

# Climate Change affecting our Fragile Rainforest

- \* Warmer days and nights.
- \* Parts of the world may **starve** in the future because the changing climatic conditions can have devastating effects on **agriculture**.
- \* **Hurricanes, wildfires** and other weather-affected natural disasters will become stronger and more frequent.
- \* Rising ocean levels will drown **coastal cities** and millions, probably **billions of people may become homeless and jobless**.
- \* These people have to be relocated somewhere and given financial help. Millions of **environmental refugees** will migrate to countries with better conditions for life. This will not be free of conflicts and possibly wars.
- \* Many animal and plant species will lose their habitats and may go extinct.

## **Question 2**

Pupils could search for many other endangered animals threatened by climate change from the **Singapore Red Data Book 2008**

Suggested answers (extracted from the Singapore Red Data Book):

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Common name: **Malayan Horned Frog**

**National Status:** Endangered

**Habitat and Ecology:** Inhabits mature forest and swamp-forest where it is usually found on the forest floor, and along small shallow streams.

**Distribution:** In Singapore, confined to the Central Nature Reserves largely in two locations.

**Threats:** Habitat degradation, particularly from the possible drying up of the Bukit Timah forest.

**Conservation measures:** Continued protection of known habitats.

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Common name : **Pregnant mother moss**

**National Status:** Critically Endangered (CR)

**Habitat and Ecology:** Growing on wet rocks and pebbles in shaded sites along streams and forest trails.

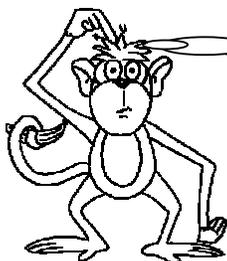
**Distribution:** In Singapore, found only in one locality in Bukit Timah Nature Reserve and one other site in Bukit Batok..

**Threats:** Degradation and drying of suitable habitats.

**Conservation measures:** Protection for the known localities of this moss in Singapore needs to be continued, and other examples of suitable habitat should be sought.

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**Question 3**



When the environment of my habitat changes, will I be able to

Match some of the factors affecting organisms' survival rate to the correct descriptions.

Factors		Descriptions
Resilience	•	How mobile is the species able to venture beyond the traditional boundaries and move to new habitats.
Habitat	•	How well can a species tolerate drastic changes in environmental conditions?
Reproduction	•	Is there alternative water source if streams in rainforests were reduced to a trickle?
Diet	•	Is breeding behaviour triggered by any particular environmental cue? How many offspring are produced per mating? How regular is the species known to breed?
Water	•	Is there sufficient shade or shelter to hide from the heat?
Mobility	•	What is the relative availability of food? Does the organism have a generalist or specialist diet?



## Roles of Rainforests – 3 'C's

Conservation of the rainforests in Singapore is important for many reasons. One of them is the supporting roles they play in combating climate change.

### ➤ Cool

Explain how the trees help to keep the temperature cool in the rainforests.

Ans: A combination of tall trees, dense vegetation and multiple layers in the rainforest helps to block out heat and light from the Sun.

### ➤ Carbon Sink

How does the rainforests act as a carbon sink?

Ans: Rainforest captures large quantities of carbon dioxide, a greenhouse gas from the environment during photosynthesis. Cumulatively, our rainforests act as significant carbon sinks, storing excess carbon quantities and only releasing them progressively with the decomposition process.

### ➤ Catchment

Explain the role of rainforests in water catchment.

Ans: The forests that surround our central reservoirs serve as a water catchment. Numerous streams meander through these forests, purifying the water and eventually entering the reservoir. Without the rainforests, these fragile streams cannot be sustained and will be choked with silt and run dry.

# Tricks for survival in the Rainforest!

## A) Malayan Colugo's Adaptations



Mechanism		Type of adaptation (Structural/ Behavioural?)	How this helps the species in its survival
1	It has a very large flexible membrane that acts like a parachute.	Structural	The membrane is able to act like a parachute to help it glide a long distance so that it can escape predators easily.
2	It has fur which blends with the colour of the tree bark.	Structural	The colour of fur helps it to camouflage with the surrounding so it is not easily detected by the predators.
3	It stays motionless on the tree in the day.	Behavioural	Staying motionless on the tree helps it to escape detection by the predators.
4	It is active at night.	Behavioural	There are fewer predators at night, so this behaviour increases its chance of survival.

### (B) Pangolin's Adaptations



Mechanism		Type of adaptation (Structural/ Behavioural?)	How this helps the species in its survival
1	It has strong claws.	Structural	The strong claws help to break into ants' and termites' nests so that they can get their food easily.
2	It has long sticky tongue	Structural	The long sticky tongue helps it catch insects for food.
3	It has scales.	Structural	The scales protect the pangolin from ant bites.
4	It can roll up into a ball when threatened.	Behavioural	This behaviour protects them from the attacks by the predator.
5	It is active at night.	Behavioural	There are fewer predators at night, so this behaviour increases its chance of survival.

**(C) Assassin Bug's adaptations**



Mechanism		Type of adaptation (Structural/ Behavioural?)	How this helps the species in its survival
1	It possesses a flexible, segmented proboscis that deliver potent toxin into a victim's body.	Structural	The toxin immobilise the victim so that it can devour/eat its prey easily.
2	At the juvenile stage, certain nymphs cover themselves with debris (above).	Behavioural	To camouflage itself and aid in sneaking up on unsuspecting prey.

**(D) Moth's adaptations**



Mechanism		Type of adaptation (Structural/ Behavioural?)	How this helps the species in its survival
1	It looks brown like dried leaves.	Structural	The colour helps it to camouflage in the forest so that predators will not see it.
2	It is active at night.	Behavioural	There are fewer predators at night, so this behaviour increases its chance of survival.

**5 ways to combat climate change..... (Suggested ways)**

- Reduce your carbon footprint.
- Plant a tree. Trees help to slow climate change because they absorb carbon dioxide during photosynthesis. Trees also provide shade, which helps keep streets and houses cooler in the summertime and reduces the need for air conditioning. (Join GreenWave 2012)
- Spread the word. Give a presentation to your family, school, or community group that explains how their actions can cause or reduce climate change.
- Bring reusable bags when you go shopping.
- Don't leave the refrigerator door open! This lets cold air escape, making the refrigerator work harder and use more energy. Decide what you want before you open the door.
- A household dryer uses an average of 750 kWh per year, which means a lot of energy is used to dry your clothes! So don't run the dryer for just a few things; dry a full load.
- Only wash clothes when you have a full load of laundry, using cold water when possible
- Pack a waste-free lunch to school. Waste requires energy for disposal, so packing your lunch with reusable or recyclable items can help save energy and reduce greenhouse gas emissions.
- Consider buying locally grown food. The further your food travels, the more greenhouse gas emissions are produced in transporting the food from the farm to your plate.
- Turn off lights when you don't need them—when light bulbs burn out replace them with energy-efficient bulbs;
- Do not waste water ;
- Recycle;
- Encourage your parents to drive fuel-efficient cars

**5 ways to save the rainforests..... (Suggested ways)**

- Teach others about the importance of the environment and how they can help save rainforests.

- Restore damaged ecosystems by planting trees on land where forests have been cut down.
- Encourage people to live in a way that doesn't hurt the environment
- Establish parks to protect rainforests and wildlife
- Support companies that operate in ways that minimize damage to the environment
- Use recycled paper.