

Barnacles

Teacher's Guide

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

Topics: Intertidal Zone, Substrate, Sedentary, Tides, Longitudinal Study

Summary:

Students will observe barnacles in various locations (relating their range in the intertidal zone and the connections with the sun-moon-earth system that influences it). Students will examine site selection and feeding strategies, and consider the potential value of barnacles as an indicator species. Finally, students will measure and record the location of barnacle clusters at a permanent monitoring site on the dock as part of a long-term study.

After completing the field lab, students will be able to:

Objective(s):

1. Explain the lifecycle and range of barnacles
2. Compare barnacle data in the longitudinal study and note changes
3. Describe the feeding habits of barnacles

Ecosystem(s): Marine, Coastal, Bay Shoreline

Equipment:

- Pre-selected stations from the dock to the beach
- Magnifying glasses
- Digital Camera (optional)
- 2 x GPS Unit(s)
- Tide Chart or GPS
- Tape Measure
- Measuring Rod (optional)
- String
- Optional: Drill or electric screwdriver and rustproof screws (~3)

Background:

- Reference Material: Barnacle Biology: <http://library.thinkquest.org/J001418/barnacles.html>
Barnacle Fact Sheet: <http://seagrant.gso.uri.edu/factsheets/597barnacle.html>
Lunar Tides: <http://csep10.phys.utk.edu/astr161/lect/time/tides.html>; Seaside Naturalist;
- Vocabulary: intertidal , substrate, range
- Equipment Training: Metric Measurement

Procedure (Engage; Explore; Explain)

1. Start with the full group of students at the dock. Where do barnacles live, what do they eat and how do they catch their food? Use their answers to introduce the following concepts: filter feeders; intertidal zone(s); sun-moon-earth system and tides; sedentary lifestyles.
2. Explain to students that they will be observing barnacle habits, location preferences and collecting data on barnacle locations as part of a long-term study. Let them know that students in subsequent years will compare their observations with the ones they will make today, so it is important to make careful, precise and accurate observations.
3. Divide the students into two groups (one studying barnacle habits and location selection and the other taking measurements of barnacle locations for the long-term study).
4. The group studying barnacle habits and site selection will begin by viewing barnacles in a small tank of shallow water. After observing the barnacles, the students will walk from the dock to the eastern edge of the marine lab and note all the places they find barnacles (rocks, plastic, cement, tree stumps, crab shells, etc.)
5. The group studying the dock column/piling should use the top of the dock as a fixed reference point and measure the distance down to the top of the barnacle cluster on the piling. The exact location identified as the top of the barnacle cluster will be marked (in advance) with a string around the piling.
6. This group should also make note of the tide using the tide function on the GPS unit
7. Photograph the measurement area.

Sunshine State Standards:

Science: SC.D.1.3.2; SC.D.1.3.3; SC.F.1.3.1; SC.F.1.3.7; SC.F.2.3.3; SC.G.1.3.4; SC.H.2.3.1

Language Arts: LA.A.1.3.3; LA.B.2.3.1; LA.C.1.3.1 **Mathematics:** MA.A.1.3.1; MA.B.3.3.1; MA.B.4.3.1, MA.E.3.3.1 **Social Studies:** SS.A.6.3.2

Barnacles

Student Data Sheet

General Information

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

Student Hypothesis and Rational

If barnacles only settle on particular surfaces, than I hypothesize (Choose one: concrete, pine stumps, or marsh grass) will provide a better surface for barnacle growth because_____.

Cement dock

Field Observations/Measurements/Data

Structure	Post 17	Post 18	Post 20
Time			
Current Tide Level (indicate rising or falling)			
Time of High/Low Tide			
Distance (in 1000ths meters) from the top of the dock to highest point of colonization (established by placing a string at the highest living barnacle with a diameter >5 mm at its base)			

Wood piling

Cement dock

Boat

Measure distance from top of dock to string

String marking highest point of barnacle cluster

Barnacles

Data Sheet (b)

Barnacle Habits

General (list or draw below)	Feeding (list or draw below)	Movement (list or draw below)

Barnacle Siting Preferences

Location in the intertidal zone	Are barnacles present? (yes/no)	What are they attached to (substrate)?	Other Observations
1			
2			
3			
4			
5			
6			
7			

Barnacles

Assessment

1. How do barnacles obtain their food?

2. What sets the limit on the range of barnacle habitat? What happens if a barnacle settles beyond this range?

3. What would happen if the sea level were to change?

4. Why do barnacles form on tree stumps but not grasses?

5. What types of animals might barnacles find suitable for settlement? Why?

Portfolio Journal Prompt

Imagine that you are a marine biologist working at the Florida State University Marine Laboratory. You discover a new species of fish, plankton or barnacles. Now you have to write a paper describing the organism that you discovered. On the lines below write a paper describing your discovery as if you were submitting a paper to a scientific journal. Name the organism and tell where you discovered it. Give the location and depth of the water. Explain the physical or behavioral characteristics it has that help it to survive.