

Atomic Theory 4: Subatomic Particles

Name: *Key*

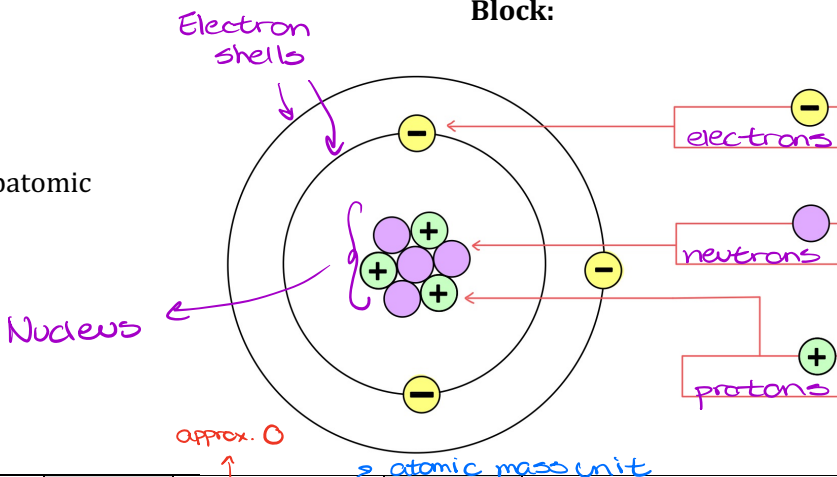
Date:

Block:

What is an atom made of?

An atom is made of three subatomic particles:

- Electrons
- Neutrons
- Protons



What is an electron?

Charge	<i>-1</i>	Mass	<i>approx. 0</i>	Location	<i>in the electron shells</i>
How many?	Same as the <u><i>atomic number</i></u> for a neutral atom				

Practice: Find the number of electrons for the following elements:

1. Silver: *47*
2. Palladium: *46*
3. Gallium: *31*
4. Fluorine: *9*
5. Cesium: *55*
6. Krypton: *36*

What is a proton?

Charge	<i>+1</i>	Mass	<i>1 amu</i>	Location	<i>in the nucleus</i>
How many?	Same as the <u><i>atomic number</i></u>				

Practice: Find the number of protons for the following elements:

1. Sodium: *11*
2. Neon: *10*
3. Einsteinium: *99*
4. Chlorine: *17*
5. Tin: *50*
6. Platinum: *78*

What is a neutron?

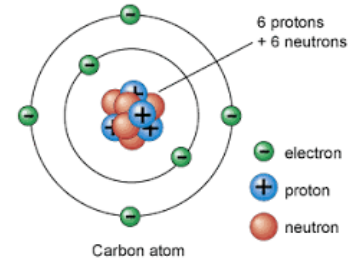
Charge	<i>0</i>	Mass	<i>1 amu</i>	Location	<i>in the nucleus</i>
How many?	$\text{Atomic mass} - \text{Atomic number} = \text{number of neutrons}$ <p><i>*Rounded</i></p> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">Atomic number →</div> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;"> 1 </div> <div style="margin-right: 10px;">← Symbol</div> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;"> H </div> <div style="margin-right: 10px;">← Name</div> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;"> Hydrogen </div> <div style="margin-right: 10px;">← Atomic mass</div> <div style="border: 1px solid black; padding: 5px;"> 1 </div> </div>				

Practice: Find the number of neutrons for the following elements! (Round the mass up or down)

1. Manganese: $55 - 25 = 30$
2. Bismuth: $209 - 83 = 126$
3. Osmium: $190 - 79 = 111$
4. Potassium: $39 - 19 = 20$
5. Sulfur: $32 - 16 = 16$
6. Arsenic: $75 - 33 = 42$

Practice:

1. The atom pictured to the right represents the element Carbon because the number of protons matches the atomic number and carbon is atomic number 6



2. If an atom has 17 protons, it must have 17 electrons.

⊕ ⊖

3. Fluorine has an atomic mass of 19 and an atomic number of 9, therefore, the number of neutrons is 10.

Atomic mass - Atomic number

4. Round the following atomic mass numbers to the nearest whole number: .5 ↑ .4 ↓

a. 131.29 131

b. 79.90 80

c. 51.99 52

d. 63.55 64

e. 14.01 14

f. 35.45 35

In summary:

	PROTON	ELECTRON	NEUTRON
Where is it found?	Nucleus	Electron shell	In the nucleus
Charge?	+1	-1	0, neutral
Mass: Heavy or light?	Heavy	Light	Heavy
How to find how many using the PT?	Atomic number	Atomic number	Atomic mass - Atomic number

round to nearest whole number

What am I?

1. Have a charge:

proton // electron // neutron

2. Have the heaviest mass:

proton // electron // neutron

3. Does not have a charge:

proton // electron // neutron

4. Has the lightest mass:

proton // electron // neutron

5. Found in the nucleus:

proton // electron // neutron

6. Have equal masses:

proton // electron // neutron

7. Found in shells that surround the nucleus:

proton // electron // neutron

8. Exist in equal quantities in all neutral atoms:

proton // electron // neutron

Name: _____

Block: _____

Subatomic Particles Practice

Fill in the following table. Please round the atomic mass.

Element Name	Element Symbol	Atomic Number	Atomic Mass	# of Protons	# of Electrons	# of Neutrons
1. Chlorine	Cl	17	35	17	17	18
2. Silver	Ag	47	108	47	47	61
3. Oxygen	O	8	16	8	8	8
4. Aluminum	Al	13	27	13	13	14
5. Cesium	Cs	55	133	55	55	78
6. Palladium	Pd	46	106	46	46	60
7. Ruthenium	Ru	44	101	44	44	57
8. Tungsten	W	74	184	74	74	110
9. Europium	Eu	63	152	63	63	89
10. Protactinium	Pa	91	231	91	91	140

d 1. What particles are found in the nucleus of an atom?

- a. Electrons
- b. Electrons and protons
- c. Neutrons
- d. Neutrons and protons

a 2. Which subatomic particle has the smallest mass?

- a. Electrons
- b. Neutrons
- c. Protons

b 3. Which subatomic particle has a charge of zero?

- a. Electrons
- b. Neutrons
- c. Protons

c 4. The atomic number tells us the

- a. Number of electrons in the atom
- b. Number of neutrons in the atom
- c. Number of electrons and protons in the atom
- d. Number of protons and neutrons in the atom

b 5. Challenge: Based on what you know, the atomic mass is the sum of the

- a. Electrons and protons
- b. Protons and neutrons
- c. Atomic number and electrons
- d. Atomic number and protons