

**A magnetic attraction**

One day, as you're walking down the street, the Earth's magnetic field turns off.

(a) Name two reasons why this is an issue.

(b) In a rush to fix these problems, Earth's scientists come together to try and create a new magnetic field for the Earth. From a planetary perspective, what three ingredients will they need?

(c) Are there certain times at which the Sun might be more dangerous in this scenario than others? Why?

(d) What are sunspots? Could the Sun having more or fewer sunspots directly endanger the Earth?

**Planets and moons**

(a) On Earth, we're mostly familiar with helium as a gas. How could there be helium rain on Saturn and Jupiter?

(b) What's the difference between a planet and a moon? A planet and a star?

(c) What are two ways to acquire a moon?

(d) Why do some Galilean moons have differentiated interiors, while others do not?

(e) What are the two "flavors" of moons? How does this tie into the formation of those moons?

(f) Why would Titan be exciting from an astrobiology perspective?

**Challenge questions**

(a) Ganymede is the largest moon in the Solar System, orbiting Jupiter. Your friend Ho Yin has just discovered further evidence of Ganymede's tectonic activity — great! But what is meant by such tectonic activity? How can it be tectonically active? Does it have moving plates? Could there be large-scale earthquakes?

(b) Why don't coronal mass ejections happen all over the Sun, all the time?

(c) Why aren't planetary orbits bound by magnetism (or electricity — or electromagnetic forces in general)?

(d) Why don't we say that moons are bound by tidal forces?