four seasons? Winter, Summer, Fall or Autumn,

Spring.

18. Stars are mostly made up of what two gases? hydrogen and helium.

BIBLIOGRAPHY

NASA. http://nssdc.gsfc.nasa.gov/planetary/factsheet/planet_table_ratio.html. December 2016.
09 December 2016.