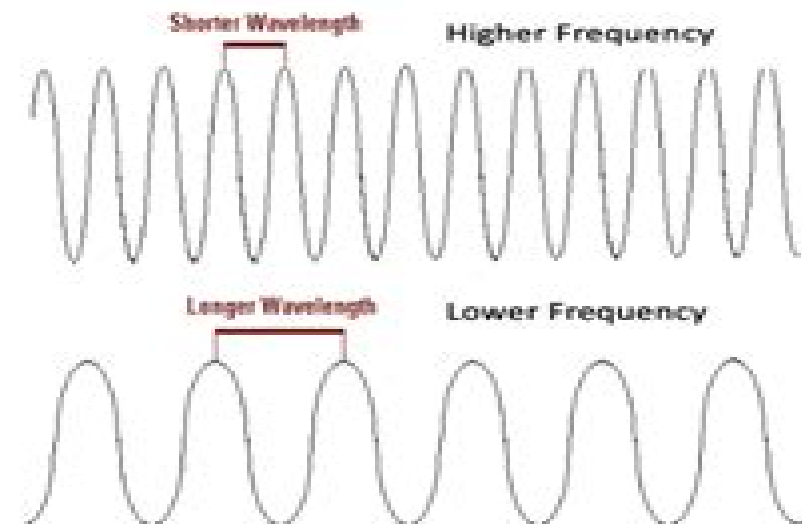
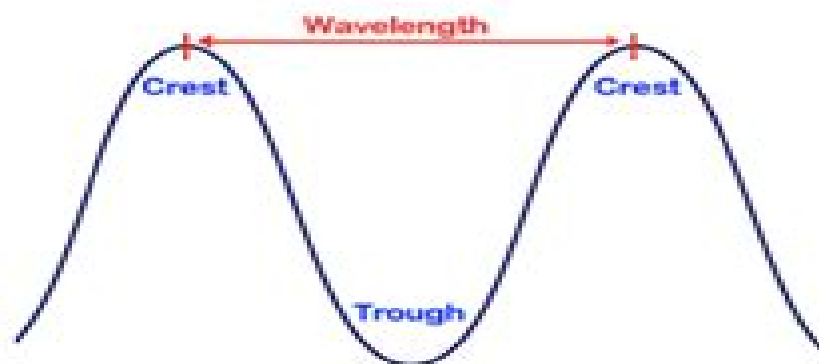


## The Electromagnetic Spectrum POGIL Activity



**Wavelength ( $\lambda$ )** - Units: m, cm, nm

**Frequency ( $\nu$ )** - the # of waves that pass a given point in one second.

Units: Hz,  $\text{sec}^{-1}$ , waves/sec, 1/sec

The relationship between frequency ( $f$ ) and wavelength ( $\lambda$ ) of a wave is described by the equation

$$\text{Waves speed} = \text{frequency} \times \text{wavelength} \quad \text{OR} \quad c = \nu \lambda$$

All electromagnetic radiation propagates at a speed of  $c = 3.00 \times 10^8$  m/sec (approximately 186,000 miles per second) this is called the speed of light!

When solving problems using  $c$  (the speed of light)  $\nu$  MUST be in Hz or  $\text{sec}^{-1}$  and  $\lambda$  MUST be in meters.

### Problems

1. What is the wavelength of radiation with a frequency of  $6.24 \times 10^{13} \text{ sec}^{-1}$ ?
2. What is the frequency of radiation with a wavelength of  $2.20 \times 10^{-6}$  nm? (1 nm =  $10^{-9}$ m or  $10^9\text{nm}=1\text{m}$ )
3. A television relay transmitter operates at a frequency of 927.9 MHz. Calculate the wavelength of the signal in nanometers. Is this visible light? (1 MHz = 1,000,000 Hz)

# Electromagnetic Spectrum Pogil

**Arturo Cuomo**



## **Electromagnetic Spectrum Pogil:**

Analytical Chemistry Juliette Lantz, Renée Cole, The POGIL Project, 2014-12-31 An essential guide to inquiry approach instrumental analysis Analytical Chemistry offers an essential guide to inquiry approach instrumental analysis collection The book focuses on more in depth coverage and information about an inquiry approach This authoritative guide reviews the basic principles and techniques Topics covered include method of standard the microscopic view of electrochemistry calculating cell potentials the BerriLambert atomic and molecular absorption processes vibrational modes mass spectra interpretation and much more Invisible Universe Stephen M. Pompea, Alan Gould, Lincoln Bergman, 2002 The 5 class sessions of 45 60 minutes each deepen student understanding of the electromagnetic spectrum enabling students to detect and consider wavelengths other than visible light Activities feature energy stations including infrared TV remote microwave pager ultraviolet black light and other devices Students come up with their own tests to see what blocks each wavelength and what does not They learn how these other wavelengths can be used to see things we cannot see with our eyes *Tour of the Electromagnetic Spectrum* Ginger Butcher, 2016 *The Electromagnetic Spectrum (Set)* Alison Eldridge, 2022-01-15 Although only a small portion of the electromagnetic spectrum or visible light can be seen by the human eye people depend on the energy from the waves in the electromagnetic spectrum every day Without it the world we know could not exist Whether tuning a radio sending text messages or cooking microwave popcorn people use electromagnetic energy all the time Scientific instruments use the spectrum to help us study Earth and the universe This set provides easy to understand explanations of the different portions of the spectrum from radio waves to gamma rays Readers will learn how we encounter and use them Through accessible texts sidebars and photographs readers will discover how these physical science topics aren't just subjects to study in school but are an integral part of their daily lives Features include Easy to understand explanations of a foundational physical science topic A ton of interesting examples demonstrate how human ingenuity has put scientific knowledge to work Covers electromagnetic radiation which is a core idea in the Next Generation Science Standards at both the middle school and high school levels EM Spectrum Jeremiah Hilderman, 2021-05-04 The book reassesses the Kelvin temperature scale by spectrum for wider application The idea occurred to the author to revise the temperature scale where the Kelvin scale is no longer practical because a true temperature scale must be based upon electromagnetic radiation and the Kelvin scale is not based on the EM Spectrum The Kelvin scale is based on a foggy notion of absolute zero temperature in which there is no motion inside of atoms Kelvin's scale is based on no motion not on the electromagnetic spectrum and thus is flawed So in the pursuit of a true scale I ventured into a review of the Electromagnetic Spectrum and several new ideas came forth the most astounding of these new ideas is the bifurcation of the spectrum into radio waves versus all other waves of EM **Tour of the Electromagnetic Spectrum** Ginger Butcher, Claire L. Parkinson, Edward J. Wollack, 1915-09-30 This publication introduces the electromagnetic energy and the properties of electromagnetic waves

across the spectrum Each wavelength is shown with stunning NASA imagery with explanations of how NASA instruments collect data to help study Earth and space The Electromagnetic Spectrum (Set) Alison Eldridge,2022-01-15 Although only a small portion of the electromagnetic spectrum or visible light can be seen by the human eye people depend on the energy from the waves in the electromagnetic spectrum every day Without it the world we know could not exist Whether tuning a radio sending text messages or cooking microwave popcorn people use electromagnetic energy all the time Scientific instruments use the spectrum to help us study Earth and the universe This set provides easy to understand explanations of the different portions of the spectrum from radio waves to gamma rays Readers will learn how we encounter and use them Through accessible texts sidebars and photographs readers will discover how these physical science topics aren't just subjects to study in school but are an integral part of their daily lives Features include Easy to understand explanations of a foundational physical science topic A ton of interesting examples demonstrate how human ingenuity has put scientific knowledge to work Covers electromagnetic radiation which is a core idea in the Next Generation Science Standards at both the middle school and high school levels Electromagnetic Spectrum ,2010 Feeling Electrified! Electromagnetic Waves and Electromagnetic Spectrum Explained | Grade 6-8 Physical Science Baby Professor,2024-04-15 Explore the electrifying world of electromagnetic waves and spectrums with this guide for Grade 6-8 students A cornerstone of the US STEM curriculum it unveils the fascinating universe of E-M waves from radio waves to gamma rays and explains their pivotal role in our daily lives This book is a call to empower young minds with the knowledge of physics encouraging them to see the unseen and understand the principles shaping our world **The Electromagnetic Spectrum** ,2002 **Optics of the Electromagnetic Spectrum** Charles Luther Andrews,2003-01 **The Electromagnetic Spectrum** Mary Elinor Batson,1934 *Electromagnetic Spectrum New Many Speeds Theory* Walter H. Volkmann,2008 Electromagnetic Physics quanta information chart spectroscopy and red shift distance time energy gravity electricity doppler effect galactic energy nine planets and the sun repulsion energy *Exploring the Spectrum* Philip S. Callahan,1994 This book attempts to explain not only the visible light spectrum but also the invisible high energy nuclear and low energy infrared and radio portions of the electromagnetic spectrum Part one is about the physics of the spectrum part two about the spectrum of life Many pictures short stories tables and figures complete the book Electromagnetic Spectrum Wayne Tomasi,1994 The impact of the propagation medium on electromagnetic energy and the refraction of light are discussed Diagrams show the range of waves from subsonic to gamma rays and the use of Snell's Law to calculate the refractive index of a light ray is described SLNSW Infocus item 1408 **Radio Waves** Wade Flach,2021-03-17 The book reassesses the Kelvin temperature scale by spectrum for wider application The idea occurred to the author to revise the temperature scale where the Kelvin scale is no longer practical because a true temperature scale must be based upon electromagnetic radiation and the Kelvin scale is not based on the EM Spectrum The Kelvin scale is based on a foggy notion of absolute zero temperature in which there is no

motion inside of atoms Kelvin's scale is based on no motion not on the electromagnetic spectrum and thus is flawed So in the pursuit of a true scale I ventured into a review of the Electromagnetic Spectrum and several new ideas came forth the most astounding of these new ideas is the bifurcation of the spectrum into radio waves versus all other waves of EM Utilization of the electromagnetic spectrum, 1962 *Radio Waves* Chung Kology, 2021-05-04 The book reassesses the Kelvin temperature scale by spectrum for wider application The idea occurred to the author to revise the temperature scale where the Kelvin scale is no longer practical because a true temperature scale must be based upon electromagnetic radiation and the Kelvin scale is not based on the EM Spectrum The Kelvin scale is based on a foggy notion of absolute zero temperature in which there is no motion inside of atoms Kelvin's scale is based on no motion not on the electromagnetic spectrum and thus is flawed So in the pursuit of a true scale I ventured into a review of the Electromagnetic Spectrum and several new ideas came forth the most astounding of these new ideas is the bifurcation of the spectrum into radio waves versus all other waves of EM *The Use and Management of the Electromagnetic Spectrum* E.V. Rostow, President's Task Force on Communications Policy, 1969 **Exploiting the Electromagnetic Spectrum**, 2004

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