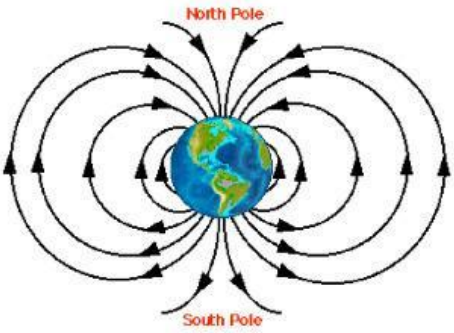
Earth's Magnetic Field

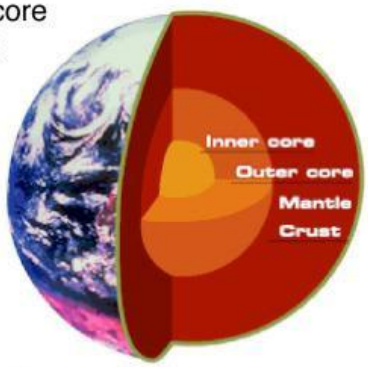


You can use a compass to help find your way because the earth is like a big magnet. A compass needle points North because it lines up with the earth's magnetic field. In fact, the first compasses came from the earth itself. Ancient sailors used a magnetic rock called lodestone to tell where to go. They would hang it from a string and it would line up with the earth, just like a modern-day compass does.



The magnetic field of Earth looks a lot like the field around a bar magnet. It extends outwards from the magnetic poles and forms loops around the planet. Like a bar magnet, the field around the earth is strongest at the magnetic poles. Earth's magnetic poles do not match up exactly with its North and South poles. That means a compass does not really point to true north. It is close enough that it can get you moving in the right general direction though.

So, what causes the earth to have a magnetic field? Scientists think it has to do with the liquid outer core of the earth. The outer core is mostly made of molten iron and nickel. You may know that iron and nickel are two of the three metals that can be turned into a magnet (cobalt is the other one). As this liquid metal layer moves around, it creates currents that give the earth its magnetic field.



Earth's magnetic field protects us from dangerous space weather as well. The sun ejects a stream of charged particles called the solar wind. The magnetic field deflects this radiation and keeps it from reaching the earth's surface. Sometimes these charged particles get trapped by the magnetic field. This gives us auroras, or the Northern and Southern Lights.

Data shows that the earth's magnetic field has been getting weaker over the last 100 years. This is pretty normal for the earth. Scientists can see the history of the magnetic field by studying volcanic rocks. These rocks show that there are times when the field almost disappears completely. It also shows that the field reverses direction from time to time. About 20 of these reversals have occurred in the last one million years.

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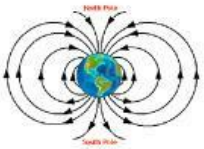
Reading Guide



1. A compass helps you find your way because the earth is like a big _____.
2. A compass needle points _____ because it lines up with the earth's magnetic field.
3. Ancient sailors used a magnetic rock called _____ as a compass.
4. The magnetic field around earth looks like the field around a _____ _____.
5. Earth's field is _____ at its magnetic poles.
6. Earth's _____ _____ do not line up exactly with its North and South poles.
7. Earth's magnetic field is caused by currents in its _____ _____.
8. The outer core of the earth is made of molten _____ and _____.
9. Earth's magnetic field protects us from the _____ _____.
10. The magnetic field has been getting _____ over the last 100 years.
11. The magnetic field of the earth has reversed directions about _____ times.

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