

Evolution Summative Assessment — Prompts and Rubric

1. A species of cactus has spines. How would biologists explain how a species of cactus with spines evolved from an ancestral cactus species without spines?

2. A species of fly lacks wings. How would biologists explain how a species of fly without wings evolved from an ancestral fly species with wings?

Proficient answers should include correct references to the science concepts below.

Science idea	Examples of student language
Genetic variation	mutation, recombination, sexual reproduction, allele mixing
Heritability	reproduction, passed to offspring
Differential reproductive success	Reproductive/survival advantage, more likely to reproduce/survive

Ex: A genetic variation existed that produced spines on a cactus. The spines gave the cactus a reproductive advantage (helped it survive and reproduce), and the variation was passed from generation to generation.

Watch for, and correct, the following naïve ideas

Naïve idea	Description
Acclimation	Adjustment or acclimation to circumstances, which are then inherited
Need/goal	Goal-directed change; organisms change in response to a need
Use/disuse	Using (or not using) a trait causes it to become more or less common.

Highly proficient answers should include NO naïve ideas, and they should contain additional information that demonstrates deeper understanding. Examples include references to probability (more/less likely), change over time, natural selection, and reproductive isolation or speciation.

Ex: A genetic variation caused by a mutation that produced spines on a cactus. The spines gave the cactus a reproductive advantage, and the variation was passed from generation to generation. Natural selection acted on the “spine” trait over many generations in reproductively isolated populations until the populations were different enough to be considered a new species.

For more information, see <http://www.evograder.org/static/docs/EvoGraderJournalArticle.pdf>