Magnets influence each other. This influence is called magnetic force. The magnetic force can (unlike the force of gravity) either push the magnets apart (repulsion) or pull them together (attraction). This force is exerted up to a certain distance. To describe the magnetization direction of a magnet, the ends of magnets are named north and south poles.

Material

2	Bar magnet, 72 mm	07823.00
2	Car, small	11059.00
1	Floating magnet	06348.00
1	Demonstration magnetic needle	06314.00
1	Needle base	06316.00

Setup and implementation

Experiment 1

- Place one bar magnet in each car and slowly push one car towards the other
- Let the red end of one magnet at first approach the red end of the other magnet and then the green end
- Let the green end of one magnet at first approach the red end of the other magnet and then the green end (Fig. 1)

Experiment 2

- Approach a car with a ring magnet from the “floating magnets”, at first with the red side and then with the green side in front.
- At first construct the “floating magnets” in such a manner that red faces red and then so that green faces green
- Place two magnets at the same time in one car, red to red and green to green (Fig. 2)

Experiment 3

- Approach the demonstration magnetic needle with the bar magnet
- Approach the demonstration magnetic needle with the ring magnet
- Move the magnetic needle away from all magnets, pay attention to where the magnetic needle points, e.g. different places of the room (Fig. 3)

Observation

Experiment 1

Different colored ends of the magnets attract each other, like colored ends repel. The force can be noticed at a distance of several centimeters.

Fig. 1

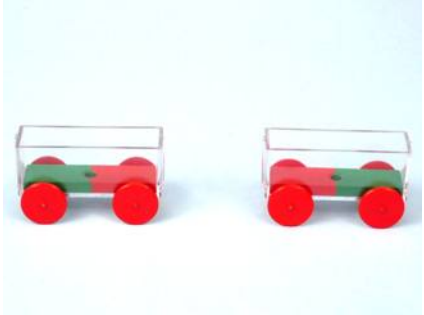

Fig. 2

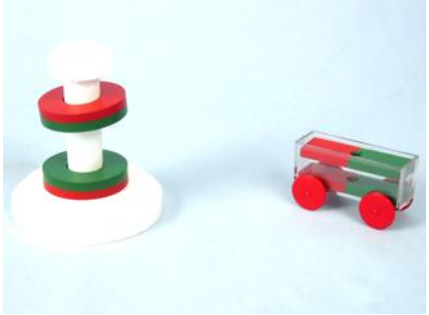

Fig. 3

Experiment 2
The main direction in which the force in ring magnets is exerted lies along its axis, not along its greatest expansion; otherwise it also works like the bar magnets. The repelling force is strong enough to keep magnets floating in mid air.

Experiment 3
The demonstration magnetic needle reacts to the different types of magnets. If possible it turns so that its green end is pointing to the red end or its red end is pointing to the green end of a magnet. Even at a distance from the magnets the demonstration magnetic needle swings toward a certain direction, i.e. it points, although this may be slower and “less decisive”. In addition to attraction and repulsion magnetism can also cause things to rotate.

Evaluation
The different colored ends of the magnets can be distinguished, because opposite ends attract and like ends repel each other. The ends of the magnet are therefore called “poles”.
The poles determine a direction. The direction of the green pole to the red pole is described as the direction of the magnetization. Magnets are objects that have a permanent magnetization.
Magnetic force is called the force, which a magnet exerts on another magnet at a distance. With a magnet it can be determined whether an object is a magnet or not and in which direction it is magnetized.
The magnetic force can be stronger than the force of gravity.
The magnetic field of the earth has an effect on a magnetic needle if there are no other interferences. At ground level the magnetic field of the Earth points mainly in a north-south direction and the magnetic needle is oriented in north-south direction by it. The end of one magnet that is pointing north (here the red ends) is therefore called the north pole, the other end is called the south pole (here the green ends) * remember: North = red, south = green.

Remarks
In buildings Earth’s magnetic field is often overlapped by other fields, e.g. those of construction reinforcement, of pipes, or of metal parts in furniture, which is why it can easily happen that the magnetic needle does not point north or south, but rather in another direction. However, a complete absence of magnetic fields is rather unlikely.