Standard Model (p. 720 – 724)

Despite what you learned in grade 9 Chemistry, there are things smaller than protons and neutrons. Electrons, however, do seem to be a fundamental particle in that they do not break down into smaller bits. The standard model of the atom goes beyond just 'proton, neutron and electron'. What IS matter? See our scientific process pg. 721.

Standard model → explains fundamental (most basic) particles and their interactions in attempt to explain atomic model, radioactive decay etc…. There are 2 families of particles.

1) Leptons = family of fundamental particles (electron is most famous one!!)
   - Each one has charge, spin and mass
   - Occur in pairs. There is always a 'neutrino twin'. Neutrino is neutral. The other one has +ve or –ve charge
     Electron and electron neutrino, antiparticle (positron) and positron neutrino
   - Affected by weak nuclear force (p. 722)
   - Neutrinos – hard to detect. The SNO lab in Sudbury is 2 km below surface embedded in rock to protect from stray cosmic rays. Detect 8 -10 /day
     $73 million to build…..100 USA/Canadian scientists

2) Quarks – 2nd fundamental family of particles (p. 723)
   - There are 6 that are creatively named in 3 pairs. Each quark has an antiquark
     ie: **up/down** **strange/charm** **bottom/top**

Quarks always are bundled. A bundle of quarks is called a 'hadron'

Hadron → 2 types

Baryon = 3 quarks ie: proton is a baryon & neutron is a baryon

Meson = 1 quark + antiquark

Although quarks can have fractional charges (1/2), hadrons (groups of quarks) always have full integral charges.

Force Particles = Bosons

FORCE	**PARTICLE**
Gravity →	Graviton particle
EMR →	photon
Strong nuclear force →	gluons
Weak nuclear force →	W+ W- Z^o