YUNGA LEARNING AND ACTION SERIES

SUPPORTED BY Sida

Forests Challenge Badge

CBD :: FAO :: THE GREEN WAVE :: UNESCO
WAGGGS :: WOSM :: WWF

This booklet is intended as a guide for teachers and youth leaders. These individuals are responsible for the development of programmes and activities which are suitable for their group and provide the required supervision and safety precautions to ensure all participants are safe and sound.

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21 March International Day of Forests

YOUTH AND UNITED NATIONS GLOBAL ALLIANCE (YUNGA)

Forests Challenge Badge

Developed in collaboration with

Convention on Biological Diversity

FAO FIAT PANIS

The Green Wave

UNESCO
United Nations Educational, Scientific and Cultural Organization

SCOUTS
Creating a Better World

WWF

The World Association of Girl Guides and Girls Scouts (WAGGGS) and the World Organization of the Scout Movement (WOSM) endorse this educational badge framework for use by Guides and Scouts around the world, adapting it as necessary to their local needs and requirements.

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS | 2013

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WELCOME

“Our planet’s forests are the lungs that clean the air we breathe, the homes of countless species of plants and animals, the source of inspiration and livelihood for millions of people.

Forests offer an amazing assortment of benefits for humans and animals. For humans, forests are a source of livelihood, food, medicinal herbs; forests give us wood that can be used for shelter, furniture and fuel; and they are places of recreation. They also play a huge role in maintaining the planet’s environmental health.

Forests help to prevent soil erosion, improve water quality, provide habitats for millions of animal and plant species, and offer protection against floods. In coastal areas, mangrove forests can greatly reduce damage caused by hurricanes and tsunamis. Globally, forests make a valuable contribution to climate change mitigation, in their role as carbon sinks.

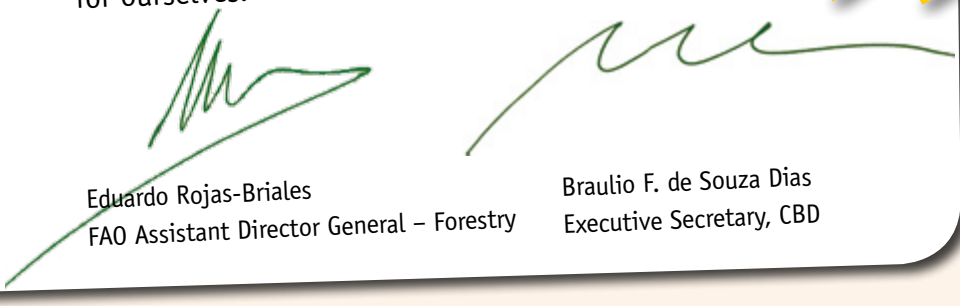
Unfortunately, forests are under threat in many parts of the world, and are being degraded or destroyed at alarming rates. This is due to many reasons, ranging from profit-seeking by large companies to individual actions driven by poverty. Climate change is expected to worsen these threats and to change ecosystem dynamics within forests.

There is a lot you can do to help forests! Nobel laureate Wangari Maathai famously said:

> "when we plant trees, we plant the seeds of peace and the seeds of hope"

If, in planting trees, we sow peace and hope, just imagine what we can achieve if young people from around the world take part in this one simple act!

Read on to find out about activities that can help you to better understand the many roles of forests. Every step made to help forests counts! Let's act to ensure a future for our forests and for ourselves.



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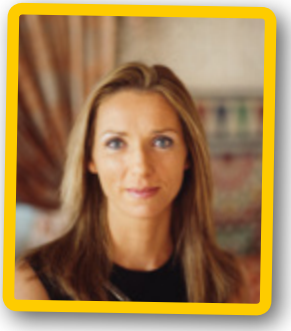


Valentina Vezzali

Fanny Lu

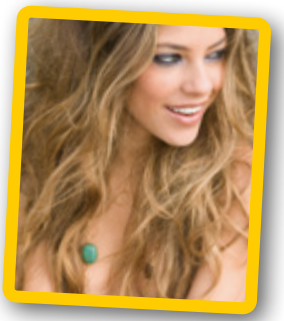
Nadeah

Carl Lewis

Noa (Achinoam Nini)

Forests are key to sustaining life on Earth. Did you know that forests cover just over 30 percent of our planet's land area? However, forests are also at risk of being over-used by humans, and many of them are being cut down so that their wood can be used by people and the cleared land can be used for agriculture. We need to protect our forests!

Anggun



Debi Nova

Lea Salonga

Percance

TAKE this booklet and EXPLORE, PLAY and DISCOVER – and while you're having fun, maybe you can even come up with some clever ways to help preserve the Earth's forests. We hope you're fascinated by the different types of forests in our world and that you feel inspired to take action to save and protect them. After all: YOUR actions and ideas to protect our forests today will help the world thrive and grow tomorrow!

BE SAFE AND SOUND!

DEAR LEADER OR TEACHER,

The challenge badges are designed to support you in undertaking educational activities. However, as you will be implementing these activities in different contexts and environments, it is up to you to ensure that the activities you choose are appropriate and safe.

LOOK AFTER YOURSELF

* Wash your hands after every activity.
* Don't look directly at the Sun.
* Don't pick and eat any plants because some poisonous plants look very similar to non-poisonous ones.
* Don't drink water from natural sources unless you are sure it is safe.
* Be particularly careful when you're near deep water or fire. Make sure there is an adult with you at all times.
* Be careful when using sharp objects and electrical appliances. Young children should be supervised by an adult at all times.
* In some activities, you have the option of uploading pictures or videos to websites such as YouTube. Always make sure that everyone in the pictures or video, and/or their parents, have given their permission before you post anything online.

Exploring the great outdoors is a fantastic way to learn about the natural world; nevertheless, it is important to take some precautions to ensure nobody gets hurt. Please plan carefully and make sure you have enough adult support to keep participants safe, especially when near water. Please consider the general precautions in the boxes below and carefully evaluate which other safety issues need to be taken into consideration before undertaking any activity.

LOOK AFTER THE NATURAL WORLD

* Treat nature with respect.
* It is better to leave nature as you found it. Never pick protected species. Before collecting plants or picking flowers, get permission. Only take what you really need and make sure you leave at least one third of anything you find in the wild.
* Don't collect living creatures; draw a picture instead.
* Only build campfires in places where it is specifically allowed (e.g. in campfire pits at campsites, never in the wild).
* Be careful if you are working with animals. Wear protection if necessary. Be gentle. Make sure they have appropriate food, water, shelter and air. When you're done, return them to where you found them.
* Recycle or reuse the materials used in the activities as much as possible.

THE CHALLENGE BADGE SERIES

Developed in collaboration with United Nations agencies, civil society and other organizations, the YUNGA challenge badges are intended to raise awareness, educate and motivate young people to change their behaviour and be active agents of change in their local communities. The challenge badge series can be used by teachers in school classes, youth leaders and especially Guide or Scout groups.

To see existing badges go to www.yunga-un.org. To receive updates on new releases and other YUNGA news, register for the free YUNGA newsletter by emailing yunga@fao.org.

YUNGA has or is currently developing badges on the following topics:

AGRICULTURE: How can we grow food in a sustainable way?

BIODIVERSITY: Let's make sure no more of the world's glorious animals and plants disappear!

CLIMATE CHANGE: Join the fight against climate change and for a food secure future!

ENERGY: The world needs a healthy environment as well as electricity – how can we have both?

FORESTS: Forests provide homes for millions of plant and animal species, help regulate the atmosphere and provide us with essential resources. How can we ensure they have a sustainable future?

GOVERNANCE: Discover how decision-making can affect your rights and equality between people around the world.

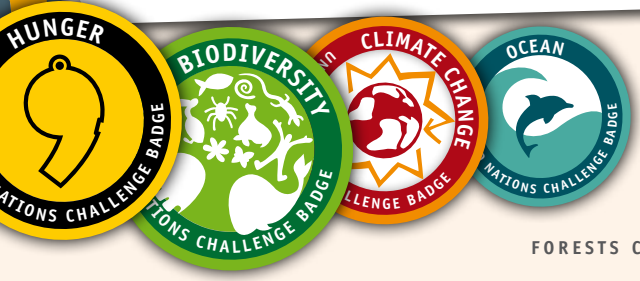
HUNGER: Having enough to eat is a basic human right. What can we do to help the one billion people who still go hungry every day?

NUTRITION: What is a healthy diet and how can we make food choices which are environmentally friendly?

THE OCEAN: The ocean is mesmerizing and amazing. It helps regulate temperatures on Earth, provides us with resources and much, much more.

SOILS: Without good soil, nothing grows. How can we take care of the ground under our feet?

WATER: Water is life. What can we do to safeguard this precious resource?



CREATING BEHAVIOUR CHANGE

We work with young people because we want to support them in leading fulfilling lives, help them prepare for their futures, and for them to believe that they can make a difference in the world. The best way to make this difference is by encouraging young people to embrace long-term behaviour change. Many current social and environmental problems are caused by unhealthy or unsustainable human behaviour. Most people need to adapt their behaviour, and not just for the duration of a project such as working on this badge, but for life. Young people know more about these issues than ever before, but still behave in detrimental ways. It is clear that simply raising awareness is not enough to change behaviour.

So what can you do?

There are some proven ways of promoting behaviour change, so to increase the long-term impact of this challenge badge, try to do the following:

FOCUS ON SPECIFIC, ACHIEVABLE BEHAVIOURAL CHANGE Prioritize activities which target very clear and specific behaviour change (e.g. 'buy toilet paper made from recycled materials' rather than giving generalized advice like 'protect forests').

ENCOURAGE ACTION PLANNING AND EMPOWERMENT Put young people in charge: let them choose their own activities and plan how to carry them out.

CHALLENGE CURRENT BEHAVIOUR AND TACKLE BARRIERS TO ACTION Encourage participants to scrutinize their current behaviour and think about how it could be changed. Everyone has excuses for why they don't behave in a particular way; lack of time, lack of money, not knowing what to do... the list goes on. Encourage young people to voice these excuses and then find ways around them.

PRACTISE ACTION SKILLS You'd like to take public transport more often? Collect and practise reading timetables, plot out routes on a map, take a walk to the bus stop, find out what the fare is, do a trial journey. You'd like to eat more healthily? Try lots of healthy foods to see which you like, experiment with recipes, learn how to read food labels, create meal planners, visit the shops to find healthy foods on their shelves. Keep practising until it becomes a habit.

SPEND TIME OUTDOORS No one is going to look after something they don't care about. Time spent in natural environments – whether that is the local park or a pristine wilderness – encourages an emotional connection with the natural world which is proven to lead to more pro-environmental behaviour.

GET FAMILIES AND COMMUNITIES INVOLVED Why change the behaviour of just one young person when you could change the behaviour of their entire family, or even the whole community? Spread your message more widely, encourage young people to pester their family or friends to join in and showcase what you have been doing for the local community. For an even bigger impact, get political and lobby your local or national government.

MAKE A PUBLIC COMMITMENT People are far more likely to do something if they agree to do it in front of witnesses or in a written statement – why not take advantage of this?

MONITOR CHANGE AND CELEBRATE SUCCESS Behaviour change is hard work! Revisit tasks regularly to monitor achievement and reward continued success in an appropriate way.

LEAD BY EXAMPLE The young people you work with look up to you. They respect you, care about what you think and want to make you proud. If you want them to embrace the behaviour you are advocating, then you must lead by example and make those changes yourself.

TIPS ON UNDERTAKING THE BADGE WITH YOUR GROUP

In addition to the suggestions on pages 12-13 encouraging behavioural change, the following ideas are intended to help you develop a programme to undertake the challenge badge with your group.

STEP 1 INVESTIGATE

Encourage your group to learn about forests. We recommend that you begin by introducing forests through an active learning experience in a forest (such as Activity A.1. Forest Hike). You can also show a fun and informative video to introduce forest issues, e.g. ***Of Forests and Men***: **www.unep.org/flvPlayer/share/default.asp?id=1307**

From there, participants can pursue their learning in many different places! Visit your local botanic gardens, neighbourhood library, or natural history museum; invite a scientist to talk with your group, do some research online or explore the great outdoors. Resources like the Youth Guide to Forests, ***The Green Wave*** Web site (**greenwave.cbd.int**) and others listed at the end of this booklet are great places to look.

Then, discuss with the group how our individual choices and actions can help make a positive difference.

STEP 2 SELECT

Apart from the compulsory activities, which ensure that participants understand basic concepts and issues related to forests, participants are encouraged to select the activities that best match their needs, interests and culture. As far as possible, let the participants choose which activities they want to do. Some activities can be done individually, others in small groups. If you can think of other activities that are especially appropriate for your group or area, you may also include them as additional options.

STEP 3 ACT

Allow enough time for the group to carry out the activities. Some activities, such as playing a game of charades showcasing different forest jobs or making a forest collage, can be completed in an hour or less, while others, like observing forest life in different seasons, require some work over the course of several weeks or months. It's helpful to first decide how you want to complete the badge (e.g. during weekly meetings or in a camp setting) and then select appropriate activities to carry out. Support and guide your group throughout the process while ensuring they carry out their tasks as independently as possible. Many activities can be conducted in different ways. Encourage participants to think and act creatively when undertaking their activities.

STEP 4 DISCUSS

Have participants present the results of their challenge badge activities to the rest of the group. Do you notice any changes in their attitudes and behaviour? Encourage participants to think about how objects and activities in their daily lives both depend upon and affect forests. Discuss the experience and reflect on how they can continue to apply it in their lives.

STEP 5 CELEBRATE

Organize a celebration for those who successfully complete the badge curriculum. Invite families, friends, teachers, journalists and community leaders to participate in the celebration. Encourage your group to present the results of their project to the community in a creative way. Award them with certificates and challenge badges (see page 134 for details).

STEP 6 SHARE WITH YUNGA!

Send us your stories, photos, drawings, ideas and suggestions. We are always delighted to hear how you have been using these challenge badges and we always want to improve our resources, so contact us at:
yunga@fao.org

BADGE STRUCTURE AND CURRICULUM

The Forests Challenge Badge is designed to help educate children and young people about the vital role that forests play in sustaining life on Earth. This booklet will help you develop an appropriate, enjoyable and engaging educational programme for your class or group.

This booklet includes basic **background information** on relevant educational topics, aiming to help teachers and youth leaders to prepare their sessions and group activities without having to search for the information. Contents include: the importance of forest ecosystems, forests in use, forests at risk and the cultural, economic and social value of forests to people around the world. Naturally, not all the materials provided will be required or appropriate for all age groups and activities. Leaders and teachers should therefore select the topics and level of detail most appropriate for their group.

The second part of the booklet contains the **badge curriculum**, a range of activities and ideas to help young people gain the knowledge, skills and values needed to protect, preserve and enhance forests and sustain the benefits they provide to people and the planet. A checklist to help participants keep track of the activities they have completed is provided at the end of the curriculum.

Additional resources, useful Web sites and a glossary explaining key terms (which are highlighted in the text like **this**) are provided at the end of the booklet.

Badge structure

For ease of use and to ensure that all the main topics are addressed, both the background information (pp.26-91) and the activities (pp.92-131) are divided into five main sections:

A. **FOREST LIFE**: introduces basic facts about forests and forest life, giving a detailed overview of different types of forests.

B. **FORESTS IN USE:** takes a closer look at the wealth of services and resources that forests provide.

C. **FORESTS AND CULTURE:** explores the cultural significance of forests around the world, and the role forests play in recreation.

D. **FORESTS AT RISK:** discusses the ways in which natural and human processes can harm forests, harming life on Earth as a result.

E. **TAKE ACTION:** suggests ideas to motivate and help your group or class undertake forest-related initiatives within your local communities.

Requirements: To earn the badge, participants must complete one of the two compulsory activities presented at the beginning of each section, plus (at least) one additional activity from each section, chosen individually or as a group (see graphic on p.18). Participants can also complete additional activities considered appropriate by the teacher or leader.

Section A: FOREST LIFE

1 compulsory activity (A.1 or A.2) & at least 1 optional activity (A.3 - A.27)

+

Section B: FORESTS IN USE

1 compulsory activity (B.1 or B.2) & at least 1 optional activity (B.3 - B.17)

+

Section C: FORESTS AND CULTURE

1 compulsory activity (C.1 or C.2) & at least 1 optional activity (C.3 - C.20)

+

Section D: FORESTS AT RISK

1 compulsory activity (D.1 or D.2) & at least 1 optional activity (D.3 - D.15)

+

Section E: TAKE ACTION

1 compulsory activity (E.1 or E.2) & at least 1 optional activity (E.3 - E.15)

=

Forests Challenge Badge
COMPLETED!

REMEMBER!

The key objectives of the challenge badge are to educate, inspire, stimulate interest about forests and motivate individuals to change their behaviour and create local and international action. However, most of all, the activities should be fun! Participants should enjoy the process of earning the badge and learning about forests.

This badge offers many different activities to appeal to young people around the world, living near different types of forests and with different degrees of access to resources and technologies. Not all activities will be possible in all parts of the world: it's hard to explore the frozen, wintry world of forests when you live in the tropics, or to post a podcast online when you don't have a high-speed internet connection. Be sure to choose activities that are relevant and can be carried out in your area.

Age ranges of activities

To help you and your group select the most appropriate activities, a coding system is provided to indicate the age group(s) for which each activity is most suitable. Next to each activity, a code (for example 'Levels 1 and 2') indicates that the activity should be suitable for five to ten year olds and for eleven to fifteen year olds.

LEVEL

1 Five to Ten years old

2 Eleven to Fifteen years old

3 Sixteen plus years old

However, please note that this coding is only indicative. You may find that an activity listed at one level is suitable for another age group in your particular circumstances. As teachers and youth leaders you should use your judgement and experience to develop an appropriate curriculum for your group or class. This could incorporate additional activities not listed in this booklet but which allow you to achieve all the educational requirements.

SAMPLE BADGE CURRICULA

The sample curricula for the different age groups below provide examples of how the badge could be earned. They are intended to help you to develop your own programme. For example, the Forests Challenge Badge could be completed at a camp – or over the course of several, separate meetings or classroom sessions that include a field trip.

LEVEL

1 **Five to Ten years old**

2 **Eleven to Fifteen years old**

3 **Sixteen plus years old**

Each activity has a specific learning aim, but in addition to this, children will also have the opportunity to learn more general skills including:

* TEAMWORK
* IMAGINATION AND CREATIVITY
* OBSERVATION SKILLS
* CULTURAL AND ENVIRONMENTAL AWARENESS
* NUMERICAL AND LITERACY SKILLS

SECTION	ACTIVITY	LEARNING OBJECTIVE
A Forest life	**A.1: Take a Hike** (p.93)	To explore living and non-living things in forests using different senses.
	A.10: A Forest For All Seasons (p.95)	To observe how a local forest changes during different seasons.
B Forests in Use	**B.1: Lively Woods** (p.103)	To investigate how a forest in your area is important for people's livelihoods.
	B.5: Climbing Trees (p.104)	To learn about jobs in which people need to climb trees, and to find out how to climb trees safely.
C Forests and Culture	**C.1: Indigenous Inhabitants** (p.111)	To perform a role-play about the cultural importance of forests in your country.
	C.8: Literary Inspiration (p.113)	To read literary works about forests and to describe forests creatively.
D Forests at Risk	**D.1: Forests Under Threat** (p.119)	To understand some of the factors that threaten forests.
	D.4: Aliens! (p.120)	To find out what kinds of invasive species live in forests in your area.
E Take action	**E.1: Forest Fête** (p.125)	To carry out a fun event to celebrate forests.
	E.4: Funds for Forests (p.126)	To organize a fundraiser for an organization that protects forests.

LEVEL

1 Five to Ten years old

2 Eleven to Fifteen years old

3 Sixteen plus years old

As in Level 1, each activity in Level 2 has a specific learning aim, but also fosters additional, more general skills including:

* **TEAMWORK AND INDEPENDENT STUDY SKILLS**
* **IMAGINATION AND CREATIVITY**
* **OBSERVATION SKILLS**
* **CULTURAL AND ENVIRONMENTAL AWARENESS**
* **RESEARCH SKILLS**
* **PRESENTATION AND PUBLIC SPEAKING SKILLS**
* **THE ABILITY TO PRESENT AN ARGUMENT AND DEBATE**

SECTION	ACTIVITY	LEARNING OBJECTIVE
A Forest life	**A.2: Biome Homes** (p.93)	To learn about different forest biomes in your area or country.
	A.17: Soil Analysis (p.98)	To observe different layers of soil in a local forest.
B Forests in Use	**B.1: Lively Woods** (p.103)	To investigate how a forest in your area is important for people's livelihoods.
	B.9: Ecotourism (p.106)	To learn about the social and environmental impacts of ecotourism.
C Forests and Culture	**C.1: Indigenous Inhabitants** (p.111)	To perform a role-play about the cultural importance of forests in your country.
	C.12: Sacred Forests (p.115)	To appreciate the cultural and religious value of forests.
D Forests at Risk	**D.1: Forests Under Threat** (p.119)	To understand some of the factors that threaten forests.
	D.9: Deforestation and Degradation (p.122)	To find out about deforestation and forest degradation.
E Take action	**E.2: Plant a Tree** (p.125)	To organize a tree planting event and to motivate others to plant trees, too.
	E.11: Contact Decision Makers (p.129)	To advocate for a specific forest policy to address a forest issue in your area.

LEVEL

1 Five to Ten years old

2 Eleven to Fifteen years old

3 Sixteen plus years old

General skills a Level 3 curriculum seeks to develop include:

* **TEAMWORK AND INDEPENDENT STUDY**
* **IMAGINATION AND CREATIVITY**
* **OBSERVATION SKILLS**
* **CULTURAL AND ENVIRONMENTAL AWARENESS**
* **TECHNICAL SKILLS AND THE ABILITY TO RESEARCH COMPLEX ISSUES**
* **PRESENTATION AND PUBLIC SPEAKING SKILLS**
* **THE ABILITY TO PRESENT AN ARGUMENT AND DEBATE**

SECTION	ACTIVITY	LEARNING OBJECTIVE
A Forest life	**A.2: Biome Homes** (p.93)	To learn about different forest biomes in your area or country.
	A.26: Mighty Mangroves (p.101)	To discover how mangrove forests protect coastal areas.
B Forests in Use	**B.2: Alternative Livelihoods** (p.103)	To explore how people rely on forests for their livelihoods and well-being.
	B.10: Energetic Trees (p.107)	To stimulate creative thinking about making energy from resources found in forests.
C Forests and Culture	**C.2: Forests and Fires** (p.111)	To safely build an outdoor campfire and to roast food over it.
	C.18: News Report (p.117)	To create a news report about an indigenous person and the challenges they face in local forests.
D Forests at Risk	**D.2: Losing Biodiversity** (p.119)	To discover which forest animals face extinction.
	D.13: Forests in Flames (p.123)	To understand the impacts of forest fires on forest ecosystems.
E Take action	**E.2: Plant a Tree** (p.125)	To organize a tree planting event and to motivate others to plant trees, too.
	E.10: Forest Volunteer (p.128)	To support forest conservation by volunteering for a local organization.

FOREST LIFE

WHAT IS A FOREST?

It's not easy to define a forest in a few words. Forests are much more than just a whole lot of trees growing over a large area! They are complex **ecosystems** that are constantly changing and are full of life. They provide homes for millions of people, animals, insects, trees, **fungi**, and microscopic soil **organisms**, where they all live and grow. (These 'homes' are scientifically known as **habitats**: many different **habitats** make up larger **ecosystems**.)

SOO-YEONG CHOY, Aged 10, REPUBLIC OF KOREA

DID YOU KNOW?

300 million people and 80 percent of the world's land-based biodiversity live in forests.

Source: WWF

By providing **habitats** and food for millions of plants and animals, forests help to maintain **biodiversity** on Earth. They also provide us with useful materials such as wood for building or for fuel. They help to keep our water sources clean and safe to drink and their strong roots prevent soils from **eroding** and being washed away, which also makes us less vulnerable to environmental hazards like flooding. Forests also help to keep the air clean. Forests store **carbon dioxide**, which helps to slow the rate of **climate change**. They provide jobs which help people and their families lead better lives, and they provide places for people to play and relax. You try summing all of that up in a definition of a few words!

Nevertheless, it is important to establish a shared definition to give people around the world a common starting point for action. The Food and Agriculture Organization of the United Nations (FAO) provides a definition of forests that is used internationally, stating that a forest must have the following three characteristics:

- Land area – minimum 0.5 hectares
- Tree height – minimum 5 metres
- Crown cover – at least 10 percent

In other words, according to the FAO, a forest must:

- Be at least as big as an American football field;
- Have trees as tall as (or taller) than an adult giraffe;
- Have enough branches, leaves and vines in the treetops to hide at least one tenth of the sky.

DID YOU KNOW?

More than half of the world's forests (by area) are found in just five countries (the Russian Federation, Brazil, Canada, the United States of America and China).

WHAT IS A TREE?

> *I think that I shall never see*
> *A poem as lovely as a tree.*
>
> Joyce Kilmer

Since the very definition of a forest is based on the presence of trees, let's find out how trees themselves are defined. The most basic definition of a tree is a plant with a long stem that supports branches that have leaves or needles. Digging deeper, we see that, like many plants, trees begin as **seeds**. If the tree seed receives enough food, water, and sunlight, it will sprout into a **seedling** that will grow into a **sapling** (a young tree) and eventually grow into a tree that will produce its own seeds.

The diagram opposite helps to explain the life cycle and the different parts of a tree.

All trees have **roots**, which grow downwards into the soil and serve some very important functions: they anchor the tree firmly in the ground so that it can stand upright; and they also absorb water, minerals and **nutrients** from the soil, which nourish the whole tree.

Many people extend the definition of a 'forest' to include urban parks, orchards, **agro-forestry systems** and other agricultural tree crops.

BARKING BAD HUMOUR

Q: What did the tree wear to the pool party?
A: Swimming trunks!

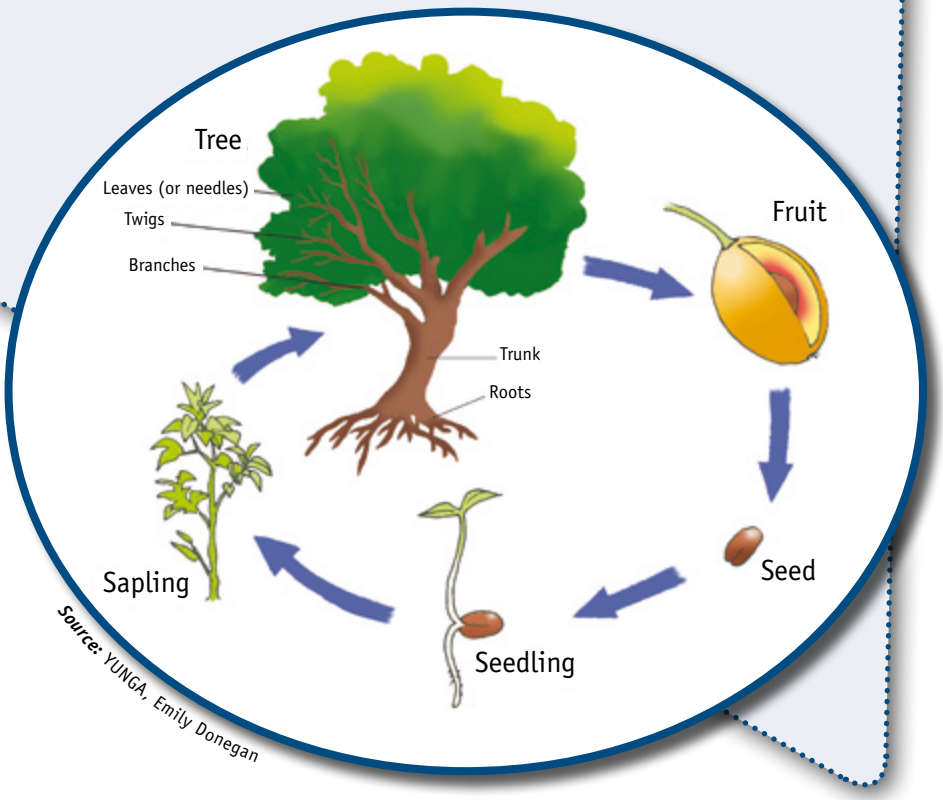
Q: What did the tree do when the bank closed?
A: It started a new branch!

Source: www.ducksters.com/jokesforkids/tree.php

Then there's the tree **trunk**. The trunk supports the branches and transports water and **nutrients** from the soil to the rest of the tree. The trunk is covered with a tough, protective layer called **bark**.

Trees also have **branches** and **twigs**. Branches grow out of the trunk. Little twigs grow at the tips of branches. Twigs transport water and minerals from the trunk and branches to the leaves or needles.

A tree's **leaves** or **needles** also perform an important job. They are arranged on the twigs so that they receive maximum sunlight, with which they produce food for the whole tree. This process is known as **photosynthesis**, and we'll learn more about it later.



Source: YUNGA, Emily Donegan

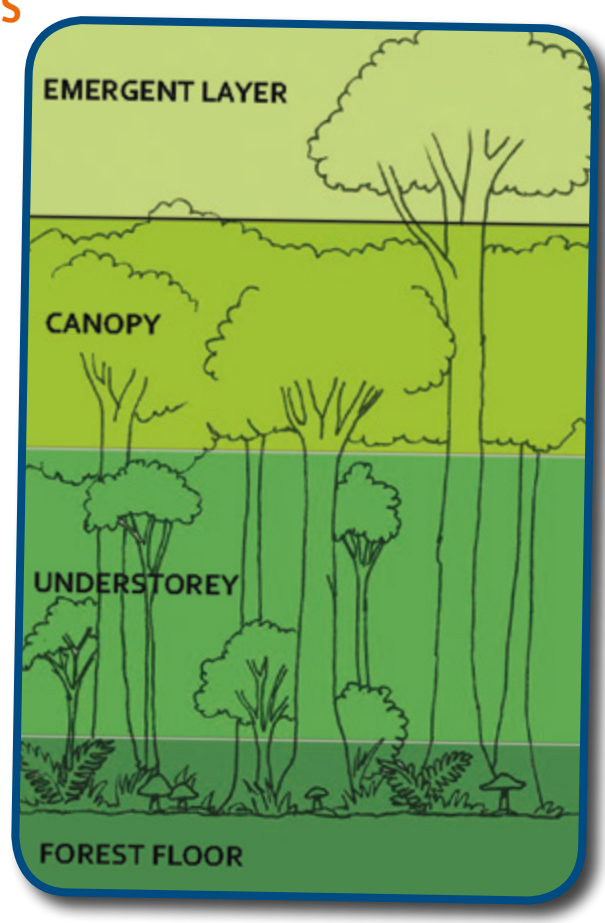
Unfortunately, our world's forests are disappearing at an alarming rate. According to FAO, between the years 2000 and 2010, the world lost 5.2 million hectares of forest per year. That's an area about the size of Costa Rica! Today, the world's total forest area is just over four billion hectares, which is 31 percent of the total land area. Fortunately, the rate of forest loss is slowing down, but there are still many challenges threatening our forests. There are also many things we can do to help save them, which we'll learn about in this challenge badge.

FOREST LAYERS

Many forests have different layers of plant growth. The main layers are:

The forest floor

If you get the chance to explore a forest, take a moment to tear your eyes away from all the interesting sights to study the ground for a bit. Often, **forest floors** are covered with decaying leaves, twigs, fallen trees, animal waste, moss and other organic (natural) materials. This seemingly unexciting area of the forest is



Source: YUNGA, Emily Donegan

actually incredibly important. This is where recycling takes place: **fungi**, insects, bacteria, and earthworms busily break down waste materials to create new soil and **nutrients** for the plants. The **forest floor** is often covered by a carpet of ferns, grasses, mushrooms and tree seedlings.

DID YOU KNOW?

Around two thirds of all land-based species live in forests, or depend on them for their survival.

The understorey

Moving one level up, the next layer to examine is called the **understorey**. This is made up of bushes, shrubs and young trees that have adapted to living in the shade of the **canopy**.

The canopy

Looking even further up, you can see the forest **canopy**. The **canopy** is like a roof made of the intertwined branches, twigs, and leaves of the forest's taller trees. It forms a shady, protective cover for the rest of the forest.

The emergent layer

The **emergent layer** consists of the tallest trees that stick out even above the **canopy** (they 'emerge' from it).

OON BING SHEN, Aged 16, MALAYSIA

TYPES OF FORESTS

One way to classify forests is by the impact of human activities on forests, which divides them into three categories:

Primary forests

Primary forests make up 36 percent of the world's forests. These are forests that have not been changed by human activity, and only **native** tree **species** grow in them. **Primary forests**, particularly wet tropical forests, have the greatest variety of plant and animal **species**.

Planted forests

These are forests in which trees were planted by humans. They are an increasingly important source of different forest products, including wood for timber, fuel wood, and **non-wood forest products** such as fibre. Planted forests (also called '**forest plantations**') are important because, by providing these wood and **non-wood forest products**, they help to reduce **deforestation** in **natural forests**. Planted forests are also often created for environmental purposes such as soil **conservation**. The area of **forest plantations** in the world is increasing, and this trend is expected to continue. Currently, planted forests make up seven percent of the world's forests.

Natural forests

Natural forests are composed of **native** trees that are not classified as **forest plantations**. For example, in addition to their **native** tree **species**, these forests may include non-native **species** introduced by humans. Occasional logging is another example of human activity that affects such forests. **Natural forests** make up 57 percent of the world's forests.

There are different types of **natural forests** across the world, varying according to factors such as **climate** (temperature and rainfall) and location. Find out about the different types on pages 36-41!

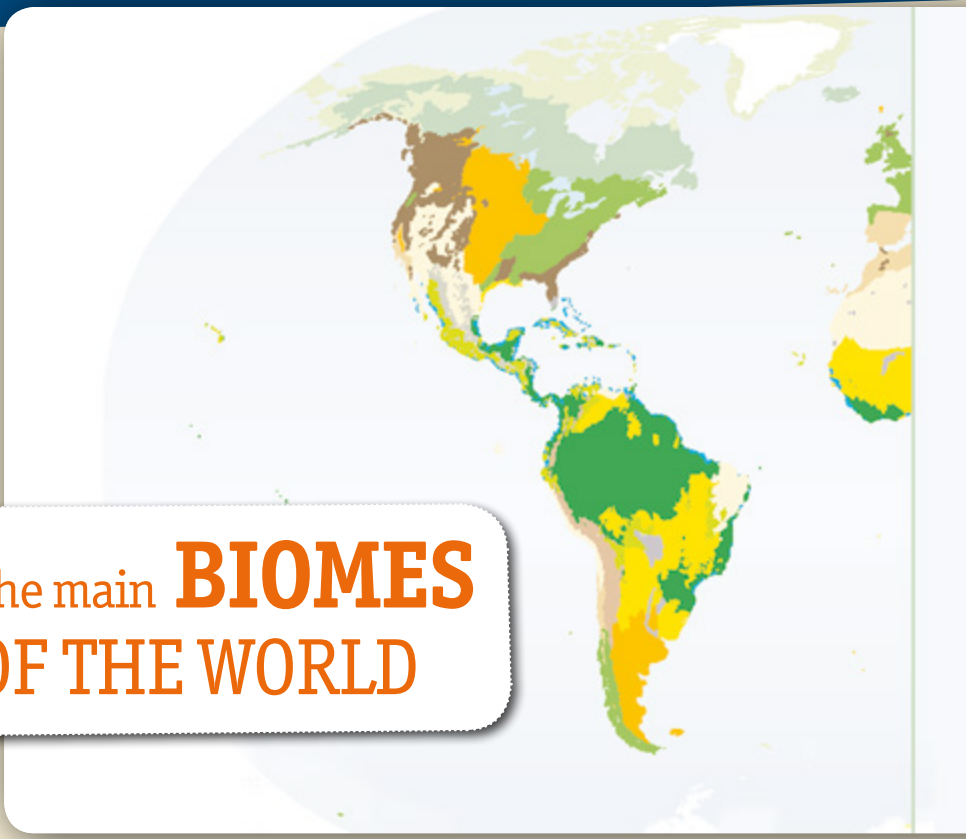
LAI YUNG WONG, Aged 13, HONG KONG, CHINA

DO YOU KNOW THE DIFFERENCE BETWEEN CLIMATE AND WEATHER ?

* **Weather** is fixed to a specific place and takes place within a fairly short time. For example, one day might be overcast and drizzly, another day could be sunny with fluffy clouds.
* **Climate** is what we call the average or typical **weather** conditions for a particular area. This 'area' could be a single city (e.g. some regions have a dry, hot **climate** while others may be cool and rainy...) or the whole planet (e.g. we can calculate average global temperatures, or the average amount of rainfall globally).

Remember: *Climate helps you decide which clothes you need generally for where you live. Looking out of the window and seeing the weather helps you decide which of those clothes to wear each day!*

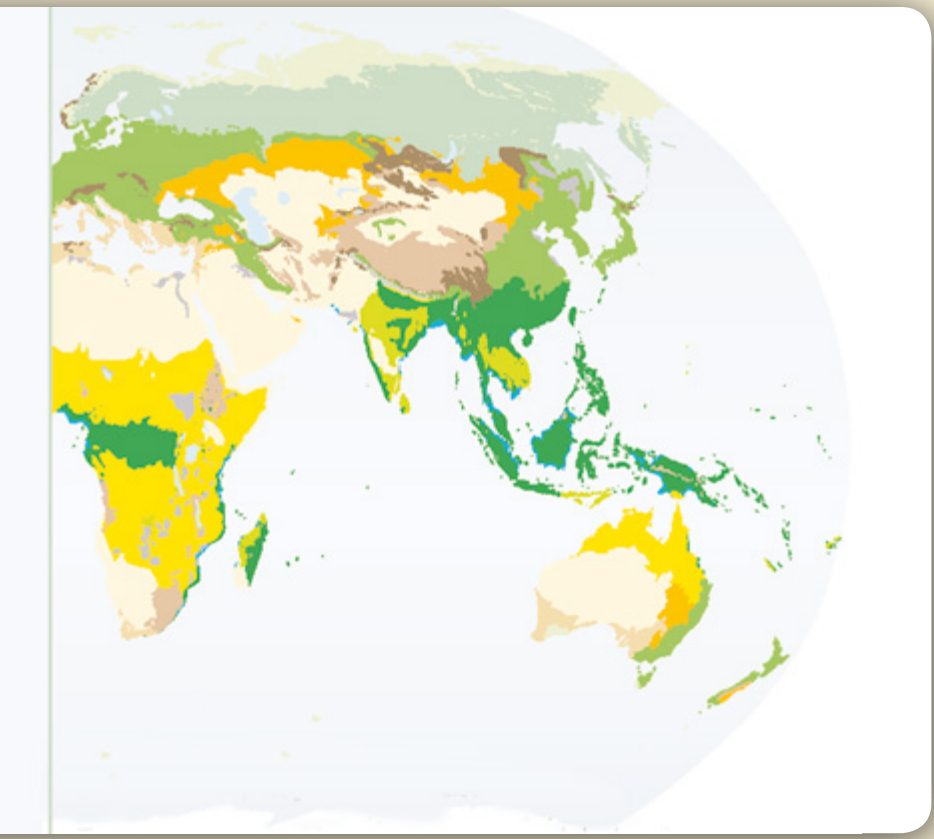
Forest types also vary according to the **biome** that they are part of (see pp.34-35). **Biomes** vary due to the different **climate** and **weather** conditions in the regions where they are found.



The main **BIOMES** OF THE WORLD

Whether natural or planted, forests have one thing in common: trees! In fact, a forest's trees — along with the other plants and animal **species** that live and grow in it — are what define the forest type or "**biome**". A **biome** is an area that can be classified according to the plants and animals that live in it. For example, a rainforest is a **biome**. Other examples of **biomes** include deserts, grasslands and coral reefs.

This map shows different **biomes** on Earth, and where they are located.



Source: MA 2005. Map designed by Emmanuelle Bournay, Paris.

- Tropical and sub-tropical moist broadleaf forest
- Tropical and sub-tropical dry broadleaf forest
- Tropical and sub-tropical coniferous forest
- Temperate broadleaf and mixed forest
- Temperate coniferous forest
- Boreal forest / Taiga
- Tundra
- Mediterranean forest, woodland and scrub
- Tropical and sub-tropical grassland, savannah and shrubland
- Temperate grassland, savannah and shrubland
- Montane grassland and shrubland
- Flooded grassland and savannah
- Mangrove
- Desert and xeric shrubland
- Rock and ice

Let's take a closer look at the different kinds of forests that exist and where they grow.

TROPICAL DRY FORESTS

Tropical dry forests and woodlands occur in tropical regions with very distinct dry seasons. These forests are found in eastern and southern Africa, India, parts of South America and parts of China, where woodlands stretch over large areas. The **vegetation** is relatively open and is typically made up of **deciduous** trees, which are trees that seasonally lose their leaves. Here the trees tend to grow up to 20 metres tall and there is a grass **understorey** (the **vegetation** that grows beneath the **canopy**). Because of frequent fires and tree cutting, many of these woodlands have turned into areas called savannahs, where grass and shrubs dominate. In Africa in particular, woodlands and savannahs are major **habitats** for wildlife and also provide local people with valuable products and services, such as fuel wood, honey, timber, **bushmeat**, medicines and grazing ground for cattle. Animals including giraffes, monkeys and white rhinos are known to roam tropical dry forests.

SUB-TROPICAL DRY FORESTS

Sub-tropical dry forest is the natural **vegetation** of the Mediterranean **climate** type (mild humid winters, dry summers), found in various regions around the world. The typical tree **species** have small, leathery leaves all year round (making them **evergreen**, the opposite of **deciduous**). The **vegetation** ranges from tall, open forest to sparse woodland and shrubs. A large proportion of the historical Mediterranean forest has been cleared and is now dominated by shrubs, whereas many Australian eucalyptus forests have been turned into **forest plantations**. The Cape Region of South Africa is home to particularly rich plant life, including many **endemic species**. Important forest products of commercial value include timber, cork, honey and olives. The giant otter, jaguar, and giant armadillo are some of the animals that hang out here.

DID YOU KNOW?

The Amazon rainforest is the largest rainforest in the world, stretching over 800 million hectares and spanning nine countries. The Amazon basin is home to the world's richest diversity of birds, fresh water fish and butterflies, and it is estimated that one quarter of all land-based species can be found here. It is, for example, the habitat of rare species such as jaguars, harpy eagles and pink river dolphins. Find out more about tropical rainforests on p.38.

TROPICAL RAINFORESTS

Tropical rainforests are mainly found where the **climate** is hot and humid throughout the year (i.e. in the **tropics**). For example, there are major tropical rainforests in the Amazon Basin of South America and the Congo Basin of Central Africa. Tropical rainforests are the world's most diverse land-based **ecosystem**. Many rare and **endangered** plant and animal **species** live in rainforests (**endangered** means they are under threat of becoming **extinct**), as well as a lot of **endemic species** (**species** that are **native** to one place and can't be found anywhere else). At the moment, around 1.75 million **species** of plants, animals and **fungi** are known to science. However, it is estimated that there could be up to 100 million **species**, and most of the **species** scientists haven't discovered yet are expected to live in tropical rainforests.

Rainforest **vegetation** is rich, with tall, closely set trees that often form a thick, continuous **canopy** above the rest of the forest, often up to 50 to 60 metres high. Some '**emergent**' trees also stick out above the **canopy**. Tropical rainforests contain many **natural resources** such as timber, fruits, nuts, medical plants, rubber, and the palm stems known as rattan, which are used to make furniture and handicrafts. Such forests are also home to a large number of **indigenous peoples** (also known as native peoples, first nations peoples and aboriginal peoples).

TEMPERATE BROADLEAVED DECIDUOUS FORESTS

Temperate broadleaved **deciduous** forest is the natural **vegetation** of eastern North America, Western Europe, Eastern Asia and parts of Patagonia. This forest is associated with a humid **climate** and includes tree **species** such as oak, beech, birch, hickory, walnut, maple, elm and ash. These forests vary in structure and composition according to local **climate**, soils, altitude and frequency of fires. Many of these **hardwood** **species** are highly valued for their wood qualities and uses, and most remaining forests are intensively managed. Typical animals found here include foxes, deer and boars, as well as large birds of prey like red-tailed hawks. These animals have special adaptations suited for seasonal life. For example, deer store up fat in spring and summer, which they burn during the colder months when less food is available.

MOUNTAIN FORESTS

Mountains and highlands often look entirely different than other forest areas, with different plants and animals from surrounding lowland **vegetation**. The high mountains in the **tropics** (e.g. the Andes and Himalayas) have a range of forest types depending on their altitude (height) and exposure to the **climate**. Their upper limit is typically about 3 000 metres. In dry regions, such as the Middle East, **natural forests** are often only found in the mountains. Overall, mountain forests sustain a great diversity of **habitats** and are essential for **watershed** protection and soil **conservation**. Black bears, mountain goats, and porcupines are just a few of the four-footed creatures you might meet here.

MANGROVE FORESTS

Mangrove forests are a common sight on the banks of tropical and subtropical coastlines. Some of the largest areas of mangroves are found in Indonesia, Brazil and the Sundarbans of India and Bangladesh. Mangroves are highly productive **ecosystems** and are important for the reproduction, nursery and feeding of many marine fish and shellfish. Mangroves keep the water clean and clear by filtering out pollutants (even heavy metals such as iron and nickel). Mangroves also help prevent **erosion** and protect the coast by acting as a barrier between the land and the sea, especially during large storms, hurricanes and **tsunamis**. Apart from many **species** of fish, many foods ranging from honey and edible algae to fruits and leaves for animal feed come from mangrove forests, as do a wide variety of traditional medicines. In addition to these contributions to diet and health, mangrove fisheries provide employment for up to half a million people. Sadly these important forests are fragile, and it is estimated that over half of the world's mangroves have been cleared in recent times for agriculture, salt ponds or **aquaculture**.

BOREAL BUGS

Canada's **boreal** forest buzzes with 32 000 different **species** of insects. While this might sound like a nightmare to you, these insects play a critical role as pollinators, decomposers, and as a part of the **food web**. Many nesting birds rely on them for food.

BOREAL CONIFEROUS FORESTS

Boreal **coniferous** forests are found mainly in the northern parts of the world, where the **climate** is cold ('boreal' actually means 'North' in Greek, and a lot of scientific names come from Greek or Latin). It is the world's largest **terrestrial ecosystem** and covers parts of Alaska, Canada, Scandinavia, Russia, Kazakhstan, Mongolia and Japan. These forests are the world's major source of commercial **softwood**. Here the forest **canopy** cover is often low, and an **understorey** of shrubs, mosses or lichens is common. The Siberian **boreal** forest is the Earth's largest continuous forest. In these forests, **biodiversity** is low but that which does exist is usually not found anywhere else. Large wetlands are another characteristic of **boreal** forests; these water-rich areas carry out many important functions. For example, they are a breeding habitat for many **species** of waterfowl and shorebirds, and they store and filter important soil **nutrients**. A large range of animals, including reindeer, moose, and brown bears lives in the **boreal** forest.

CELEBRI-TREES!

Some trees are famous and have a special significance in different cultures and traditions. Here are just a few examples.

ABDUL RAHIM, Aged 10, NIGERIA

EVERGREEN CONIFERS

These trees most commonly star as Christmas trees in the global north. Their cultural significance actually predates Christmas, however. **Evergreen** trees have traditionally been seen as symbols of eternal life, because they don't shed their needles or leaves, and various pagan cultures worshipped these trees for that reason. **Evergreen** **conifers** are also valued for their wood and timber, and many have medicinal uses as well.

GINKGO
(Ginkgo biloba)

No tree is quite like the gingko (also known as ***Gingko biloba***). This is a unique tree **species**, often called a 'living fossil' because it has no close living relatives, but seems only to be similar to **species** known from fossils. Gingko has been grown for a long time in China, where some gingko trees are believed to be more than 1 500 years old. It is also a popular symbol in Japanese art. Gingko trees are also important in Buddhism and were often planted at temples. Gingko has been an important ingredient in many traditional medicines in China and Japan for a long time, but has become increasingly popular in other countries, too. One unfortunate fact about the gingko is that its fruit can be pretty smelly; in fact, in some places it is known as the 'vomit' tree!

SEQUOIA

(Sequoia sempervirens)

Sequoias are the tallest trees on Earth and amongst the oldest. The largest are as tall as an average 26 storey building, and their diameters at the base of their trunks are often greater than the width of many city streets. According to National Geographic, "they are so old because they have survived all the threats that could have killed them. They're too strong to be knocked over by wind. Their heartwood and **bark** are infused with tannic acids and other chemicals that protect against types of rot. Wood-boring beetles hardly faze them. Their thick bark is flame resistant… Lightning hurts the big adults but usually doesn't kill them. So they grow older and bigger across the millennia." Sequoia are also some of the most valuable timber **species**.

NEEM

(Azadirachta indica)

The neem tree grows in India, Pakistan, and other southeast countries. It is known as the 'village pharmacy' because of its many medicinal uses including pain relief, treating diseases such as malaria and chicken pox, reducing fever or inflammation, and treating foot **fungi**. It is also used in a range of beauty products. Even its twigs get used – as toothbrushes! The neem also plays an important role in certain religious celebrations.

OAK

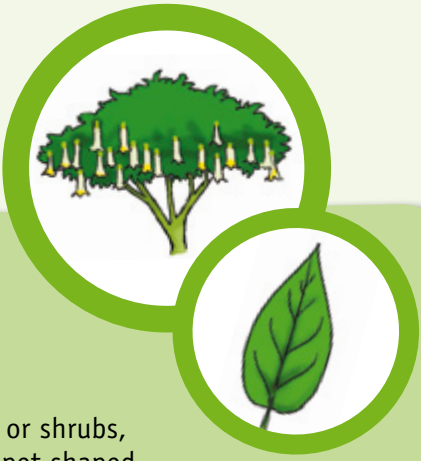
(Quercus species)

The oak is very common in the northern hemisphere. Its familiarity there may explain why it has such a special place in these cultures. It is a common symbol of strength and endurance and is the national tree of many countries, including Bulgaria, England, Estonia, France, Germany, Latvia, Lithuania, Moldova, Poland, Romania, Serbia, the United States, and Wales. It has also been adopted as the symbol for many political parties. The oak has quite a literary history in the northern hemisphere, too. It pops up everywhere from the Bible to Greek and Norse mythology.

POMEGRANATE TREE

(Punica protopunica)

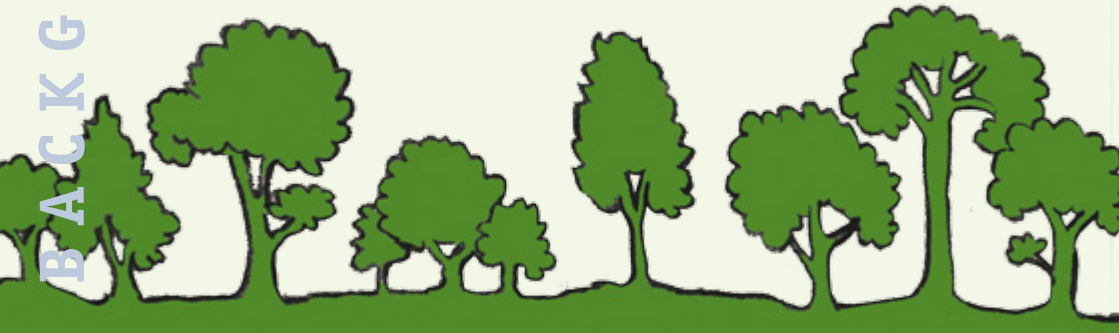
Have you ever tried a pomegranate? This delicious fruit has been grown for millennia, in warm, dry **climates** ranging from the Mediterranean to South Asia. The pomegranate has more to offer than just a great flavour, though. Its juice, seeds, and even its rind have been widely used in traditional medicines, particularly the Indian Ayurvedic system of medicine, to cure ailments such as diarrhoea, and to strengthen the heart. Pomegranates have even made an appearance in some holy books including the Bible and Koran, for their incredible healing properties.



TRUMPET TREE

(Brugmansia)

Brugmansia grow as small trees or shrubs, and they bloom with large, trumpet shaped flowers. **Native** to South America, they have by now been introduced to most parts of the world. At night they release a beautiful smell, in order to attract moths for pollination. The trumpet tree plays a role in modern and traditional medicine. It is used to treat aches and pains, dermatitis, arthritis, rheumatism, headaches, infections, and as an anti-inflammatory. Parts of the trumpet tree are also used for a number of rituals in South American cultures. In Asian cultures, it is used to help people sleep better. However, this plant can also be poisonous and cause hallucinations, and should not be consumed without professional guidance.



ANA TREE

(Faidherbia Albida)

A favourite snack for elephants, giraffes, baboons, impala, and many other creatures, the ana tree is **native** to Africa and the Middle East, where it is one of the fastest-growing trees. It is even considered to be 'the tree of life and fertility' in some cultures. Around the world, it is used to help raise bees and livestock, to build canoes, to treat diarrhoea, and to make soap. It also plays an important part in **agro-forestry** systems (where agriculture and forestry are combined) in sub-Saharan Africa. Farmers have reported increases in crop yields for maize, sorghum, millet, cotton and groundnut plants that were grown close to ana trees. In fact, yield increases ranging from six percent to more than 100 percent have been reported. Ana trees also help to improve the water quality and **nutrients** in the soil.

WONDROUS **CREATURES** of the forest

Our world's forests are teeming with animal life, and it's not easy to put an exact number on how many animals live within their leafy borders. Four-legged or flying, furry or feathered, here are a few favourites.

AISHATH AREEN ILYAAS, Aged 16, MALDIVES

BOWERBIRD

To impress the ladies, a male bowerbird must be an expert architect, construction worker and artist. Male bowerbirds search the forests of their **native** Australia and New Guinea in search of brightly coloured objects, sticks and other building materials. With this material, the males build and decorate a structure called a 'bower'. The more beautiful the bower, the more likely it is that the male will attract a female. There are about 20 different **species** of bowerbirds; each **species** prefers different colours and objects (like flowers, leaves, stones, berries, feathers, or even human-made objects like coins, plastic or bits of glass) for its bower.

DUCKBILL PLATYPUS

If you ever come across a creature with an otter's body, a beaver's tail, a huge snout that looks like a duck's bill, webbed feet, and a **reptile**'s crawl, don't worry you're not hallucinating: you've just met the shy duckbill platypus! The platypus lives in the **deciduous** forests of Australia, and it is semi-aquatic, meaning it spends a good deal of its life in the water. Male platypuses have a pointy, poisonous spur on each leg which they use to fight back when threatened. Platypuses belong to a family of animals called monotremes, which are the only mammals that lay eggs. Most monotremes are **extinct** today; the only survivors are the platypus and the spiny anteater.

SLOTH

Sloths live in the jungles of Central and South America. There are both three-toed and two-toed sloths, but both kinds spend most of their time hanging out in the treetops (literally!). The sloth is the world's slowest mammal, so they make the rest of us look super-efficient. The next time your parents tell you to hurry up and finish your chores, remind them that things could be worse: the sloth sleeps around 15 to 20 hours per day, and usually moves no more than 38 metres in a day. In appreciation of these laidback mammals, make sure you slow down on October 20th each year – it's International Sloth Day!

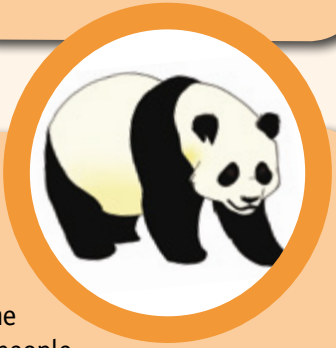
DIGEST THIS SLOWLY

Sloths do just about everything in slow-mo. Digesting one meal of leaves, twigs or fruit can take a whole month.

Source: Rainforest Alliance

ORANGUTAN

Who doesn't love orangutans? With their famous orange-ish hair and soulful expressions, orangutans are one of the world's most 'charismatic **species**', i.e. **species** that are widely popular (think of them as animal movie stars). The celebrity status of charismatic **species** can be helpful toward achieving **conservation** goals. Orangutans, for their part, have drawn a lot of attention to protecting the rainforests of Indonesia where they live. But their environmental work goes even beyond that: they eat more than 500 plant **species** and then spread the seeds around the forest, including large seeds that are not dispersed by smaller animals. This seed dispersal is important for the rainforest's health and stability, and orangutans are known as the 'gardeners' of the forest (***Source:*** IUCN).

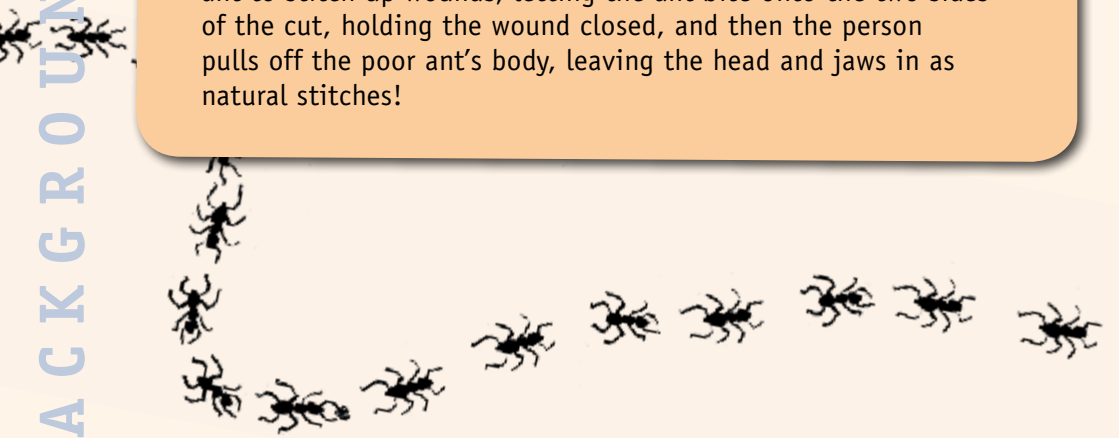


GIANT PANDA

You've probably seen many photos of pandas – or perhaps you've even met one in real life. Pandas are viewed by many people as another 'charismatic **species**' who need protection, as they are considered to be **endangered**. For this reason they have become an iconic **species** in many international **conservation** efforts. Giant pandas live in broadleaf and **coniferous** forests with a dense **understorey** of bamboo, at elevations between 1 500 and 3 000 metres. They once lived in lowland areas, but farming, forest clearing, and other developments have now forced giant pandas to move to the mountains (***Source:*** Smithsonian Institute).

ANTS

Ants are one of the most important animals in the forest. Did you know that ants 'invented' agriculture, 50 million years before us humans? Leaf-cutter ants cut up pieces of leaves and bring them back to their nest in order to grow a fungus which the ants like to eat. Some ants herd other insects such as aphids for a sweet substance they produce, called honeydew. It's a lot like how we farm cows for their milk! When you see an ant, remember that it is most probably female, and there is never just one. There can be up to a million depending on the size of the ant's family, called her colony. The ant in the drawing above is an army ant, you can see her huge jaws. Some cultures use this ant to stitch up wounds, letting the ant bite onto the two sides of the cut, holding the wound closed, and then the person pulls off the poor ant's body, leaving the head and jaws in as natural stitches!



FLYING SNAKE

If you're hiking through the jungle in South or Southeast Asia, don't forget to look up: you may just see a flying snake! Well, a flying snake can't technically fly because it doesn't gain altitude (i.e. it can't rise higher than where it started). But it can glide gracefully through the air, like it is one long wing. Here's how. First, the snake slithers to end of a branch, and dangles in a 'J' shape. Next, it uses its lower body to push itself off the branch, then simultaneously contorts its body into an S shape and flattens its body into a concave C shape that can trap air. The snake can make turns by making special body movements (imagine a snake break dancing and doing 'the worm')! The flying ability of these snakes is so impressive, the U.S. military is studying them closely.

PAEDOPHRYNE AMANUENSIS

(aka the world's smallest vertebrate)

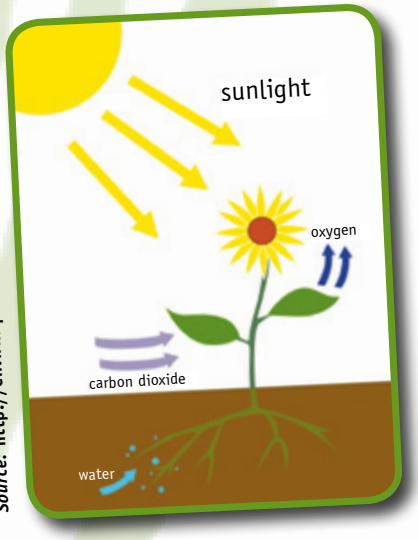
A **vertebrate** is an animal that has a backbone. For example, zebras, crocodiles, and you as a human being are all **vertebrates**, whereas snails, starfish and earthworms are not. The world's tiniest **vertebrate** is a frog that measures an average of 7.7 millimetres long. In other words, it's about the size of housefly. A resident of the rainforests of New Guinea, it is a champion jumper: in fact, it can jump 30 times longer than its body size, according to National Geographic. But ***Pedophryne amanuensis*** should enjoy its no.1 spot on the list while it can – scientists discover new **species** all the time and it's possible that an even smaller **vertebrate** is still out there.

FORESTS IN USE

Forests are one of the Earth's greatest treasures — rich **habitats** teeming with animal and plant **species**, herbs, **fungi** and **microorganisms**. Forests do not just provide a home to all these living beings, though. They also provide us with food, wood, medicine, **fresh water** and clean air, and millions of the world's poorest people rely on forests for their incomes. Imagine if the house you live in didn't just provide shelter, but also provided you and your family with clean air, water, food, medicine, and a job! Whoever invents that house wins a Nobel Prize for sure.

In the meantime though, we do have forests. Let's take a closer look at how they provide so many services.

FOREST SERVICES



Source: http://en.wikipedia.org/wiki/File:Photosynthesis.gif

Leafy lungs: photosynthesis

Forests help us with the most basic function of all: breathing. To survive, we need **oxygen** to breathe, which trees actually produce in a process called **photosynthesis**. Here's how it works: trees (and other green plants) absorb **carbon dioxide** from the air, along with energy from sunlight and water from the soil, in order to make their food.

DID YOU KNOW?

More than 40 percent of the world's oxygen is produced by rainforests. Global forests also absorb about 15 percent of the planet's greenhouse gas emissions.

Source: World Bank

Photosynthesis breaks down the **carbon dioxide** **molecule** (CO_2) into its carbon and oxygen **atoms** ('C' and two 'O's). Trees use the carbon for themselves, but release the **oxygen** back into the air. All this might not sound like a feast to you, but we can thank our lucky stars that trees are so low maintenance! Through **photosynthesis**, trees don't only reduce **carbon dioxide** in the atmosphere and produce **oxygen**: many types of trees also absorb pollutants from the air, acting like giant air filters that purify the air we breathe. Thank you trees!

LUISA LUK, Aged 16, HONG KONG, CHINA

Temperature control

Trees are natural air conditioners! They cool down the air around them through **transpiration**, harnessing the Sun's energy to make the water in their leaves **evaporate** (find out more on p.58). Also, the shade they give cools the surrounding air and ground, which ultimately helps cool the Earth's temperature overall (***Source:*** **www.ecokids.ca**).

DID YOU KNOW?

The amount of carbon stored in forests actually exceeds the amount of carbon currently in the atmosphere.

Source: IUCN

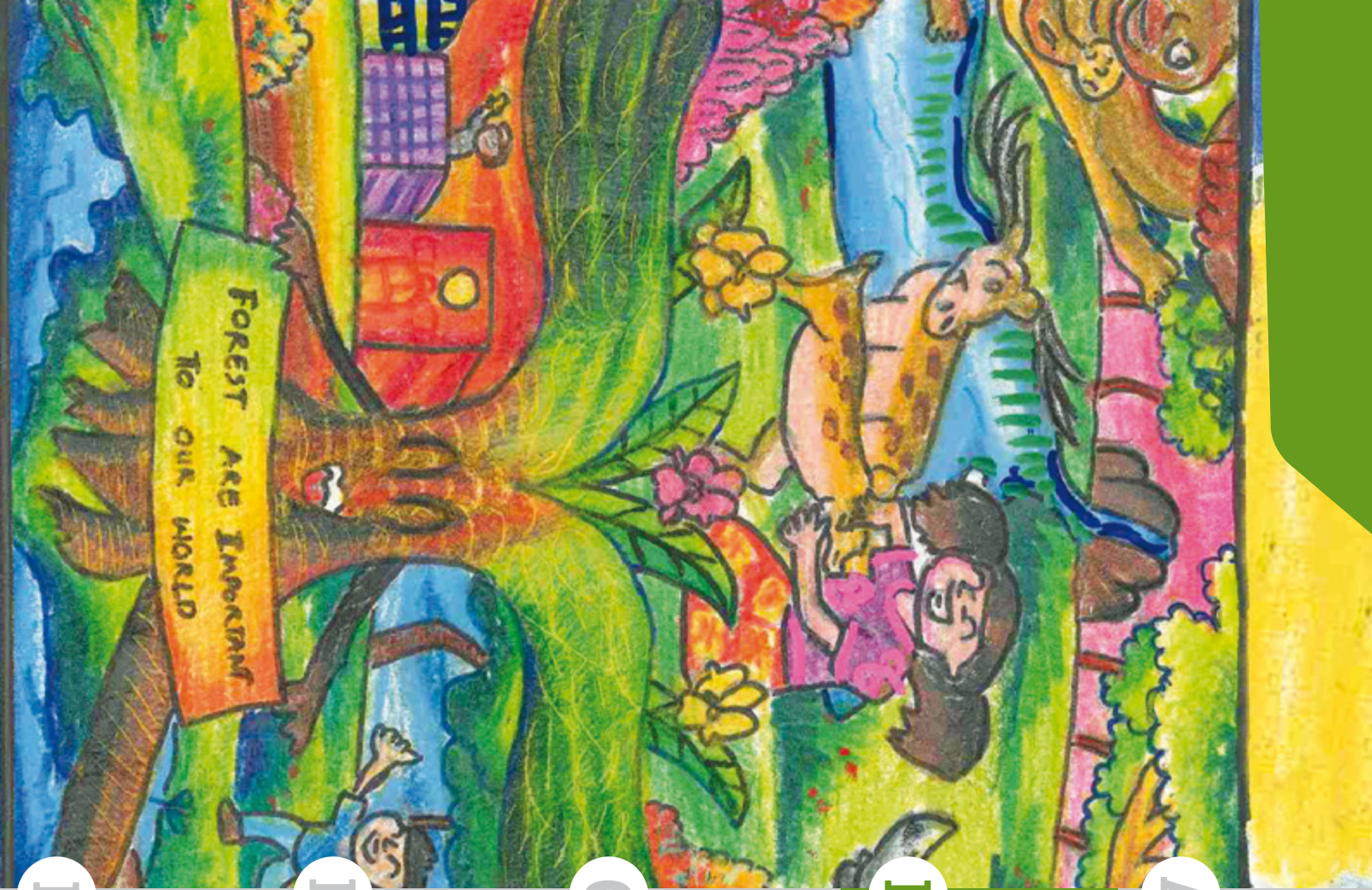
Forests also influence the wider **climate** because they absorb **carbon dioxide**. This is really important because **carbon dioxide** is a **greenhouse gas**, and **greenhouse gases** speed up **climate change**. So trees and forests play an important part in slowing **climate change** by acting as '**carbon sinks**': when they use and store **carbon dioxide**, **carbon dioxide** levels in the atmosphere sink.

Water management

Like all living creatures, trees need water to survive. But trees and forests go a step further: they do a lot to maintain and improve water quality for all the rest of us living beings, too. For one thing, they help keep water clean. Trees have amazing root networks which often cover a larger area underground than the tree that you can see above ground. These complex networks filter harmful substances out of the water in the ground, including a number of pollutants such as metals and pesticides.

Trees also help to prevent **waterlogging**. **Waterlogging** happens when the soil becomes saturated with water (i.e. it has absorbed so much water that it can't absorb any more). This makes it difficult for plants to breathe, and can be very damaging to farming practices. Trees help by capturing rainfall in their **canopy**, which reduces the amount of rain that reaches the ground. Also, by 'drinking' water from the soil through their roots, trees reduce the water levels in the soil.

Next page: IDITHA ANGGRAINI, Aged 8, INDONESIA


FOREST ARE IMPORTANT
TO OUR WORLD

DID YOU KNOW?

A healthy, 30 metre tall tree can take more than 40 000 litres of water from the soil in a single growing season!

Source: **www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5269813.pdf**

Trees don't just guzzle all the water up and keep it for themselves, though. Through **transpiration**, they release water back into the **atmosphere** as water vapour. The water then combines with water vapour from other sources in the **atmosphere** and eventually falls back to the Earth as '**precipitation**': in the form of rain, snow, hail or sleet depending on conditions in the **atmosphere** (e.g. how cold it is). As mentioned above, this helps keep global temperatures cooler.

Source: YUNGA, Emily Donegan

Transpiration in action:

For all these reasons, trees play a key role in protecting our **watersheds**, the important land areas that catch **precipitation** and feed it into larger bodies of water like streams, lakes or even the ocean.

DID YOU KNOW?

The Amazon creates 50 to 80 percent of its own rainfall through transpiration.

Source: **www.mongabay.com**

ROSHNI K.R. RAMESH BABU, Aged 7, INDIA

Soil protection

As we learned above, trees capture rainfall in their leaves and thus regulate the amount of water that reaches the ground. Moreover, tree roots store water and also help to protect the soil and hold it together. All of this helps to prevent soil **erosion** when soil is carried away (e.g. washed away by rain or blown away by wind). The forest's ground cover is also crucial in preventing **erosion**, thanks to the smaller plants growing on the **forest floor** and its layer of natural 'litter' (including fallen leaves and twigs).

Lastly, forests help keep the soil moist and fertile, so that it can continue to support **vegetation**. When forests are removed and when land is over-used, **desertification** can set in. This means that the soil dries up and is no longer fertile enough to support plant growth. In such cases, poor rural people who depend on this land may be forced to leave their homes to avoid going hungry.

FORESTS AND LIVELIHOODS

In addition to catering to our most basic needs like clean air to breathe and clean water to drink, forests also provide us with important **natural resources** such as food, fuel, and medicine. Moreover, around 14 million people worldwide make their living from forests and are formally employed in the forestry sector (***Source:*** FAO).

The forestry sector refers to all activities providing jobs and incomes that mainly depend on **goods and services** from forests. For example, the production of paper and wooden furniture are activities within the forestry sector because they rely on the production of wood fibre. Around 1.6 billion people rely on **goods and services** from forests for their incomes. This includes about 350 million of the world's poorest people, including 60 million **indigenous people**, who rely entirely on forests for their **livelihoods** and survival. Let's take a closer look at some different ways in which forests are helping people to earn a living.

WOODY WAGES: One familiar forest resource is timber. We call wood that is used to make something else 'timber'. Timber is used to create all sorts of products, such as building materials for homes and furniture. In many parts of the world, paper is also made from trees. Broadly speaking, forest products that are derived from wood are referred to as **wood forest products**.

Unfortunately, the use of wood for timber and paper has its downsides. Logging for wood products is responsible for about one-third of total global **deforestation**, and paper makes up 25 percent of landfill waste... While it is a good thing that forests help so many people earn an income, it is crucial that these resources are used in a **sustainable** way. These days, many organizations are working to ensure this, which we will learn more about in Section E.

NON-WOOD FOREST PRODUCTS: Wood is not the only forest product that people **harvest** and sell – far from it. Many other everyday things you use also come from forests. Chocolate, a general favourite, comes from rainforests, as do coffee and bananas. Nuts, mushrooms, honey, spices, oils, rubber, bamboo, and many medicines are all examples of **non-wood forest products** (NWFPs). **Non-wood forest products** have an important impact on the global economy, and also in supporting **indigenous communities**. According to WWF, about 150 different **non-wood forest product** types have a high value not only in international trade, but also for their role in helping economies grow and in protecting **biodiversity**. **Non-wood forest products** support communities through the incomes that they bring, and they can provide income alternatives that do much less damage to the environment than timber production. In 2005, non-wood products taken from forests were valued at around US$18.5 billion, with food products accounting for the biggest share.

IMBRAHIM SHUA'IBU, Aged 17, NIGERIA

WOOD YOU KNOW THE DIFFERENCE?

You've probably heard about **hardwood** and **softwood**. If you assumed that the difference between the two is based on the hardness of the wood, you're not alone. Many people think that. But it isn't the case: the difference is actually based on the type of seed that the tree produces!

Some trees are scientifically known as 'gymnosperm trees', which means their seeds do not have a covering ('gymnos' means naked in Greek!). These are **softwood** trees. Examples of **softood**-producing trees are pine, spruce, cedar, fir, larch, Douglas fir, hemlock, cypress, redwood and yew. **Softwood** trees are found in northern areas of the Earth and their wood tends to be light, both in colour and weight. This type of wood is often used for furniture or building cabins.

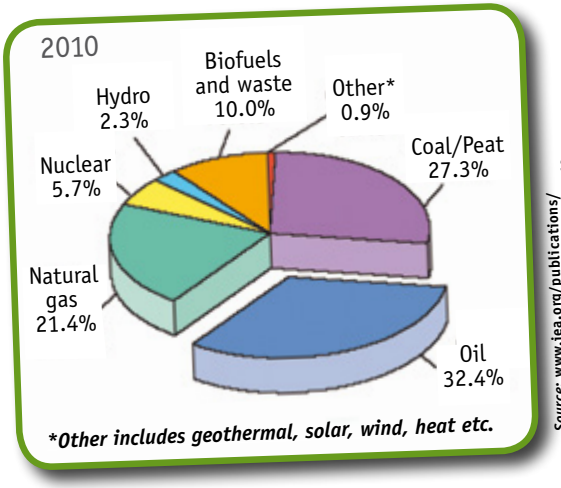
Hardwood trees are formally known as 'angiosperm trees' which means their seeds have some sort of covering ('angio' means 'vessel' or 'container' in Greek). **Hardwood** trees are found all over the world and some examples of **hardwood** trees include mahogany, teak, walnut, oak, ash, elm, aspen, poplar, birch, and maple. **Hardwoods** are used for construction, furniture, flooring, and containers, among other things. This type of wood tends to be heavy and dark.

Another big difference between the two is that **softwood** grows much faster than **hardwood**, so it is more easily replaced. This is why many environmentalists believe that it is better to use **softwood** trees for furniture and other commercial uses. **Hardwood**, which grows very slowly in comparison, is harder (haha!) to replace, and thus a less environmentally-friendly option than **softwood**.

Tree drawing: ARYAN SHARMA, Aged 10, INDIA

KA KI YUNG, Aged 17, HONG KONG, CHINA

FOREST FUELS: Another important forest resource is **biomass**. **Biomass** is an important energy source that is made from plant and animal matter (e.g. wood or animal droppings). Earlier, we learned that plants absorb energy from sunlight during **photosynthesis**. This energy gets stored in the plant and is released as heat when it is burned. Wood is a commonly used **biomass** fuel around the world. It is a simple fuel option for people in poor countries where access to electricity or other energy services is scarce. In fact, according to the World Health Organization, around 2.4 billion people (around one in three people, that is) around the world use **biomass** fuels for cooking and heating. The figure shows the percentage of different fuel types used globally for our energy needs. Biofuels make up ten percent of global fuel use.



Source: www.iea.org/publications/freepublications/publication/kwes.pdf

METHODS IN SILVICULTURE

Silviculture is the process of looking after, **harvesting** and regenerating a forest. Without the right kind of **silviculture**, it is impossible to manage forests **sustainably**. Forest **regeneration** involves replacing tree cover by planting young trees, generally soon after the previous forest area has been removed. Different methods are used to manage and **regenerate** forests – here are some examples:

* **Selection cut (group/single)** – In this technique, individual or small groups of trees are selectively removed. Usually lesser quality trees are cut to give more space to the larger and more commercially valuable trees. When remaining trees grow large enough, they may be **harvested**.
* **Clearcutting** – In this method, all trees in a certain area are removed in one go. It results a large open area, similar to the effect of a forest fire. In many countries, the use of clearcutting is restricted by laws because it can damage the forest considerably.

FOREST FEASTS: Forests also provide food for millions of people, especially those living in poor countries. Around 80 percent of the people living in **developing countries** depend on **non-wood forest products** for their health and **nutritional** needs. These include fruit, herbs, nuts, seeds, tubers, leaves, and stems, as well as animal products such as birds, their eggs, wild game, and fish. Although forest foods do not usually provide a complete diet, they do make up an important part of people's food supply, and increase the nutritional quality of rural diets. They are also crucial as emergency food supplies during periods of **drought**, **famine** or conflict (***Source:*** FAO).

Forests and trees also help to maintain the environmental conditions needed for agricultural production. They stabilize soil **nutrient** levels, prevent **erosion**, enhance the land's capacity to store water, and moderate air and soil temperatures (***Source:*** FAO).

* **Seed-tree** – This method cuts down trees, keeping the remaining ones widely spaced to allow them to spread their seeds uniformly across the **harvested** area. These trees are kept until the new trees have grown, at which point they may, in turn, be removed.
* **Shelterwood** – This cut is designed to remove all old trees over a period of several years. Tree reproduction is encouraged, and some initial protection and shade to the sensitive new seedlings are provided by the older trees.
* **Coppicing** – This **regeneration** method only works with **hardwoods**. Most of these trees, like oak, hazel, ash, willow and lime, do not die when they are cut down. The stump of the tree (the base that is left rooted into the ground after the trunk is cut) is still alive and will send up new shoots. These shoots turn into branches which then replace the trunk that was cut down with several smaller trunks.

FATHMATH LAMYA ATHIF, Aged 7, MALDIVES

PHARMACEUTICAL PLANTS: Forests literally (and we mean literally!) ***grow*** medicine! From insect repellents to painkillers, forest life offers many kinds of health benefits, which humans have been using for thousands of years. Many new medicines are still awaiting discovery, to treat illnesses such as AIDS, cancer, diabetes, arthritis and Alzheimer's. The world's forests still hold many secrets and untold treasures, let's hope some of these are new cures!

A lot of the knowledge about these natural cures is held by **indigenous communities** living in forests, who use these medicines regularly to treat illness, injuries, and to maintain good health. This is just one reason why it is so important to respect **indigenous cultures** and do whatever we can to protect the areas in which they live.

Rights to access

When we talk about all the amazing resources that forests provide, it is impossible to ignore the question: who has the **right to access** all these benefits? This is where issues such as **bioprospecting** and **biopiracy** arise.

VICENTE TIU TANGCUECO, Aged 16, SINGAPORE

DID YOU KNOW?

- More than a quarter of modern medicines, worth an estimated US$ 108 billion a year, originate from tropical forest plants*.
- More than 70 000 plant **species** are used as medicine around the world.
- In China alone, 5 000 plant **species** are used as drugs in traditional Chinese medicine.
- The National Cancer Institute estimates that more than two-thirds of all cancer-fighting drugs come from rainforest plants.

* *Source:* IUCN

Bioprospecting refers to the process of finding and making money out of newly discovered products that come from natural sources, like forests. Most **bioprospecting** takes place in **developing countries** and often relies on the knowledge of **indigenous people** because they widely use medicines and herbs that grow in remote places, of which the rest of the world is not yet aware. When companies learn that these forest products can be of immense commercial value, they often patent that knowledge as their own, which means they legally claim the knowledge or product to be exclusively theirs. Companies use these patents to earn a profit, and may not give any credit (and money) to the **indigenous community** who originally discovered the beneficial uses of the forest products. That's hardly fair! This exploitation of indigenous knowledge, without providing the tribe with any credit or compensation, is known as **biopiracy**.

These days, governance and the **sustainable** management of forest resources are recognized to be important issues, and the international community is working on ways to make sure **indigenous communities** are not exploited. Forest law is its own field now, with people specializing in creating laws relating to forest use. This is not always easy to put into practice, and we still have a long way to go, but according to International Union for the Conservation of Nature (IUCN) there have been important improvements in recent years, as local communities are given official tenure rights for their forest resources.

FORESTS AND CULTURE

FUN AND PHILOSOPHY IN FORESTS

For centuries, forests have influenced our imaginations, and therefore our collective points of view and cultures. From ancient prophets and leaders seeking spiritual sanctuaries, to philosophers seeking wisdom and inner peace, to modern day campers, explorers, and adventurers — forests are a favourite setting for all types of cultural, spiritual, and recreational activities.

Fascinated by forests, people have used them as the settings for magical stories and tales of adventure for millennia. In stories, it is usually in the forest where one comes across enchanted castles with imprisoned princesses, wicked ogres with strange powers, and dwarves who ask riddles. Poets speak expressively about the beauty of forests and their hidden mysteries. Hermits and yogis seek refuge deep within their shade. Some people worship at the roots of ancient trees, and others dance around them in celebration of festivities. Forests have always played an important role in the lives of those fortunate enough to live near them.

Forests and recreation

Forests aren't just about magic and mystery; people also make use of forests for all sorts of fun activities. In fact, outdoor activities form the basis of a multi-billion dollar industry. One of the main attractions, of course, is the amazing wildlife found within them. Lovers of animals, birds, and insects venture into forests to see and hear these creatures first hand. Others enjoy activities such

as camping or hiking along trails. Today, **ecotourism** is becoming increasingly important in many parts of the world. It is a kind of tourism that not only provides fun, recreational activities but also promotes nature **conservation**, benefits local communities, gives people a chance to explore nature while learning, and introduces people to local cultures.

If you live near a forest there are many ways that you can take advantage of this great resource. You can go for a hike, a jog, or a leisurely walk. You can prepare a delicious picnic and have a feast under a roof of leaves with your friends and family. You can go camping with your friends or just read your favourite book at the foot of a big tree. Many forest authorities offer organized recreational activities, such as guided hikes or canoeing.

Whatever fun forest activity you choose, be sure to take safety precautions and to do the activities under qualified supervision or with the permission of a parent or guardian!

JERRIKA SHI, Aged 13, PHILLIPINES

> *At the midpoint of the journey's life*
> *I found myself lost in a dark forest*
> *with no straight path I could see anywhere.*
>
> Dante Alighieri, ***The Divine Comedy***

Forests in art, literature and music

Writers and poets have a long-standing fascination with forests. If forests had any say in the matter, though, they'd probably complain about how books almost always describe them as dark and scary. Still, whether shown as scary or safe, they almost always have a magical quality that draws the characters to them. Just in the same way that we are drawn to them in real life.

Perhaps the most forest-obsessed stories are fairy tales, where unsuspecting characters experience strange adventures as they walk through the forest. There's Little Red Riding Hood who meets the cunning wolf, while Hansel and Gretel meet a mean witch. At least Snow White has better luck when she meets the seven dwarves in the forest.

Moving on from fairy tales, Robin Hood and his 'merry men' hung out in Sherwood Forest in England, which provided a safe haven as well as the perfect setting for many adventures. Ali Baba, the poor woodcutter in *Ali Baba and the Forty Thieves*, encounters the thieves in the forest. Forests feature in countless tales from Greek mythology, and appear even in the works of Shakespeare – perhaps the most memorable of which is the magical forest in ***A*** *Midsummer Night's Dream*. In mythologies from West Africa, a group of supernatural beings known as *Aziza* lives in the forests and provides good magic and spiritual knowledge to people living and hunting there.

Even modern literature often continues with forest settings. Harry, Ron and Hermione, in the *Harry Potter* books, have hair-raising adventures in the Forbidden Forest. In the *Hunger Games*, Katniss, the main character, is not only at her happiest and most peaceful in the forest, but also relies on it for food and survival.

Forests star in poetry too; for example, the "lovely, dark and deep" woods of Robert Frost. Many painters have attempted to capture the beauty of forests on canvas. Some songs also feature forests.

Can you think of any forest-y stories, poetry or songs from your culture?

WIGAVEE RATTAMANEE, Aged 10, THAILAND

FOREST-BASED CULTURES

We may think of a forest as a place to visit, but for about 150 million people in the world, the forest is home. Those who live in forests (including many **indigenous peoples**) often depend on forests for food, clothing, medicines and income. But often their connection to the forest is much deeper than that. Forests hold a sacred significance for many **indigenous people**; a special relation that has existed since their ancestors first hunted and gathered in those same lands. Often, communities living in forests hold important rituals in forests, raise their children to cherish and protect them, and feel connected to their ancestors through the ancient trees and land.

Because of their deep respect for forests, many **indigenous communities** have played a great role in protecting them. In fact, **indigenous people** live in many of the world's last remaining tropical forests. For many of them, forests are not only a source of income and sustenance, but their home; a deeply-rooted part of their identity, culture, and society. It is no wonder then that they cherish and protect these forests so carefully, and resist any attempts to encourage them to move.

Drawing on this page: SEUNGMIN KWAK, Aged 11, REPUBLIC OF KOREA

> ***Indigenous peoples'*** *desire to ensure that these forests are conserved, protected and* ***sustainably*** *used is not solely for them and for their past and future generations but also for other living and non-living things, the deities and the unseen.*
>
> *Source:* UN Framework Convention on Climate Change

Here are some examples of the different ways in which forests influence the lives of indigenous people around the world:

- The Waimiri Atroari people of the Brazilian Amazon use 32 plant species just to make hunting equipment! They specially choose each plant for its individual physical and chemical properties.
- The next time your parents or a teacher tells you to stop whistling, you can tell them you're actually communicating in *el silbo*. That's right, *el silbo* is a whistle language (how cool is that?!), which originated in the forests of Garajonay National Park, Spain, as a way for people to communicate across the deep valleys.
- Almost all the ceremonies and rituals of the indigenous Maasai people — including naming, marriage, and death ceremonies — take place in the forest, or use plants and trees from the forest.
- The Efe, commonly known as 'pygmies' have lived in the Ituri Forest in the Democratic Republic of Congo for thousands of years. The forest has inspired them to create amazing music. "Summoning Tore (God) with trumpet-like calls that imitate the sounds of animals, washing clothes to the accompaniment of the *likembi*, and often chanting continuously through the evening, the Efe are world-renowned for their songs — songs of love for the forest that is their home".*

**Source:* Cultural Survival

FORESTS AT RISK

Given all the amazing ways in which forests help us, you'd think we'd be doing everything possible to preserve them, right? Unfortunately, it's not always so simple. There are many factors threatening our world's forests and the **biodiversity** that they are home to, and both are disappearing at an alarming rate. While forests have always changed in size and shape because of factors such as **climate**, **natural hazards**, and water availability, the removal of forests by humans (e.g. for farms or urban use) has caused the rate of forest loss to skyrocket in comparison to the past. Fortunately, the rate of forest loss is slowing down now thanks to international efforts, but there are still many challenges to overcome, as you will see in this section.

DID YOU KNOW?

* An area of forest equivalent to five football pitches disappears every minute!
* Moreover, up to 100 forest animal and plant **species** are lost every day!

DEFORESTATION

The permanent removal of a forest to clear land for a specific purpose, such as agriculture, is called **deforestation**. When a forest is lost, many of the plants and animals that lived in it are unable to adapt to the new environment and also disappear. Although different reasons for **deforestation** exist in different regions, these are some of the main causes:

- Clearing forest to make space for agricultural purposes, in particular for orchards and palm oil plantations, as well as

VULNERABLE TREES

Although threats to the survival of popular forest-dwelling species such as grizzly bears, tigers or gorillas are well known, not many people are aware of the vulnerable situation of some of the world's trees. The World List of Threatened Trees (1998) indicates that more than 8 000 tree species, ten percent of the world's total, are currently threatened with extinction.

Many economically important tree species, including some species of pine, oak, fir, cedar, mahogany and meranti, are threatened due to unsustainable use. More than one in six mangrove species worldwide is on the IUCN Red List of Threatened Species. They are in danger of extinction because of factors such as coastal development, climate change, logging and agriculture.

for livestock grazing areas. This usually involves burning and cutting down the trees in a process known as slash-and-burn.

- Selling timber on a large scale. In this case, forests are cleared for harvesting and exporting timber, without ensuring that this is sustainable, meaning that trees are cut down faster than they can grow back. Today this mostly happens in developing countries to help bring in profit, but many of today's developed countries have also been guilty of clearing large amounts of their forest cover. Until the early 20th century, the highest rates of deforestation occurred in temperate forests in Asia, Europe and North America (Source: FAO). In fact, the largest remaining forests in the world today are mostly in developing countries.
- Creating more land for development. As populations grow, we need more space, and in many countries the easiest option is to exploit forest land.
- Large-scale mining, which often requires forest clearing so the mine site can be dug and roads can be constructed.
- Lack of proper forest management systems.

DID YOU KNOW?

Deforestation is a major driver of climate change, responsible for up to 20 percent of global greenhouse gas emissions – more than all the cars, trucks, planes, boats and trains in the world combined.

Source: Greenpeace

DEGRADATION

In contrast to **deforestation**, which involves the permanent conversion of a forest into land for other uses, a forest is said to be 'degraded' when some of its specific aspects or characteristics are destroyed. For example, forest **degradation** happens when there is a decrease in a forest's tree cover, changes in the trees' structure, or a reduction in the number of **species** that can be found in it.

PALM OIL

Some of the most serious **deforestation** occurs when certain products suddenly become popular around the world. At such times farmers and large agricultural companies clear forest areas to plant more profitable market crops that are used in the production of those popular goods. One such example is palm oil, which is used in hundreds of food products, including margarine and chocolate. It's also used in detergents, cosmetics and, increasingly, for biodiesel, which is a fuel produced from vegetable oil. While it is possible to produce palm oil **sustainably** (e.g. by growing it on non-forested or degraded land), doing so will require better planning and stricter laws.

Sources: **www.unep.org/pdf/Dec_11_Palm_Plantations.pdf** and **www.greenpeace.org.uk/forests/palm-oil**

EARTH GOING BALD

Eight thousand years ago, half of the Earth's land surface was covered by forests or wooded areas. Today, forested areas make up less than one third of the planet's land surface.

Using forest land for agricultural purposes, mining, and commercial development are some of the main causes of forest **degradation**. These causes often stem from larger problems, such as the failure of organizations and governments to protect forests; unclear definitions of land and property rights; poor law enforcement; incentives to convert forest land to other uses; and insufficient human resources to monitor forests.

Forest **degradation** can also be caused by natural processes, although this is often linked to human activity. Human activity can make forests more vulnerable to **degradation** from natural causes such as fire, pests, and diseases. Since forests are a **renewable resource**, some forms of **degradation** are reversible, although it may take a long time. However, **degradation** is sometimes irreversible, resulting in the permanent loss of some forest **ecosystems**.

EROSION

Soil **erosion** is both a consequence and a cause of forest loss. Tree roots help to hold the soil together, so when forests are cleared or degraded, and **vegetation** no longer covers the soil, heavy rains can wash it away. In fact, the rainfall may be all the heavier because there are no more leaves above the soil to catch the water and stagger its release to the soil below. This washing away of the soil is called **erosion** and it can be very dangerous to forests and prevent them from re-growing. Once the **topsoil** — a soil layer full of **nutrients** — is eroded, all plants have a hard time growing again, causing the land to stay bare for long periods of time or even turn into deserts.

NAYLEE NAGDA, Aged 15, KENYA

CLIMATE CHANGE

Climate change refers to changes in the overall **climate** of the Earth, caused by a mixture of natural processes and human activities. **Weather** is getting more extreme in lots of places, meaning summers are getting hotter in some areas and winters are getting colder in others. Some places are receiving heavier rains and even flooding, while stronger hurricanes and more severe **droughts** are hitting other areas. All of this change is not sparing the forests either. Even minor temperature changes are forcing some forest **species** to find new areas to live in, which means they're expanding their territory. Other **species** are disappearing entirely from their usual **habitats**. Even entire forests are on the move, shifting either north or south toward the poles or to higher elevations in search of more favourable conditions. Some forests might disappear completely, such as those already in very dry areas, or those in wet, coastal areas with rising sea levels (e.g. mangrove forests on many Pacific islands). Changes in the **climate** can also increase or decrease forest growth, changing the face of the forest.

Forests are indirectly vulnerable to many of the other impacts of **climate change**, too. More extreme **weather** events, such as storms, heavy rainfall, and **drought** will damage trees and thereby affect a forest's health. Forest fires may become more likely, too, due to the drier and warmer conditions that some places are experiencing. **Climate change** can also lead to more frequent and intense attacks by pests and diseases, as well as the arrival of new **invasive species**.

FIRE

Forests fires are not a new phenomenon. In the ancient past, natural forces such as lightning or volcanic eruptions sparked forest fires, but later on humans became the main fire-starters, and today humans are responsible for 90 percent of forest fires. Sometimes, these fires are set deliberately, for example to clear land for agriculture. In other cases the fires start accidentally, for example, lit by a stray cigarette or leaving a campfire unattended. Forest fires can easily get out of control. These **wildfires** not only damage forests but also hurt animals, people and sometimes entire villages and communities.

DID YOU KNOW?

In some ways, fires actually help forests! One of the most interesting examples of this comes from the Australian forests and woodlands, where heat, smoke and ash are necessary for the germination of many plant species! In other words, these forests would not regenerate, or reproduce, without fire.

So completely preventing forest fires is not actually good for forests. Small-scale, controlled fires actually help to control pests, create space for the strongest trees to grow and prevent dry leaves and branches from piling up on the forest floor. The solution is to control the severity of the fires, and this is actually a job! Professional fire managers create ordered fires on a regular basis, which have a low intensity and are carefully controlled.

WATER WORRIES

It's hard to imagine that water — one of the Earth's most precious resources — could actually be harmful. The quantity and quality of water, though, can have a huge impact on a forest and its inhabitants. For example, too much water, caused by flooding or heavy rainfall, can destroy **vegetation** and cause landslides. Excess standing water (water that does not drain away) is also harmful because it fills the spaces between soil particles, replacing **oxygen** and preventing submerged roots from absorbing important **nutrients** and exchanging gases. On the other hand, water scarcity due to dry **weather** conditions also hurts plants, causing them to wither and eventually die. In addition, dryness makes plants more vulnerable to other threats, such as diseases, pests, extreme temperatures and strong winds. A prolonged **drought** also raises the risk of fires.

And then there's the issue of water quality. Water quality worldwide is deteriorating mostly because of human activities, such as discharging sewage, chemicals, and radioactive waste into lakes and rivers. Oil spills, too, can be very damaging.

KUAN YI LI, Aged 13, MALAYSIA

GOING WITH THE FLOW

The only type of forest that survives just fine in standing water is the mangrove forest.

This water pollution poses a serious threat to **biodiversity**. Chemicals in the water absorb **nutrients** and minerals from the soil before plants can use them. They also modify other usually harmless soil particles, making them dangerous for trees.

ENEMIES ALIVE AND KICKING

Insects, **fungi**, and wild animals are natural and essential inhabitants of healthy forests, and they perform many different and useful tasks. For example, they speed up the decay and **nutrient** recycling process of dead plants and animals, they pollinate plants, they transport seeds, and they may become food for other animals. At the same time, these creatures can harm forests, too. Pests and **fungi** and diseases caused by **microorganisms** can kill or injure trees and grazing animals can prevent the growth of new seedlings. These events are usually very limited and only the weakest trees die (e.g. young, stressed, or unhealthy trees). However, under certain conditions insect or pest populations expand to the point where they become a serious threat to forests. This is called a pest outbreak.

Another threat to forests occurs when non-native **species** (also called 'exotic' or 'alien' species) arrive in the area, either having migrated or been accidentally introduced by humans. When these newcomers start spreading quickly through their new environment, compete with and beat **native** **organisms** for food, and harm the ecosystems in their introduced range, they are called **invasive species** (***Source:*** CBD).

TAKE ACTION

> *The **sustainable** management of forests offers multiple benefits – with the right programmes and policies, the sector can lead the way towards more **sustainable**, greener economies.*
>
> FAO Assistant Director-General for Forestry: Eduardo Rojas-Briales

ACTIONS FOR GOVERNMENTS AND DECISION-MAKERS

We just learned about the dangers our world's forests are facing; now it's time for some good news. A lot of people and organizations around the world are working hard to protect our forests, and a lot of great work is being done. Here are some of the ways in which they are making a difference:

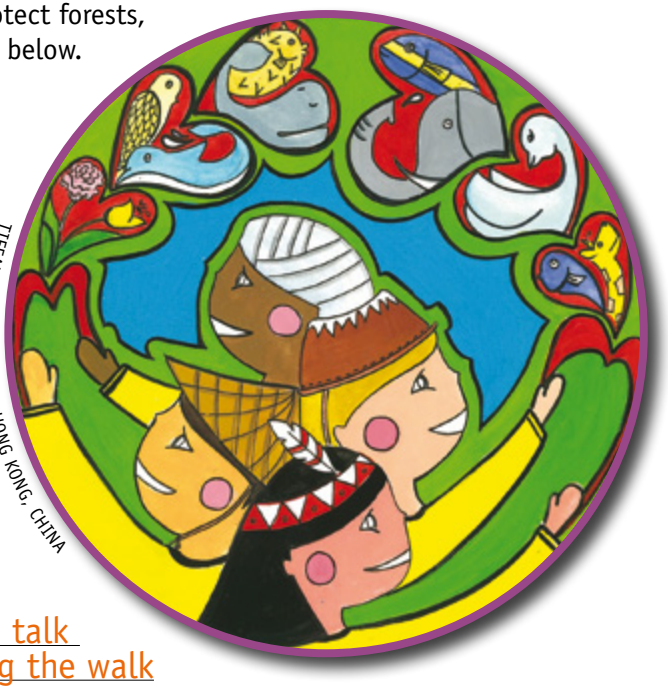
Forest certification

Forest **certification** is a way to monitor the production of timber, paper, and other forest products to make sure they've been **harvested** according to a careful set of guidelines. In addition, **certification schemes** aim to:

- Protect threatened species and habitats.
- Protect the rights of local communities and workers.
- Minimize waste from forestry activities.
- Help build sustainable local economies (i.e. help create a sustainable source of income for local people).

The business of businesses

Big businesses have great power to make a positive difference. They can make sure that their suppliers produce goods such as timber, soy, palm oil and paper in ways that have minimal damage to forests and the environment in general, by participating in **certification schemes** for example. They can also increase the use of recycled wood, pulp, paper and fibre in their products. Of course, it is down to all of us to support and encourage companies that are helping to protect forests, as we will see below.



TIFFANY LAW, Aged 15, HONG KONG, CHINA

Talking the talk and walking the walk

Politicians are in a strong position to do more for our forests. For instance, they can make sure there is good investment in programmes and research that support forests. Those in **developed countries** can create programmes through which they provide training and knowledge to people in **developing countries**. Politicians can show their support by enforcing better management of forests, creating stricter laws, and ensuring that local people are democratically involved in making decisions about their forests, as these will affect their **livelihoods**.

Raising awareness

Making sure that people are 'in the know' about important issues is one of the best ways to create change, and there are a lot of international organizations, nongovernmental organizations and other groups speaking out for forests. On their Web sites, you will find facts and figures, detailed information, and ideas about how you can join in their efforts. Some of these organizations are listed later in this section and also in the 'Resources and Additional Information' section of the badge (pp.134-137).

REDD+

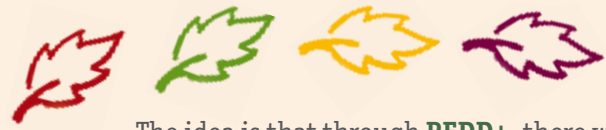
We've discussed how forests help us fight **climate change**, with trees storing huge amounts of carbon. That's an important reason to maintain healthy forests. In poorer countries, though, the profits earned through using forests for cropland or timber often provide more immediate gains. However, when trees are cut down, the carbon they store (and the carbon stored in the soil underneath the tree) is released back into the atmosphere. This is a big concern.

This is why the international community came up with an innovative way to make saving and protecting forests and fighting **climate change** at the same time easier for local communities. Fasten your seatbelt, though – the name they chose for the programme is quite a mouthful: 'Reducing emissions from **deforestation** and forest **degradation** in **developing countries**; and the role of **conservation**, **sustainable** management of forests and enhancement of forest carbon stocks in **developing countries**'.

Don't worry. It's called **REDD+** for short.

A many-branched approach

Forests are complex **ecosystems** and protecting them is a complex matter, too. In order to really make a lasting difference towards their protection, we have to take a 'holistic' approach, taking into account all the different factors that are affecting them. For example, the Convention on Biological Diversity has a 'programme of work' dedicated to protecting forest **biodiversity**. Take a look at the programme and its different 'branches':
www.cbd.int/forest/doc/forest-pow-web.pdf



The idea is that through **REDD+**, there will be financial benefits for developing countries to:

- **R**educe the **e**missions from **d**eforestation (the '**RED**');
- Reduce the emissions from forest **d**egradation (the second '**D**');
- Manage forests in a sustainable way (included in the '**+**');
- Conserve the carbon contained in forests (included in the '**+**');
- Enhance the carbon stock stored by forests (included in the '**+**').

The **developing countries** that successfully protect their trees by completing one or more of these actions (and thereby reduce their carbon emissions) are meant to be paid for their efforts. **Indigenous peoples** and other forest-dependent communities are intended to benefit most from **REDD+**, since they are the forest dwellers doing most of the **conservation** work. These groups will also benefit in the long term from the prevented forest loss or **degradation**. Although some details of **REDD+** are still under negotiation, **REDD+** projects are already underway and the first experiences are positive.

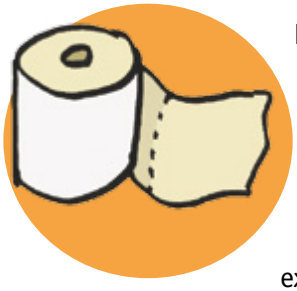
WHAT YOU CAN DO

Here are a few steps all of us can take to make sure our actions contribute to the **conservation** and **sustainable** use of forest **biodiversity**:

GET THE FACTS

We hope this challenge badge provides you with a good overview on global forests, their benefits, and the risks they face. Now it's time to learn about **biodiversity** (and especially forests) in your community. Which plants and animals are **native** to your area? Are they facing any threats? Also learn about the connections between the health and vitality of your natural environment, and your own health. There are many different sources of information: for example, you can talk to people in your local municipality, local government, or national government about the importance of **biodiversity** and forests, and ask about ways you can help to improve the **conservation** and **sustainable** use of forests in your area.

SHOP SMART



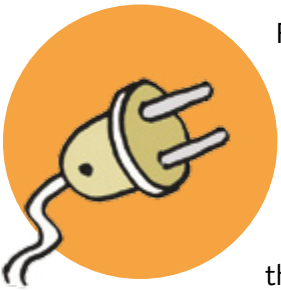
For any home construction projects, get your parents to use **sustainably sourced** timber or plywood. Also make sure that the paper products you use at home — printer paper, paper towels, toilet paper, etc. — are forest-friendly. There are several credible **certification scheme** labels to look out for when buying such products, for example that of the Forest Stewardship Council – FSC (**www.fsc.org**).

> *"I speak for the trees, for the trees have no tongues."*
>
> Dr. Seuss, *The Lorax*

SHOP LESS

Reducing consumption (the things that we use and buy) is another powerful way we can all help to protect nature. When we cut down on the amount of products that we use and buy, fewer trees are cut down to make new products! If we take care of the things that we already have, and repair them when they are broken, we don't need to buy new ones. It's also good to pay attention to a product's packaging: try to cut down on the amount of packaged products that you buy, as excess packaging just produces unnecessary waste.

UNPLUG

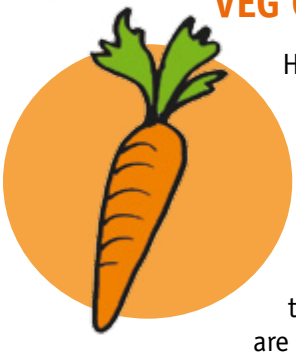


Reducing our home energy usage is also a good way to help forests. By switching off electrical appliances that we aren't using (such as lights, TVs and computers), or walking or cycling instead of taking the car, we consume fewer **fossil fuels**. **Fossil fuels** contribute to air pollution, which can cause **acid rain**. If we reduce the amount of **fossil fuels** that we use, we can help save some forests from being damaged by **acid rain**.

RECYCLE

After we can no longer use and reuse them, recycling products like paper helps prevent new trees from being cut down. According to **www.dosomething.org**, "If every American recycled just one-tenth of their newspapers, we could save about 25 million trees each year."

VEG OUT



Here's what might seem like a slightly strange way to help save forests: eat less red meat. Did you know that millions of acres of rainforest are **slashed and burned** in order to turn the land into grass pastures for cows? For every quarter pound fast-food hamburger that comes from animals reared on land that used to be the rainforest, 16 square metres of rainforest are destroyed (***Source:*** Rainforest Action Network). That's the area of a small kitchen cut down for only one hamburger! Explore recipes that do not contain beef and see if you can find alternative meals once a week that contain legumes and pulses (which also contain protein) instead of meat.

TAKE ACTION

You can make a big difference by helping to protect natural areas and green spaces in your communities, even ones as small as the neighbourhood park. One fun activity, and at the same time a very useful one, is planting a tree. Planting a local **species** of tree, in an area where it would naturally occur, can be a great way to raise awareness among your family, friends, and your community about the multiple benefits of trees and forests. But remember to look after it!

SPREAD THE WORD

Throw some forest facts at your family, friends, and community members. Get them to join forces with you in helping to protect forests and **biodiversity**. Even a small action like posting an update on your social media profile about forests is a good way to get your friends thinking about their importance. Perhaps you can start a blog, or write an article for a magazine or newspaper. Or get on Twitter and tweet – tweet for all the forest birds out there that need someone to raise a voice for them! Make sure you a get a parent's or guardian's permission if you are under 16 years old. If you don't have internet access at home, why not organize a forest-themed party in your local community? Tell people about your local forest, the threats it faces and how they can help!

GETTING INVOLVED

The activities in this challenge badge are a great way to get started on all of these steps. There are also lots of global movements and projects which can help you get started on your forest-saving mission. Also be sure to check out the Web links at the end of this booklet.

Let's do something for FORESTS!

Check out some of the some major organizations and events focusing on forests:

The **United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC)** promotes the conservation of tree species. It initiated a Global Tree Conservation Atlas in 2003, which presents profiles of threatened tree species around the world in a map-based format (**www.unep-wcmc.org**).

The **UN Forum on Forests (UNFF)** was established to promote the management, conservation and sustainable development of all types of forests and to strengthen long-term political commitments (**www.un.org/esa/forests**).

The **International Day of Forests** is observed every year on March 21 in order to celebrate and raise awareness of the importance of all types of forests (**www.un.org/esa/forests/international-day-of-forests** and **www.fao.org/forestry/international-day-of-forests/en**).

The **FAO Forestry Department** works on balancing social, economic and environmental objectives so that present generations can reap the benefits of the Earth's forest resources while conserving them to meet the needs of future generations (**www.fao.org/forestry/en**).

The International Union for the Conservation of Nature (IUCN) has a forest conservation programme that aims to "influence, encourage and assist societies throughout the world to conserve biological diversity in forests and tree-dominated landscapes and ensure that the use of forest resources is equitable and ecologically sustainable" (**www.iucn.org/about/work/programmes/forest**).

The Convention on Biological Diversity (CBD) aims to reduce the threats to forest biological diversity by creating an institutional and socio-economic environment that will help in the conservation and sustainable use of forest biological diversity, and also assessing and monitoring forest biodiversity (**www.cbd.int/forest/programme.shtml**).

SECTION A:

FOREST LIFE

DO EITHER A.1. OR A.2. AND (AT LEAST) ONE OTHER ACTIVITY OF YOUR CHOICE.

AFTER COMPLETING OUR FOREST LIFE ACTIVITIES, YOU WILL BE ABLE TO:

- **DESCRIBE the natural parts of a forest and why they are important.**
- **OBSERVE and LEARN about forests by exploring the living and non-living things in the forests around you.**

DO ONE OF THE TWO COMPULSORY ACTIVITIES BELOW:

A.01 TAKE A HIKE Go for a hike in the forest. Along the way, collect items that you think represent important parts of a forest. A pebble, a pinch of dirt, some dried leaves, a few twigs, an old snakeskin or some feathers lying on the **forest floor** can respectively represent a forest's rocks and boulders, its soil, bushes, trees, **reptiles** and birds. Use your imagination to find other items to represent more things that you can see, smell, hear or feel – such as the wind, water or insects. After the hike, create a forest collage with all the items that your group collected. Talk about what each of the items represents and why each one is important.

LEVEL 3 2 1

DON'T pick and eat any plants because some poisonous plants look very similar to non-poisonous ones. Also some plants are rare and should not be harmed. DON'T collect living creatures; draw a picture instead. ALWAYS remember to wash your hands afterwards.

A.02 BIOME HOMES The type of forest and the variety of life that is found in it (its **biodiversity**) depends on many factors, including the forest's geographic location and **climate**. Learn about these different "forest **biomes**". What is a forest **biome**? Name four examples of forest **biomes**. What are the main characteristics of each one? Where are they located in the world? Which forest **biomes** are found in your area or country? Share your answers with your group.

LEVEL 3 2 1

Extension: Collect or draw pictures of different forest **biomes**. Invent a matching game in which you place the forest **biome** onto the geographical location where is it found around the world. Play the game with a friend.

CHOOSE (AT LEAST) ONE ADDITIONAL ACTIVITY FROM THE LIST BELOW:

A.03 SOUNDS AND SIGNS Conduct an observation mission in a forest early in the morning. Listen for animal noises. Try imitating the sounds to see if the animals respond. Look for animal footprints on the ground. Can you figure out which animal made the tracks? Try looking for clues like animal hair, feathers, and faeces (animal droppings). Observe the **habitat** in which they live.

LEVEL ● ● 1

A.04 FIVE GOOD THINGS What are five reasons why forests are important to nature? Are these benefits also good for people? Why or why not? Draw a picture showing the importance of forests.

LEVEL ● ● 1

A.05 BARK PATTERNS Visit an arboretum (an outdoor living tree museum). Make **bark** rubbings of the three most unusual trees you see. (Learn how at this Web site: **www.wikihow.com/Make-a-Bark-Rubbing**). Label each rubbing with the common and scientific name of the tree, and note down where the tree grows naturally.

LEVEL ● ● 1

A.06 FOREST LAYERS Draw a picture to show the plant and tree layers of a forest in your area. Label the different layers. (If you don't live in an area that has forests, choose an area that does and draw a picture of that forest.)

LEVEL ● 2 1

A.07 AGE RINGS A tree's age can be determined by its ring numbers. Find a tree stump or cut log, and examine its growth rings. How many growth rings do you see? Each growth ring represents one growing season. How old is your tree? Are the rings evenly spaced or not? What does the spacing tell you about the tree's life history? Think about what that tells you about the forest where you found the stump or log. Make a poster showing your tree's growth rings.

LEVEL ● 2 1

GOOD IDEA

A.08 SEEDLINGS With your group, plant forest tree seedlings. Discuss how you planted them. (For example, how deep was each hole? How far apart from each other were the seedlings planted? Did you put anything into the hole before putting in the seedling, such as fertilizer or compost?) Do the seedlings need any special kind of care, for example in cold periods? Talk about how you will continue to care for the seedlings so that they will survive.

LEVEL 2 1

A.09 WHO EATS WHOM? Draw, make a collage or create an installation of a **food web** that connects many different **species** that live in a forest.

LEVEL 2 1

A.10 A FOREST FOR ALL SEASONS Pick one site in a local forest. Visit it in at least two different seasons. Record what you see, smell, hear and feel. What is the **weather** like? What are animals and people doing in the forest? Are the plants flowering? Compare your observations in each of the seasons. Share your findings with your group in a creative way, such as a photo collage, a short movie, or a series of journal entries.

LEVEL 3 2 1

A.11 FOREST PHARMACY Living material in forests can be used as medicines to treat everything from minor cuts and scrapes to deadly diseases. Learn about two plants that grow in a forest that can help to cure diseases. Plants can also be harmful. Learn about two plants that are poisonous to humans. Share your findings with your group.

LEVEL 3 2 1

GIOVANNA LUCARINI, Aged 10, ITALY

GOOD IDEA

A.12 UNIQUE VEGETATION Forest **vegetation** (plants and trees) can be very diverse. Some kinds of **vegetation** are tall, some are short, some are prickly, some have bright flowers, etc. During a forest walk, draw five different types of **vegetation**. Be sure to point out the unique traits of each. If possible, find the common name and the scientific name for each **species**.

LEVEL 3 2 1

A.13 TREE TALK Invite an arborist (a tree specialist) to meet you. Ask them all the tree-related questions you can think of, such as "why do the leaves of **deciduous** trees change colour in **temperate** forests?" or "why don't mangrove trees drown?"

LEVEL 3 2 1

A.14 ON TOP OF THE WORLD If this is possible in your area, go on a forest **canopy** walk. What do you observe from the treetops that you cannot easily see from the ground? When you are safely on the ground again, draw, paint or photograph your favourite view. Don't forget to include all the **epiphytes** ('air plants' that grow on other plants), bird nests, insects, monkeys, etc. that you saw. Write a short artist's statement to accompany your picture. With other members of your group, create an art exhibition and invite your families and friends to see it.

LEVEL 3 2 1

A.15 ROCK THE FOREST Invite a geologist (a rock specialist) to talk to your group about the different kinds of rocks you can find in a forest near you. How were the rocks formed? When did they form? Will they still be there in 100 years? What role or roles do they play in the forest landscape?

LEVEL 3 2 1

Extension: A rock sometimes acts as a substrate (a surface upon which a plant or animal can grow). For example, mosses, lichens and even some trees grow on rocks or in rock crevices. Make a real-life or online exhibit of photographs, sketches or paintings of rocks as a substrate in the forest. You can find inspiration for your exhibit in your local forest, library or nature museum. Invite your family and friends to view and comment on your exhibit.

A.16 WHERE'S THE WATER? Forests are often important **watersheds**. Find out where water can be found in a forest. Is it underground, in the soil, in a lake or stream, in tiny droplets under leaves, etc.? Draw a map or make a model of all of the water sites. Which plants and animals do you think use each of these different sites?

LEVEL 3 2 1

GOOD IDEA

A.17 SOIL ANALYSIS In a forest, dig a hole at least 30 cm deep. Observe the soil structure at the different depths. Can you see distinct layers? What is in each layer? What is the texture like and how moist is the soil? Is there evidence of plant, insect or other life? Sketch and label your soil structure. Fill in the hole before you leave.

LEVEL 3 2 1

A.18 FORESTRY QUIZ Game time! Download the FAO Forestry application from iTunes. Visit **https://itunes.apple.com/en/app/fao-forestry/id490653521?mt=8**. Take the quiz on your computer, tablet or mobile phone. Or, invent your own game about forests. Play it with your group.

LEVEL 3 2 1

A.19 ANIMAL CLASS There are six main animal classes: mammals, **reptiles**, birds, **amphibians**, insects and fish. Find one example of each class that lives in a forest in your area. Now, get ready to play a guessing game with your group. Each group member should write down their examples, one example per piece of paper. Put all the pieces of paper in a hat. Form teams of three to four people. Each team member draws a piece of paper out of the hat and sticks it onto their forehead **without reading it**. Each team member has to guess what they are. Only questions with a "yes" or "no" answer are allowed, which are given by the rest of the group. If the answer is yes, the asker may pose another question, until the answer is "no". Then it is the next person's turn to ask questions.
(E.g. "Do I lay eggs?" – YES.
"Am I a **reptile**?" – NO.)

LEVEL 3 2 1

GOOD IDEA

HOI KEI LEUNG, Aged 18, HONG KONG, CHINA

A.20 ON THE MOVE Some forest animals live in different parts of the forest at different times in their lives. For example, a snake in a **temperate** forest may hatch and spend winters in a cave, and then spend the warm spring and summer months on the **forest floor** and up trees. Pick a forest animal in your area. Find out where it lives in the forest at different times of the year. Make a year-long calendar and draw the different places where you might find the animal each month. Show your calendar to your group.

LEVEL 2

A.21 FLY AWAY Some migratory birds travel vast distances each year. They spend the winter months in warm tropical forests near the equator, and the summer breeding months in insect-rich **temperate** forests. Pick one **species** of forest bird that migrates across continents each year. Where does it live? What types of forests does it live in? Does it eat the same food in each forest? What predators and pathogens (bacteria and viruses that cause disease) attack it in each forest? Do the birds have different social groups at each site, for example do they flock in small groups at one site and in large ones at another? How do you think the birds can cope with all this variety? Share your answers with your group. Don't forget to show some pictures!

LEVEL 3 2

A.22 PLOTTING VEGETATION In teams of two to three, investigate a **vegetation** plot. This is a method used by scientists to sample the **vegetation** and soil of different landscapes. To do this, mark a 1 m by 1 m square on the **forest floor**. Count the number of plants in your plot. What **species** are they? How big or small are they? Are there other things in your plot such as rocks, insects or garbage? Draw your plot to scale (i.e. if you take a 1:10 scale, your 1 m^2 (100 cm^2) plot on the ground will become a 10 cm^2 plot in your diagram). Compare your results with the results of other teams. How are they different and how are they similar? If possible, invite a botanist (a plant specialist) to accompany your group and help you identify different plant **species**.

LEVEL 3 2

A.23 FOREST SOUNDSCAPES Visit a forest and record forest sounds. Include both biotic (living) noises like bird songs and insect chirping and abiotic (non-living) ones from moving water or the wind. You might even hear human sounds (like your footfall as you walk). Make a mix of all the forest noises you record. Share it with your group. Can they identify the sounds?

LEVEL 3 2

GOOD IDEA

AFRIM NORN, Aged 14, BANGLADESH

A.24 FORESTS THROUGH THE AGES Many different factors determine which types of **species** survive and thrive in a forest. (The types and relative amounts of gases in the **atmosphere** are one such factor.) Pick one period in history, such as the Jurassic or Cretaceous period, and learn about some of the forest plants that lived at that time. Do these plants have modern relatives living today? Are they bigger or smaller? Do they have different characteristics? Was the variety within plant families (such as horsetails) greater back then or now?

LEVEL 3 2

A.25 COAL COMIC Discover how parts of a forest were transformed into energy sources such as coal. Make a comic strip or short graphic novel explaining the process. Share it with your group.

LEVEL 3 2

A.26 MIGHTY MANGROVES Learn how a mangrove forest can help to protect coastal areas from storm surges (huge waves caused out at sea by extraordinarily strong winds pushing the water's surface) and **tsunamis** (huge waves caused by large masses of sea water being moved by events like earthquakes or volcanic eruptions underwater). If you can, visit a mangrove forest. Observe the way the trees grow. What does the root system look like? What other **species** – both land and water based **species** – live in the mangrove forest? What role do you think the mangrove trees play in providing a 'structure' for these **species** to live in?

LEVEL 3 2

A.27 Do any other activity approved by your teacher or leader.
LEVEL 1 2 3

SECTION B:

FORESTS IN USE

DO EITHER B.1. OR B.2. AND (AT LEAST) ONE OTHER ACTIVITY OF YOUR CHOICE.

AFTER COMPLETING OUR FORESTS IN USE ACTIVITIES, YOU WILL BE ABLE TO:

- **APPRECIATE how forests support the livelihoods of people in your area and around the world.**
- **UNDERSTAND how entire ecosystems, containing many different species of plants and animals, depend on forests for their survival.**

DO ONE OF THE TWO COMPULSORY ACTIVITIES BELOW:

B.01 LIVELY WOODS Prepare an investigative report on a forest in your area. What type of forest is it? Is it important to the local cultural heritage? What local **livelihoods** does it support? Are there any threats to the forest? What (if anything) are people doing to protect the biological, cultural and economic value of the forest? Present your findings creatively, such as in the form of a play, a newscast, a Web site or poster.

LEVEL 3 2 1

B.02 ALTERNATIVE LIVELHOODS Not all people who rely on forests for their **livelihoods** are part of what is called the "**formal economy**" – the official economic system (of earning money, buying and selling goods) in a country that is recognized by the government. Some people hunt and gather wood and forest products for food, medicine, clothing and supplies to make other goods that are important for their wellbeing. Make a list of all the things found in a forest that people can use for their **livelihoods**. Invent a game to teach your friends about different forest products and their **livelihood** uses.

LEVEL 3 2 1

IFA AHMED, Aged 10, MALDIVES

B.03 SAFETY FIRST To be safe, the people who work in forests need to follow certain security and safety rules. What are some examples of rules forest workers must follow? What kind of clothing should forest workers wear? Create a checklist of things you should bring with you to ensure your safety when you are in the forest.

LEVEL 2 1

B.04 FOREST JOBS List as many jobs as you can think of that depend on forests, either directly or indirectly. With your group, play a game of charades in which one person acts out the job, and the other people try to guess it.

LEVEL 3 2 1

B.05 CLIMBING TREES Tree-climbing isn't just a fun activity or a way to get a fresh mango or coconut. It is also an important skill required for some types of **livelihoods** or jobs. What are five jobs or **livelihoods** in which people climb trees? Why is tree-climbing important for their work? Do the climbers in each job climb trees the same way or to the same height? Do they use any special climbing equipment? What safety precautions do the climbers take? What types of people climb trees, for example is it young men or old women who do most of the climbing? Share your discoveries with your group.

LEVEL 3 2 1

Extension: Try climbing a tree yourself.

Pay close attention to where you place your hands and feet! Don't put your weight on small or thin branches. Only climb a tree if there is at least one adult around to watch out for you.

DANIELA KARAIVANOVA, *Aged 17*, BULGARIA

B.06 FOREST WARDENS Interview a forest guard or a park warden who works in a protected area. Prepare a list of questions to find out about their work. For example, you might ask what they do each day, if their activities change from season to season, where they go, how their work helps to protect the forest and the **ecosystem goods and services** they provide, or how they work with local people. Share your interview findings with your group.

LEVEL 3 2 1

B.07 USING WOOD List all the things made by wood around you and in your house. What can we create and use thanks to wood? Which ads and campaigns tell you it is bad to cut trees? Do you agree with them? In one column, list all the reasons why you think cutting trees is good and in the other column list why it is bad.

LEVEL 3 2

B.08 CHANGING WITH THE CLIMATE

LEVEL 3 2

Climate change both affects and is affected by forests. The functioning and composition of forests can change with temperature changes as little as 1 °C! Compare how three different types of forests (such as mangrove, mountain and **boreal** forests) will be affected by **climate change**. How can each of them influence **climate change**? To share your findings, create a card game in which the players have to match each forest type with its relationship to **climate change**.

B.09 ECOTOURISM

LEVEL 3 2

Research two examples of **ecotourism** that help to protect forests and the people who live in and around them. What type of forest is included? What activities do the **ecotourists** participate in? Where do they stay? What do they eat? Does the **ecotourism** company hire local people? How does **ecotourism** impact the environment? How does it impact the local people? Do you think these operations are good examples of **ecotourism**? Why or why not? Do you want to participate in **ecotourism**? Present your findings to your group.

Extension: Visit a forest in your area and imagine that it were an **ecotourist** destination. What activities could be offered? Where would the guests stay? What would they eat? How much would it cost? Would any of the money go toward helping local people or forest **conservation**? Make a travel brochure for your **ecotourism** destination. If possible, bring some friends to the forest and give them a 'live tour' or guided hike.

B.10 ENERGETIC TREES Forests can be an important energy source. For example, logs and sticks can be burned as cooking fuel or turned into charcoal. What are some other ways in which forest resources are used as sources of energy? What are some of the possibilities being explored by energy and biotechnology companies at the moment? Do you have any new and original ideas for how to make energy from forests? Create a mini-model of your invention.

LEVEL 3 2

B.11 FORESTS AND THE UN Several United Nations agencies work on forests. Learn about two of these agencies. What are the specific issues each one covers? What are the main global challenges each tries to address? Are forests the main focus of each agency, or do they fit into broader objectives and activities? Where are their head offices located? When were the agencies set up? What are some of the current forest-related projects each agency is running? Share your findings with your group.

LEVEL 3 2

B.12 FAIR FORESTS **Rights to access** and **benefit-sharing** for local people is a fundamental requirement for **sustainable** forest management and poverty reduction in rural forested areas. With your group, discuss how this right can be protected within your government's forest management policies.

LEVEL 3

B.13 BIOPIRATES! LEVEL 3 Forest **biodiversity** holds precious ingredients for medical and pharmaceutical products. Traditional healers and doctors know some of the medicinal uses of plants, animals and **fungi** (mushrooms). Pharmaceutical companies (those who produce commercial medicines) and research institutions (like universities) are trying to access and learn from this traditional knowledge so that they can develop better medicines. Host a debate on the issue with your group. One side should represent the researchers and drug companies and argue in favour of '**bioprospecting**'. The other side should represent groups who are against '**biopiracy**' (e.g. **indigenous peoples**).

CHARLOTTE NGO SUET, Aged 14, HONG KONG, CHINA

B.14 INTERNATIONAL TIMELIINE Learn about the important conferences and events related to **climate change** and forests that have taken place in the past fifty years. Create a timeline showing all these events. What were the roles of governments, United Nations agencies, **indigenous peoples** and nongovernmental organizations in each of these events?

LEVEL 3

B.15 NATURAL HAZARDS When a **natural hazard** (such a landslide, typhoon or **tsunami**) occurs, the forests in the area can influence whether or not the hazard causes a disaster (it becomes a 'disaster' when the community are unable to respond and cope with the effects of the hazard). Investigate one disaster in which forests played a role. Did the forests worsen or help improve the impacts on people? Present your findings in a journalistic report – in a newspaper article, online blog, radio programme or television clip.

LEVEL 3

GOOD IDEA

B.16 REDD+ **REDD+** (pronounced "REDD plus") is an international programme that aims to reduce the amount of **greenhouse gases** in the **atmosphere** and **mitigate climate change** (learn more on pp.84-85). If it is used correctly, it has the potential to help **biodiversity**, especially forest **biodiversity**. Record a podcast or write a newspaper article explaining **REDD+** and how it works. Don't forget to give your opinion about it.

LEVEL 3

B.17 Do any other activity approved by your teacher or leader.
LEVEL 1 2 3

SECTION C:

FORESTS AND CULTURE

DO EITHER C.1. OR C.2. AND (AT LEAST) ONE OTHER ACTIVITY OF YOUR CHOICE.

AFTER COMPLETING OUR FORESTS AND CULTURE ACTIVITIES, YOU WILL BE ABLE TO:

* **UNDERSTAND** and appreciate the cultural importance of forests to people in your area and around the world.
* **PROMOTE** forests through musical, artistic, literary or athletic activities.

DO ONE OF THE TWO COMPULSORY ACTIVITIES BELOW:

C.01 INDIGENOUS INHABITANTS

LEVEL 3 2 1

Learn about the traditional stories or legends of the **indigenous peoples** who live or used to live in your country's forests. Prepare a short role-play and perform one of them with your friends. You could even organize a special event such as an evening show in which several groups perform different legends.

Extension: Invite an **indigenous person** to come to your meeting to talk about how they use and respect the forest. Is their people's current relationship to the forest the same as it was 50 years ago? What about 200 years ago? Why or why not?

C.02 FORESTS AND FIRES

LEVEL 3 2 1

Particular caution and adult supervision required

Learn how to safely build and enjoy an outdoor campfire. Collect wood and kindling (dry leaves and small sticks to help light the fire). Build up the pyre and light it under adult supervision. Make sure to take precautions so that the fire remains under control. You can carefully roast food on the fire (e.g. chestnuts, apples, potatoes, popcorn). Create a list of why fires are essential for our survival. Look up the different kinds of wood and find out which ones burn faster than others (e.g. oak burns slowly whereas pine burns very quickly). When are fires dangerous to humans and forests? Have any forests in your area suffered from forest fires? What precautions can you take to ensure your campfire does not start a forest fire? Discuss in your group. You can also enjoy the campfire by singing or reading around it. Discuss how campfires are important to different cultures – what events or rituals can you think of that take place around a fire?

Extension: Plan and lead a campfire sing-along with a forest theme.

C.03 PLAYFUL LEARNING Research different kinds of games traditionally played by forest-based cultures. Play three of these games; choose one game that is played in your country and two that are played in other countries. What does each game teach the players?

LEVEL ● 2 1

C.04 OUTDOOR ADVENTURES What are some different recreational activities you can do in the forest (e.g. camping, hiking, rock climbing, cooking, etc.)? Write down all your ideas. Choose three activities and create an illustrated guide of things to wear or to bring with you for these activities. Carry out at least one of these activities with them.

LEVEL ● 2 1

C.05 WISH TREE Collect forest materials that can be used as paper (e.g. **bark**, leaves, etc.). Write wishes on them, and then use them to create a big collage of a tree – or a group of trees, if you have enough. Your wishes can be for yourselves, your friends and families or the whole world. Make sure to send photographs of your wish trees to **yunga@fao.org**!

LEVEL ● 2 1

STEPHEN TSZ CHUN CHAU, Aged 15, HONG KONG, CHINA

GOOD IDEA

C.06 FORESTS AROUND THE WORLD Learn how to say "forest" and "tree" in ten different languages. On a map of the world, write the word in its language on each of the ten countries. Do you notice any similarities between the words? Are similar words close to each other on the map? Why do you think this might be?

LEVEL 2 1

C.07 YOUR SPORT Invent a sport and play it in the forest. How does the forest environment support your sport?

LEVEL 1 2

C.08 LITERARY INSPIRATION Read some poems, stories or plays that feature forests. How does the author describe a forest? What are some of the words or phrases he/she uses? What do the poems or stories make you think and feel? Why do you think the author chose to portray the forest in this way? Does the description make you want to visit this forest? Share your answers with your group.

LEVEL 3 2 1

Extension: Write a poem, short story or play inspired by a forest yourself!

C.09 SING WITH THE FOREST Create and perform a song about a forest. You can also collect items as you walk through the forest and make a musical instrument to accompany your favourite song, or the song you have written (e.g. rustling with leaves; drumming with sticks; whistling like a bird, etc.).

LEVEL 3 2 1

DON'T pick and eat any plants because some poisonous plants look very similar to non-poisonous ones.

DON'T collect living creatures.

ALWAYS remember to wash your hands afterwards.

GOOD IDEA

C.10 FOREST ART GALLERY Create a piece of art, such as a painting, drawing or sculpture, inspired by forests. Write or record a short artist's statement describing your piece. Have your friends create pieces of art too. Display your artwork in a 'forest art gallery' at your next meeting; you can invite your family and friends to take a tour and explain your exhibits to them.

LEVEL 3 2 1

ABY ABRAHAM, Aged 13, QATAR

C.11 FOREST FOODS Forest **biodiversity** is an excellent source of food for plants, animals and even people. Invite someone who collects wild foods from the forest to your meeting. If you don't know of anyone, then research which edible foods are available for collecting and hunting in your local forest. What is the tastiest, safest and healthiest way to prepare these foods? If possible, ask the person you invite to help you prepare a meal with forest-based foods, or do so with your group. Bon appétit!

LEVEL 3 2 1

DON'T pick and eat any plants that you are not able to identify, as they may be poisonous.

GOOD IDEA

C.12 SACRED FORESTS For some groups of people, the forest is a sacred, spiritual or religious site. Pick three **indigenous communities** or religions that value forests in this way. Find out why the forest is important to each one. How is the forest used? Which parts of the forest? When is the forest used? What, if any, are the taboos (things that are not OK to do) in the forest? Why do you think the forest was chosen as a special place, instead of a city centre for example? Share your findings with your group.

LEVEL 3 2 1

GOOD IDEA

C.13 FIND YOUR WAY Participate in a forest orienteering event where you have to find your way through a forest with a map. If you live in a place where there is snow, try orienteering in different seasons. You could hike in the spring or summer, and try snowshoeing or cross-country skiing in the winter months.

LEVEL 3 2

C.14 DISASTER SCULPTURE

LEVEL 3 2

Create a sculpture inspired by a natural disaster. When a **natural hazard**, such as a flood, typhoon, hurricane, cyclone (spiralling winds) and earthquake severely harms people, their homes and their **livelihoods**, the event is called a 'disaster'. To cope with tragedy and loss, people sometimes create sculptures and pieces of art out of 'reclaimed wood' (from the uprooted trees). If you live in a disaster-affected area, try using reclaimed wood to create a carving or sculpture. Otherwise, use wood that has been **sustainably sourced**. If you live near the sea you could also use driftwood that you find on the shoreline.

C.15 TRAIL TRACKERS

LEVEL 3 2

Some people who live in and around forests are very good at navigating their way through forests even though there are no roads or street signs. Instead, they use other landmarks or trail markers to find their way. Learn how to make trail symbols meaning things like 'go straight ahead', 'turn right', 'stop' and 'I have gone home'. With two or three friends, make a trail through the woods using trail symbols. Invite another group to try following your trail.

C.16 FOREST FARMERS

LEVEL 3 2

Some forest-based peoples grow food and farm animals in forests. Through their cultivation (growing plants), they can actively manage **biodiversity**, sometime even increasing the **biodiversity** present in the area. Learn about one group that farms in a forest. Share your findings with your group in a creative way, such as a model, comic strip or short illustrated novel.

C.17 LIFE IN THE TREES Some forest-based peoples, such as the Korowai in West Papua, build incredible tree houses in the jungle. Learn about two **indigenous peoples** who build temporary or permanent tree huts, hammocks or houses in the forest. Build a miniature replica of one of these houses.

LEVEL 3

C.18 NEWS REPORT Interview an **indigenous person** about an important challenge facing his or her people, and their use of local forests. Write a newspaper report or make up a radio show based on your interview. Remember to ask for the person's permission to share the information they give you. It is also a good idea to have the person preview your report before you show it to your family and friends. If you have permission from the person you interviewed, you may even want to share your report or radio show to the local newspaper or radio station!

LEVEL 3

C.19 POLITICAL FORESTS Pick one example of how the forest has been used as a site of political resistance, for example in the Chipko Movement in India or the Green Belt Movement in Kenya. Learn about it: what happened, when and where? Who participated? What was the cause? What were the results? Why was the forest important to the movement? Present your results in a creative format such as a podcast, spoken word poem, a dance or journalistic account.

LEVEL 3

C.20 Do any other activity approved by your teacher or leader.
LEVEL 1 2 3

SECTION D:

FORESTS AT RISK

DO EITHER D.1. OR D.2. AND (AT LEAST) ONE OTHER ACTIVITY OF YOUR CHOICE.

AFTER COMPLETING OUR FORESTS AT RISK ACTIVITIES, YOU WILL BE ABLE TO:

- **APPRECIATE the factors that are putting our world's forests at risk.**
- **UNDERSTAND the wider impacts on the planet as a result of losing forests.**

DO ONE OF THE TWO COMPULSORY ACTIVITIES BELOW:

D.01 FORESTS UNDER THREAT Create a collage, model or educational poster of the threats to forests in your area and to forests around the world. Write a short artist's statement to accompany it explaining the impacts of these threats and what we can do to make a difference. If possible, display your artwork in a public space, like a school or a park visitor's centre.

LEVEL 3 2 1

D.02 LOSING BIODIVERSITY Forest animals suffer as forests are destroyed or degraded. The many thousands of forest **species** currently at risk of **extinction** include some of the most well-known animals on Earth, such as giant pandas, Asian rhinoceroses, tigers, orangutans and gorillas. Pick your favourite forest animal out of those facing **extinction**, and make a poster describing its current situation and how you think this animal could be protected from **extinction**.

LEVEL 3 2 1

SR. SALWA TASNIM, Aged 13, BANGLADESH

D.03 LOGGING Invite someone who works in the logging industry to speak at your meeting. Ask them what their company and the logging industry are doing to ensure that forests do not disappear. What can consumers (people who buy wood products) do to support **sustainable** logging practices (i.e. logging practices that don't harm the environment in the long-term)? How can you tell if a wood product does not come from an **endangered species** or a **primary forest**?

LEVEL 3 2 1

D.04 ALIENS! Find out which kinds of **invasive species** now live in forests in your area. Are they insects, mammals, viruses, trees, grasses or something else? Where did they come from? How did they get to your forest? How are they affecting it? What measures can be taken to prevent more 'alien invasions'? Share your findings with your group.

LEVEL 3 2 1

D.05 THE FATE OF FORESTS Split up into groups, with each group picking a continent. Find out how much forest cover your continent has today, and how much forest cover it has lost over the years. Why did this happen? How did this forest loss affect life on that continent? Create a poster of your findings and re-group for a poster viewing.

LEVEL 3 2 1

D.06 FORESTS AND YOU Do you live near a forest? How important a part does it play in your life? How would you feel if it were to disappear? Write a report about what your forest means to you and your community. If you do not live near a forest, then write about why you might like to have one nearby, and how it would affect your life. Read your pieces out loud to each other in your group.

LEVEL 3 2 1

SIDDHI PRASAD, Aged 8, QATAR

GOOD IDEA

D.07 FAVOURITE FOREST Look up different forests in the world and choose one that seems especially nice to you. Would you like to visit this forest? Why? Is this forest facing any risks? What are they? What are people doing to protect it? What are your own suggestions for how it can be protected? Create a poster about this forest and why, in your opinion, it is important to look after it. Then present your posters to each other in the group.

LEVEL 3 2 1

D.08 BUSHMEAT **Bushmeat** (wild meat) is a very important source of protein for rural households (households in the countryside) in some parts of the world like Central Africa. Unfortunately, in some places, **bushmeat** **species** are disappearing because of **over-exploitation**. Find three countries where people eat **bushmeat**. What **species** of animal do people eat? How are they hunted? What is the impact of **bushmeat** hunting on forests? What do you think should be done to address the '**bushmeat** crisis'? Share your findings with your group.

LEVEL 3 2

D.09 DEFORESTATION AND DEGRADATION

LEVEL 3 2

Deforestation and forest **degradation** are major threats to forests worldwide. What portion of your country is covered by **primary forest** and what portion by other forest types? What is the current rate of **deforestation** in your country? Is it greater or smaller than the global average? Is it faster or slower than in previous years? Why do you think this is? Invent a creative way to share your findings with your group.

D.10 WATER-SMART SPECIES

LEVEL 3 2

All life needs water to survive. But getting enough water can be tricky in some seasons, for example in the dry season when it doesn't rain, or in the winter when the water is frozen. Learn how four different forest **species** (e.g. a **coniferous** tree, a bird, a mushroom and a wildflower) manage to find water or survive without water during these periods. Do you think these strategies will continue to work if **climate change** affects water availability in forests? Why or why not?

D.11 NON-WOOD AND NOT GOOD

LEVEL 3 2

Some **non-wood forest products** (NWFPs) are produced in ways that can be environmentally damaging. For example, as we learned earlier, large areas of forest are often cleared to produce profitable palm oil. Investigate your home to find how many of the items you use contain palm oil. Were they produced **sustainably**? If not, could you switch to a company that engages in responsible farming, or perhaps switch to different products? Do the same research for other NWFPs in your home.

GOOD IDEA

D.12 FORESTS AND CLIMATE CHANGE

LEVEL 3 2

Research which gases were present in the **atmosphere** historically. What was the percentage of each gas in the **atmosphere**? Compare your findings with current types and levels of gases in the **atmosphere**. Why have these gas types and levels changed over time? According to scientists, how do atmospheric gases affect plant life in forests? What you do think might happen if **carbon dioxide** levels keep increasing? Share your findings with your group.

GOOD IDEA

D.13 FORESTS IN FLAMES

LEVEL 3

Fires can be part of the natural forest cycle. In fact, some seeds need the intense heat of a fire before they can germinate. On the other hand, some fires destroy huge parts of forest and people's homes. Find out how your municipality and/or country deals with forest fires. Does it carry out controlled burns (burning specific parts of the forest under careful supervision)? Does it allow natural forest fires? Does it educate residents on forest fire prevention? Are fires important to the forest **ecosystems** in your area? What can you do to prevent accidental and uncontrolled fires? Share your ideas with your group.

D.14 DIGGING FOR DIRT

LEVEL 3

Form teams and set out to investigate different types of pollution in your area, for example water pollution (which can also take the form of **acid rain**), and soil pollution. How big a problem is it in your area? What are the causes? Is it affecting forest **biodiversity**, and if so, how? What can be done to prevent this pollution problem? Present your findings in the form of a news report.

D.15

Do any other activity approved by your teacher or leader.

LEVEL 1 2 3

SECTION E:

TAKE ACTION

DO EITHER E.1. OR E.2. AND (AT LEAST) ONE OTHER ACTIVITY OF YOUR CHOICE.

AFTER COMPLETING OUR TAKE ACTION ACTIVITIES, YOU WILL BE ABLE TO:

- **ORGANIZE and PARTICIPATE in a community initiative to help protect your forests.**
- **CONVINCE other people to join in the efforts to protect Earth's forests!**

DO ONE OF THE TWO COMPULSORY ACTIVITIES BELOW:

E.01 FOREST FÊTE Plan and/or participate in a forest celebration with games, music, sports, entertainment, food and other fun things. Invite your family and friends to join the festivities. You can also combine this activity with exhibitions, presentations or performances you have prepared throughout this challenge badge! If your country has a national forest day, you can host your event on that day. International Forests Day is on March 21st each year and the International Day for Biological Diversity is on May 22nd.

LEVEL 3 2 1

E.02 PLANT A TREE Work with a teacher or parent to find a community space where your group can get permission to plant a tree. Next, research which type of tree to plant. Visit this Web site for instructions on how to go about planting your tree: **http://greenwave.cbd.int/resources/how-to-plant**, and then organize an official tree planting ceremony. Invite friends and family to join you on the big day and hand out information about trees and forests, encouraging everyone to organize tree plantings of their own. Make sure you plan how to take care of your tree after having planted it, and how to share responsibility for doing so.

LEVEL 3 2 1

TSUNG NGUYEN THANA, Aged 14, VIETNAM

E.03 LESS LITTER! Unfortunately, garbage sometimes becomes a part of the forest landscape. Visit a forest in your area and look for litter and other waste. You might be surprised to see how nature breaks down the garbage: decomposing paper coffee cups, mosses and grasses growing in a rusty old car. Think about how you can get rid of the garbage and help to prevent more littering in the forest. Share your ideas with your family and friends. Carefully collect the garbage and dispose of it properly, for example, in recycling bins.

LEVEL 3 2 1

Wear gloves and protective clothing, if appropriate!

GOOD IDEA

E.04 FUNDS FOR FORESTS Organize a fundraiser to raise money to protect a forest (or part of one). Donate the money to a local forest **conservation** group or to an organization working on forest protection in another country. It's important to research the organization you will be supporting before you have your fundraiser. Don't forget that your fundraiser is also an opportunity to teach other people about the benefits of forests and the threats they face!

LEVEL 3 2 1

E.05 ANTI-INVASION EDUCATION Make a poster showing what people can do to prevent the transfer of **invasive species** between forests. Display your artwork in a public space such as at the beginning of a nature trail, a school or a park visitor's centre. Maybe you can give a talk or presentation to your local community, too.

LEVEL 3 2 1

E.06 BEYOND DOCUMENTARIES With your group, watch a documentary about a forest. Afterwards, discuss the issues the film raises. Whose points of view are represented in the film? Whose are not represented? What are the most important messages? What actions are recommended? And most importantly: what will your group do to follow up its recommendations? Make an action plan and then carry it out.

LEVEL 3 2 1

E.07 REDUCE, REUSE, RECYCLE Look around your home for the next few days, taking stock of your household's use of items derived from trees, such as paper towels and notebooks. Are you using more than you need to? Could you be reusing more? Are you recycling when items can no longer be reused? Create a checklist of reminders and place it somewhere your whole family can easily see it (e.g. on the fridge). Check to see if everyone is following it, and how it is impacting the overall use of forest derived products in your home.

LEVEL 3 2 1

SOFIA DEL RIO ROJAS, Aged 7, MEXICO

E.08 GREEN WAVES Host a ***Green Wave*** celebration on the International Day for Biological Diversity! ***The Green Wave*** is a global campaign which educates children and youth about **biodiversity**. Its main activity involves local tree-planting celebrations held each year at 10 am local time on the International Day for Biological Diversity (always on May 22nd). Together, all of these celebrations create a 'green wave' across the planet that starts in the far east and travels west. Don't forget to sign up on **greenwave.cbd.int**.

LEVEL 3 2 1

E.09 GREEN GARDENING Healthy soil is essential for healthy forests. Do your part by taking care of the soil in your garden. One great way to do so is by preparing a compost bin (find out how: **www2.epa.gov/recycle/composting-home**). Composting is nature's way of recycling organic materials back into the soil in order for the cycle of life to continue. The billions of living **organisms** in healthy soil transform dead plants into vital **nutrients** for new plant growth. Keep a diary of what you are putting in the bin and keep an eye on your plants to see if it makes a difference. If you do not have a garden, create a poster about composting and its importance in general, and share with friends and family members who do have gardens.

LEVEL 3 2

E.10 FOREST VOLUNTEERING Spend a few hours each week for a couple of months helping a local forest **conservation** organization.

LEVEL 3 2

E.11 CONTACT DECISION MAKERS In addition to United Nations agencies, there are other organizations that work on forest issues, too. Learn about some of these actors and decision-makers. What is one issue that they are working on that really interests you? Why is the issue important to you? What might a possible solution to the issue be? Share your opinion about a specific forest policy with your government or elected official. You can contact them by writing, phoning or visiting them in person.

LEVEL 3 2

E.12 CONSUMER CONFESSIONS Keep a diary in which you monitor your everyday habits and their potential impacts on forests. For instance, are you consuming more energy and beef than necessary? Do you buy wood and **non-wood forest products** from responsible companies only? After one month, come together as a group and compare notes. Discuss ways in which you can improve your consumer habits.

LEVEL 3 2

E.13 BLOG IT! Start a blog in your group about your local forest and different ways in which community members can help protect it. Spread the word by emailing the blog to family and friends and asking them to pass it on. Invite people to comment or contribute forest-related content. Hold a photograph competition and invite people to submit pictures of your local forest. Upload the images to the blog and ask people to vote for their favourite photo.

LEVEL 3

E.14 CARBON JOURNALISM Prepare a business newscast to teach people about **carbon markets and carbon offsets**. Perform it as a live or recorded radio, television or online broadcast.

LEVEL 3

E.15 Do any other activity approved by your teacher or leader.

LEVEL 1 2 3

OASE QOMARA, Aged 14, INDONESIA

CHECKLIST

Keep track of the activities you are undertaking in this checklist. When you show that you have completed them, you will have earned the Forests Challenge Badge!

YOUR NAME: .....

YOUR AGE: 1 (5 to 10 years) 2 (11 to 15 years) 3 (16+ years)

	Activity n°	Activity name	Completed on (date)	Approved by (leader's signature)
A Forest life				
B Forests in Use				
C Forests and Culture				
D Forests at Risk				
E Take action				

YOUR NOTES

RESOURCES AND ADDITIONAL INFORMATION

STAY UPDATED

This challenge badge is one of several complementary resources and activities developed by YUNGA and its partners. Please visit **www.yunga-un.org** for additional resources or subscribe to the free news letter to receive updates of new materials by sending an email to **yunga@fao.org.**

SEND US YOUR NEWS

We would love to hear about your experience of undertaking the challenge badge! Which aspects did you particularly enjoy? Did you come up with any new ideas for activities? Please send us your materials so we can make them available to others and gather ideas about how to improve our curricula. Contact us at **yunga@fao.org.**

CERTIFICATES AND BADGES

Email **yunga@fao.org** for certificates and badges to reward course completion! Certificates are FREE and cloth badges can be purchased. Alternatively, groups can print their own badges; YUNGA is happy to provide the template and graphics files free of charge on request.

WEB SITES

On the **BIRDLIFE** Web site, learn about birds, their habitats, global biodiversity and examples of conservation projects: **www.birdlife.org**

The **CONSERVATION INTERNATIONAL** Web site provides examples of successful forest conservation programmes and informative graphics about forests and their role in mitigating climate change: **www.conservation.org/learn/climate/forests/Pages/overview.aspx**

The **CONVENTION ON BIOLOGICAL DIVERSITY (CBD)** youth pages have information about the CBD and biodiversity and offer many activities and resources for young people: **www.cbd.int/youth**

The **ENCYCLOPEDIA OF LIFE** is an online reference book and database of all species known to science: **www.eol.org**

The **FAO CHILDREN AND YOUTH CLIMATE CHANGE** portal contains activities, resources, events, competitions and projects related to biodiversity, climate change and other issues that concern youth: **www.fao.org/climatechange/youth/en**

The **FOREST ACADEMY** encourages you to learn about trees and forests by playing interactive games online and collecting merit badges as you go: **www.theforestacademy.com/en**

THE GREEN WAVE Web site is your gateway to an exciting biodiversity project for young people. It offers lots of resources and stories about how youth around the world are celebrating biodiversity: **www.greenwave.cbd.int**

The **ROYAL SOCIETY FOR THE PROTECTION OF BIRDS** in the United Kingdom has an excellent programme for children. Visit the Wildlife Explorers Web site for great resources and activities. Several activities in the Wildlife Action Awards inspired activities for this badge: **www.rspb.org.uk/youth**

TUNZA is the children and youth programme of the United Nations Environment Programme. Its Web site has information about youth activities and campaigns, as well as publications and multimedia resources: **www.unep.org/tunza**

Have a look at TUNZA's magazine for youth, which has a special Forests edition: **www.ourplanet.com/tunza/issue0403en** and also UNEP's magazine's special Forests edition: **http://unep.org/pdf/ourplanet/OP-2008-09-en-FULLVERSION.pdf**

United Nations
Educational, Scientific and
Cultural Organization

UNESCO's World Heritage Forest Programme conserves natural forests around the world by making them recognized World Heritage sites – now covering over 75 million hectares of land around the world. Find out more: **http://whc.unesco.org/en/activities/43**

UNICEF VOICES OF YOUTH is an online space where you can shout out your own views and also find out what other young people are saying on different topics, including the environment: **http://voicesofyouth.org/sections/environment/pages/environment-the-big-picture**

The **UNITED NATIONS CYBERSCHOOLBUS** is a global teaching and learning project that covers topics such as peace, human rights, environment, health and the ocean: **www.cyberschoolbus.un.org**

2011 was the **UNITED NATIONS INTERNATIONAL YEAR OF FORESTS** and its Web site provides a host of information on all things forest: **www.un.org/en/events/iyof2011**

The **WORLD ASSOCIATION OF GIRL GUIDES AND GIRL SCOUTS (WAGGGS)** Web site contains many resources and news on environmental issues such as the 'Together we can Change our World' badge on the Millennium Development Goals: **www.wagggsworld.org**

The **WORLD ORGANIZATION OF THE SCOUT MOVEMENT (WOSM)** have teamed up with the United Nations Environment Programme (UNEP) to be a part of the 1 Billion Trees Campaign. Check it out: **www.plant-for-the-planet-billiontreecampaign.org**

The **WWF** Web site contains interesting facts and figures on forests and the different ways they are important to us: **wwf.panda.org/about_our_earth/about_forests**

GLOSSARY

ACID RAIN: Any type of **precipitation** that contains nitric and sulphuric acids, which form when rain mixes with sulphur and nitrogen oxides, gases that are released into the **atmosphere** when **fossil fuels** are burned. Acid rain harms plant and animal life.

AGRO-FORESTRY: A type of farming that integrates growing trees with cultivating crops or raising livestock.

AMPHIBIANS: A large group of animals that live both in water and on land. Billions of years ago, amphibians were the first animals to start living on land. Modern amphibians include frogs, salamanders and newts. Today, most amphibians lay their eggs in the water, meaning that their young begin their life underwater.

AQUACULTURE: The farming of marine or aquatic animals or plants for food, usually in cages, ponds or sometimes on ropes or racks.

ATMOSPHERE: The atmosphere is a layer of gases around the Earth that is held in place by gravity. The gases in the atmosphere include **oxygen** (which humans and animals need to breathe) and **carbon dioxide** (which plants need to respire, which is like breathing). Also see **greenhouse gases**.

ATOM: Everything in the world is made up of miniscule particles called 'atoms'. These particles are like small 'building blocks'. Different atoms combine to make up **molecules** of different substances.

BARK: The thick, protective layer covering a tree's trunk and branches.

BENEFIT-SHARING: Benefit-sharing implies that everyone has equal access to local **natural resources** and the gains (physical or financial) they provide. Also see **biopiracy**, where benefits are not shared.

BIODIVERSITY: The variety of all the different kinds of plant and animal life on Earth, and the relationship between them.

BIOMASS: Plant material and animal waste that are used as a fuel or energy source.

BIOME: A biome is an area of the planet that can be classified according to the plants and animals that live in it. A biome is different from an **ecosystem**, because an **ecosystem** refers to the interaction of living and non-living things in an environment, while a biome is a specific geographic area defined by the **species** living there.

BIOPIRACY: The act of commercially developing naturally occurring biological products, such as plant chemicals or animal genes without the consent of and/or fair compensation (e.g. payment) of the people or country where the material was first discovered. Biopiracy is usually committed by technologically advanced countries or organizations.

BIOPROSPECTING: Searching for plants, animals and other biological matter that can be used for commercial products, such as cosmetics or medicine.

BOREAL: Of, or relating to, the Northern part of the world. For example, boreal forests are found in the Northern hemisphere.

BUSHMEAT: Wild meat from animals that have been hunted or caught, not farmed.

CANOPY: The top layer of a forest, including treetops and the plant **species** that reach above the canopy.

CARBON DIOXIDE (CO_2): A gas made up of carbon and **oxygen**, which makes up less than one percent of the air. A carbon dioxide molecule is made up of one carbon **atom** (C) and two oxygen **atoms** (O_2). CO_2 is produced by animals and used by plants and trees. It is also produced by human industrial processes such as burning **fossil fuels**. CO_2 is a **greenhouse gas** and can speed up **climate change**.

CARBON MARKETS AND CARBON OFFSETS: An economic concept to regulate **carbon dioxide**. Because **carbon dioxide** is a gas, it is everywhere. This means that if **carbon dioxide** is released (emitted) into the world's **atmosphere** in one place, it can be removed again in another place. This is called 'carbon offsetting'. Large industrial countries that produce a lot of **carbon dioxide** make up for some of their carbon pollution by buying offsets from projects that reduce (mitigate) carbon levels in the **atmosphere**. This buying and selling of carbon offsets is called the 'carbon market' or 'emissions trading'. Also see **climate change**, **greenhouse gases**, **mitigation of climate change** and **REDD+**.

CARBON SINK: A 'reservoir' in which carbon can be stored in a harmless solid form, instead of in the harmful gaseous form that can speed up **climate change**. A tree is an example of a carbon sink. The four major sinks, which are regions of the Earth within which carbon behaves in a systematic manner, are the **atmosphere**, the land-based biosphere (usually including forests and **fresh water** systems), the ocean, and sediments (including **fossil fuels**).

CERTIFICATION SCHEME: Certification schemes establish a set of rules and conditions that ensure **natural resources** (like timber) are produced or sourced fairly and sustainably (without damaging the environment).

CLIMATE: This is the long-term average, or overall picture, of the everyday **weather** experienced in a location.

CLIMATE CHANGE: A change in the overall state of the Earth's **climate** (such as temperature and rainfall) caused by both natural processes and human activities. The build-up of **greenhouse gases**, such as **carbon dioxide**, in the Earth's **atmosphere** is an example of how some human activities (e.g. energy production, transportation, farming and the manufacturing of goods) can accelerate climate change.

CONIFEROUS: Tree **species** that bear cones as their seed source. Coniferous trees are mainly found in the Northern hemisphere.

CONSERVATION: Maintaining the health of the natural world (including land, water, **biodiversity**, and energy) by changing human needs or habits.

CROWN COVER: The amount of forest **canopy** covering and shading the **forest floor**.

DECIDUOUS: Decidious plants lose their leaves in winter. This type of forest associated with a humid **climate** that includes tree **species** such as oak, beech, birch, hickory, walnut, maple, elm and ash.

DEFORESTATION: Removing a forest or part of a forest (e.g. by cutting it down and burning it) to use the wood (e.g. to make paper or furniture) or to use the land for something else (e.g. farming or building on it).

DEGRADATION: Degradation takes place when parts of an ecosystem (e.g. a forest) is damaged (e.g. because some of it is cut down) but the ecosystem is not yet lost. This may only be temporary, in which case a damaged forest could grow back into a healthy one over time.

DESERTIFICATION: Land can also be degraded (see **degradation**). This is especially likely to happen in arid (dry) or semi-arid areas, where little water is available to help maintain fertile soils. In bad cases, this can lead to the collapse of the **ecosystem** and make farming very difficult.

DEVELOPED COUNTRY: A socially and economically well-off country, with high levels of industry, technology, infrastructure and so on.

DEVELOPING COUNTRY: A poor country that is trying to become more economically advanced. Developing countries tend to rely heavily on subsistence farming or fishing (where farmers or fishers grow, raise or catch enough food only to feed their families, and rarely produce enough to sell on to earn a living).

DROUGHT: A prolonged period of unusually low rainfall, leading to a shortage of water. Droughts may lead to **desertification**.

ECOSYSTEM: The physical and biological components of an environment, and their interactions. An ecosystem is relatively self-contained and is defined by the types of **organisms** found in it and their relationships to each other (e.g. how the plants, animals and non-living parts of a forest interact).

ECOSYSTEM GOODS AND SERVICES: The benefits that humans and the natural environment can obtain from natural ecosystems. There are four types of **ecosystem** services: provisioning (providing food and water), regulating (e.g. healthy tree roots in the ground help with flood control), cultural (people enjoy spending time in nature; some cultures worship nature or parts of it) and supporting (e.g. the natural water cycle helps maintain life on Earth).

ECOTOURIST/ECOTOURISM: Ecotourism is a kind of tourism that has a low impact on the environment and supports local **livelihoods**. Ecotourists often like going to areas of natural beauty to enjoy nature.

EMERGENT LAYER: The tallest layer of trees in a forest; the layer that sticks out above the **canopy**.

ENDANGERED: If a plant or animal **species** is in danger of becoming **extinct**, it is said to be 'endangered'.

ENDEMIC: A **species** that is **native** to a particular area or environment and not found naturally anywhere else.

EPIPHYTE: A plant that grows on and lives off other plants without roots of its own in the ground. For this reason, epiphytes are sometimes also known as 'air plants'.

ERODING, EROSION: The wearing away of the land surface by rain, running water, wind, ice, gravity, or other natural processes or human activities.

EVERGREEN: A plant that keeps its leaves or needles all year round (unlike **deciduous** plants).

EXTINCT, EXTINCTION: The state in which a plant or animal **species** no longer exists on Earth.

FAMINE: An extreme scarcity of food, leading to chronic hunger.

FOOD WEB: A system of interdependent food chains. Food chains show us the links between **organisms** based on what eats what. As some **organisms** eat the same things, these chains cross over, forming complex food webs.

FOREST FLOOR: The bottommost layer of a forest.

FOREST PLANTATION: A forest established by planting or/and seeding in new trees to cultivated land. It consists of introduced **species** or, in some cases, **indigenous species**.

FORMAL ECONOMY: The official economic system in a country (of earning money, buying and selling goods) that is recognized by the government.

FOSSIL FUELS: Fuels that are derived from prehistoric plant or animal remains and take millions of years to form.

FRESH WATER: Naturally occurring water that is not salty (e.g. in rivers, lakes and groundwater).

FUNGUS (PLURAL: FUNGI): An **organism** that grows in the soil, on dead matter or on other fungi by decomposing organic matter. This process means **nutrients** are reused ('nutrient recycling'). Mushrooms, for example, are the fruits of specific kinds of fungi.

GERMINATION: The process by which seeds start growing into plants.

GOODS AND SERVICES: Goods are products that we consume or use, like clothing or groceries. Services refer to intangible items we make use of, such as electricity or an internet connection, which make our lives easier.

GREENHOUSE GASES: These are gases in the **atmosphere** that can absorb and emit (or radiate) heat. They include water vapour, **carbon dioxide**, methane, nitrous oxides and ozone. Human activities like industrial production, energy production and transportation have increased the levels of greenhouse gases in the **atmosphere** to such an extent that the Earth's temperature is starting to rise: this is known as **climate change**. Also see **mitigation of climate change**, **carbon markets and carbon offsets** and **REDD+**.

HABITAT: The local environment within an **ecosystem** where an **organism** usually lives.

HARDWOOD: The wood from 'angiosperm' trees, which means their seeds have some sort of covering. Hardwoods are used for construction, furniture, flooring, and containers, among other things.

HARVEST: The act or process of gathering crops or **natural resources**, such as trees.

INDIGENOUS PEOPLE, INDIGENOUS COMMUNITIES: The people who were the original or oldest known inhabitants of a particular area (also known as native peoples, first nations peoples or aboriginals). These communities often have a strong cultural, and sometimes spiritual, connection to the forests in which they live.

INVASIVE SPECIES: Animals, plants and other **species** that have been introduced to an area from elsewhere, either by accident or on purpose, and negatively affect the **native habitat** and **biodiversity** by out-competing **native species**.

LIVELIHOOD: A way of supporting yourself, either by earning money through a paid job or by growing, producing and/or gathering everything you need to survive.

MICROORGANISM: A creature too small to be seen with the human eye alone, but which can be seen through a microscope. In **ecosystems**, they help to recycle **nutrients**.

MITIGATION OF CLIMATE CHANGE: Decreasing the amount of **greenhouse gases** in the **atmosphere**. There are different ways in which **greenhouse gases** can be removed from the **atmosphere**. Trees, for example, need **carbon dioxide** to respire – which is why **REDD+**, an international mechanism for **climate change** mitigation, supports the planting and protection of trees and forests. Also see **climate change** and **carbon markets and carbon offsets**.

MOLECULE: When individual **atoms** stick together, they make up small clusters called 'molecules'. Different molecules make up different substances. For example, **carbon dioxide** **atom** is made up of one carbon atom (C) and two oxygen atoms (O_2), which is why its scientific name is CO_2.

NATIVE: Something that is original to a place and occurs naturally there.

NATURAL HAZARD: **Droughts**, floods, hurricanes, landslides and **tsunamis** are all examples of natural hazards that can harm people and/or the environment. Natural hazards are becoming more threatening as they become more severe and more frequent due to **climate change**.

NATURAL FOREST: A forest composed of **native** trees and not classified as **forest plantation**.

NATURAL RESOURCES: Natural resources are useful materials found in the natural environment around us. Water, soil, wood or rocks are examples of natural resources we rely on to survive. We need water for drinking, water and soil for growing food, wood for making things like paper or furniture and rocks for building materials. And those are only a few of the uses we can put these resources to! Can you think of more?

NON-WOOD FOREST PRODUCTS: All forest products except timber are non-wood forest products (NWFPs). NWFPs include resins, oils, leaves, **bark**, **fungi**, animals or animal products, and plants other than trees.

NUTRIENTS: Chemicals which animals and plants need to live and grow.

ORGANISM: A living creature, like a plant, animal or **microorganism**.

OVER-EXPLOITATION: The overuse of a **species** or **ecosystem** that can lead to the inability of a natural area to renew itself. In severe cases, over-exploitation may lead to the **extinction** of a **species**.

OXYGEN (O_2): A gas produced by plants and trees during **photosynthesis**, and used by humans and animals who need it to breathe. An oxygen **molecule** is made up of two oxygen **atoms** (O_2).

PHOTOSYNTHESIS: A biological process found in green plants that uses light as an energy source to convert **carbon dioxide** and water into a source of food (sugars and other useful chemicals). Photosynthesis breaks **carbon dioxide** **molecules** down so that the plant can use the carbon (C). The left over **oxygen** (O_2) **molecules** are released back into the air, which is very important for life on Earth!

PRECIPITATION: The process by which water vapour in the **atmosphere** condenses and falls in the form of rain, sleet, snow or hail.

PRIMARY FOREST: Forests with **native** tree **species** and mostly undisturbed **ecosystem** processes, without visible impact of human activity.

REDD+: An international mechanism which aims to reduce the amount of **greenhouse gases** in the **atmosphere** and to **mitigate climate change**. It rewards governments, local authorities and forest owners in **developing countries** for protecting their forests instead of cutting them down. Its full name is 'Reducing emissions from **deforestation** and forest **degradation** and the role of **conservation**, **sustainable** management of forests and enhancement of forest carbon stocks in **developing countries**', or REDD+ (pronounced 'red plus') for short.

REGENERATE/REGENERATING: To renew or restore something that is damaged. For example, a forest may need to regenerate after a **wildfire**, or after an **invasive species** has been removed.

RENEWABLE RESOURCE: A **natural resource** that can be replaced or replenished, either by the Earth's natural processes or by human action. Air, water and forests are often considered to be example of renewable resources.

REPTILES: Snakes, lizards, crocodiles, turtles and tortoises are examples of reptiles. Some reptiles are terrestrial (living on land), others live on both land and in water, and some exclusively in water (e.g. **fresh water** turtles). Most reptiles lay their eggs on land, where they also develop and hatch.

RIGHTS TO ACCESS: The concept of ensuring that poor and vulnerable people have secure and equitable rights to access land and other **natural resources**.

SILVICULTURE: The process of developing and caring for a forest.

SLASH-AND-BURN: A process of clearing forests by cutting and burning trees to clear land for temporary agriculture or cattle grazing.

SOFTWOOD: Wood from trees known as 'gymnosperm' trees, which means their seeds do not have a covering. Softwood trees are found in the global north and their wood tends to be light, both in colour and weight.

SPECIES: A group of similar **organisms** which are able to breed together and produce healthy offspring that are able to produce young themselves.

SUSTAINABILITY, SUSTAINABLE: The state in which we humans use the natural environment to meet our needs without damaging it so that it can no longer be productive (i.e. can no longer support plant, animal or human life). Making sure that our actions are sustainable means that future generations will be able to live well, too.

SUSTAINABLY SOURCED: This refers to products that are produced with environmental and social impacts in mind. For example, sustainably sourced paper is produced using methods that do not exploit forests, and is often derived from recycled materials.

TEMPERATE: The type of **climate** that can be found between Earth's **tropics** and its polar regions where the temperatures are relatively moderate with few extremes in winter and summer. For example, the Mediterranean **climate** is a temperate **climate**.

TOPSOIL: The top layer of soil, from which plants obtain most of their **nutrients**.

TRAIT: A characteristic or distinguishing feature that identifies an **organism**, like curly hair or tallness. In agriculture, important traits include those that affect a plant's yield (how much it can grow or how much fruit it can bear) or how resistant it is to disease. Some traits are hereditary (can be passed from parent plants or animals to their offspring) and others are not.

TRANSPIRATION: A process where moisture is released from tiny holes called 'stomata' (meaning 'mouths' in Greek!) on the underside of plant leaves.

TROPICS: The areas around the equator, which have a very warm **climate** and about 12 hours of daylight (and 12 hours of darkness) throughout the year. The tropics extend north to the Tropic of Cancer (the line on which the Sun is directly overhead at noon on 21 June) and south to the Tropic of Capricorn (the line on which the Sun is directly overhead at noon on 21 December).

TSUNAMI: Tsunamis are xtremely powerful waves caused by movements at the seabed including earthquakes, volcanic eruptions and underwater landslides.

UNDERSTOREY: The layer of **vegetation** beneath the main **canopy** of a forest.

VEGETATION: The plants and trees in an area.

VERTEBRATE: An animal that has a backbone.

WATERLOGGING: When agricultural land is soaked because there is too much water for it to absorb or drain away, it is said to be 'waterlogged'.

WATERSHED: An area of land that catches rain and snow, and drains into a larger body of water such as a marsh, stream, river, lake, ocean or groundwater. A watershed (sometimes also called a 'drainage basin') can be as small as a few hectares or as large as thousands of square kilometres.

WEATHER: The conditions outside experienced on a day to day basis including the cloud cover, rainfall, air temperature, air pressure, wind and humidity (the amount of water vapour in the air).

WILDFIRE: A large, destructive fire that spreads easily.

WOOD FOREST PRODUCT: Any product produced from the stems and branches of trees and other woody plants.

LEA ANNE R. RULLODA, Aged 14, PHILIPPINES

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*Some of the illustrations in this booklet are a selection from more than 20 000 drawings received from various drawing competitions. See our Web site (**www.yunga-un.org**) or register to our free mailing list (email **yunga@fao.org**) to find out about current competitions and activities.*

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www.sida.se

This badge was developed in collaboration with and is endorsed by:

Convention on Biological Diversity

SECRETARIAT OF THE CONVENTION ON BIOLOGICAL DIVERSITY (CBD) The Convention on Biological Diversity came into force on 29 December 1993 with the objectives to conserve biodiversity, use it in a sustainable fashion and to share its benefits fairly and equitably. The CBD Secretariat manages biodiversity policy discussions, facilitates the participation of countries and groups in biodiversity processes and supports the implementation of the Convention. **www.cbd.int/youth**

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO) FAO leads international efforts to end hunger and promote food security for all people in the world. Serving both developed and developing countries, FAO acts as a neutral forum where all nations meet as equals to negotiate agreements and debate policy. FAO is also a source of knowledge and information, helping countries to modernize and improve agriculture, forestry and fisheries practices and ensure good nutrition for all. FAO's Forestry Department helps member nations manage their forests in a sustainable way, balancing social, economic and environmental objectives.
www.fao.org/climatechange/youth/en

THE GREEN WAVE

THE GREEN WAVE ***The Green Wave*** is a global campaign to educate children and youth about biodiversity. The main activity centres around local tree-planting celebrations held each year at 10 am local time on the International Day for Biological Diversity on 22 May. Collectively, all of these Green Wave celebrations create a 'green wave' that starts in the far east and travels west around the planet. **www.greenwave.cbd.int**

IRINA IORDACHE, Aged 16, ROMANIA

United Nations
Educational, Scientific and
Cultural Organization

UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION (UNESCO) UNESCO was founded on November 16, 1945 in order to respond to the firm belief of nations, forged by two world wars in less than a generation, that political and economic agreements are not enough to build a lasting peace. Peace must be established on the basis of humanity's moral and intellectual solidarity. The Organization strives to build networks among nations that enable this kind of solidarity, by mobilizing for education, building intercultural understanding, pursuing scientific cooperation, and protecting freedom of expression. This specialized United Nations agency has set itself an ambitious goal: to build peace in the minds of men and women through education, science, culture and communication. **www.unesco.org**

THE WORLD ASSOCIATION OF GIRL GUIDES AND GIRL SCOUTS (WAGGGS) The World Association of Girl Guides and Girl Scouts (WAGGGS) is a worldwide movement providing non-formal education where girls and young women develop leadership and life skills through self-development, challenge and adventure. Girl Guides and Girl Scouts learn by doing. The association brings together Girl Guiding and Girl Scouting associations from 145 countries, reaching 10 million members around the globe. **www.wagggsworld.org**

THE WORLD ORGANIZATION OF THE SCOUT MOVEMENT (WOSM) The World Organization of the Scout Movement (WOSM) is an independent, worldwide, non-profit and nonpartisan organization which serves the Scout Movement. Its purpose is to promote unity and the understanding of Scouting's purpose and principles while facilitating its expansion and development. **www.scout.org**

WWF WWF is one of the world's largest and most experienced independent conservation organizations, with over 5 million supporters and a global network active in more than 100 countries. WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption. **wwf.panda.org**

YOUTH AND UNITED NATIONS GLOBAL ALLIANCE (YUNGA) YUNGA was created to allow children and young people to be involved in important issues and make a difference. Numerous partners, including UN agencies and civil society organizations, collaborate in developing initiatives, resources and opportunities for children and young people. YUNGA also acts as a gateway to allow children and youth to be involved in UN-related activities such as the Millennium Development Goals (MDGs), food security, climate change and biodiversity. **www.yunga-un.org**

THE YOUTH AND UNITED NATIONS GLOBAL ALLIANCE (YUNGA) IS A PARTNERSHIP BETWEEN UNITED NATIONS AGENCIES, CIVIL SOCIETY ORGANIZATIONS AND OTHER ENTITIES WHICH DEVELOPS INITIATIVES, RESOURCES AND OPPORTUNITIES FOR CHILDREN AND YOUNG PEOPLE TO LEARN, GET INVOLVED AND MAKE A DIFFERENCE.

YUNGA ACTS AS A GATEWAY FOR CHILDREN AND YOUTH TO PARTICIPATE IN THE ACTIVITIES AND INITIATIVES OF THE UNITED NATIONS.

WE ARE MANY. WE ARE YUNGA!

PRINTED ON ECOLOGICAL PAPER
FSC (FOREST STEWARDSHIP COUNCIL) CERTIFIED

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The purpose of the United Nations Challenge Badges is to raise awareness, educate and motivate young people to change their behaviour and be active agents of change in their local communities. Additional badges are available or are being developed on a number of other topics including: Agriculture, Biodiversity, Climate Change, Energy, Governance, Hunger, Nutrition, the Ocean, Soils and Water.

The Forests Challenge Badge is designed to help educate children and young people about the crucial role that forests play for life on our planet. This booklet includes basic educational contents on the different types of forests and where they grow. It explains how forests provide essential ecosystem services such as clean air, water, and climate change mitigation. It also describes various forest resources and explains how millions of people worldwide rely on forests for their livelihoods. The badge describes the threats to our planet's forests and what is being done to protect them. This material is appropriate for use in school classes, Guide or Scout groups or youth meetings generally. It includes a wide range of activities and ideas to stimulate learning about the importance of forests, while motivating children and young people to help protect forests and become aware of the impacts of their actions on the environment.

FOR MORE INFORMATION ON THIS AND OTHER MATERIALS CONTACT:

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