Stop the Spill

Read how a model helps solve a cleanup problem.

E.3.10.4 "Design a process for cleaning a polluted environment (e.g., simulating an oil spill in the ocean or a flood in a city and creating a solution for containment and/or cleanup). Use an engineering design process to define the problem, design..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline Maya's goal, then number the sentences that tell how she built, tested, and improved her barrier. These marks will help you follow her design process.

A Barrier for Oil

1. At a beach, spilled oil can spread across water and harm living things. Maya models a spill in a shallow tray with water and a few drops of vegetable oil. The oil floats on top. Her problem is to keep the oil in one spot so it can be picked up. A good design will keep oil from crossing a line marked on the tray when the water moves.

2. Maya makes a floating barrier from a strip of craft foam. She bends the strip into a ring around the oil, leaving its ends touching. She taps the tray three times to make small waves. Some oil slips through the space between the foam ends and crosses the marked line. The barrier does not meet her goal. Maya looks closely at the place where the oil escaped.

3. Maya joins the foam ends with tape above the water to close the space. She adds fresh water and the same number of oil drops for a new test. After three taps, the oil stays inside the foam ring and away from the line. She uses a cotton ball to lift some oil from the water. Testing helped her improve the barrier before cleanup.

2 ANSWER WITH EVIDENCE

Use the passage

1. What problem is Maya trying to solve, and how will she know if her barrier works?

2. How does Maya build her first barrier?

3. What happens in the first test that tells Maya her design needs to change?

4. What does Maya change, and what happens when she tests again?

3 YOUR TURN

Your own words

Rain has washed small bits of litter into a schoolyard puddle. Plan a model using clean water and paper bits: tell how you would stop and collect the bits, test your design, and improve it if some bits escape.

ANSWER KEY

Stop the Spill

GRADE 3 · E.3.10.4

PART 1 · READ AND MARK

Underline Maya's goal, then number the sentences that tell how she built, tested, and improved her barrier. These marks will help you follow her design process. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What problem is Maya trying to solve, and how will she know if her barrier works?	**She wants to keep the oil in one spot for cleanup. The barrier works if the oil does not cross the marked line when the water moves.**
2	How does Maya build her first barrier?	**She bends a strip of craft foam into a ring around the oil, with its ends touching.**
3	What happens in the first test that tells Maya her design needs to change?	**Oil slips between the foam ends and crosses the marked line after she taps the tray.**
4	What does Maya change, and what happens when she tests again?	**She tapes the foam ends together. After three taps, the oil stays inside the ring and does not cross the line.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I will put paper bits in a tray of water to model the litter. I will place a small mesh screen across one end of the tray to catch the bits, then lift them out with the screen. I will gently move the water toward the screen and check whether any bits pass through. If bits escape, I will try a screen with smaller holes and test it the same way.

Accept designs that name a way to contain or collect the paper bits, a way to test whether it works, and a change based on what the test might show. For question 1, students may describe the marked line as the limit the oil must not pass.