

Focus Question 1: How can animals sense the world around them?

Lesson 1: Now You See It

We see objects because light reflected from their surface reaches our eyes.

Students carry out an investigation by manipulating components in a system to determine what allows us to see objects.

Lesson 2: The Eyes Have It

Internal and external eye structures support different functions for survival.

Students analyze animal eye structures for patterns in structures that support similar functions.

Lesson 3: Survival Sense

Animals have a variety of sense receptors specialized for different kinds of information.

Students obtain, evaluate, and communicate information about animal senses and structures and collaboratively construct an argument for which sense an animal relies on most for survival.

Focus Question 2: How can animals process and respond to information?

Lesson 4: Can You Believe Your Eyes

Information from the senses is processed in the brain.

Students analyze optical illusions using tools and develop a model to show how body structures work as a system to form the images we see.

Lesson 5: Live and Learn

Animals can use their memories to learn and guide their actions.

Students analyze data from an investigation to develop a model that explains how songbirds can use their structures to learn to avoid distasteful insects.

Lesson 6: Quick Study

Information from multiple senses, as well as memories, can be integrated when animals decide how to react.

Students engage in argument from evidence to support a prediction about the type and timing of sensory information that would cause birds to learn the fastest.

Focus Question 3: How can animals send and receive information to communicate?

Lesson 7: Sending and Receiving

Communication requires a sender, signal, and receiver.

Students obtain and evaluate information from a text about the components of an animal communication system.

Lesson 8: Do the Wave

When receivers are not present, communication is not possible.

Students plan and carry out an investigation into the components of the fiddler crab communication system.

Lesson 9: Conferring with the Flowers

Plants have structures that support survival and that can sometimes be used to communicate information to animals.

Students engage in argument from evidence about what counts as a plant-animal communication system.

Focus Question 4: What are some challenges in communication?

Lesson 10: I Can't Hear You!

Animals can solve communication problems.

Students analyze and interpret data to make an argument about how urban noise caused nightingales to sing louder.

Lesson 11: What's the Code?

Computers send messages as digital signals of 1s and 0s.

Students design and test a solution to represent a picture of patterns of 1s and 0s and short and long flashes of light.

Lesson 12: Messaging Faster

Solutions to human communication problems vary based on criteria and constraints, but digital signals solve many problems and allow messages to be sent quickly and accurately.

Students obtain information from text to define human communication problems and their solutions including the relative speed of those solutions. They argue from evidence to compare different designed solutions based on the criteria and constraints of the solution.

Science Challenge

Focus Question 5: How can fireflies communicate to attract a mate?

Lesson 13: Firefly Flashes Part 1

Fireflies identify mates using species-specific flash patterns.

Students obtain information about how fireflies use flash patterns to communicate and plan for a model by identifying key components and interactions.

Lesson 14: Firefly Flashes Part 2

Flash patterns can be modeled to test how likely they are to be confused for similar patterns.

Students use an electric firefly model to test how differences in flash patterns affect their ease of identification.

Lesson 15: Firefly Flashes Part 3

Scientific arguments are based on evidence.

Students use data from testing with a model to develop an argument about whether fireflies with more distinct flash patterns are better at communicating.