

Evidence Idea Sort

Distinguish scientific hypotheses, theories, and laws when evaluating explanations.

PS.1.d.iv "constructing and critiquing conclusions and explanations differentiate between a scientific hypothesis, theory, and law"

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline the sentence that defines each scientific idea, then number the definitions 1, 2, and 3 for hypothesis, theory, and law. Circle the sentence that gives a caution about drawing a conclusion from results.

Three Jobs for Scientific Ideas

- ① Scientists use evidence to build explanations, but different scientific ideas have different roles. A hypothesis is a testable proposed explanation for an observation. For example, a student notices that a sealed plastic bottle becomes dented after it is cooled. She hypothesizes that cooling the air inside lowers its pressure, so outside air pushes the bottle inward. She can test this explanation by measuring pressure at different temperatures while keeping the bottle sealed. A hypothesis may be supported, changed, or rejected when results are collected.
- ② A scientific theory is a broad explanation supported by many lines of evidence from repeated investigations. It connects evidence and makes useful predictions. The kinetic molecular theory explains gas pressure by describing particles in motion. Scientists use this theory to explain why a warmer sealed container can have higher pressure: faster-moving particles strike walls more often and with greater force. A theory does not become a law just because evidence grows. Theory and law answer different questions. A theory explains how or why a pattern occurs.
- ③ A scientific law describes a consistent pattern in nature, often with words or a mathematical relationship. Boyle's law describes how the pressure of a fixed amount of gas changes as its volume changes at constant temperature. It does not explain the particle-level cause of that pattern. A careful conclusion states what the results support and names limits. If a bottle test had a leaking cap, pressure measurements could be unreliable. Scientists would critique the conclusion by asking whether the test controlled leaks, temperature, and measurement error.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 Why is the student's statement about the cooled bottle a hypothesis? Describe one way she could test it.

2 According to the passage, how does the kinetic molecular theory explain higher pressure in a warmer sealed container?

3 How is the job of a scientific theory different from the job of a scientific law?

4 Why would a leaking cap weaken a conclusion from the bottle test? Name one question a scientist should ask when critiquing that conclusion.

3 YOUR TURN _____ Your own words

Choose an observation that is not about bottles or gas pressure. Write four sentences: state a testable hypothesis, explain whether a scientific theory or law could help explain or describe the observation, give a conclusion that results could support, and name one limit to check when critiquing that conclusion.

PART 1 • READ AND MARK

Underline the sentence that defines each scientific idea, then number the definitions 1, 2, and 3 for hypothesis, theory, and law. Circle the sentence that gives a caution about drawing a conclusion from results. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Why is the student's statement about the cooled bottle a hypothesis? Describe one way she could test it.	It is a testable proposed explanation for the dented bottle. She could measure the pressure at different temperatures while keeping the bottle sealed.
2	According to the passage, how does the kinetic molecular theory explain higher pressure in a warmer sealed container?	It explains that faster-moving particles strike the container walls more often and with greater force.
3	How is the job of a scientific theory different from the job of a scientific law?	A theory is a broad, evidence-supported explanation of how or why a pattern occurs. A law describes a consistent pattern, often with words or a mathematical relationship, but does not explain its cause.
4	Why would a leaking cap weaken a conclusion from the bottle test? Name one question a scientist should ask when critiquing that conclusion.	A leak could make pressure measurements unreliable. A scientist should ask whether the test controlled leaks, temperature, or measurement error.

PART 3 • YOUR TURN (SAMPLE ANSWER)

A student notices that a metal spoon becomes warmer in hot soup. The student hypothesizes that thermal energy moves from the soup into the spoon. A scientific theory can help explain energy transfer through particle motion, while a law can describe a measured relationship without explaining the transfer. If the spoon temperature rises in repeated trials, the results support the hypothesis, but the spoon material must be controlled.

Accept equivalent descriptions that correctly distinguish a testable proposed explanation, a broad evidence-supported explanation, and a description of a consistent pattern. In Part 3, accept varied observations if the response includes all four requested parts and identifies a realistic limitation.