Question Detectives

Find the variables in a testable science question.

6.1.a.i "asking questions and defining problems ask questions to determine relationships between independent and dependent variables"

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the factor that is changed and circle the result that is measured in each example in the passage. Number the two reasons a science question may need revision.

Questions That Test Relationships

1. Scientists begin an investigation by asking a question that can be tested. A useful question names a factor the investigator will change and a result the investigator will measure. The changed factor is the independent variable. The measured result is the dependent variable because it may depend on the changed factor. A clear question often follows this pattern: How does [changed factor] affect [measured result]? This wording helps scientists focus on one possible relationship at a time.

2. Suppose a class wants to learn why a sports drink feels colder in one cup than another. The class could ask, "How does the starting temperature of a drink affect the time it takes ice to melt?" Starting temperature is the factor to change. Time for ice to melt is the result to measure. The class should keep the cup size, amount of ice, and drink volume the same. Keeping other conditions steady makes the relationship easier to examine.

3. Questions can be improved before testing begins. Avoid a question that changes two factors at once, such as both the drink temperature and the amount of ice, because the results would be confusing. Also avoid words like better or best unless the class decides exactly what it will measure. A question about a measurable result, such as melting time in minutes, can be answered with observations. Scientists then compare results to decide whether the changed factor affected the measured result.

2 ANSWER WITH EVIDENCE

Use the passage

1. A student will change the number of paper clips on a paper airplane and measure its flight distance. Write a testable question for this investigation.

2. A student changes the distance of a flashlight from a solar cell and measures the electrical current. What is the independent variable?

3. A student changes the type of surface a toy car rolls on and measures how far it travels. What is the dependent variable?

4. A student asks, “How do soil type and amount of water affect plant height?” Explain why this question needs revision. Then write one way to revise it.

3 YOUR TURN

Your own words

Choose a safe classroom test about materials, light, or motion. Write one testable question using “How does ... affect ...?” Then name the independent variable, the dependent variable, and one condition you would keep the same.

ANSWER KEY

Question Detectives

GRADE 6 · 6.1.a.i

PART 1 · READ AND MARK

Underline the factor that is changed and circle the result that is measured in each example in the passage. Number the two reasons a science question may need revision. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	A student will change the number of paper clips on a paper airplane and measure its flight distance. Write a testable question for this investigation.	**How does the number of paper clips on a paper airplane affect its flight distance?**
2	A student changes the distance of a flashlight from a solar cell and measures the electrical current. What is the independent variable?	**The distance of the flashlight from the solar cell.**
3	A student changes the type of surface a toy car rolls on and measures how far it travels. What is the dependent variable?	**The distance the toy car travels.**
4	A student asks, "How do soil type and amount of water affect plant height?" Explain why this question needs revision. Then write one way to revise it.	**It changes two factors at once, so the results could be confusing. One revision is: How does soil type affect plant height?**

PART 3 · YOUR TURN (SAMPLE ANSWER)

How does the surface type affect the distance a toy car rolls? The independent variable is the surface type. The dependent variable is the distance the toy car rolls. I would keep the same toy car and starting position.

Accept testable questions that clearly name one changed factor and one measurable result. Accept reasonable controlled conditions that are not the independent or dependent variable.