**Name\_\_\_Key\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_\_\_\_\_\_**

Information from the presentation**: Of Light and Lasers**

**Short Essay Questions**

**Video: The Original Double Slit Experiment- What is Light and How does it Travel as a Particle or a Wave?**

|  |  |  |
| --- | --- | --- |
| **Before the Video** | **After the Video** | **Analyze Thoughts** |
| 1. *What is Light?* (slide 3) | 2. After watching the video, answer the question again: *What is Light?* (slide 4) | 3. *Did the video change your thoughts on “What is Light”? If so how?* (slide 4) |
| **Answers will vary** | **Light is part of the electromagnetic spectrum, which ranges from radio waves to gamma rays.**    **Light is composed of photons that move in waves**  **The human eye can see the visible spectrum and colors seen are from the wavelengths reflected off matter and to your eye.** | **Answers will vary** |
| 4. *How do You Think Light Travels? (a wave, a particle or how?)* (slide 3) | 5. After watching the video, answer the question again: How do you think light travels? (slide 4) | 6. *Did the video “How you think light travels”? If so how?* (slide 4) |
| **Answers will vary** | **Light is composed of particles (photons) that travel in waves.**  **Light travels as a wave with components of: crests, trough, amplitude, and wavelength.**    **Interacting Light waves can undergo destructive and constructive interference.** | **Answers will vary** |

**Fill in the blanks on the following:**

7. Visible light is part of the \_\_\_electromagnetic spectrum\_\_\_\_. (slide 5)

8. Light is composed of \_photons\_\_that move in \_\_waves\_\_\_\_. (slide 5)

9. Colors that are seen are \_\_\_\_reflected\_\_\_\_\_\_\_ to the eye. (slide 5)

10. Light and electromagnetic waves do not require a \_medium\_\_to travel. (slide 5)

11. The speed of light and electromagnetic waves is approximately \_\_\_\_3.0 X 108 m/sec\_\_\_\_\_. (slide 6)

12. The formula to calculate the speed of light & electromagnetic waves is speed=frequency times wavelength. (slide 6)

13. Visible light has a range of wavelengths between \_\_\_400 nm\_\_\_ and \_\_\_700 nm\_\_\_\_\_. (slide 7)

**Short Essay Questions**

**Video:** How a Laser Works

|  |  |  |
| --- | --- | --- |
| **Before the Video** | **After the Video** | **Analyze Thoughts** |
| 14. How does a laser work? Write your answer based on what you know or think. (slide 9) | 15. After watching the video, answer the question again: How do you think a laser works? (slides 10-11) | 16. Did the video change the way you think about light? If so how? (slides 10-11) |
| **Answers will vary** | **Photons from an external source excite the electrons of atoms in the laser rod.**  **excited electrons move from a lower-energy orbit to a higher-energy orbit**  **when electrons return to their normal or “ground” state, the electrons emit photons**  **Coherent focused photons leave the rod through a slit in the mirror** | **Answers will vary** |

Fill in the blanks on the following:

14. \_\_\_Electrons\_\_\_ give off \_\_photons\_\_\_\_ as they drop from an excited state to a lower state. (slide 12)

15. \_Theodore H. Maiman \_\_invented the first working laser in \_\_\_1960\_\_\_\_\_\_\_. (slide 12)

16. Light from a laser is \_a single\_\_ color, meaning \_the same\_ wavelength. (slide 12)

17. Light from a laser is both \_\_coherent\_\_and \_\_focused\_\_\_\_\_. (slide 12)

18. Originally LASER was an acronym for: L\_\_\_\_Light\_\_\_\_­­­­\_\_\_ (slide 12)

A\_\_\_\_Amplification

S\_\_\_\_Stimulated \_\_

E\_\_\_\_ Emission \_\_\_

R\_\_\_\_ Radiation\_\_

19. Label the parts of the laser below (slide 13)

|  |  |
| --- | --- |
|  | Word Bank:  Silvered Mirror  Flash Tube  Ruby Rod  Photons  Cooling Tube  Partially Silvered Mirror  Laser Beam |

**Short Essay Questions**

**Video:** How a Laser Works

|  |  |  |
| --- | --- | --- |
| **Before the Video** | **After the Video** | **Analyze Thoughts** |
| 20. What are some uses of Lasers in Industry? (slide 14) | 21. After watching the video, answer the question again: What are some uses of Lasers in Industry? (slide 15-16) | 22. Did the video change what you think about some of the uses of lasers in industry? If so how? (slide 15-16) |
| **Answers will vary** | **This video point out the use of laser in barcode scanners, DVD players, medicine, laser light shows, and micro manufacturing.**  **There are other applications students can research and add to the list including**  **Laser stereo lithography,**  **Laser targeting**  **Laser punching and manufacturing**  **Laser communications** | **Answers will vary** |