# Notes: Bohr Theory

# Why do Blimps Float?

## Because they are filled with a gas less dense than air

# Electromagnetic Radiation

## Light is one of the forms of energy

## Light is one type of a more general form of energy called *electromagnetic radiation*

## Electromagnetic radiation travels in waves

# Characteristics of a Wave

## 09_01

## Wavelength = distance from peak to peak

## Amplitude = height of the peak

## Frequency = the number of wave peaks that pass in a given time

## Speed = rate the waves travel

# Particles of Light

## Scientists in the early 20th century showed that electromagnetic radiation was composed of particles we call *photons*

### photons are particles of light energy

## Each wavelength of light has photons that have a different amount of energy

### the longer the wavelength, the lower the energy of the photons

# The Electromagnetic Spectrum

## Light passed through a prism is separated into all its colors = *continuous spectrum; colors blend into each other*

## Color of light is determined by its wavelength *and* frequency

# Electromagnetic Spectrum: Light’s Relationship to Matter

## Atoms can absorb energy, but they must eventually release it

## When atoms emit energy, it is released in the form of light = *emission spectrum*

## Atoms don’t absorb or emit all colors, only very specific wavelengths; the spectrum of wavelengths can be used to identify the element

#

# Emission Spectrum or *Line Spectrum Electromagnetic Spectrum*

|  |  |
| --- | --- |
| spectra | 09_04 |

# *Line Spectra* = specific wavelengths are emitted; characteristic of atoms

# The Bohr Model of the Atom

## Nuclear Model of atom does not explain how atom can gain or lose energy

## Neils Bohr developed a model to explain how structure of the atom changes when it undergoes energy transitions

## Bohr postulated that energy of the atom was *quantized*, and that the amount of energy in the atom was related to the electron’s position in the atom

### *Quantized:* means that the atom could only have very specific amounts of energy



## In the Bohr Model, electrons travel in orbits or energy levels around the nucleus

## The farther the electron is from the nucleus the more energy it has

|  |  |
| --- | --- |
| Quantized Energy States | Hydrogen Spectrum Series |
| 09_09 | Screen Shot 2012-03-25 at 7.26.40 PM.png |

# The Bohr Model of the Atom:Orbits and Energy

## Each orbit (energy level) has a specific amount of energy

## Energy of each orbit is symbolized by *n*, with values of 1, 2, 3 etc; the higher the value the farther it is from the nucleus and the more energy an electron in that orbit has

# The Bohr Model of the Atom: Energy Transitions

## Electrons can move from a lower to a higher (farther from nucleus) energy level by absorbing energy

## When the electron moves from a higher to a lower (closer to nucleus) energy level, energy is emitted from the atom as a *photon of light*

# The Bohr Model of the Atom: Ground and Excited States

## *Ground state* – atoms with their electrons in the lowest energy level possible; this lowest energy state is the most stable.

## *Excited state* – a higher energy state; electrons jump to higher energy levels by absorbing energy