The Electromagnetic Spectrum

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| Radio Waves |  |
| * Longest \_\_\_\_\_\_\_\_\_\_\_, lowest \_\_\_\_\_\_\_\_\_\_\_\_\_ * Wavelength range:\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_ * Usually described by their \_\_\_\_\_\_\_\_\_\_\_\_ * Different types of radio waves (from high f to low f are: \_\_\_\_\_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_, \_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_ * AM stands for \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and is given in \_\_\_\_\_\_\_ * FM stands for \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and is given in \_\_\_\_\_\_\_ * 1st Radio waves were transmitted/detected by \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ * The first “wireless” radio device was invented by:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by Earth’s atmosphere   Cosmic Connection:   * SETI:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Closely related to \_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ events | Guglielmo Marconi  (1874-1937)  http://en.wikipedia.org/wiki/Guglielmo\_Marconi |
| Microwaves |  |
| * Name means:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Wavelength range:\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_ * Non-ionizing; when absorbed they cause \_\_\_\_\_\_\_\_,   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.   * First developed during \_\_\_\_\_\_\_ and used for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. * Causes:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   Calculating the Speed of Light =  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  c = \_\_\_\_\_\_\_\_\_\_\_\_\_\_  % error =  Cosmic Connection:  \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_ detected the \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ (CMBR). Left over radiation from the \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_. Uniform to 1 part in 1 \_\_\_\_\_\_\_\_\_\_\_\_. (Nobel Prize in 1978) | Telescope used by Penzias and Wilson at Bell Labs    <http://www.pbs.org/wgbh/aso/databank/entries/dp65co.html> |

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| Infrared Rays |  |
| * Name means:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * a.k.a. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Wavelength range:   Near:\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Mid:\_\_\_\_\_\_\_\_\_\_\_\_\_  Far:\_\_\_\_\_\_\_\_\_\_\_\_\_   * Uses: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   * Discovered in 1800 by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ using a prism and a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Non-ionizing; when absorbed they cause atoms to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   Cosmic Connection:  Great indicator of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Google Image Search |
| Visible Light |  |
| * Small band of frequencies that the \_\_\_\_\_\_\_\_\_\_ of the eye responds to.   --Color receptors:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  --Black/white receptors:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   * Longest wave, lowest frequency: \_\_\_\_\_\_\_\_\_\_\_\_\_ * Shortest wave, highest frequency: \_\_\_\_\_\_\_\_\_\_\_\_\_ * First separated into the visible spectrum by: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   Cosmic Connection:  -Identifying atomic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  -Lightcurves of extrasolar \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Biographyonline.net |

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| Ultraviolet Rays | |
| * Wavelength range:\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_ * Discovered in \_\_\_\_\_\_\_\_\_\_\_\_\_\_ by \_\_\_\_\_\_\_\_\_\_\_\_\_\_   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_--Tried to find “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_” past the violet end of the spectrum after hearing about Herschel’s heat rays. White Silver Chloride turned dark when exposed to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Named the new wavelength “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”   * 3 Kinds: UVA:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   UVB:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  UVC:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   * UVB and C destroy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * UVB produces vitamin \_\_\_\_\_\_\_ in skin up to \_\_\_\_\_\_\_\_\_\_IUs per min. Regulates \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, immunity, and blood pressure. * Uses: http://en.wikipedia.org/wiki/Johann\_Wilhelm\_Ritter | |
| X-Rays |  |
| * Wavelength range:\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_ * Discovered in \_\_\_\_\_\_\_\_\_\_\_\_\_\_ by \_\_\_\_\_\_\_\_\_\_\_\_\_\_   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   * Man-made x-rays are made by a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ tube that generates high \_\_\_\_\_\_\_\_\_\_\_\_\_\_ to accelerate \_\_\_\_\_\_\_\_\_ (cathode). The high velocity \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ collide with a metal target usually \_\_\_\_\_\_\_\_\_\_\_\_\_\_, (\_\_\_\_\_\_\_\_\_\_\_) . * Uses:   Hard: Soft: | <http://nobelprize.org/nobel_prizes/physics/laureates/1901/rontgen-bio.html> |

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| Gamma Rays |  |
| • Wavelength:\_\_\_\_\_\_\_\_\_\_\_\_  • Discovered in \_\_\_\_\_\_\_\_\_\_\_\_\_\_ by \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  • Produced by :  Gamma-ray astronomy: Started in late 1960/early 1970 with the \_\_\_\_\_\_\_\_\_\_ satellite. Was used to detect \_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, but instead found \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Ground-based gamma-ray detection: |  |
| Cosmic Rays | |
| \*Not technically light, but travel at or close to c.  • Discovered in \_\_\_\_\_\_\_\_\_\_\_\_\_\_ by \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  • Energetic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  originating from \_\_\_\_\_\_\_\_\_\_\_\_\_\_  • May be:    http://en.wikipedia.org/wiki/Victor\_Francis\_Hess | |