



LET'S MAKE
SINGAPORE
OUR GARDEN

A Trip to Bukit Timah Nature Reserve

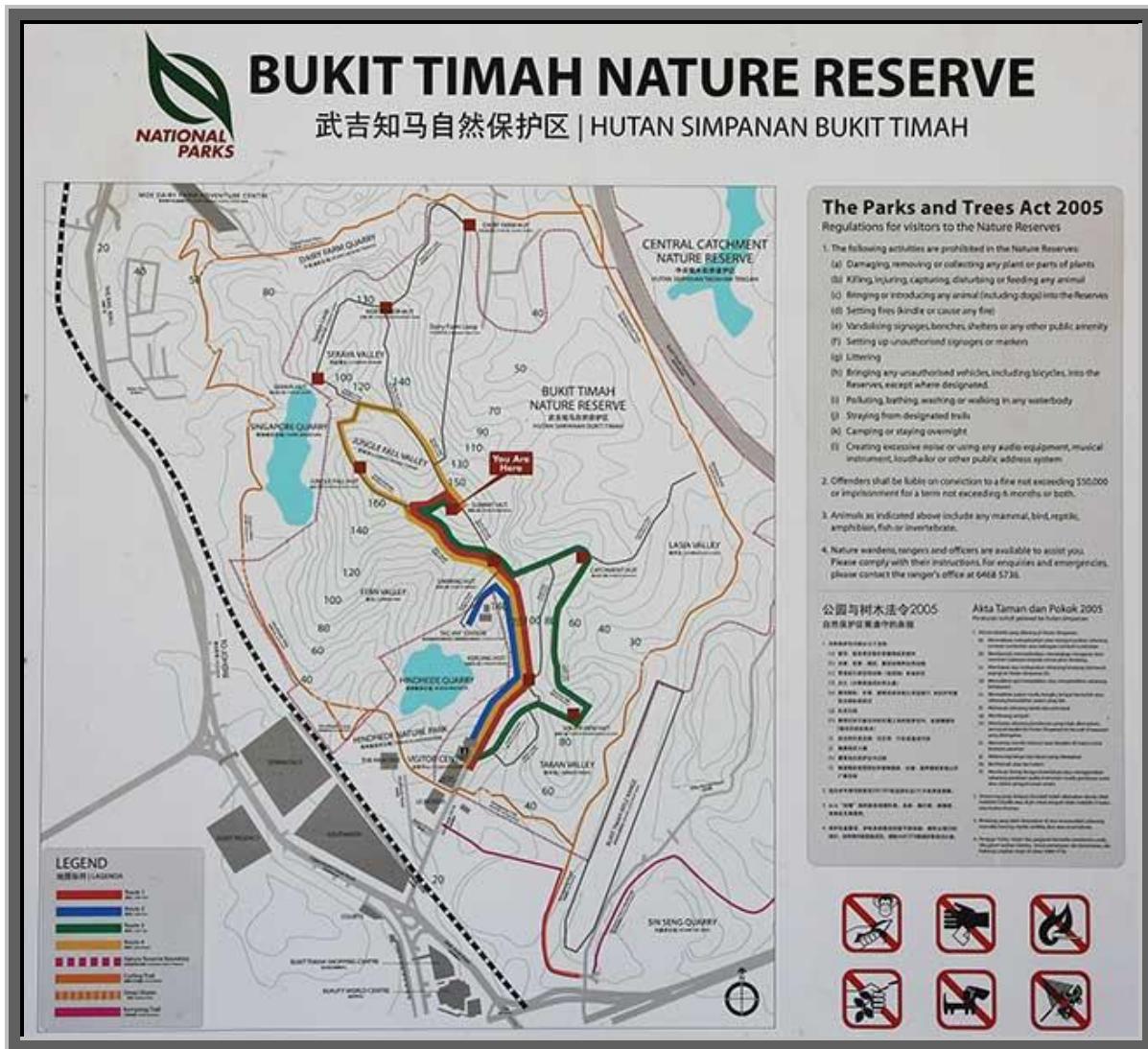


Pre-Learning Journey Worksheet

Annex 1

Did you know? At 163.63 metres, Bukit Timah hill is Singapore highest point in Singapore.

A Map of Bukit Timah Nature Reserve.

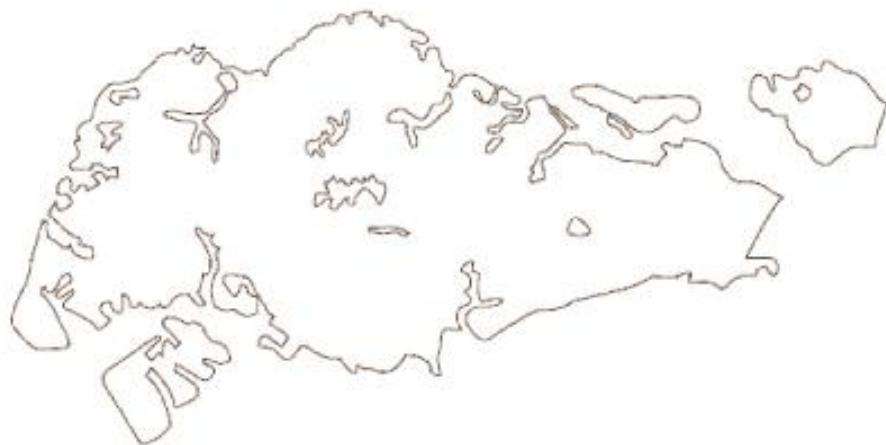


Nature Reserves

1. Define 'nature reserve'.

.....
.....
.....

2. There are 4 nature reserves in Singapore (as of 2002). Using your atlas,
 - a. Name them and
 - b. Label their locations on the map given below



- c. Identify the natural heritage of each nature reserve and fill in your answers in the table below.

3. List down 3 differences between a nature reserve and a park near your school.

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4. Do you think that the nature reserves are important? Give reasons for your answer.

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5. List down and explain the threats faced by tropical forests in the world.

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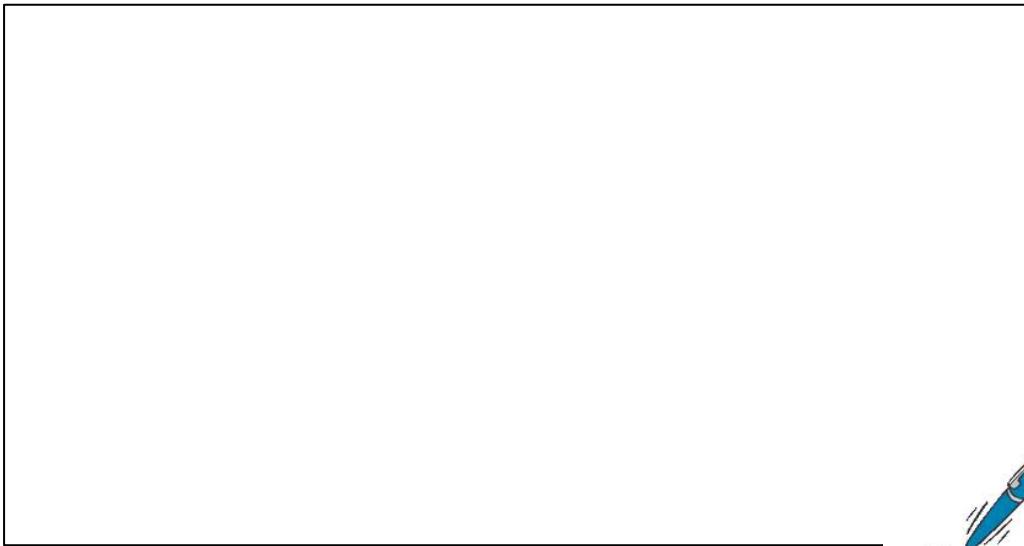
6. List down and explain 3 threats faced by nature reserves in Singapore.

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Discussion Activity

Annex 1b

After researching on Bukit Timah Nature Reserve, list down the different interpretations of how the name Bukit Timah Hill came about? Write down your answers below.



After watching the video on the 'Legend of Bukit Timah', write down your thoughts and reflections below.



Bukit Timah Nature Reserve is the largest surviving primary rainforest in Singapore. Some of the trees in this forest are a few centuries old. By participating in this walk, you can learn about Singapore's Natural Heritage and the importance of Bukit Timah Nature Reserve.

Step into the nature reserves and journey back in time to the days before Sir Stamford Raffles arrived, when much of the island was covered with lowland, tropical forest. Though much of Singapore's original vegetation has been cleared for logging and cultivation after 1819, the forest at Bukit Timah Nature Reserve has remained relatively undisturbed. Likewise, patches of primary rainforest can be seen around the MacRitchie area and Nee Soon Swamp at the Central Catchment Nature Reserve.

These nature reserves bounded 4 reservoir - namely MacRitchie Reservoir, Lower Peirce Reservoir, Upper Peirce Reservoir and Upper Seletar Reservoir. The nature reserves act as water catchment for the reservoirs. In addition, the nature reserves also help to ensure the quality of water in the reservoirs.

Other than being storehouses of water, today, Bukit Timah Nature Reserve and Central Catchment Nature Reserve are homes to more than 840 flowering plants and over 500 species of animals (including butterflies). With such an astonishing variety of plants, animals and insects, the nature reserves are indeed treasure houses of Singapore's biodiversity.

Covering an area of approximately 3,043 hectares, both the Bukit Timah Nature

Reserve and Central Catchment Nature Reserve are managed by the Central Nature Reserve Branch of the National Parks Board.

As nature reserves, Bukit Timah Nature Reserve and Central Catchment Nature Reserves are protected by the Parks & Trees Act (2005) for the conservation of our native biodiversity. Certain activities are prohibited within the nature reserves, especially activities that cause a lot of impacts on the native flora and fauna. Hiking in groups of more than 30 without a permit, releasing of animals into the nature reserves, feeding of animals, removing of native flora and fauna from the nature reserves, cycling, walking off the designated trails are just some of these activities which are not allowed.

Bukit Timah Nature Reserve was one of the first forest reserves established in Singapore. When the government of the Straits Settlements commissioned a report on the state of the forests, it was recommended that several reserves be created. Thus, in 1883, Bukit Timah Nature Reserve was established. In 1951, it received more protection under the Nature Reserves Ordinance which was enacted under the National Parks Act. The 163-hectare reserve retains one of the largest tracts of primary rainforest left in Singapore.

The forest has been a botanical collecting ground for more than a century, where the first known specimens of many species of Malayan plants were obtained. Dr David Bellamy, a renowned conservationist, once pointed out that the number of plant species growing in the Bukit Timah Nature Reserve is more than that in the whole of North America!

Bukit Timah Nature Reserve is also home to Singapore's highest hill at 163.63 metres. Bukit Timah Hill was once an active granite quarrying site in the mid-

1900s. One abandoned quarry has been developed as Hindhede Nature Park. It is now a popular spot with visitors who come to enjoy the quarry's scenic beauty and have some fun with the more challenging play equipment. Bukit Timah Nature Reserve was declared as an Asean Heritage Park in October 2011.

Let's explore Bukit Timah Nature Reserve

Annex 3a



Bukit Timah Nature Reserve South View Challenge

What have you see? Put a tick in the boxes when you have spotted the animals.



Common
Sun Skink



Giant
Forest Ant

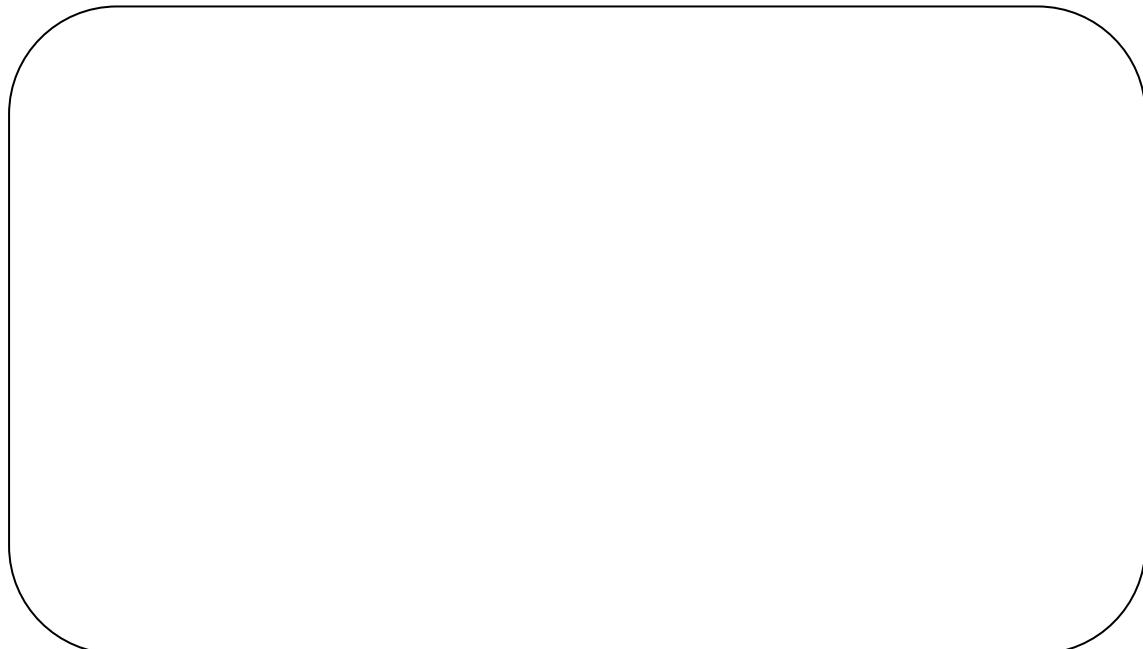


Plantain
Squirrel



Clouded
Monitor
Lizard

How many leaves of different shapes can you see along the trail? Draw them in the box below.



What have you learnt? Try answering the following questions. You may find clues on the signs and in the huts along your route.

1 What is the name of the heritage tree along the South View Path?

.....

2 What does the Spiny Hill Terrapin feed on?

.....

3 Tell us an interesting fact about the mighty Keruing Tree.

.....

.....

4 What are the uses of Licuala ferruginea?

.....

5 Are all snakes venomous?

.....

Did you know? • The Cicada's song can reach 120 decibels, louder than the sound of a car horn.

- The Giant Forest Ant is one of the world's largest, growing up to 3cm long.
- The commonly seen Plantain Squirrel has a black and white stripe on each side of the body.
- The Common Sun Skink can often be seen sun-bathing in sunny areas.
- There are over 840 species of flowering plants and over 500 species of animals in this Nature Reserve.

Let's explore Bukit Timah Nature Reserve

Annex 3b

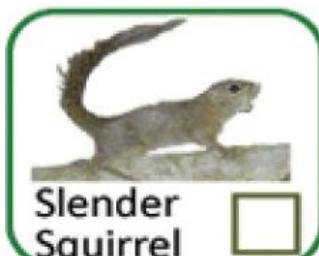


Bukit Timah Nature Reserve Summit Challenge

What have you seen? Put a tick in the boxes when you have spotted the animals.



St Andrew's
Cross Spider



Slender
Squirrel



Greater Racket-
tailed Drongo



Long-tailed
Macaque

What is the most interesting thing you have seen on the trail? Draw it in the box below.

A large, empty oval-shaped box intended for children to draw the most interesting thing they saw on the trail.

What have you learnt? Try answering the following questions. You may find clues on the signs along the route.

- 1 What should you do if you encounter a snake in the reserve?

.....
.....

- 2 What are plants that grow on other plants for support called?

.....

- 3 Which two organisms make up a lichen?

.....

- 4 What do some birds mimic others?

.....

- 5 Which male insect produces a buzzing sound to attract females?

.....

Did you know? • The legs of the St Andrew' Cross Spider are arranged in pairs

- to form an 'X' shape.
- The 'X' is called the St Andrew's cross because it is believed that the saint suffered on a cross bearing the same shape.
 - The Greater Racket-tailed Drongo is often spotted following monkeys and squirrels and it feeds on insects that they disturb.
 - The Slender Squirrel is smaller than the Plantain Squirrel and its underside is grey.
 - The Long-tailed Macaque helps in the dispersal of seeds by storing food in their cheek pouches and transporting it to another site for consumption.

Reflection Time

Annex 4



What is one feature that you like most in Bukit Timah Nature Reserve? Why?

How do you think the features in Bukit Timah have benefited visitors to the nature reserve?

What other features would you like to see in the nature reserve?

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

Role-Playing Activity: Where are the forests?

Annex 5

Scenario

Singapore is facing some uncertainties regarding her future. Being such a small city state, she has been fighting for her independence just to keep afloat amidst all the larger nations that are rich in natural resources. She has no natural resources and is highly dependent on her people.

One of her survival tactics is to be unique. That is why she is also known as a garden city. She never ceases to amaze the many visitors with lush greenery that lines her streets and expressways. Her geographical location also puts her at an advantage. In terms of accessibility, she is the mid-way point between the West and the East. In terms of biological diversity, she is located in a region where biodiversity is very rich and abundant.

As she begins to progress, she is attracting more and more foreign talents and investors. She needs more space to develop. Maybe some of the nature areas will have to go. But these nature areas are the very reason why foreign talents and investors had decided to set up companies in Singapore. What should be done?

The government has gathered 4 groups of people to discuss the future of Singapore. In the discussion, these groups of people are to decide if the nature areas should be kept or if they should be cleared for development.

Your group is to take the roles of the following characters.

1. Minister - Your role is to balance the physical and economic development of the country with the needs of the people. There are times where you need to compromise either the needs of the people over economic development or vice-versa. You are treading on very thin ice and whatever decisions you come up with, it will have an effect on the people, both in the present and also in the future. The progress of the nation will also be affected.
2. Environmentalist - As the name suggests, your main role is to protect the environment. You tend to see the problem on a much broader and global scale but at the same time, it is somewhat remote in terms of view. You understand how a current action can affect the world a few decades later. For instance, the release of too much greenhouse gases now will cause climate change in the future (E.g. a few decades later).

Nevertheless, you aim to educate people on the impacts and outcomes of certain decisions on the environment and inevitable effects on people.

3. Planner - Your role is to plan the land use for Singapore. In other words, you are to balance all the different land use to ensure that every space is accounted for. The main land uses in Singapore are industrial, commercial, residential and natural. If you increase the land use for industrial, commercial and residential, you need to increase the land use for recreational and natural because everyone needs a place to relax and de-stress. Before you increase any land use, it is important to know which land use takes up more space and if this land use will still be relevant in the future.
4. Foreign Investor - Your role concerns dollars and sense. Basically, you need to make calculated decisions to help your business grow. You are a foreign investor from the commercial sector, offering high value-added goods and services. In looking for a place to set up your business, you will consider the following factors - infrastructure (physical and telecommunications), environment (political and physical) and cheap labour (to reduce overhead costs). Keeping in mind the recent movement towards greening businesses, locating your business to a place where the physical environment supports this movement will also be key in your decision-making.
5. Man-on-the-street - Your role is simply about bread and butter issues. In other words, it is all about survival. You are concerned about how you can put food on the table and live your life from day to day. You are not interested in politics or the environment but you are open enough to consider issues from both sides. Decide if the decisions for these issues affect you and the way you live your life.
6. Moderator - Your role is to ensure that every character keeps to his or her role. You are also a mediator when a conflict ensues and a time-keeper to make sure that all the necessary tasks are done within the time stipulated.



**Introduction:**

Despite being a small city state with no natural resources and being highly dependent on its people, Singapore's geographical position has made it an ideal location as a trading hub between the East and West. Singapore is moving from being a *Garden City* into a *City in a Garden* with its lush greenery and a rich and abundant biodiversity of flora and fauna.

As Singapore continues to grow and prosper, she is attracting more investors and foreign talents into the country. This would mean more spaces are needed. That might mean the reduction of green spaces which ironically led foreign talents and investors to come here in the first place. This would lead to dilemma where she has to balance nature with the large influx of people.

Your team has been invited to join in the discussions and decision-making process with a government created task force.

Your Roles are:

1. Understand the development of Singapore from a *Garden City* into a *City in a Garden*.
2. Know the importance of nature areas.
3. Learn how the Singapore government needs to cater to the needs of the people as well as the challenges of being a globalised city state.
4. Decide and come up with the reasons if the nature areas should be kept or if they should be cleared for development.

Your Task:

Write a one-page report on the decisions that will be taken on the nature areas. Make use of the given template to organise and craft your report.

**Task Requirements**

In your report, be sure to include the following:

1. Highlight the natural constraints of Singapore. (e.g. Physical constraints)
2. Identify the government's vision of making Singapore a "City in a Garden".
3. Stress on the importance of nature areas.
4. Draw attention to how the government overcomes constraints and balance the needs of the people as well as practical concerns as a nation.

5. Come up with decisions on whether the nature areas should be kept or cleared for development.

Some useful questions to guide your team:

1. What are the objectives of having nature areas?
2. Why did the Singapore government decide to develop its City in a Garden?
3. What are the costs of keeping its nature areas?
4. What are the advantages of keeping and sustaining its existing nature areas?
5. What are the future plans for Singapore?

Process:

Assigning specific roles for each member of the team

Example

1. Leader (To lead and co-ordinate the team)
2. Editor (To proofread and edit the report)
3. Secretary (Record information)
4. Writer (Type out the report)
5. Researcher (To research on additional information that is needed or should be included in the report)

Websites:

1. http://www.nparks.gov.sg/cms/index.php?option=com_visitorsguide&task=naturereserves&id=46&Itemid=75
2. <http://www.wildsingapore.com/places/btnr.htm>
3. <http://www.ecologyasia.com/html-loc/bukit-timah.htm>
4. <http://habitatnews.nus.edu.sg/pub/naturewatch/text/a061c.htm>

Project Rubrics

Annex 7

Group Members:

.....

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CATEGORY	4	3	2	1
Organization	Information is very organized with well-constructed paragraphs and subheadings.	Information is organized with well-constructed paragraphs.	Information is organized, but paragraphs are not well-constructed.	The information appears to be disorganized. 8)
Amount of Information	All topics are addressed and all questions answered with at least 2 sentences about each.	All topics are addressed and most questions answered with at least 2 sentences about each.	All topics are addressed, and most questions answered with 1 sentence about each.	One or more topics were not addressed.
Quality of Information	Information clearly relates to the main topic. It includes several supporting details and/or examples.	Information clearly relates to the main topic. It provides 1-2 supporting details and/or examples.	Information clearly relates to the main topic. No details and/or examples are given.	Information has little or nothing to do with the main topic.
Mechanics	No grammatical, spelling or punctuation errors.	Almost no grammatical, spelling or punctuation errors	A few grammatical spelling, or punctuation errors.	Many grammatical, spelling, or punctuation errors.
Notes	Notes are recorded and organized in an extremely neat and orderly fashion.	Notes are recorded legibly and are somewhat organized.	Notes are recorded.	Notes are recorded only with peer/teacher assistance and reminders.
Paragraph Construction	All paragraphs include introductory sentence, explanations or details, and concluding sentence.	Most paragraphs include introductory sentence, explanations or details, and concluding sentence.	Paragraphs included related information but were typically not constructed well.	Paragraphing structure was not clear and sentences were not typically related within the paragraphs.

Supplementary Worksheet Activity: Where are the forests?

Annex 8

1. Search your atlas for a world map on natural vegetation types. Look at the map and name some countries where tropical rainforests can be found.

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.....

2. Why are tropical rainforests found in these areas?

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.....

3. This question requires you to conduct a search on the internet to find out about the fate of the tropical rainforests on a global scale. With the information, answer the following questions.

- a. Over the next 25 years, an area of 300 million hectares (an area larger than the size of India) of tropical rainforests is likely to be lost. Why?

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.....

- b. What is the impact of this loss?

.....
.....

4. Search your atlas for a recent vegetation map of Singapore and answer the following questions.

a. Where are the tropical rainforests located?

.....
.....

b. Account for the location of the tropical rainforests in Singapore.

.....
.....

5. Compare the vegetation map of Singapore between 1819 and 2002. Describe the differences.

.....
.....

6. Give reasons for the differences.

.....
.....

7. Are the tropical rainforests in Singapore important? Why?

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.....

8. What will happen to the tropical rainforests if climate change becomes more rampant?

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.....

9. Conduct the role-playing activity found in the Annex 5 and answer the following question.

If you are a Minister, do you think it is important to protect the remaining rainforests in Singapore? Why?

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Copyright Acknowledgement

- Cliparts and graphics found in the worksheet are taken from <http://office.microsoft.com/en-us/images/>
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- All other information, resources, pictures and photographs are adapted from the National Parks Board and NParks Flora and Fauna websites.

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