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.

Main Core Tie
Science - 5th Grade
Standard 3 Objective 1

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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