

Questions Scientists Can Test

Use evidence to tell scientific questions from opinion questions.

4.1.a.i “asking questions and defining problems identify scientific and non-scientific questions”

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each question inside quotation marks. Write **S** above it if evidence could answer it, or **N** above it if it asks for a personal opinion.

A Question Worth Testing

- ① A class noticed that bean plants near a sunny window looked taller than plants on a shelf. Before planning an investigation, students need a question that evidence can help answer. They might ask, “How does the number of hours of light affect bean plant height?” This question names something to change and something to measure.
- ② Scientific questions can be investigated by observing, measuring, or testing. A fair test changes one factor at a time while other important conditions stay the same. For example, “Do bean plants grow differently with 4, 8, or 12 hours of light each day?” A student could measure each plant's height after two weeks and compare results.
- ③ Some questions ask for a personal choice or opinion, so evidence cannot settle them. “Which color is the happiest?” depends on what a person thinks, not on a test. A question can become scientific when it names something observable. Instead of asking, “Is our school garden beautiful?” a student could ask how many butterflies visit the garden during ten minutes.

2 ANSWER WITH EVIDENCE Use the passage

- 1 Write scientific or non-scientific for this question: "Does the number of worms in a garden change after rain?" What could a student measure?

- 2 Write scientific or non-scientific for this question: "Is a rainbow the prettiest sight in the sky?" Explain why.

- 3 Look at this question: "Does the kind of soil affect how tall radish plants grow?" What factor would change, and what would be measured?

- 4 Which phrase from the passage makes a question more scientific: "the happiest" or "during ten minutes"? Explain your choice.

3 YOUR TURN Your own words

Write one scientific question and one non-scientific question about the schoolyard. Then write one sentence explaining why your scientific question could be investigated with evidence.

PART 1 • READ AND MARK

Underline each question inside quotation marks. Write **S** above it if evidence could answer it, or **N** above it if it asks for a personal opinion. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Write scientific or non-scientific for this question: "Does the number of worms in a garden change after rain?" What could a student measure?	Scientific. A student could count the worms in the garden before and after rain.
2	Write scientific or non-scientific for this question: "Is a rainbow the prettiest sight in the sky?" Explain why.	Non-scientific. "Prettiest" is a personal opinion, so evidence cannot settle it.
3	Look at this question: "Does the kind of soil affect how tall radish plants grow?" What factor would change, and what would be measured?	The kind of soil would change. The height of the radish plants would be measured.
4	Which phrase from the passage makes a question more scientific: "the happiest" or "during ten minutes"? Explain your choice.	"During ten minutes" makes a question more scientific because butterflies can be observed and counted during that time.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Does the amount of shade affect the temperature of the schoolyard pavement? Which playground game is the most fun? The first question can be investigated by measuring pavement temperature in places with different amounts of shade.

Accept scientific questions that could be answered through observation, measurement, or a fair test. Accept non-scientific questions based on personal opinion, taste, or preference, with a reasonable explanation.