Guiding Question: How can we model the electrons in an atom?

Learning Goal: Draw a Bohr model with electrons for the first 20 elements. Find patterns in the Perodic table for electrons.

Agenda
1) Daily Science Review-subatomic particles
2) Review/Finish #P, #N, #E
3) Bohr Model and Energy Levels Notes
4) Practice Bohr Model drawing for First 20
5) Card Activity
6) Patterns we found in Bohr Model-add to our notes
7) Exit Ticket

Words of the day
Electron Shells
Groups/Families
Periods

Energy Levels C-Notes

Write Questions

Electron Location Rules

Patterns in Periodic Table

Valence Electrons

Write a summary

ENERGY LEVELS
ELEMENTS 1–20

Complete each energy level model by drawing the correct number of electrons in their corresponding energy levels.

HYDROGEN 1  1.01							HELIUM 2  4.00
LITHIUM 3  6.94	BERYLLIUM 4  9.01	BORON 5  10.81	CARBON 6  12.01	NITROGEN 7  14.01	OXYGEN 8  16.00	FLUORINE 9  19.00	NEON 10  20.18
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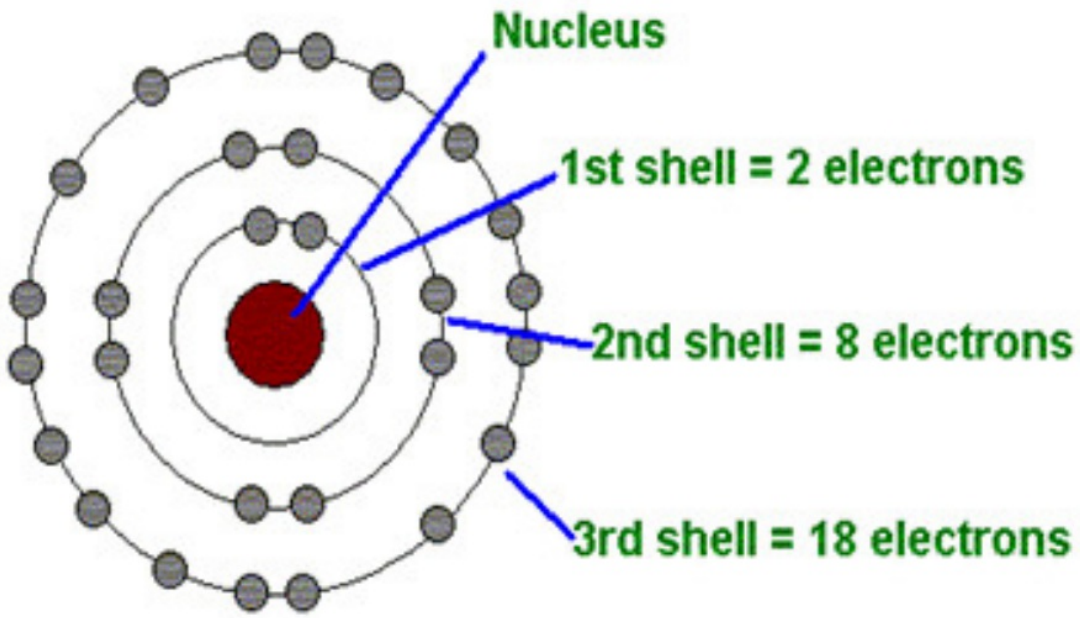
POTASSIUM 19  39.10	CALCIUM 20  40.08						

WOD

Electron Shells

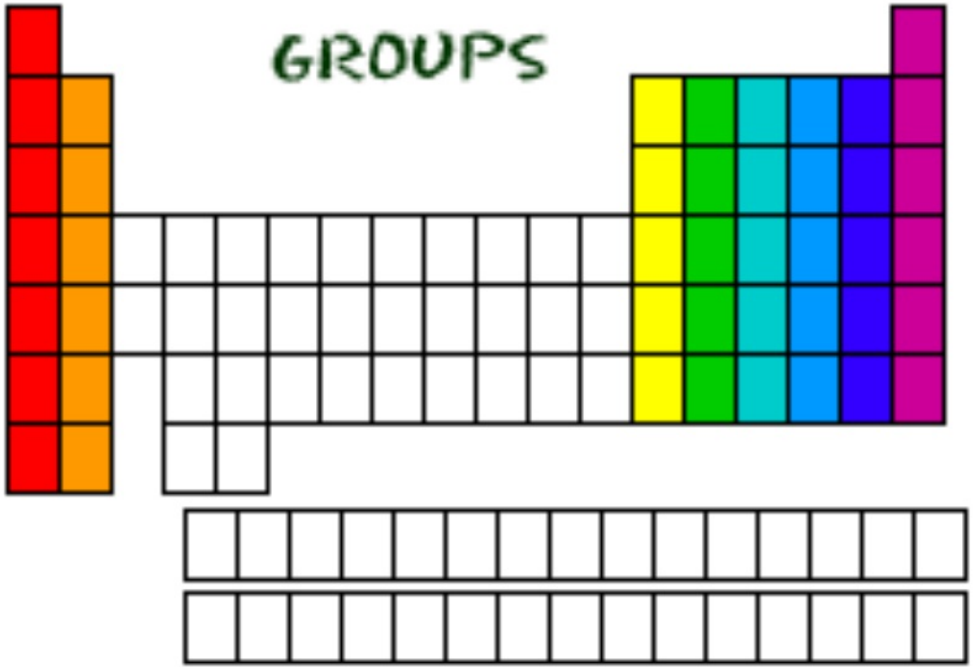
The location of the electrons around the nucleus, according to Bohr. The electrons "fill" in a regular pattern.



WOD

Groups/Families

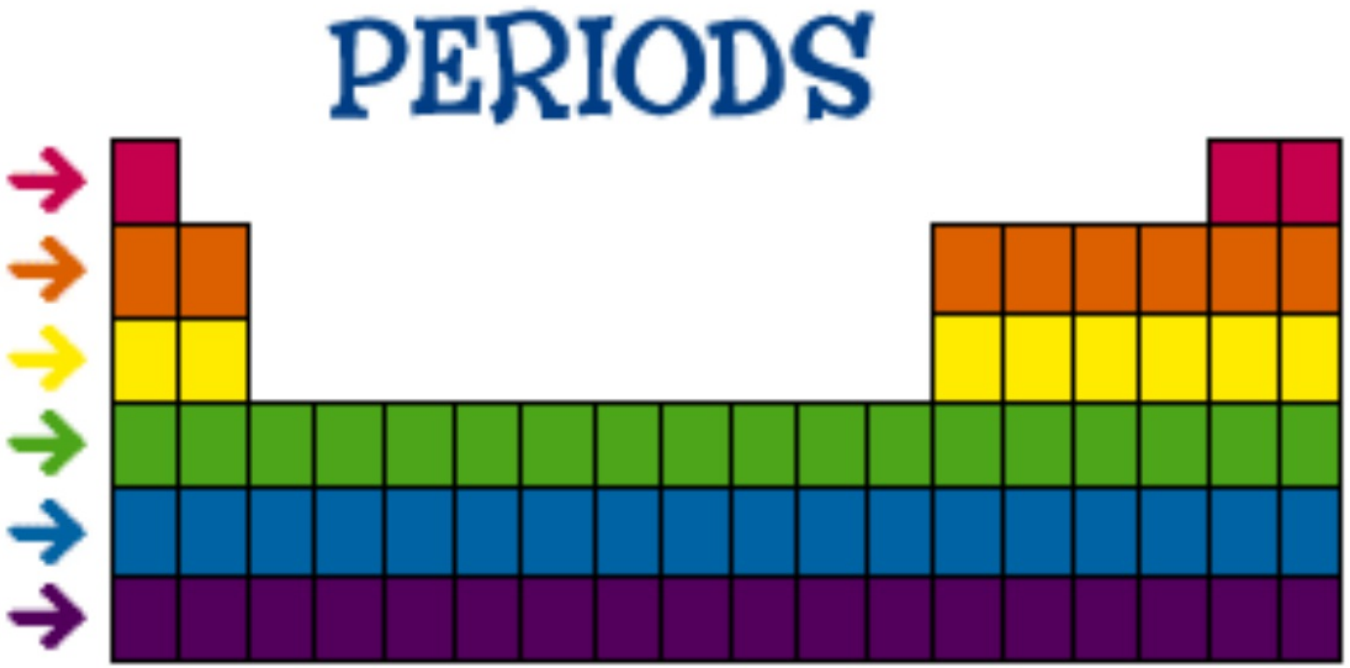
Elements arranged in vertical columns in the periodic table



WOD

Period

Elements arranged in horizontal columns in the periodic table



DSR Today

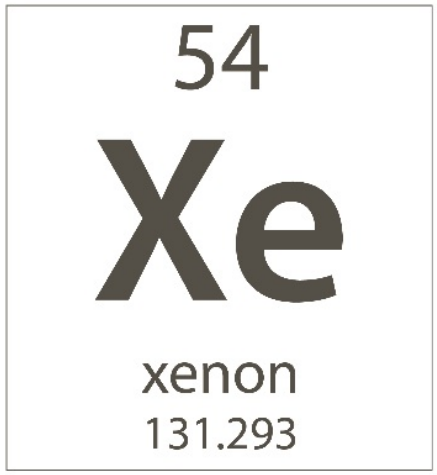
PERIODIC TABLE
ELEMENTS 1–20

Write the number of protons, electrons, and neutrons in each element.

HYDROGEN 1 # of Protons: # of Electrons: # of Neutrons: 1.01							**HELIUM** 2 # of Protons: # of Electrons: # of Neutrons: 4.00
LITHIUM 3 # of Protons: # of Electrons: # of Neutrons: 6.94	**BERYLLIUM** 4 # of Protons: # of Electrons: # of Neutrons: 9.01	**BORON** 5 # of Protons: # of Electrons: # of Neutrons: 10.81	**CARBON** 6 # of Protons: # of Electrons: # of Neutrons: 12.01	**NITROGEN** 7 # of Protons: # of Electrons: # of Neutrons: 14.01	**OXYGEN** 8 # of Protons: # of Electrons: # of Neutrons: 16.00	**FLUORINE** 9 # of Protons: # of Electrons: # of Neutrons: 19.00	**NEON** 10 # of Protons: # of Electrons: # of Neutrons: 20.18
SODIUM 11 # of Protons: # of Electrons: # of Neutrons: 22.99	**MAGNESIUM** 12 # of Protons: # of Electrons: # of Neutrons: 24.31	**ALUMINUM** 13 # of Protons: # of Electrons: # of Neutrons: 26.98	**SILICON** 14 # of Protons: # of Electrons: # of Neutrons: 28.09	**PHOSPHORUS** 15 # of Protons: # of Electrons: # of Neutrons: 30.97	**SULFUR** 16 # of Protons: # of Electrons: # of Neutrons: 32.07	**CHLORINE** 17 # of Protons: # of Electrons: # of Neutrons: 35.45	**ARGON** 18 # of Protons: # of Electrons: # of Neutrons: 39.95
POTASSIUM 19 # of Protons: # of Electrons: # of Neutrons: 39.10	**CALCIUM** 20 # of Protons: # of Electrons: # of Neutrons: 40.08						

Note: Remember that the number of neutrons is not the same for every atom of an element. The number of neutrons you write in this chart will be a number, that when added to the number of protons, gives a sum as close as possible to the atomic mass.

Exit Ticket



1. What is the name of the element?

2. What is the element's symbol?

3. What is the Atomic Number?

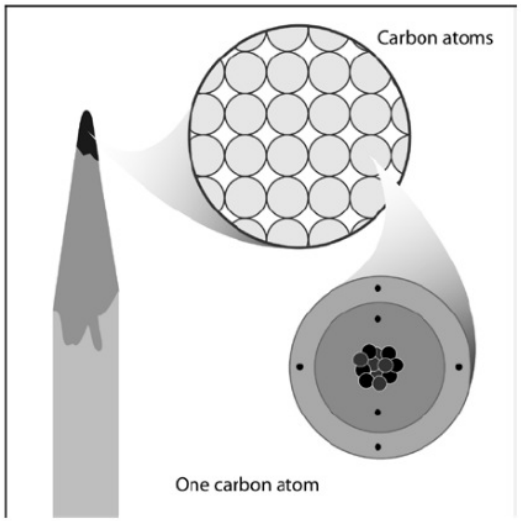
4. What is the atomic Mass?

5. How many of each subatomic particles are there?
   Protons:
   Neutrons:
   Electrons:

INTRODUCTION

If you look closely at the tip of a sharpened pencil, you will see that it is made of graphite. Going deeper, graphite is made of carbon atoms. Deeper still, each carbon atom is made of protons, neutrons, and electrons. In this lesson, you will explore these subatomic particles and their charges.

HOMEWORK



1. Label the nucleus (protons, neutrons) and electrons in the drawing of a carbon atom above.

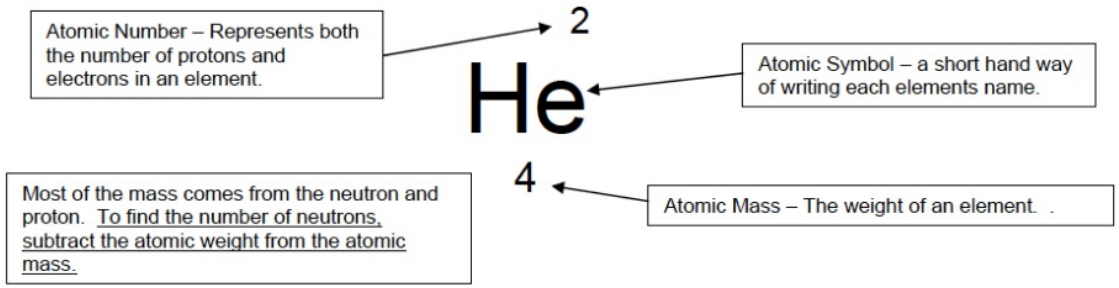
2. Draw a line between the subatomic particle and its charge.

proton	no charge
electron	positive charge
neutron	negative charge

3. Would the following subatomic particles attract each other or repel one another?

Two protons _____
Two electrons _____
A proton and an electron _____

Element Practice



Fill in the necessary information.

2
He
4

element: _____
protons: _____
neutrons: _____

26
Fe
56

element: _____
protons: _____
neutrons: _____

13
Al
27

element: _____
protons: _____
neutrons: _____

20
Ca
40

element: _____
protons: _____
neutrons: _____

10
Ne
20

element: _____
protons: _____
neutrons: _____

6
C
12

element: _____
protons: _____
neutrons: _____

9
F
19

element: _____
protons: _____
neutrons: _____

17
Cl
35

element: _____
protons: _____
neutrons: _____

11
Na
23

element: _____
protons: _____
neutrons: _____

Energy Levels C-Notes

Write Questions

Electron Location Rules

Patterns in Periodic Table

Valence Electrons

Write a summary

Electron Location Rules

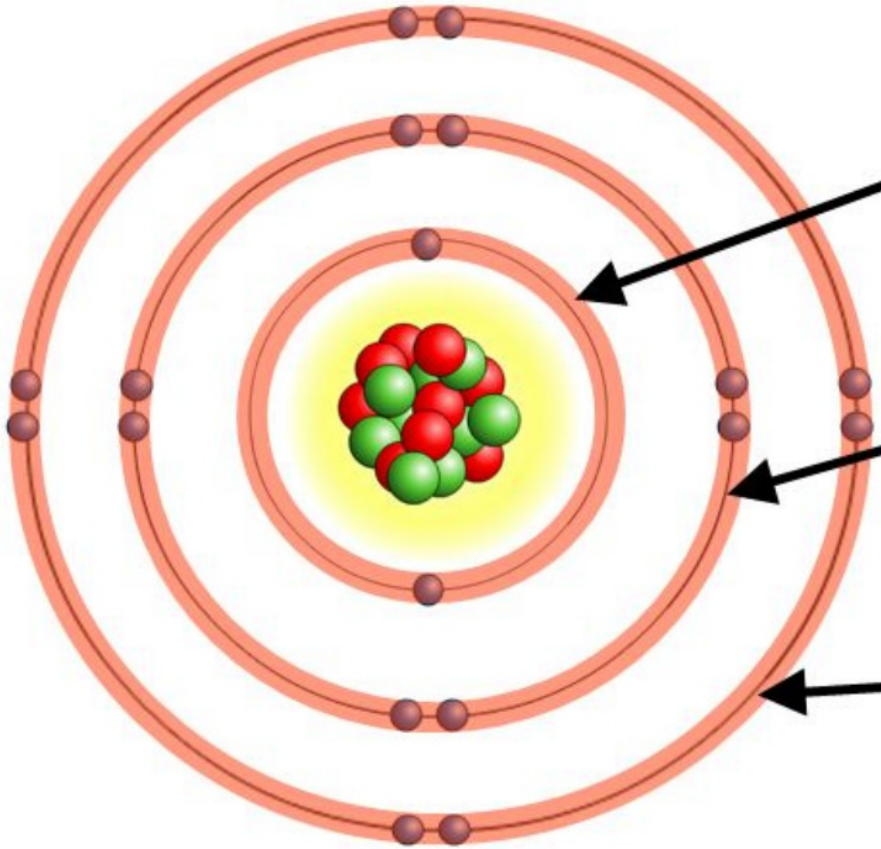
1. Electrons are found in shells around the nucleus of the atom also called energy levels

3-D Version

In 2-D

2. Each layer can only hold a certain about of electrons

Each shell has a maximum number of electrons that it can hold.
Electrons will fill the shells nearest the nucleus first.



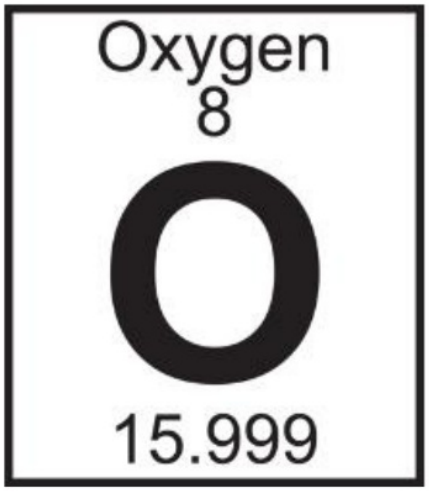
1st shell holds a maximum of 2 electrons

2nd shell holds a maximum of 8 electrons

3rd shell holds a maximum of 8 electrons

This electron arrangement is written as 2,8,8.

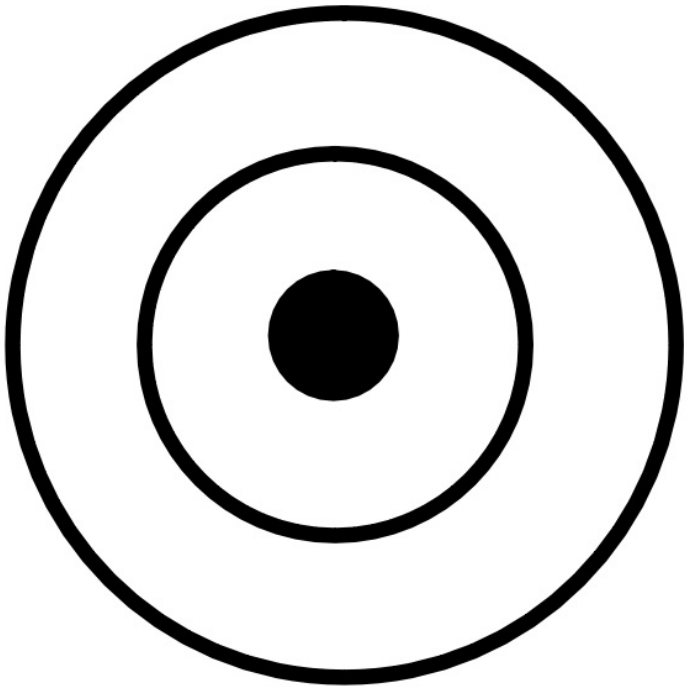
Example



Atomic Number:

Number of Electrons:

Location of electrons:



ENERGY LEVELS
ELEMENTS 1–20

Complete each energy level model by drawing the correct number of electrons in their corresponding energy levels.

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POTASSIUM 19  39.10	CALCIUM 20  40.08						

The atom you are looking for has this Energy Level Model:

The atom you are looking for is **directly below** the atom with this Energy Level.

The atom you are looking for has **2** Electrons on the **First** Energy Level and no other electrons.

The atom you are looking for is **directly above** the atom with this Energy Level.

Patterns in Periodic Table

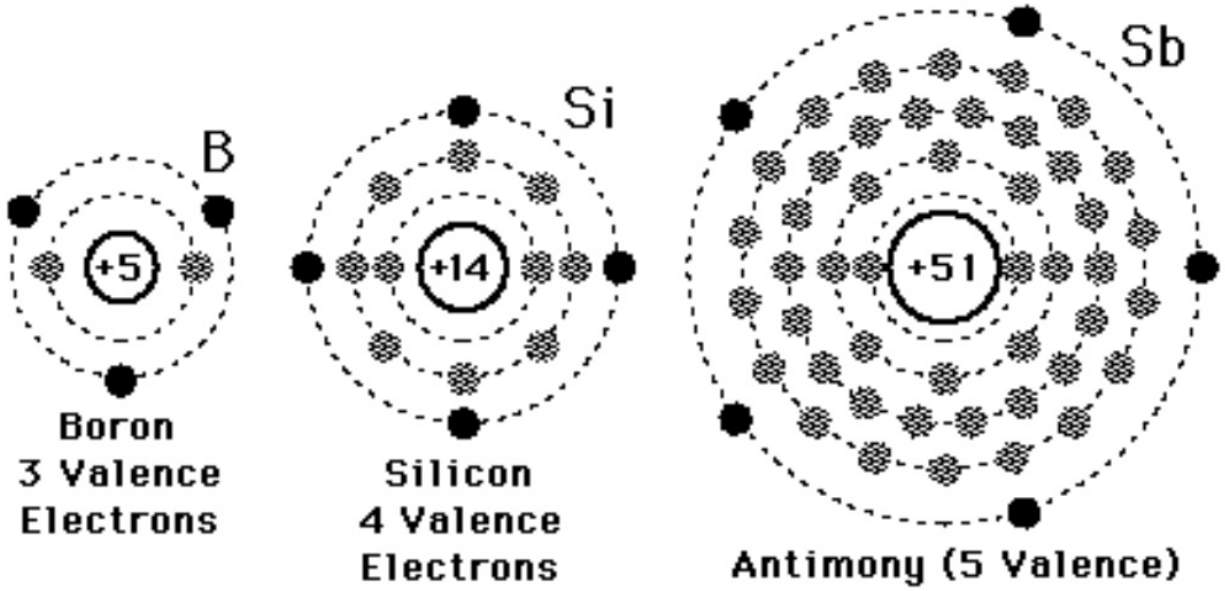
Periods:

Groups/Families:

Valence Electrons

Number of electrons in the outermost shell

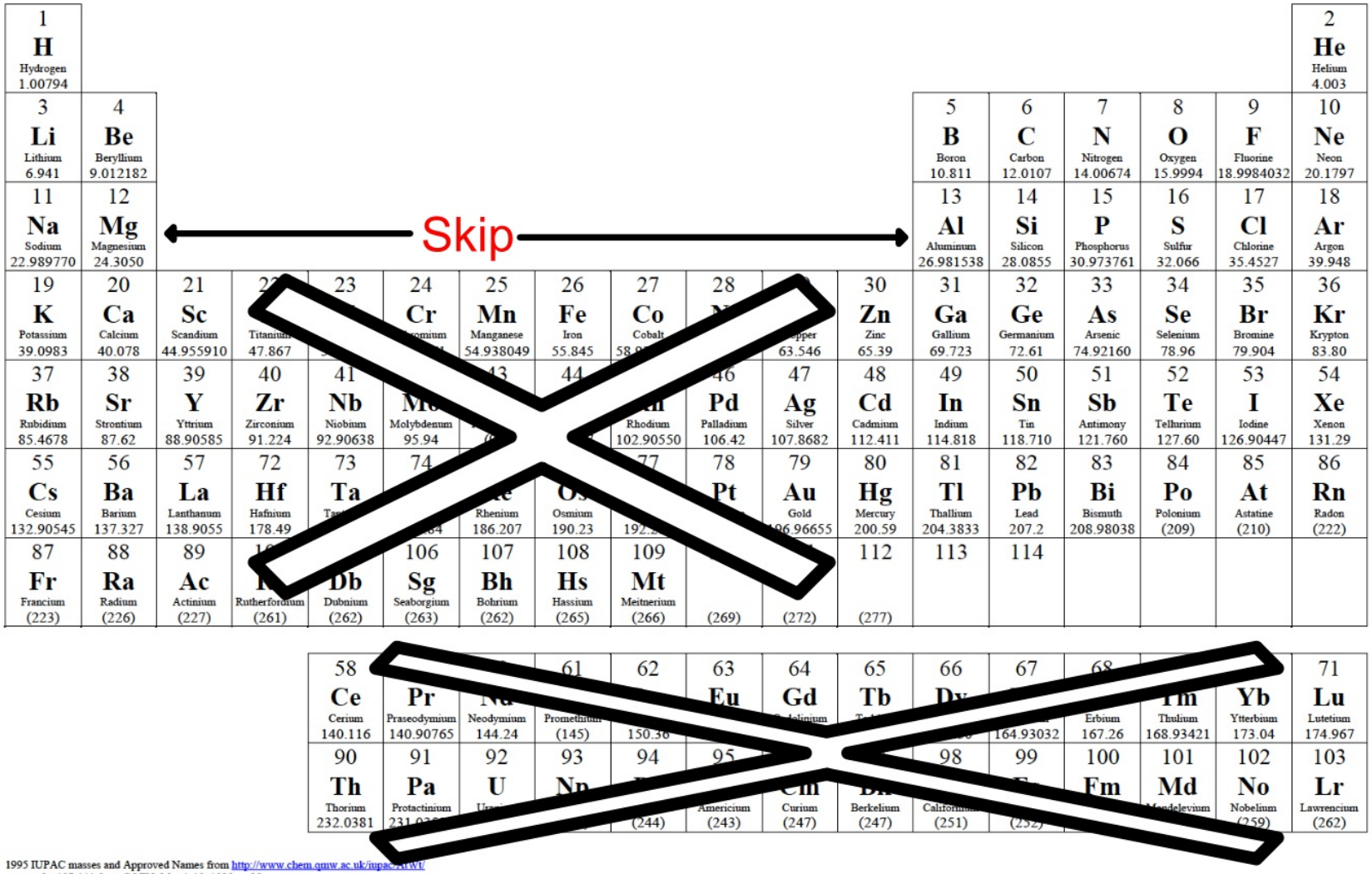
Examples



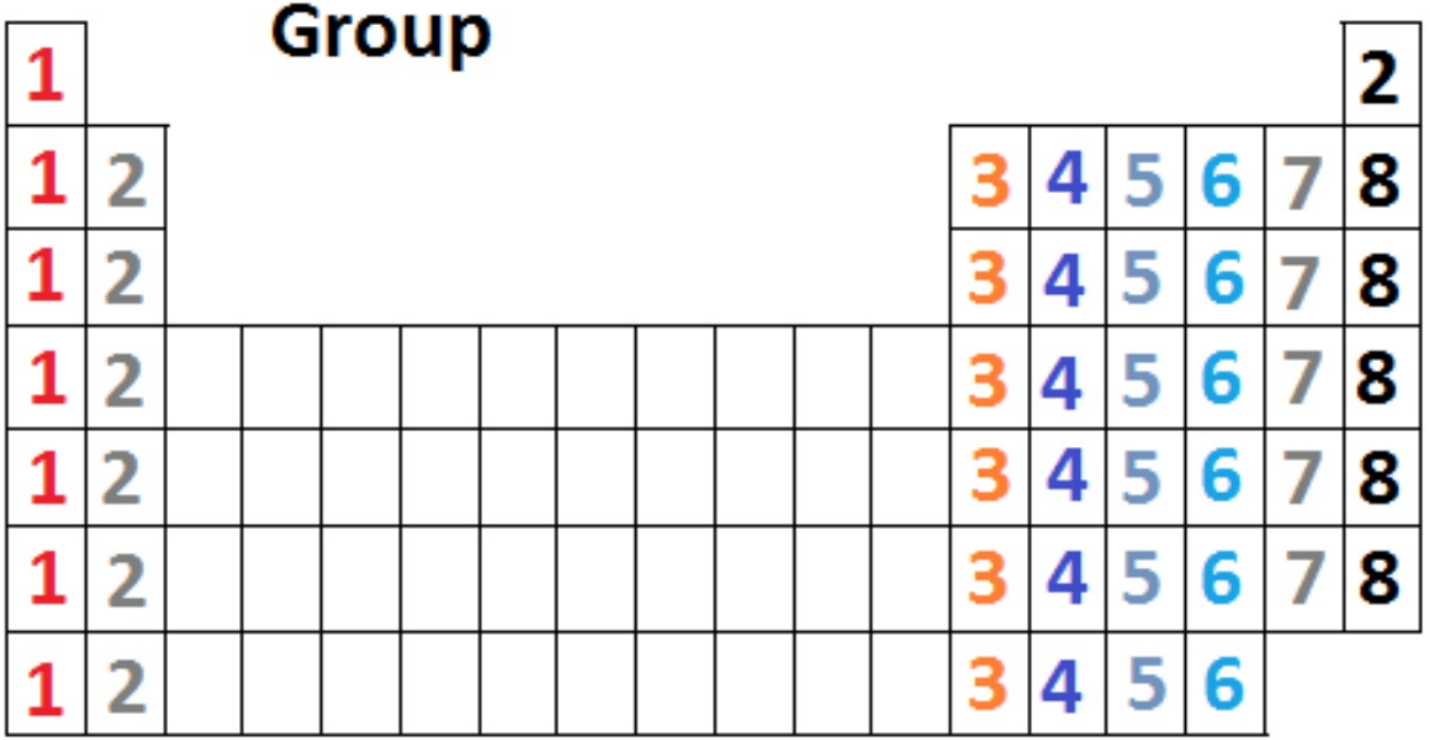
Lets put the patterns on the Periodic Table

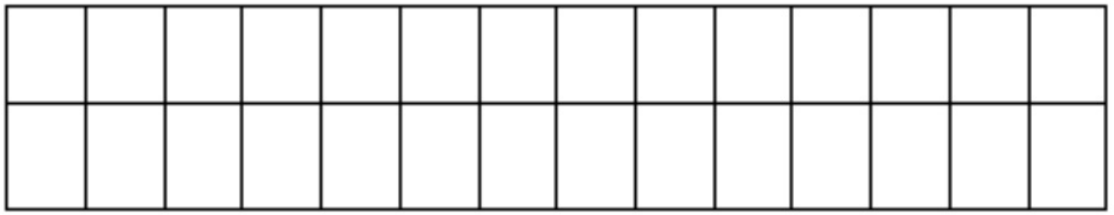
Valence Electrons

Energy Level



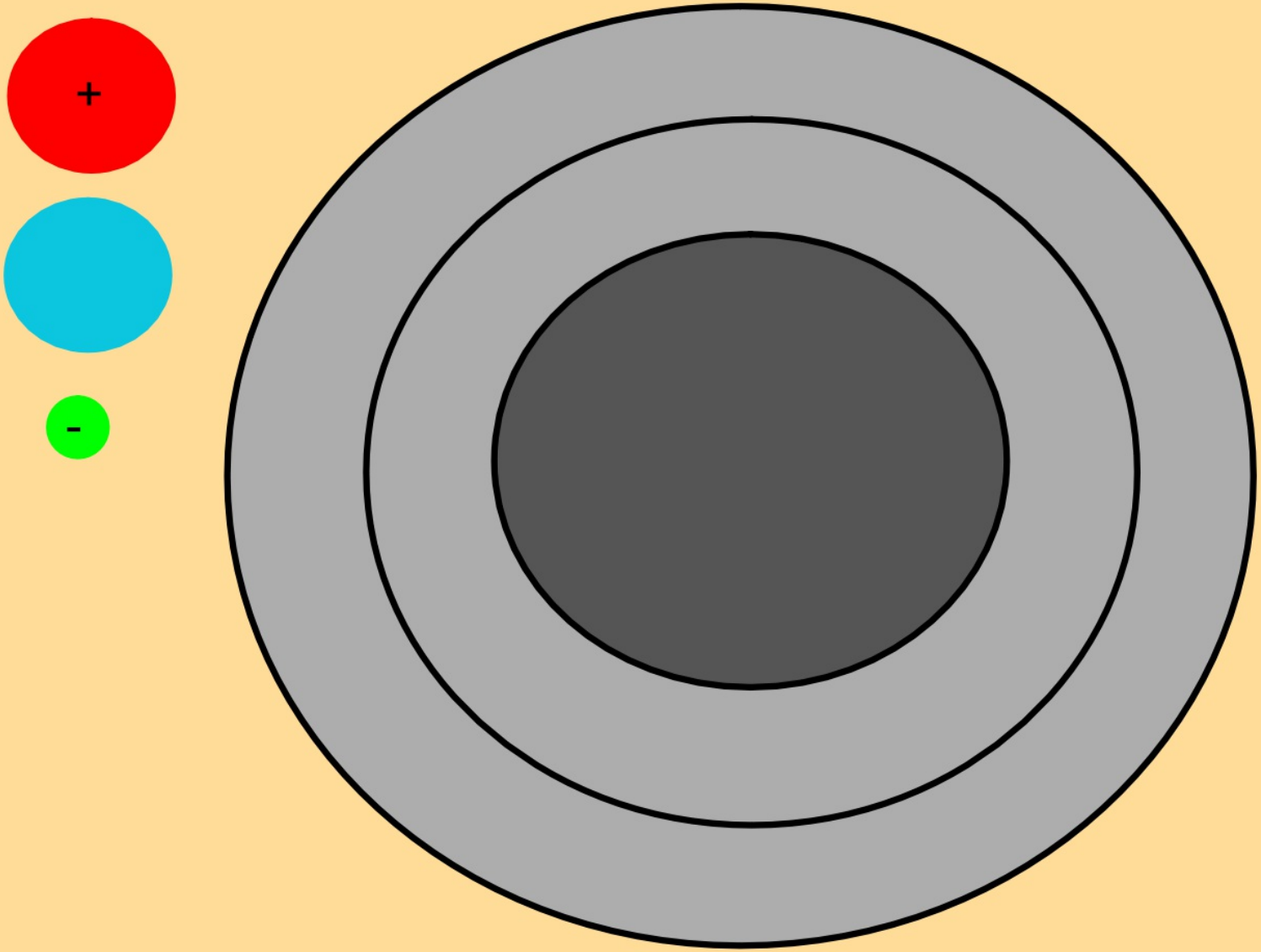
Valence Electrons in Each Group





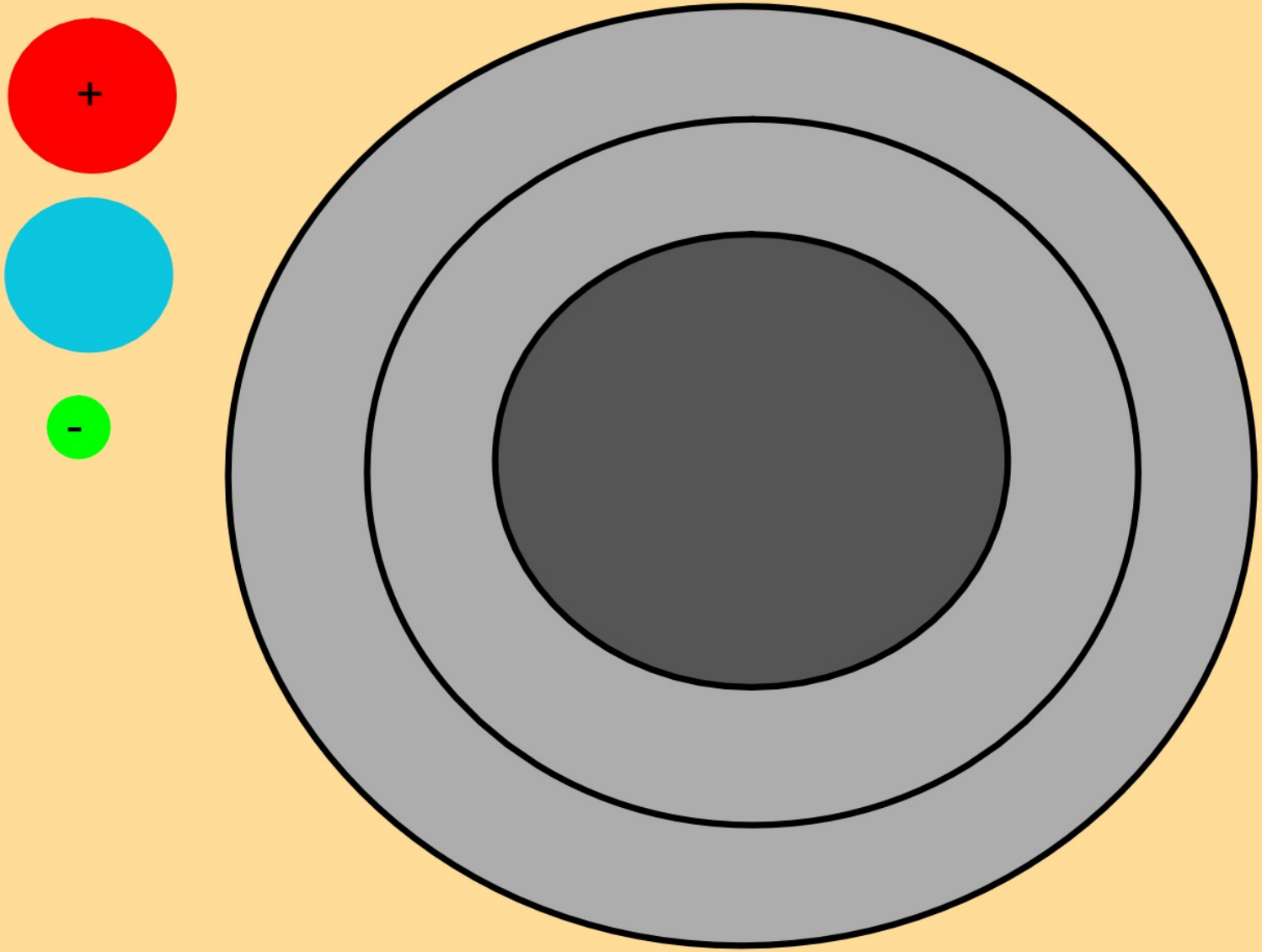
Model Fluorine - atomic number 9

Atomic mass - 18.99



Model Beryllium- atomic number 4

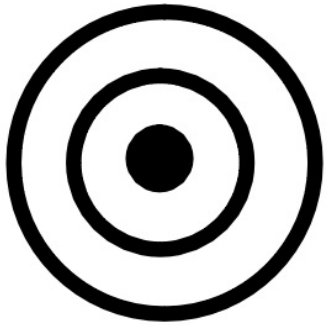
atomic mass 9.01



Exit Ticket

Use your periodic table to answer the questions

1. Draw the Bohr model for Sodium (Na)



2. How many electrons do you predict are in the outer shell of Krypton. HINT: Use the patterns

3. How many valence electrons are there for Carbon?

ENERGY LEVELS
ELEMENTS 1–20

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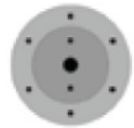
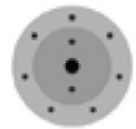
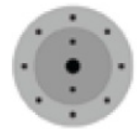
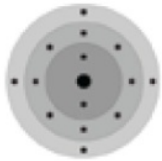
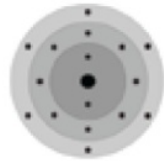
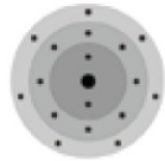
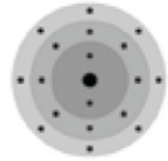
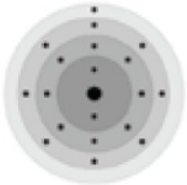
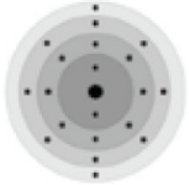
LITHIUM 3  6.94	BERYLLIUM 4  9.01	BORON 5  10.81	CARBON 6  12.01	NITROGEN 7  14.01	OXYGEN 8  16.00	FLUORINE 9  19.00	NEON 10  20.18
SODIUM 11  22.99	MAGNESIUM 12  24.31	ALUMINUM 13  26.98	SILICON 14  28.09	PHOSPHORUS 15  30.97	SULFUR 16  32.07	CHLORINE 17  35.45	ARGON 18  39.95
POTASSIUM 19  39.10	CALCIUM 20  40.08						

Write the number of electrons in the OUTER Shell for every element.