SCH4U

Orbitals

- Are regions of space around the nucleus where the probability of finding an electron is high
- The electron no longer has a set path that it follows; it can be anywhere within the orbital
- Maximum of 2 electrons per orbital
- p sublevel has 3 orbitals, d has 5 and f has 7
- each orbital has a distinctive shape
  S's are spherical, 1s being smaller than 2s, etc
  P's are somewhat like the figure 8, on the x, y and z axes
  D's and f's are crazy!

Orbital diagrams:

- are similar to electron configurations except that electrons are shown in their orbital and their direction of spin is shown

i.e. Na

Electron configuration	$1s^2$	$2s^2$	$2p^6$	$3s^1$
Orbital diagram	1s	2s	2p	3s

Pauli Exclusion Principle: no 2 electrons can have the same 4 quantum numbers; no 2 electrons in the same orbital can have the same spin.

Hund's Rule: electrons spread out as much as possible in orbitals; they don't double up in one orbital until they have to

Draw orbital diagrams for:

Nitrogen:

Oxygen:

Scandium:

Manganese:

Magnesium ion:

Nitride ion:

Iron:

Fe^{2+}:

Fe^{3+}

*Note: d orbitals are the most stable when they are completely filled, followed by when they are half filled.

Nickel:

Ni^{2+}:

Ni^{3+}:

Pb^{2+}:

Pb^{4+}:

Anomalous Orbital Diagrams:

Cr:

Cu: