Physicists believe that matter – created by the Big Bang some 14 billion years ago – is made up of 12 subatomic particles and six force carriers. One, the Higgs boson, gives matter mass and holds the universe together.

**Atom**

- **Nucleus**: Made of neutrons and protons...
- **Electron**: The nucleus is made up of quarks...

**Fundamental particles and forces (year of discovery)**

- **LEPTONS**
  - *These particles exist on their own*
  - Electron 1897
  - Electron neutrino 1956
  - Muon 1937
  - Muon neutrino 1962
  - Tau 1975
  - Tau neutrino 1975
  - Most matter on earth is made from these four particles

- **QUARKS**
  - *Quarks only exist bound together*
  - Up 1994
  - Down 1977
  - Strange 1947
  - Charm 1973
  - Bottom 1977
  - Top 1994

- **FORCE CARRIERS**
  - Photon 1900
  - Z boson 1983
  - W+ boson 1983
  - W- boson 1983
  - Gluon 1979

**2012: New particle could be Higgs boson**

Sources: CERN, Particle Physics and Astronomy Research Council

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