

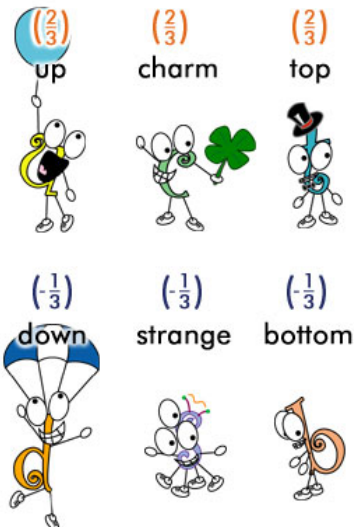
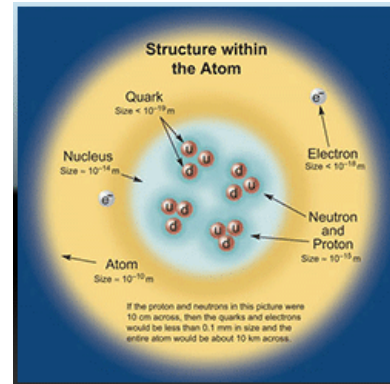
## Hadrons Are a Little Quarky

Physicists have discovered that protons and neutrons are composed of even smaller particles called quarks. Quarks are one type of matter particle. Most of the matter we see around us is made from protons and neutrons, which are composed of quarks.

There are six quarks, but physicists usually talk about them in terms of three pairs: up/down, charm/strange, and top/bottom. For each of these quarks, there is a corresponding antiquark. Antiparticles look and behave just like their corresponding matter particles, except they have opposite charges.

Quarks are never found alone (they are in a herd). A meson is one quark and one antiquark and a baryon is any hadron with 3 quarks. The proton is an example of a baryon (see picture above). Although individual quarks have fractional electrical charges, they combine such that hadrons have a net integer electric charge.

Another property of hadrons is that they have no net color (i.e. white) charge even though the quarks themselves carry color charge. A “white” meson must have a color and its anti-color. A “white” baryon has all three colors or anti-colors.



Your assignment is to take the cards that you are given and make as many hadrons as possible following the creation rules (below). The highest score will be given to the group that has “created” the most baryons in the least amount of time. Mesons will be worth fewer points than baryons.

### Rules for Quarks

1. Quarks combine in pairs (mesons) or triplets (baryons)
2. The net charge of all hadrons is 0, +1, or -1
3. The net “color” of all hadrons is “white”.