

Name:

Partners' name(s):

## Laboratory 11: Atomic Structure

1. Lab Quiz: Reactions
2. Complete Copper Cycle experiment
3. Film: The Atom
4. The Nucleus and isotopes
5. Spectra and waves
6. Electron Structure

**Purpose:** To observe and analyze the spectra of several elements

**Lecture Notes:**

### The Structure of the atom


#### Charged particles

Opposites attract

Like charges repel

#### The Nucleus

Particles of the nucleus

What holds the nucleus together?

Nuclear size versus atomic size

Atomic Number

Mass Number

Nuclear symbols

**Isotopes** are atoms of the same element. They have the same number of protons but a different number of neutrons.


## **Electrons**

How are electrons arranged in the atom and why is it important?

Location of the electron

Energy levels

Number of electrons on each shell or energy level

Valence Shell

Using the periodic table to determine the shell

What is the maximum number of electrons on the valence shell?

Determining the electron arrangement in the atom

How many electrons does the atom have?

How many shells are in the atom?

How many electrons are in each shell?

First put the correct number of electrons in the valence shell.

Put the correct number of electrons in the rest of the shells starting with the first shell.

Atomic Diagrams

1. Energy, light and electrons

2. Lewis electron dot symbols:

**Procedure and Observations and Data: (To be done in groups of two)**

1. Complete the copper cycle experiment.
2. Spectra and light flame tests
  - A. Around the room are several stations, each containing a beaker of a salt solution. Go to each station. Dip the loop of the Ni-Chrome wire into the solution. Put the loop into the base of the flame. Observe and record the color of the flame.

Element	Color of Solution	Color of Flame
Li		
Na		
Ba		
Cu		
Ca		
Sr		
K		
Unknown 1		
Unknown 2		

Identify the unknown elements.

Unknown	Color of Solution	Color of Flame	Element
1			
2			

- B. At one of the stations is a tube with a gas in it. In front of the tube is a spectroscope. Turn on the power. Look through the eyepiece. Choose one of the lines. Record its color and wavelength. Turn off the power. Change the gas tube and repeat.

Gas in the tube	Color of line	Wavelength

**Questions and Answers:**

1. What causes the colors of the spectrums? Include a diagram.

**Conclusions and Reflections**

Why is it important for your students to understand the structure of the atom?

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What would be some other ways to get your students to better understand the structure of the atom?

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Why is atomic structure so difficult to understand?

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Notes:

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