Stopping Soil Loss

Trace how observations, tests, and design work together.

8.1.B "use scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems;"

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline one descriptive, comparative, and experimental action in the passage. Circle conditions kept the same, then number the barrier's four design requirements to trace how evidence leads to a solution.

A Garden Path Problem

1. After heavy rain, water washed soil from a school garden path into a storm drain. The eco club began with a descriptive investigation. They mapped wet spots, noted the depth of small channels, and recorded whether each area had bare soil, grass, or wood chips. They did not change the garden yet. Their observations showed where erosion occurred and helped them state a testable question: Which ground cover reduces soil loss during rainfall? Descriptive work can reveal patterns before a team chooses variables to test.

2. Next, the club planned a comparative investigation using three trays with equal amounts of the same soil and the same slope. One tray had bare soil, one had wood chips, and one had leaf mulch. For each trial, students poured the same amount of water from the same height onto every tray. They collected and weighed the soil carried away, then repeated the trials three times. Keeping important conditions alike made differences in soil loss more likely to be linked to ground cover.

3. Then the club conducted an experimental investigation of mulch thickness. They used wood chips in all trays but changed only the thickness, 0 centimeters, 2 centimeters, or 4 centimeters. Soil type, tray slope, water amount, and pouring height stayed the same. Using the evidence, students designed a removable edge barrier for the path. The barrier had to reduce soil reaching the drain, cost less than $25, use reclaimed materials, and leave space for wheelchairs. They tested a model with the same water procedure, revised it, and tested it again.

2 ANSWER WITH EVIDENCE

Use the passage

1. What did the club record in its descriptive investigation, and how did those observations help the club plan its work?

2. Explain how the comparative investigation was set up to make soil-loss results from the three ground covers meaningful.

3. What variable did the experimental investigation change? Name two conditions that stayed the same.

4. Name one success criterion and two constraints for the edge barrier.

3 YOUR TURN

Your own words

Choose a small school problem involving water, soil, waste, or heat. In 5 to 6 sentences, describe a descriptive or comparative investigation, an experimental test that changes one variable and names two constants, and a solution design with one success criterion, two constraints, and a test-and-revise step.

ANSWER KEY

Stopping Soil Loss

GRADE 8 · TEKS 8.1.B

PART 1 · READ AND MARK

Underline one descriptive, comparative, and experimental action in the passage. Circle conditions kept the same, then number the barrier's four design requirements to trace how evidence leads to a solution. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What did the club record in its descriptive investigation, and how did those observations help the club plan its work?	**They mapped wet spots, noted channel depth, and recorded ground cover. The observations showed where erosion occurred and helped the club form a testable question about ground cover.**
2	Explain how the comparative investigation was set up to make soil-loss results from the three ground covers meaningful.	**The trays had equal amounts of the same soil and the same slope. Students used the same water amount and pouring height, measured soil carried away, and repeated the trials three times.**
3	What variable did the experimental investigation change? Name two conditions that stayed the same.	**It changed wood-chip thickness. Conditions held constant included soil type, tray slope, water amount, and pouring height.**
4	Name one success criterion and two constraints for the edge barrier.	**Success criterion: reduce soil reaching the drain. Constraints: cost less than $25, use reclaimed materials, and leave space for wheelchairs.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

The cafeteria recycling bin contains food scraps. I will begin by recording the kinds and amounts of contamination in the bin for three lunches. For an experimental test, I will change the bin label from words only to words plus photographs while keeping the bin location, lunch period, and measurement method the same. I will design a reusable sign with clear pictures above the bin. It must reduce food scraps by at least half, cost under $10, and not block the walkway. I will measure contamination for three more lunches, revise the sign if it misses the goal, and test it again.

Accept equivalent descriptions of fair testing, including correctly identified variables and constants. For Part 3, accept any feasible school problem if the response includes an investigation plan, a controlled experimental test, measurable design criteria, constraints, and revision based on testing.