

Grade 6

BE A FOREST FRIEND

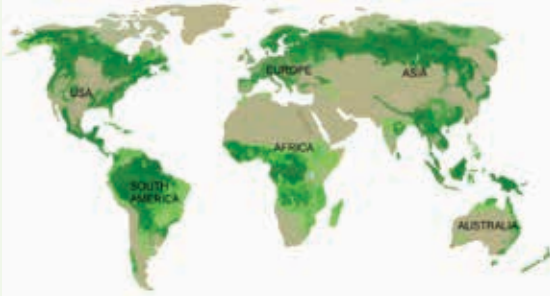
Activity Book



Friends of the Forest

A forest is a big area of plants and animals made up mostly of trees. It is also an ecosystem. Just like you live in a community of people, an ecosystem is a community where plants and animals work together, with the weather and land, to form a 'bubble' of life. Forests are very important for life on Earth. Almost all the land animals, plants and insects on Earth live in forests. Forests also make a lot of the oxygen that we breathe.

Without oxygen, there would be no life on earth!



All over the world, forests are in danger. As you will learn about in this activity book, humans use the wood and pulp from trees for many things that we use in our daily lives. They also destroy forests to make place for houses, farming and mining. Every single second of the day, one forest, the size of a soccer field, is being destroyed somewhere on earth!¹ Unless we learn how to manage and protect our forests, some forests, especially rainforests, could be destroyed for ever.

This is why we all need to be "friends of the forest", people who look after and use forests in a responsible way.

When we look after something, this is called stewardship. Stewardship means being responsible for something and taking good care of it, especially when it belongs to someone else. The forests of the world belong to us all. Whether we use a forest for hiking, hunting, or getting wood, we need to be good forest "stewards", so that other people can use the forests for many years to come.

The Forest Stewardship Council® (FSC®) is an international organisation that helps to manage the world's forests. The FSC makes sure that forest lands are used in ways that are helpful to humans but also kind to the environment.



When you see the FSC label on a product (e.g. furniture and paper), it tells you that the product comes from a forest where the trees were cut down in such a way that they will be able to grow, and to be used, again. It is the job of the FSC to make sure that forests are managed in a sustainable way. When we say that forests are managed in a sustainable way, this means that the trees – and the people and animals who live in the forest – are protected and looked after.

What does a forest steward do? The first thing a forest steward does is plan. Just like you plan for your weekend, forest stewards plan for a forest's future. By planning, a forest steward can make sure that animals have the right food, shelter, water, and hiding places that they need, that humans have what they need from the forests and that trees and plants are looked after. Forest stewards also care about the soil. If roads and trails are planned, they must be built carefully. They should not be too steep or built where it is too wet. Roads that are built in the wrong place, can damage the forest's soil.

You can also be a forest steward by:

- keeping forests healthy and beautiful for plants, wildlife, and people.
- not damaging plants and trees and not littering.
- recycling wood and paper.
- choosing to use products that have an FSC label.

Use and share

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¹Onetreeplanted.org

Forests are the lungs of the Earth



Forests are called the “lungs of the Earth” because they absorb (‘take in’) the carbon dioxide that we breathe out, and then give us the oxygen we need to survive. One leafy tree can produce a whole day’s supply of oxygen for up to 4 people!²

Our earth is getting hotter all the time. This is called global warming. The more carbon dioxide there is in the air, the hotter it gets. Forests help to fight climate change and global warming just by breathing! Trees and plants need the carbon dioxide, which causes global warming, for photosynthesis (the process whereby green plants use the sun’s energy to make their own food). Carbon dioxide

<https://www.adsoftheworld.com/campaigns/lungs-30636458-3515-4df1-b3b4-82c94f264a77>

is stored in wood, leaves and soil. Trees also absorb many kinds of pollution in the air. In this way, forests help to keep our air clean and healthy.

Healthy forests also act like a filter to keep pollution out of water. The strong roots of the trees also help to make sure that the soil in the forest does not get washed away. The plants in the forest need healthy soil to grow in and animals and humans need healthy plants to eat. When forests are disturbed, the soil flows into streams and pollutes our water. This is called soil erosion.

Forests are also home to millions of animals, such as lizards, snakes, turtles, crocodiles, insects, birds, and monkeys. Other wild animals like elephants and gorillas also live in the forests or within the rivers and streams in forest areas. Forests are also very important for our health because many medicines, which we use to make us better, come from the plants and animals that live in the forests.

Forests are very important for our economy (the way people spend and make money). Some forests give us wood to build houses and furniture, as well as to make the paper that this book is printed on. Forests also give us beautiful places to camp, fish, hike, or just relax!

1. Look at each of the following statements about forests. Circle how important each aspect of forests is to you, with 1 being “not at all important” and 10 being “very important”.

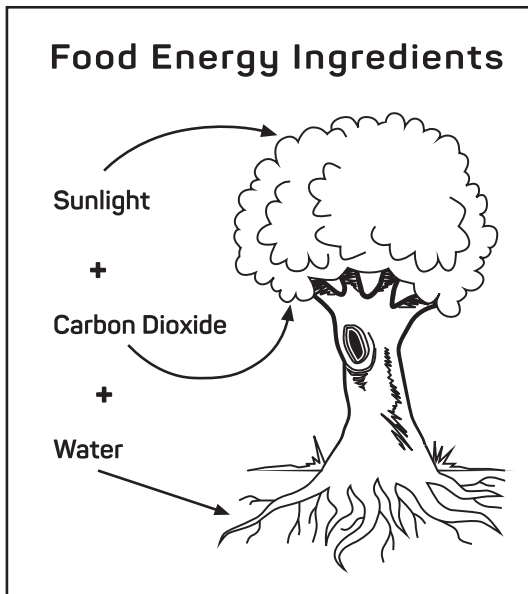
		Not important					Very important				
A	Forests provide food.	1	2	3	4	5	6	7	8	9	10
B	Forests help to control soil erosion.	1	2	3	4	5	6	7	8	9	10
C	Forests give us places to hike, camp and play.	1	2	3	4	5	6	7	8	9	10
D	Forests give us oxygen to breathe.	1	2	3	4	5	6	7	8	9	10
E	Forests help keep water clean.	1	2	3	4	5	6	7	8	9	10
F	Forests provide products like timber (wood) and paper.	1	2	3	4	5	6	7	8	9	10
G	Forests are places of beauty.	1	2	3	4	5	6	7	8	9	10
H	Forests absorb carbon dioxide from pollution.	1	2	3	4	5	6	7	8	9	10
I	Forests provide homes for animals and plants.	1	2	3	4	5	6	7	8	9	10
J	Forests provide firewood and charcoal.	1	2	3	4	5	6	7	8	9	10

2. In your group, compare your choices above with other learners. Are they different or similar? Discuss your choices and why forests are important to you.
3. Create a group collage called “Forests are important”. Use words and pictures (from magazines, the internet, or your own drawings) to describe all the reasons that forests are important.

²<https://www.usda.gov/media/blog/2015/03/17/power-one-tree-very-air-we-breathe>

How energy flows in the forest

We use energy to run and play, but we also use energy to sit in school or sleep. Humans get energy from the food we eat. Energy can be a hard thing to understand because we can't see or touch it.



Forests are ecosystems. Ecosystems are made up of living things ('biotic') like plants and animals that interact with the non-living things ('abiotic') like the soil, stones, rocks, water and energy in their environment.

Depending on how they get their energy, living things are either producers, decomposers or consumers.

Producers are green plants. Even though the sun gives energy to the whole forest, only plants can use that energy. They use the sun's energy to make their own food. This process is called photosynthesis. Green plants provide food and oxygen for other living things. Because people don't have leaves, we can't make our own food.

Decomposers break down the dead plant and animal material. They are the recyclers of the forest because they return the decomposed matter to the soil, water and air for use again. Decomposers include bacteria, fungi, earthworms and snails.

Consumers are living things that eat other living things. Animals are consumers. To consume something means to use it. Animals are consumers because they have to eat something to get energy to live. They cannot make the energy themselves, like plants can. Primary consumers ("herbivores") are animals that eat plants to get energy to live and grow e.g. elephants, antelope and rabbits. Secondary consumers ("carnivores") are animals that eat other animals to get energy to live and grow e.g. leopards, owls, snakes and crocodiles. Both primary and secondary consumers get the energy they need from plants. Even though carnivores don't eat plants, the animals - that they eat for energy - got their energy from the plants that they have eaten. For example, a buck gets its energy by eating a plant. Then when a crocodile eats the buck, it receives energy from the buck. This is an example of a food chain. Some animals (and humans) eat both plants and animals e.g. baboons, warthogs and monkeys. They are called omnivores. Our planet needs enough producers to make energy for all the consumers. When we destroy forests, through deforestation, there are fewer producers left which means that the consumers cannot get enough energy to survive. (You will learn more about deforestation on page 3.)

1. Write producer, consumer or decomposer for each of the following living things.

a. Grass	
b. Elephant	
c. Bacteria	
d. Leopard	
e. Acacia Tree	
f. Earthworm	
g. Mushroom	
h. A blueberry plant	
i. Bear	
j. Black mamba	

2. Use the living things above to draw your own picture of a forest food chain in your workbooks.

Tropical rainforests and deforestation

Rainforests are huge, thick forests that are found around the equator, where it is warm all year round. Rainforests grow in areas where there is a lot of rain and cover only 2% of the Earth's surface, but they are home to more than 50% of all of the plant and animal species on Earth!³

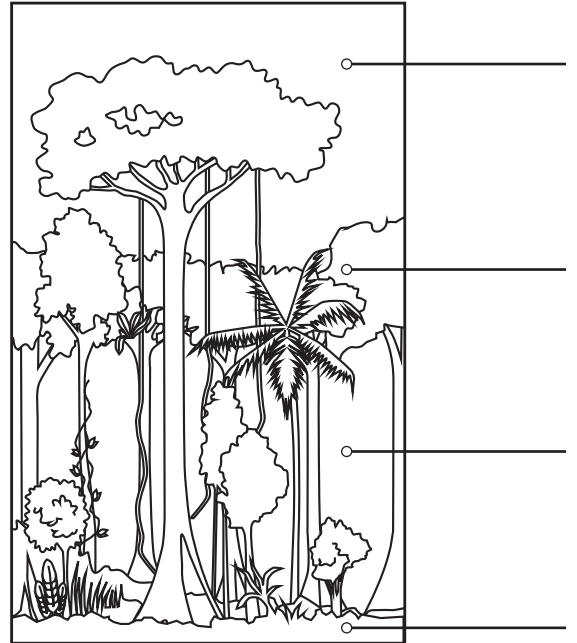
1. As you read this information, fill in the correct word, on the diagram, to describe each part of a rainforest.

A tropical rainforest has many layers. The tallest layer of trees in the rainforest is called the emergent layer. These trees have small waxy leaves to survive in the very hot weather. The emergent layer only has a few wide, very tall trees and is where many animals including monkeys, frogs, lizards, birds, snakes, sloths, and small cats are found.

Beneath the emergent layer is the canopy. The canopy is the thick, leafy roof of the rainforest. The canopy gets lots of sunlight and rain. The thick branches and large leaves of the tall trees in the canopy stop most of the sunlight from getting through to the layers below.

The understory is the layer below the canopy and contains plants that are adapted to live in the shade because very little sunlight reaches this layer. Most plants here have large leaves to absorb the limited sunlight.

Below the understory is the bottom layer of the rainforest, called the forest floor. Hardly any sunlight reaches this layer, so there are not many plants on the forest floor. The only plants on this layer are seedlings, fungi, mosses, ferns, algae, and other plants that can survive with very little sunlight.



2. Draw your own picture of a rainforest. Include some animals in your picture and label the different parts of your diagram.

Rainforests keep the carbon and water in our atmosphere in balance. They also give us food (coffee, chocolate, avocados, bananas), medicine and ingredients for other products such as chewing gum, rubber, fibre for rope, and oils for soap and shampoos.

The biggest threat to rainforests is deforestation. Deforestation means the cutting down or clearing of the trees in a forest. Rainforests are being destroyed so that farmers can grow more food and plant crops like coffee, rubber trees, or palm trees. These crops are grown on large farms called plantations. Deforestation also happens when people build new settlements. The FSC helps to make sure that products, which come from forests, do not create more deforestation. On the West Coast of Africa, we have the second biggest tropical forest region in the world, also known as the Congo Basin. The biggest tropical forest is the Amazon rainforest in South America.

Some farmers cut down large trees and then set fire to the rainforest. Crops are grown there for a few years, until the land becomes useless. The farmers then leave the area and move to a new place. This is called *slash and burn*. Large areas of rainforest are also cut down by *logging*. Machines are used to cut down many trees which are used as timber (wood that is used to make things). With nowhere to live and less food to hunt or eat, many animals and plants could become extinct.

3. In your workbook, make two lists:

- List one: The causes of deforestation
- List two: The effects of deforestation

4. What two methods are used to destroy forests? Write the names and explain them in your own words.

³<https://www.livescience.com/63196-rainforest-facts.html>

Coniferous forests and plantations



Coniferous forests are made up of trees that have cones and needle- or scale-shaped leaves. Coniferous trees are evergreen, which means that these trees keep their leaves all year round. These forests contain many pine and eucalyptus trees. They were planted to improve the landscape and give us a source of timber (wood that is used to make furniture) and pulp (a substance made from wood to make paper). These planted forests are also called plantations. South Africa's timber plantations cover 1.2 million hectares, located in five provinces. There are two main commercial ('money-making') tree types – pine (49%), which is a coniferous (cone-bearing) tree, eucalyptus (43%), and a small amount of wattle (7%).

Hundreds of products are produced from these three tree types. Forests and their products ('the forestry value chain') provide jobs for more than 158 000 people and contribute R69 billion to our country's economy each year.⁴

South Africa also has many natural, or indigenous, forests, for example the Knysna and Tsitsikamma Forests of the southern Cape. These forests have many types of trees, like yellowwood, stinkwood and ironwood trees, and are home to many animals, like bushbuck, leopards, monkeys, baboons, snakes, frogs, Knysna Loeries, owls and eagles.

Over 80% of all the forest plantations in South Africa are certified by the Forestry Stewardship Council. The FSC makes sure that trees are planted, harvested and replanted in a sustainable way, so that there are always trees growing at different stages. Every time a tree is cut down, new trees are planted, for our use, and for future generations. South Africa has one of the highest percentages of forests that are certified by the FSC in the world. We can be proud of our forestry industry because our forests are managed very responsibly.

These 3 Ps summarise why coniferous forests benefit our lives: **Products, Pay and Play**:

Products	Forest plantations grow trees that are mainly used to make building timber (wood), paper, poles, matches and charcoal. The trees are also used in many other products like, toilet rolls, tissues, packaging, pencils, furniture, toys, lipstick, paint, washing powder, cleaning products, tyres, shoes and clothing.
Pay	Forest plantations in South Africa create work for over 150 000 people. ⁵ Many of these jobs are in rural communities, where there is high unemployment. People can have many jobs on a forest plantation, including tree planters, truck drivers, loggers, chainsaw and machine operators, wildlife managers, foresters, fire fighters, plant nursery workers, forest planners, biologists, ecologists, water managers, forest health specialists, insect specialists, conservationists, road builders and surveyors.
Play	Forest plantations and conservation areas provide amazing spaces for people to spend time in nature and enjoy a healthy outdoor lifestyle. There are many activities that we can do in the forest, like hiking, mountain biking, camping, bird watching and trail running.

1. Find the following words in the Word Search. Circle words that relate to **PRODUCTS** in **RED**. Circle words that relate to **PAY** in **GREEN**. Circle words that relate to **PLAY** in **BLUE**.

- | | |
|--------------|----------------|
| Timber | Bird Watching |
| Truck Driver | Logger |
| Hiking | Running |
| Fire Fighter | Pencils |
| Paint | Paper |
| Mountain | Camping |
| Biking | Tree Planter |
| Furniture | Forest Planner |



⁴ www.forestryexplained.co.za

⁵ www.forestrysouthafrica.co.za

'Wood' you believe it?



When we think about the products that we get from trees, many of them are easy to recognise, like wood for making fires, fruits and nuts, furniture, pencils, cricket bats, books and paper. On page 4, you learned about the many other products that come from the trees in forests.



How can so many different products come from trees? Trees are mainly made of fibres called cellulose. The fibres are held together with glue-like matter called lignin.



When wood is cooked, the cellulose is separated from the gluey lignin to make wood pulp. This pulp is made into paper, packaging like boxes and egg cartons, serviettes, toilet rolls, paper cups, envelopes and even disposable nappies. The lignin is used to make different chemicals that go into medicines and even cosmetics like face creams, sunscreen, nail polish and make-up.



The cellulose in wood fibres is used in hundreds of different products. Some fabrics, which are used to make clothes, are made from cellulose. Ice cream, tomato sauce, syrup and salad dressings all use cellulose to make them thick, smooth and creamy. Cellulose is used to make the outer layer that holds hot dogs and sausages together. Fast food chains use cellulose in burgers, sauces, chips and fried chicken to hold the food together.



Cellulose is even found in toothpaste "paste" and sponges. Shampoo would be just watery soap without cellulose to make it thick.

The sticky sap from pine trees in coniferous forests gives us chemicals, like turpentine, and is even used in perfume. Some trees, called rubber trees, have a milky sap which is used to make tyres and car parts, the soles of shoes, medical products, rubber bands and erasers.

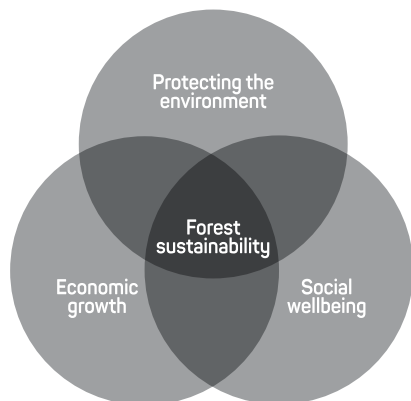


1. Use the information in this lesson (and the rest of the book) to make a list of every product that you use from the forest for one week.
2. Compare your list with a partner. How many products did you both come up with in total?
3. Your class is now going to play "Forest Pictionary"! Read the information below to see how to play Pictionary.
 - Divide into teams (of about 4 learners in each team).
 - Your teacher will choose one forest product from this list:

Toothpaste	Envelope	Eraser	Nail polish	Shoe sole
Pencil	Tyre	Egg carton	Shampoo	Paper cup
Sausage	Ice cream	Cardboard box	Book	Table

- Each team will choose one artist for that round.
- The artist from each team will go to your teacher and be told the product to draw.
- The artists will return to their groups and have 10 seconds to think about what they will draw.
- Your teacher will say "GO!"
- The artists will start drawing, using only images, no letters or words, and no talking.
- Teams cannot look at the list to help them guess the forest product!
- Team members shout out guesses.
- The first team to correctly guess the forest product gets 1 point.
- Repeat the game using a different artist from each team, until all the forest products have been drawn.
- The team with the most points wins!

Forest sustainability and management



Forests must be managed responsibly for the benefit of everything, and everyone involved. We have to think about three main things:

Protecting the environment: The forest itself, and all the plants and animals that live in the forest;

Social wellbeing: The happiness and security of the communities of people who live in and near the forest; and

Economic growth: The prosperity of the people that depend on the forest to earn a living. (Prosperity is when a person or community is doing well financially.)

Before reading further, imagine that you are one of the following characters. Which of the three main things, would be most important to you?

1. In your workbooks, write a sentence for each character that describes their relationship with the forest.

A bird	An owner of a paper company
A birdwatcher who loves hiking	A person living on the edge of the forest

All the users of the forest have needs to make sure that they can live and survive:

- The trees and the animals in the forest need space to grow in peace to survive.
- The people and communities around the forest need to use the forest and the trees in their everyday lives, like collecting wood for fires, to survive.
- The businesses that make products from the forest need to be able to cut trees to survive.

We can make sure that forests are managed sustainably by balancing the needs of these three groups of forest users.

As the population of the Earth gets bigger, we need more space to live, and more land to grow and produce the things that we need to survive. This has led to the problem of deforestation, where forests are destroyed to make way for the needs of the people.

The Forest Stewardship Council (FSC) helps forest owners, communities and businesses to work together to find the best solutions for all the groups that use the forests. Each group is called a different 'user' (someone who uses something).

When your parents buy something with the FSC logo, you know that the materials, used to make the product, come from sustainable sources. The FSC makes sure that:

- when trees are harvested, more trees are planted to replace them;
- the different kinds of life in the forest (like animals, plants, fungi, and even microorganisms like bacteria) is protected; and
- the needs of the people who live in and around the forest are listened to and respected.

In order to have a management plan for a forest, you need to know what each group of forest users want and need. This is called the forest manager's goal. The goal of a forest manager is to try to meet as many of these needs as possible.

1. Do the following activity in your group.

You are in charge of a large forest. You need to have a meeting with each of the following groups of people who have an interest in the forest. Discuss and then, in your workbooks, write down what you think each of them would want you to do with the forest:

A company that makes paper	A wildlife ranger who protects animals and plants	A hiker who likes walking and having picnics in the forest	A company that wants to build houses in the forest
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All the things that you have written down are examples of forest management ideas.

Some animals, like nyala and leopards, need dense forest with no roads and no large openings in the forest. Other animals in the forest, like bushbuck and duikers, need lots of edge habitat. Edge is where the forest meets open space. The forest on the edge is not too dense (this means not too many people or plants in a small area), so that the animals can move around easily.

Businesses that operate in the forest have needs too. For example, a paper company needs to clear space in the forest to plant pine trees, which are grown in rows, so that they can be easily harvested. The paper company also needs roads in the forest to transport the trees once they have been harvested. Land developers need open spaces in the forest to build houses and roads so that people can reach the houses.

People that use the forest for recreation (an activity done for enjoyment), like hikers and campers, need forest areas that are not too dense, with paths to follow through the forest.

2. Read the information in this table. It contains different forest users' needs and the goals that forest managers must think about when planning to manage a forest.

Use these descriptions for the 'User's need' column:	Use these sentences for the 'Manager's goal' column:
1. Dense forest with no roads, or large openings.	A. Keep edge areas free of dense forest growth.
2. Lots of edge habitat, where the forest meets open spaces.	B. Clear areas of forest to plant new trees.
3. Forest areas that are not too dense, with paths to follow through the forest.	C. Don't allow any roads or houses in an area.
4. Open spaces in the forest.	D. Make pathways in areas of the forest.
5. Clear space in the forest to plant pine trees, which are grown in rows.	E. Cut open areas in the forest.

3. Each of these forest users has a need that is the forest manager's goal to meet. Use the information in the table above to match each forest user with a need, and a manager's goal to meet that need. The first one has been completed for you.

Forest user	User's need	Manager's goal
Bushbuck	2	A
Paper Company		
Hiker		
Land Developer		
Nyala		

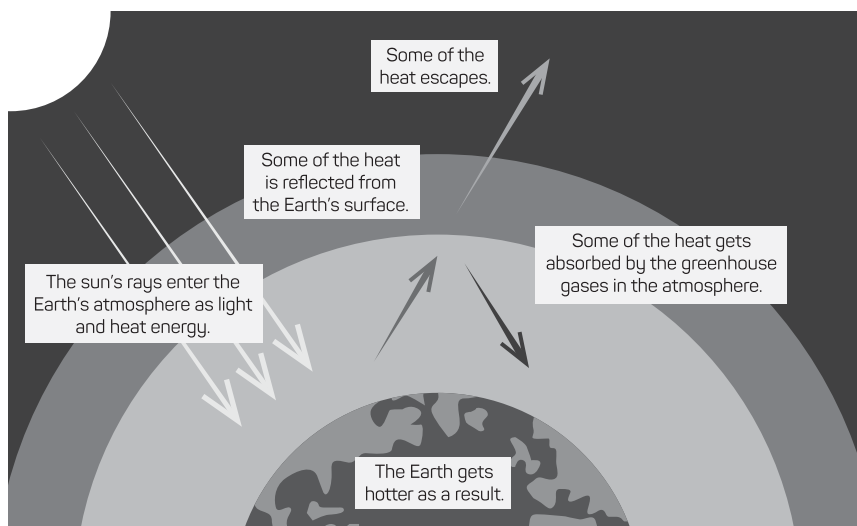
If foresters managed the forest to meet only one forest user's goal, then other forest users' goals would not be met.

3. Discuss: Could some of the goals of different forest users be met at the same time? How?
4. Write a paragraph on everything you have learned, in this lesson, about forest management. Include how you think forests can be managed to meet the needs of all users.

Global issue; individual responsibility

Do you like watching TV and playing on your phone? Modern activities – such as plugging in devices, driving cars, and cooling homes – rely on energy sources such as natural gas, oil, and coal.

Those energy sources release carbon dioxide (CO₂) into the atmosphere. When CO₂ and other gases trap heat, that would otherwise escape Earth's atmosphere, the planet's temperature rises. We call this global warming. As life on Earth gets hotter, it becomes more uncomfortable for humans and animals and may cause natural disasters such as uncontrolled forest fires.



<https://www.storyboardthat.com/lesson-plans/global-warming/concept-model>

Your "carbon footprint" is the amount of carbon dioxide released into the air because of your own energy needs from things like transport, electricity, food and clothing.

The best way to help the Earth is to keep our carbon footprint as low as we can. Our choices can make a difference. We can do this by using the 5 Rs of responsible consumption.

Reflect	To reflect means to think about something carefully. We need to think about what we use, why we use it and how much we use.
Respect	We need to respect the Earth and do whatever we can to protect all the natural resources that we are blessed with!
Reduce	Reduce means to use less of something. For example, try to use fewer paper plates, cups and plastic straws.
Reuse	When we reuse something, we stop it from landing up in a rubbish dump. You can pack your lunch in a lunchbox which can be used every day (rather than a plastic bag). You can also reuse old tyres to plant flowers and vegetables!
Recycle	To recycle means to take things like cans, bottles, paper, and cardboard and remake them into either the same kind of thing or new products.

When it comes to protecting our forests, there are many ways that we can use the 5 Rs, especially when it comes to using paper wisely. By using both sides of paper for example, you can reduce the effect of your carbon footprint on forests, cut energy use and the release of greenhouse gases, reduce water, air and other pollution and produce less rubbish.

1. For one week, save all the wastepaper used in class. Separate the papers into two piles each day: one for paper that has been completely used, and the other for paper that could be used again for something else. At the end of the week, compare the amount of paper in the piles and have a class discussion on wasting paper.
2. Make a list of all the things that you can do with the reusable paper.
3. In your groups, create a play to teach other learners about the 5 Rs. Act out your plays to other classes or at a school assembly to teach others to become responsible citizens.



PLEDGE

My name is

I promise to be a Forest Friend and love and protect forests because they support life on Earth!



As a Forest Friend, I will:

Teach others about the importance of forests.

Recycle paper, cardboard, metal, plastic, glass and re-use wood to protect our planet.

Encourage people not to litter and keep the environment clean.

Enjoy everything that forests have to offer without damaging them.

Support companies that look after our forests.

Learner

Teacher

Parent / Caregiver

The Paper Making Process



- 1 Logging
- 2 Debarking & Chipping
- 3 Cooking / Digester
- 4 Cleaning & Bleaching
- 5 Refining & Mixing
- 6 The Wet End
- 7 The Wire
- 8 Press Rollers
- 9 The Dry End
- 10 Winding
- 11 Cutting: Reels & Sheets
- 12 Market Use
- 13 Recycling

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