



LET'S MAKE
SINGAPORE
OUR GARDEN

A Trip to Dairy Farm & Wallace Education Centre



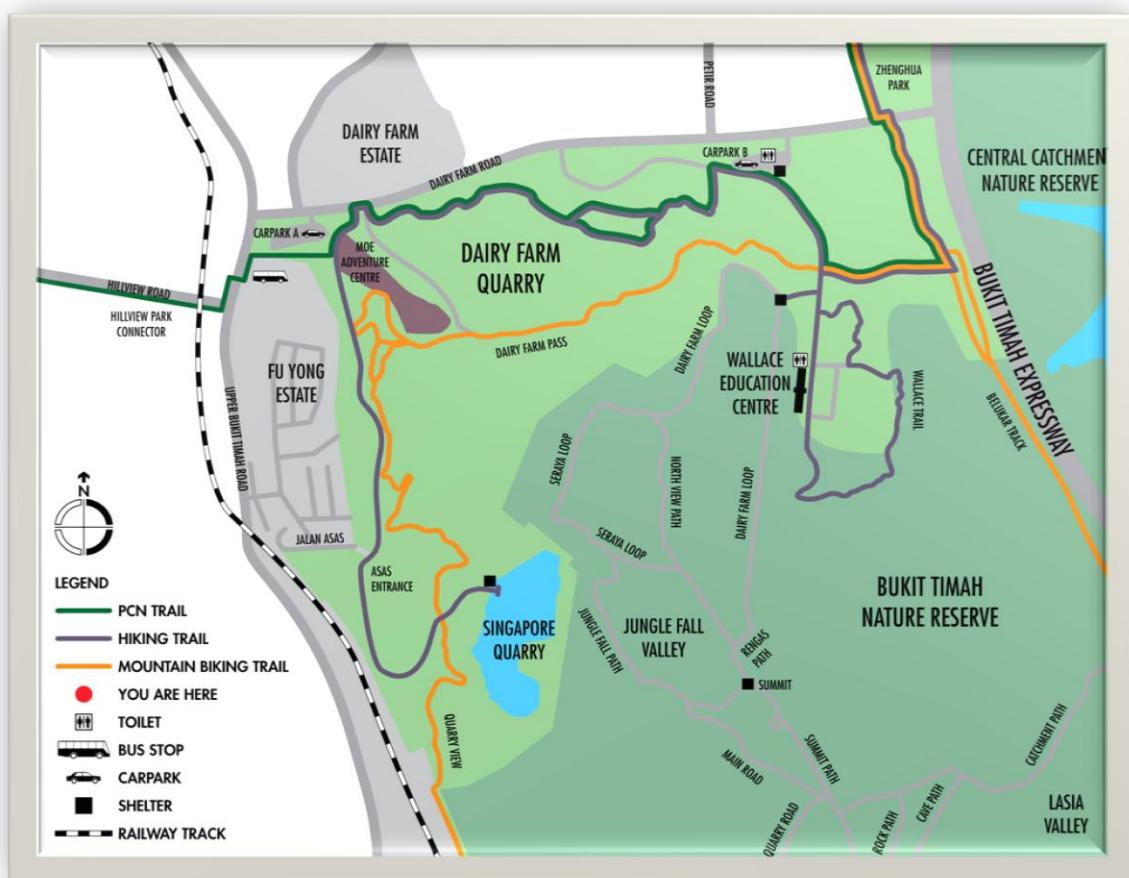
Pre-Learning Journey Worksheet

Annex 1a

Did you know? Wallace Education Centre and Wallace trail are dedicated to Alfred Russel Wallace, a British naturalist for his contributions to Natural Science.



A Map of Dairy Farm Nature Park.



Based on the given map, make a list of the some features that you can see.



Pre-Learning Journey Worksheet

Annex 1b



During the 1830s, this plant was grown in the plantation in Dairy Farm. It is a tropical vine, which was used for tanning and dyeing. Can you identify the plant?

.....

The photograph below shows us a view of the Dairy Farm in the 1930s.



Look closely at the photograph above. What do you think the place was used for back then?

.....

.....

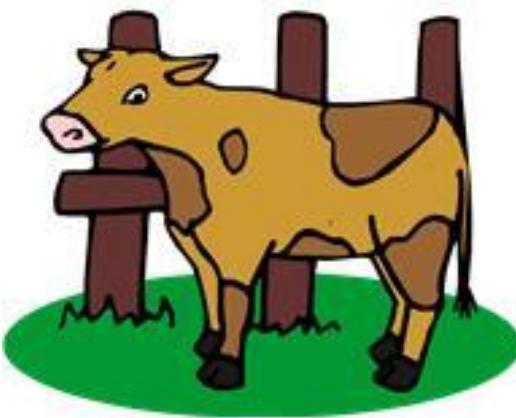
On 20 April 1854, Dr Alfred Russell Wallace (1823 - 1913), an English naturalist, evolutionist, anthropologist, social critic, theorist and author of the classic travel book, came to Singapore during his journeys to the Malay Archipelago to study the island's natural history and collect specimens. The place where he did his fieldwork was Bukit Timah Hill. During his visit, he collected as many as 700 species of beetles within the vicinity of the Dairy Farm area. In 1929, Cold Storage acquired 60 acres of land in Bukit Timah, converted it into a dairy farm with the Friesian cows from Europe, and began production of fresh milk for the local population. It was only natural that the place be called Dairy Farm. Two Dairy Farm cowsheds have remained to this day. In the 1970s, it became the site of a vegetable farm and subsequently was used for other horticulture-related operations.

Today, although the landscape has gone through numerous changes after Wallace's visit in the 1850s, the area in which they lie is mostly untouched by modernization. It still teems with biodiversity and possesses a heritage of national and ecological significance. Its rich biodiversity is now conserved as it has been identified as a protected nature park today.

Two buildings, formerly cowsheds within the park, have stood the test of time. These buildings have been refurbished. One of them has been turned into the Interpretive Centre, where visitors can learn about the changing landscapes of Dairy Farm and Bukit Timah Nature Reserve through various exhibits and is run by NParks. The other is the Wallace Environmental Learning Laboratory, or WELL. WELL, is part of the Wallace Education Centre in Dairy Farm Nature Park and is named after Alfred Wallace. Here, students will be able to discover

Singapore's natural heritage through interesting hands-on activities. Students will be able to explore the trails of Dairy Farm, and conduct research such as water, soil, rock, and insect studies, and carry out data analysis in the Lab.

At the south-western end of the park lies the Singapore Quarry which now offers visitors a tranquil setting with a scenic view. In a short time, the transformation of the site into a wetland has attracted fauna, including the Little Grebe, a critically endangered bird that was known to be found only in Lorong Halus, as well as many species of dragonflies, many of which are rare.



The secondary vegetation in Dairy Farm consists predominantly of fruit trees such as durian, rambutan, jackfruit and mango trees, and exotic and ornamental plant species such as Heliconias, Dumbcane and colourful climbers. Butterflies, beetles, dragonflies, birds and a variety of insects such as cicadas and crickets, spiders and mammals such as colugos are some of the common animals that you may find in Dairy Farm. With its location next to Bukit Timah Nature Reserve, it is possible to find animals such as monkeys, flying lemurs, pangolins and bats in the night.



Fauna species in Dairy Farm

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

Changeable Lizard



Striped Tit-Babler



Common Hedge Blue Butterfly



Long-tailed Macaque



Asian Glossy Starling



Dingy Bush Brown





Flora species in Dairy Farm

Castor Oil Plant



The castor oil plant is a flowering plant. Its seed is the castor bean but despite its name, is not a true bean. The castor seed is the source of castor oil, which has a wide variety of uses. The seed contains a toxin, which is also present in lower concentrations throughout the plant.

Mock Lemon



This plant is a bush, which can be grown easily. It produces yellow colour flowers, which are very fragrant in smell. These are as small as a grain of with a very strong It also has many medical uses.

Bracket Fungi



They have or fruiting bodies that look like brackets or shelves and hence, its common name. The fungi come in various shapes and appearances. They are commonly found growing on and

Turkey Berry



The Turkey Berry comes from a family of toxic flowering plants and important agricultural crops like the potato and tomato. Its green fruits are harvested for use as one of the main ingredients in

African Tulip



The African Tulip trees were brought into Singapore from Africa during the 1910s. There are many African Tulip trees in Singapore today. Its flowers provide for birds, which helps to the trees.

Durian



The durian is known as the "....." in Southeast Asia, it is among the many fruit trees like the mango, jackfruit and rambutan trees found in Dairy Farm. Depending on the time of the year, the durian fruits can be found scattered on the grounds.

Bamboo



The bamboo tree is one of the fastest growing plants in the world. It can grow as fast as cm in a day and achieve a maximum growth rate of more than one metre per hour. Yet it takes many bamboos to flower at intervals as long as or years.

Strangler Fig



The Strangler Fig forms an intricate network of roots and wraps itself around the hosting tree. It grows downwards to compete with the host tree and ultimately as the nutrient flow will be cut off as the roots get larger.

Bird's Nest Fern



This fern is an , which is a plant that grows upon another plant, and obtains its moisture and nutrients from the air, rain and sometimes from debris accumulating around it in its centre of the leaf. There are brown-coloured which can be found on the underside of the fronds.

Creeping Cucumber



This is a vine whose stem is thin and smooth. It bears green fruits which looks like tiny watermelons. It provides one with carbohydrates and protein but one has to avoid eating the fruit as it turns purple or black as its seeds contain a powerful when ripe.

Mango



The mango tree can grow up to 35-40 m. It bears a and fruit and is usually eaten and used in the preparation of cuisines. In some culture, its fruits and leaves are used in rituals as floral decorations at weddings and religious ceremonies.

Ivy Gourd



Ivy gourd is an aggressive climbing vine that can quickly spread over other vegetation, grounds and fences. Its flower is whiter while the fruit is a smooth and bright red. The fruit is eaten as curry in India, In Thailand, the leaves and vines are used in

Other Species of Fauna in Dairy Farm



Common Land Snail



This tropical land snail is a medium-sized and air-breathing species. The length of the body is up to 5-6 cm. The back part of its head and foot is dark brown in colour while its front parts are creamy-white in colour. Its eye tentacles are long and the eyespots are large. A unique feature of this snail is that it is..... Its eggs in the dark. The young snail and most of the adult snails give off flashes of green light.

Grasshopper



Grasshoppers prefer to eat....., leaves and cereal crops. In certain countries, grasshoppers are eaten as a good source of protein. In

Millipede



The word 'millipede' means '.....', but it does not really have a thousand legs as the name indicates. The millipede plays an important role as nature's recyclers by eating decaying leaves and other small pieces of dead plants.

Net Winged Beetle



This beetle is and usually found on flowers or stems. The adults of some species feed on the nectar of flowering plants. Some

some Chinese food market, they are cooked and served on skewers.

beetles have short-lived adult lives during which they may not feed at all. Its head is They are brick red in colour and are protected from predators by being toxic.

Common Mormon



The female the patterns of the Red-bodied Swallowtails, Common Rose and Crimson Rose to protect itself from predators. It usually flies low within ten feet off the ground, so do keep a lookout for them along the trail.

Blue Dasher Dragonfly



The female dragonfly will usually in or near water, often on floating or emergent plants. Most of its life is spent beneath the water's surface and it will eat other animals such as mosquito larvae, tadpoles and fish etc. as it grows and develops.

Discussion Question: Dragonflies in Dairy Farm Park

Annex 3b



The picture on the left shows a stream located within Dairy Farm. There is an indication of the presence of dragonfly nymphs here. What does this tell you?

NParks opens new Dairy Farm Nature Park to protect biodiversity

SINGAPORE: The National Parks Board (NParks) has unveiled a blueprint to sustain and develop Singapore's biodiversity. National Development Minister Mah Bow Tan announced this at the opening of a new nature park on Saturday.

And one aspect of the plan involves the building of a land bridge between the Bukit Timah and Central Catchment Nature Reserves.

An old disused quarry has been turned into a freshwater wetland. It's now home to insects, birds and fish, some never before seen in the area. This is an example of how a new ecosystem can be created out of what ecologists term degraded areas. And that's one objective of a blueprint called the National Biodiversity Strategy and Action Plan to guide conservation efforts in the public and private sectors.

Lena Chan, deputy director, National Biodiversity Centre, National Parks Board, said: "If you do things in a sort of ad-hoc manner and everybody just does it in different ways, and their own initiatives, then we are not optimising our resources. So there could be duplication, there is no synergy."

The quarry is located within the newly opened Dairy Farm Nature Park. The park was created as a buffer to protect the nearby Bukit Timah Nature Reserve from increasing urbanisation in the area. The aim is to minimise the impact of urbanisation on these habitats. In 2001, Hindhede Nature Park at the foot of Bukit

Timah Hill was created for this purpose.

The 63-hectare park has walking trails and camping areas. And in line with the blueprint's aim of education, there's also a centre where the public can learn about the different wildlife species in Singapore and the efforts to conserve them.

Experts said sustaining healthy biodiversity levels requires the movement of wildlife between habitats.

But currently, the Bukit Timah Nature Reserve is cut off from the larger Central Catchment reserve by the Bukit Timah Expressway.

The solution is an overhead bridge, called the Eco-Link. The bridge will be hour-glass shaped and will be densely planted with vegetation to encourage animal crossings. For instance, forest birds are extremely shy creatures and therefore need dense canopy cover to help aid their flight from one area to the other.

The Eco-Link will help reduce over-crowding in the reserves, encourage the healthy exchange of genetic material among the plant and animal species, thus preventing the threat of extinction.

Experts said in the long term, these regular exchanges would help restore the ecological balance in the fragmented habitats.

Building of the land bridge is expected to begin late next year. - Hoe Yeen Nie, Channel News Asia 5 September 2009.

Based on what you have read in the above article, discuss with your group members on the importance of Dairy Farm Nature Park in conserving the rich biodiversity in Singapore.



Reflection Time

Annex 5



What is one feature that you like most in Dairy Farm Nature Park?
Why?

How do you think the features in Dairy Farm 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?

Task

Annex 6

Introduction:

You are members the school's Nature Society. Your team has been asked by your teacher to come up with a video on the history of Dairy Farm Nature Park and the flora and fauna which can be found here.

Your Roles are:

1. To understand and appreciate the natural history of Dairy Farm Nature Park.
2. To learn about the importance of Dairy Farm Nature Park in Singapore's history.
3. To learn how Dairy Farm has evolved over the years.
4. To promote Dairy Farm as a park with rich natural history to all walks of life.

Your Task:

At the end of your visit to Dairy Farm Nature Park, your team is to complete the video on your findings.

Some useful questions to guide your team:

1. What is the role and purpose of Dairy Farm Nature Park in the natural history of Singapore?
2. Who is the organisation behind the management of Dairy Farm Nature Park today?
3. Why is Dairy Farm Park important in Singapore's history?
4. Why should we visit Dairy Farm Nature Park?
5. What are some of the important features that can be found in Dairy Farm Nature Park?
6. What changes have Dairy Farm Nature Park gone through over the years?
7. What are the areas in Dairy Farm Nature Park that should be further conserved and preserved?
8. What can be done for the future of Dairy Farm Nature Park as an important natural history park?

Process:

Assigning specific roles for each member of the team

Example

1. Group Leader (Lead and co-ordinate, conceptualize ideas)
2. Scribe (Record information, prepare the storyboard and script)
3. Videographer / Photographer (Take and edit video and photos)

4. Researcher (Search for information on the history, flora and fauna, what to look out for at the park etc.)
5. Logistics and Map reader (Prepare the equipment, map reading if you are carrying out the task without a guide)

Websites:

1. http://www.nparks.gov.sg/cms/index.php?option=com_visitorsguide&task=parks&id=85&Itemid=73
2. <http://www.youtube.com/watch?v=kJFDhQz0vvQ>
3. <http://placesinsingapore.blogspot.com/2010/04/blog-post.html>
4. http://en.wikipedia.org/wiki/Dairy_Farm_Nature_Park
5. <http://cuisineparadise-eatout.blogspot.com/2009/09/dairy-farm-nature-park.html>
6. http://www.natureloveyou.sg/Plant%20Story/Nature%20Walk_BTNR_0110.html

Rubrics

Annex 7

Group Members:

.....

.....

.....

CATEGORY	4	3	2	1
Teamwork	Students meet and discuss regularly. All students contribute to the discussion and all are listened to respectfully. All team members contribute a fair share of the work.	Students meet and discuss regularly. Most students contribute to the discussion and are listened to respectfully. All team members contribute a fair share of the work.	A couple of team meetings are held. Most students contribute to the discussion and are listened to respectfully. All team members contribute a fair share of the work.	Meetings are not held AND/OR some team members do not contribute a fair share of the work.
Concept	Team has a clear picture of what they are trying to achieve. Each member can describe what they are trying to do and generally how his/her work will contribute to the final product.	Team has a fairly clear picture of what they are trying to achieve. Each member can describe what they are trying to do overall but has trouble describing how his/her work will contribute to the final product.	Team has brainstormed their concept, but no clear focus has emerged for the team. Team members may describe the goals/final product differently.	Team has spent little effort on brainstorming and refining a concept. Team members are unclear on the goals and how their contributions will help them reach the goal.
Storyboard	Storyboard is complete with sketches for each scene, detailed notes on titles, transitions, special effects, sound, etc. Storyboard reflects outstanding planning and organization for the visuals in the video.	Storyboard is relatively complete with sketches for most scenes, and notes on titles, transitions, special effects, sound, etc. Storyboard reflects effective planning and organization for the visuals in the video.	Storyboard has glaring omissions in scene planning. There are some sketches, and notes on titles, transitions, special effects, sound, etc. Storyboard reflects attempts at planning and organization for the visuals in the video.	Storyboard is not done or is so incomplete that it could not be used even as a general guide. Storyboard reflects very little planning of the visuals.
Script	Script is complete and it is clear what each actor will say	Script is mostly complete. It is clear what each actor will	Script has a few major flaws. It is not always clear	There is no script. Actors are expected to invent

	and do. Entries and exits are scripted as are important movements. Script is quite professional.	say and do. Script is shows planning.	what the actors are to say and do. Script shows an attempt at planning, but seems incomplete.	what they say and do as they go along.
Equipment Preparation	All necessary equipment/supplies are located and scheduled well in advance. All equipment (sound, light, video) is checked the day before the shoot to ensure it is operational. A backup plan is developed to cover possible problems with power, light, etc.	All necessary equipment/supplies are located and scheduled a few days in advance. All equipment (sound, light, video) are checked the day before the shoot to ensure they are operational. A backup plan is developed.	On the day of the shoot, all necessary equipment/supplies are located and checked to ensure they are operational. There may or may not be a backup plan.	Needed supplies/equipment are missing OR were not checked before the shoot.
Research	Note cards indicate that the group members developed questions about the assigned topic, consulted at least 3 reference sources, developed a position based on their sources, and correctly cited their sources.	Note cards indicate that the group members consulted at least 3 reference sources, developed a position based on their sources, and correctly cited their sources.	Note cards indicate that the group members consulted at least 2 reference sources, developed a position based on their sources, and correctly cited their sources.	There are fewer than two note cards OR sources are incorrectly cited.

Copyright Acknowledgement:

- Photograph of Dairy Farm in Annex 1a is taken from http://www.ura.gov.sg/myendearinghome/westregion/westregion_intfacts_text.htm
- Photograph of gambier plant in Annex 1a is taken from <http://en.wikipedia.org/wiki/File:Koeh-275.jpg>
- Photographs of fauna in Annex 3a (Striped Tit-Babler, Common Hedge Blue Butterfly, Long-tailed Macaque, Asian Glossy Starling, Net Winged Beetle, Common Mormom and Blue Dasher Dragonfly) and photographs of flora in Annex 3a (Caster Oil Plant, Bracket Fungi, Turkey Berry, African Tulip, Durian, Strangler Fig) in Annex 3a are taken from <http://en.wikipedia.org/wiki>
- Photographs of flora (Mock Lemon, Mango and Ivy Gourd) and photographs of fauna (Dingy Bush Brown, Common Land Snail and Changeable Lizard) are taken from http://www.natureloveyou.sg/Plant%20Story/Nature%20Walk_BTNR_0110.html
- Photograph of flora (Bird's Nest Fern) in Annex 3a taken from <http://www.tropical-plants-flowers-and-decor.com/asplenium-nidus.html>
- Article in Annex 5 taken from <http://wildsingaporenews.blogspot.com/2009/09/nparks-opens-new-dairy-farm-nature-park.html>
- Cliparts and graphics in Annex 1a, 3a and 4 are taken from <http://office.microsoft.com/en-us/images/>
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- Rubrics found in Annex 8 is created from Adapted from rubistar.4teachers.org

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