

S414

Magnetic Field

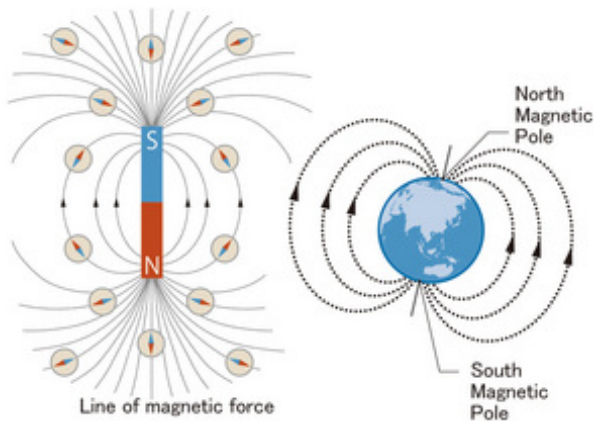
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■ Purpose of Exhibition

There is a force called the 'Magnetic Field' created around magnets. In the exhibit, you will have a chance to observe the shape of a magnetic field around a bar magnet.



■ Additional Knowledge



In the exhibit, a large bar magnet is placed in the center, with multiple small compasses spread all around. When rotating the bar magnet, the compass orientation changes and you can observe the shape of the magnetic field created by the bar magnet in the center.

A magnetic field is created around magnets and electromagnets. This field is represented by the strength and direction of the magnetic force. In this exhibit, you cannot know the strength of the magnetic force, but you can know the direction of the magnetic force by the compass needle direction.

In a magnet, the direction from North Pole to South Pole of the magnetic force is called the line of the magnetic force.

The pattern produced by the compass in the exhibit shows the line of magnetic force.

Using a compass, you can know which direction is north. This is because earth is a large magnet. The reason why the earth is a large magnet is that current is flowing to the core in the center of the earth. The electricity amounts to billions of amperes. If the earth's magnet were at the top of the rotation axis of earth, the compass would be pointing north.

Unfortunately, that is not the way it is.

Therefore, in Nagoya, the direction to north pointed to by a compass is off by 7 degrees from the true north to the west.

The Earth's magnetic field is not constant.

The north and south poles pointed to by a compass are slowly moving.

In the last 100 years they have moved more than 1000 km. Recently, the compass of N pole points at the north, however, the direction of the north and south poles have been switched over and over through the history of earth.

[We Survive Because of the Earth's Magnetic Field]

In space, there are cosmic rays carrying harmful high energy to living things. They cause injuries to genes, hitting living things. However, the cosmic rays containing electricity are bent by the earth's magnetic field and cannot reach the earth. We are protected from harmful cosmic rays by the magnetic field of the earth. Furthermore, crows traveling long distances are considered to determine their direction by relying on the earth's magnetic field.

[People who Discovered the Compass] When sailing in a boat, for navigation on the Pacific Ocean or the Atlantic Ocean where land cannot be seen at all, an invention such as the compass was necessary.

The compass evolved and was improved in Europe, but it is believed that it was first invented in China. From playing with the needles floating on the surface of the water to fortune telling games, it is thought they noticed that the needle charged with magnetic force was pointing south and north.

Article by Yoshitaka Yamada, curator