

First Grade

Standard

P1-3. Obtain, evaluate, and communicate information to demonstrate the effects of magnets on other magnets and other objects.

3a. Construct an explanation of how magnets are used in everyday life. (GSE S1P2a) (Clarification statement: Everyday life uses could include refrigerator magnets, toys, magnetic latches, and name tags.)

b. Plan and carry out an investigation to demonstrate how magnets attract and repel each other (GSE S1P2b)

c. Plan and carry out the effect of magnets on common objects. (GSE S1P2b)

Teaching Tips

Preparation Obtain Materials listed for lesson and make mixture of paper bits and paper clips for students to sort. Consider placing individual portions of the mix in paper cupcake wrappers for ease of distribution.

Directions for this lesson and design challenge (on next page) are written for adult use. Students will use the Notice / Wonder / Design template from the appendix, which has larger space for drawing and writing.

Phenomenon: Present phenomenon in lesson without explanation before or after students view it.

What Do you Notice? Engage students in writing a tentative explanation (or making a labeled drawing) that tells what they observed.

What Do you Wonder? Engage students in asking their own questions, which will form the basis for research.

Student Research After each student writes a question, consider placing each question on a sticky note, grouping them in categories, and allowing students to learn more in small groups according to their interests.

Teacher-Directed Activity Show one or more explainer videos (see Teacher Resources section for ideas).

Zero Heroes Lesson Activity This lesson provides an Eco-Engineering Challenge to design a metal sorter that provides an opening to drop in a mixture of paper bits and paper clips and uses a magnet to separate the metal parts from the paper so each can be recycled separately, without using hands. Before they begin building their metal sorting device, students should be able to see available materials. Then engage them in drawing and labeling a design for the device they will build. After showing the teacher the design, the student or team may begin to build. Provide opportunities to test the device, see what other students have created, and refine or change the design.

Revised Explanation Allow students to return to and revise their initial explanations of the phenomenon. Clear up any student misconceptions about magnets and the materials they attract, and why sorting materials by type must happen before like-materials can be recycled together and re-made into another form.

Teacher Resources

Science Buddies Lesson: [Teaching Tips for Recycling Sorter Machine](#)

Explainer Videos:

- Magnets in Recycling: <https://youtu.be/Th6GQjSHfKk>
- How are Magnets Used in Recycling? <https://sciencing.com/about-6398727-magnets-used-recycling-.html>
- How Do Magnets Help in a Scrapyard? <https://www.bbc.co.uk/bitesize/clips/zcntsbk>
- Magnets Lifting Metal in a Scrapyard: <https://www.youtube.com/watch?v=XBWY9gzGGd4>



1st Grade Eco-Engineering Challenge: Junkyard Magnets

The Phenomenon



Video Credit: [Steel Unloading with Magnets](#)

What do you notice? (tentative explanation)

Engage students in writing about what they noticed when observing the phenomenon. This will serve as their tentative, initial explanation. At the end of the lesson, allow students to revise and refine their explanations to reflect new information and understanding. Explanations may take the form of labeled drawings. Distribute copies of the K-2 student lab report template in the appendix.

What do you wonder? (student questions)

Engage students in asking their own questions about the unexplained phenomenon. These questions will form the basis for student research.

The Eco-Engineering Challenge: Make a Recycling Separator for Metals

Design a device that uses magnets to separate paper clips from paper.

Junkyards contain many kinds of materials that come from old cars. Sometimes metal is separated from other junk using strong magnets. Then the metal can be melted and recycled into new things. See if the device you design can separate paper from metal for recycling. What are other ways things could be separated for recycling?

Constraints

Time Allotted: _____

Design Goals: Design a device with a hole to drop in a mixture of paper and paper clips; the device should use magnets to separate metal from paper; try to make it work so that the paper bits and clips are sorted automatically

Materials

- Metal [paper clips](#)
- Paper bits (approx. 1" x .25")
- [Magnets](#)
- Scissors
- Cardboard, used file folders, construction paper, empty bathroom tissue or paper towel rolls, small paper cups, used containers
- Paper oil funnels (free from car parts stores) or sheets of paper that can be curled and taped into funnels
- Tape, glue, binder clips, clothespins, or other fasteners

Revised Explanation

Allow students to return to and revise their initial explanations of the phenomenon to reflect what they have learned OR do this as a class discussion.