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SAVE PLANET EARTH

MISSION: CONSERVATION

Author
Tanya Luther Agarwal

Terrapin

Note from Mr. Majid Al Mansouri

It is He, who made you trustees of the earth,
And exalted some in rank over others.
In order to try you
By what He has given you
Indeed your Lord's retribution is swift
Yet He is forgiving and kind.

Verse from Holy Quran –Surat Al Ana'am

Ayah 165 (6:165)

Climate change today is threatening our planet and in fact our very survival on earth .All countries and governments are concerned as we humans have contributed to this malaise. To find solution to any problem, we must first fully comprehend it. Hence Environment Agency – Abu Dhabi (EAD) in association with The Energy Research Institute (TERI) is adapting and bringing this save planet series of books on Climate change to children in the UAE with a hope that students as future custodians of our environment learn about what ails our mother earth, how each one us impact the environment through our actions, so that they are in a position to make appropriate decisions on matters that affect the health of our planet.

Climate change is expected to have direct and indirect impacts on earth. Scientists predict that we would lose nearly one third of our biodiversity, Sea levels would rise flooding low lying areas, face severe fresh water shortages , desertification , health issues such increased incidences of infectious diseases, heat strokes, forest fires, hurricanes and extreme and strange weather patterns to name some .

While governments are trying to fathom this new reality and looking at ways and means to tackle this global issue, it is becoming clearer to all, that only a concerted and collaborative action from each and everyone can actually help save this unique planet. United Arab Emirate too is aware of its responsibility and that is why despite being a country which is endowed with vast reserves of petroleum, a non renewable resource, and the one which contributes to climate change, it is working hard to establish the first carbon neutral city MASDAR in the coming few years and invest more on developing the renewable source of energy in the country. In addition, the country is also aiming to educate its future generation, through imbibing sound knowledge, imparting skill and helping to develop right attitude towards the environmental issues so as to prepare them to face any eventualities in the future.

We hope these books would be read by all students and would help them to understand the issue of climate change and the role that they can play in helping to save this unique planet.

CONTENTS

Nature's order

All living things on the earth such as insects, birds, fish, snakes, cows, plants, trees, and humans together make up the 'biosphere'. Just so scientists and people can study and understand the enormous living world, the biosphere is broken up into simpler parts called 'ecosystems'.

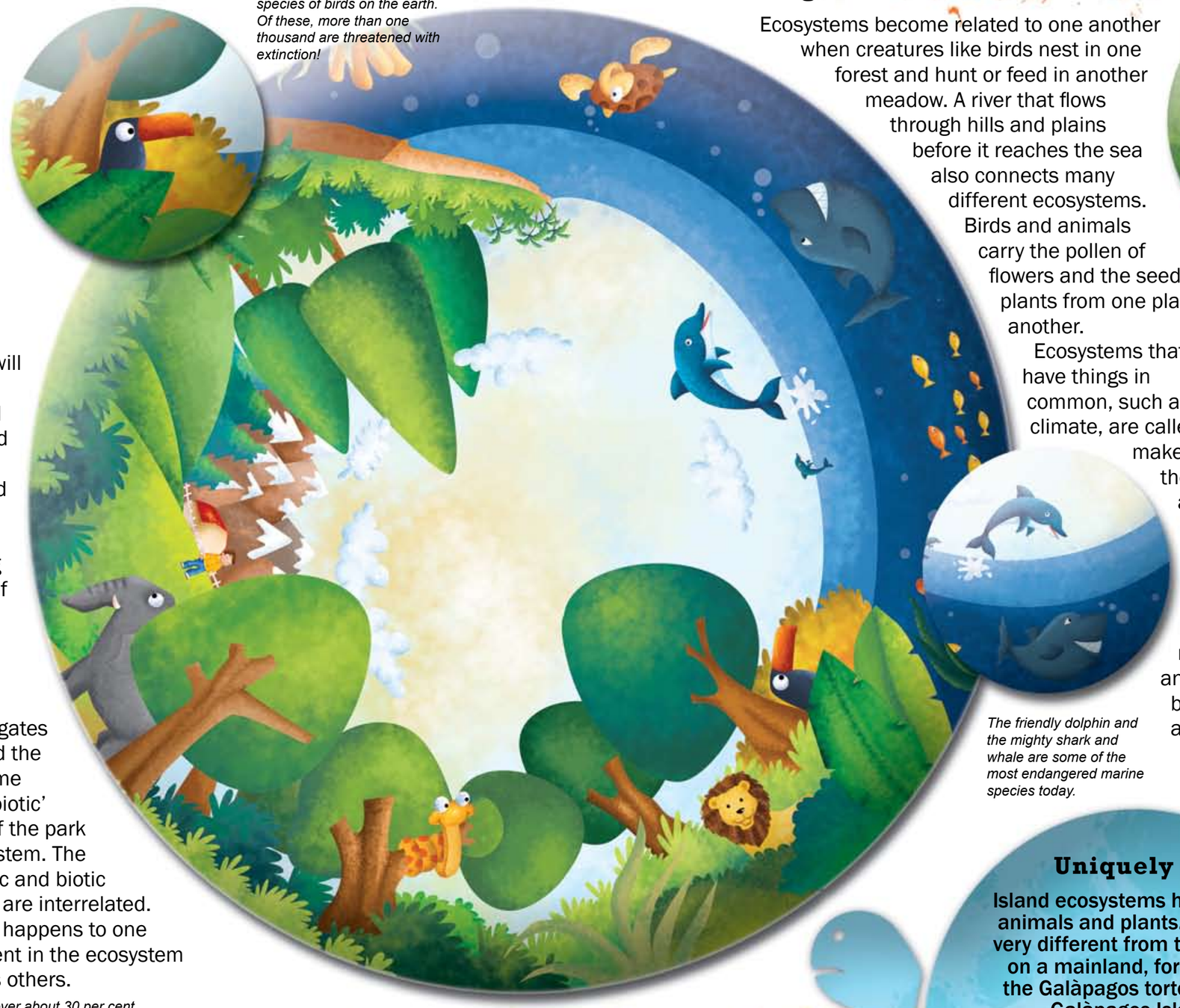
'B' for birds and for biotic

Spend a few hours in a park and you will understand the park ecosystem and how it works. Bees feed on nectar and pollen from flowers. Birds, spiders, and frogs feed on bees. Birds also feed on spiders, worms, and frogs. Snakes and owls feed on frogs and rats. Deer eat grass, and squirrels gather nuts from trees. All these living beings, including you in the park, are the 'biotic' parts of the park ecosystem.

'A' for all else that you see

Rain, sunshine, soils, rocks, the lawnmower used in the park, and the gates and fencing around the park are some of the 'abiotic' parts of the park ecosystem. The abiotic and biotic parts are interrelated. What happens to one element in the ecosystem affects others.

Forests cover about 30 per cent of the earth's land area.



There are nearly ten thousand species of birds on the earth. Of these, more than one thousand are threatened with extinction!

A + B = living world

Ecosystems become related to one another when creatures like birds nest in one forest and hunt or feed in another meadow. A river that flows through hills and plains before it reaches the sea also connects many different ecosystems. Birds and animals carry the pollen of flowers and the seeds of plants from one place to another.

Ecosystems that have things in common, such as climate, are called 'biomes'. What makes them different is the amount of sunlight and rainfall they receive. There are six land biomes: tundra, grassland, taiga, deciduous forest, tropical rainforest, desert, and two aquatic biomes—fresh water and salt water.

Did you know that reptiles are found in every continent except Antarctica!

The friendly dolphin and the mighty shark and whale are some of the most endangered marine species today.

Uniquely you

Island ecosystems have unique animals and plants. These are very different from those found on a mainland, for example, the Galàpagos tortoise of the Galàpagos Islands.

One big home...

Even though biomes may be far away from one another in different countries or continents, changes in one biome can directly or indirectly affect another biome. A volcano that erupts in Japan can bring down the temperature of the whole world by a few degrees and for several years.

Each biome has special plants and animals that live there.

Only animals like seals, polar bears, arctic hares, and foxes, and plants like lichen and mosses can survive in the tundra region, though migratory birds drop by in thousands.

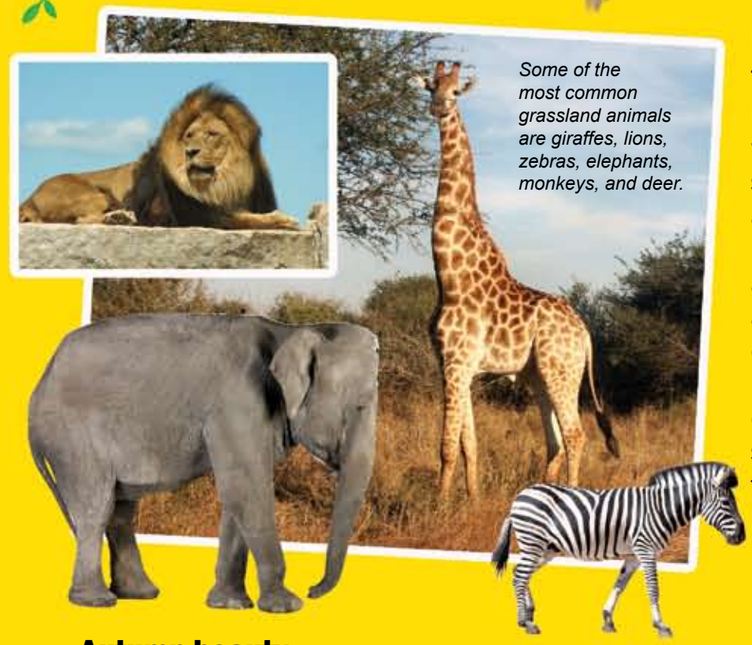
Chilled-out zone

The world's youngest biome is the Arctic tundra, near the North Pole. The winters are long and frozen, while summers are short and cool. Permafrost, the permanently frozen layer that lies just beneath the topsoil, makes it difficult for plants to grow.

The tundra is one of the earth's major carbon dioxide (CO_2) sinks. Plants here take in CO_2, which gets sealed in the permafrost when they die. This does not allow the CO_2 to be released into the atmosphere.

Brown meadows

Grassland biomes are places with hot, dry climates, vast lands of grasses, and sparse trees. In South America they are called 'pampas', in the US, 'prairie', and 'savanna' in Australia and Africa. Pampas and savannas are hot throughout the year but do have a season of heavy rainfall. The prairies have hot summers and cold winters. These grassy fields are ideal for growing cereal crops and grazing cattle.



Some of the most common grassland animals are giraffes, lions, zebras, elephants, monkeys, and deer.

Pine scented

The taiga, or coniferous forest, is the largest biome in the world. Its beautiful forests stretch over North America and Eurasia and cover over 17 per cent of the earth's land area. The summers are warm and rainy and the winters, extremely cold with snowfall.

The taiga cannot boast of diverse plant and animal life. In summers, birds migrate here to feed and nest while the insect population runs into millions.

Autumn beauty

Deciduous forest biomes have two things in plenty—human population and deciduous trees. Deciduous trees like maple, oak, beech, and hickory are tall and majestic, and some oak trees live for more than three hundred years! Bears, deer, wolves, squirrels, woodpeckers, and rabbits, among others, inhabit these forests.

Spruce and fir trees grow in abundance in the taiga region.

Deciduous trees shed their leaves in autumn. The leaves decay on the forest floor and become nutritious food for the soil.

Name game

There are more than sixty thousand species of trees of different shapes and sizes around the world! Does that leave you wondering about the people who came up with names for them?

With different rooms

Green, blue or brown; wet, dry or slushy, these biomes offer the perfect living conditions for species, many of which are still unknown to us and yet to be discovered.

Toucans, jaguars, orangutans, and lemur roam wild in rainforests. Bamboo, banana, rubber, and cassava are some common trees here.

People have used the rainforests for herbs, medicines, fruits, and foods for thousands of years.

Shades of green

Half of the world's plant and animal species are found in tropical rainforests in Asia, Africa, and Central and South America. Lush, dense, and green, these forests make 40 per cent of the oxygen on our planet.

Rainforests grow on mountains, plains, in river valleys or along coasts. These forests are very wet, getting about 180 centimetres of rain each year. Tall trees, measuring thirty to sixty metres, grow very close to one another, blocking sunlight from the ground. A combination of sun, shade, and rain makes these forests a perfect environment for over fifteen million plants and animals.

Sand and dunes

Desert biomes are dry places with very little water. Some deserts such as the Sahara in northern Africa, get very hot in the day and are very cold at night. Some like the Gobi Desert in Asia can be extremely cold. Not surprising then to find snow leopards there! Camels, coyotes, jackrabbits, kangaroos, snakes, and scorpions are some animals and insects that can survive the heat and live without water for long periods.

Plain or salted

Three-fourths of our planet is covered with water, and half the planet's oxygen is made by phytoplankton plants in the ocean. Ponds, lakes, streams, rivers, and wetlands that have less than 1 per cent salt make up the freshwater biome. This biome gives us our drinking water and water for crops to grow.

One world

In Biosphere 2 at the University of Arizona, Phoenix, visitors can experience all the biomes under one roof! This biome building is a research centre that also teaches and shares information about the earth and its living systems.

Home to several thousand species of sea life – fish, whales, octopi, crabs, lobsters, dolphins, and turtles – oceans also give food to people.

The balancing act

For billions of years there has been life on Earth. How is that possible? The sun is like the fuel in a vehicle. Heat and light from the sun give energy to all living things on the planet and help them grow. The atmosphere, or air around us, water, and sun combine to give us rain, seasons, oxygen as well as life and food.

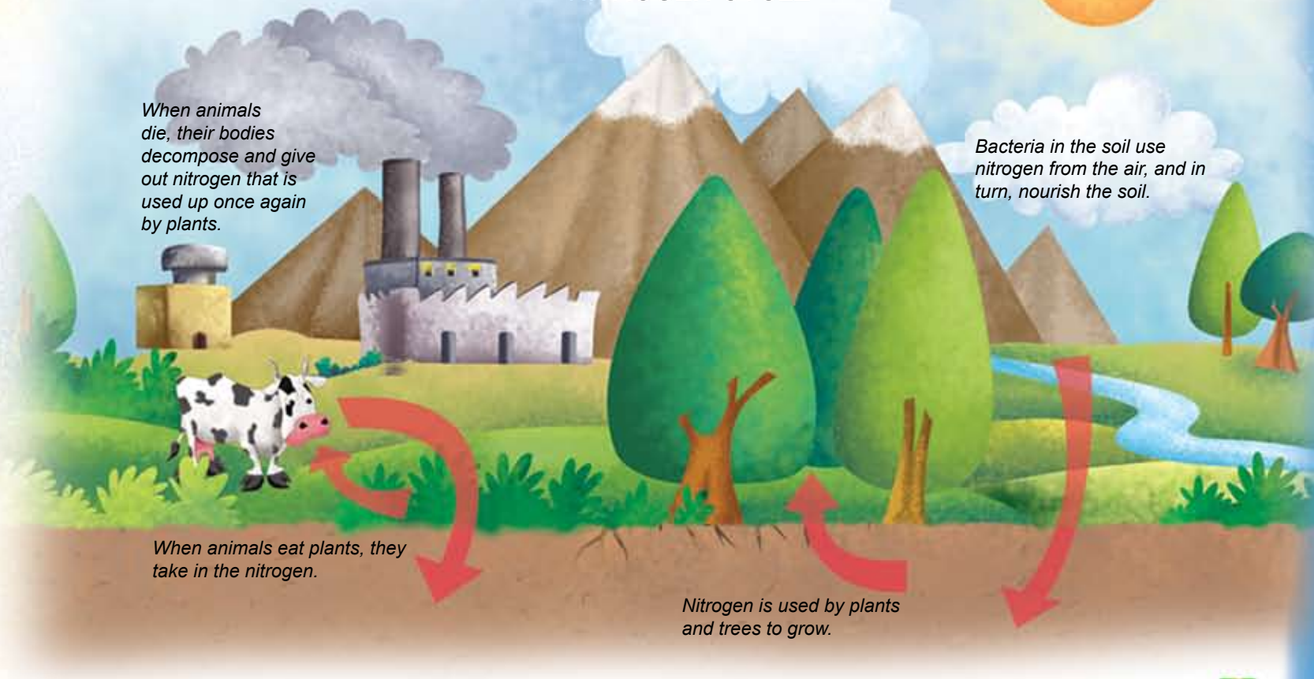
Every living thing is important for the other. So as long as there is a balance in nature, a species will survive; without it, it is sure to die.

Eat to live

All living things on our planet feed on something. A food chain of 'who feeds on what' always starts with plants, since they are the only living things that make their own food. When a deer eats grass, it uses the nutrients and energy in grass. When a lion eats that deer, the energy from the grass and the deer are passed on to the lion. Finally, when the lion dies, it passes its energy to vultures, hyenas, and bacteria in the soil. This energy is used up by the grass once again. Normally, a food chain is made up of six levels, though aquatic food chains are longer.

Groups of plants, animals, insects, and aquatic animals are involved in different food chains in an ecosystem. These are connected to one another for survival and together make a food web.

NITROGEN CYCLE



When animals die, their bodies decompose and give out nitrogen that is used up once again by plants.

Bacteria in the soil use nitrogen from the air, and in turn, nourish the soil.

When animals eat plants, they take in the nitrogen.

Nitrogen is used by plants and trees to grow.

Round and round

The atmosphere is made up of gases – about 20 per cent oxygen, 79 per cent nitrogen, and 1 per cent other gases. Carbon is a material, or substance, present in all living things, including diamonds and petrol. It is also contained in carbon dioxide gas. Humans and animals breathe in oxygen and breathe out carbon dioxide. Plants use carbon from the carbon dioxide found in the air, along with water and energy from the sun, to make their food, and give out oxygen. The use and reuse of carbon makes up the 'carbon cycle'.

On the menu

A herbivore is a creature that eats only plants, a carnivore eats only meat, and an omnivore eats both plants and meat. Frugivores eat fruit, piscivores eat fish, and sanguinivores drink blood!

The human bug is spreading fast!

Medical report of Planet Earth

1. Global temperature rose by 0.74 degree Celsius in the last twenty-five years.
2. Carbon dioxide in the atmosphere is 30 per cent more than it was hundred years ago.
3. The ozone hole above Antarctica is getting larger.
4. Twenty per cent of wetlands around the world have vanished.
5. Glaciers and polar ice sheets are melting very quickly.
6. The world population has grown more in the last fifty years than it did in four million years.

Diagnosis

Sick and warm.

Causes

A bug called humans.

Advice

Operation 'Educate the Humans' suggested.

Bugging effects...

A forest area the size of a football field is destroyed by people every two seconds. Giant trees from the Amazon forest, some over a thousand years old, are chopped down to make paper or tissues!

...in air

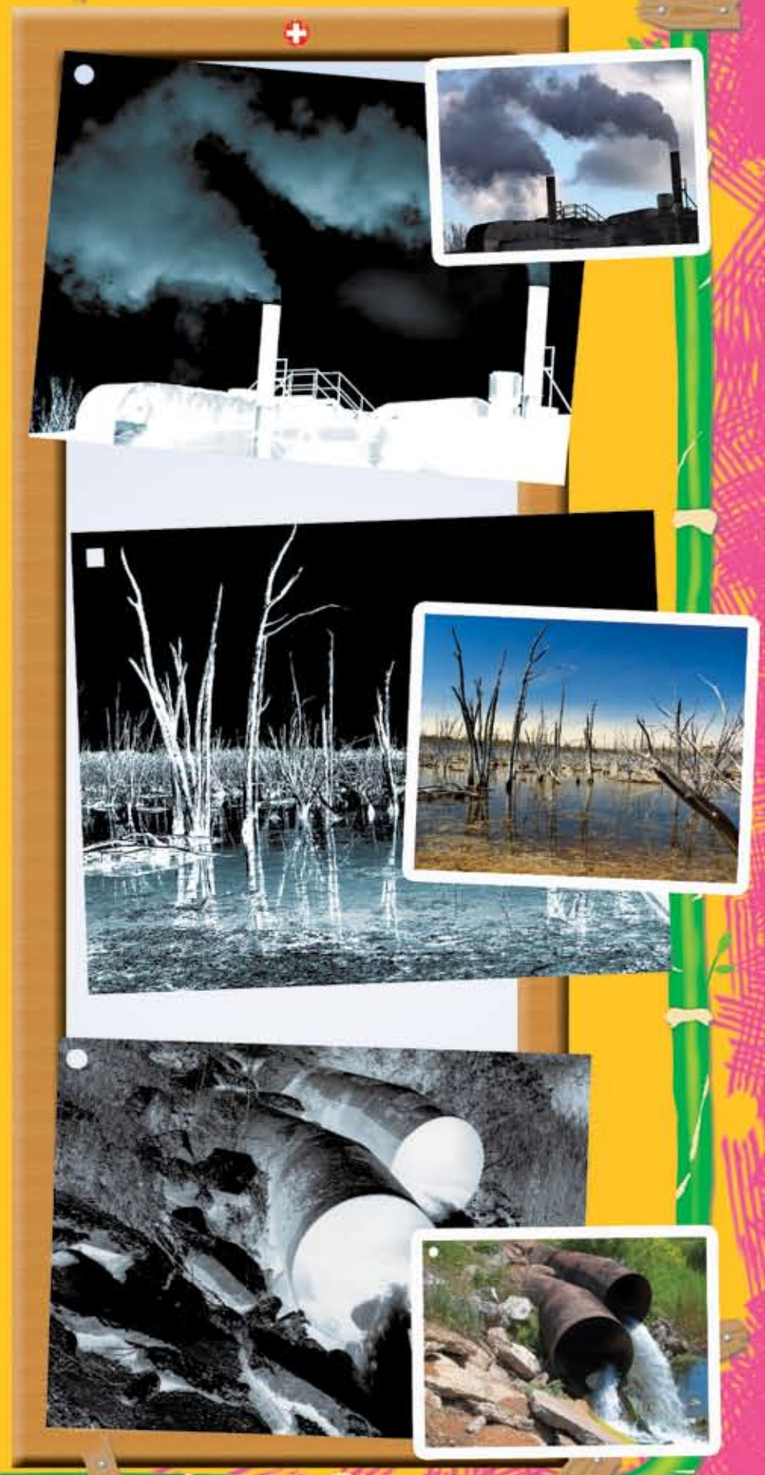
Burning diesel, coal, and petrol in vehicles and factories gives out greenhouse gases like carbon dioxide and methane, which are known to raise global temperatures. With fewer forests for cleaning up the carbon dioxide in the air, pollution levels and temperatures keep rising.

...on land

With more people on the planet, there is huge pressure on countries to build homes and industries, mine minerals, and grow more food. Cutting down trees, clearing forests for farming and settlements, and mining for thousands of years have destroyed the natural air conditioners and pollution cleansers of the planet. In Russia, the land around some nickel mines has become so degraded that plants in the area have died.

...in water

Chemicals and fertilizers used in farming, along with household and industrial wastes, flow out or are dumped on the soil or into rivers and oceans. These poison not just plants and animals but also our drinking water and the food we grow and eat. Human activities such as shipping, dumping wastes, and offshore oil production cause 80 per cent of all marine pollution.



Home under siege!

Habitat is the home of a particular species. It is the natural environment of a living creature, which means that the creature lives, reproduces, finds its food, and thrives in that surrounding.

Just as people live in one place but shop, work, vacation or go to school in another, so do living things in the wild. Many waterfowl nest in upland habitats but feed from nearby wetlands. Migratory birds like starlings have summer and winter homes in different continents.

Starling numbers have fallen by 66 per cent in Britain since the mid-1970s.

Save as...

Scientists in the UK have collected a billion plant seeds from around the world and frozen them at sub-zero temperatures. This 'collection' is being made in case there is complete habitat destruction due to natural disasters, war or epidemics, and the species are lost to us forever!

Be kind to us...

Even if you have never stepped into a wetland, you still enjoy the luxury of clean water in your tap, which has been purified by it. Wetlands are natural filters and purify water by trapping the pollutants. Throughout the United States, there are about 600 manmade wetlands that actively treat wastewater generated by farms, cities and industries. We also use a few things from the rainforests like paper, nuts and coffee without much thought to where they came from...

...and we will be cruel to you!

It has taken sixty to hundred million years for the oldest land-based ecosystem, our Earth to grow but only forty years to wipe out 20 per cent of it. More than half of the planet's wildlife and about 70 per cent of plant varieties have their habitat here.

Coral reefs are the largest living structure on Earth but 5%–10% of them around the world have already been destroyed. Twenty-five per cent of all marine species live in reefs and by 2050, 70 per cent of the reefs might vanish from the face of the earth!

Sixty to 70 per cent of European wetlands have been completely destroyed.

Less than 0.1% of tropical deciduous dry forests remain in Central America's Pacific Coast.

Mangrove forests that once stretched along three-fourths of the coastlines in tropical countries have now been halved and are reducing.

More than half the earth's forests have disappeared forever.

When animals and plants lose their homes, they not only become misfits in the changed habitats but also face the danger of dying out.

Sounding the red alert

There are hundreds of animals and plants around the world that have become so few in number that it is feared they will soon become extinct. Threatened animals or plants are those whose numbers are reducing quickly, and hence they are likely to become endangered.

Who knows?

The World Conservation Union (IUCN) does. They created a Red List in 1963, which examines the risk of threat and endangerment faced by plants and animals. Every five or ten years, this list and the status of those on it are rechecked. The idea is to inform and educate people and governments to take action and control the threat to species. The Red List has 40,177 species, 16,119 of which are considered to be endangered.

Is it us?

Mostly yes. For food or fur, for wood or water, humans have deprived other living beings of shelter, food, nesting grounds, and a pollution-free environment. This has happened so rapidly that some species have not had a chance to adjust, adapt or evolve.

Another cause of species endangerment is when a non-native plant, animal, fish, bacteria or virus is intentionally or accidentally introduced in a new habitat. Eventually it does adjust and belong, but in the process, it upsets the food web and food chain.

Natural disasters like floods, droughts, tsunamis, and diseases and epidemics also destroy habitats as well as species.


Tiger


Pink and red corals

The RED ALERT has sounded for:


Hawksbill turtle


Giant panda


The great apes (gorillas, chimpanzees, and orangutans)


Rhinoceros

Red alert!

The top ten most endangered species according to the World Wide Fund for Nature (WWF) are:

- Porbeagle
- Sawfish
- Tiger
- Spiny dogfish
- Red and pink coral
- Asian rhinos
- European eel
- Elephants
- Great apes
- Bigleaf mahogany

Countries with the largest number of threatened species

Indonesia	Mammals
Brazil	Birds
Mexico	Reptiles
Columbia	Amphibians
US	Fish Molluscs Other invertebrates
Ecuador	Plants

Forever yours

The squirrel that hoards nuts during summer, the falcon that hunts for hours to feed its young, the Arabian leopard that defends its territory in the high mountains of Arabia, the elephant that fiercely protects its calves: all these creatures protect, save, manage or store what is important to them. They all 'conserve'.

What

Conservation is saving and protecting wildlife, forests, water, and land. All of these are nature's resources or valuable possessions. If they are damaged or in short supply, some of them can be mended or repaired. They can be unlimited if used and managed intelligently.

Coal, oil, and natural gas are obtained from the earth and are limited in supply. Therefore, it is even more important to conserve them to make sure they last a long, long time and are not wasted.

Coal, oil, and natural gas are the earth's non-renewable resources.

Who

A conservationist is someone who works to protect the environment and species from pollution and finally, destruction. S/he can do this in many different ways—by teaching at schools and colleges, by conducting research in laboratories or in the field or even by working with governments and international organizations like the World Wide Fund for Nature (WWF).

Why

Conservation is saving not just for oneself but also for others who will live on the planet years later. It is an effort made for future generations to enjoy clean drinking water, fresh air, forests, and a healthy balance of them all.

Just as people need to exercise and eat right to stay fit and healthy so also does the earth need to be looked after. If we want clean air and water, medicines from forests, recreational outdoors, and fossil fuels, then we must take care of our planet.

Recycle, turn off lights when not needed, and donate books and clothes that you do not use anymore.

Humans have the sole responsibility of keeping the earth healthy because they can and they ought to. You too can become a conservationist!

The last resort?

Conservationists have listed thirty-four 'biodiversity hotspots', or those places on the earth that have some plant and animal species found there alone. These hotspots have at least 1,500 species of plants but have lost at least 70 per cent of their original habitat. Some of them are the Western Ghats in India, the mountains of southwest China, tropical Andes, and the Caribbean Islands.

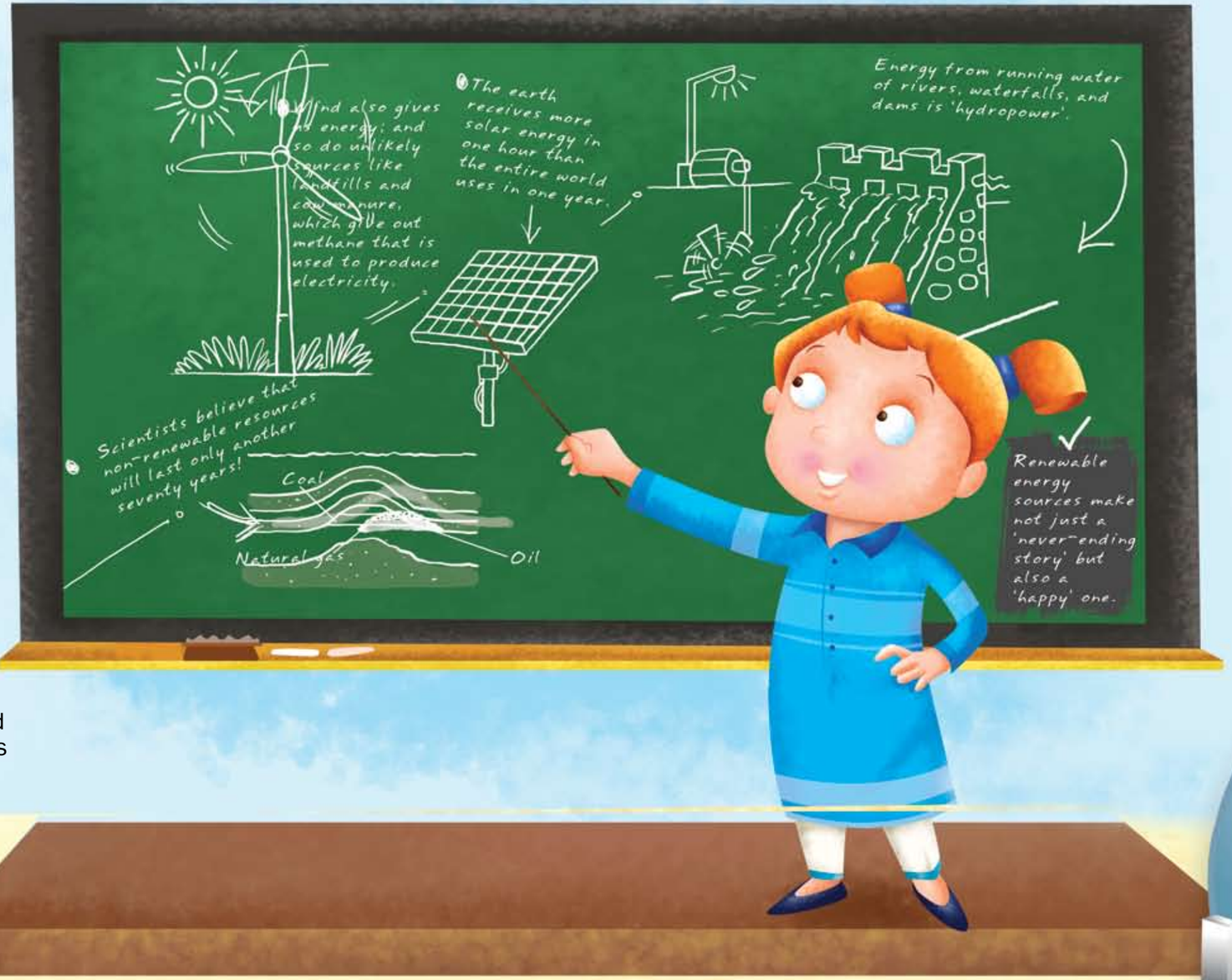
Full of energy

People have it, cars have it, and the sun has it, and so does water. Fans, toasters, air conditioners, and televisions are some of the things that use it. Energy is the power that makes these things work, and it is obtained from the earth and nature.

Use it and lose it!

Non-renewable energy resources once used are gone forever. They cannot be made again in a short time. Coal, petroleum, and natural gas were formed naturally over millions of years in the earth from dead and buried animals and plants, even before dinosaurs walked the earth.

These sources produce 66 per cent of the world's electricity and power 95 per cent of its vehicles, industries, and homes.



Never-ending story

Hydropower is the champion of all renewable energy resources and 20 per cent of electricity worldwide is produced by hydropower.

Non-polluting and free forever is the energy from the sun (solar energy). The high cost of solar power stations and the fact that it is not a dependable source in shady places, are some of the reasons for its limited use.

Saving it all

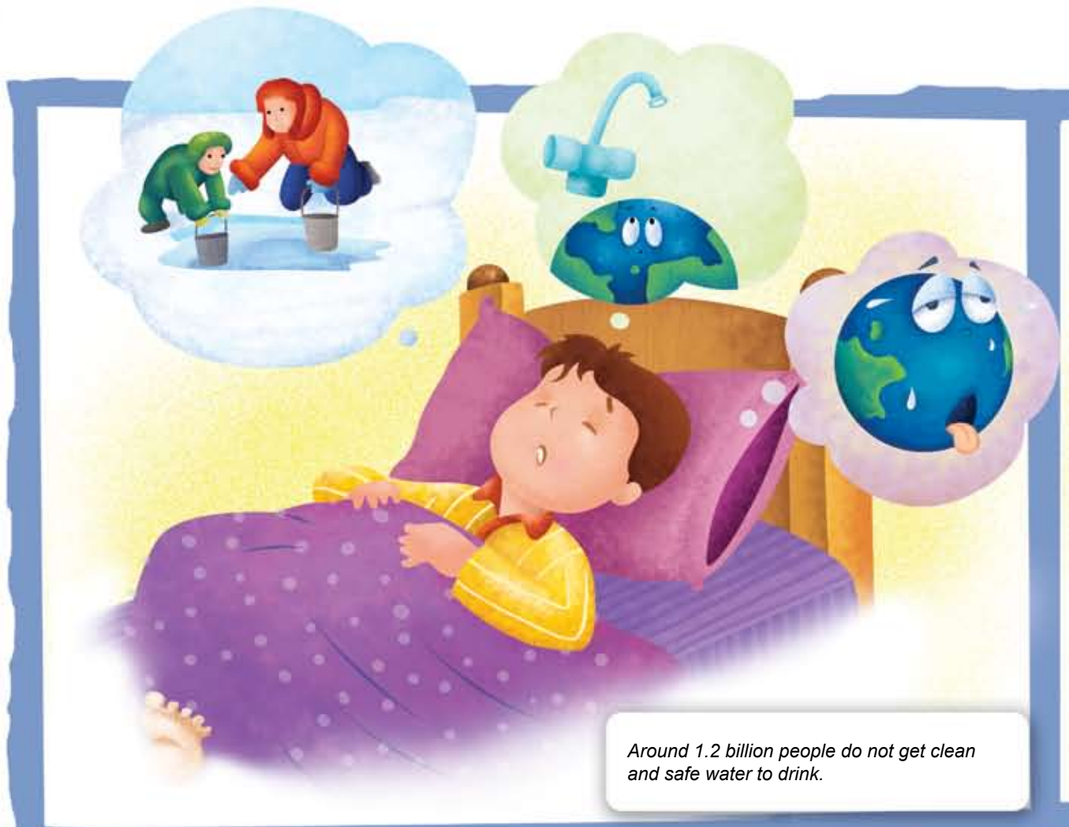
Although wind and solar energy are good for the environment, they cannot be stored, and so people continue to depend on non-renewable resources. Using energy intelligently helps save and conserve energy—not forgetting money saved on electricity bills!

Beam it down, Scottie!

Scientists are studying the possibility of orbiting satellites in space to capture the sun's energy and beam it down on the earth for us to use it as clean energy, forever.

$H_2Oh!$

They don't call it 'blue planet' for nothing. More than 72 per cent of the earth is covered with water. However, only 2.5 per cent of the water on the earth is fresh water, or drinkable, and most of it is frozen in ice caps. Humans have only 1 per cent of fresh water available to them.



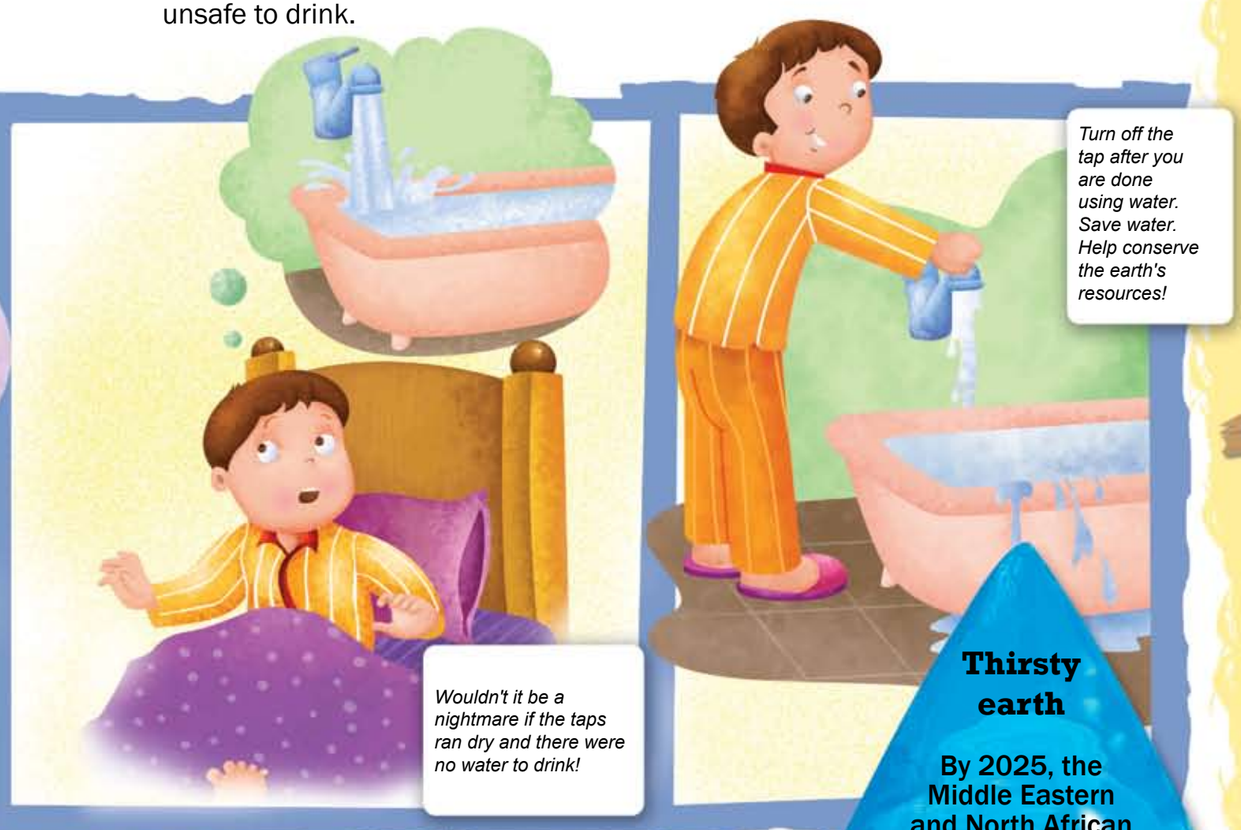
Water, water everywhere

Sixty-nine per cent of fresh water is used to grow food, 15 per cent is used in industries, and 15 per cent is utilized for drinking, bathing, cooking, and gardening.

Fortunately, fresh water is a renewable resource. Rain and melting snow flow into streams, lakes, and rivers (surface water) and also into aquifers or wells in the ground (groundwater). People in different parts of the world get their water from one or both of these places.

What a waste!

You would not dream of reusing your bath water because it is dirty. Yet, this water has to go somewhere. Waste water is somewhat cleaned at water plants and then dumped into rivers, lakes and oceans. Despite the clean up this water still carries some impurities and toxins. Some of these toxins in the water are naturally cleaned by the soil and rocks in rivers and lakes but many others linger on for hundreds of years. Fish, marine life, birds, and animals that drink this water die and many species struggle to survive. Chemicals also soak into the groundwater, making it harmful and unsafe to drink.



Fix that drip!

While countries need to control their pollution levels and clean up their mess, there is plenty that you can do to save water. Turn off the tap while brushing teeth, fix leaky faucets, take shower baths instead of tub baths, wash full loads of clothes in the washing machine, and water the garden and plants early in the morning or in the evening.

Thirsty earth

By 2025, the Middle Eastern and North African countries, along with Pakistan, India, South Africa, and China, will not have enough water for their industries and for growing food to feed their people.

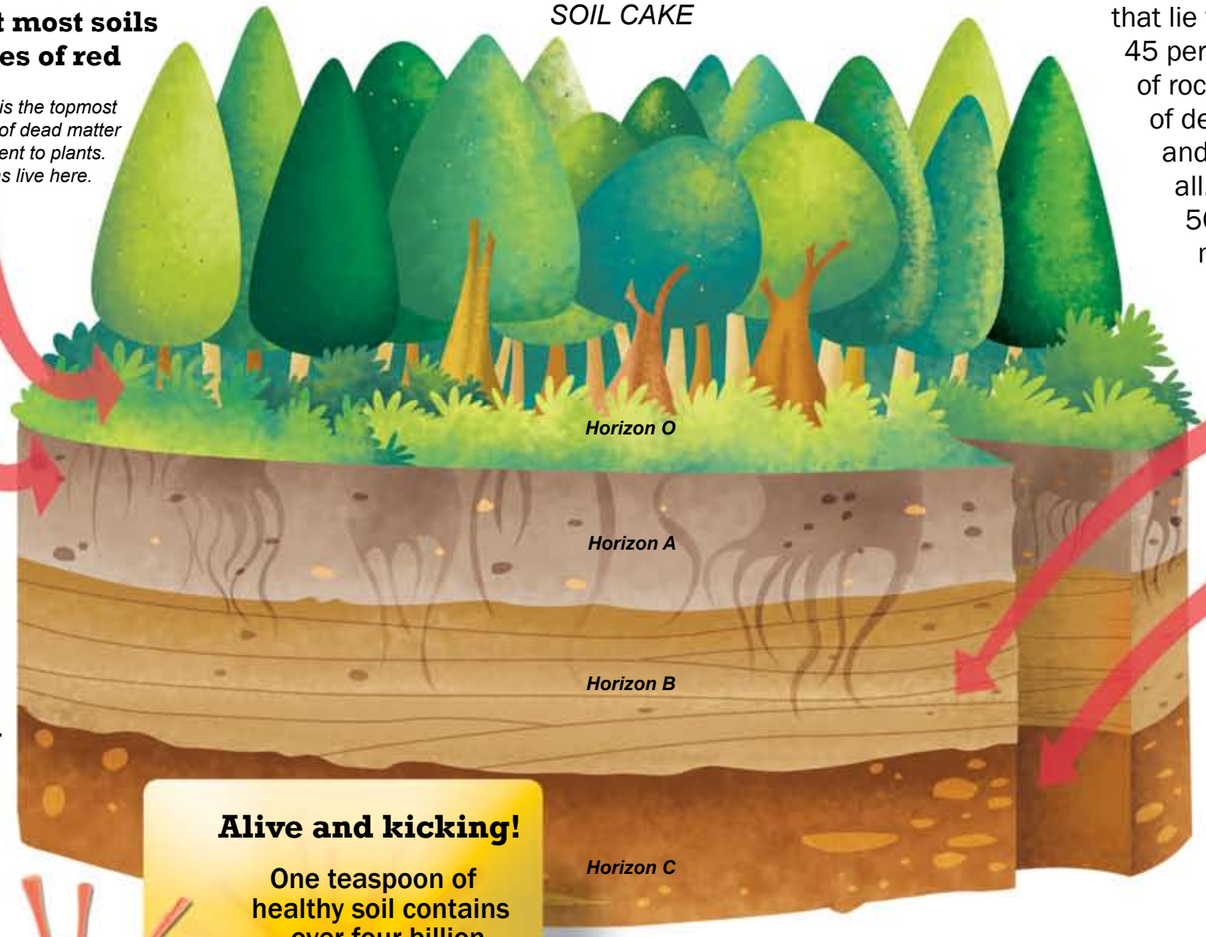
Down to earth

Out in the open, it's there for everyone to see. It is everywhere and people walk on it all the time. And, it's not dirt we are talking about, but soil. Soil is the outermost layer of the earth and a part of the environment. There are thousands of different kinds of soils around the world but most soils are black, grey or in shades of red to yellow.

SOIL CAKE

Horizon O (humus) is the topmost layer. It is made up of dead matter that gives nourishment to plants. Animals and humans live here.

Horizon A is the topsoil. It has plant roots, bacteria, fungi, worms, and insects. It holds plants and trees down and prevents them from falling.



Horizon B forms the subsoil. It is mostly clay here but also has minerals like iron and calcium carbonate.

Horizon C is the bedrock

Who soiled it?

The soil you see today was made by the changing weather (rain, sunshine, snowfall, etc) over thousands of years.

Over long periods of time, hot weather made rocks grow bigger while cold weather made them smaller. Due to this expanding and shrinking, the rocks split into smaller chunks. Rain and ice further lashed these chunks, crumbling them into smaller pieces to give us the soil we have today. It takes five hundred or more years to make one inch of soil.

Alive and kicking!

One teaspoon of healthy soil contains over four billion micro-organisms! That number is close to two-thirds of the human population on the earth.

Wanted – dead or alive!

Soil scientists, or pedologists, know that soil is made up of living and dead things. Soils have a basic combination of sand, silt, clay, and other dead matter. Twigs, leaves, dead bugs, living insects, rocks, and stones are some of the things that lie within. While 45 per cent of the soil is made of rocks, 5 per cent is made of dead and living plants and animals. But that's not all. Air and water make up 50 per cent of the soil, making it very much alive.

Soiled rotten

Yes, even soil is dirtied! Dumping of waste from industries and homes, overuse of chemicals and toxic pollutants, and weed killers are some of the things that dirty soil and, eventually, harm all living beings.

Home to moles, caterpillars, beetles, snakes, rabbits, and a million other species; oxygen giver for all living things; and a great record keeper of life on Earth, soil is as important for the earth as air and water.

Soil conservation is important because a healthy soil gives us healthy food.

Rocks weather and crumble into tiny chunks till they become fine soil—a process that may take thousands of years.

Over a period of time, grasses and plants start to grow.

The bedrock has rocks that have not been broken down by weather.

Rx fire: fire prescription

When you think of fire you probably picture early man cooking on it or using it to scare away wild beasts. Those were 'good fires'. As time went by, natural, accidental, and uncontrollable fires caused destruction to life and property and wiped out human settlements. Those were 'bad fires'.

Humans have learned to turn 'bad fires' into good ones. Around the world, people use the destruction of fire for conservation. A planned or 'prescription fire' prevents the outbreak of wild forest fires.

In fire-dependent ecosystems, plants and animals have adapted to the frequent fire spells. Birds and animals either run away from the fire or take shelter in holes or on tree tops.

Big, bad, and destructive

About 106,400 wild fires break out around the world each year. Nine out of ten are badly planned attempts to clear forests or started by people accidentally.

'Bon' fire

Prescription fire is used for many reasons. Forests where the insect population has boomed out of control or where disease has infected crops, qualify to be burned. A ground cover that is layered with leaves and dead trees is burned to allow new plants to sprout. In fact, longleaf pines need fire for their seeds to burst out for new trees to grow.

Wild about fire

There are many fire-dependent ecosystems around the world, which thrive, or do well, with the natural outbreak of fire. These ecosystems cover about 53 per cent of land on the earth. The forests in the Assam hills in India and almost all of Northern America, the eucalyptus forests in Australia, and the taiga forests in Siberia are some such places. Without fire these ecosystems would lose their species of plants and animals.

Fire ecologists identify the location that needs to be set on fire and decide if the fire should be set into or against the wind.

Aim, fire!!!

Fire ecologists, or scientists, know how, when, and where to set fires. Fires are set in different ways—dropped from helicopters, alighted in a circle on the ground, set up slope or down slope, and even in neat rows. Whatever the method, some fire is good for many ecosystems around the world.

Alien invaders

Pretty pinks, sunny yellows, lush, shiny greens, fragrant flowers: some of the gorgeous disguises these invaders wear. They come in all shapes and sizes, move or are stationary, and multiply so rapidly that they cloak everything in their surroundings. These are invasive species. They are plants, animals, insects, trees, and herbs that are inhabitants of a certain environment. When they enter a new habitat away from their own home, they cause damage to the nearby environment, to agriculture as well as to human health.

Invasive plants produce large amounts of seeds in their new environment, which are carried far by birds and winds. This gives them a high chance of survival and germination.

Halt! Who goes there?

Many invasive plants like the black locust are innocently used as decorative pieces by gardeners for landscaping. In fact, 60 per cent of all invaders are used in botanical gardens and arboretums.

Some 10 per cent of the plants are accidentally carried across countries in cargo ships, airplanes or trucks. Tourists also contribute to this transportation when they take back home exotic species from their travels.

Prevention...not a cure!

About 30 per cent of invasive plants are planted by conservationists to conserve soil. They are positioned as barriers to prevent soil erosion. They are also planted for food and cover for wildlife. However, most often the seeds and fruits of these plants are not nourishing and end up becoming 'junk food' for birds and animals.

Enemy operations

Some invasive plants have long, wide, and strong roots that spread out underground and choke other plant roots. Some others flourish just about anywhere—along highways, in streets, and in parking lots. The tree-of-heaven is one such plant. It grows easily in cities as well in fields and forest openings.

Clever invaders like the velvet tree spread out and make a canopy under the shade of which no other plant, except its own seeds, can survive. Invasive plants grow into drainage pipes, blocking them; kill shade trees; spread out in lakes and wetlands; and take over homes of birds and animals.

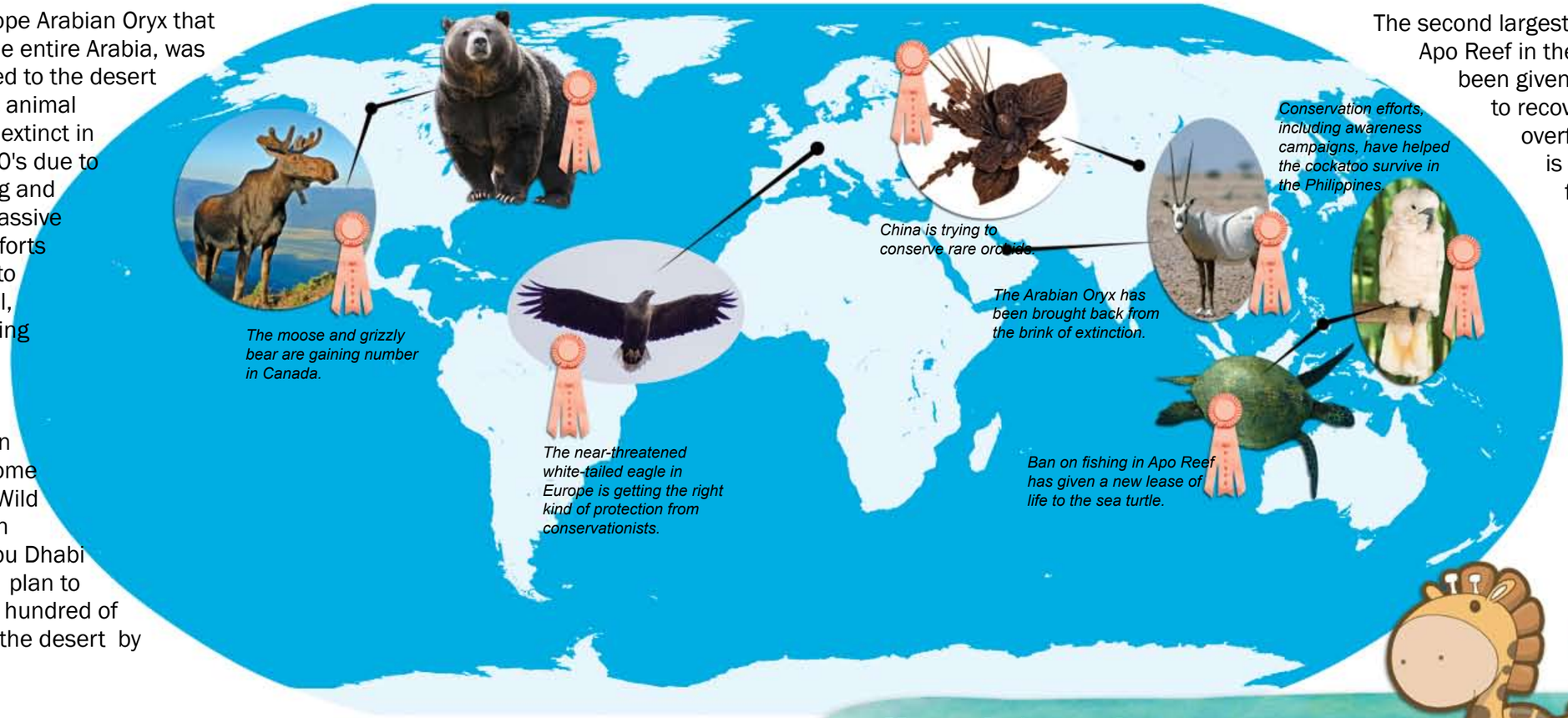
It is believed that the loss suffered worldwide from the effects of invasive plants on ecosystems, water, and crops is about five trillion dollars!

Conservation paying off

It's not all a gloomy picture. Where there is a will there is a difference. Conservationists have been making huge efforts to save, protect, and revive disappearing species, and their efforts have been paying off.

Three chirps for conservation!

The regal antelope Arabian Oryx that once roamed the entire Arabia, was superbly adapted to the desert conditions. This animal became largely extinct in the wild by 1960's due to exessive hunting and habitat loss . Massive conservation efforts were launched to save this animal, including breeding in captivity. As a result this beautiful animal has been introduced in some countries now. Wild life conservation specialists in Abu Dhabi Emirate, in UAE plan to reintroduce five hundred of them back into the desert by 2012.



The moose and grizzly bear are gaining number in Canada.

The near-threatened white-tailed eagle in Europe is getting the right kind of protection from conservationists.

China is trying to conserve rare orchids.

The Arabian Oryx has been brought back from the brink of extinction.

Conservation efforts, including awareness campaigns, have helped the cockatoo survive in the Philippines.

Ban on fishing in Apo Reef has given a new lease of life to the sea turtle.

Striking the balance

Wild life conservationists in Abu Dhabi, UAE have taken tremendous efforts to conserve the houbara bustard, a migratory bird that migrates to Arabia in the winters. This endangered bird is being bred in captivity, and at the same time protected in its natural habitat.

In the deep end

The second largest reef in the world, Apo Reef in the Philippines, has been given a second chance to recover from years of overfishing. The area is a nesting ground for many marine species like sperm whales, sea turtles, sharks, and rays. Fishing and coral collecting have now been banned.

Getting wiser

The European Commission has added 4,225 new habitats under a habitat protection plan. Caring for these areas would not only mean cleaner air for the Europeans but also ensure the safety and survival of thousands of species.

The tropical rainforests in Peru, about the size of France, are now being saved from damage and destruction by conservationists. They are using satellite systems to track changes in the forests right down to a tree fall!

Name their togetherness

A group of cattle is called a herd. Here are some unusual group names.

Lizards	lounge	Jays	scold
Flies	business	Goldfish	troubling
Hippos	bloat	Cats	pounce
Giraffes	tower	Cormorants	gulp

You and your conservation

If it's April 22, then it must be Earth Day! It's a day when countries all over the world celebrate one common gift all humans have—the earth. You do not have to wait for the next Earth Day to do your bit to save the planet. Every day can and should be Earth Day!

Wake up sleepyheads!

Reading and educating yourself about climate change, endangered species, water shortages, energy conservation, and other earth matters will not just keep you in the loop but also urge you to think about things around you, which you might be taking for granted. Look at your water and electricity bills over three months and find out how much your family consumes. Compare notes with friends and challenge one another to reduce your bills. Think about what you buy and how you will dispose of it.

Recycle paper, aluminium, glass, motor oil, and batteries.

Say 'No' to meat of endangered species.

Eat locally produced fruits and vegetables.

Turn over a green life!

Buying recycled products is good for the earth.

You might find this fact hard to digest: What you eat contributes to deforestation and pollution! More and more forests are being cut down to grow food, which is then transported around the world.

Eat locally grown food. Make your own compost, too, with broken eggshells, tea leaves, and fruit and vegetable peels, and watch your garden grow!

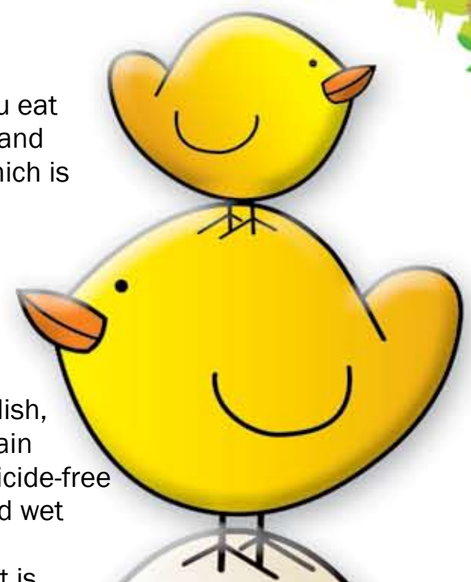
Have a h-earth!

Laundry soaps, household cleaners, furniture polish, paints, fertilizers—eventually all flow down the drain and into the soil and rivers. Phosphate- and pesticide-free soaps and cleaners work just as well. Vinegar and wet newspapers make great window glass cleaners.

When out in the wild on a hike or a trek, it is important not to disturb or dirty the environment. Taking home bugs and seeds from the wild could result in an invasion of wild species!

Use vermicompost instead of chemical fertilizers.

Be judicious in the use of paints, thinners, polish, and so on.



How green is your food?

The farm and poultry animals that we breed for meat give out 21 per cent of the carbon dioxide from all human activity and consume food that can feed 8.7 billion people.

When you are out on a trek, do not treat nature as your dumping ground!

Long live...and forever!

These are the natural wonders of the world. They have roughed harsh and extreme climates and survived. Today, their biggest threat comes from humans. If they are not conserved, these wonders will vanish, taking with them thousands of species seen nowhere else on the earth.

Antarctica

The earth's southernmost continent is unbelievably cold with 70 per cent of our planet's fresh water frozen there as ice. No human population lives there though about five thousand scientists and twenty-five thousand tourists visit each summer. Only six species of seals and twelve species of penguins live and breed there. Birds found there are migratory.

Orange, yellow, and green lichens and mosses dot the white landscape, making for a spectacular sight.

Amazon Forest, South America

This rainforest is the largest and densest in the world, giving out 20 per cent of the oxygen on the earth. In few other places would one be able to see 50,000 varieties of plants, 2,500 kinds of fish, 1,500 species of birds, 1,800 types of butterflies, and about 200 different kinds of mosquitoes!

Great Barrier Reef, Australia

It looks visibly stunning from space but get closer and its beauty only gets magnified. The Reef is eight thousand years old and a collection of three thousand reefs made up of exotic corals, some of which are over a hundred years old. Green turtles, bottle nose dolphins, and humpback whales are some of the inhabitants of the reefs, along with thousands of sponges, anemones, sea stars, and urchins.

Grand Canyon, Arizona

The Grand Canyon rocks were formed millions of years ago but even today they continue to be chiselled and shaped by the mighty Colorado river. Some fascinating creatures roam the deep reddish-brown-coloured landscape—lizards, bighorn sheep, coyotes, elks, mountain lions, golden eagles, peregrine falcons, and rattlesnakes.

Aurora Borealis

The 'Northern Lights', seen in Norway, Sweden, Greenland, Iceland, Alaska, and Canada, are the most amazing natural firework display.

Search

Angel Falls, Venezuela

Free falling doesn't get higher than this. The Angel Falls is the world's highest waterfall at 984.5 metres (twenty times the height of Niagara Falls) with an uninterrupted drop of 807 metres.

Himalayas, Asia

Forty million years ago stood India and Eurasia. They moved, they collided, and they came together to form the Himalayas. Stretching 2,900 kilometres on the Indo-Tibetan border, this mountain range is ruled by the mighty Mt Everest—the world's highest mountain!

Amazing discoveries

Not everyone knows everything. And, the more we know, the more we realize how little we know. Sometimes scientists find themselves feeling a little speechless but mostly surprised. Sometimes, they stumble upon something entirely new, and sometimes, they go out there looking for it. They are still discovering new species, and as they do, we get to learn more about our amazing planet.

A whole new world!

Living deep down in 60 degrees celcius water, inside a goldmine, completely isolated from the rest of the world, with no light or oxygen is no mean task. But scientists have discovered a bacterium 'Candidatus Desulforudis' nicknamed the 'bold traveller', far removed from any other form of life. This could perhaps be a peep into what alien life might look like!

The shrimp-like crustaceans found in the dark caves are blind—an adaptation to the darkness they have lived in!

Do and die!

Discovered in Madagascar in 2008, the trunk of the giant palm grows eighteen metres tall and its leaves fan out almost five metres in diameter. What makes this tree unique and bizarre at the same time is the fact that when it flowers, its nectar attracts hundreds of insects and birds. As soon as the flowers turn into fruits, the entire tree collapses!

The giant palm is so enormous that it can be caught on space satellite cameras!

Croaked in secrecy

Though this toad will certainly never turn into a handsome prince, it had scientists very excited when they found it along with other species in Suriname in South America in 2008.

The frog discovered in Suriname has a shiny black wet appearance with fluorescent purple markings.

A taste for rats!

A new and rare species of the pitcher plant, called Tenax, was unknown to the world till now. Growing in a small swampy area in Cape York, Australia, the exact location of this find is kept a secret by scientists who wish to protect its survival.

Although pitcher plants are known to be flesh eating, the new species has a taste for small rats!

Finding the shrew

Even though its size is anything but huge, it belongs to a family known as giant elephant shrew (sengi family). They call it the grey-faced sengi. The shrew is small and furry with a miniature version of an elephant's trunk that helps it locate its insect diet.

The grey-faced sengi is related to the elephant, manatee, and aardvark!

Lost and found

Scientists believe that even a moderate increase in global temperatures could result in the extinction of 20%–30% of the entire world's species of animals and plants.

Did you know?

On November 28, 2007, a record seventy-nine million trees were planted in Indonesia. The country has had a reputation for cutting down 63 per cent of forests to grow, ironically, palm olive plants—to be used as a 'green' bio-diesel fuel.

Noise pollution has been increasing in the water world and is particularly distressing for sea animals like whales and dolphins that use sound to locate their position. While trying to avoid noisy boats these creatures often miscalculate their location, especially while migrating, and often get stranded on beach shores.

The dust covering the bulb blocks out almost half of the light the bulb gives out. When you switch on a clean incandescent light bulb, it gives out only 10 per cent of the electricity as light—90 per cent of it is wasted as heat. A compact fluorescent light bulb (CFL) in comparison uses 75 per cent less electricity.

The Sumatran tiger may become the first predator to join the extinct dinosaurs if Indonesia does not take drastic steps to control poaching for illegal trade. As of now, there are less than five hundred tigers in Sumatra.

On an average

- A leaky tap can waste about 12,400 litres of water in a year.
- You waste eleven litres of water a minute when you let the tap run while brushing your teeth.
- People use nineteen litres of water per minute when they take a shower.
- Every time you flush the toilet about eleven litres of water goes down the drain.

Harness the sun's energy!

Make your own solar oven

Grab those rays to cook up something. A solar oven uses the sun's energy to heat and cook food without giving out pollution and smoke. By using a solar oven, you can save precious fossil fuels too.

Heat it and eat it!

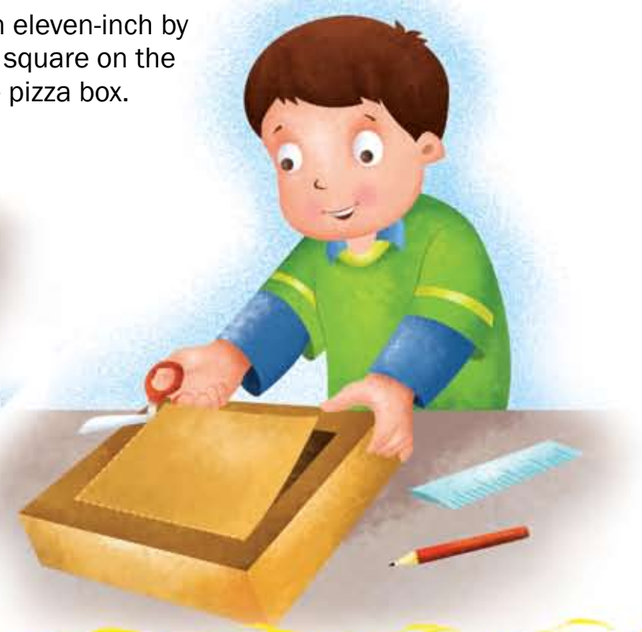
What you need

• A large empty pizza box • Black card paper • Aluminium foil (kitchen wrapping foil works too) • Clear plastic (heavy plastic laminate works best) • Non-toxic glue, tape, scissors, ruler, twig, and a pencil

Putting it together

1 Draw out an eleven-inch by eleven-inch square on the cover of the pizza box.

2 Cut out three sides of the square (leaving the back flap side uncut).



3 Lift the cut-out square and cover and tape the inside of the flap with aluminium foil.

4 Cut out the plastic a little larger than the square you have cut. Keeping the flap lifted, stretch the plastic tightly across the square opening and tape it to the sides of the box. This becomes the window. It needs to be tight so that no air can escape from inside the oven.

5 Open the lid of the pizza box. Cut out aluminium foil and completely cover the inside of the box with it. Glue it in place.

6 Cut out the black construction paper to fit the inside of the box. Place it on the aluminium foil and secure it with tape.

7 Close the lid and open the flap with a twig or a pencil. Face it towards the sun. Adjust the direction of the box so the flap can reflect maximum rays to the plastic window.

8 Warm up your muffins or cook apples and marshmallows by placing them on the window. Pick up your cooked food carefully after it is ready, as it will be very hot.

Glossary

Arboretum— a place where an extensive variety of woody plants are cultivated for scientific, educational, and ornamental purposes

Bacteria— living things seen only under a microscope, and found in rotting matter, air, soil, and living bodies, some being the germs of disease

Biosphere— the parts of the land, sea, and atmosphere in which organisms are able to live

Biodiversity— the variety of living things found in a certain region

Bon— good

Contaminate— pollute, make filthy

Carbon dioxide (CO_2)— a colourless, odourless gas that is found in small amounts; humans exhale it while plants absorb it to make their food

Critically endangered— species that are at an extremely high risk of becoming extinct

Ecosystem— a collection of living things and the environment in which they live

Erosion— the process by which the surface of the earth is worn away by the action of water, glaciers, winds, waves, and so on

Eurasia— Europe and Asia together as a continent

Food chain— a community of living things where each member is eaten in turn by another member

Fossil fuels— fuels such as oil, coal, and natural gas

Fungi— yeasts, moulds, and mushrooms

Germination— the process of sprouting from a seed into a plant

Habitat— the natural environment of an organism

Hibernation— a state in which animals like bears become inactive in winter months when food is hard to find

Permafrost— permanently frozen subsoil

Pedologist— a scientist who studies soil

Predator— an animal that lives by capturing and eating other animals

Phytoplankton— minute, free-floating aquatic plants

Pollutants— things that contaminate air, water or soil

Micro-organism— any organism too small to be seen without a microscope

Migratory— travelling from one place to another at regular times of year, often over long distances (salmon, whales, and swallows are all migratory animals)

Mineral— a natural substance like coal and oil

Near-threatened— animals whose numbers are small or becoming smaller

Nitrogen cycle— the circulation of nitrogen in nature

Nutrients— foods that give nourishment

Recycle— processing waste products or things that we no longer need into new, usable items

Reforest— to replant an area with trees

Silt— fine sand

Species— a group (of animals or plants) whose members are so similar or closely related as to be able to breed together

Toxic— having the effect of poison

Thrive— to grow well

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