

Background Information for Teachers

Information on Learning Journeys Organisation

Name of organisation	<ul style="list-style-type: none">• National Parks Board (NParks)
When was the organisation founded?	<ul style="list-style-type: none">• 1990
Learning Objectives stated by the organisation	<ul style="list-style-type: none">• Combining the visual delights and rich biodiversity of our parks, gardens & nature reserve with thoughtfully planned recreational activities, NParks facilitates visitors' communion with Nature
What is the purpose of the organisation?	<ul style="list-style-type: none">• NParks conserves, creates, sustains and enhances the green infrastructure of our City in a Garden.• Responsible for providing and enhancing the greenery of Singapore• NParks also monitors and co-ordinates measures to ensure the health of Singapore's biodiversity.
What is the mission and vision of the organisation?	<ul style="list-style-type: none">• Mission: To create the best living environment through excellent greenery and recreation, in partnership with the community.• Vision: Let's make Singapore our Garden
How is the organisation so important to Singapore?	<ul style="list-style-type: none">• The organisation is important as National Parks Board (NParks) is responsible for providing and enhancing the greenery of the City in the Garden.• Beyond green infrastructure, NParks is committed to enhancing the quality of life through creating memorable recreational experiences and lifestyles.• NParks manages over 300 parks and 4 nature reserves. Adding to this is the extensive streetscape, or roadside greenery, that forms the backbone of our City in a Garden.• An island-wide Park Connector Network is also being developed to link major parks and residential areas.• As Singapore's scientific authority on nature conservation, NParks monitors and coordinates measures to ensure the health of Singapore's biodiversity.• This supports the overall thrust of our urban biodiversity conservation model, which aims to conserve representative eco-systems in land-scarce Singapore for future generations.• NParks is also the lead agency in the efforts to continually upgrade the Landscape Industry in Singapore.• It works closely with industry partners to

promote good work practices and create a thriving, innovative and professional industry that will support Singapore's aspirations of being a City in the Garden.

What are the NE messages / NE learning journey objectives that can be highlighted through this learning journey?

NE Messages:-

- Cultivate a sense of ownership for the environment where Singapore is our homeland, this is where we belong.
- Cultivate a sense of nationalism and pride in the students where we have confidence in our future.

Learning Objectives.

- Provide students with relevant knowledge on the importance of natural heritage in Singapore.
- Instil a sense of connection on how changes from the past influence our present.
- Understanding Singapore: Its constraints, Challenges and Opportunities that with the ever changing landscape, our natural history might disappear if no one spreads word of it

In what ways can the learning journey be relevant to students? (This can related to both personal experiences and curriculum matters)

The visit can be tied with:
Primary 1-6 English
Primary 4-6 Science
Secondary 1-4 Geography

Theme:	Learning Journeys
Name of Activity:	Roots, Shoots and Fruits
Venue/s:	Admiralty Park
Duration:	1 – 1.5 hrs
Level/s:	Primary 1-6, Secondary 1-4
Pre-requisite/s	Nil

Introduction:

During the learning journey, students will learn that plant kingdom is made up of a large variety of plants that use different methods in survival according to the habitats they thrive in. The learning journey highlights how different plants have adapted to the environment to ensure successful growth and reproduction in Admiralty Park. Given the rich variety of animals and plants found here, students can interact with nature and enhance their knowledge and interests in them. At the same time, they will also learn about the importance of conserving our natural heritage and develop a sense of commitment and ownership of the parks and greenery.

Objectives of this Learning Journey:

1. Students will have fun as they walk and appreciate and at the same time learn about nature.
2. Students will be aware of the importance of secondary forests and mangroves and the roles they play in Singapore.
3. Students will gain greater awareness of the biodiversity of flora and fauna and enhance their knowledge and interests in the various species that exist in one of Singapore's parks.
4. Students will learn about the importance of conserving our natural heritage, develop a sense of commitment and ownership of the parks and green, and to protect our home and rich history

National Education Message:

- The importance of national defence where Singapore is our homeland and we must ourselves defend Singapore as no one else will defend her for us.
- This is tied in with the need to protect the natural heritage of Singapore as well because it will be lost if we do not protect them.

Approaches

Programmes/Activities:

- Students will go on a learning journey to Admiralty Park.
- Guides assisted by teachers from the school, will lead and direct students in making various observations on the flora and fauna that exist here at Admiralty Park This will allow students to learn more about the nature and flora and fauna to meet the above objectives.
- Students will complete worksheets and take primary data (e.g. note taking and photographing) of all information which is required for the completion of an assignment or project.

Deployment:

- Guides will do a live commentary on the visit to Admiralty Park.
- School teachers are deployed to assist and also to help monitor and discipline students on site.

Assessment and Review:

- Students will complete the worksheets and activities individually or as a group.

- Students will be debriefed after the learning journey.
- As a post-activity, students will complete a reflection on their learning journey.
- Students will complete a feedback form.
- Students will complete an assignment or project based on their learning journey.

Lesson	Outline of Lesson	Period/s	Resources	Remarks
Lesson Structure: Pre-Lesson Journey				
Lesson 1 Introduction	<p>Students will be introduced to adaptation of plants in the environment.</p> <p><u>Worksheet Activity</u></p> <ul style="list-style-type: none"> Students are to draw how they think the types of leaves will look like in the boxes provided. <p><u>Briefing on Learning Journey to Admiralty Park</u></p> <ul style="list-style-type: none"> Students are given a briefing on the scenario and learning journey objective. 	30mins	Annex 1a	<ul style="list-style-type: none"> To enable students find out about the adaptation of plants. To enable students to learn more about how plants adapt through its leaves To prepare students and to provide information on the park that they will be visiting.
Development	<p><u>Exploration of the features in Admiralty Park</u></p> <ul style="list-style-type: none"> Students are divided into pairs/groups to research on Admiralty Park. <p><u>Discussion Questions</u></p> <ul style="list-style-type: none"> Each pair/group will work on the question and pen down their answers in the worksheet provided. 	20 mins	Annex 1b	<ul style="list-style-type: none"> To enable students to have prior knowledge on Admiralty Park before going on their learning journey. To motivate the students to learn and have a sense of ownership in their learning. To incorporate the elements of cooperative and collaborative learning.
Closure	<p><u>Reflections</u></p> <ul style="list-style-type: none"> Students to share their thoughts and reflections on Admiralty Park. 	10 mins		<ul style="list-style-type: none"> To sum up students' learning on Admiralty Park.

Lesson Structure: During Learning Journey				
Lesson 2 Introduction	<p><u>Admiralty Park</u></p> <ul style="list-style-type: none"> Students will read the factsheet on Admiralty Park before commencing on their learning journey. 	10 mins	Annex 2	<ul style="list-style-type: none"> To enable the students to know more about the Admiralty Park and what they can expect to see during the learning journey.
Development	<p><u>Breakup Session</u></p> <ul style="list-style-type: none"> Students are divided into different groups with the guides to explore the different features and areas. Teachers are to ensure that students ask the guides the relevant questions which are found in the worksheets. 	2 periods (60 mins)	Annex 3 - 6	<ul style="list-style-type: none"> To enable students to explore Admiralty Park.
Closure	<p><u>Reflection</u></p> <ul style="list-style-type: none"> Teachers to get students to share their thoughts on the visit. 	20 mins		<ul style="list-style-type: none"> To sum up students' learning at Admiralty Park. To allow students to evaluate how their group works.
Lesson Structure: Post Learning Journey				
Lesson 3 Introduction	<p><u>After the visit</u></p> <ul style="list-style-type: none"> Students are to form into groups of 4-5 and discuss and reflect on what they have learnt. Students are to discuss this using their post-visit reflection worksheet found in Annex 7. 	1 period (30 mins)	Annex 7 (Post-visit Reflection)	<ul style="list-style-type: none"> To allow students to sum up what they have learnt.
Development	<p><u>Task</u></p> <ul style="list-style-type: none"> Each group is read the task and submit the multimedia storyboard on history, flora and fauna in Admiralty Park. 	6 periods (180 mins)	Annex 8 (Task) Annex 9 (Rubrics)	<ul style="list-style-type: none"> To consolidate students' learning through the completion of the allocated task.

	<ul style="list-style-type: none"> Rubrics for the submission of the multimedia storyboard can be found in Annex 8. 			
Closure	<p><u>Class Activity</u></p> <ul style="list-style-type: none"> Teachers are to go through the worksheet answers with students. 	1 period (30 mins)	Annex 10 (Answers)	<ul style="list-style-type: none"> To sum up students' learning.

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Annex 1a

<p>A.</p> <p>I have a waxy coating that helps me retain water</p>	<p>B.</p> <p>My leaves curl. On cool and dry days, I don't lose too much water.</p>
<p>C.</p> <p>I taste bad so animals will not eat me.</p>	<p>D.</p> <p>My leaves enable rain drops to run off quickly.</p>

Annex 3a

Sungei Cina

- Eustarine
- Mix
- Two
- Salt
- Day
- Forebay
- Trapping
- Reducing

Annex 3b

List down the uses of the Nypah Palm in the boxes below.

<p>Leaves</p> <p>The leaves here are used for roof thatching, which is why our houses in the past are called "Attap" houses and these are the "Attap".</p>
<p>Flower stalk</p> <p>The flower stalks can be tapped for sugar to be made into toddy or gula melaka.</p>
<p>Seeds</p> <p>The seed pods produce the "Attap Chee" this sweet transparent fruit you can find in ice-kachang.</p>

List down two adaptations of the Nypah Palm in the boxes below.

<p>Fruit</p> <p>The fruit is made of fibrous husks. This watertight design allows the fruit to be dispersed by water where it is found.</p>
<p>Stem</p> <p>The stem is fibrous which means that the fronds do not get washed under when the plant is submerged. Hence, there is natural buoyancy to the plant.</p>

List down two interesting facts about the Mikania micrantha in spaces below.

- Tea and coffee plantations owners hate it as it grows over the plant and kills them.
- It is almost impossible to totally remove them.

List some uses of the pong pong tree.

- The seeds were used as a fish poison in small streams (Philippines).
- The wood produces a fine charcoal that was used for gunpowder (Thailand).
- Oil pressed from the seeds were used in lamps but produces an irritating smoke.
- Medicinal uses for the oil include treating itches, rheumatism, the common cold and as hair oil that doubled up as insect repellent.

List some uses of the Simpoh Air tree.

- The large leaves were used to wrap food such as fermented soya bean cakes (tempeh).
- Its large leaves can be formed into shallow cones to contain traditional food such as rojak.

List some of the uses of the Bird nest fern.

- The leaves are used to ease labour pains by a tribe in Malaysia.
- The Malays use the leaves for a lotion to treat fever.

Annex 4

Characteristics of a Secondary Forest

- Disturbed
- Naturally
- Unnaturally
- Hundred

List down some of the characteristics of a secondary rainforest in the boxes below.

No complete continuous canopy	Thick undergrowth at the bottom layer
Younger trees	Lesser biodiversity

Syzygium lineatum

- Common Kelat
- Eaten
- Roots
- Tonic
- Pregnant mothers
- Tolerate
- Propagated

Fishtail palm

- Commonly
- Fishtails
- Tinder

Macaranga

- Elephant Ear
- Three

- Lobes
- Two

Malayan Mistletoe (*Dendrophthoe pentandra*)

- Parasitic
- Attaches
- Reduced
- Host
- Painted Jezebel
- Defoliated
- Killed

Lianas

- Woody
- Old

Terrestrial Algae

- Patches
- Carotene
- Carrots

Annex 5a

Mangroves

What are mangroves?

- They are trees or shrubs that grow along tropical shores. They are really hardy, able to thrive in salty, hot and muddy environment, in conditions that would kill most other plants.

List down some interesting facts about mangrove trees below.

- Mangrove trees grow where no tree has grown before. They are able to survive inundation by saltwater twice a day, and in 'soil' which is soft, unstable and poor in oxygen (anaerobic). They also have to deal with rivers carrying silt during the wet season, as well as violent storms that hit the coasts. Mangrove trees also have features that conserve water. The thick waxy leaves, fleshy leaves, pores in the leaves are sunken below the surface so that wind doesn't dry them out.

Mangrove roots

Explain how mangrove roots do this.

- To avoid suffocation in the oxygen-poor mud, mangrove trees snorkel for air. They develop aerial or air-breathing roots that grow upwards from the ground. All aerial tree roots have on their surface, special tiny pores to take in air (lenticels). Only air can get through the lenticels, not water or salts. All aerial roots also contain air spaces (aerenchyma). These not only transport air, but also provide a reservoir of air during high tide when all the aerial roots may be submerged. Roots for absorbing nutrients are tiny and emerge near the muddy surface.

Salt excretion

Explain how these mangrove trees achieve this.

- The mangrove trees achieve this by filtering it out through their roots. Some species can keep out more than 90% of salt in sea water. Others quickly pass the salt out of their systems once it has entered. Their leaves have special salt glands which pass the salt out.

You can see and taste the salt coating the leaves. Still others collect the salt in bark or in older leaves that are about to drop. Some mangrove trees use more than one of these methods.

Vivipary

Explain how these mangrove trees achieve this.

- Mangroves are the only plants in the world to germinate while attached to the parent plant. The germinated seeds, called propagules, are able to produce their own food. Thus, they are able to survive extreme conditions for a long time by being dormant. These propagules drop off from their parent tree and into the swamp. Hence, mangroves disperse propagules via water when they are big enough or ready to survive on their own.

Annex 5b

Noni Tree (*Morinda citrifolia*)

- Smelly
- Antiseptic
- Medicine

Fish Stunner Tree (*Barringtonia racemosa*)

- Chemical
- Saponin

Mangrove Rattan (*Calamus erinaceus*)

- Palms
- Climbers
- Support
- Spines
- Hooks

Annex 6

Grassland

List down some interesting information about grassland.

- The African savannah is the most famous grassland. One of the most productive and it can support millions of animals and supports humans as well as most of our food is from the grass e.g. wheat, rice, oats. Elephant grass (*pennisetum purpureum*) is extremely good for feeding livestock when it is leafy. They can survive fire as usually grass has roots or storage deep below ground as adaptation.

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