Runoff Test Lab

Mark the parts of a fair investigation and accurate data plan.

6.1.b "planning and carrying out investigations independently and collaboratively plan and conduct observational and experimental investigations; identify variables, constants, and controls where appropriate..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the changed variable, responding variable, control, and two constants. Circle each action that makes the investigation safer or the data more accurate.

Testing Ground Cover

1. To investigate how ground cover affects runoff, Maya's team built identical collection devices from plastic bottles, tape, and metric rulers. Each device held a tray at the same 20-degree slope and caught water. The team placed bare soil in one tray, soil covered with leaves in a second, and soil planted with grass in a third. They used a measuring cylinder to pour 250 mL of water with one drop of food coloring onto each tray over 30 seconds. The teacher cut the bottles, and students wore goggles and did not taste the colored water.

2. The kind of ground cover was the variable the team changed. The amount of water collected was the responding variable. Water volume, pouring time, tray slope, soil amount, and device size were constants. The bare-soil tray was the control because it gave the team a comparison without added cover. After each trial, students read the bottom of the water curve at eye level and recorded the volume in milliliters. They repeated every condition three times. Averaging the three results reduced the effect of one unusual pour or reading.

3. Before drawing a conclusion, the team checked whether their method was accurate enough. One student timed the pour, while another checked the cylinder markings and a third recorded the measurement. They noticed that drops sometimes missed the bottle opening. To improve the device, they added a wide paper funnel above each collector and tested it again with the same conditions. The team compared the repeated results, not just one trial. Their final claim had to match the data and explain that the test modeled runoff, rather than proving what happens in every outdoor storm.

2 ANSWER WITH EVIDENCE

Use the passage

1. What variable did the team change, and what responding variable did they measure?

2. Which tray was the control, and why was it a control?

3. Name two constants in this investigation. Why must constants stay the same?

4. Give two details that helped the team collect more accurate volume data.

3 YOUR TURN

Your own words

Write a six-sentence plan for an investigation about a question you choose. Include a changed variable, responding variable, control, two constants, a metric measurement, a safety step, a simple data-collection device or improvement, and repeated trials.

ANSWER KEY

Runoff Test Lab

GRADE 6 · 6.1.b

PART 1 · READ AND MARK

Underline the changed variable, responding variable, control, and two constants. Circle each action that makes the investigation safer or the data more accurate. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What variable did the team change, and what responding variable did they measure?	**They changed the kind of ground cover and measured the amount of water collected.**
2	Which tray was the control, and why was it a control?	**The bare-soil tray was the control because it provided a comparison without added ground cover.**
3	Name two constants in this investigation. Why must constants stay the same?	**Answers include water volume, pouring time, tray slope, soil amount, device size. Constants must stay the same so changes in collected water can be connected to ground cover.**
4	Give two details that helped the team collect more accurate volume data.	**Answers include reading the bottom of the water curve at eye level, using a measuring cylinder with milliliter markings, repeating each condition three times and averaging, assigning checking roles, or adding funnels to catch missed drops.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

My question is whether the amount of dish soap changes the height of bubbles in water. The cup with no soap is my control, and the amount of water and stirring time will stay the same. I will change the soap amount and measure bubble height in centimeters with a metric ruler. I will wear goggles, avoid tasting the soap solution, and wash spills promptly. I will tape a ruler to a cardboard stand so it stays upright beside each cup. I will test each amount three times and calculate the average height to reduce the effect of an unusual trial.

Accept equivalent wording for variables, controls, constants, safety actions, and accuracy improvements when it matches the passage. For the open response, accept any workable investigation plan that includes all required elements and uses a device or improvement to solve a data-collection problem.