Date:



Chemistry ~ Ms. Hart

Anions or Cations

UNIT 4: The Periodic Table!

Class:

Lesson 4.1: Bright-Line Spectra

DO NOW: About Neon-20

	Protons	Neutrons	Electron
Amount of each			
Mass of each			
Location of each			

1. What is the atomic number of Neon-20?

2. What is an isotope?_

3. The percent abundance of Neon-20 is 92%. Another isotope, Neon-22 has a percent abundance of 8%. Setup, but do not calculate how you would find the average atomic mass for the element Neon.

Objective: SWBAT determine how our understanding of the atom explains how the lights in Time Square work!

Thought Provoker:

Demo Questions!

- 1. What color does potassium look like?
- **2.** What color is strontium burning?
- **3.** Which of the elements burned green?

Quick Read: How do neon lights work? (7 minutes)

Directions: Silently read the article "How Neon Lights Works" and annotate using our annotation strategies. Then answer the questions below in full sentences using your own words. Be prepared to share your answers!

Adapted from http://www.herebeanswers.com/2011/07/how-do-neon-and-fluorescentlights-work.html



Cool and colorful, eerily radiant, a neon tube emits a light of almost seductive elegance. But mesmerizing as their shimmer may be, neon systems owe their glow to nothing more glamorous than a bit of gas and a jolt of electricity. Sealed within the glass tubing

of, say, an illuminated signboard is a mixture of gases, one of which will always be neon. Left to itself, neon remains still and colorless. It is only when a current of electricity is passed through the gas that it reveals its garish talents.

When such an electrical change is applied, it stimulates electrons circling a neon atom's nucleus. The suddenly excited electrons move farther away from the nucleus. This condition lasts only an instant. Almost immediately, the electrons return to their unexcited state (original position), emitting a burst of energy that is visible and creates the beautiful colors we see in neon signs.

- 1. Which subatomic particle plays a role in neon lights? ____
- 2. Describe what happens to this subatomic particle in order to produce neon lights?

Bright Line Spectra

An emission spectrum or bright line spectra of an element looks like this:



Think, Pair, Write, Share! (2 minutes)

Directions: How can we identify an unknown from a bright light (atomic emission spectrum)?

How to Do Atomic Emission Problems

Remember: The different lines for each element represent a different color being given off

NAME THE STEPS:





Check For Understanding!

Directions: Circle your answer and wait to put your fingers up to respond.

Bright-Line Spectra



Which elements are present in this mixture?

- 1. E and D, only
- 2. E and G, only
- 3. D and G, only
- 4. *D*, *E*, and *G*

Classwork:



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SUMMARIZE: What part of the atom is responsible for producing spectral lines and how can spectral lines be used to identify different elements?

CRITICAL THINKING: Why do you think every element produces their unique set of spectral lines?

Homework 4.1 Bright-Line Spectra

The diagram below shows the characteristic spectral line patterns of four elements. Also shown are spectral lines produced by an unknown substance. Which pair of elements is present in the unknown?



- 1. lithium and sodium
- 2. sodium and hydrogen
- 3. lithium and helium
- 4. helium and hydrogen

Many advertising signs depend on the production of light emissions from gas-filled glass tubes that are subjected to a high-voltage source. When light emissions are passed through a spectroscope, bright-line spectra are produced.

Gas A	
Gas B	
Gas C	
Gas D	
Unknown mixture	

Identify the two gases in the unknown mixture.

- 1. *A* and *B*
- **2.** A and D
- 3. *B* and *C*
- 4. C and D

Given the bright-line spectra of three elements and the spectrum of a mixture formed from at least two of these elements:
Bright-Line Spectra

Element D											
Element E											
Element G											
Mixture											-
750 nm Which elements are present in this mixture? 1 E and D only									36	0 nn	
2. E ar 3. D ar 4. D, E	1d <i>G</i> , on 1d <i>G</i> , on 2, and <i>G</i>	ly ly									

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2. Draw the bright-line spectra for a mixture of hydrogen and lithium:





- 1. Which two elements are in this mixture?
 - (3) helium and hydrogen
 - (1) barium and hydrogen (2) barium and lithium
- (4) helium and lithium
- 2. Draw the bright-line spectra for a mixture of hydrogen and lithium: