

Name: _____

Per: _____


Quantum Theory Internet Activity

To help further develop your background understanding of atomic electron structure and quantum mechanics, we are going to spend the day in the internet (writing) lab. During this time, you are going to visit several web sites, each meant to further develop your knowledge of atomic structure. Feel free to interact with and explore each of these sites.

After fully exploring a site, please spend the time necessary to answer the questions accompanying each site.

Finally, if you have time, use your favorite search engine (my favorite is www.google.com) to find any additional information pertaining to this topic. Potential search terms include quantum numbers, Erwin Schrodinger, schrodinger model, or quantum theory. In the space provided, please list the sites that you found interesting and what in particular you found at these sites.

Notes:

- The URL's for these sites can be found at the "Links" page for this assignment on www.ohsscience.org
-  indicates links to other web sites

Electromagnetic Waves

http://www.colorado.edu/physics/2000/waves_particles/index.html

- follow all of the links that this set of pages offer, including the “next” links at the bottom of each page. You know you have completed the set of pages when there is no “next” link at the bottom. Don’t worry about the “email us” or “table of content” links.
- Read each page before trying to answer the questions

Page 1

What is the range of values for the wavelength of the following types of radiation (in meters)
(Hint: use the demo)

Radiation Type	Range of wavelengths
TV signals	
Microwaves	
Radar	
Visible Light	
X-rays	
Gamma Rays	

Page 2

What happens to the force on a particle (electron) as it gets closer to the nucleus?

In what direction did you need to exert the force in order to get the electron to orbit the nucleus? Was it more or less force than you expected to need? Why?

Page 3

Explain your understanding of force fields.

Page 4

What happens to the wavelength of a wave as the frequency increases? Draw a high and low frequency wave.

High

Low

Page 5

Feel free to explore X-rays, CAT scans, and microwave ovens

Quantum Atoms

<http://www.colorado.edu/physics/2000/quantumzone/index.html>

- follow all of the links that this set of pages offer, including the “next” links at the bottom of each page. You know you have completed the set of pages when there is no “next” link at the bottom. Don’t worry about the “email us” or “table of content” links.

Questions:

What are spectral lines?

What is an emission spectrum?

Draw 2 sets of spectral lines for the element of your choice. If you do not have color pencils, simply label the color of each line.

According to the Bohr’s atom page, what causes radiation?

Photons are little bursts or packages of _____.

What makes electrons change orbits?

Why is it not appropriate to say that electrons *orbit* the nucleus?

Why does a change in energy of an electron produce a specific color?

Elements as Atoms

http://www.colorado.edu/physics/2000/elements_as_atoms/index.html

- follow all of the links that this set of pages offer, including the “next” links at the bottom of each page. You know you have completed the set of pages when there is no “next” link at the bottom. Don’t worry about the “email us” or “table of content” links.
- Stop at “The Origin of the Periodic Table.”
- Be sure to play with the “David’s Whizzy Periodic Table” pop-up

Questions:

What is ionization energy?

For Li, what are the ionization energies for the 3 electrons?

Why are the ionization energies for the electrons closer to the nucleus higher than for the electron further from the nucleus?

What is the Pauli exclusion principle?

How can 2 electrons occupy the same energy level? What is spin?

Which letter corresponds to the first primary level: *s*, *p* or *d*? _____ The second? _____

How many electrons can each sublevel hold? *s*: _____ *p*: _____ *d*: _____ *f*: _____

An *s* sublevel is always what shape? _____

Sketch a rough outline of the periodic table and designate each section as *s*, *p*, *d*, and *f*.

Additional Interesting Pages (please find at least one)

URL = _____

Summary:

URL = _____

Summary:

URL = _____

Summary: