

Is There Anybody Out There?

This is perhaps the biggest question we are attempting to answer. Along the way, you'll learn about astronomical bodies (planets, moons, stars, galaxies, etc.), how we explore these bodies, how the Universe may have been born, and whether life exists outside of our planet.



As a class will be creating a web resource to help answer the question, "Is there anybody out there?" as our project for this unit. The second page of this handout details the project requirements

The Big Picture

1. How did the Universe begin?
2. How do planets and stars form?
2. What are the life cycles of stars?
3. What does life (as we know it) need to begin on another planet, and does life exists outside of our planet?

Vocabulary Terms on quizzes along with key ideas:

Astronomical unit

Light year

Constellation

Visible universe

Big bang theory

Galaxy

Doppler effect

Blue shift

Red shift

Cosmic microwave background

Electromagnetic spectrum

Emission spectrum

Magnitude

Luminosity

Emission spectrum

HR diagram

Nebula

Protostar

pulsar

Quasar

Giant

Red Giant

Dwarf

Supergiant

Nova - supernova

Sunspots

Solar wind

Solar flare

Nuclear fusion

Equipped with his five senses, man explores the universe around him and calls the adventure science.

— Edwin P. Hubble 1948

Is There Anybody Out There? – Project Details

The goal of this project is to collectively make a computer based encyclopedia in the form of a wiki. This on-line book will be comprised of all of the research that you do over the next few weeks.

You may work with a partner or individually on this project. You and your partner will choose a topic from the list below, research that topic, fully address the criteria required on your topic, and create a chapter about your topic on our class wiki. Each group will have their own wiki page that is linked to the main page (table of contents). All of the topics together will create a great on-line astronomical resource – the Virtual Astronomicon.

General Requirements:

Each chapter has specific requirements that are related to the specific area you choose to study, however **all** chapters must include the following:

- Introduction outlining scope of your chapter
- Main text must be accompanied with pictures
- Main text must include all of the required sections (criteria)
- Conclusion
- Bibliography – please no wikipedia!

Project Topics and Specific Requirements:

1. Black Holes, Neutron Stars, and Pulsars

Specific Topic Requirements:

- | | |
|--|---|
| <input type="checkbox"/> description/characteristics | <input type="checkbox"/> formation of |
| <input type="checkbox"/> proof of existence | <input type="checkbox"/> location |
| <input type="checkbox"/> event horizon | <input type="checkbox"/> escape velocity |
| <input type="checkbox"/> singularity | <input type="checkbox"/> diagrams and NASA photos |

2. Meteorites, Asteroids, and Comets

Specific Topic Requirements:

- | | |
|--|---|
| <input type="checkbox"/> description/characteristics | <input type="checkbox"/> formation of |
| <input type="checkbox"/> composition | <input type="checkbox"/> orbits |
| <input type="checkbox"/> famous examples | <input type="checkbox"/> belt/non-belt asteroids |
| <input type="checkbox"/> impact craters | <input type="checkbox"/> diagrams and NASA photos |

3. Lunar Phases, Tides and Eclipses

Specific Topic Requirements:

- | | |
|--|---|
| <input type="checkbox"/> cause of tides | <input type="checkbox"/> cause of eclipses |
| <input type="checkbox"/> types of eclipses | <input type="checkbox"/> revolution |
| <input type="checkbox"/> rotation | <input type="checkbox"/> mythology |
| <input type="checkbox"/> dark side | <input type="checkbox"/> diagrams and NASA photos |

4. Life on Other Worlds, SETI project, Extra-solar planets

Specific Topic Requirements:

- conditions for life
- chemical evolution
- Miller and Urey experiment
- techniques to find extra solar planets and life
- how does SETI work?,
- Earth's first life forms
- evidence of life

5. Mars, Current Missions, Possibility of Life

Specific Topic Requirements:

- formation of
- physical characteristics (water, atmosphere, geology)
- history of explorations
- mythology
- rotation/revolution
- current explorations and goals
- diagrams and NASA photos

6. Mercury, Venus and our Moon

Specific Topic Requirements:

- formation of each
- revolution/rotation
- current explorations and goals
- diagrams and NASA photos
- physical characteristics
- history of explorations
- mythology

7. Jupiter, Europa, Io, Callisto, Ganymede

Specific Topic Requirements:

- formation of each
- revolution/rotation
- comet impact on Jupiter
- possibility of life
- physical characteristics
- history of explorations
- current explorations and goals
- diagrams and NASA photos

8. Saturn, Titan, Rings and Smaller moons

Specific Topic Requirements:

- formation of each
- revolution/rotation
- history of explorations
- possibility of life
- physical characteristics
- comet impact on Saturn
- current explorations and goals
- diagrams and NASA photos

9. Uranus, Neptune, and Pluto

Specific Topic Requirements:

- formation of each
- revolution/rotation
- possibilities of life
- current explorations and goals
- physical characteristics
- their moons and rings
- history of explorations
- diagrams and NASA photos

10. The Sun

- evolution of the sun (beginning to end)
- structure of sun
- sunspot cycle
- solar winds
- nuclear fusion in the sun
- solar flares
- disruption of communications

12. ExoPlanets

Specific Topic Requirements:

- how are extra solar planets discovered? (This requires the most research)
- how many of them are there
- current missions and equipment used
- properties of giant planets orbiting other stars?
- How common are terrestrial planets?
- characteristics of exoplanets
- which of them might be habitable?

11. Other-(by teacher assignment only): COBE, Hubble, , WMAP, LISA, famous astronomers and their contributions, your specific interest by teacher approval.

Specific topic requirements will be assigned by the teacher

Extra Credit:

Make Podcast or video that describes one of the sections of the assigned criteria for your topic. We will put this in the wiki.

Helpful websites:

- <http://www.windows.ucar.edu>
- <http://www.nasa.gov/worldbook/index.html>
- <http://www.nasa.gov/topics/universe/index.html>
- <http://www.cfa.harvard.edu/>
- <http://astrophysics.gsfc.nasa.gov/>
- <http://map.gsfc.nasa.gov/universe/>
- http://imagine.gsfc.nasa.gov/docs/dict_ad.html
- <http://sci.esa.int/>