PAL worksheet – Chem 6A

Electronic Structure and Atomic Radius

1. Shells and subshells

How many electrons are required to fill an *s* subshell? _____

How many electrons are required to fill a *p* subshell? _____

How many electrons are required to fill a *d* subshell? _____

How many electrons are required to fill an *f* subshell? _____

What are the subshells within the 1st shell? _____

What are the subshells within the 2nd shell? _____

What are the subshells within the 3rd shell? _____

What are the subshells within the 4th shell? _____

2. Electronic structure

a. Chlorine

What is the symbol for chlorine? _____ What is the atomic number of chlorine?

_____

How many protons does a chlorine atom have? _____

How many electrons does a chlorine atom have? _____

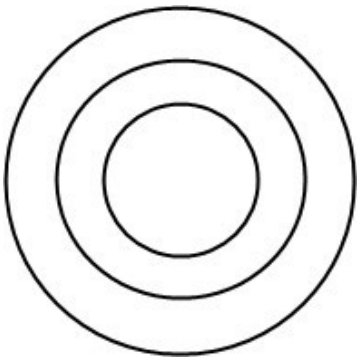
Identify how many electrons are in each subshell for a chlorine atom:

1*s* ____ 2*s* ____ 2*p* ____ 3*s* ____ 3*p* ____

Write the electron configuration of a chlorine atom: _____

Draw a shell diagram for an atom of chlorine. Label the protons, electrons, and nucleus.

Use the three shells provided below.



b. Palladium

What is the symbol for palladium?

What is the atomic number of palladium?

How many protons does a palladium atom have?

How many electrons does a palladium atom have?

Identify how many electrons are in each subshell for a palladium atom:

1*s* ____ 2*s* ____ 2*p* ____ 3*s* ____ 3*p* ____ 4*s* ____ 3*d* ____ 4*p* ____ 5*s* ____ 4*d* ____

Write the electron configuration of a palladium atom:

_____

c. Neon

What is the symbol for neon?

What is the atomic number of neon?

How many protons does a neon atom have?

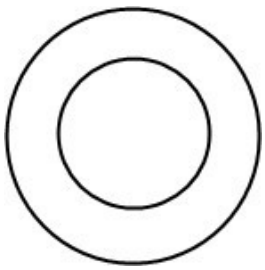
How many electrons does a neon atom have?

Identify how many electrons are in each subshell for a neon atom:

1*s* ____ 2*s* ____ 2*p* ____

Write the electron configuration of a neon atom: _____

Draw a shell diagram for an atom of neon. Label the protons, electrons, and nucleus. Use the shells provided below.



What do you notice about the 2nd shell for a neon atom?

d. Krypton

What is the symbol for krypton?

What is the atomic number of krypton?

How many protons does a krypton atom have?

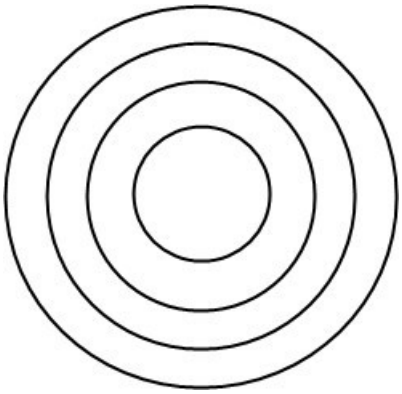
How many electrons does a krypton atom have?

Identify how many electrons are in each subshell for a krypton atom:

1*s* ____ 2*s* ____ 2*p* ____ 3*s* ____ 3*p* ____ 4*s* ____ 3*d* ____ 4*p* ____

Write the electron configuration of a krypton atom: _____

Draw a shell diagram for an atom of krypton. Only include the electrons here. Be careful where you place them.



What do you notice about the 4th shell for a krypton atom? (Careful, only the 4th shell)

What can you conclude about the outermost shell for atoms of all the noble gases?

3. Electron configurations – noble gas core

Write the shorthand (a.k.a. abbreviated or Noble gas) electron configuration for a *chlorine* atom:

Which Noble gas did you put in the brackets? Why?

Write the shorthand (a.k.a. abbreviated or Noble gas) electron configuration for a palladium atom:

4. Atomic radii

Describe the trend for atomic radii size from top to bottom on the periodic table.

Which is the largest atom in each of the following?

a) barium or calcium

b) oxygen, iodine, or selenium

Why are elements near the top of the periodic table smaller than elements listed near the bottom?

Describe the trend for atomic radii size horizontally on the periodic table (for elements in the same row/period).

Which is the largest atom in each of the following?

a) calcium or potassium

b) selenium, arsenic, or bromine

Why are elements on the right side of the periodic table smaller than elements on the left side?

Arrange the following atoms in order from smallest to largest.

a) aluminum, germanium, calcium

b) iodine, beryllium, phosphorus, sulfur, rubidium