

From Guess to Theory

Compare a testable hypothesis with an evidence-supported scientific theory.

LS.1.d.iii "constructing and critiquing conclusions and explanations differentiate between a scientific hypothesis and theory"

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline the hypothesis and prediction, circle the description of a scientific theory, and number the three method checks that could limit the conclusion.

Pill Bugs and Evidence

- ① In a school garden, students noticed that pill bugs often gathered beneath damp boards. They proposed a hypothesis: pill bugs choose damp places because their bodies lose less water there. This is a testable, limited explanation for one observation. The students predicted that, when given a choice between a damp chamber and a dry chamber with equal darkness and temperature, more pill bugs would spend time in the damp chamber. A prediction helps scientists plan a fair test.
- ② After repeating the test several times, students found more pill bugs in the damp chamber. They concluded that the results supported their hypothesis under those conditions. A careful conclusion does not claim that dampness is the only factor affecting pill bugs. The group should also ask whether both chambers had equal space, whether the pill bugs started on different sides, and whether enough trials were run. These questions critique the method and limit the conclusion.
- ③ A scientific theory is not a personal hunch or an upgraded hypothesis. It is a broad explanation that has been tested many times and is supported by evidence from many investigations. For example, cell theory explains that living things are made of cells, cells are the basic unit of life, and cells come from existing cells. One small pill-bug investigation cannot create or prove a theory. Its results can add evidence, lead to new hypotheses, or reveal a problem needing more study.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 Why is the students' statement about pill bugs a scientific hypothesis instead of only an observation?

2 What conclusion do the results support, and what larger claim would not be justified?

3 Name two method checks the group should make before making a stronger conclusion.

4 Why can the pill-bug investigation not create or prove a scientific theory?

3 YOUR TURN _____ Your own words

In four sentences, create a testable hypothesis about why seedlings near a window are taller. Include a prediction and a fair-test detail, state a careful conclusion the results could support, and explain why one investigation would not be a scientific theory.

PART 1 • READ AND MARK

Underline the hypothesis and prediction, circle the description of a scientific theory, and number the three method checks that could limit the conclusion. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Why is the students' statement about pill bugs a scientific hypothesis instead of only an observation?	It is a testable, limited explanation for why pill bugs gather in damp places, and it leads to a prediction.
2	What conclusion do the results support, and what larger claim would not be justified?	The results support the hypothesis under the test conditions. They do not show that dampness is the only factor affecting pill bugs.
3	Name two method checks the group should make before making a stronger conclusion.	Any two: check that the chambers had equal space, that pill bugs started on different sides, and that enough trials were run.
4	Why can the pill-bug investigation not create or prove a scientific theory?	A scientific theory is a broad explanation supported by evidence from many investigations and repeated testing. One small investigation can only add evidence or lead to more study.

PART 3 • YOUR TURN (SAMPLE ANSWER)

If seedlings receive more light, then they will grow taller because light helps them make food. I would grow equal seedlings with the same water, soil, and temperature, changing only the amount of light, and predict that the brighter group will be taller. If that group is taller after repeated trials, the results support the hypothesis but do not prove it. This one investigation is not a scientific theory because a theory is supported by many investigations and broad evidence.

Accept equivalent explanations that distinguish a testable, limited hypothesis from a broad theory supported by repeated evidence from many investigations. For the open response, require a testable claim, a prediction, a controlled variable or fair-test detail, a limited conclusion, and an accurate explanation of why the study is not a theory.