

Crab Adaptations

Teacher's Guide

Subject: Integrated Science (Life; Earth-Space; Physical)

Topics: Animal Adaptations; Niches; Interdependence

Summary: Students will observe and examine various species of crabs found within RBNERR. After examining each of the crab species specific adaptations, students will explore to figure out which crab lives in which particular ecosystem.

After completing the activity, students will be able to:

Objective(s):

1. Recognize the diversity of crab species within RBNERR.
2. Relate physical and behavioral adaptations to the individual crabs.
3. Discuss how these adaptations make “space” for more crabs (niche).

Ecosystem(s): coastal, estuary, mangroves, mud flats

Equipment:

- 2 sets of crab specimens
- Student worksheet
- Pencils
- Clipboards
- Airstones
- Pictures of habitats
- Magnifying Lenses
- Rulers

Background (Pre-field Classroom Activity)

- Vocabulary: adaptations, niche, detritus, habitat, opportunistic
- Rookery Bay Field Guide available at <http://www.rookerybay.org/publications/field-guide>
- All life forms exhibit adaptations to the environments in which they live. Wildlife species are adapted to their environment in ways that enable them to survive and maintain their populations. Each habitat is suitable only to those life forms that are adapted to their ecological conditions. (Project WILD)

Procedure (Engage; Explore; Explain)




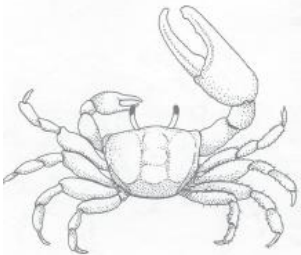
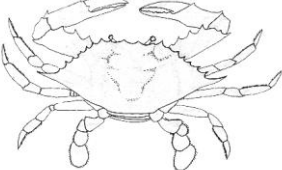
1. *Setup.* Divide students into two small groups. There will be a table set up for each group that will have specimens of the 5 different crab species available for the students to observe and examine.
2. *Engage.* Engage the students by showing them different pieces of footwear. For example, have flippers, sneakers, dress shoes, and water shoes and ask the students how humans use these pieces of footwear to adapt to our environment. Discuss why each shoe is beneficial for different activities.
3. Ask the students to formulate their own hypothesis relating to their own expectations of the outcome of the lab. Crab #5 has a paddle-like shape on the fifth pair of legs. Where might they live because of this trait?
4. *Explore.* After students have observed and recorded the traits of the 5 crab species on their data sheet, take students to view crabs in their natural habitat. For example, take students to the edge of the water by the mangroves to view Mangrove tree crabs. Take students across the bridge and down by the edge of the water to view Fiddler crabs. Take students to the dock to pull up oyster beds. Encourage students to be still and quiet. Have students record the type of crab and actual habitat on their data sheet.
5. *Explain.* After completing the lab, allow the students to answer the discussion questions as a group. Relate their answers to the concepts, processes and skills associated with the activity. Students should record their answers individually. At this time, facilitators can introduce/explain the specific concepts and explanations in a formal manner.
6. *Elaborate.* Teachers should reinforce the concepts back in the classroom.
7. *Evaluate.* Have students reflect on what they have learned by writing in their journal or by drawing a concept map of what they have learned.

Sunshine State Standards

Science: SC.7.L.15.2, SC.7.L.15.3, SC.7.L.17.3 **Language Arts:** LA.7.1.6.1, LA.7.1.6.2, LA.7.1.6.5, LA.7.1.6.11 **Mathematics:** Supporting Idea 6 **Ocean Literacy Principle:** 5

Crab Adaptations

Reference Chart

Crab	Picture	Color	Body Size and Shape	Claws	Legs	Diet	Habitat
Porcelain Crab <i>Petrolisthes armatus</i> Crab #1		Orange-brown to dark brown. Blue pigmentati on on mouthparts	0.75" 1.9 cm Flattened	Large Claws	3 pairs of visible legs. 4 th pair under carapace	Filter Feeder: Plankton	Oyster Beds
Flat Mud Crab <i>Eurypanopeus depressus</i> Crab #2		Grayish-olive	1" 2.5 cm Oval	Unequal size	Adapted for walking rather than swimming	Oyster spat Algae Amphipods Sponges Detritus	Oyster Beds
Mangrove Tree Crab <i>Aratus pisonii</i> Crab #3		Muddy Brown to reddish. Specks of white, blue, green, yellow.	1" 2.5 cm	Stiff bristles on edges.	Sharp Tips	Mangrove Leaves Algae Detritus	Mangrove Trees
Fiddler Crab <i>Uca rapax</i> Crab #4		Tan	1" 2.5 cm	Males have one large claw and one small claw. Females' claws are the same size.	Move sideways rather than forward or backward	Detritus in sand	Mudflats
Blue Crab <i>Callinectes Sapidus</i> Crab #5		Olive Brown/Bright Blue	8" 20.3 cm Sharp points on either side of body	Powerful claws. Claw tips of the female are red.	The fifth pair of legs is adapted to a paddle-like shape for swimming (swimmerets)	Opportunistic Clams Oysters Mussels Fish Worms	Open Water

Phylum-Arthropoda; Class- Crustacea; Order- Decapoda

Crab Adaptations

Student Data Sheet

General Information

Full Name:		Date:	
School (teacher):		Time:	

Student Hypothesis and Rationale

The fifth pair of legs on Crab #5 is adapted to a paddle-like shape. Therefore, we could expect to find the Blue Crab living in (open water/oyster beds/mudflats/mangrove trees) because_____

Field Observations/Measurements/Data

Trait	Crab 1	Crab 2	Crab 3	Crab 4	Crab 5
Body shape -Oval -Flattened -Sharp points on either side					
Body size -How many centimeters wide?					
Mouth -Location -Size					
Legs -Sharp tips -Paddle-like legs					
Claws -Unequal Size -Large compared to body -Stiff bristles on edge -Powerful					
Coloration/Patterns -Tan -Brown -Blue -Olive					
Movement -Forward -Backward -Sideways -Walker/Swimmer					
Where do I live? -Oyster Bed -Mudflat -Open Water -Mangroves					
Type of Crab					
Actual Habitat					

Crab Adaptations

Assessment

1. Was there any one trait that was the same for all five crabs examined?

2. Based on its movement and legs, where do you think Crab #3 might find its food?

3. Was your hypothesis supported by your data? Whether your hypothesis is supported or not, what can you conclude from your observations, measurements, and results?

4. The Fiddler crabs coloration adaptation allows it to blend in to its mudflat habitat. How might a Fiddler crabs coloration be different if it lived on a volcanic island with black sand?

5. Similar to crabs, humans have the ability to adapt to their natural environment. Give an example of how humans have adapted to live in Florida's environment.

6. Think about the observations you have just made. Did the activity raise new questions? Write a short question (start with "What, Why, Where, When, or How") about something you want to learn more about.
