

Magnet Problem Detectives

Find the need, goal, and limits in a magnetic design problem.

3-PS2-4 "Define a simple design problem that can be solved by applying scientific ideas about magnets. Clarification Statement: Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving..."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline the need, circle the magnetic idea that could help the latch, and write 1 by the goal and 2 and 3 by its limits. These marks show the parts of a clear design problem.

A Latch for the Art Center

- ① At the art center, a supply cabinet door kept swinging open when students carried projects past it. Paint and paper could fall out. The class wanted the door to stay closed, but they did not want to use a lock. They decided to define the need before choosing any materials. A clear design problem names what must be fixed and who it helps.
- ② Magnets can help when objects need to pull together without glue. A magnet has two poles. When opposite poles face each other, they attract. When like poles face each other, they repel, or push apart. Magnetic force can work through a small space, such as a thin piece of wood or plastic. The class discussed which magnetic idea could help hold a door in place.
- ③ Next, the class wrote this design problem: Create a magnetic latch for students that keeps the supply cabinet door closed when someone walks by. The latch must open easily when a student pulls the handle. It must fit on the cabinet without blocking the shelves. This problem gives a goal, a user, and limits. The group can now sketch, build, test, and improve a latch.

2 ANSWER WITH EVIDENCE Use the passage

1 What need did the class notice, and who would the latch help?

2 What is the goal of the class's design problem?

3 Which magnetic idea could help hold the door closed?

4 What are the two limits the latch must meet?

3 YOUR TURN Your own words

Write a two-sentence design problem for two toy cars that move toward each other on a classroom track. Include the user, the goal of keeping the cars from touching, two limits, and a magnetic idea that could help.

PART 1 • READ AND MARK

Underline the need, circle the magnetic idea that could help the latch, and write 1 by the goal and 2 and 3 by its limits. These marks show the parts of a clear design problem. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What need did the class notice, and who would the latch help?	The cabinet door swung open and could spill supplies. The latch would help students using the art center.
2	What is the goal of the class's design problem?	Create a magnetic latch that keeps the supply cabinet door closed when someone walks by.
3	Which magnetic idea could help hold the door closed?	Opposite poles facing each other attract.
4	What are the two limits the latch must meet?	It must open easily when a student pulls the handle, and it must fit without blocking the shelves.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Design a magnetic bumper for two toy cars on a classroom track so they push apart before they touch. It should help students test the cars safely, use like poles facing each other, fit on each car, and let the cars still roll.

Accept equivalent wording for the passage questions. For the open task, accept any clear two-sentence problem that names a user, goal, two limits, and a scientifically accurate magnetic idea, such as attraction or repulsion.