NGSS & Common Core 5E Lesson Plan

Brief Lesson Description: Students will make observations on (and act out) how ants communicate to construct an argument about the structure and importance of social interactions in a colony. Performance Expectation(s): 3-LS2 Ecosystems: Interactions, Energy and Dynamics Students who demonstrate understanding can 3-LS2-1 Construct an argument that some animals form groups that help members survive. Specific Learning Objectives: Students will construct an argument that ants communicate and share food with each other in order for the colony to be successful. Prior Student Knowledge: Students have knowledge about ecosystems and interactions between species. They understand how plants and animals are dependent on each other and compete for resources. Essential Features of Classroom Inquiry within Lesson: Students will collect and observe ants passing colored sugar water. With support, students will be able to use the evidence to make a claim about how and why ants socialize.		
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Adaptations/Accommodations for Diverse Learners:		
Supporting language development during the lessons with sentence frames and opportunities to talk with peers. (Example of		
a sentence frames include: If, then, because)		
Visual support of videos and graphs.		
Hands-on activity allows for all students to participate. The game allows for students to act out and make personal		
connections the lesson. Common Core Standards Addressed:		
ELA/Literacy — RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS2-1) RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS2-1) W.3.1 Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-LS2-1) Mathematics — MP.4 Model with mathematics. (3-LS2-1) 3.NBT Number and Operations in Base Ten (3-LS2-1)		
Science & Engineering Practices: Disciplinary Core Ideas: Crosscutting Concepts:		
Engaging in Argument from Social Interactions and Group Behavior Cause and Effect		
Evidence Being part of a group helps animals Cause and effect relationships are		
Construct an argument with evidence, obtain food, defend themselves, and routinely identified and used to explain		
data, and/or a model cope with changes. change.		
Possible Preconceptions/Misconceptions:		
There is one "bossy ant" or queen ant that gives orders for the other ants to follow.		
Ants are not social and they don't communicate.		
LESSON PLAN - 5E Model (6E Extend)		
Teacher does Student does		
ENGAGE: ENGAGE:		
"What do we know about ants?" Record answers on a Students brainstorm ideas about ants.		
chart. Support language with academic vocabulary.		
Vocabulary: Insects, colony, queen, workers,		
female, male, nest, tunnels, swarm, marching, head, thorax, abdomen, antenna, brood, eggs, larva,		

pupae	
EXPLORE: Collecting Ants: Prepare tubs for collections. Demonstrate how to use paintbrushes to collect ants. Have students go outside and collect ants. In each tub, place three small cotton balls. Add colored sugar water to each ball (a different color on each ball works best). EXPLAIN: Concepts Explained and Vocabulary Defined: In a whole class discussion, have students share their observations. Ask questions to have students make a connection to social interactions (Why would? What is important about?)	EXPLORE: Students will work with their teams to go outside and collect ants. Students help prepare the experiment. Students watch the ants. Record observations. EXPLAIN: Students will share their observations.
ELABORATE: Applications and Extensions: Use slides from Dr. Noa Pinter-Wollman. Discuss her research. Look at graphs and watch videos.	ELABORATE: Students can take notes.
EVALUATE:	EVALUATE:
Formative Monitoring (Questioning / Discussion): During the experiment, the teacher will walk around to each group and ask them about their findings. What did you notice? What evidence do you have? Why do you think that?	
Summative Assessment (Quiz / Project / Report): Claim: have students make a statement about their findings. Evidence: have students site their evidence. Reasoning: how does your evidence support your claim? Why does that make sense?	Students will work with a team to create an argument.
EXTEND: Elaborate Further / Reflect: Enrichment: Social Animals Game: Set up room, make the cards, explain the rules. After the game, have a class discussion about what they noticed and how it applies to social animals.	EXTEND: Students work as a whole class to solve the puzzle word "Hungry". Students discuss their experience.

<u>Materials Needed:</u> Paintbrushes (one for each student) Tupperware (one per team) Ants (collected on site)
Cotton balls Sugar water Eye dropper

Food coloring (three colors) Magnifying glasses (optional)

Social Animal Game:

Letter cards Square Circle

Resources:

CSET Investigating Ant Colony

https://cset.stanford.edu/media/news/investigating-ant-colony-searching-link-citizen-science-project

Fluon: https://www.bioquip.com/search/default.asp

Aspirator: https://www.bioquip.com/search/DispProduct.asp?pid=1135A