

## **Activity: Mussel Mania!**

### **Lesson Summary**

In this lesson students begin to explore mussels and build observation and questioning skills. They work collaboratively to develop a class RAN chart that lists what they think they know, what they have confirmed as scientifically accurate, misconceptions, new information, and wonderings. They then listen to a read aloud of *Russell the Mussel*. This is followed with observations of mussel shells and living mussels. Students generate questions they have about mussels as they are making their observations.

### **Ohio Standards Correlations**

**Standard:** Life Sciences

**Grades 3-5 Benchmark A:** Differentiate between the life cycles of different plants and animals.

#### **Indicator(s)**

##### **Grade Three**

1. Compare the life cycles of different animals including birth to adulthood, reproduction and death (e.g., egg-tadpole-frog, egg-caterpillar-chrysalis-butterfly).

##### **Grade Four**

5. Describe how organisms interact with one another in various ways (e.g., many plants depend on animals for carrying pollen or dispersing seeds).

**Grades 3-5 Benchmark B:** Analyze plant and animal structures and functions needed for survival and describe the flow of energy through a system that all organisms use to survive.

#### **Indicator(s)**

##### **Grade Three**

2. Relate animal structures to their specific survival functions (e.g., obtaining food, escaping or hiding from enemies).

##### **Grade Five**

3. Trace the organization of simple food chains and food webs (e.g., producers, herbivores, carnivores, omnivores and decomposers).

**Grades 6-8 Benchmark A:** Explain that the basic functions of organisms are carried out in cells and groups of specialized cells form tissues and organs; the combination of these cells make up multicellular organisms that have a variety of body plans and internal structures.

**Indicator(s)**

**Grade Six**

2. Explain that multicellular organisms have a variety of specialized cells, tissues, organs and organ systems that perform specialized functions.

**Time**

60 minutes

**Materials**

Per group

Individual RAN chart, table group RAN chart, small Post-It notes, mussel shells, living mussels in table top aquarium set-ups, algae, sentence strips, hand lens

Russell the Mussel—

1 tabletop aquarium set up: one 10-15 gallon aquarium, gravel to cover 2" base, non chlorinated water, 2-3 mussels, air stone/bubbler, nannochloropsis Algae paste

For whole class

Post-Its, chart paper, *Russell the Mussel* (book and/or pdf file), LCD projector and laptop

**Background**

Freshwater mussels are filter feeders that feed on phytoplankton. Since mussels filter the water they live in, they are highly susceptible to pollutants. Consequently they are a good indicator of water quality. Twenty-eight of Ohio's eighty mussel species are threatened or endangered. See *Columbus Dispatch* article on Darby Creek and mussels.

Anthropomorphism is attributing human form, personality, or behavior to things not human (e.g., inanimate objects, animals, or natural phenomena). People have used human-like animals in stories for hundreds of years and they remain very popular in children's literature today. Authors use animals in this way for a variety of reasons: animals appeal to children; children relate well to talking animals, especially if the animals are teaching values such as kindness, responsibility, or honesty; animals can do and say things in a book that children as characters or in real life would not do; and animals are multi-cultural appealing to children of all ages, race and color. Scientists and wildlife professionals, however, suggest caution when using anthropomorphic characters. The use of these kinds of animals can create misconceptions related to the real

animal counterpart and create strong emotions that can lead to unsafe or inappropriate behavior (e.g., rescuing a baby bird that fell from the nest) and/or wildlife management, political or economic decision-making (e.g., the Bambi syndrome). See the *Science and Children* article, "Analyzing Anthropomorphisms."

This activity involves live animals. See NSTA position statement for information about the use of live animals in the classroom.

### **Vocabulary**

filter feeder—An organism that **filters** food particles from its surrounding aqueous environment; water is drawn in through the siphon and over the gills

### **Teacher Tips**

Considerations for freshwater mussel aquariums:

- The substrate should consist of 2" of gravel.
- Mussels should be completely covered by the water with the water extending 1-2 inches above the mussels.
- Only 2-3 mussels per 15 gallon tank.
- The water has to be aerated. An air pump with an air stone will be adequate.
- Set up tanks prior to use so that mussels are not stressed
- Feed the mussels Nannochloropsis Algae Paste "Greenwater;" this can be ordered at:  
<http://www.brineshrimpdirect.com/Nannochloropsis-Algae-Paste-Greenwater-c34.html>
- Freshwater mussels are available through biological supply houses.

### **Procedures**

#### **Engage**

1. Ask students to complete the first and last column of an individual Mussel Mania! RAN chart (Attachments A & B). Each idea should be written on a separate small Post-it note.
2. Divide students into groups of 3-4 to discuss and share their individual RAN charts. Ask each group to complete a group Mussel Mania! RAN chart.
3. Using the group RAN charts, develop a class RAN chart. Each idea should be posted on a separate Post-it note. Students will revisit individual and class RAN charts regularly throughout the Mussel Mania! activity and throughout the course.

4. Using the LCD projector, read *Russell the Mussel* as a class. After reading *Russell the Mussel* discuss the role of anthropomorphism in the book. Be sure to point out that this is an imaginary story. While most of the information about mussels is correct, mussels and other animals do not talk.
5. Revisit the RAN chart and move Post-its from one column to another as students ideas and understandings of the concepts develop.

### **Explore**

**Note:** Students continue working in groups for this portion of the lesson.

1. Set-up table groups with a variety of mussel shells and living mussels in a small tabletop aquarium. Set up the aquarium with 1-1/2 inches of gravel in the bottom, an air stone, and enough water so that the mussels are covered by 1-2 inches. Add Nannochloropsis Algae Paste (see Teacher Tips above) so that the water is noticeably green. Also have hand lenses and sentence strips at the tables.
2. Ask students to make observations of the materials on their tables and record any questions they have on a sheet of paper.
3. After 15 minutes ask groups to choose the three questions they would most like to investigate. Students then write each selected question on a separate sentence strip.

### **Explain**

1. Each group should share their questions with the class.
2. As a class sort the questions into 3 groups: questions we can test at this time, questions we can revise and then test, questions we cannot test at this time.
3. As a class write an operational definition of a testable question.
4. Regroup the testable questions by topic (e.g., feeding habits of mussels, structure and function of shells).
5. Through discussion help students come to the guiding question: "What role does a mussel play in a freshwater ecosystem?"

### **Elaborate/Extend**

1. Add additional testable questions to RAN chart.
2. Ask students to examine the questions looking for similarities and differences in the types of questions asked. (See Attachment C)  
Prompt students to look for questions that:
  - a. Measure and/or count
  - b. Compare
  - c. Ask "what happens if . . ."
  - d. Ask "can you . . ."
  - e. Ask for an explanation

**Evaluate**

1. Exit Slip-Ask students to respond to the following prompt after completing the lesson: What is the most interesting observation you made about mussels today?

**Note:** Later students will design and conduct an investigation of one of their questions.

## Attachment A: Mussel Mania! RAN Chart

Mussel Mania! RAN Chart				
What I Think I Know	Confirmed	Misconceptions	New Information	Wonderings

## Attachment B: RAN Strategy

Students can use different strategies and help them process information as they read. The RAN strategy (Reading and Analyzing Nonfiction) is a modification of the KWL strategy. In the KWL students identify what they know (K), what they want to know (W) and what they learned (L). According to Stead (2006, p. 16-18), "What I Know" depends on individuals' background knowledge of a topic. If they know very little or have misconceptions, the information could be incorrect. If it is incorrect, then "What I Want to Know" could be based upon this misinformation. Finally, "What I Learned" may be nothing because they could not find information that supported their "incorrect" thinking and they missed other key "correct" information in the process.

The RAN strategy, which has five categories, addresses this issue. The first category, "What I Think I Know," allows students to see that their background knowledge may be incorrect. The second category, "Confirmed," gives students the opportunity to see if they were right or not. If they discover that what they "know" is not supported by their reading and research, they record that in the "Misconceptions" column. "New Information" captures ideas not previously included under column one. Finally, new learning may peak their interest and raise questions or "Wondering."

Stead, Tony. (2006). Reality checks: Teaching reading comprehension with nonfiction K-5. Portland, ME: Stenhouse

## **Attachment C**

### **Types of Testable Questions**

- ***Attention-Focusing Questions***  
This type of question can be used to focus students' attention on particular observations or details.
  
- ***Measuring and Counting Questions***  
These questions encourage quantitative observations and provide opportunities to refine measurement skills.
  
- ***Comparison Questions***  
These questions refine students' abilities to compare and contrast objects.
  
- ***Action Questions***  
This is a "what if . . ." type of question. Students make predictions, form hypotheses, and conduct investigations to answer action questions.
  
- ***Problem-Posing Questions***  
These questions challenge students to develop methods for finding solutions to problems.
  
- ***Reasoning Questions***  
These questions require students to think about how things work.

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## Notes

## **Anthropomorphism pp. 21-24**







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