Objectives:

1. Students will be understand the similarities and differences between an element, an atom, and a molecule.
2. Students will know what electrons, protons, and neutrons are.
3. Students will understand the concepts of atomic number and atomic mass and will be able to find this information on a periodic table.
4. Students will be able to use a periodic table to find the number of protons, electrons, and neutrons an element has.

What is biochemistry?

- Our topic for the next several weeks
- Looks at the chemicals that make up organisms
- Looks at the chemical reactions that occur in organisms

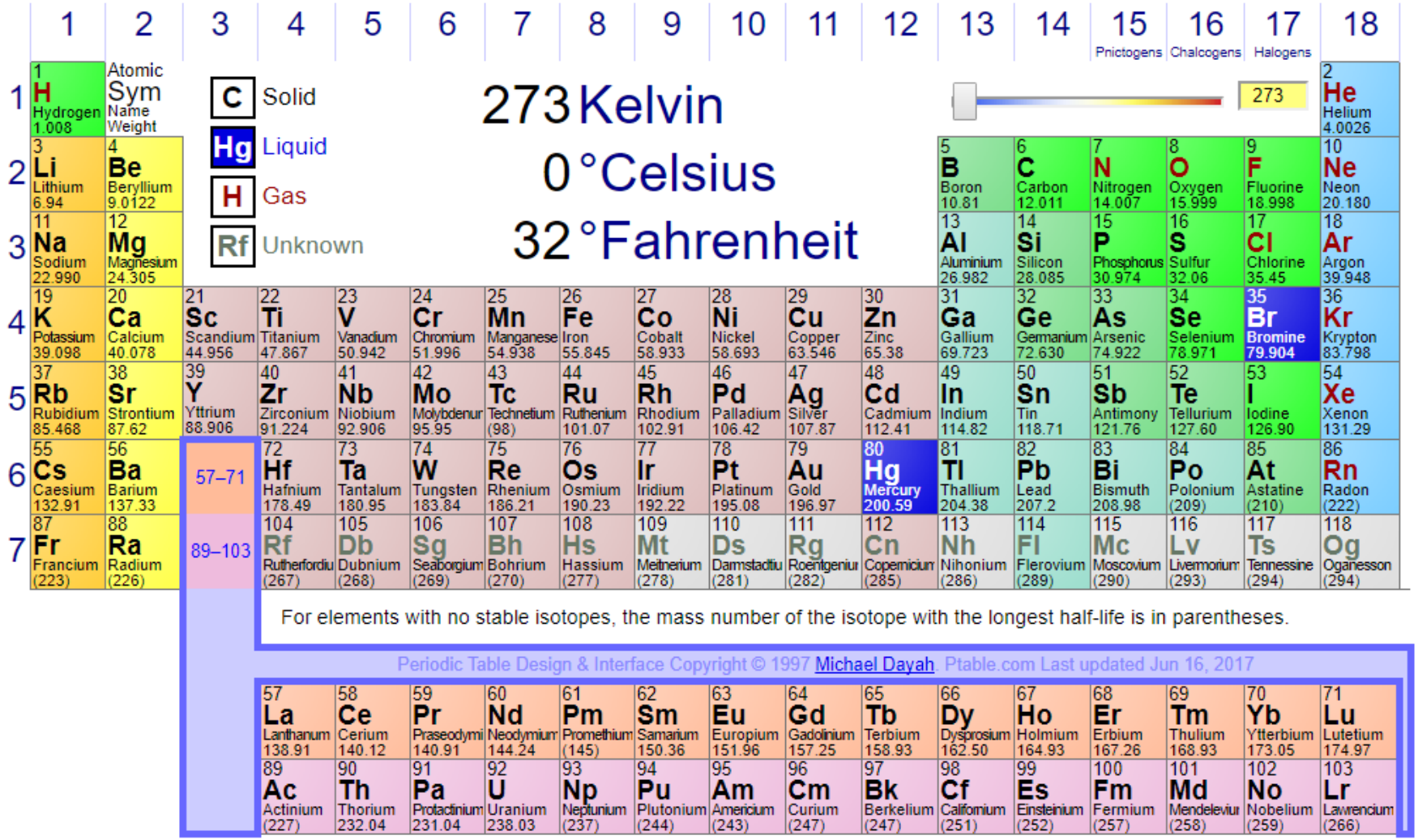
Why are we studying biochemistry?

Chemicals & chemical reactions are at the heart of everything else we might look at in Biology

Element: A type of atom - major differences between elements (like a 2x3 vs. 1x2 lego)

Atom: the building block of everything (minor differences between atoms of the same element - like different colors of 2x3 lego)

Molecule: Groups of atoms hooked together (pretty strongly)


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
15 Pnictogens
16 Chalcogens
17 Halogens
Atomic
Sym
Name
Weight
C Solid
Hg Liquid
H Gas
Rf Unknown
273 Kelvin
0 °Celsius
32 °Fahrenheit
273
1 H Hydrogen 1.008
2 He Helium 4.0026
3 Li Lithium 6.94
4 Be Beryllium 9.0122
5 B Boron 10.81
6 C Carbon 12.011
7 N Nitrogen 14.007
8 O Oxygen 15.999
9 F Fluorine 18.998
10 Ne Neon 20.180
11 Na Sodium 22.990
12 Mg Magnesium 24.305
13 Al Aluminium 26.982
14 Si Silicon 28.085
15 P Phosphorus 30.974
16 S Sulfur 32.06
17 Cl Chlorine 35.45
18 Ar Argon 39.948
19 K Potassium 39.098
20 Ca Calcium 40.078
21 Sc Scandium 44.956
22 Ti Titanium 47.867
23 V Vanadium 50.942
24 Cr Chromium 51.996
25 Mn Manganese 54.938
26 Fe Iron 55.845
27 Co Cobalt 58.933
28 Ni Nickel 58.693
29 Cu Copper 63.546
30 Zn Zinc 65.38
31 Ga Gallium 69.723
32 Ge Germanium 72.630
33 As Arsenic 74.922
34 Se Selenium 78.971
35 Br Bromine 79.904
36 Kr Krypton 83.798
37 Rb Rubidium 85.468
38 Sr Strontium 87.62
39 Y Yttrium 88.906
40 Zr Zirconium 91.224
41 Nb Niobium 92.906
42 Mo Molybdenum 95.95
43 Tc Technetium (98)
44 Ru Ruthenium 101.07
45 Rh Rhodium 102.91
46 Pd Palladium 106.42
47 Ag Silver 107.87
48 Cd Cadmium 112.41
49 In Indium 114.82
50 Sn Tin 118.71
51 Sb Antimony 121.76
52 Te Tellurium 127.60
53 I Iodine 126.90
54 Xe Xenon 131.29
55 Cs Caesium 132.91
56 Ba Barium 137.33
57–71
72 Hf Hafnium 178.49
73 Ta Tantalum 180.95
74 W Tungsten 183.84
75 Re Rhenium 186.21
76 Os Osmium 190.23
77 Ir Iridium 192.22
78 Pt Platinum 195.08
79 Au Gold 196.97
80 Hg Mercury 200.59
81 Tl Thallium 204.38
82 Pb Lead 207.2
83 Bi Bismuth 208.98
84 Po Polonium (209)
85 At Astatine (210)
86 Rn Radon (222)
87 Fr Francium (223)
88 Ra Radium (226)
89–103
104 Rf Rutherfordium (267)
105 Db Dubnium (268)
106 Sg Seaborgium (269)
107 Bh Bohrium (270)
108 Hs Hassium (277)
109 Mt Meitnerium (278)
110 Ds Darmstadtium (281)
111 Rg Roentgenium (282)
112 Cn Copernicium (285)
113 Nh Nihonium (286)
114 Fl Flerovium (289)
115 Mc Moscovium (290)
116 Lv Livermorium (293)
117 Ts Tennessine (294)
118 Og Oganesson (294)
For elements with no stable isotopes, the mass number of the isotope with the longest half-life is in parentheses.
Periodic Table Design & Interface Copyright © 1997 Michael Dayah Ptable.com Last updated Jun 16, 2017
57 La Lanthanum 138.91
58 Ce Cerium 140.12
59 Pr Praseodymium 140.91
60 Nd Neodymium 144.24
61 Pm Promethium (145)
62 Sm Samarium 150.36
63 Eu Europium 151.96
64 Gd Gadolinium 157.25
65 Tb Terbium 158.93
66 Dy Dysprosium 162.50
67 Ho Holmium 164.93
68 Er Erbium 167.26
69 Tm Thulium 168.93
70 Yb Ytterbium 173.05
71 Lu Lutetium 174.97
89 Ac Actinium (227)
90 Th Thorium 232.04
91 Pa Protactinium 231.04
92 U Uranium 238.03
93 Np Neptunium (237)
94 Pu Plutonium (244)
95 Am Americium (243)
96 Cm Curium (247)
97 Bk Berkelium (247)
98 Cf Californium (251)
99 Es Einsteinium (252)
100 Fm Fermium (257)
101 Md Mendelevium (258)
102 No Nobelium (259)
103 Lr Lawrencium (266)

Proton: Positive charge (large)
is for Proton
same size

Neutron: No charge (large)
Neutral

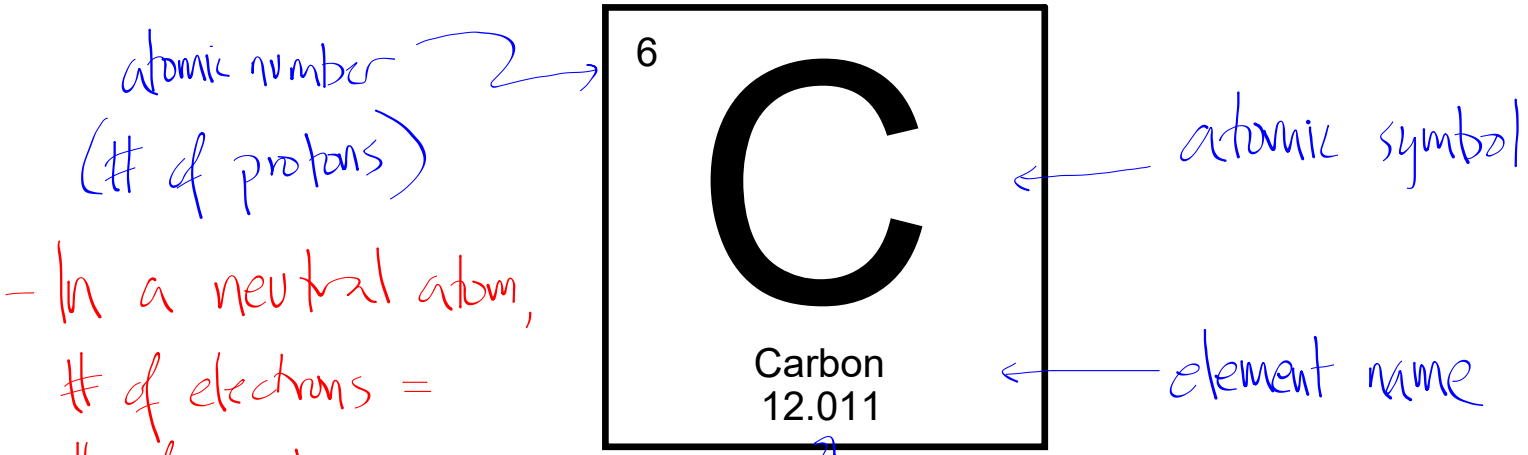
Electron: Negative charge (tiny, tiny tiny!)

Building blocks of atoms

Atomic Mass: The "weight" of an atom –
atomic mass = protons + neutrons

Atomic Number: # of protons an atom has
(each element has a different atomic number – # of neutrons & electrons can change)

Reading and interpreting the information in each box:



atomic number
(# of protons)

atomic symbol

element name

atomic mass
(# of protons + # of neutrons)

- In a neutral atom,
  # of electrons =
  # of protons
- # of neutrons =
  atomic mass - atomic number
  (round to nearest whole number!)