

MS-LS4-5 Biological Evolution: Unity and Diversity

Students who demonstrate understanding can:

- MS-LS4-5. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.** [Clarification Statement: Emphasis is on synthesizing information from reliable sources about the influence of humans on genetic outcomes in artificial selection (such as genetic modification, animal husbandry, gene therapy); and, on the impacts these technologies have on society as well as the technologies leading to these scientific discoveries.]

The performance expectation above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.

- Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence.

Disciplinary Core Ideas

LS4.B: Natural Selection

- In *artificial* selection, humans have the capacity to influence certain characteristics of organisms by selective breeding. One can choose desired parental traits determined by genes, which are then passed on to offspring.

Crosscutting Concepts

Cause and Effect

- Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology

- Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems.

Connections to Nature of Science

Science Addresses Questions About the Natural and Material World

- Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes.

Observable features of the student performance by the end of the course:

1	Obtaining information
a	Students gather information about at least two technologies that have changed the way humans influence the inheritance of desired traits in plants and animals through artificial selection by choosing desired parental traits determined by genes, which are then often passed on to offspring. Examples could include gene therapy, genetic modification, and selective breeding of plants and animals.
b	Students use at least two appropriate and reliable sources of information for investigating each technology.
2	Evaluating information
a	Students assess the credibility, accuracy, and possible bias of each publication and method used in the information they gather.
b	Students use their knowledge of artificial selection and additional sources to describe how the information they gather is or is not supported by evidence.

c	Students synthesize the information from multiple sources to provide examples of how technologies have changed the ways that humans are able to influence the inheritance of desired traits in organisms.
d	Students use the information to identify and describe how a better understanding of cause-and-effect relationships in how traits occur in organisms has led to advances in technology that provide a higher probability of being able to influence the inheritance of desired traits in organisms.