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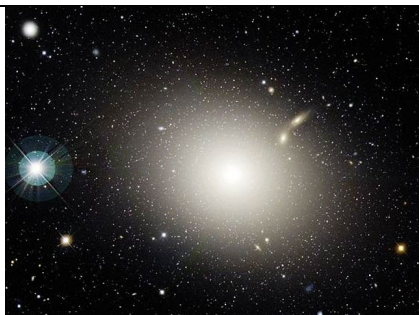
Earth Science 10 Learning Guide

INSTRUCTIONS

Complete the following notes and questions as you work through the related lessons. You are required to have this package completed **BEFORE** you write your unit test. Do your best and ask questions about anything that you don't understand **BEFORE** you write the unit test.

4.1 – Dissecting the Universe

1. The Universe is made up of _____ , _____ and a whole lot of _____
2. A _____ contains stars, _____ and _____ all held together by gravity.
3. Galaxies can be classified, or sorted, by their _____.
4. Identify the following three types of Galaxy shapes:

	Include full name of pattern used to identify this shape and describe the typical characteristics of this cluster.
	

4.2 – Formation of the Universe

1. Watch the video '**The Beginning of Everything**' and answer the following questions;
 - The **Big Bang Theory** explains the formation of the _____.
 - The theory supports the notion that the universe was suddenly _____ and is not _____.
 - How did Einstein and Hubble's work contribute to the **Big Bang Theory**?
 - What discovery in 1964 was key to supporting the **Big Bang Theory**?

- Name the technological tool that has played a role cosmology and support for the **Big Bang**.
- Why is the '**Big Bang**' not an accurate description for the formation of the universe?
- What happens to the temperature of matter as distance is increases? Explain why.
- According to the **Big Bang Theory**, what did protons and neutrons form from?
- Why would protons and neutrons hold together in the first second following the **Big Bang**?
- What was the first atom formed? How big was the Universe? How hot was it?
- Why would the addition of electrons to the hadrons (protons and neutrons) allow for a 'stable and electrically neutral' environment?
- Describe how stars and galaxies formed? How long did this take?
- Which of Einstein's two theories are scientists working on to 'unify' and possibly explain the moment of the **Big Bang**?

2. Explain the **Doppler Effect** in your own words. Can you think of examples, other than a siren, where the Doppler Effect can be witnessed?

3. Explain the **Red Shift** and how this evidence to support the **Big Bang**?

4. Since 1965, Cosmologists now study _____; the 'afterglow' of the **Big Bang**.

5. Use the Large and Small Magellanic Cloud Galaxies to explain the **Blue Shift**. What force is moving these galaxies, in fact, all galaxies in the Universe?

6. Astronomers have 'settled' on the name **Big Bang Theory** and television shows have been popularized using the name! With what you have learned in this unit, can you think of another name to describe the formation of the Universe?



4.3 Stars, Stars, Stars

1. Outline the life cycle of a star-include the order. Explain each stage

Stage 1

Stage 2

Stage 3

Stage 4

Stage 5

Stage 6

2. The brightness of a star is called its _____ Stars can be classified by their _____ magnitude (how bright they appear), or their _____ magnitude (how bright they really are)
3. Everything about a star-Size, color, what happens to it over its life, is fixed by its _____
4. The most massive stars are _____. They are 40 times more massive than the _____
5. Stars of lower mass are _____ and _____ and their surface temp is _____.
6. An orange star, blue star , yellow star-put these in order from coolest to hottest _____, _____, _____

4.4 Formation of the Solar System

1. Describe the formation of the solar system according to the Nebular Theory

4.5 The Sun's Energy

1. Create a diagram of the sun. On your diagram you must label and explain each of the following:

Core

Photosphere

Chromosphere

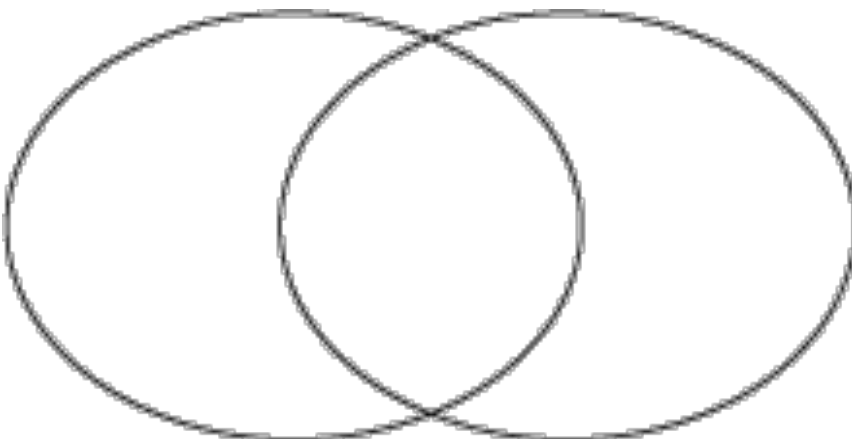
Corona

Solar flares

-Solar Prominences

4.6 – Astronomical Data & Collection Methods

1. Our understanding of the universe is based on studying the _____ of objects in space and their _____ from each other.
2. Describe how an '**optical telescope**' works.
3. Why is the '**Hubble Space Telescope**' considered the most significant advancement in Astronomy since Galileo's first optical telescope?
4. Make a Venn Diagram to compare space satellites and space probes



5. Describe the features of a **'spaceplane'** and why they are such an important technological tool for the study of Space.

6. How many years and how many *kilometres* did the **'Cassini Spacecraft'** travel to reach Saturn following its launch in 1997?

7. What has NASA planned for Cassini's *'Grand Finale'*?

8. How many months and how many kilometres did the **'Curiosity Rover'** travel to reach Mars?

9. List the 3 goals of the Curiosity Rover mission to Mars.
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10. List 3 ways the **'Parker Solar Probe'** mission is considered extreme?
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5. Click on the '**Virtual Museum of Canada**' link to learn more about the myths of First Peoples from various cultures to understand and explain the formation of the Universe.

4.4 – Space Exploration & Travel

1. The issues surrounding space exploration and travel fall into 3 categories; Ethical, Political and Environmental. Indicate where you stand on space exploration and travel by answering the following questions:
 - Do humans have the right to alter and colonize unique environments on another planet? Explain your answer.
 - Do humans have the right to remove resources from other planets? Explain your answer.
 - Should money be used for space travel when there are so many serious problems on Earth to be addressed? Explain your answer.

- Who should be responsible for assessing and regulating the environmental impact of space exploration and travel on Earth's natural systems and the environment of other planets? Why?
- Who should have ownership over space resources? Explain your answer
- Who should be responsible for deciding how space resources should be used? Explain your answer.
- Should space technology and resources be shared amongst countries? Explain your answer