

Grade: Kinder

Science Lesson/Unit Title: Ant Wrangling

Arizona Science Standard

K.L1U1.7: Observe, ask questions, and explain how specialized structures found on a variety of plants and animals (including humans) help them sense and respond to their environment.

Leading Questions: What are our five senses? Do you think other animals have senses like we do? What kinds of animals do you think have senses like we do? How do you know animals have senses? Do you think insects have senses? What are some insects you know about?

Essential Question: Do ants have senses?

Investigative Phenomenon: Ant Wrangling Video (<http://bit.ly/AntWranglingVideo>)

<p>Science and Engineering Practice</p>	<p>Asking Questions and Defining Problems: A practice of science is to ask and refine questions that lead to descriptions and explanations of how the natural and designed world(s) works and which can be empirically tested. Engineering questions clarify problems to determine criteria for successful solutions and identify constraints to solve problems about the designed world. Both scientists and engineers also ask questions to clarify ideas.</p>	
<p>Components of SEP In this lesson, <u>students</u> have a structured opportunity to:</p>	<p>Teacher actions taken to facilitate this component for students:</p>	<p>The scientists (students) are...</p>
<p>Ask questions based on observations and/or other appropriate information of a scientific phenomenon</p>	<ul style="list-style-type: none"> • Show Ant Wrangling video and let the scientists notice. • Record what the scientists notice. • After the scientists have had a chance to notice, then facilitate their wonderings. 	<ul style="list-style-type: none"> • Watching the video and noticing. • Describing what they noticed. • Asking questions they have about what they noticed.
<p>Generate, identify, and/or evaluate questions that can be systematically investigated (i.e., questions that are testable or investigable or scientific)</p>	<ul style="list-style-type: none"> • Lead discussion about which questions are testable by asking the scientists what questions they think are testable and talking it through. 	<ul style="list-style-type: none"> • Contributing to conversation by identifying which questions are testable and why or how.

<p>Science and Engineering Practice</p>	<p>Constructing Explanations: The end-products of science are explanations of natural phenomena. The goal of science is the construction of theories that provide explanatory accounts of the world. A theory becomes accepted when it has multiple lines of empirical evidence and great explanatory power than previous theories.</p>	
<p>Components of SEP In this lesson, <u>students</u> have a structured opportunity to:</p>	<p>Teacher actions taken to facilitate this component for students:</p>	<p>The scientists (students) are...</p>
<p>Articulate a claim/explanation (a testable statement or conclusion that answers a questions about how or why) that is based on and consistent with available evidence</p>	<ul style="list-style-type: none"> • Go back to the Essential Question and ask scientists to make a claim – turn the question into a statement they will be able to back up with evidence. 	<ul style="list-style-type: none"> • Coming up with the claim that “Ants do have senses.”
<p>Identify and describe appropriate and sufficient evidence that support the claim/explanation</p>	<ul style="list-style-type: none"> • Ask scientists to identify observations from what they noticed which support the claim. 	<ul style="list-style-type: none"> • Identifying observations which are evidence for the claim that ants have senses.
<p>Describe the reasoning (mechanism an how or why) that connects the evidence to the claim/explanation using scientific ideas/principles</p>	<ul style="list-style-type: none"> • When a scientist completes the sentence starter with an observation from the things they noticed, facilitate a dialogue about how that observation either does or does not support the claim that ants have senses. 	<ul style="list-style-type: none"> • Explaining how the observation from their noticing either does or does not support the claim.

In-Person Lesson

- 1) (5-10 minutes) Ask scientists the leading questions and let them respond.
- 2) (2 minutes) Explain that today in your lab all scientists will be working together to answer the question “Do ants have senses?” using their observation skills to notice and wonder.
- 3) (10 minutes) Watch the Ant Wrangling video and let scientists notice using their sense of sight. Record what they notice after each round of the ant wrangling video.

- 4) (5 minutes) Let scientists wonder. Record their responses to the question “What do you wonder?” You can help them by giving them sentence starters like:
 - a. I wonder why...?
 - b. I wonder if...?
 - c. I wonder what...?
 - d. I wonder how...?
 - e. I wonder what would happen if...?
- 5) (5 minutes) Go through the list of questions and identify some questions that are testable with the scientists. These are questions you could design an experiment to test – gather evidence which would either support a claim or refute a claim made about the question. Discuss what an experiment might look like to gather evidence for that question.
- 6) (5 minutes) Refer back to the essential question, “Do ants have senses?” Ask scientists to make a claim and use a piece of evidence from what they noticed to support their claim. Their claim can be either, “Yes, ants have senses because...” or “No, ants do not have senses because...” and then it needs to be backed up with something they observed. “Yes, ants have senses because they turn around when they get to the line.” or “No, ants do not have senses because they...” (NOTE: Ants do have senses!) See if they can use more than one piece of evidence (observation) to support their claim.
- 7) Extension: Ask students which sense they think the ants are using. It could be either sight (seeing the line) or smell (smelling the ink) or feel (feeling the wetness of the line) or taste (they can taste the line). Additionally you could talk about how you could try to design an experiment to determine which sense the ants are using. In the end, the fact that the ants react to a line that is drawn by turning around and going in another direction is evidence to support the claim that ants have senses.

Virtual Lesson Adaptation

The lesson detailed above can be carried out online synchronously. The Notice and Wonder parts could also be assigned asynchronously to scientists by either using the print version (<https://stemazing.org/ece-notice-and-wonder-journal/>) or Google Docs version (<http://bit.ly/ECENoticeWonderGoogleDoc>) of the ECE Notice and Wonder Journal. If using the Google Docs version of the journal, students can use Voice typing to record what they notice and what they wonder about the Ant Wrangling video.

What the heck? Science Explanation

Ants have all five senses, just like we do, but they all work a bit different. Ants see with compound eyes, which is basically like having a bunch of little eyes all working together to help the ant make sense of the world. Ants’ eyesight is fairly poor so they don’t rely heavily on this sense.

Ants hear by detecting vibrations through their antennae, legs, and bodies. They can send out vibrations they make to other ants to communicate about food and to send out an alarm message to others when in danger.

Ants use their antennae for their senses of smell, taste, and touch. The most sensitive of these is their sense of smell. Ants can detect many more smells than most insects and communicate in a variety of ways with each other using chemicals called pheromones.

For more about ants and their senses, see some of these articles and videos:

SciShow Kids video: How Do Ants Find Food? <http://bit.ly/HowAntsFindFood>

LIVEscience article: Ants: From the Cool to the Creepy
<https://www.livescience.com/ant-facts.html>