

ALL ABOUT PLANTS

Home activity pack by Alameda Education

Meet Bobby!

Hey there explorer! My name is Bobby and I am a frequent visitor here to Gibraltar Botanic Gardens. Can you guess what type of bird I am?

That's right! I am a blackbird. All these trees and flowers here make the perfect home for me. In fact, I know lots about plants and I am excited to tell you all about them. Do you like nature too?

Come with me and my fellow wildlife friends in the Alameda to learn all about plant life here. And from the comfort of your own home too!

This book is full of fun activities we can do together. Remember some of the crafts may require adult supervision. Have fun!

But first, let me introduce you to my friends...



Meet Bobby's Friends





Larry the Lizard



Chloe the carp



How many of my friends have you spotted around the botanic gardens?



Tyrone the terrapin



Betty the butterfly



Activity: Which flowerbeds in the Alameda can you find each of the following plants in?





Candelbra aloe Aloe arborescens



Bird of paradise Strelitzia reginae



Angel's trumpet Brugmansia suaveolens



Chinese hibiscus Hibiscus rosasinensis



African daisy Dimorphotheca ecklonis



Brazilian paper flower Bougainvillea spectabilis



Golden barrel cactus Kroenleinia grusonii



Gibraltar candytuft Iberis gibraltarica

Hint: Look up where in the world these plants are from! Ask a member of staff if you are unsure.

What are those tricky italic words underneath their names? Tyrone, those are their scientific names! Every plant and animal has a scientific name that is used in all languages, so no one gets confused. The scientific name for a human is 'Homo sapien' for example.

Parts of the plant

Can you match the name to the picture and its role?





Roots

Stem

I absorb water from the soil and bring it into the plant

The Alameda

I absorb sunlight which makes the plant grow! However, I can also lose a lot more water than the rest of the plant

I make the plant colourful, to attract pollinators like bees and birds

I hold up the plant



How plants grow



Plants are **autotrophs**. This means they make their own food.

Animals are **heterotrophs**. This means find food from other sources, like plants or other animals.



Food is made by plants in the form of **sugars**. Plants need water, sunlight and a gas in the air called carbon dioxide to make sugars. They also make oxygen, which we need to breathe!



The name of this process which plants use to make food is called **photosynthesis**.

Activity: Seed grow jars



You can watch a seed sprout at home in three simple steps!

You will need:

Some seeds (e.g. peas, beans, flower seeds)

A transparent jar

Paper towels



 Put several wet paper towels in the jar. Make sure to wring out the paper towels first so there is no excess water in the jar. We don't want to drown our seeds!



2. Place the seeds near the bottom half of the jar.

PEA BEAN FLOWER

3. Place them by the window and wait for them to sprout! Remember to label the jars if you are growing multiple types of seed!





What plants need





<u>Soil</u>

I contain **nutrients** which are taken up by the roots. I also **catch rainwater**, which is absorbed into the plant through the roots.



<u>Water</u>

I am needed in **photosynthesis** to make food and oxygen. I also help the plant to **stand up**.



<u>Sunlight</u>

I give the plant **energy** to turn water and carbon dioxide into sugars and water. Photosynthesis cannot happen without me.



Space

I make sure neighbouring plants aren't squashed together and competing with each other for nutrients and water.



<u>Carbon dioxide gas</u> I am needed in photosynthesis to make food and oxygen. I am found in the air and can make the Earth very warm if there are not enough plants to absorb me! Some plants also need animals like me to spread their seeds or pollinate them!

Activity: Can you find the following key words below?

K J G O O S R M X P P H D P Р EXNXAOEEJDEXQH Q T Y Y U T T Y F I V W E B VGAQSQAPLQIIKT EHNLRVWICAHFHP M U G E H O H J P U R I G M D PORTORETEHIYVI H AFYTQOVCLMYHO E IGLRSTDJNAJKYX WOIREHUSFRSCI VGOOMSWGOP BBD R XPHDSAFMKSKOE HZFGKPKDTESL 1 D N NUTRIENTSRAGUSO PHOTOSYNTHESISC

Leaf Stem Petal Roots Autotroph Heterotroph Soil Sunlight Water **Nutrients** Carbon Dioxide Sugars Oxygen Photosynthesis

Gibraltar

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Extra challenge from Chloe: Can you remember what each of these words mean?

A timeline of plants





Bryophytes
Mosses and lichensPteridophytes
FernsGymnosperms
Conifers and cycadsAngiosperms
Flowering plants470 million years ago444 million years ago360 million years ago130 million years ago

The rise of the dinosaurs was about 240 million years ago. Which of the above plants existed during this time?

The "ph" sound is the same as an "f" sound!

Also, the "p" in "pt" is silent! This in the same in "pterosaur", like me! I lived alongside the dinosaurs. Did you know grass, fruits and flowers did not exist until the very end of our time? My name is Pterry by the way...



6	Bryonhytes	Pteridonbytes Gibraltar
	Diyophytes	T terraopriytes
	(Bri-yo-fites)	(Teree-do-fites)
	Mosses and lichens	Ferns
	THE OLDEST LAND PLANTS IN THE WORLD!	THE FIRST PLANTS TO HAVE ROOTS AND VEINS!
	THEY HAVE NO WATED TRANSPORT SYSTEM THIS MEANS	THIS MEANS THEY CAN GROW TALLER THAN MOSSES.
	THEY HAVE:	HOWEVER, THE SEED AND FLOWER STILL DID NOT
	<u>NO ROOTS</u> TO ANCHOR THE PLANT INTO THE SOIL, SO THEY CANNOT GROW VERY TALL.	EXIST YET!
	NO VEINS TO CARRY WATER FROM THE BOTTOM TO THE TOP OF THE	SO LIKE THE MOSSES THEY DO NOT HAVE ELOWERS
	PLANT, SO EVERY PART OF THE PLANT MUST BE TOUCHING MOISTURE. THIS IS WHY YOU FIND MOSSES IN DAMP ENVIRONMENTS LIKE BOGS AND	AND THEY REPRODUCE BY SPORES.
	RAINFORESTS.	A Frank
	THEY DO NOT HAVE FLOWERS.	
	THEY DO NOT HAVE	
	SEEDS. THEY REPRODUCE BY A DUST	
	CALLED SPORES	
	INSTEAD. THE SEED DID	
	NOT EXIST YET AT THIS	
	TIME/	
		- ANY CONTRACTOR

Gymnosperms



(Jim-no-sperms)

Conifers and cycads (types of trees)

THE FIRST PLANTS TO HAVE SEEDSI THIS MEANS THEY CAN BE A MIX OF <u>2</u> <u>PARENT PLANTS</u>, RATHER THAN A CLONE OF ONE. THIS MAKES THEM <u>DIFFERENT</u>, SO THEY ARE MORE LIKELY TO SURVIVE A CHANGE IN THEIR ENVIRONMENT. THE SEED CAPSULE ALSO HELPS PROTECT THE INSIDES FROM DAMAGE.

THEIR SEEDS ARE <u>NAKED</u>- THIS MEANS THEY CAN BE SEEN EASILY AND ARE <u>NOT</u> COVERED BY ANYTHING. AN EXAMPLE OF A NAKED SEED IS A PINE CONE. THEY ARE LIGHT AND HOLLOW SO THEY CAN BE SPREAD BY THE WIND.

> THEY HAVE BIG ROOTS TO HELP THEM GROW VERY TALL!

HOWEVER, THEY DO <u>NOT</u> HAVE Flowers.

Angiosperms

Gibraltar Botanic Gardens The Alameda

(Anjee-yo-sperms)

Flowering plants



THE FIRST PLANTS TO HAVE FLOWERS! FLOWERS ARE COLOURFUL TO ATTRACT POLLINATORS.

THEIR SEEDS ARE NOT NAKED. THEY ARE ENCLOSED IN A FRUIT. THIS ENCOURAGES ANIMALS TO SPREAD THEIR SEEDS BY TAKING AND EATING THEIR FRUIT.

Challenge question: Why do you think wood exists, and why do you only normally see it on tall plants?

Activity: Which types of plant do the features below belong to?



Hint: There may be more than one answer per feature!



All about habitats



Can you match the habitat to its description?



Rainforest



Grassland



I am a very **dry** place with not many plants. The plants that are here must be very good at keeping water. I can be either very hot or very cold.

I am a very warm and rainy place. I am very humid too- this means there is a lot of water in the air. As a result, I have lots of plants with big leaves. You can find me around the Earth's equator.

I receive a little amount of rain, which is suitable for grasses but not enough for big forests. I am often **grazed** at by animals and sometimes if I am really dry then I can catch fire!

Extra challenge: Can you name any plants you know belong in each habitat? How do you know?

Desert

Plants in different places

How you can guess a plant's habitat



Rainforest plants

These tend to have **big leaves**, to compete with neighbouring plants in the jungle for rainwater and sunlight. They droop a lot to let excess rainwater run off.

They are **very green** because they contain a LOT of a green chemical called **chlorophyll**. Chlorophyll absorbs the sunlight. As the rainforest can be dark and dense, plants here need lots of chlorophyll to absorb as much sunlight as possible.

Grassland plants

These habitats are too hot and dry for forests, but have just enough water in the soil to support the growth of grasses.





Desert plants

Up to 80% of water lost from a plant is through the leaves, so plants in the desert tend to have **tiny leaves, to prevent water loss.**

Some desert plants drop their leaves altogether during the Summer when it gets too hot and dry. Many cacti do not grow leaves at all, to reduce water loss.

Activity: Bottle rainforest

Reuse your plastic waste to make a mini exotic habitat!

Materials:

- ·Large clean plastic water bottle
- ·Pebbles or aquarium rocks
- ·Activated carbon (purchase this from the pet store)
- ·Small tropical plant, like a fern or palm
- \cdot Spanish moss (purchase this from a craft or garden supply store)
- ·Potting soil
- ·Fresh moss (from outside!)
- ·Small toy animal

Instructions:

- 1. Cut your bottle into two parts, about two thirds of the way down its length. Using scissors may require parental supervision.
- 2. Add a layer of pebbles to the bottom part of the bottle, for drainage.
- 3. Sprinkle on a little activated carbon. This will filter the water and keep your terrarium from getting smelly.
- 4. Add a barrier layer of Spanish moss.
- 5. Add potting soil—enough so that it comes to just below the rim of the bottom piece.
- 6. Plant your tropical plants and add the fresh moss.
- 7. Find a small toy that would enjoy living in your terrarium. If you can find a rainforest animal, that's even better!
- 8. Lightly water your terrarium (you could mist it with a spray bottle).
- 9. Add the lid (top part of the bottle)
- 10. Put your terrarium in a spot where it'll get plenty of INDIRECT sunlight.

There's no need to consistently water your rainforest. Moisture will form on the inside of your terrarium and on the plants. That moisture will drip down and water the soil. It's kind of like a real rainforest!

11. Study up! Google rainforests, check out books about them and watch movies about our beloved rainforests and the creatures that call them home.





Surviving the desert

Succulents and cacti



A **succulent** is a plant with thick, fleshy leaves or stems. They feel so swollen because they are filled with water (normally stored as sap).

The cactus is an example of a succulent. All succulents are adapted in many ways to survive in very hot and dry habitats.

Many cacti are tall and narrow, so less of their surface area are facing up towards the burning sun.

The top of the stem and areas of new growth may be covered in lots of lightly colored hairs to deflect sunlight. This protects the cactus from burning.



Aloe verg is a succulent but not a cactus because it has no spines. All cacti are succulents.

Some cacti may however be **round** and **ribbed**, to help guide water down towards the roots.







Some old cacti have very small leaves or may shed their leaves in the summer, when it is really hot. This is because up to 80% of plant water loss is from the leaves, and they cannot afford to lose water in the desert!

stem.

Cacti are flowering plants, which means they can produce fruit and flowers

More modern cacti may have no leaves at all.

Spines protect against herbivores and can **collect** water from the air at night when it is cooler.

You cannot drink the water stored in cacti. Some cacti are toxic!

The Alameda habitat



How we choose our plants

Gibraltar is in an area at the bottom of Europe called the **Mediterranean**. It is very **warm** here but that does not mean it is a dry place! Did you know we receive more rainfall a year than London?



This does not mean they are always from the Mediterranean. **Mediterranean climates can also exist in other parts of the world** like in South Africa, California, Australia and some parts of Chile.



There are **cactus beds** near the car park and behind the Education Centre. These **don't need much** water to grow.

There are also other succulents here, like *Aloe* and the **elephant bush**.

STREET STREET

The **bird of paradise** flower is from **South Africa**. Parts of South Africa have a very **similar climate to Gibraltar**, so it grows well here. The Gibraltar campion is very rare and can only be found growing wild in Gibraltar. It is grown on the rockery in these gardens.



The greenhouse behind the hibiscus bed is kept very warm and misty to grow rainforest plants, which need much more water than there is outside.

Activity: Scavenger hunt



Can you find one thing around the gardens starting with every letter of the alphabet? Write down what you find when you see it- no need to collect anything!



Types of trees

Mediterranean

olive tree

Olea europaea

Have you spotted these three trees in the Alameda?

The most common tree in Gibraltar. Lots of the green vou can see on The Rock are olive trees.



These can grow very tall!

Stone pine

Pinus pinea

They are gymnosperms, so they make naked seeds in the form of pine cones. They do not make fruit but they do make pine nuts, which we can eat.

Beware of the caterpillars from these trees! They can make your skin very red and itchy.

This is not actually a tree! It is a succulent. This is because their trunks are full of water, not bark. Their sap is bright red, like dragon's blood.



Their branches are very high up and only grow once every 15 years, They make fruit, but not dragon fruit! That is from a different plant.



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Botanic Gardens The Alameda

Dragon tree

Dracaena

draco

Medicinal plants

Can you match these Alameda plants with their uses?





Aloe vera



Lavender



I can help treat stomach aches. I am also a very common flavour of toothpaste.

I can repel mosquitoes.

I am good at waking people up in the morning! I can

also help with hair loss.

smell nice and fresh.

I can help reduce stress and anxiety.

Eucalyptus

I am filled with sap which can soothe burns and moisturize skin.







Mint



Can you colour in these plants with accuracy?





Inviting wildlife



Sometimes, seeds can hook

onto my fur, so I can spread them around when I walk!

Why are birds and insects important to our gardens?

Many animals can **spread seeds** across bigger distances than wind can. When the animal eats a fruit, the seed may pass through the digestive system and be excreted in a new place. This allows plants to spread across large distances, which is good, because it means they won't need to compete with each other for space and resources.

Many birds and insects are **important pollinators**. This means they transfer pollen from plant to plant to fertilize their seeds. Ultimately, this enables more flowers and trees to grow.

Less than 1% of garden animals are pests and inviting wildlife can **remove**

these pests naturally.

Many are beautiful animals who deserve space on this Earth too! Encouraging wildlife to visit your garden **helps maintain a healthy** ecosystem and can stop a wide range of species from becoming extinct.

What wildlife have you seen in the botanic gardens recently?

Making homes for wildlife

Ask a responsible adult at home if you have (or can make) any of these things for your garden or terrace.



Butterfly table https://scottishwildlifetrust. org.uk/resource/make-abutterfly-feeder





Bug hotel https://cdn.buglife.org .uk/2019/07/Build-abug-hotel.pdf

Wildflower patchrequires soil

https://www.wildlifetrusts .org/actions/how-growwild-patch-or-minimeadow



Composter - a great home for worms!

https://kids.nationalgeographic. com/books/article/createcompost



Mini hedge- tricky one! https://www.tvn.co.nz/q-anda/container-and-planter-boxinstant-hedge-planting-guide





Mini pond - may not be as effective in terrace flats!

https://www.wildlifetrusts. org/actions/how-createmini-pond



https://www.rspb.org.uk/ helping-nature/whatyou-cando/activities/build-abirdbox

P: Who eats what Alameda Wildlife Conservation Park



Did you know the plants in the Alameda are also very important for the animals at the AWCP zoo?



Barbary macaque 'Macaca sylvanus'

Poppy is homely young lady, who enjoys eating branches from her native **olive trees**, just like the other Barbary macaques up The Rock.

Iray is a type of primate called a lemur, from Madagascar. In the wild, lemurs like to eat the leaves of a semi-succulent desert plant called the Madagascan ocotillo. Have you seen this plant growing at the front of the Alameda gardens?



Katie is the largest species of tortoise in mainland Africa and third largest in the world! Like most tortoises, she likes to eat lots of leaves, especially hibiscus!

Activity: Make a poster

Can you make a poster about the importance of gardens

and wildlife to our world?



CONTRACTOR OF CONTRACTIVITIES

https://www.**rspb**.org.uk/helping-nature/what-you-cando/activities

https://www.kew.org/learning/community-and-access/youthprogrammes/activities-and-resources

https://www.wildlifewatch.org.uk/activities_

https://www.woodlandtrust.org.uk/visiting-woods/things-todo/children-and-families/

https://www.discoverwildlife.com/people/nature-activities-forchildren



Think about including *why* we are important, and what people can do to make their outdoor spaces more nature-friendly...

Sustainable living

What we can do at home to help the environment

Shop local and waste-free



Buy foods that are grown nearby, rather than those that have traveled thousands of miles to arrive in your supermarket! Only buy things you know won't be wasted. Check the expiry date before you buy them.

Reuse



Buy reusable coffee cups, bottles and shopping bags, rather than constantly buying disposable ones! This will save you money, as well as the environment. Furoshiki is a Japanese practice where gifts are wrapped in resuable fabric instead of wrapping paper!



Did you tins and cans can take up to 500 years to break down underground and glass take over 4000 years? Recycle plastics, card, aluminium and glass so they can be turned into something new instead of going to landfill.

Buy second hand



Not everything can be bought secondhand but lots of things like clothes, toys and furniture can be fit for reuse or given another life. Again, this also saves money as well as resources.



Saving electricity and water



Turn lights off when you are not using the room and shut down electrical devices like computers and TVs, rather than leaving them on standby. Save water by turning the tap off whilst brushing your teeth.

Eat less meat



Did you know meat production worldwide has doubled in the last 30 years? We are eating too much and do not need it with every meal. Look out for the words "organic" and "free range" when buying animal products, to ensure the environmental impact is minimal and the animals are treated as humanely as possible.

Home growing

The best times of year to grow veggies in Gibraltar



Spinacia oleracea L. Cucurbita maxima Cucurbit

Gardening suppliers in Gibraltar:

- Gibralflora
- Morrisons

Gardening suppliers in Spain:

- Leeroy Merlin Los Barrios
- Vivero Los Rosales
- Vivero Ordonez









Activity: Gardening tools

Can you match the tool to its purpose?



This waters the plants. The sprinkler at the end spreads the water evenly so the seedlings aren't damaged.

This can wiggle out weeds, including their roots.

This can dig large amounts of soil at a time or move compost.

These protect your hands when using chemicals and pruning thorny plants.

This can dig small, neat holes in the soil to plant seeds.

These cut plants and crops with hard, woody stems! They are good for pruning



Gibraltar

Plant quiz!

What have you learned?

1.What is the role of the plant's roots?

2. Plants are autotrophs. What does this mean?

3. What is the name of the process plants undergo that turns carbon dioxide and water into oxygen and sugars?

4. What are the most important things plants need for this process to happen?

5. What is the oldest group of land plants on the planet?

6. What were the first plants with roots and veins and what did this mean they could do?



7. What is the difference between a naked and enclosed seed?

8. What is the name of the habitat that is too dry for forests but receives just enough rain to support the growth of grasses?

9. Up to 80% of water loss from a plant is lost from which part?

10. What is a succulent?

11. Why is the olive tree so important in Gibraltar?

12. Name 3 features of cacti that enable them to survive hot and dry conditions.

Answers: 1) To absorb water from the soil to bring up into the plant, 2) They make their own food / sugars, 3) Photosynthesis, 4) Sunlight, 5) Bryophytes (mosses and liverworts), 6) Pteridophytes (ferns), 7) Enclosed seeds are in a fruit, 8) Grassland, 9) Leaves, 10) A plant with fleshy, swollen leaves and/or stem to store water in dry conditions, 11) Food source for migrating birds, 12) Anything from their spines, lightly colored swollen leaves and/or stem to store water in dry conditions, 11) Food source for migrating birds, 12) Anything from their spines, lightly colored swollen leaves and/or stem to store water in dry conditions, 11) Food source for migrating birds, 12) Anything from their spines, lightly colored here in a fruit, storage of water as sap, leaf shedding, round shape for drainage or tall, narrow shape for less sun exposure



Well done! End of pack!

