Name: _____ Date: _____ Block: _____

NASA's *Tour of the Electromagnetic Spectrum* Video Guide

Use the following website to answer the questions below:
https://www.youtube.com/watch?v=HPcAWNlVl-8&t=597s.

Introduction

0:00-1:05

1. What are the waves in order from smallest to biggest?

1:05-2:18

1. Electromagnetic waves, or EM waves, are similar to ocean waves in that both transmit _____. EM waves are produced by the vibration of _____ _____ and have electrical and magnetic properties.
2. Unlike ocean waves that require water, EM waves travel through _____ at the constant speed of light.
3. What 2 wave characteristics do they have?
4. Which wave has the lowest frequency? How much energy does it have?
5. Which wave has the highest frequency? How much energy does it have?

2:19-5:04

6. What part of the electromagnetic spectrum can our eyes see?
7. Why do things appear to have color?
8. Why does the leaf look green?
9. To learn more about the world around us, scientists and engineers have devised ways to enable us to see beyond that sliver of the electromagnetic spectrum called visible light. Data from multiple wavelengths help scientists do what?
10. Everything around us emits, reflects, and absorbs EM radiation different based on its _____.

Radio Waves

5:05-8:43

11. Radio waves are the _____ and contain the _____ amount of energy. Radio waves vary from the size of a _____ to waves longer than the diameter of our _____.
12. What radiates radio waves in space?
13. Astronomical objects that have a _____ _____ usually produce radio waves, such as our Sun, thus NASA's stereo satellite is able to monitor bursts of radio waves from the Sun's corona.
14. What are the two ways we use radio waves on Earth?
    a.
    b.
15. Can you hear the radio waves? Yes / No How do radio waves turn into sound waves?

Microwaves Waves

8:45-11:44

16. What are the four ways that microwaves can be used?
    a.
    b.
    c.
    d.
17. What is the range in size of microwaves?
18. Microwaves are used in Doppler Radar, which is utilized for short-term localized _____ _____. By providing a global view of weather patterns and surface temperatures, microwaves have helped to increase the accuracy of tropical storm and climate forecast.
19. How have microwaves helped gain information on the arctic ice amounts?
20. Microwaves are the _____ of our communication systems on Earth.

Infrared Waves

11:45-17:07

21. What household item uses infrared waves?
22. What size range are infrared waves?

23. How do humans use infrared waves for hunting or military?

24. What keeps our planet warm inside the atmosphere?

25. _____ gases, such as water vapor and carbon dioxide, help keep our planet warm by trapping infrared radiation from the _____.

Visible Light Waves

17:08-21:55

26. All electromagnetic radiation is *light*, but _____ _____ is the only part of the spectrum that we can see. Our eyes rely on this narrow band of EM radiation to gather information about the world.

27. Though the Sun's visible light appears _____, it is really the combined light of the individual _____ _____.

28. What size range is visible light? What color has the shortest wavelength? What color has the longest wavelength?

29. Why does the Earth's sky look blue?

30. Why does the sunset look red/orange/yellow?

31. As things get hotter, do the wavelengths get shorter or longer?

32. Why is the Sun yellow? What color would it be if it were cooler? What color would it be if it were hotter?

33. How does a satellite measure the topography of a planet?

34. Using visible light, the _____ _____ _____ has created countless images that spark imagination, inflame curiosity, and increase our understanding of the universe.

Ultraviolet Waves

22:00-25:34

35. Why do bug catchers work so well?

36. What size range is ultraviolet light?

37. What causes sunburn?

38. What are the most harmful ultraviolet rays? How are we protected by them?

39. Why is it important for scientists to know how much UV light is in our atmosphere?

X-Rays Waves

25:36-28:24

40. What are some uses of x-rays?

41. What size range are x-rays? Are they high or low energy?

42. X-rays can reveal an object's temperature, since temperature determines the wavelength. The hotter the object, the _____ the wavelength.

43. What things do x-rays give information about?

Gamma Waves

28:25-32:06

44. Do gamma rays meet the surface of the Earth?

45. What three ways are gamma rays created on Earth?
    a.
    b.
    c.

46. Gamma rays carry enough energy to _____ living cells and doctors use it in _____ treatment.

47. What size range are gamma rays?

48. Gamma rays have the _____ energy.