1. Optical telescopes are designed to do what?
   
   **Gather and focus visible light to see distant objects more clearly**

2. Visible light can be separated into various colors to form a(n) _____________.
   
   **Spectrum**

3. The full range of frequencies of electromagnetic radiation is called ___________.
   
   **The electromagnetic spectrum**

4. Electromagnetic waves vary from each other in which way?
   
   **Wavelength and frequency**

5. Which type of wave that has the highest frequency?
   
   **Gamma Rays**

6. Name the type of wave that has the greatest energy.
   
   **Gamma Rays**

7. The waves with the longest wavelengths in the electromagnetic spectrum are ___?
   
   **Radio Waves**

8. What led to the discovery of more planets in our solar system than the ancient observers knew about?
   
   **The invention of the telescope in 1600**

9. Name the types of electromagnetic radiation in order that make up the electromagnetic spectrum.
   
   **Radio Waves, Microwaves, Infrared, Visible Light, Ultraviolet, X-rays, and Gamma Rays**

10. What type of telescope uses mirrors and lens to observer a planet?
    
    **Reflecting Telescope**
11. The Earth’s atmosphere blocks and distorts much of the light coming from the stars. Which of the following telescopes avoids these problems by being above the atmosphere?

The Hubble space telescope

12. What type of optical telescope uses two lenses to gather and focus visible light?

A Refracting Telescope

13. What type of mirror reflects light in?

Concave Mirror

14. What type of lens bends light in?

Convex lens

15. What type of mirror bends light out?

Convex Mirror

16. What type of lens bends light out?

Concave Lens

17. What type of electromagnetic radiation does a radio telescope use?

Radio Waves

18. What tool do astronomers use to break down light into a spectrum from a star?

Spectroscope

19. Astronomers use spectral analysis to determine what of a star? (Hint: Humans)

It’s unique Fingerprint = elements that make up the star (chemical composition)

20. A large artificial satellite on which people can live and perform scientific investigations is called what?

Space Station (International Space Station)

21. What is the main use for satellites?

Observing Earth’s weather
22. Exploration of space beyond the moon has been done by ________________?

   **Space probes and satellites with no human crew**

23. A space shuttle can be used ____________ times to carry astronauts into orbit.

   **Many**

This Space Shuttle can be used multiple times

24. Give an advantage of space probes exploring space?

   **Human life is not placed at risk**
   **They can withstand extreme cold or hot temperatures**
   **Can’t get sick or die**
   **Can travel farther distances**

25. This space exploration vehicle would be helpful to researchers to land on mars and drive around to collect rock samples and data.

   **Rover**

26. These space exploration vehicles orbits the Earth receiving radio, television, and telephone signals and then transmits them around the world.

   **Satellites**

27. What type of space probe is Pioneer 10?

   **Fly by**

28. What is an advantage of human exploration of space?

   **They can think and solve unexpected problems**
   **Study microgravity**
   **Naturally curious**
Review for History of Rockets

Study Guide

29. The first person to orbit the earth?
   a) Neil Armstrong
   b) William Hale
   c) Robert Goddard
   d) Yuri Gagarin

30. Which did the United States not create?
   a) Mercury Project
   b) Space Shuttle
   c) Skylab
   d) Sputnik

31. What did the Chinese first produce?
   a) fire arrows
   b) step rockets
   c) spin stabilization
   d) V-2 rockets

32. What did Sputnik 2 accomplish for the space race?

   Sending the first animal into space

33. What contribution did Isaac Newton make to rocket technology?
   a) 1st multistage rocket
   b) V-2 Rocket
   c) 3 Laws that explain the motion of rockets
   d) Fire Arrows

34. What was the name of the first space craft and the man to land on the moon?
   a) Explorer 1 and John Glenn
   b) Explorer 1 and Yuri Gagarin
   c) Apollo 11 and Neil Armstrong
   d) Apollo 11 and Alan Shepherd

35. Who was the first American to orbit the earth?
   John Glenn
36. What US civilian agency is in charge of space exploration?

   NASA: National Aeronautics and Space Administration

37. What country developed the V-2 rocket?
   a) United States
   b) China
   c) Britain
   d) Germany

38. What was the year that the USA walked on the moon? 1969

39. What contribution did all of the countries build together? ISS (International Space Station)

40. What did Sputnik 1 accomplish for Russia? 1st artificial Satellite

41. In the War of 1812 these English men contributed what to missile rockets?
   William Hale- spin stabilization
   William Congreve- Congreve Rockets (inspired rockets’ red glare)

42. Johann Schmidlap created the step rocket and this allowed rockets to achieve higher altitudes because the weight was less causing it to be more fuel efficient.

43. Robert Goddard built and flew the 1st liquid propellant rocket.

44. What are the 3 types of rockets that power modern space craft?
   a. Solid Fuel
   b. Liquid Fuel
   c. Ion (electrically charged particles in a gas)

SHORT ANSWERS

45. What was the fight for power in the area of science called? Who Won? Why?
   Space race the USA because they landed on the moon first over Russia

46. Name 1 war that was going on during the space race.
   Cold War, War II, Vietnam
Possible Essay Questions….

47. Which type of electromagnetic wave has the longest wavelength and lowest frequency?

48. Which electromagnetic waves have wavelengths longer than those of visible light? Give an example of how each kind of wave is used.

49. What are the differences between reflecting telescopes and refracting telescopes?

50. Explain how a spectroscope is used to provide information about a star.

51. What is a space station? Name some uses of space stations.

52. What is a space shuttle? How are they being used in space exploration?

53. Why do astronomers use other types of electromagnetic radiation in their studies other than visible light?

54. What are the two tools that can see through the Earth’s atmosphere in any type of weather?

55. Pick five types of space vehicles you would send to space if you discovered a new planet. Explain the order they would be sent.

56. Describe how satellites help humans in everyday lives.