

Communicating Ocean Sciences to Informal Audiences

Session 9: Inquiring Minds & Promoting Discussions

Quick Write



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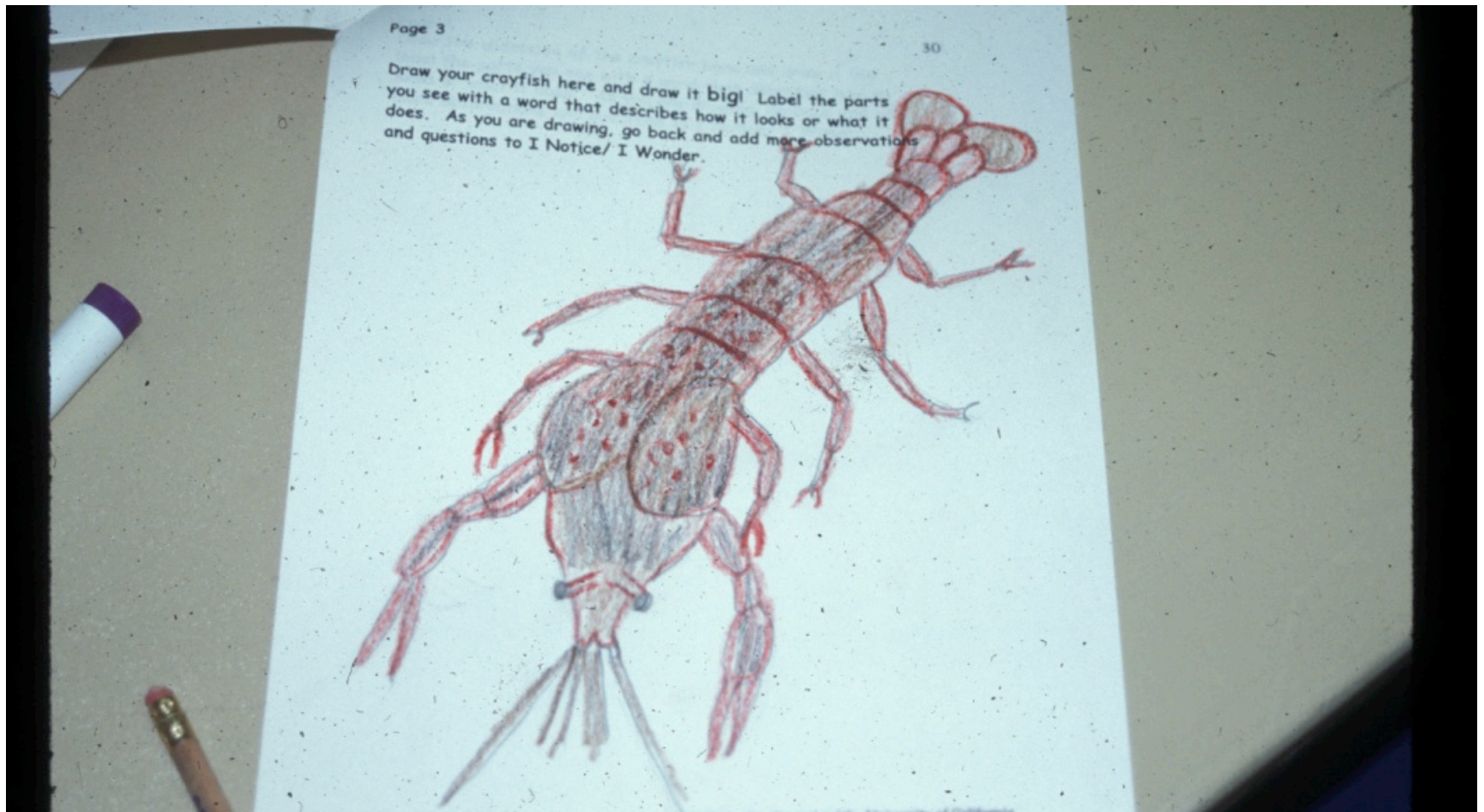


Inquiry

How we're using the word *inquiry*:

*Scientific questions about the natural world that we can figure out the answers to by **doing an investigation** right here in the classroom.*

Crayfish Investigation



Rules about what we can investigate

1. Animals are not harmed in any way.
2. The question isn't too big - it can be answered by just one investigation and within one class period.
3. The materials needed are easy to get, inexpensive or already available in the building.
4. The investigation is a what-happens-if, comparison, or measuring question, not a “why” or “how” question.
5. The question is important (or relevant) to the crayfish in its real life.
6. The question can be answered by something you can **do** and not just by looking up the answer.

Example

- What is a crayfish's favorite food?

Starting your investigation

1. With your group, choose a question you would like to investigate
2. Write your question on an Investigation Card (if you pick a non-investigable question, try to turn it into an investigable question to see if you can use it)
3. Post your Investigation Card on the board under “Investigations”
4. Feel free to use resources to learn more about crayfish (we have information cards available)
5. Do page 1 of your Investigation Journal
6. Generate at least 2 hypotheses (including a prediction and a rationale for each)
7. Share your investigation plan with another group

Discussion

- What changes do you think you would need to make to the Crayfish Investigation in order to facilitate the activity on the museum floor?

COMPARING THE “INQUIRY”



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Small Group Discussion

- Recall an interaction between the facilitator and a visitor (or yourself if you participated in the activity) involving the visitor asking a question or making a comment and the facilitator responding.
 - How would you describe the way the facilitator responded to the visitor?
 - How did the visitor respond to what the facilitator said? Did a discussion start?

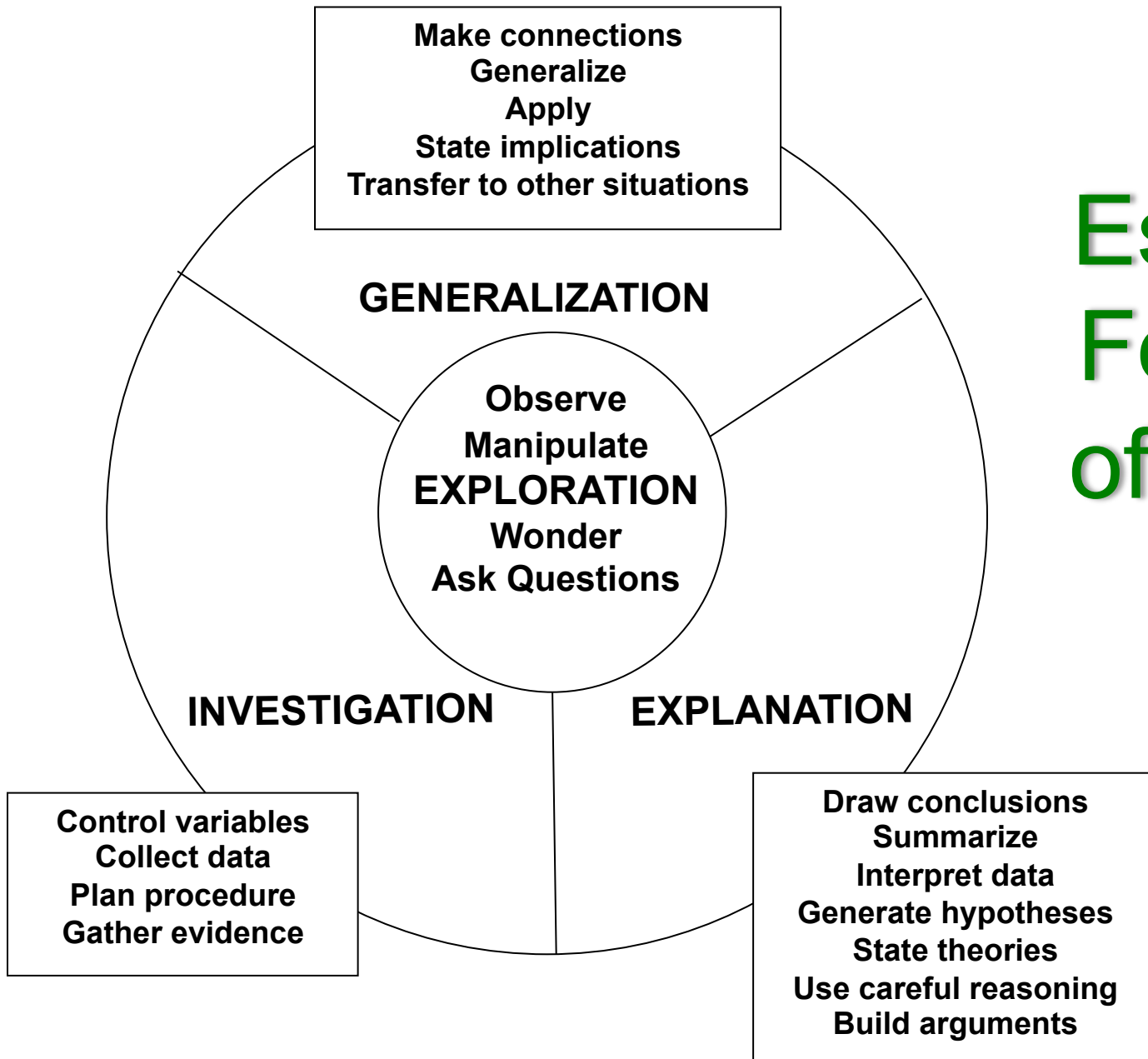
Research Discussion

- Which of these ideas have you tried or have you seen someone else do? Describe the situation and what you thought of the interaction.
- Which of these ideas to promote discussion are you most interested in trying and why?

What can you tell me about things that float?

- Learner #1: Spoons float.
- Learner #2: The mocus they're moving. But then they stop. And when they stop, it floats.
- Learner #3: Light things float.
- Learner #4: Things that are less dense than water float.
- Learner #5: My uncle has a boat. And when we go fishing, we catch lotsa fish, but my brother doesn't like to fish, 'cause he thinks they're gross.

Essential Features of Inquiry



Inquiry & the National Science Standards

- Learners are engaged by scientifically oriented questions.
- Learners give priority to evidence, which allow them to develop and evaluate explanations.
- Learners formulate explanations from evidence to address scientifically oriented questions.
- Learners connect their explanations to scientific knowledge.
- Learners communicate and justify their proposed explanations.

From Inquiry and the National Science Education Standards, Chap. 2, pp. 24–27

Inquiry in Informal Settings (What visitors actually do)

1. Visitor questions typically focus on the physical display, not underlying phenomena or concepts.
2. Visitors are generally successful at answering their questions through manipulation and observation.
3. Conclusions and explanations seldom generalize past the exhibit.
4. Situations involving alternative explanations or evidence to support claims are rarely seen.

Breakdown of Inquiry Emphases

NSES	Visitors
Exploration	Exploration
Investigation	Investigation
Explanation	Explanation
Generalization	Generalization

Table 2.–6. Essential Features of Classroom Inquiry and Their Variations

Essential Feature	Variations			
1. Learner engages in scientifically oriented questions	Learner poses a question	Learner selects among questions, poses new questions	Learner sharpens or clarifies question provided by teacher, materials, or other source	Learner engages in question provided by teacher, materials, or other source
2. Learner gives priority to evidence in responding to questions	Learner determines what constitutes evidence and collects it	Learner directed to collect certain data	Learner given data and asked to analyze	Learner given data and told how to analyze
3. Learner formulates explanations from evidence	Learner formulates explanation after summarizing evidence	Learner guided in process of formulating explanations from evidence	Learner given possible ways to use evidence to formulate explanation	Learner provided with evidence
4. Learner connects explanations to science knowledge	Learner independently examines other resources and forms explanations	Learner directed towards sources of scientific knowledge	Learner given possible connections	
5. Learner communicates and justifies proposed explanations	Learner forms reasonable and logical argument to communicate explanations	Learner coached in development of communication	Learner provided broad guidelines to use and sharpen communication	Learner given steps and procedures for communication

More-----Amount of Learner Self-Direction-----Less
 Less-----Amount of Direction from Teacher or Material-----More

How would you describe what inquiry-based means compared to open-ended inquiry?

Work with Partner

- Discuss with your partner how you might include more inquiry in the design and/or delivery of your own activity.

Homework

- Reading
 - *Surrounded by Science*
 - Ch 6, Assessing for Learning, pp. 103-115.
- Activity Development
 - Modify your activity to be inquired-based.