

OIMB GK12 CURRICULUM

6th Grade

60 minutes

MOLE CRAB EXPERIMENT

Oregon Science Content Standards:

6.2 Interaction and Change: The related parts within a system interact and change.

6.2.L.2. Explain how individual organisms and populations in an ecosystem interact and how changes in populations are related to resources.

6.3 Scientific Inquiry: Scientific inquiry is the investigation of the natural world based on observations and science principles that includes proposing questions or hypotheses, and developing procedures for questioning, collecting, analyzing, and interpreting accurate and relevant data to produce justifiable evidence-based explanations.

6.3S.1 Based on observations and science principles, propose questions or hypotheses that can be examined through scientific investigation. Design and conduct an investigation that uses appropriate tools and techniques to collect relevant data.

6.3S.2 Organize and display relevant data, construct an evidence-based explanation of the results of an investigation, and communicate the conclusions.

6.3S.3 Explain why if more than one variable changes at the same time in an investigation, the outcome of the investigation may not be clearly attributable to any one variable.

Ocean Literacy Principles:

5. The ocean supports a great diversity of life and ecosystems.

Goals:

- Students engage in a scientific investigation.
- Students appreciate how to appropriately handle live animals.

Concepts:

- Experiments help us understand the world around us.
- Graphing is a useful way to present data.

Materials:

- Pacific Mole Crab Fact Sheet for background information for the teacher
<http://www.farallones.org/documents/sandcrab.pdf>
- Trays, 1 per group
- Sand, about 2 cups per group
- Cups for mole crabs, 1 or 2 per group
- Live mole crabs, 2 or 3 per group
- Buckets
- Seawater, chilled

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- Rags
- Mole Crabs – Scientific Investigation worksheet

Lesson plan:

1. Review the scientific method (stress it is an iterative process):
 - a. Ask a question
 - b. Think about all you know about the topic
 - c. Make a hypothesis
 - d. Design an experiment
 - e. Perform the experiment
 - f. Collect results (data)
 - g. Make conclusions
 - h. Discuss and share results
2. Introduce mole crabs. Ask what the students know about mole crabs and where they have seen them.
3. Work with the students to come up with rules about how to treat the crabs. They are fragile, living organisms and need to be treated carefully and respectfully.
4. Walk a container of mole crabs around, or set a container with a small amount of sand and a mole crab at each table of students (not enough sand for the mole crab to completely bury). Instruct the students NOT to touch the mole crabs at this point. Let the students make and write down observations, and write down questions that they have about mole crabs.
5. Take back the containers of mole crabs and list the students' questions. Have a class discussion about the questions. Answer some questions and let the students know they will conduct experiments to find the answers to others. Some of the questions asked by students have included: Can boy or girl mole crabs burrow faster? Do mole crabs burrow into dry sand, or does the sand have to be wet? Does mole crab behavior change when they are in the dark? How far down will they dig?
6. Conduct a class discussion about which question or questions they could test during the class time with available materials. What would be a good experimental design? Remind the students
 - that they have sand, water, mole crabs, containers and whatever else is in the room
 - to keep all but one variable constant
 - that it is important to repeat their experiment more than once
 - that they need to record their data
 - that they need to treat the mole crabs with care
7. Possibilities include:
 - Timing how long it takes a mole crab to dig into wet sand vs. dry sand

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- Timing the digging speed of male vs. female mole crabs
 - Measuring how deep mole crabs dig in a given amount of time
8. After the discussion, allow students to form groups based on the question they want to test.
 9. Have the students set up their experiments.
 10. Remind students to treat the mole crabs carefully---not to push or crush or poke or force or shake them. Allow only one person at a time to be the “handler” and take the mole crab out of the sand after it has buried itself.
 11. When they are ready and you have approved their set-up, provide each group with mole crabs and have the students conduct their experiments to discover the answer to their question.
 12. Have the students return the mole crabs to their buckets and clean up.
 13. Have each table report on what they discovered.
 14. Wrap-up with a review of scientific investigations and what students learned about the scientific process.

Assessment: Students’ participation in the discussions and experiments along with their experimental procedure reports, listing their question, hypothesis, methods and materials, data and conclusions.

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Name: _____

Mole Crabs – Scientific Investigation

Question: _____

Hypothesis (prediction): _____

Methods: (Write what you did here.)

1. _____

2. _____

3. _____

4. _____

Illustrate your experimental set-up:

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Data: (Record information from your experiment here.)

Graph: (Make a graph of the data you collected here.)

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Results: (Write what happened in your experiment here.)

Conclusion: (Write what your results mean here.)
