



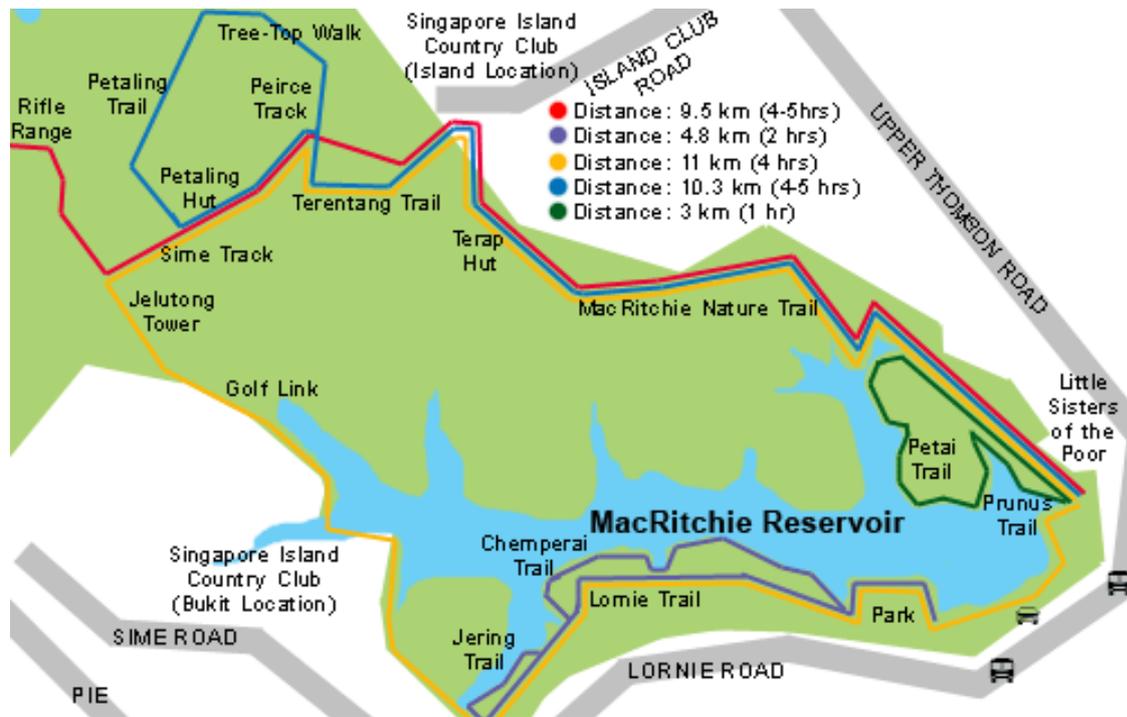
A visit to MacRitchie Reservoir Park



Did you know? MacRitchie Reservoir was the site for Singapore's first reservoir and it was completed in 1868. MacRitchie Reservoir was known as Thomson Reservoir during the early days.



A Map of MacRitchie Reservoir Park



Research on the features of MacRitchie Reservoir Park

Based on your research, make a list of some features that you can find in MacRitchie Reservoir Park.



Before setting off on our learning journey, let's go around the school garden to see what we can find.

Look out for useful trees or plants in your school garden.

- i) Identify which part/s of the trees or plants is/are useful. Write down the name of the tree or plant in the table below.
- ii) Take a photo of the tree or plant.
- iii) After the walkabout in the garden, download the photographs and do research on these trees or plants.

Trees or Plants with useful leaves	Trees or Plants with useful fruits
Trees or Plants with useful stems	Trees or Plants with useful roots
Trees or Plants with useful seeds	Trees or Plants with useful sap

Let's continue our walkabout of the school garden to see what else we can find.

- i) What are some plants in your school garden that have a fragrance?
- ii) Which part of the plant (e.g. leaves, flower etc) is fragrant? Record these in the table below:

No.	Name of plant/Description	Which part is fragrant?
1.		
2.		
3.		
4.		
5.		

Try the following questions. Write your answers in the given boxes.

- a) Having fragrant parts is an adaptation of plants. What are their benefits?

- b) How have people used the fragrance in plants?

Pre-Field Trip Activity: MacRitchie Reservoir Park

Annex 1c

The photograph on the right shows a view of MacRitchie Reservoir Park.



Discuss with your partner or group why the British felt that there was a need to build a reservoir in Singapore. Write down your answers in the box below.



Information

Before 1819, most of the island of Singapore was covered with primary forests. Between 1820 and 1870, an extensive area of forest was cleared by the British to develop Singapore as an important trading settlement. Prior to this, many Chinese merchants had worked the land, clearing the forests for timber and cultivated crops like gambier, pepper and rubber. By 1886, only 10% of the original forest cover remained.

Singapore's first reservoir at MacRitchie Reservoir was constructed between 1867 and 1868. The development of this reservoir halted the devastation caused to the area around the forest station. The forest around MacRitchie Reservoir was protected as a water catchment reserve.

Today, most of MacRitchie is covered with secondary forest tree species but it still nurtures some of the last precious patches of primary rainforests in Singapore. Native species, like Gahuru (*Aquilaria malaccensis*) and Sterculia species are part of this lush habitat. The presence of non-native tree species like rubber trees and Jambu Ayer show signs of past disturbance during the colonial period but in no way do they detract from the majesty of the pristine forest ecosystem that once covered the whole island of Singapore in the 1800s. The forest houses precious habitats for a vast array of flora and fauna.



Let's visit MacRitchie Reservoir Park

Annex 3a

Fauna species in MacRitchie (Prunus Trail)



Put a tick next to the boxes if you spotted the following animals during your visit.

Common Sun Skink



Clouded Monitor Lizard



Oriental Whip Snake



Plantain Squirrel



Slender Squirrel



Long-tailed Macaque



White-bellied Fish Eagle



Greater Racket-tailed Drongo



Pink-necked Green Pigeon



Banded Woodpecker



Collared Kingfisher



Butterfly (Branded Imperial)





Singapore Rhododendron (*Melastoma malabathricum*)

The Singapore Rhododendron is a shrub with pretty pink flowers and lush green leaves. The traditional Chinese medicine, that Mum prescribes whenever you have an upset tummy are made from this shrub.

'Ant Plant' (*Macaranga bancana*)

This plant is found near the forest floor. It is nature's home for ants living in the hollow of the plant. These ants protect the plant from pesky caterpillars while the while the plant provides the ants with the that it needs.

Nibong Palm (*Oncosperma tigillarum*)

The Nibong Palm has growing on their trunks. The slender trunks of these palms are amazingly resilient and rot-

Rubber Tree (*Hevea brasiliensis*)

The Rubber Tree has distinctive trifoliate leaves, where each leaf is made up of three leaflets. It was introduced by the British as an alternative source of latex for making natural rubber products. As natural rubber fell out of use, this tree is now of little economic value. However, the wood can be used to make
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Tembusu (*Fagraea fragrans*)

The Tembusu tree is found on the Singapore five dollar note. The trunk of this tree has distinctive grooves. Nature has given the trunk properties that make it ideal as chopping boards in the days when wooden boards were the norm. When its flowers are in bloom, they give off a strong fragrance which accounts for its scientific name, *Fagraea fragrans*.

Leaf Litter Plant (*Agrostistachys longifolia*)

The Leaf Litter Plant grows profusely under the shade of trees. The

resistant. They are used to make the stilts of kelongs. The Nibong Palm is the fisherman's friend. The spikes are used as needles for fishermen to sew and mend their nets.

Petai (*Parkia speciosa*)

The Petai or bitter bean is edible. The seeds of this tree is eaten raw, grilled or blanched. The beans taste like and have a very strong and pervasive odour.

'Cheng Tng' Tree (*Scaphium macropodium*)

The Malay name for the 'Cheng Tng' Tree is Kembang Semangkok, which means 'fill a cup'. The ripe seeds, when soaked in a cup of water overnight, give rise to a brown spongy jelly that swells to fill the cup, Cheng Tng. This is a local dessert made with the brown spongy jelly, which incidentally is very

presence of Leaf Litter Plants growing are indicators that it is a good forest with enough dark shade.

Chestnut Tree (*Castanopsis schefferiana*)

The Chestnut Tree is actually a member of the family. The species found here closely related to the imported chestnuts sold in our markets.

Lianas

Lianas are the woody climbers or vines of the forest. They are only found in old forests. In general, lianas are to the trees that support them and the growth rates are lower for trees with lianas.

Let's visit MacRitchie Reservoir Park

Annex 3c

Fauna species in MacRitchie (Prunus Trail)



Try locating one the species of fauna listed below in MacRitchie and fill in the information in the table below. You might need to do some research first.

1. Green Crested Lizard
2. White-throated Kingfisher
3. Dragonflies

1) Describe the species.

2) Where is this species usually found?

3) One amazing fact about this species.

4) A photograph or drawing of the species.



Buttress Roots

The buttress roots are thick roots that flare out from the base of tall or shallowly rooted trees. Typically, they are found in rainforests where soils are poor and roots do not go very deep. These roots the tree from falling over. Hence, the name 'buttress'. They help to gather more nutrients and are there to anchor the tree and soak minerals and nutrients from the ground.

Licuala Palm (*Licuala ferruginea*)

This prominent fan palm stands out with its beautiful fronds radiating from the ground on long stalks.

Given the strikingly beautiful neatly-pleated leaflets of the Licuala, many Licuala species from the tropics make beautiful ornamental plants at home.

Calophyllum Tree (*Calophyllum lanigerum* var. *austrororiaceum*)

The Calophyllum tree has a compound from its dried fruits and twigs that form the basis of new pharmaceutical drugs and natural ingredients for cosmetics. This compound is also known to have properties.

Butterfly Climber

This plant has beautiful leaves which hang delicately over the water. Each half of the leaf of this plant is a image of the other. By night, apparently, these leaves will close up to rest but as soon as dawn breaks, they will unfold once again to greet the morning sun.

Wild Ixora (*Ixora congesta*)

The wild ixora many butterflies such as the Banded Imperial and Common Grass Yellow. This plant, which blooms seasonally with clusters of bright orange-red flowers help to add splashes of colour to the greenery.

Chemperai Tree (*Champereia manillana*)

The Chemperai tree or the Olive of the East is a small tree. It is not related to the Mediterranean olive but because there is a resemblance, it is often known as the Olive or the Olive of the East.

Dragonflies and Damselflies

Dragonflies are usually larger and fly well away from the water surface, and they have huge eyes. When at rest, they hold their wings outstretched, often at right angles to their bodies. Its forewings and hindwings are shaped differently.

Damselflies are smaller and stay near the water surface. They hold their wings close to their slim bodies when they are at rest.

Conduct a research and find out what kind of environment is suitable for the dragonfly and damselfly to thrive in. List your findings below.



Red leaves

Conduct a research and find out why the leaves of some trees that hang over the water red in colour List your findings below.



Did you know? The thick carpet of fallen leaves, flowers, fruits, twigs and even a fallen or chopped down log or two will in time, disintegrate and be broken down, and their nutrients recycled and reused by other forest plants. Fungi and tiny insects, like the termites, help in this process. This ongoing cycle is dependent on every twig, branch and dead leaf. It is important that we do not remove anything from this forest, as this will upset the continuous nutrient flow within the rainforest.



What is one feature that you like most in MacRitchie Reservoir Park? Why?

How do you think the features in MacRitchie Reservoir Park have benefited visitors to the park?

What other features would you like to see in the park?

As students, what is one thing you can do to help make the park a better place for park users?

Without NParks, what do you think Singapore will be like?

How do you feel about working in a group? What has your group done well? What can be improved?

Introduction:

Human activities, such as poaching and pollution upset the balance and well-being of the forest habitats. We need to do our part to minimise the disturbances to the rainforests by avoiding such activities. In doing so, we are helping to conserve this rich biodiversity, our ecological heritage, for future generations. As members of the school environment club, you all have been asked by your teacher-in-charge to come up a poster to encourage students in the school to do their part to protect the rainforests.

Your Roles Are:

1. To understand and appreciate the need to conserve the rich biodiversity.
2. To learn about the importance of rainforests towards this biodiversity of flora and fauna.
3. To generate awareness among the student population about the problems of pollution and poaching.
4. To promote to the school community about the need to protect the rainforests.

Your Task:

You are to visit MacRitchie Reservoir Park. At the end of your visit, your club members are to come up with a poster to encourage students in the school to do their part to protect the rainforest in MacRitchie.

Some useful questions to guide your members:

1. What is the role and purpose of rainforests in Singapore and around the world?

2. Who is the organisation behind the management of MacRitchie Reservoir Park?
3. Why is MacRitchie Reservoir Park important in the history of Singapore as well as today?
4. Why should we visit MacRitchie Reservoir Park?
5. What are some of the problems (e.g. Littering, pollution) that are found in MacRitchie Reservoir Park which pose a threat to the biodiversity of flora and fauna found there?
6. What are the areas in MacRitchie Reservoir Park that should be further conserved and preserved?
7. What can be done for the future of MacRitchie Reservoir Park as an important park?

Process:

Assign specific roles for your club members.

E.g.

1. Group Leader (Lead and co-ordinate, conceptualise idea)
2. Scribe (Record information, preparing the resources and edit the poster)
3. Photographer (To take and edit photos)
4. Researcher (Search for information on the history, flora and fauna and what to look out for at the park etc.)
5. Designer (To conceptualise and come up with the poster design)

Websites:

1. http://www.nparks.gov.sg/cms/index.php?option=com_visitorsguide&task=naturereserves&id=49&Itemid=75
2. <http://www.nparks.gov.sg/cms/docs/nature-reserves/MacRitchie-Trails.pdf>

3. <http://www.wildsingapore.per.sg/>
4. <http://www.wildsingapore.com/news/20060304/060322-2.htm>
5. http://www.enotes.com/topic/MacRitchie_Reservoir

Project Rubrics

Annex 7

Group Members:

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CATEGORY	4	3	2	1
Graphics - Clarity	Graphics are all in focus and the content easily viewed and identified from 6 ft. away.	Most graphics are in focus and the content easily viewed and identified from 6 ft. away.	Most graphics are in focus and the content is easily viewed and identified from 4 ft. away.	Many graphics are not clear or are too small.
Graphics - Originality	Several of the graphics used on the poster reflect a exceptional degree of student creativity in their creation and/or display.	One or two of the graphics used on the poster reflect student creativity in their creation and/or display.	The graphics are made by the student, but are based on the designs or ideas of others.	No graphics made by the student are included.
Graphics - Relevance	All graphics are related to the topic and make it easier to understand. All borrowed graphics have a source citation.	All graphics are related to the topic and most make it easier to understand. All borrowed graphics have a source citation.	All graphics relate to the topic. Most borrowed graphics have a source citation.	Graphics do not relate to the topic OR several borrowed graphics do not have a source citation.
Labels	All items of importance on the poster are clearly labelled with labels that can be read from at least 3 ft. away.	Almost all items of importance on the poster are clearly labelled with labels that can be read from at least 3 ft. away.	Several items of importance on the poster are clearly labelled with labels that can be read from at least 3 ft. away.	Labels are too small to view OR no important items were labelled.
Required Elements	The poster includes all required elements as well as additional information.	All required elements are included on the poster.	All but 1 of the required elements are included on the poster.	Several required elements were missing.

Knowledge Gained	Student can accurately answer all questions related to facts in the poster and processes used to create the poster.	Student can accurately answer most questions related to facts in the poster and processes used to create the poster.	Student can accurately answer about 75% of questions related to facts in the poster and processes used to create the poster.	Student appears to have insufficient knowledge about the facts or processes used in the poster.
Content - Accuracy	At least 7 accurate facts are displayed on the poster.	5-6 accurate facts are displayed on the poster.	3-4 accurate facts are displayed on the poster.	Less than 3 accurate facts are displayed on the poster.
Attractiveness	The poster is exceptionally attractive in terms of design, layout, and neatness.	The poster is attractive in terms of design, layout and neatness.	The poster is acceptably attractive though it may be a bit messy.	The poster is distractingly messy or very poorly designed. It is not attractive.
Title	Title can be read from 6 ft. away and is quite creative.	Title can be read from 6 ft. away and describes content well.	Title can be read from 4 ft. away and describes the content well.	The title is too small and/or does not describe the content of the poster well.
Mechanics	Capitalization and punctuation are correct throughout the poster.	There is 1 error in capitalization or punctuation.	There are 2 errors in capitalization or punctuation.	There are more than 2 errors in capitalization or punctuation.
Grammar	There are no grammatical mistakes on the poster.	There is 1 grammatical mistake on the poster.	There are 2 grammatical mistakes on the poster.	There are more than 2 grammatical mistakes on the poster.

Copyright Acknowledgement

- Some information in Annex 2 is adapted from http://en.wikipedia.org/wiki/MacRitchie_Reservoir
- Photograph of leaf litter in Annex 5 is taken from <http://www.countrysideinfo.co.uk/forest2/FOLDER01/HTML/INDEX.HTM>
- Cliparts and graphics found in the worksheet are taken from <http://office.microsoft.com/en-us/images/>
- All other information, resources, pictures and photographs are adapted from the National Parks Board and NParks Flora and Fauna websites.
- Rubrics found in Annex 8 is adapted from rubistar.4teachers.org

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