Representation of the field lines of a bar magnet

Task and equipment

Information for teachers

Additional information

The pupils should gain a first impression of the structure of a magnetic field.

Notes on the setup and procedure

The paper which is to be used should not be too shiny otherwise the iron powder can easily slide to the magnetic poles and no powder remains the area around the poles. On the other hand, too rough paper hinders the refilling in the container. One should be particularly careful that no experimental apparatur is soiled with the iron powder; particularly the polycarbonate plate.

The experiment yields only a section trough the spatial field of the magnet and the pupils should be made aware of this. This spatial structure in the area surrounding the manget`s poles can be shown when the poles are dipped in iorn fillings.

However, it is better that the pupils do not carry out this experiment as the very fine iron powder is very difficult to remove again from the magnets.

In the experiment "Direction of the field lines of a bar magnet", the spatial organization of the field is investigated using a magnetic probe.

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Representation of the field lines of a bar magnet

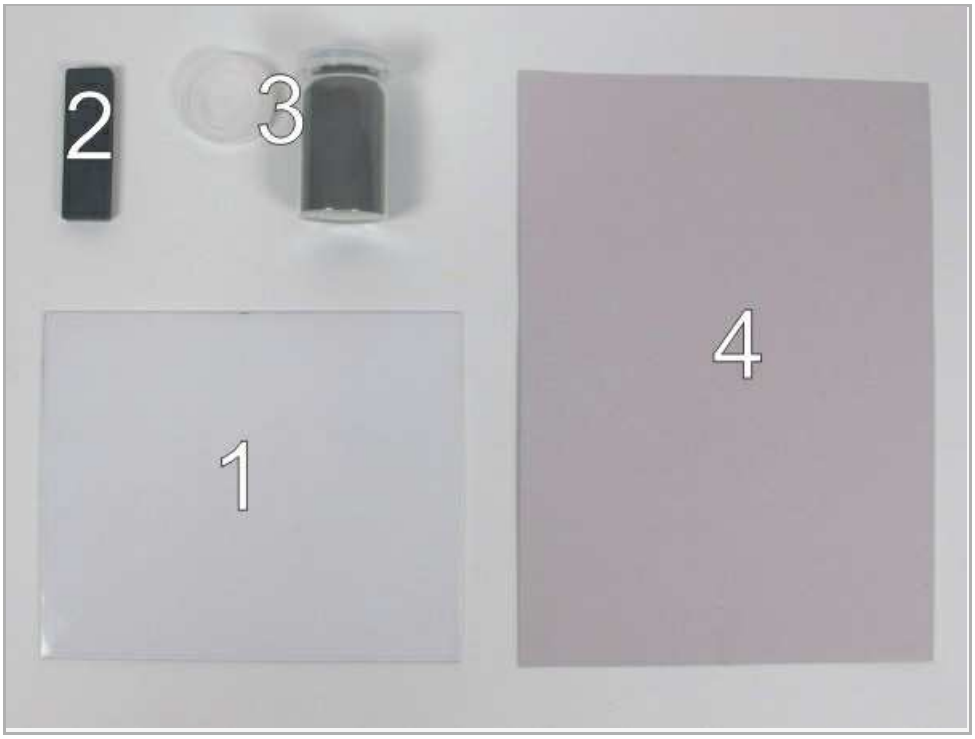
Task and equipment

Task

What is the magnetic field?

Illustrate the shape of a magnetic field using bar magnets and iron powder.

Equipment



Position No.	Material	Order No.	Quantity
1	Polycarbonate plate, 136x112x1 mm	13027-05	1
2	Bar magnet l 50 mm	07819-00	1
3	Sprinkler w. iron powder, 20 ml	06305-10	1
Additional material			
4	Rough paper sheet		1

Student's Sheet

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Set-up and procedure

Set-up

- Cut a piece of rough paper to about the size of the polycarbonate plate (A5) and place the sheet on the plate. Both together is now, as in Fig. 1, attached to the magnet.

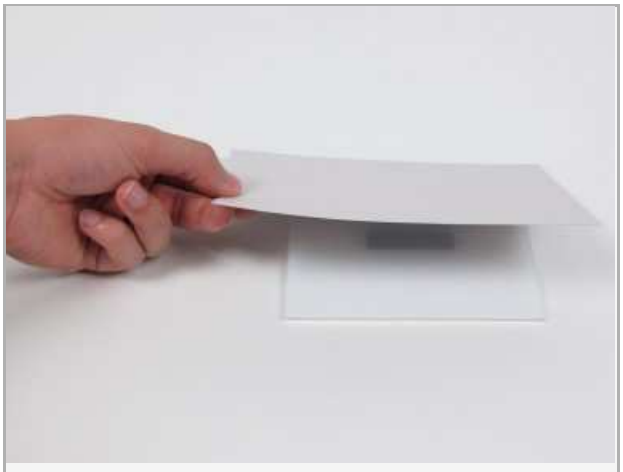


Fig. 1

- Replace the lid of the shaker containing iron powder with the lid with holes.

Procedure

- Gently tap the tin from about 10 cm above the paper so that the iron powder falls evenly over the paper (Fig. 2) until a pattern is reconizable in the iron fillings spread on the paper.

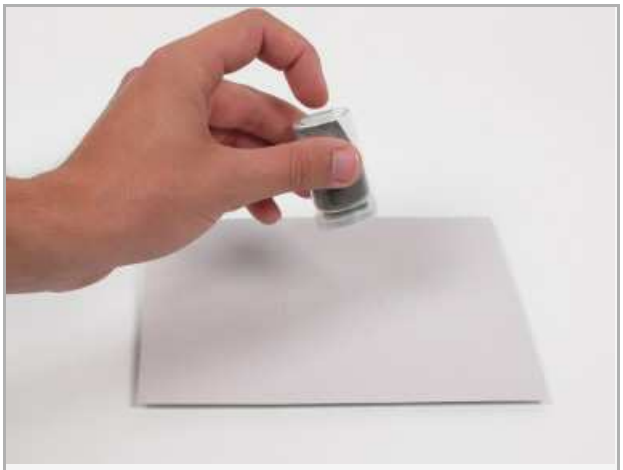


Fig. 2

- Gently tap from underneath until the iron powder forms a clear pattern of lines.
- Fill after the experiment the iron powder carefully back into the open shaker (a fold in the paper bend) and close it carefully (Fig. 3).

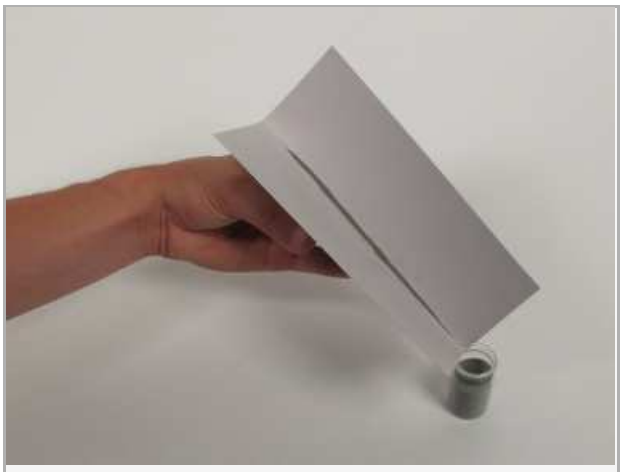
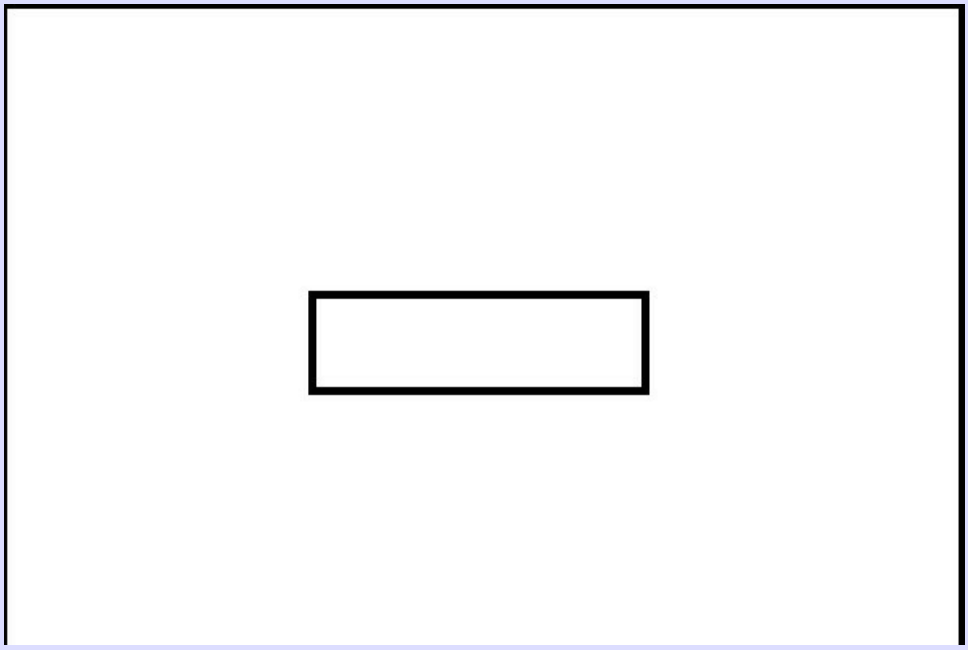


Fig. 3

Report: Representation of the field lines of a bar magnet

Result - Observation 1

Draw in the following box the pattern you saw formed by the iron powder.



Evaluation - Question 1

The arrangement of the iron powder corresponds to the path of the field lines in the plane of the paper. Describe this pattern.

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