

Space Exploration

Topic 1

Vocabulary

Frame of reference –

Celestial bodies –

Constellations -

Planets –

Azimuth -

Altitude -

Astrolabe –

Compass -

Geocentric -

Heliocentric -

Epicycles -

Reading Questions

1. Give two different frames of reference of a bug flying in a car travelling at 100 km/h.
2. What function did myths play in the lives of early people? Give one example.

3. What constellation/star did early navigators use to guide them
 - a) in the northern hemisphere?
 - b) In the southern hemisphere?
4. List the four discoveries made by ancient peoples watching the skies.
5. What two coordinates are necessary to give the location of a celestial body? How is each of these coordinates measured?
6. Why is it important to use the stars as a frame of reference in order to predict the movement of the planets?
7. Who first theorized the geocentric model of the universe? What did he base his theory upon?
8. What was the celestial sphere and how did it fit into the geocentric universe?
9. What was the biggest question that geocentric universe could not answer? How did Ptolemy modify the geocentric model to account for this problem (epicycles)?
10. What is retrograde motion?
11. Who first suggested a heliocentric model of the universe? What were the major problems that people had accepting this model?

Topic 2

Vocabulary

Telescope –

Objective lens –

Ocular lens -

Resolving power –

Refracting telescope -

Reflecting telescope -

Ellipse –

Universal gravitation –

Reading Questions

1.
 - a. Who invented the telescope and in what year?
 - b. What was the original purpose of the telescope?
2. List five observations and conclusions Galileo reached by turning the telescope to the heavens.
3.
 - a. What does the resolving power of the telescope depend on?
 - b. How do you make a telescope with the highest resolving power possible?
4. How does a refracting telescope differ from a reflecting one?
5. How did Kepler change Copernicus' heliocentric universe?

6. How did Newton explain the elliptical pattern of the planet's orbital?
7. How do astronomers locate celestial bodies?
8. What is a solar eclipse and how does it occur?
9. How does the orbit of a comet differ from the orbit of a planet?

Topic 3 **Vocabulary**

Spectroscopy -

Spectral Lines -

Diffraction Grating -

Doppler Effect -

Red Shift -

Reading Questions

1. What are the three types of spectrums and how are they found?
2. How is a pattern of Spectral lines like a fingerprint?
3. How does a spectrum help to infer about the composition of stars?

4. Why is calling a Pokemon card holographic an incorrect term?
5. What is the Doppler Effect? How have scientists used this phenomenon to explain the movement of stars?

Topic 4

Vocabulary

Triangulation -

Parallax(pg 389) -

Astronomical Unit (**AU**) -

Light Year -

Reading Questions

1. What did Sir William Herschel discover with his telescope and when?
2. How have computers affected the study of space?
3. Why do stars twinkle?
4. How do modern telescopes fix the atmosphere distortion?
5. What two methods are used by scientists to find the distances to stars?
6. Explain how triangulation works.

7. What is Parallax? What do scientists use as the base line when looking at stars?
8. Which star is closest to the Earth? (Not the sun) **How far away is this star?**

Topic 5

Vocabulary

Radio Astronomy -

Radio Objects-

Interferometry -

VLBI (very long baseline interferometry) -

Questions

1. List seven types of electromagnetic radiation.
2. What is radio astronomy and how was it discovered?
3. What did Karl Jansky discover in 1932?
4. How did Grote Reber add to Jansky's discoveries during the 1930's?
5. What is one disadvantage and one advantage of using radio waves to produce images of the skies?

6. Radio waves cannot be seen. How do astronomers produce radio images both in the past and today?

7. What is an active galaxy?

8. How do astronomers improve radio images?

9. What is very long base-line interferometry? How do astronomers use this technique to get even better images of space?

Topic 6

Vocabulary

Rocket –

Payload -

Staged Rocket -

Ballistic Missile -

Gravitational Assist -

Charged Coupled Devices (CCD'S) -

Artificial Satellite -

Low Earth Orbit -

Geosynchronous Orbit -

Remote Sensing -

Global Positioning System (GPS) -

Reading Questions

1. What is the action/reaction principle? How is this principle used in rocket science?
2. What advantage is there to a staged rocket?
3. What advantage are there to liquid fuels over solid fuels?
4. When was the first ballistic missile launched?
5. What was Werner von Braun accomplishment?
6. What job do computers do for rockets today?
7. How do scientists keep rockets moving through space?
8. List four uses for artificial satellites.
9. How do we use Low Earth satellites and geosynchronous orbit satellites?
10. At what speed do satellite signals travel?
11. List four uses for remote sensing.

12. How can your location be discovered by using GPS?

Topic 7

Vocabulary

Solar Wind -

Inner planets -

Outer planets -

Questions:

1. What is the cause of Sunspots?
2. What is a solar flare?
3. a) What is a solar wind?
b) How does the solar wind determine the extent of our solar system?
c) How is the Earth protected from the solar wind?
4. What process on the sun supplies the solar system with its energy?
5. What is the “dark side of the moon”?
6. List three pieces of information for each of the nine planets in our solar system.

Mercury

Venus

Earth

Mars

Jupiter

Saturn

Neptune

Uranus

Pluto

Topic 8

Vocabulary

Sub orbital _____

Microgravity _____

Questions:

1. What speed must an object reach in order to leave the Earth's gravitational field? ____

2. When was the first unmanned satellite launched? What was it called? _____

3. When did the first man orbit the Earth? How long was he in space for? _____

4. What was the goal of Project Mercury? Who was the first American astronaut to make a full orbit? What year was this accomplished? _____

5. What was the Gemini project? _____

6. When did man first arrive on the moon? Who was the first man to set foot on the moon? _____

7. What was the first Russian/American collaboration in space? _____

8. How did the Russians and the Americans approach the problem of oxygen supply in their spacecrafts? _____

9. What was the advantage of the space shuttle over a rocket? _____

10. What was the name of the first space shuttle? When was its first mission? _____

11. What is the Canadarm? _____

12. Who was the first Canadian in space? When did he fly his first mission? _____

13. What is the “International Space Station”? Who is working on this project? _____

14. Why does weightlessness occur in space? _____

15. What is the purpose of the International Space Station? _____
