Life as we know it

(a) Rooster is an alien astronomer living on Proxima Centauri b. They are carbon-based. need water to survive, and their genetic code is comprised of DNA. What observations might they make to find life like their own out in the Universe?

(b) In what ways might Rooster's search for life be limited?

(c) Rooster's colleague, Stump, is a biologist. Stump is certain that chirality is a key difference between life and non-life — a clue to the "missing link." How might Rooster's expertise come into play here?

(d) Why might Rooster be justified in thinking that water is necessary for life to exist?

(e) A core aspect of Rooster's PhD thesis (yes, these aliens have a remarkably similar system of higher education!) is a search for planets in the habitable zone. Why might a definition of a "habitable zone" be controversial?

(f) Now, let's recall that Rooster and Stump are both fictional. Are we alone in the Universe?

Making a splash

(a) What is impact frustration?

(b) Might the Earth have felt the effects of impact frustration before, during, or after the collision that formed our Moon?

(c) Could life on Mars have felt the effects of impact frustration during the process that led to it having moons? WHat about life on Jupiter?

Challenge questions

(a) Would it be possible to remotely sense the chirality of a molecule?

(b) One theory as to why we have not detected any alien civilizations is that there exist a number of "Great Filters": milestones in a civilization's history that are absolutely destructive, such as the invention of nuclear weapons. Do you think we've made it past all such Great Filters? Might more await?