

Name \_\_\_\_\_

## Quiz

1. What is the charge of an up quark? \_\_\_\_\_
2. What is the charge of an anti-up quark? \_\_\_\_\_
3. What is the lepton number of an electron? \_\_\_\_\_
4. What is the lepton number of an anti-electron (positron)? \_\_\_\_\_
5. What is the baryon number of a proton? \_\_\_\_\_
6. What is the strangeness of a down quark? \_\_\_\_\_
7. Which is bigger:            quark            OR            baryon    ?
8. Which has other things inside of it:            lepton            OR            quark            OR            meson    ?
9. What two traits make a neutrino unique? \_\_\_\_\_            \_\_\_\_\_
10. Discuss how these two traits make neutrinos both ideal and difficult to detect for IceCube.

## KEY:

1.  $+2/3e$
2.  $-2/3e$
3.  $+1$
4.  $-1$
5.  $+1$
6.  $0$
7. baryon
8. meson
9. chargeless; nearly massless
10. because neutrinos are chargeless and nearly massless, they are not effected by electric, magnetic, or gravitational fields. They travel from their source to earth is a straight line, so if we can detect one we can easily trace back to its sources. But, because they're chargeless and nearly massless, neutrinos can be difficult to detect.