TRB 5:3 - Activity 1: Push and Pull Magnets

Summary

Students will discover through hands-on activities that magnets have the ability to push and pull iron objects without touching them.

Materials

- various types of permanent magnets (horseshoe, circular, bar, disk)
- various types of temporary magnets (magnetized nail, knitting needle)
- various natural magnets (lodestones)
- paper, tag board, cardboard, wax paper, aluminum foil, plastic wrap
- cookie sheet, plastic cutting board, plywood, a glass pane (taped around all the edges for safety)
- paper clips, thumbtacks or other iron objects to move about with the magnets

Additional Resources:
Books:
Magnets by Janice VanCleave
Science Projects about Electricity and Magnets by Robert Gardner
The Magnet Book by Shar Levine and Leslie Johnstone

Intended Learning Outcomes

1-Use science process and thinking skills.
2-Manifest scientific attitudes and interests.

Instructional Procedures

Invitation to Learn:
Demonstrate to the students the “flying” paperclip (a paper clip attached to a string taped to the table is suspended in mid-air by a bar magnet). Ask questions like: Why is the paper clip suspended in mid-air? How many other things can you attach to a string and suspend with a magnet? Does using a circular magnet alter the experiment? How about a horseshoe magnet? How about this nail?
Instructional Procedures:

- Demonstrate to the students by placing a magnet beneath a sheet of paper and placing a paper clip on top, you can pull the paper clip with the magnet.
- Have the students experiment with the different magnets beneath the paper, pulling the paper clip along the top of the paper. Ask questions like: Do both ends of the magnet behave the same way? Would thicker paper allow the magnetic force to pass through?
- Repeat the original experiment replacing the single sheet of paper with hicker paper.
- Repeat the original experiment, replacing the paper with different materials such as the aluminum foil, the plastic wrap, the cookie sheet, the plywood, and the glass pane.
- Make sure the students record their results in their journals or in some sort of graphic organizer.

Conclusion:
Magnets have the ability to push and pull iron objects without touching them.

Extensions

Language:

- Create a Venn Diagram comparing permanent, temporary and natural magnets.
- Write a 5-paragraph essay explaining the different magnet types and their pulling/pushing abilities.
- Read excerpts from the book, The Secret Life of Dilly McBean, by Dorothy Haas; a story about a

boy with magnetic powers.

Art:

Drop several different colors of paint onto a sheet of white art paper using an eyedropper or a brush. Place several small ball bearings or BB 's on the paper.
Carefully drag them from beneath with a magnet creating an interesting design.
Try using other iron objects, such as paper clips or straight pins.

Assessment Plan

Have the students design their own types of games to demonstrate the difference between magnet types and their abilities to pull or push iron objects without touching them. Suggestions: fishing poles with various magnets attached to pick up iron objects from a bucket; a paper racetrack where student-designed cars with paper clip bottoms are pulled around with magnets beneath the track; a homemade version of an "Etch-A-Sketch" using iron filings and acetate sheets.

Bibliography

This lesson is part of the Fifth Grade Science Teacher Resource Book (TRB3) http://www.usoe.org/curr/science/core/5th/TRB5/. The TRB3 is designed to be your textbook in teaching science curriculum to your students. This book covers all the objectives of each standard and benchmark. If taught efficiently, a student should do well on the End-of-Level (CRT) tests. The TRB3 is designed for teachers who know very little about science, as well as for teachers who have a broad understanding of science.

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