

TROPICAL RAINFORESTS

Tropical rainforests are today restricted to relatively small pockets of land clustered around the equator. Yet within these remaining parcels of land is an extraordinarily diverse ecosystem.

This diversity is driven by the tropical climate - rain - and lots of it - along with abundant sunshine. This promotes rapid plant growth, which in turn, attracts a stunning variety of animals.

The world's rainforests can all be divided into four distinct zones, each of which has its own common characteristics.

At the top is the emergent layer where the tallest trees supported by massive buttress roots, break through into the sunlight. Below these giants of the forest is the unbroken canopy of the rainforest - an endless mat of interlocking trees; home to many animals that spend their whole lives solely in the tree tops.

Below the canopy, the rainforest takes on a different feel as sunlight is shut out and plants struggle for what little light there is. In the understorey broad leaved plants capture every drop of sunlight, while in clearings young trees race to fill the gap in the canopy.

At the bottom is the forest floor, a wet, leaf strewn world primarily inhabited by scavenging mammals, insects, fungi and amphibians. Together these plants and animals break down enormous amounts of organic material enabling the rainforest to survive.



Word Check:

Tropical, Monsoon, Ecosystem, Emergent Layer, Canopy, Understorey, Decomposers, Fungi.

Pre-viewing Questions:

1. Where in Australia are there still areas of tropical rainforests?
2. Here and around the world, what are the major threats to tropical rainforests?
3. Why is it important to save what tropical rainforests we have left?

TROPICAL RAINFORESTS

This guide provides you with a summary of the program and follow-up questions (along with their answers). A list of web links leads to further information on the topic.

The question sheet is designed to be duplicated for class distribution.

Before Viewing: Give students an overview of the program. Use the program summary to help provide this introduction. Select pre-viewing discussion questions and vocabulary to provide a focus for students when they view the program.

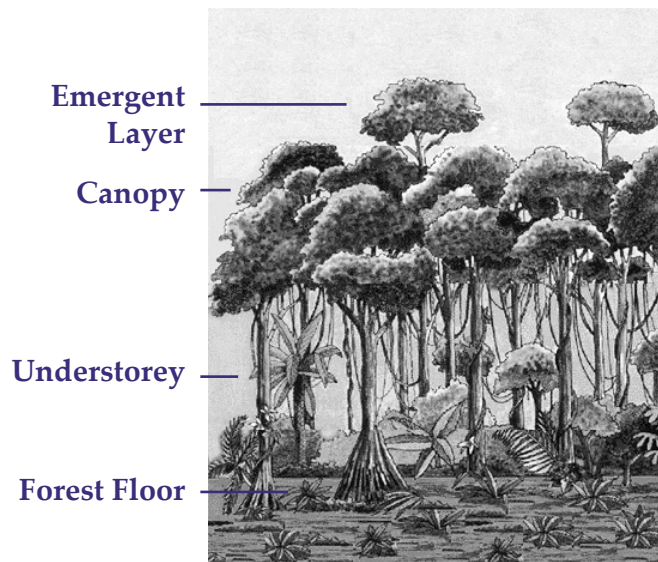
After Viewing: Use a selection of the follow-up questions to help review the program and encourage students to research the topic further with the internet resources provided.

You can cut and paste text from the pdf file to compile your own set of questions or to enter links into a web browser.



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Rainforests: QUESTIONS

1. Which ecosystem has a great number of different species living in it?

Chapter 1: Location of Tropical Rainforests?

2. Where in the world are tropical rainforests located today?
3. What factors make the abundance of life in a tropical rainforest possible?
4. On average, how many centimetres of rain falls in tropical rainforests each year?
5. How have plants adapted to the high rainfall?
6. What provides the power for the rainforest's lush growth?
7. Why do rainforest trees need buttress roots in order to remain upright?

Chapter 2: The Canopy

8. Do you find single large stands of one species of tree in rainforests?
9. How do the layers of the rainforest increase the number of plants and animals living there?
10. What is the top-most layer of tropical rainforests called?
11. How would you describe the nature of this top-most layer?
12. What is one animal that makes its home in the top-most layer of the rainforest?
13. How would you describe the canopy layer of a rainforest?
14. What are two plants that grow among the trees' branches in the canopy layer?
15. Are epiphytes such as Bromeliads parasites (i.e. do they draw nourishment from the tree)?
16. How do epiphytes such as Bromeliads get their nourishment?
17. How do Bromeliads make it possible for some frogs to spend their whole lives in the canopy layer of the rainforest?
18. What is an example of how many different types of insects live in the canopy layer?
19. What proportion of the world's bird species can be found in tropical rainforests?

20. How do fruit eating birds help the rainforest trees?
21. What are some of the mammals that make the canopy layer of the rainforest their home?

Chapter 3: The Understorey

22. How would you describe the understorey layer of a rainforest?

Chapter 4: The Forest Floor

23. What is the lowest zone of a tropical rainforest?
24. Why is plant life sparse in this zone of the rainforest?
25. Where do you get lush growth on the rainforest's floor?
26. Which cat is the largest carnivore in South America?
27. What are the decomposers?
28. What role do termites play in the tropical rainforest?
29. Why are there so few nutrients in rainforest soils?

FURTHER INFORMATION

Links to information and illustrations.

- http://www.srl.caltech.edu/personnel/krubal/rainforest/serve_home.html
- <http://mbgnet.mobot.org/>
- <http://www.enchantedlearning.com/subjects/rainforest/animals/Rfbiomeanimals.shtml>

Rainforests

ANSWERS

1. The tropical rainforest ecosystem has one of the greatest number of species living in it.

Chapter 1: Location of Rainforests?

2. Tropical rainforests are today limited to small areas of land around the equator.
3. The tropical climate with a lot of rain and abundant sunshine create the ideal conditions for a large number of plants and animals to be supported.
4. Around 400 cm of rain (150 inches) per year falls in areas of tropical rainforests.
5. Leaves of rainforest plants tend to be waxy to help them shed water.
6. The energy needed to support a rainforest comes from the abundant solar energy one finds in the tropics.
7. In the rainforest there is such competition for sunlight that trees grow tall. If they did not have buttress roots they would fall over as rainforest soils tends to be thin.

Chapter 2: The Canopy

8. No, in rainforests species tend to be mixed as there are a lot of different species competing for the same area.
9. The layers in a rainforest in effect provide four distinct habitats allowing a greater range of plants and animals to live in the one area.

10. The top-most layer of tropical rainforests is called the emergent layer.
11. The emergent layer is characterised as containing the crowns of large forest trees that have risen above the rest of the forest.
12. The eagle is one animal which inhabits the emergent layer of the rainforest.
13. The canopy, formed by large numbers of trees, creates an unbroken umbrella above the forest floor.
14. Both vines and Bromeliads use rainforest trees to reach a position high in the canopy.
15. Epiphytes such as Bromeliads are not parasites, they only use the tree for support.
16. Epiphytes capture nutrients from the humid air with 'air roots'.
17. Bromeliads form small pools of water at the centre of their leaves. In these pools some frogs spend their whole life.
18. In one instance 950 different species of beetle were collected from just one rainforest tree.
19. One third of the world's bird species have been recorded within tropical rainforests.
20. The fruit eating birds disperse the seeds of the trees around the rainforest.
21. Monkeys, such as the Howler Monkey, Tree Porcupines and South American Sloths are just a few of the many animals that inhabits the rainforest's canopy layer.

Chapter 3: The Understorey

22. The understorey is starved of light by the canopy above. Therefore there are not a large number of plants in this zone and those that are here tend to have large leaves to help capture as much sunlight as possible.

Chapter 4: The Forest Floor

23. The lowest zone of a tropical rainforest is the forest floor.
 24. Plant life on the forest floor is sparse because of the shortage of sunlight that is blocked by the canopy.
 25. The only place you get lush growth on the forest floor is along the banks of creeks and rivers.
 26. The Jaguar is the largest carnivore in South America.
 27. Decomposers are primarily fungi and insects that break down organic matter on the forest floor.
 28. Termites break down fallen timber on the forest floor.
 29. Because almost all nutrients are recycled by the forest, very little is left over.
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THE ARCTIC TUNDRA

The tundra is a cold, treeless area; it is the coldest biome or habitat on earth. The tundra is characterized by very low temperatures, very little precipitation (rain or snow), a short growing season, few nutrients, and low biological diversity. The word tundra comes from the Finnish word *tunturia*, which means 'treeless plain.'

Few places in the world could be as unforgiving as the arctic tundra. Yet in this most forbidding of environments a startling array of plant and animal life can be found.

Given the weather it is hardly surprising that few animals remain in the tundra during winter. Some specially adapted animals such as the Musk Ox and the Arctic Fox tough out the impossible winter conditions, while the majority, including Caribou and birds migrate south to avoid the worst of winter.

With the coming of spring life returns to the tundra. Migratory animals begin to move north and the ground thaws enough to allow the shrubs, flowers and grasses to germinate for another year. With the melting of the winter snow innumerable lakes are formed across the tundra that soon become home to billions of insects.

The brief summer is a time for raising young and putting on enough reserves to get through the coming winter. This is a time of plenty on the tundra when the sun never sets and the vast plains are filled with animal and bird life.



By August the summer is already turning and those animals that migrate begin their journey south. Some flowers use the last of the summer's warmth to flower and set seed before the arrival of winter giving animals the last chance to fatten up before the return of cold weather.

Word Check:

Biome, Arctic, Permafrost, Migration.

Pre-viewing Questions:

1. Why is there no tundra in the southern hemisphere? (there are no land masses at the right latitude in the south, only in the north)
2. What environmental challenges would living in a tundra region present?

THE ARCTIC TUNDRA

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Arctic Tundra

QUESTIONS

Chapter 1: Location of the Arctic Tundra

1. Where is the arctic tundra located?
2. Between which two ecological zones does the arctic tundra exist?
3. What climate does the arctic tundra have?

Chapter 2: Winter

4. What is the only large mammal that exists year round in the tundra?
5. How does the Musk Ox survive the cold of the tundra?
6. What other adaptations does the Arctic Fox have to cope with the winter temperatures?
7. How do Lemmings survive in the tundra environment?

Chapter 3: Spring

8. In what month of the year does spring arrive in the arctic tundra?
9. In what month of the year does the temperature rise above freezing in the arctic tundra?
10. What happens on the tundra when the snow and ice melts?

11. What is permafrost?
12. How does the permafrost contribute to the formation of lakes in tundra regions?
13. Why are there no trees on the tundra?

Chapter 4: Summer

14. For how long is the growing season for plants on the arctic tundra?
15. How have the plants of the tundra adapted to this short growing season?
16. What does the flush of summer growth mean for the animals of the tundra?
17. Which large mammal migrates from the coniferous forests to the tundra during summer?
18. The tundra is home to many species of water birds during the summer. Where do these birds come from as they are not on the tundra during winter?
19. What is one unpleasant aspect of life on the tundra during summer?
20. How do the insect eating birds of the tundra take advantage of the swarms of insects during summer?

21. How far does the Golden Plover travel to raise its chicks on the tundra?
22. How does the Ground Squirrel use the summer to prepare for the winter?
23. What is the only tundra animal that hibernates during the winter?

Chapter 5: Autumn

24. By which month does summer on the tundra start to draw to an end?
25. What do Caribou do during autumn on the tundra?

FURTHER INFORMATION

For further information on the tundra biome:
<http://mbgnet.mobot.org/>

Facts and figures concerning the tundra:
<http://earthobservatory.nasa.gov/Laboratory/Biome/biotundra.html>

Tundra Fact Sheet:
<http://www.ucmp.berkeley.edu/glossary/gloss5/biome/tundra.html>

For tundra related illustrations:
<http://www.enchantedlearning.com/biomes/tundra/tundra.shtml>

Arctic Tundra

ANSWERS

Chapter 1: Location of the Arctic Tundra

1. The arctic tundra exists in a belt around the north pole.
2. The arctic tundra exists between the ecological zones of the coniferous forest to the south and the Arctic Ocean to the north.
3. The arctic tundra is cold year round, has a short growing season and receives very little precipitation (about 125-150 mm per year, mostly in the form of snow).

Chapter 2: Winter

4. The Musk Ox is the only large mammal that exists year round in the tundra.
5. The Musk Ox is large so it produces a lot of heat and its fur is well insulated so it loses this heat slowly.
6. The Arctic Fox has short ears to reduce heat loss and its white fur also helps absorb any heat that is available.
7. Lemmings build tunnels beneath the snow where the temperatures are always warmer.

Chapter 3: Spring

8. By April the days are getting longer and the snow begins to melt.
9. It is not until June that the temperatures rise above freezing.
10. When the snow and ice melts the tundra turns into a vast network of shallow lakes and swamps.
11. Permafrost is a frozen layer of soil beneath the tundra that never thaws out.
12. Water can not get past the permafrost so it collects on the surface forming many lakes.
13. The permafrost prevents trees from having the deep roots that they need.

Chapter 4: Summer

14. The growing season for plants on the tundra is about six weeks.
15. The plants of the tundra have adapted by being about to germinate, flower and set seed all in the space of the limited growing season.
16. The summer growth allows animals like the Musk Ox to gain weight easily and it encourages animals such as the Lemming to multiply rapidly, thereby providing more food for predators such as the Snowy Owl.

17. The Caribou migrate north each year to spend the summer on the tundra.
18. The water birds migrate to the tundra; sometimes over distances of thousands of kilometres.
19. During summer the tundra is home to billions of mosquitoes and other blood-sucking insects.
20. Insect eating birds have timed the hatching of their young to the moment when there are the most insects available.
21. The Golden Plover travels 8000 miles (5000 km) from Argentina each year to nest on the tundra.
22. The Ground Squirrel puts on fat during the summer months in order to survive the winter.
23. The Ground Squirrel is the only tundra animal that hibernates during winter.

Chapter 5: Autumn

24. By August summer on the tundra is rapidly drawing to an end.
 25. The Caribou migrate south to the coniferous forests for the winter.
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