

Solve It First

Ask testable questions, predict changes, and name design problems.

3.1.a “asking questions and defining problems ask questions that can be investigated and predict reasonable outcomes ask questions about what would happen if a variable is changed define a simple design problem that can be solved through the...”

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline the investigable question, circle the variable Maya changes, and box the design problem to find three ways scientists and engineers begin their work.

Saving Garden Soil

- ① At the school garden, Maya noticed that water from a hose washed soil away from a small hill. She wanted to protect the soil. First, she made an investigable question: “What will happen to the amount of soil washed away if we place different kinds of ground cover on the hill?” She could test one kind of cover at a time and observe the soil.
- ② To make a fair test, Maya planned to keep the hill, the amount of water, and the pouring time the same. The ground cover would be the variable she changed. Maya predicted that grass clippings would hold more soil in place than bare dirt. Her prediction was reasonable because the clippings could slow water as it moved down the hill.
- ③ Then Maya named a design problem for the garden: “Design a low wall that keeps soil on the hill during watering.” The wall had to use safe, reused materials and let water reach the plants. The class could build a small model, pour the same amount of water on it, and improve the wall if soil still moved. Their problem could be solved by creating and testing an object.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 What investigable question did Maya ask?

2 What variable did Maya change? Name one thing she kept the same.

3 What did Maya predict would happen with grass clippings? Why was this prediction reasonable?

4 What was the class's design problem? Give one requirement for the wall.

3 YOUR TURN _____ Your own words

Choose a small problem at school or at home. Write four sentences: name the problem, ask a question about what will happen if you change one variable, make a reasonable prediction, and define an object or tool you could design to help solve the problem.

PART 1 • READ AND MARK

Underline the investigable question, circle the variable Maya changes, and box the design problem to find three ways scientists and engineers begin their work. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What investigable question did Maya ask?	What will happen to the amount of soil washed away if different kinds of ground cover are placed on the hill?
2	What variable did Maya change? Name one thing she kept the same.	She changed the kind of ground cover. She kept the hill, the amount of water, or the pouring time the same.
3	What did Maya predict would happen with grass clippings? Why was this prediction reasonable?	She predicted that grass clippings would hold more soil in place than bare dirt. This was reasonable because clippings could slow the water moving down the hill.
4	What was the class's design problem? Give one requirement for the wall.	The problem was to design a low wall that keeps soil on the hill during watering. It had to use safe, reused materials or let water reach the plants.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Our classroom pencils roll off the supply table. My testable question is, "What will happen to the number of pencils that roll off if the table has different kinds of edge guards?" I would change the kind of edge guard, and I predict a foam guard will stop more pencils than no guard. My design problem is to make a safe edge guard from reused materials that keeps pencils on the table.

Accept many school or home problems if the student clearly states one changeable variable and a prediction connected to that variable. The design problem should name an object or tool and explain what it should do.