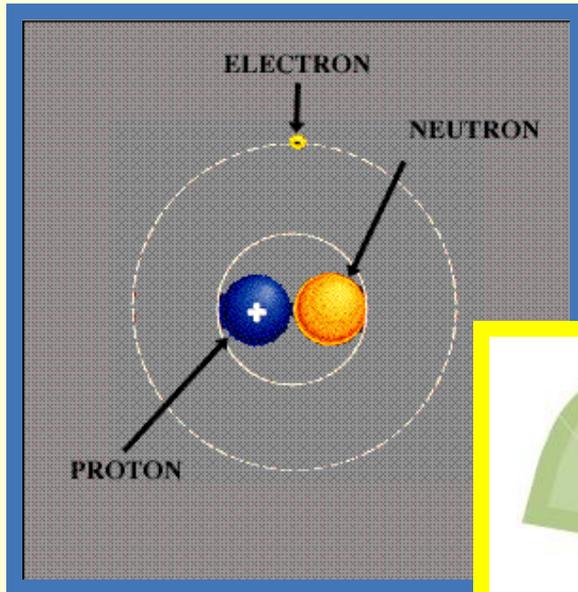


Atomic Structure and the Periodic Table



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PERIODIC TABLE OF THE ELEMENTS
<http://www.kf-split.hr/periodni/en/>

GROUP	PERIODIC TABLE OF THE ELEMENTS																18		
PERIOD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1	H 1 1.0079 HYDROGEN																	He 2 4.0026 HELIUM	
2	Li 3 6.941 LITHIUM	Be 4 9.0122 BERYLLIUM																	Ne 10 20.180 NEON
3	Na 11 22.990 SODIUM	Mg 12 24.305 MAGNESIUM																	Ar 18 39.948 ARGON
4	K 19 39.098 POTASSIUM	Ca 20 40.078 CALCIUM	Sc 21 44.956 SCANDIUM	Ti 22 47.867 TITANIUM	V 23 50.942 VANADIUM	Cr 24 51.996 CHROMIUM	Mn 25 54.938 MANGANESE	Fe 26 55.845 IRON	Co 27 58.933 COBALT	Ni 28 58.693 NICKEL	Cu 29 63.546 COPPER	Zn 30 65.39 ZINC	Ga 31 69.723 GALLIUM	Ge 32 72.64 GERMANIUM	As 33 74.922 ARSENIC	Se 34 78.96 SELENIUM	Br 35 79.904 BROMINE	Kr 36 83.80 KRYPTON	
5	Rb 37 85.468 RUBIDIUM	Sr 38 87.62 STRONTIUM	Y 39 88.906 YTRIUM	Zr 40 91.224 ZIRCONIUM	Nb 41 92.906 NIOBIUM	Mo 42 95.94 MOLYBDENUM	Tc 43 (98) TECHNETIUM	Ru 44 101.07 RUTHENIUM	Rh 45 102.91 RHODIUM	Pd 46 106.42 PALLADIUM	Ag 47 107.87 SILVER	Cd 48 112.41 CADMIUM	In 49 114.82 INDIUM	Sn 50 118.71 TIN	Sb 51 121.76 ANTIMONY	Te 52 127.60 TELLURIUM	I 53 126.90 IODINE	Xe 54 131.29 XENON	
6	Cs 55 132.91 CAESIUM	Ba 56 137.33 BARIUM																	Rn 86 222 RADON
7	Fr 87 (223) FRANCIUM	Ra 88 (226) RADIUM																	

Legend:
 Metal (blue), Alkali metal (light blue), Alkaline earth metal (medium blue), Transition metals (dark blue), Lanthanide (purple), Actinide (pink)
 Semimetal (orange), Chalcogens element (light green), Halogens element (medium green), Noble gas (yellow-green)
 Nonmetal (green)
 STANDARD STATE (25 °C; 101 kPa):
 Ne - gas, Fe - solid, Ga - liquid, Tc - synthetic

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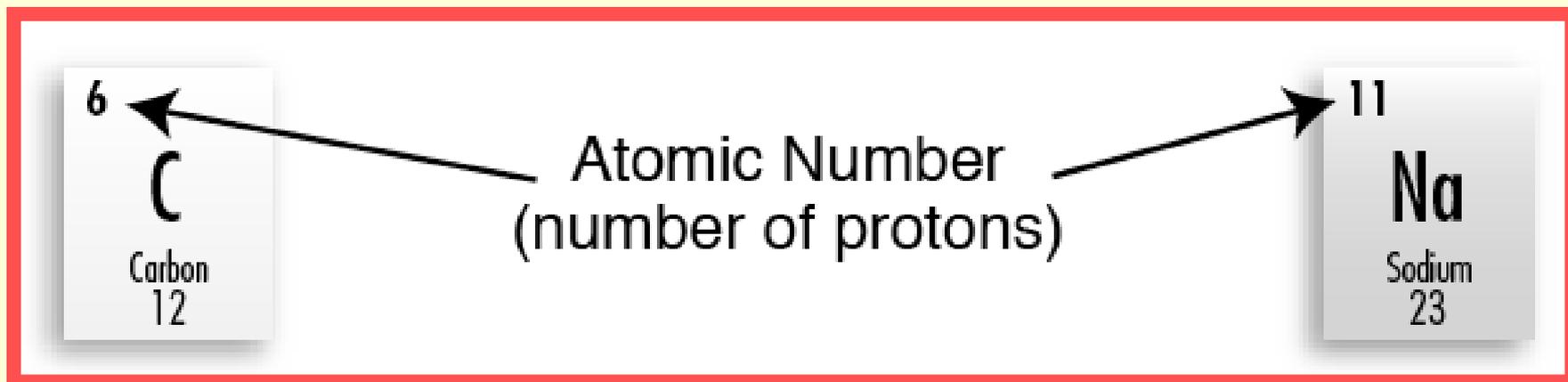


Atomic Structure & the Periodic Table Today's date

Focus Question: How
does the structure of
an atom help you
make sense of the
Periodic Table of the
Elements?



Look at your copy of the Periodic Table. The number at the top left corner of the block for each element is the **atomic number** of the element. The atomic number is the number of **protons** in an atom of the element. All atoms of an element have the SAME number of protons.



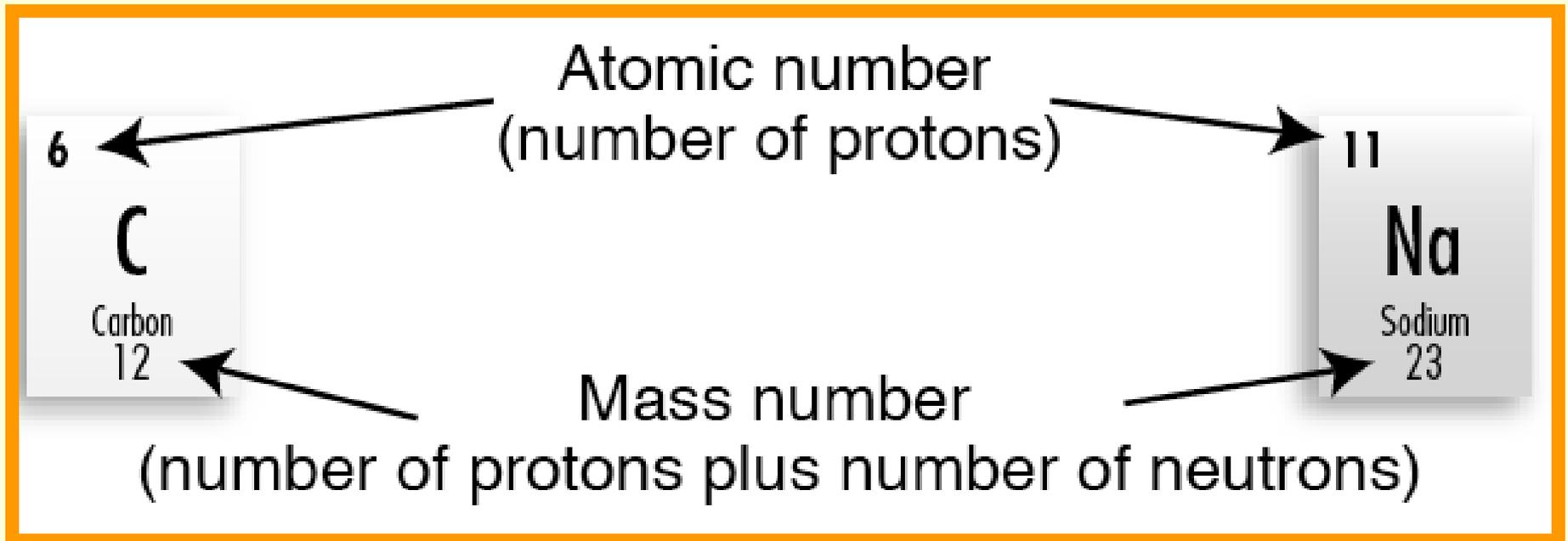
The elements in the Periodic Table are arranged from left to right and top to bottom in order of increasing atomic number.

13	IIIA	14	IVA	15	VA	16	VIA	17	VIIA	HELIUM
5 10.811	B BORON	6 12.011	C CARBON	7 14.007	N NITROGEN	8 15.999	O OXYGEN	9 18.998	F FLUORINE	10 20.180 Ne NEON
13 26.982	Al ALUMINIUM	14 28.086	Si SILICON	15 30.974	P PHOSPHORUS	16 32.065	S SULPHUR	17 35.453	Cl CHLORINE	18 39.948 Ar ARGON
39 31 69.723	Ga GALLIUM	32 72.64	Ge GERMANIUM	33 74.922	As ARSENIC	34 78.96	Se SELENIUM	35 79.904	Br BROMINE	36 83.80 Kr KRYPTON

Atomic Mass Number

The number in the bottom of the block for each element is called the *atomic mass number*.

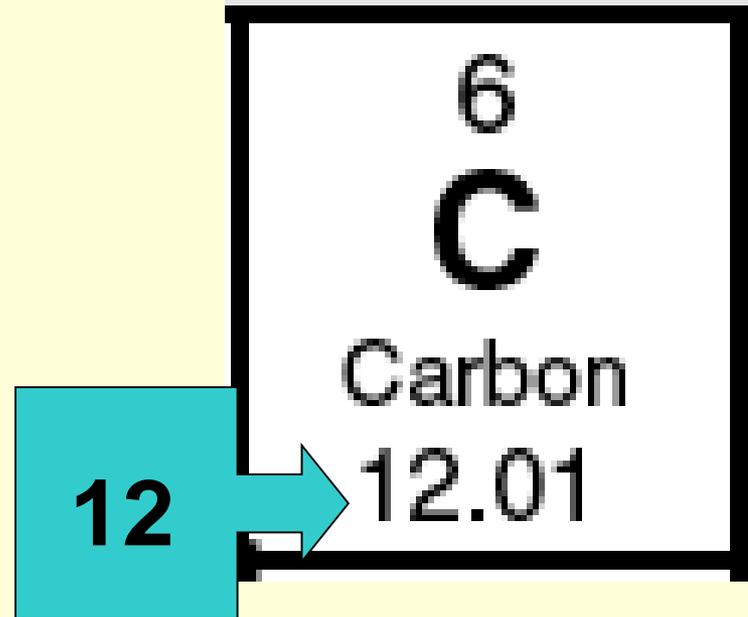
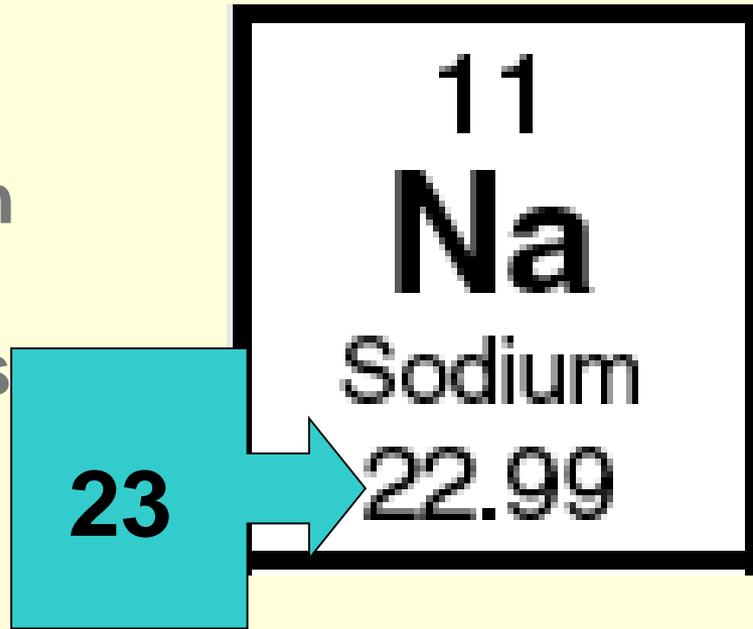
This is the number of **protons** PLUS the number of **neutrons** in the atom of the element.



Almost all of the mass of the element is in the nucleus of the atom, which contains the **protons** and the **neutrons**. So, the mass numbers explain how the masses of each elements compare.

For example, sodium (Na) has a mass number of 23 and carbon (C) has a mass number of only 12.

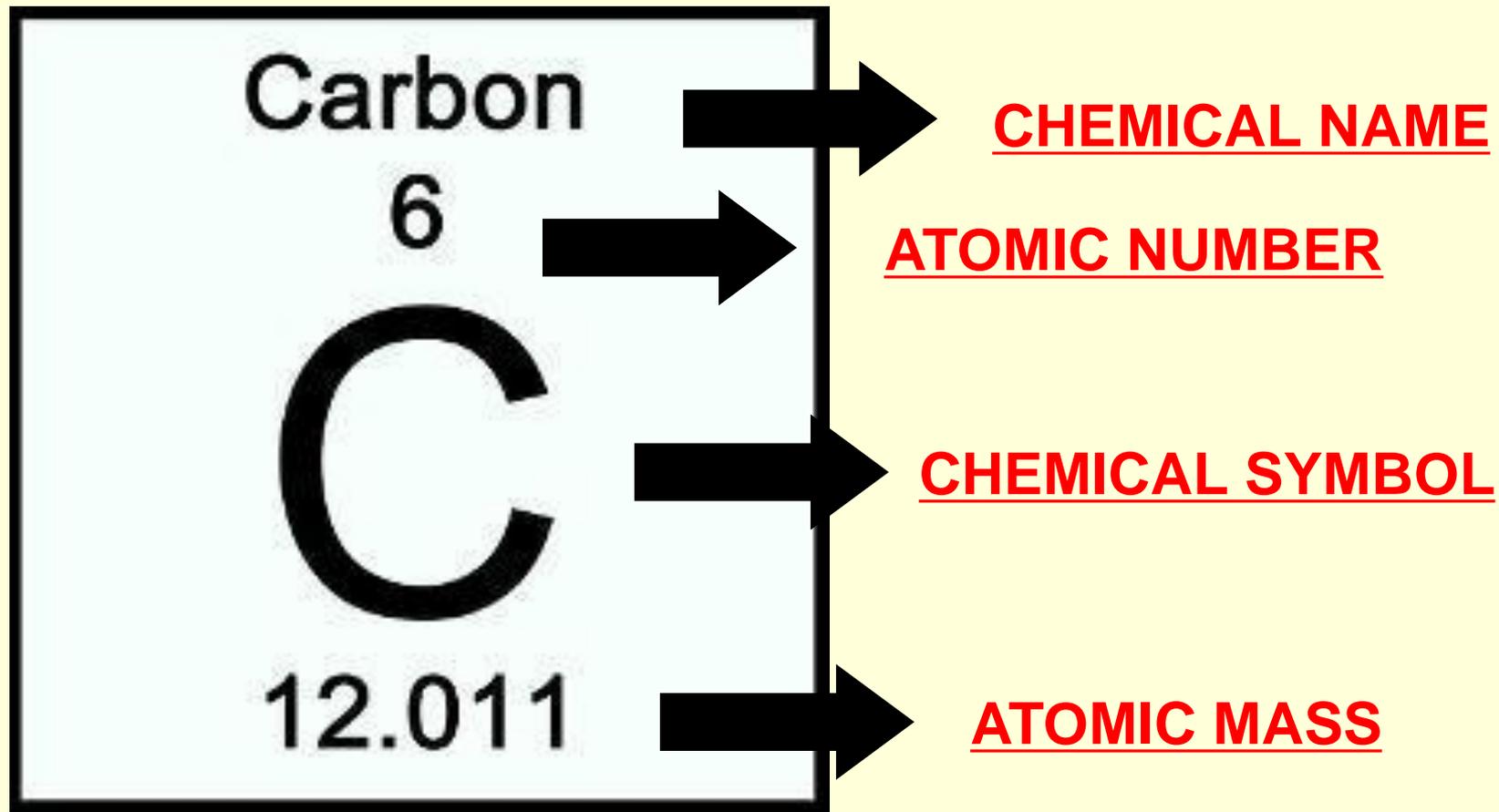
Question: how many neutrons does each atom have in its nucleus?



Easy Atomic Math!

- You can determine the number of protons and neutrons of an atom from the atomic number and mass number of each atom
- **Mass Number = # of protons + # of neutrons**
- **Atomic # = # of protons (OR # of electrons)**

Sample “Element Block”



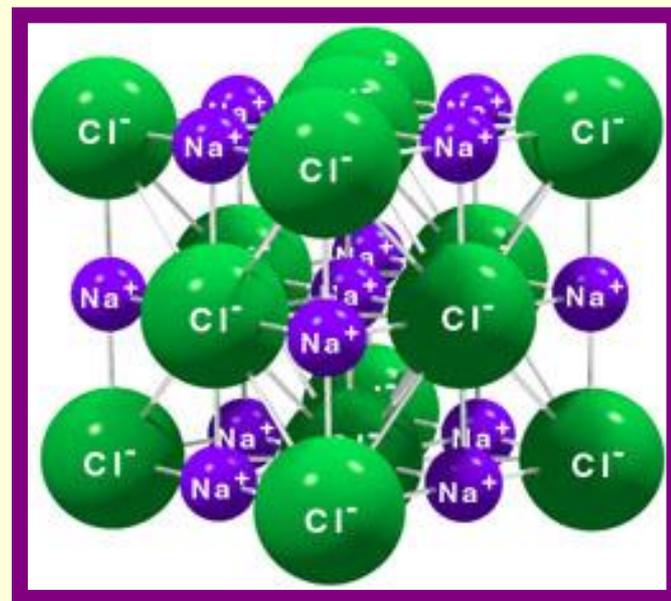
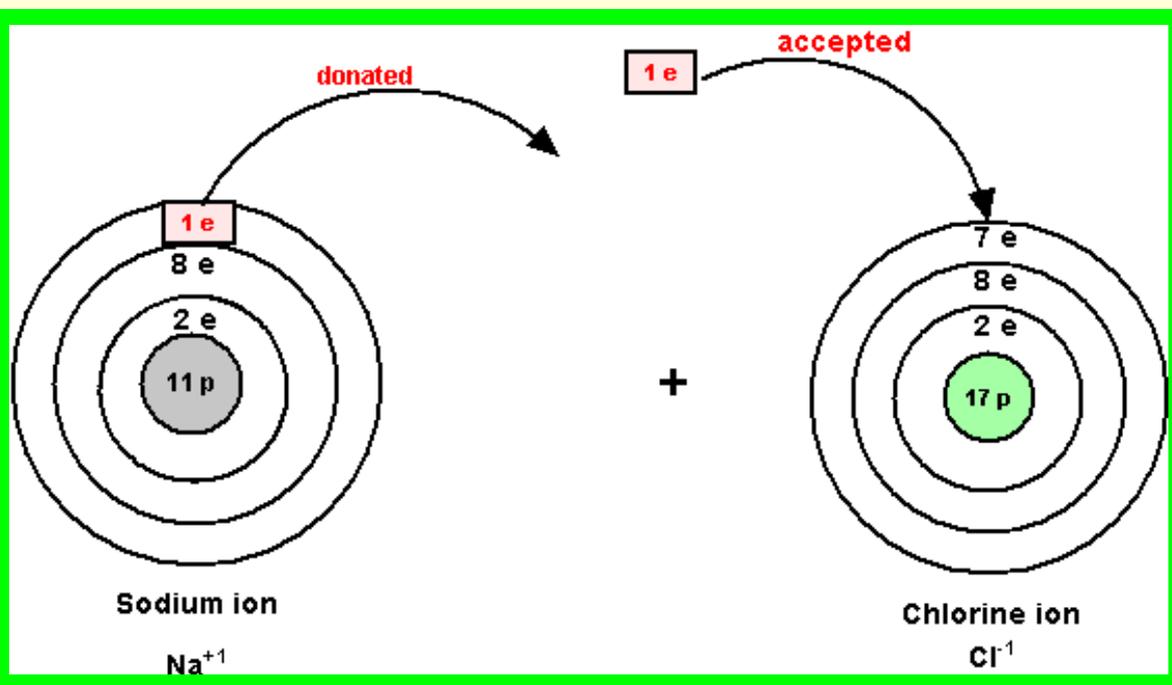
LOS to Record and Remember...

- add to page 109 in the NB

Atomic number: the number of protons in an atom of an element (or the number of electrons)

Atomic mass: the number of protons plus the number of neutrons in the atom of an element

Atoms are usually neutral. This is because they have an equal number of protons and electrons. Sometimes an atom can have a different number of protons and electrons - then it isn't an atom any more, it is called an **ion**. An ion is a single atom or a group of atoms that has a positive or negative electric charge. These are important in chemical bonding.



	13	14	15	16	17	He 4.00
	5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
	13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
12 Zn 5.39	31 Ga 69.72	32 Ge 72.61	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80

The **ATOMIC NUMBER** of an element is equal to...
the number of **PROTONS**. How many protons does Carbon have?

What if I took away 1 proton, what would I have then?

What if I added 10 protons, what would I have then?

What if I added 30 protons, what would I have then?

Nothing other than Carbon can have 6 protons - EVER!!

Two more "RULES" to remember...

Add to your notebook under the last LOS word written. Be sure to complete the ...

1. All atoms of the same element have the _____ number of _____.

2. Atomic _____ = # of protons (or # of electrons)

Atomic mass = # of protons + # of _____

Atomic Structure and the Properties of Elements

For Thought: The identity of each Element comes from the number of Protons in the Atom.

Look on your P.T. at carbon and nitrogen, 2 elements that are right next to each other. Carbon is a solid up to a very high temp (3600 C). Nitrogen is a gas until it is cooled to a very low temperature (-196 C). This HUGE difference in the melting points of 2 adjacent elements shows that a slight change in the atomic structure must result in VERY DIFFERENT set of properties for each element.

6 C Carbon 12.01	7 N Nitrogen 14.01
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Elements Chart

Directions: use your periodic table to fill in the missing information about each of the given elements.

Remember:

Atomic Number = # of protons (or # of electrons)

Atomic Mass = # of protons + # of neutrons

Element	Atomic Number	Atomic Mass	Protons	Neutrons	Electrons
Li	3	7			
P	15	31			
Cl		35	17		
Ni	28			31	
K		39			19
Ag	47			61	
H		1	1		
Si				14	14
W			74	110	
Ne				10	10

Next...

- Complete the first page of the Atom Basics worksheet.
- Watch the BrainPop video “Periodic Table of Elements”
 - Take the quiz and share your score with Mr. Bridges.