What Changes?

Identify the factor tested and the result measured in fair experiments.

SC.7.N.1.4 "Identify test variables (independent variables) and outcome variables (dependent variables) in an experiment."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each test variable and circle each outcome variable in the two investigations. Number one condition kept the same in each investigation.

Testing One Factor

1. In an experiment, scientists change one factor on purpose and measure what happens. The factor changed on purpose is the test variable, also called the independent variable. The measured result is the outcome variable, also called the dependent variable. A fair test keeps other important conditions the same. For example, a gardener might change the amount of compost given to identical tomato plants and measure the mass of tomatoes each plant produces. Plant type, pot size, sunlight, and watering should stay the same.

2. Ms. Ruiz wants to learn whether water temperature affects how quickly an effervescent tablet dissolves. She prepares four cups with equal volumes of water. The cups begin at 10°C, 25°C, 40°C, or 55°C. She drops one identical tablet into each cup and records the number of seconds until no solid tablet remains. She uses the same cup size, water volume, tablet brand, and stirring method for every trial. She repeats each temperature test three times, then compares the average times.

3. At lunch, a student team investigates whether the amount of salt on a road affects the time needed for ice to melt. Each team places equal-sized ice cubes on identical trays at the same room temperature. They add 0, 1, 2, or 3 teaspoons of salt to separate cubes. Then they use timers to record how many minutes pass before each cube has melted. The teams avoid changing tray type, ice-cube size, room temperature, or the way salt is spread.

2 ANSWER WITH EVIDENCE

Use the passage

1. What is the test variable in Ms. Ruiz's tablet investigation?

2. What is the outcome variable in Ms. Ruiz's tablet investigation?

3. What is the test variable in the ice-and-salt investigation?

4. A student says ice-cube size is the outcome variable. Use the passage to correct the student.

3 YOUR TURN

Your own words

Plan a fair experiment you could do at school or at home. Write three sentences that name the test variable, name the outcome variable, and name two conditions you would keep the same.

ANSWER KEY

What Changes?

GRADE 7 · SC.7.N.1.4

PART 1 · READ AND MARK

Underline each test variable and circle each outcome variable in the two investigations. Number one condition kept the same in each investigation. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What is the test variable in Ms. Ruiz's tablet investigation?	**Water temperature.**
2	What is the outcome variable in Ms. Ruiz's tablet investigation?	**The number of seconds until the tablet dissolves completely.**
3	What is the test variable in the ice-and-salt investigation?	**The amount of salt added to each ice cube.**
4	A student says ice-cube size is the outcome variable. Use the passage to correct the student.	**Ice-cube size is kept the same, so it is a controlled condition. The outcome variable is the number of minutes needed for the ice to melt.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would test whether the number of hours of light changes the height of basil plants. The test variable would be hours of light, and the outcome variable would be plant height after four weeks. I would keep the plant type and amount of water the same.

Accept equivalent descriptions of the factor deliberately changed and the result measured. For Your Turn, accept any safe, testable investigation with one clear test variable, one measurable outcome variable, and two reasonable controlled conditions.