

## **BEACH MEASUREMENTS AND MONITORING**

**Objective**-Students will observe the dynamics of the beach environment making observations and seasonal comparisons.

**Description**-Students will map a specific section of a beach seasonally taking into account topography and structures, sand sizes, wave activity and environmental conditions.

### **NYS Standards-**

- #1: Analysis, Inquiry and Design
- #2: Information Systems
- #3: Mathematics
- #5: Technology
- #7: Interdisciplinary Problem Solving

**Population served**-Activity is suitable for grades 6-12 and special education groups

**Implementation**-Mapping using pace and compass of a specific section of the beach; measure sand dune elevation using levels and Jacob staffs; video the area creating a panoramic view, record weather and marine conditions; create a phi size finder to analyze sand grain sizes.

### **Materials-**

- \*\*compass
- \*\*levels
- \*\*Jacob staff
- \*\*video camera
- \*\*data sheets
- \*\*plastic bags-ziploc
- \*\*phi size finder
- \*\*thermometers

### **Beach Vocabulary-**

Check the following vocabulary words prior to your beach experience.

1. rip current
2. wrack line

Submitted to the Coastal Steward Marine Education Committee by Janet Werner

3. wave
4. wave period
5. crest
6. trough
7. sand
8. phi size
9. dune
10. primary dune
11. secondary dune
12. swale
13. Beaufort Wind Scale
14. secchi disc
15. quartz
16. feldspar
17. garnet
18. magnetite
19. supratidal, intertidal and subtidal zones
20. longshore drift
21. tides

**Questions and Inquiries-**

1. What is a beach and how is it formed?
2. What determines the composition and grain size of sand?
3. How is a winter beach different from a summer beach?
4. What is specific heat and why is ocean water cooler in the summer and warmer in the winter? (Hint: temperature lag time)
5. What causes waves to form?
6. Describe the longshore drift on Long Island's south shore.
7. How can you tell by the shape of a dune which is the windward side and which is the leeward side?
8. Is the beach a depositional or erosional environment (or both)? Explain your answer.
9. Will this beach look the same in ten years as it does today? Explain your answer and the changes that can occur.
10. What force(s) do you consider to have the greatest affect on this beach? Explain your answer.

**BEACH MONITORING REPORT SHEET**

Date: \_\_\_\_\_ Time: \_\_\_\_\_ High/Low Tide  
Times: \_\_\_\_\_

**Weather Conditions:**

- a. wind speed(k) \_\_\_\_\_
- b. air temperature(C) \_\_\_\_\_
- c. water temperature(C) \_\_\_\_\_
- d. cloud cover and type(s) \_\_\_\_\_
- e. humidity and dew point(% and C) \_\_\_\_\_
- f. air pressure (mb) \_\_\_\_\_
- g. precipitation and amount \_\_\_\_\_
- h. general weather \_\_\_\_\_

**Marine Conditions:**

- a. wave height \_\_\_\_\_
- b. wave period \_\_\_\_\_
- c. wave appearance \_\_\_\_\_
- d. water color \_\_\_\_\_
- e. water clarity \_\_\_\_\_

**Faunal Types Observed and Numbers:**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

**Floral Types Observed and Numbers:**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.

10.

**Sediments:**

Gather samples from the supradital and intertidal zones. Bring them back to the classroom for microscopic analysis and comparison with your phi size finder.

Answer the following questions.

1. What are the size ranges of sand from this beach?
2. What is the composition of your samples? Use a magnet to determine if there is any magnetite in your sample.
3. Do the sand grains have a smooth or angular appearance and why?
4. What gives sand its color?
5. What is an economic use of sand?

### **Area Map and Video:**

1. Create a map of a section of the beach using pace and compass to make an east-west and a north-south traverse.
2. The map should contain the supratidal zone to the water line. Be careful not to walk on delicate dunes or destroy dune grass.
3. Label north on the map.
4. Use a Jacob staff and level to measure dune height in meters.
5. Record latitude and longitude of your area.
6. Record any structures such as those man-made to use as reference.
7. Create a 360 degree panoramic video of the site for comparative use.

### **Other:**

Students may wish to collect objects such as plastic, paper, etc. from the beach environment for later analysis. Make certain to wear protective gloves and bring sturdy garbage bags. Collect from each zone.

