

Saltwater Seedlings

Read a model investigation for variables, accurate measurements, and safe procedures.

LS.1.b “planning and carrying out investigations independently and collaboratively plan and conduct observational and experimental investigations; identify variables, constants...”

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline the sentence that names the changed variable, circle the control group, and number 1 through 4 beside one constant, accuracy check, safety step, and metric or microscope procedure.

Testing Salt and Growth

- ① Maya’s team investigated whether salt in water changes bean seedling growth. They planted twelve similar seedlings in identical cups of the same potting soil. The team randomly assigned three plants to each of four labeled solutions: 0, 1, 2, or 3 grams of salt per 100 milliliters of water. The 0-gram solution was the control because it contained no added salt. Salt concentration was the changed variable, and stem-height increase was the responding variable over one week.
- ② Each group received 25 milliliters of its solution every day and stood under the same lamp for eight hours. Cup size, soil amount, seedling type, light time, and temperature stayed constant. On day one and day eight, a student measured each stem from the soil surface to its tip with a metric ruler, to the nearest millimeter. Another student repeated every measurement. The team also viewed prepared leaf-surface slides, beginning with low power and recording stomata in one field of view.
- ③ To protect people and equipment, the team wore goggles while mixing salt solutions, washed hands after handling soil, and kept liquids away from the microscope’s electrical parts. They calculated each plant’s height change, then found the mean for each group. Repeated ruler readings reduced random measurement error, while using the same ruler and a clear starting point improved consistency. If the groups showed a difference, the team would compare it with the control before claiming that salt caused the change.

2 ANSWER WITH EVIDENCE _____ Use the passage

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

2 What was the control group? Name three conditions that the team kept constant.

3 Describe the team's metric measurement, microscope procedure, and one step used to improve data accuracy.

4 Identify two safety actions the team used while working with materials and equipment.

3 YOUR TURN _____ Your own words

Plan a five-day experiment to test how 4, 8, and 12 hours of light each day affect radish seedling growth. Write 6 to 8 sentences that state the variables, control, at least three constants, metric data collection and an accuracy check, and safe procedures.

PART 1 • READ AND MARK

Underline the sentence that names the changed variable, circle the control group, and number 1 through 4 beside one constant, accuracy check, safety step, and metric or microscope procedure. 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 salt concentration in the water. They measured each seedling's increase in stem height.
2	What was the control group? Name three conditions that the team kept constant.	The control group received the 0-gram salt solution. Accept any three: cup size, soil amount, seedling type, light time, or temperature.
3	Describe the team's metric measurement, microscope procedure, and one step used to improve data accuracy.	They measured stems from the soil surface to the tip with a metric ruler to the nearest millimeter. They began viewing prepared leaf-surface slides with low power and recorded stomata in one field of view. Accuracy was improved by repeating measurements or by using the same ruler and clear starting point.
4	Identify two safety actions the team used while working with materials and equipment.	Accept any two: wore goggles while mixing salt solutions, washed hands after handling soil, or kept liquids away from the microscope's electrical parts.

PART 3 • YOUR TURN (SAMPLE ANSWER)

My question is, How do 4, 8, and 12 hours of light each day affect radish seedling height over five days? The independent variable is daily light time, and the dependent variable is the change in stem height in millimeters. The 8-hour group is the control because it receives the usual classroom light schedule. I will keep the seed type, number of seeds per cup, soil amount, cup size, water volume, and temperature the same. I will use three cups in each group and measure each stem from soil surface to tip with the same metric ruler on day one and day six. I will measure each stem twice and record the average to check accuracy. I will keep water away from the lamp and cords, wash my hands after touching soil, and handle the ruler carefully.

Accept equivalent scientific wording for variables, controls, constants, accuracy checks, and safety procedures. For the open response, accept a different reasonable control group if the student explains why it provides a comparison baseline.