



Rainbow trout are fish that swim in fast-flowing rivers.

# Magnetic Force and Rainbow Trout

If you hold two magnets near each other, they affect each other even before they touch. Hold them one way, and you can feel them pushing each other apart. Hold them another way, and you can feel them pulling together. These pushes and pulls are magnetic forces. Imagine being able to sense magnetic forces, even without touching a magnet. You could if you were a rainbow trout!

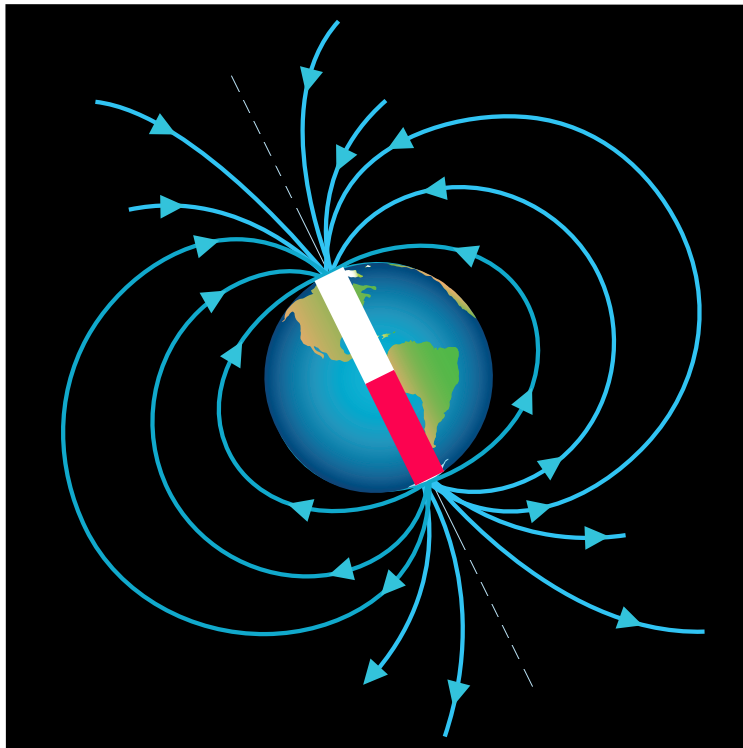
Forces are pushes and pulls that can change the motion of an object. Some forces require that objects touch. For example, if you want to hold a magnet in your hand, your hand has to touch the magnet for you to exert the force to pick it up. Other forces, like magnetic forces, can act at a distance. That means magnets don't need to be touching in order to exert magnetic force on one another. However, as magnets get closer together, the magnetic force becomes stronger.

Also, stronger magnets exert a stronger force. Every magnet has two ends called poles. When magnets interact, opposite poles attract (pull on) each other and like poles repel (push on) each other. Magnetic forces can be explained by magnetic fields. A magnetic field is the space around a magnet where that magnet can exert magnetic force on other objects.

Rainbow trout have tiny bits of a metallic mineral called magnetite in some of their body cells. Magnetite is affected by Earth's magnetic field. No matter which way a trout is facing, one end of the magnetite points north. It's as if each trout has millions of tiny compasses in its body!

Rainbow trout are able to sense magnetic fields, and they use this sense to find their way. The magnetic field a rainbow trout senses is generated by Earth itself. Earth's core is made of iron, and it generates a huge magnetic field that reaches all the way out into space. The whole planet acts like a giant magnet.

## Earth's Magnetic Field



The area where Earth's magnetic force can act on objects is called Earth's magnetic field. The arrows show the direction in which the north end of a compass needle would point.