Magnet Rescue Plan

Test and improve a way to move steel without touching it

3.4 "Apply scientific ideas about magnetic interactions to solve a problem using the engineering design process."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the problem Maya must solve, circle the two paper barriers she tests, and number the two steps in her final plan to show how she improves her design.

The Washer in the Box

1. A steel washer fell into a clear plastic box beside a small clay model. Maya needed to move the washer to an empty corner without opening the box or touching the model. The box had a thin plastic bottom. Maya knew that a magnet attracts steel, even through thin plastic. Could she use that pull to move the washer safely?

2. Maya placed a magnet under the box and slid it toward the washer. The washer followed the magnet along the bottom. Next, she put five sheets of paper between the magnet and the box to keep the magnet from scraping the plastic. This time, the washer did not move. With only one sheet of paper, it followed again.

3. Maya had one more problem. If she slid the magnet too fast, the washer might bump the clay model. She put one sheet of paper between the magnet and the box. Then she slid the magnet slowly along the far side. The washer reached the empty corner without touching the model. Maya kept that plan because it met both needs.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why could Maya use a magnet under the box instead of opening the box to move the washer?

2. Maya wants to keep the magnet from scraping the box. Which tested paper barrier should she use, and why?

3. What problem could moving the magnet too fast cause? How did Maya change her plan?

4. What two results show that Maya's final plan solved the problem?

3 YOUR TURN

Your own words

Steel tacks are scattered on top of dry sand in a tray, and you must collect them without scooping the sand. In three or four sentences, describe a magnet tool, explain why it works, and tell how you will test and improve it if it misses tacks.

ANSWER KEY

Magnet Rescue Plan

GRADE 3 · 3.4

PART 1 · READ AND MARK

Underline the problem Maya must solve, circle the two paper barriers she tests, and number the two steps in her final plan to show how she improves her design. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why could Maya use a magnet under the box instead of opening the box to move the washer?	**The magnet attracts the steel washer through the thin plastic bottom.**
2	Maya wants to keep the magnet from scraping the box. Which tested paper barrier should she use, and why?	**She should use one sheet of paper because the washer followed the magnet with one sheet, but not with five.**
3	What problem could moving the magnet too fast cause? How did Maya change her plan?	**The washer might bump the clay model. Maya slid the magnet slowly along the far side of the box.**
4	What two results show that Maya's final plan solved the problem?	**The washer reached the empty corner, and it did not touch the clay model.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I will put a magnet in a thin plastic bag and hold it just above the sand. The magnet should pull the steel tacks up while the sand stays in the tray. I will test it over one small part of the tray and count the tacks it picks up. If it misses tacks, I will move the magnet closer to the sand and test again.

Accept plans that use magnetic attraction to collect the steel tacks without scooping sand. The response should include a way to test the tool and a change that could help it collect missed tacks.