

UNIT 3 – ATOMS, ELEMENTS, MOLECULES

L2: Atomic Pudding



TURN IN BINDERS TO THE BACK SHELF

I have not passed back the Plate Tectonics Performance Task yet.

GUIDING QUESTION: DESCRIBE AND DRAW AN ATOMIC MODEL AND EXPLAIN THE EVIDENCE THAT SUPPORTS THE EXISTENCE OF ATOMIC STRUCTURES.

Do Now: Draw what you think the atom looks like. Label any components that you are aware of.

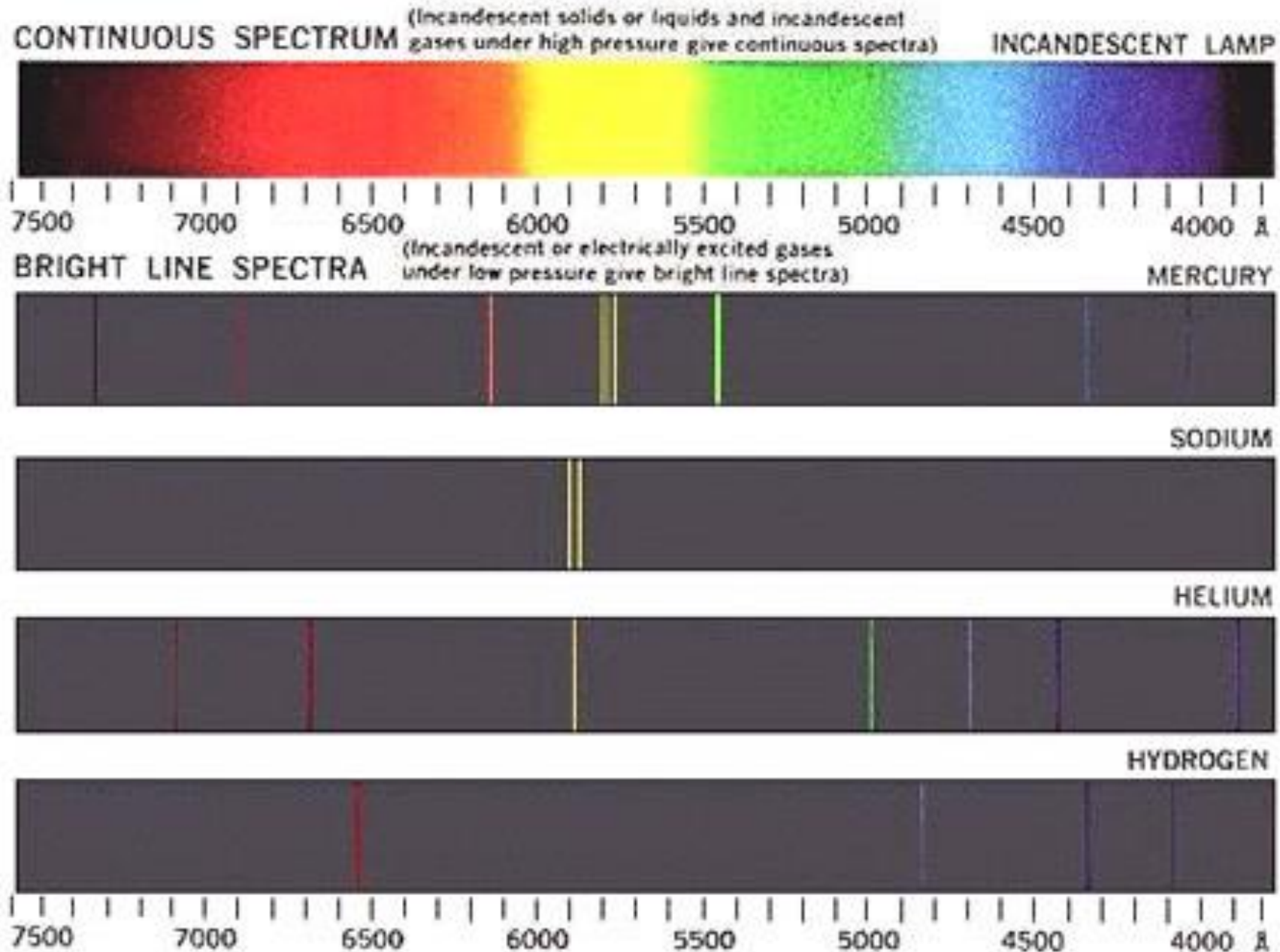
EXPERIMENT 1: CATHODE RAY TUBE

<https://youtu.be/O9Goyscbazk>

EXPERIMENT 2: RUTHERFORD'S GOLD FOIL EXPERIMENT

<https://youtu.be/XLaeFUKd2Y4>

EXPERIMENT 3: EMISSION SPECTRA



NOTES (PAGE 7)

Atomic Theory states that all matter is made up of atoms

- An atom is the smallest unit of an element that retains the chemical properties of that element and can exist as a separate particle.

NOTES

But what are atoms made of? The model of the atom has been refined and changed several times over the course of the last century. Today, we have many different models of varying complexity that we use depending on what we are trying to explain. However, all of the models we use agree on the subatomic particles found within the atom.

NOTES

- Electron: A particle with a negative charge. Electrons are $1/1800$ the size of the other subatomic particles and move around very quickly outside of the nucleus.
- Proton: A particle with a positive charge.
- Neutron: A particle with a neutral charge.

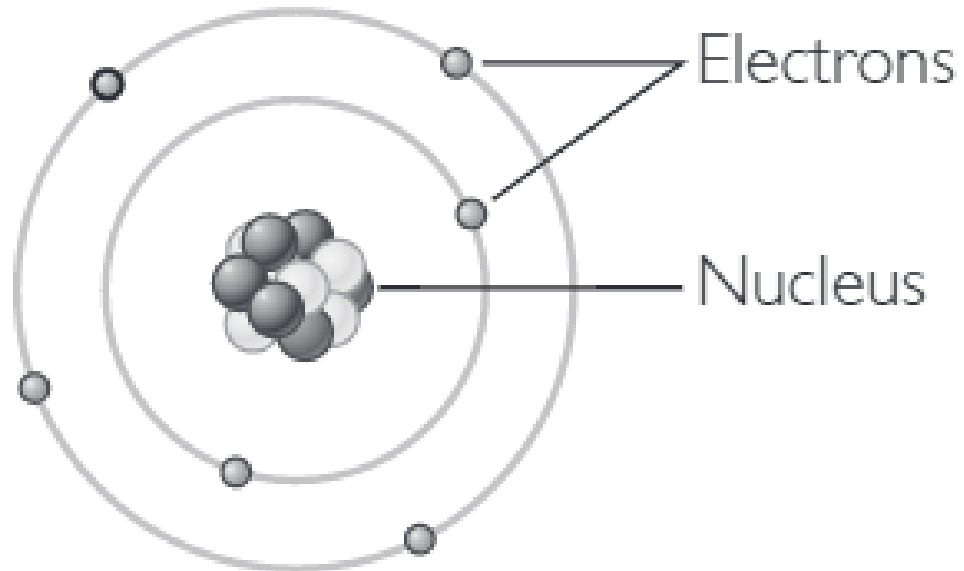
NOTES

Protons and neutrons are found in the nucleus which is the dense, positively charged structure found in the center of the atom.

In a neutral atom, the number of protons is equal to the number of electrons.

NOTES

Simple atomic model:

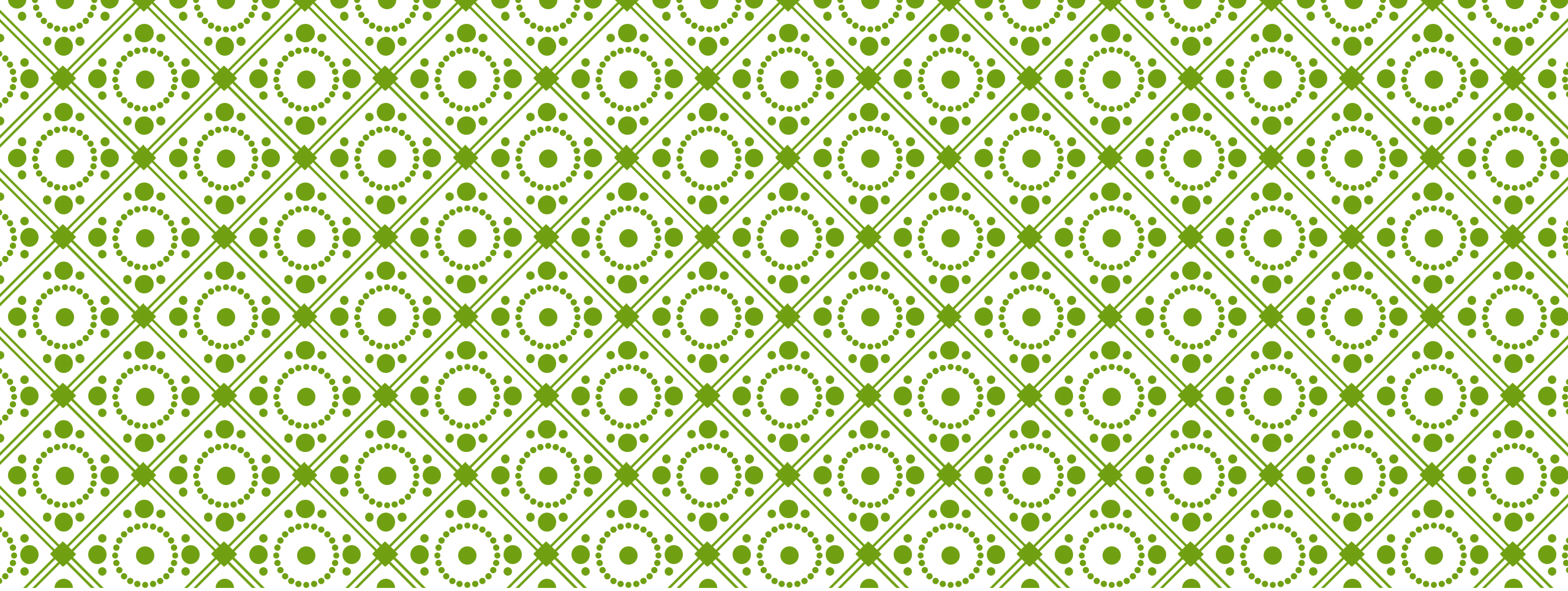


Limitations:

- Electrons are much smaller compared to protons and neutrons than the model shows.
- There's a lot more space between the nucleus and the outside of the atom.

RESPOND TO GUIDING QUESTION

Describe and draw an atomic model and explain the evidence that supports the existence of atomic structures.



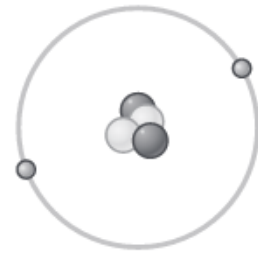
UNIT 3 – ATOMS, ELEMENTS, MOLECULES

L3: Atoms by Numbers

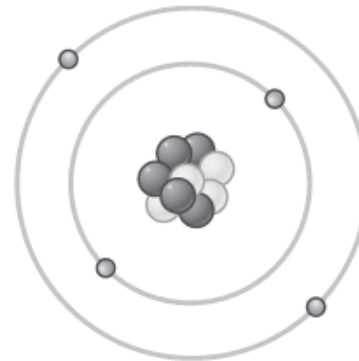
GUIDING QUESTION: EXPLAIN HOW TO EXTRACT INFORMATION FROM THE PERIODIC TABLE ABOUT ATOMIC STRUCTURE AND ATOMIC MASS.

Do Now:

Models of a helium atom and a beryllium atom are shown. The nucleus of each contains protons and neutrons. The electrons orbit the nucleus.



Helium, He



Beryllium, Be

1. Compare the two models. List three similarities and three differences.
2. Based on the models, why do you think helium is number 2 (the second element) and beryllium number 4 (the fourth element) on the periodic table?

NOTES (PAGE 12)

The atomic number is the number of protons in the nucleus of an atom of an element. On the periodic table, atoms are arranged in order by atomic number.

NOTES

- In a neutral atom,
the # of protons = the # of electrons
- The atomic number does *not* tell you how many neutrons an atom of an element has.

NOTES

Protons and neutrons account for most of the mass of an atom. Protons and neutrons each have a mass of 1 amu (atomic mass unit). By comparison, the mass of an electron is 0.0005 amu, or about 2000 times lighter. Because the mass of the electron is so small, the mass of an atom is approximately equal to the sum of the number of protons and neutrons.

NOTES

Atomic mass = # of protons + # of neutrons

NOTES

The atomic mass is **not** identical to the average atomic mass found on the periodic table (we'll talk about why next class). However, you can estimate the number of neutrons in an atom by subtracting the number of protons from the average atomic mass of an element rounded to the nearest whole number.

NOTES

$\# \text{ of neutrons} = \text{average atomic mass} - \# \text{ of protons}$

If you change the number of protons in an atom, you also change the elemental identity of the atom.

CHECK-IN

Use your periodic table to identify these elements:

- Atomic number is 18 ARGON
- Has three electrons when the atoms are neutral. LITHIUM
- Atomic mass is 16.0amu OXYGEN



RESPOND TO GUIDING QUESTION

Explain how to extract information from the periodic table about atomic structure and atomic mass.

CLOSURE

Homework #9 due Friday, 11/3

Achieve 3000 article: There's Gold in that Ocean due Friday 11/10 at 11:59pm