



**Bahamas National Trust**

**Mission of the BNT**

To conserve and protect the natural resources of the Bahamas, through stewardship and education for present and future generations.

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# Sea Shore Program

**Teacher's Manual**

Your Sea Shore Pack should include
• Back pack
• Teacher's manual
• 4 Seashore field guide
• 20 laminated quick reference guide
• Refractometer
• Thermometer
• 20 pencils
• 20 work booklets
• Water bottle
• Whistle
• Quadrat
• Transect line (marked twine)
• 2 Profiling poles
• Tape measure
• Level

Items recommended to bring along
• A small first aid kit: sterilized wipes, rubbing alcohol, Band-Aids, tweezers, cortisone cream, antibacterial cream, bandage tape and pads.
• Sun block
• A gallon of water
• Sample bucket
• 4 empty Gatorade bottles

## Notes

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### Introduction to out door field trips

Field trips are a great way to reinforce information that is taught inside the class room. Each and every one of us learn in different ways, some prefer to read information, to hear information, see graphical information or to actually learning through doing an exercise. Many young children, especially boys, are the latter. These are the "Doers" and these children will benefit the most from field trips.



## Before your trip

### Finding a good spot for a field trip

#### **Sandy Shore**

When choosing an appropriate sandy shore for a field trip, look for one that has good examples of native sand dune plants rather than one that is necessarily large and picturesque. On certain islands (like New Providence) this may be difficult and therefore areas that may have interesting things that have washed up, or a good example of invasive plants may need to be a determining factor.

#### **Rocky Shore**

A good rocky shore to visit is one that has a large area of rock that become exposed to the air only during low tide. It should also have a good number of tidal pools (rock pools). When selecting the site also make sure that has a good range of living things there, such as Bleeding teeth, West Indian Top Shells (Whelks) and Chitons (Curbs).

### Choosing a good time to make the field trip

At both the Sandy and Rocky Shore it is best to go at low tide as that is when the water exposes the shore and leaves behind a host of organisms to discover. When planning your field trip be sure to visit a website that displays tides and currents for your area. A good website to use is:

<http://www.mobilegeographics.com:81/zones:/America/Nassau>

You should see a list of different locations in the Bahamas. Click on the nearest location to where you plan to do your trip. Then scroll down the page to select the day that the trip is planned for.

Also, be sure to get local info from the Department of Meteorology either by listening to the local news or phone 915. This way you can be sure that your tide timing is correct but also pay close attention to the weather forecast for the day.

### Chaperones of your field trip

It is a requirement of the Ministry of Education to have at least 1 chaperone for every 5 students in areas that include water bodies. Chaperones can be parents of some of the students, family members or any willing participant of at least 17 years of age. It is always best to brief your chaperones with the activities of the field trip, or even taking them to your planned destination and familiarizing them with the environment of which they will be assisting you. To further prepare your Chaperones you can also give them a copy of the Sea Shore field guide prior to the trip so they can familiarize themselves with the environment.

### Preparing your students for the trip

Make sure that your students know before the day that they will be visiting a Sea Shore and that they should come dressed appropriately. Sports clothes or jeans and t-shirt are usually recommended. Appropriate footwear is very important especially when visiting a Rocky Shore. If children own water shoes they should bring them but tennis shoes are also good. Flip flops are not appropriate and can cause accidents. On the Rocky shore please stress that the rocks are very slippery and very sharp and so children must be very careful and no running or jumping at any time. Explain to the children that they will be working in groups to complete certain activities and they must ensure that their team stays focused to help complete their assigned task.

## During your trip

### Dividing your groups

Students are naturally going to be easily excited when out doors and this can quickly lead to chaos. However, chaos can be over come by keeping groups to a small manageable size and by dividing the children randomly. There should be a healthy mix of boys and girls in each group and friends/ enemies should be separated. As the teacher, you should have a better knowledge of which children should be kept separate and therefore take advantage of that useful knowledge when dividing groups. Once the children are gathered in their grouping, assign a chaperone to each group and ensure that the children know the name of their chaperone.

### Expectations and Rules

The children should be told that they are to stay with their chaperone at all times, they must listen to their chaperone's instructions and each group is to complete their task assigned to them. The children must know that they will not be welcome on future trips if they misbehave, especially if their behaviour endangers another.

### Description of Activities

#### 1. See by the Sea

Items needed:

- Sea Shore field guide
- Laminated quick reference guides for each child
- Pencils and Notebooks
- Sample buckets (optional)

Skills acquired:

- Organism identification
- Observational Skills

Talk to students:

Discuss with the students the different **zones** of the Sea shore (eg. Low tide through to the High tide zone and beyond). Explain the difficulties that organisms face living in such places. Therefore the organisms found in these sites must be well equipped or **adapted** to living in such environments. Explain the different types of adaptations that such organisms possess.

Activity:

Each group will explore the Rocky and/ or Sandy shore with their chaperone and try to identify as many different organisms as they can. On the Rocky shore the tide pools will be a haven of organisms. The Sandy Shore will have remnants of organisms (eg. Shells). The Sandy Shore should also have a host of plants living beyond the High tide mark. In their note book the children should write down the names of the different organisms that their group have found and choose one that they wish to draw and write down what adaptations that organism has to help it survive in its environment.

Back in the class room:

Have the children re-draw their organism bigger so that they can show the class.

## After your trip

### Reporting of activities

Have the children present their findings as a group to the rest of the class. Once each child has had a chance to present their information, ask them about what they learnt. Was there anything that they found most interesting or surprising?

### Conservation Lesson

#### The importance of the sea shore

The Sea Shore is the point where the sea and the land meet. Both the land and the sea are very important to people. The sea provides food for Bahamians but can also be dangerous during a storm, and the land is where we live and it holds our fresh water underground. The coastal zone is very dynamic (ever changing). Sand is deposited (dumped) by the sea and therefore creates more land but the sea can also eat away at the land. This is a natural process that happens over time. If you watched the sea shore speeded up over years, you would notice changes all the time.

On the Sandy Shore the wind blows the sand gradually in land and some very special plants colonize this sand known as the Pioneers. These plants are low lying and extremely hardy, coping with windy and salty conditions as well as the bombardment of storm waves. They are specially adapted to capturing sand and stabilizing it with their roots, making it more and more difficult for the storms to wash the sand away and protect the land further inland. These tough plants form a mound at the top of the beach known as the sand dune. A healthy sand dune will protect the land behind it from storm destruction and allow other plants to grow.

#### Threats to the Sea Shore

Certain human factors have been contributing to the gradual degradation of the coastline over time. The most common problem especially on New Providence (but also many other islands) has been the building directly on top of the sand dune it self with either buildings or roads. Sea walls are often put in place to help prevent damage to the coast line but this gives the storm waves a solid surface to pound until it gives way.

Certain plants that have been brought to the Bahamas over time invade the sand dune areas and eventually replace the sand dune plants with plants that lack the ability to withstand storm waves or hold the sand at all and allow it to wash away. Such plants include but are not limited to the **Australian Pine** (*Casuarina equisetifolia*), **White inkberry** (*Scaevola taccada*) and the **Brazilian Pepper** (*Schinus terebinthifolius*).

## 5. Sand dune vegetative zones

Items needed:

- Transect
- Meter ruler
- Soil sampling bottles

Skills acquired:

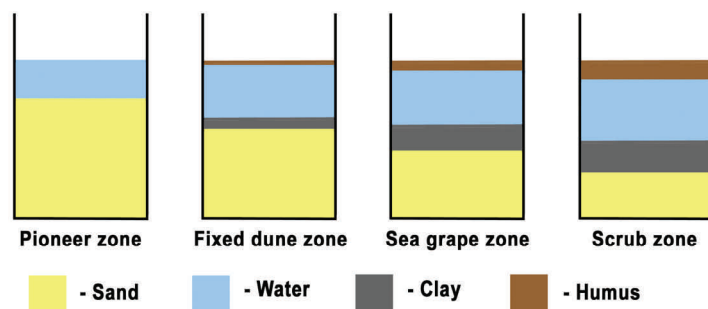
- Organism identification
- Observational Skills
- Population density estimation
- Using quadrats and a transect

Talk to students:

Discuss with the students the different **zones** of the Sea shore (eg. Low tide through to the High tide zone and beyond). Explain that the plants of the sand dune plants are equipped or **adapted** to live in these hot, dry, salty and storm wave pounded areas. Also tell them that the first plants are usually low growing to reduce the chance of damage from the pounding of waves. Tell them that they are going to assess the different types of plants that are found in these areas, measure their general height and take samples of the soil at different zones up the dune.

Activity:

1. Have the children pick where they want to do their transect. The children will place one end of the transect line (the marked twine) at the bottom of the sand dune (before where the plants grow) and the transect should run straight up over the sand dune and over the plants going inland. **Be careful not to damage the plants or the sand dune.**
2. Some of the children will be assessing the types of plants that come into contact with the transect line. Using their quick field guides they will identify the plants starting with the first plant that the transect comes into contact with and ending behind the dune. During this one of the children will measure the general height of the plants at each zone (ie. Pioneer zone, fixed dune zone etc).
3. The other children will be taking samples of the soil at each zone. Here they take the Gatorade bottles fill the bottle up to three quarters with the soil from that zone and to top it up with the sea water. Label the bottles.



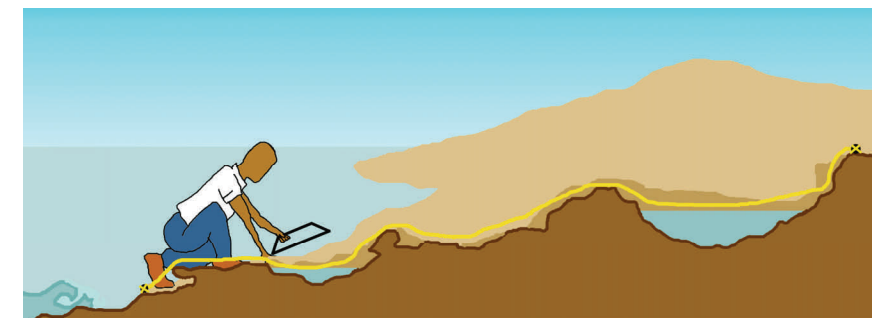
## 2. Rocky Shore Quadrats

Items needed:

- Sea Shore field guide
- Laminated quick reference guides for each child
- Pencils and Notebooks
- Quadrat
- Transect

Skills acquired:

- Organism identification
- Observational Skills
- Population density estimation
- Using quadrats and a transect



Talk to students:

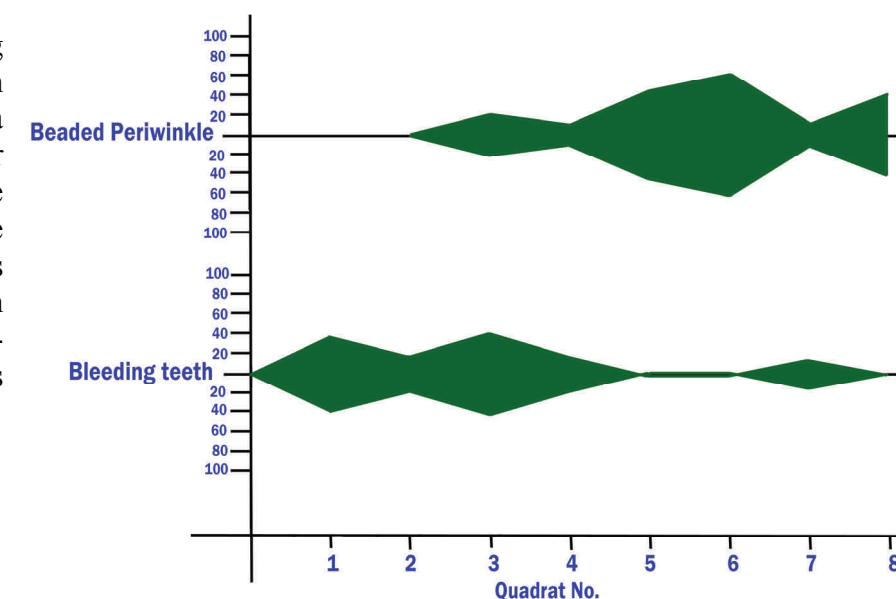
Discuss with the students the different **zones** of the Sea shore (eg. Low tide through to the High tide zone and beyond). Explain that different organisms are equipped (adapted) to living in slightly different conditions. Eg. Some need to always be under water and some can stay quite far away from the water. Tell the students that they are going to investigate the population densities of organisms on the rock shore and see how they change as they travel up the shore.

Activity:

1. Have the children pick where they want to do their transect. The children will place one end of the transect line (the marked twine) at the water's edge and the transect should run straight up the shore to the end of the rocky shore. A rock or similar object may be needed to anchor down the ends of the transect. Remember the transect needs to be as straight as possible.
2. The children should then get the quadrat and place it at the beginning of the transect by the water's edge. Inside the quadrat the children need to do two things: a. Identify the organisms within the quadrat. b. Estimate the % cover each of those organisms within the quadrat.
3. Next they are to move the quadrat to the next meter mark and repeat the process. This should be done at every meter mark along the transect.

Back in the class room:

Have the children display their information using a Kite diagram on a piece of graph paper. A Kite diagram is a way of displaying the percentage of different organisms along a transect. List the different organisms on the Y axis of the graph leaving enough space between them so that each species has a percentage scale on either side. The X axis will have the number of meters along the transect. For each species draw the percentage found in the quadrat at particular intervals along the quadrat as shown.



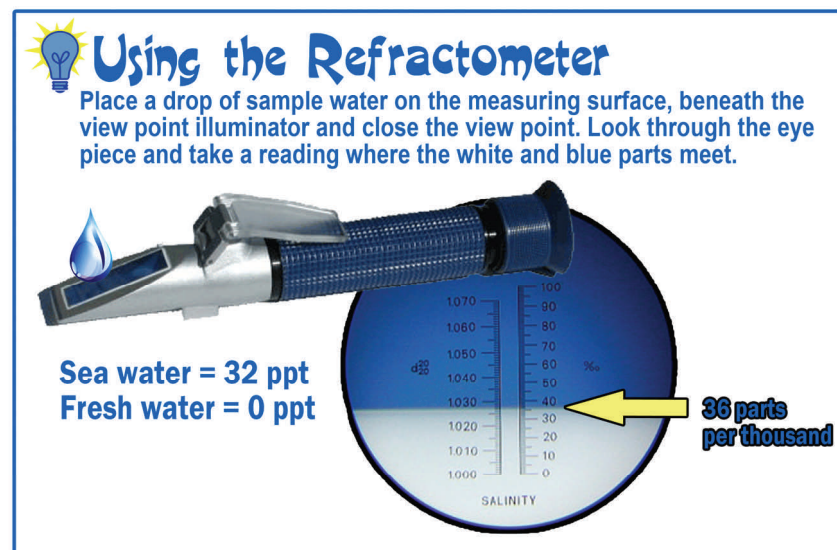
### 3. Rock pool physical factors

Items needed:

- Sea Shore field guide
- Laminated quick reference guides for each child
- Pencils and Notebooks
- Thermometer
- Refractometer

Skills acquired:

- Organism identification
- Observational Skills
- Reading a thermometer
- Reading a Refractometer



Talk to students:

Explain that different organisms are equipped (adapted) to living in slightly different conditions. Eg. Some need to always be under water and some can stay quite far away from the water. Some organisms can deal with greater temperature and salinity variations than others. Tell the students that these are the non-living factors they are going to investigate, called the **abiotic** factors.

Activity:

1. Have the children pick a rock pool.
2. Each child will do a different task.
3. One of the children should use the tape measure and measure the distance of the rock pool from the sea.
4. Another child will use the Refractometer to measure the salinity of the water in the pool.
5. Another will use the thermometer to measure the temperature of the rock pool. This child should also take a temperature reading at the surface of the rock out side of the pool.
6. Another child will identify the organisms in the rock pool, writing the number of different types and the names of those organisms.
7. The children will repeat these tasks for as many rock pools as they can in the time assigned to them.

Back in the class room:

Have the children display their information using bar charts and line graphs in three separate graphs. The children are to discuss any correlations and workout if they are statistically significant.

### 4. Beach profiling

Items needed:

- 2 Profiling poles
- Transect
- Leveler
- Measuring tape

Skills acquired:

- Organism identification
- Observational Skills

Talk to students:

Discuss with the students the different **zones** of the Sea shore (eg. Low tide through to the High tide zone and beyond). Explain that the sea shore is dynamic and ever changing shape in response to wind, waves, tides and especially storms. Explain the importance of the sand dunes as a barrier from the impact of storm waves and that a healthy sand dune to ensure that the beach does not de-grade over time.

Activity:

1. Have the children pick where they want to profile the beach. If the tide is rising, it is best to work from the water up the beach. If tide is falling then it is best to work towards the water.
2. Have a look at the beach you are about to profile. You will notice that the beach can be divided into different sections depending on the slope angle as some parts will be steeper than others.
3. If you start from the water you would place a profiling pole at the waters edge and have some-one place a pole further up the beach just before where the slope angle dramatically changes.
4. Next you want to record the angle of the beach slope between the two poles.
5. Run a taut line between the two vertical poles and using the level make sure that the line is level. The line from the most elevated pole should be held at the top of the pole and the line should then reach the second pole further down the pole, depending upon the slope angle. Take a reading of where the string ends up on the second pole. This number represents the height difference between the two poles. Also using the transect line, measure the distance between the two poles. These two numbers will give the slope angle.
6. Repeat for each section where the slope angle changes dramatically up the beach.

Back in the class room:

Have the children display their information on a piece of graph paper. They should have the total distance of the beach profile on the Y axis and where they took slope angle readings they should mark the height recorded as shown below.

