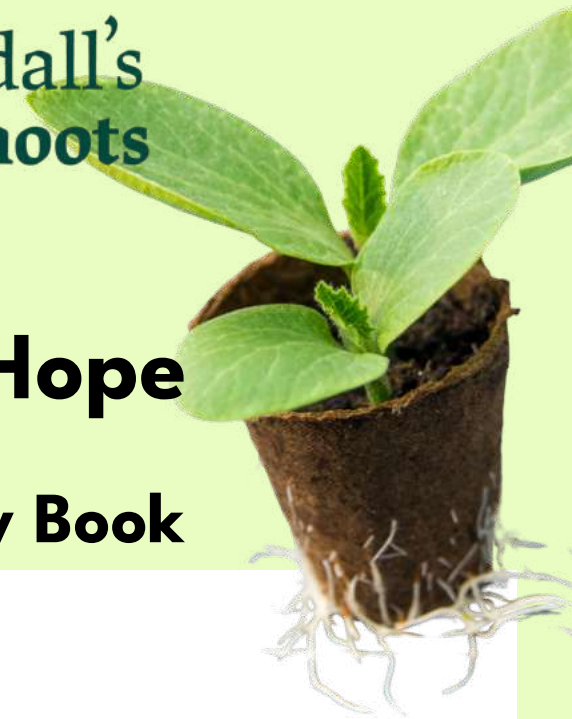




Jane Goodall's
Roots & Shoots
South Africa



Gardens of Hope

Student Activity Book

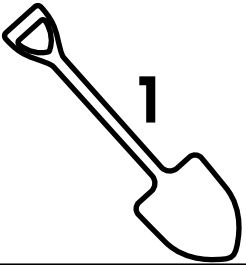

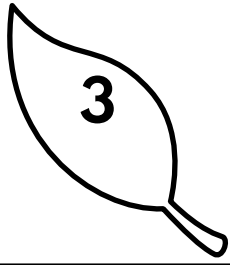
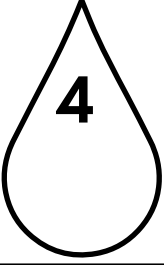
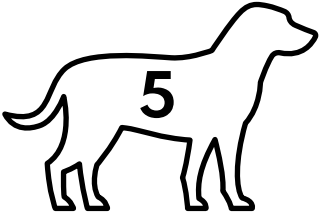

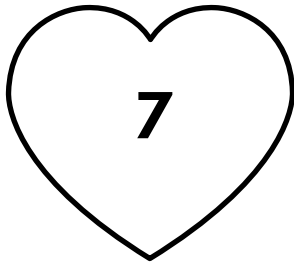
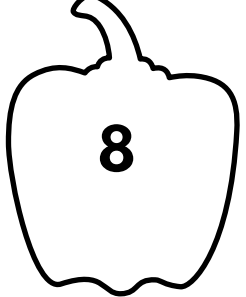
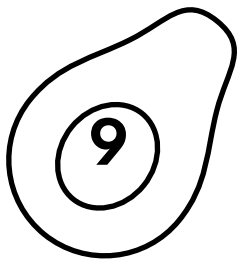
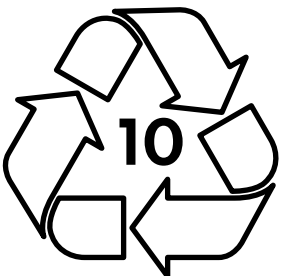
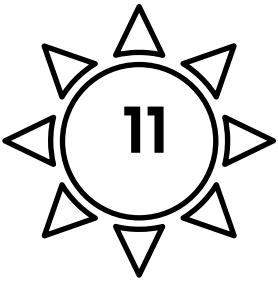

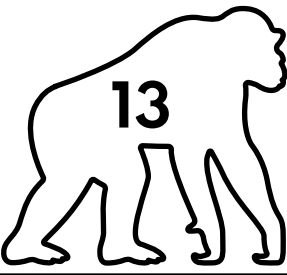
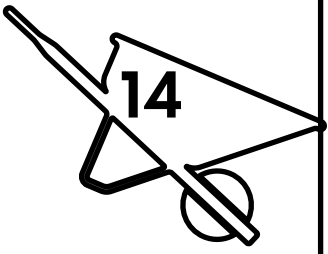
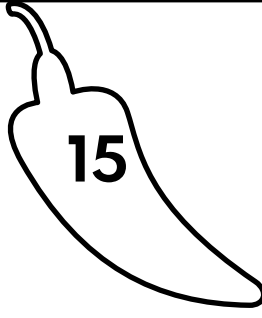
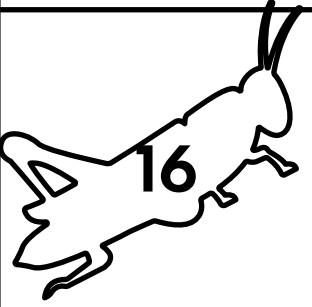
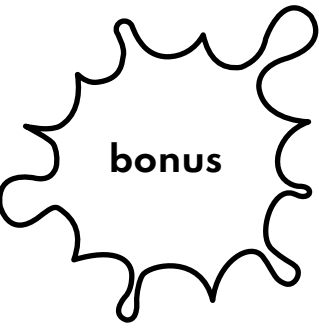

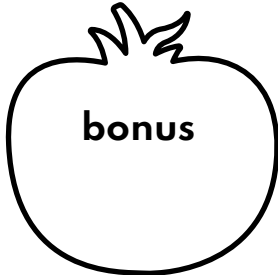
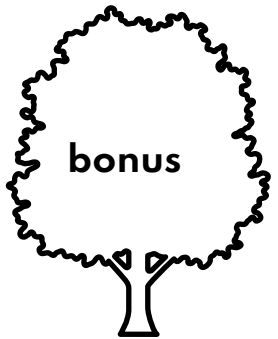


Name: _____

School: _____ **Grade:** _____

Created by Roots & Shoots South Africa thanks to support from a grant from DP World

My Gardens of Hope Passport

 1	 2	 3	 4
 5	 6	 7	 8
 9	 10	 11	 12
 13	 14	 15	 16
 bonus	 bonus	 bonus	 bonus

To graduate as a **Roots & Shoots gardener**, you must participate at least 12 sessions. If you attend extra sessions or do more garden tasks bonus tasks, you'll get a special prize at our project celebration!

Our Shared Garden Promises

1. **We will listen carefully.** Pay attention when your teacher or a friend is speaking. Only one person speaks at a time. Put up your hand and wait for your turn to talk.
2. **We will use garden tools safely.** Don't play with the tools or run while using them. Don't leave tools lying where others can step on them.
3. **We will take care of water.** Use only as much water as the plants need. Don't play with the taps or hoses.
4. **We will be kind and respectful.** Work together, and use kind words. The garden grows best when we all cooperate.
5. **We will not run in the garden.** Running can cause accidents and damage plants.
6. **We will take care of the garden environment.** No littering and watch out for the plants.
7. **We will pack up well.** Wash your tools and hands when you leave the garden. Help your facilitator to pack all the equipment away where it is safe and out of harm's way.

Are there other promises or agreements you think will help our garden grow well and keep everyone safe? Write them here:

8. _____

9. _____



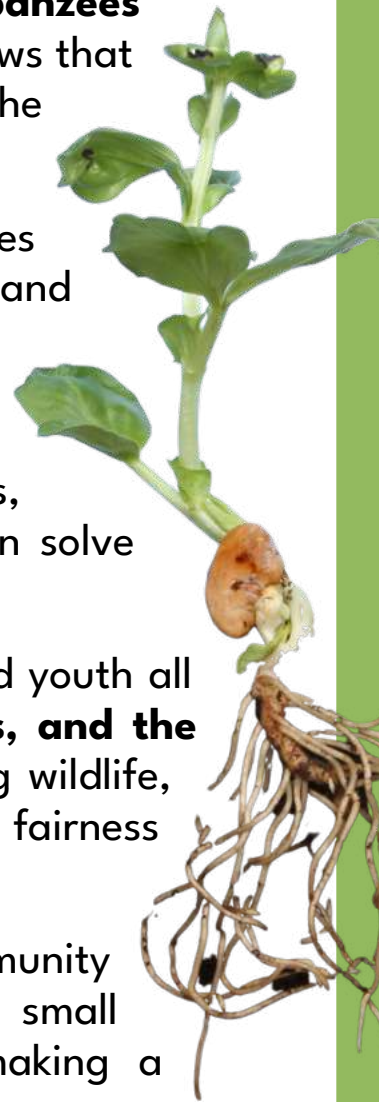
Session 1: Introduction



Photo: Michael Neugebauer

Roots & Shoots is a movement started by Dr. Jane Goodall. Dr Jane is a scientist who has spent her life **studying chimpanzees and protecting nature**. She knows that young people like you have the power to change the world.

The name Roots & Shoots comes from plants. Roots grow deep and strong, while shoots push up towards the sun. Together, they can break through even the hardest ground. Just like plants, when we work **together**, we can solve big problems.



With Roots & Shoots, children and youth all around the world create projects that help **people, animals, and the environment**. That might mean planting gardens, protecting wildlife, recycling, cleaning up rivers, or standing up for kindness and fairness in our communities.

By joining Roots & Shoots, you become part of a global community of young changemakers in more than 60 countries. Every small action you take connects you to thousands of others making a difference across the planet.

**“Together we can,
Together we will,
Together we must,
Change the world”**

Learn the Roots & Shoots greeting!



What is permaculture?

In our Roots & Shoots Gardens of Hope, we will be creating a permaculture garden together. **Permanent + Agriculture = Permaculture**

Permaculture means **working with nature** and the land instead of against it. In permaculture gardens, every part has a purpose. Plants, animals, soil, water, and people all help each other. This way, we create gardens that last longer and that are healthier for us and the earth.

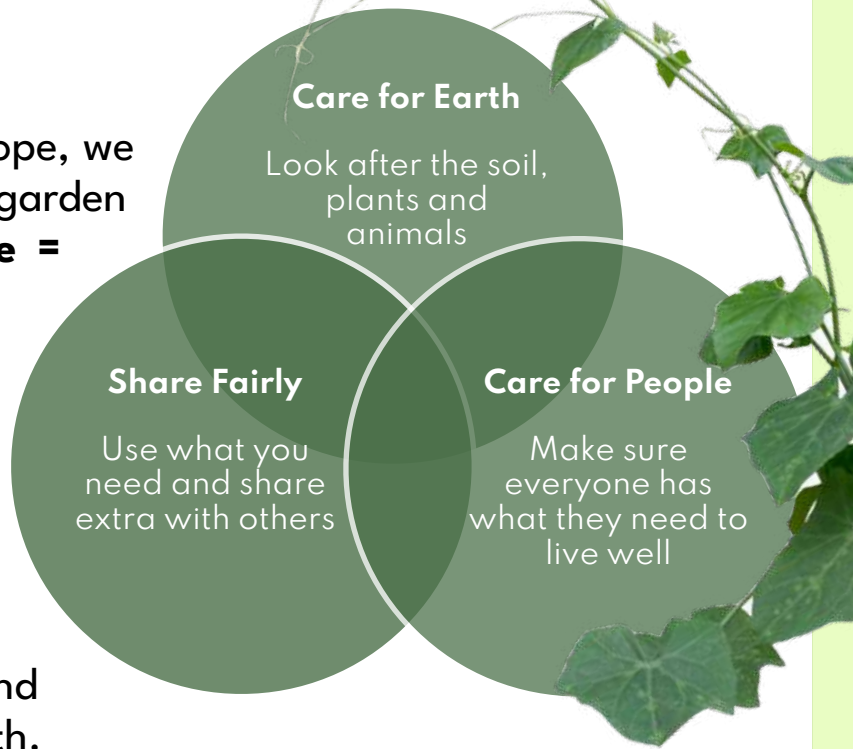
Our garden will also be **organic**. That means we won't use chemical poisons or artificial fertilisers. We use natural methods to keep the soil rich and the plants strong. This is better for our health, better for the earth, and better for all the creatures that share the garden with us. By growing food this way, we save money, protect the environment, and learn how **everything in nature is connected**.

Activity: Grow and observe a seedling

1. Make holes in the bottom of a container and fill it with soil.
2. Plant your seed in and water it so the soil is damp.
3. We will be observing the sprouting seed over the next few weeks and drawing it each week. **Learning to watch closely** is a super important skill for being a good gardener.

Quiz:

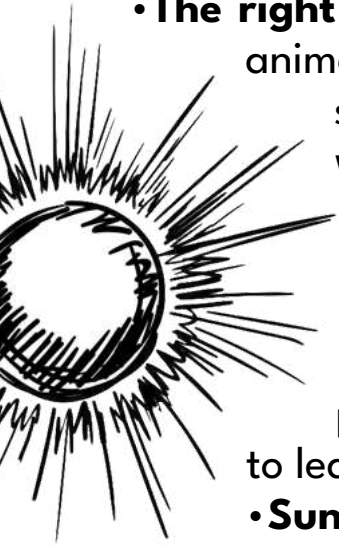
What two words combine to make permaculture?
What is the Roots & Shoots greeting?



Session 2: Garden Design

What do gardens need to grow?

- **Good soil:** Vegetables and other plants need fertile soil. The soil must be soft so that the roots can spread out and grow deep. It also needs to be full of nutrients, which are like vitamins for plants.
- **The right amount of water:** Just like people and animals, plants need water to survive. If a seedling does not get enough water, it will dry out and die. But if it gets too much, it can drown.
- **Enough space:** Plants need enough space to grow big. Sometimes, plants we do not want, called weeds will come and take up space from your veggies. We must pull out weeds so the plants we want can grow. It can take time to learn which plant is a vegetable and which is a weed.
- **Sunlight:** Plants make their own food. They do this by using sunlight, water, and air. Sunlight gives plants the energy to make their food inside their leaves. We call this **photosynthesis**.
- **Care:** Plants need you to look after them! Watch your plants closely to see how they are doing.



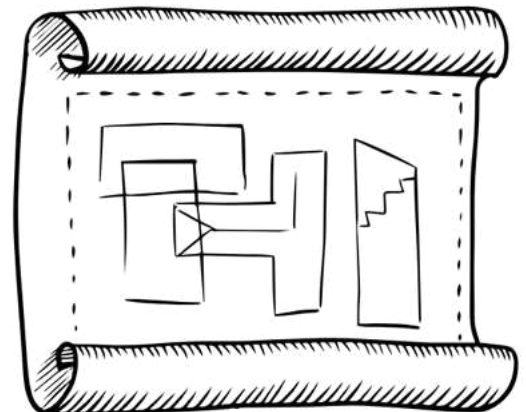
Activity: Garden design

Plan your garden by drawing a map of what it could look like.

What vegetables do you want to grow? Is it the right time of year to plant them? Look at your garden calendar for help.

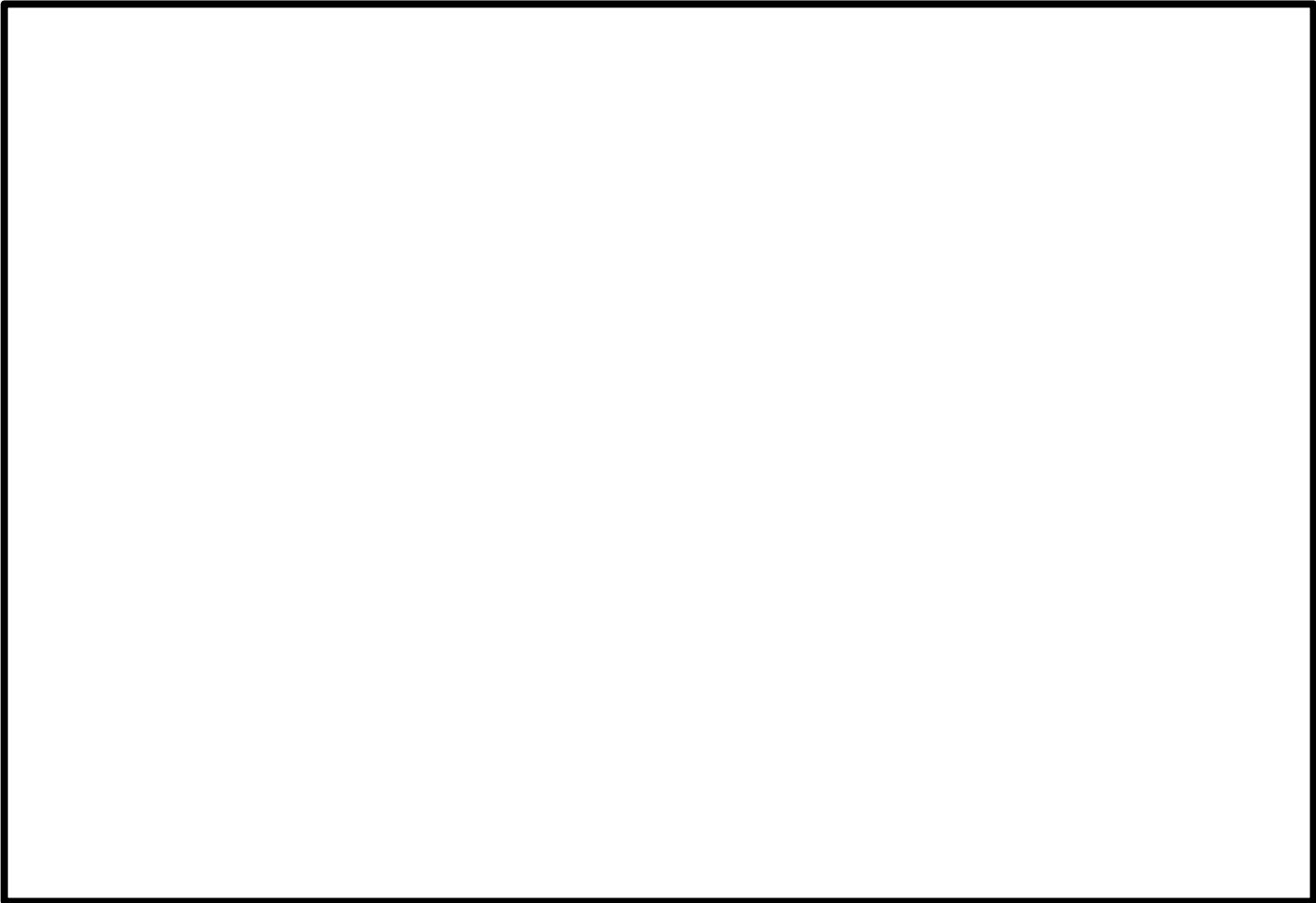
Optional Activity

Make a drawing of the seedling you planted in our last session. How is your plant growing? Sometimes seeds take a long time to sprout. If it has not sprouted yet, look around your garden and see what you notice – plants, insects, flowers, soil, grasses, draw them or write about them.



Garden Journal

Draw Here!



Session 3: Healthy Soil

Activity: Get to know your soil

Pick up a handful of your soil. What does it feel like? What does it smell like?

If it feels gritty, like beach sand, and doesn't stick to your fingers, it's **sandy soil**. Sand doesn't hold much water or food for plants.

If it feels smooth, like playdough, and sticks to your fingers, it's **clay soil**. Clay soils can

get soggy when wet and very hard when dry, which makes growing vegetables difficult.

If it breaks into small, crumbly pieces and doesn't stain your fingers, it's **loam soil**. This is a healthy mix of sand and clay, and it's great for growing garden plants.

Compost

Compost is nature's way of recycling. It turns food scraps and dry leaves into nutrient-rich soil. To grow strong plants, we need worms, mushrooms and other tiny creatures in our soil. These worms and other creatures eat food waste, dead plants and other natural matter in the soil. They are called decomposers because they break down, or decompose old plant material. Thanks to decomposers we get compost.

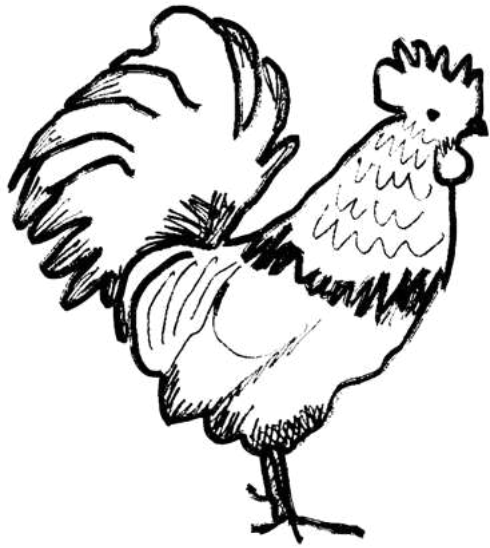
Healthy soil is like a **sponge**. It needs to be soft and full of tiny air spaces so water, roots, and worms can move. **But if we step in the garden beds, the soil gets squashed (compacted).**

Compacted soil has less oxygen, becomes too hard for water to soak in and makes it difficult for roots and worms to move.



Manure

Manure is poop from animals like cows, sheep and chickens that can help plants grow. But you can't just throw manure straight onto your garden. It must be composted first so it's safe for plants and people. Composting makes it less smelly, kills germs and makes sure it doesn't hurt the soil.

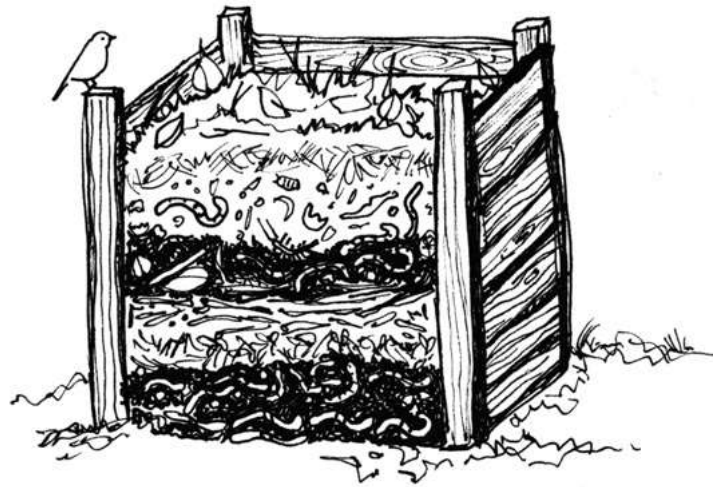


Mulch

Mulching means covering the soil with plant material, like a blanket, to keep it safe and healthy. Mulch stops the soil from drying out. It also protects the soil from heavy rain and helps stop weeds from growing. Dry materials like grass and wood chips can be good for mulch. **It's super important to mulch!** Many people forget about it.

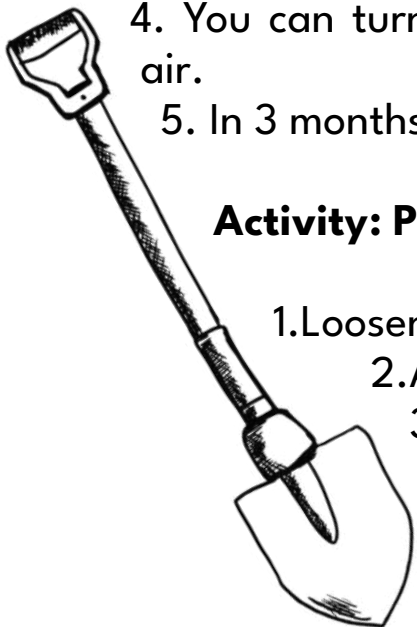
Activity: Start your compost pile

1. Choose a good spot away from the house/school. It helps if it is shady.
2. Layer twigs, grass leaves, kitchen waste, manure and mulch. Do not put meat, plastic or glass in the compost.
3. Keep your compost pile damp.
4. You can turn compost weekly to add air.
5. In 3 months, you'll have compost.



Activity: Prepare your garden beds for planting.

1. Loosen the soil gently with a garden fork or spade.
2. Add compost to keep the soil soft and healthy.
3. Stay on the paths! **Don't walk in the garden beds, your feet are heavy for the soil.**





Session 4: Planting time

It's good to mix plants up! **Companion planting** is when you grow different plants next to each other because they help each other out, almost like being good neighbours or teammates. Some plants protect each other from bugs, some share nutrients, and others give shade or support. Plants do better when they have good friends around them!

Quiz: Learn from the companion planting poster. What are 3 plants, their good companions, and their bad companions?



Optional activity: Grow seedlings

1. Make a planter with a recycled container. Remember to make holes so extra water can run out. Make planting soil by mixing sand and compost.



2. Fill a tray or pot with soil, plant the seeds, and water gently. Do not plant your seeds too close together. Plant the seed as deep as it is big. Small seeds go just below the surface and big ones a bit deeper.

3. Especially when the plants are small, keep them damp with a clear plastic cover that holds water in and lets sun come in. Keep them in the sun.

4. When your seedlings are strong enough, transplant them into your garden. Be gentle with the roots.

Optional activity: Growing plants from cuttings

1. Take a cutting, by snipping a healthy stem from a plant.

2. Prepare it by removing most of the leaves from the bottom of the stem.

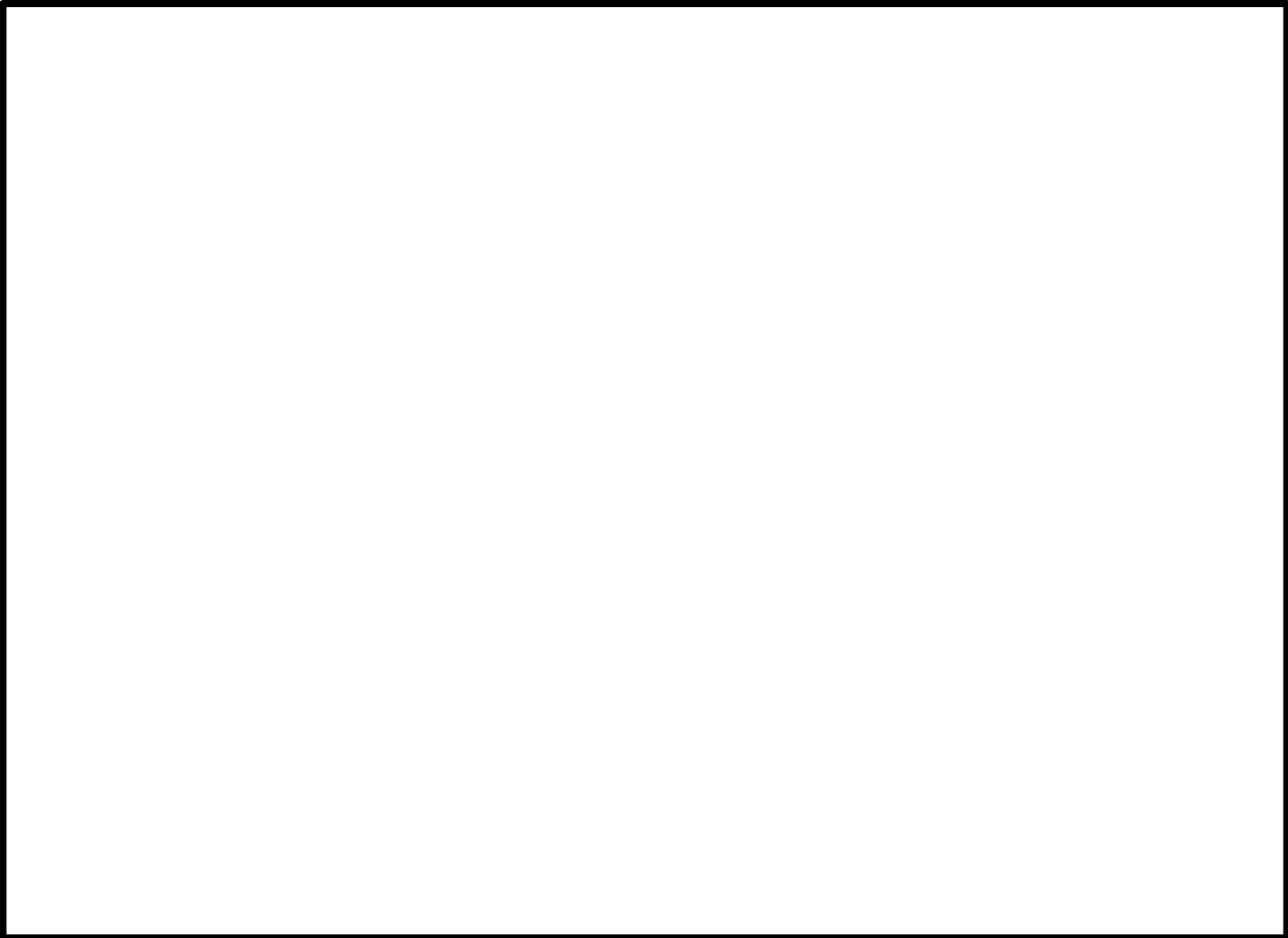
3. Put the stem in water or moist soil until roots appear.

4. Once it has roots, move it into the garden or a bigger pot.



Garden Journal

Draw Here!



Session 5: Indigenous Plants

Indigenous plants are **plants that naturally grow in South Africa**. They are used to the local climate, so they are strong and can survive heat, drought, or heavy rains better than plants from elsewhere. Growing lots of different indigenous plants helps our food supply stay strong even when the climate changes. It also protects the traditional knowledge of how people have used these plants for **food, medicine, and culture**.

Activity: If available, you'll have a chance to see, smell and taste some indigenous plants and foods.

siSwati: **Indlubu**
Tsonga: **Tindluwa**
English: **Bambara groundnut**
These are beans that grow under the ground!



siSwati: **Mgcenga/Tinhlumayo**
Tsonga: **Tinyawa**
English: **Cowpeas**
Tiny beans that are tasty and can grow even in dry soil.



siSwati and Tsonga: **Morogo**
English: **Amaranth**
A group of leafy greens, full of vitamins and eaten as spinach.



Siswati and Tsonga: **Emabele**
English: **Sorghum**
A grain used to make porridge and flour.



Sisiwati/Tsoanga: **Umthungulu**
English: **Num-num berries**

A bush with thorns but sweet red berries.



Siswati and Tsonga: **Umqokolo**
English: **Kei apple**
The bright yellow fruit that's sour and makes good jam.



Siswati: **UmNumbela.**
Tsonga: **Nombhela**
English: **Milkplum**
Small red fruit with a big seed, grows on a tree that is often in rocky places.



Siswati: **Umdlonyane**
Tsonga: **Mhlonyana**
English: **African wormwood**
The medicine from this plant is used to reduce pain and inflammation.



siSwati and Tsonga: **Isibhaha**
English: **Pepper bark**
The medicine made from the bark and leaves of this tree are used to treat flus, colds and stomach-aches.



Siswati: **Liselwa**
Tsonga: **Nghòtsá**
English: **Calabash**
These can be eaten as a pumpkin and the dried fruit is used to make bowls.



Discuss

Do you know any of these plants by other names?
Do you know any recipes for indigenous plants?
Who can you ask about how to grow and prepare indigenous plants?
Other than food, what do people use indigenous plants for?
Why are indigenous plants important?



Session 6: All about animals

Wild animals are meant to live in nature and take care of themselves, like elephants, jackals, or falcons. Wild animals should remain in their natural habitats, where they help keep the whole system healthy. We should not bring them into our homes because they often struggle to survive there.

Domestic animals are pets or farm animals that live with people, like cats, dogs, cows, and chickens. They have adapted to live with humans. We need to make sure we take good care of these animals so they can give live happy lives. They need food, water, exercise, and attention.

Habitats are the natural homes of animals. Every animal needs food, water and a home to live. A habitat contains all three of these. For wild animals, they live naturally in areas which have other animals, plants and a climate that is best for them. They find their own food, water and shelter. Humans normally provide the habitat for domestic animals. (E.g. the area around your house).

Remember: Animals can feel pain. They can be happy, afraid, sad or playful.

Endangered Species

An endangered animal or plant is one that is in danger of disappearing forever. If all of them die and none are left anywhere, we say it has become extinct. Why do animals become endangered?

- Loss of habitat. Their homes are destroyed by farming, cities, or changes in climate.
- Pollution. Water, air, or soil pollution makes it hard for them to survive.
- Overhunting or poaching. Humans sometimes hunt animals too much.
- Invasive species. Animals or plants from other places can take over their food, water, or shelter.

Discussion:

Where have you seen wild animals?

What domestic animals do you have at home?

How do you care for your pets?

How do animals help us in the garden?

Where's my home?



Praying mantis

Tropical rainforest



Dog

Rocky cliffs



Vervet monkey

Farms

homes and yards



Dwarf Mongoose

dry savannah and woodland



Black eagle

Forests and riverine woodlands



Chimpanzee

grasslands, bushes, trees, and gardens



Goat

Session 7: Seed saving and gardening at home

Saving seeds is when we collect seeds from the garden, vegetables, and fruit to make sure we can grow plants next year. It's a good way to save money too.

1. To start, pick seeds from healthy, strong plants.
2. Often, it helps to dry these seeds out in a safe, sunny place on a piece of paper.
3. Label them with the plant name and date and keep them in envelopes, bags or small jars.
4. Once dry, store your seeds in a cool, dry place away from sunlight to keep them healthy until planting time. There are many pests that eat seeds, so it can be good to store seeds in the freezer for a while to kill pests.

Some seeds you can plant right from the fruit. For example, you can plant a slice of tomato and tiny tomato seedlings will sprout.



Garlic cloves from a bulb will regrow leaves and eventually a new bulb. Have you ever noticed that potatoes and sweet potatoes start to grow little sprouts? You can plant these directly into the soil.



Discuss + Think About:

What seeds could you collect from your home meals?

Do you have a garden at home?

If not, how can you start one?

Who will look after your garden at home?

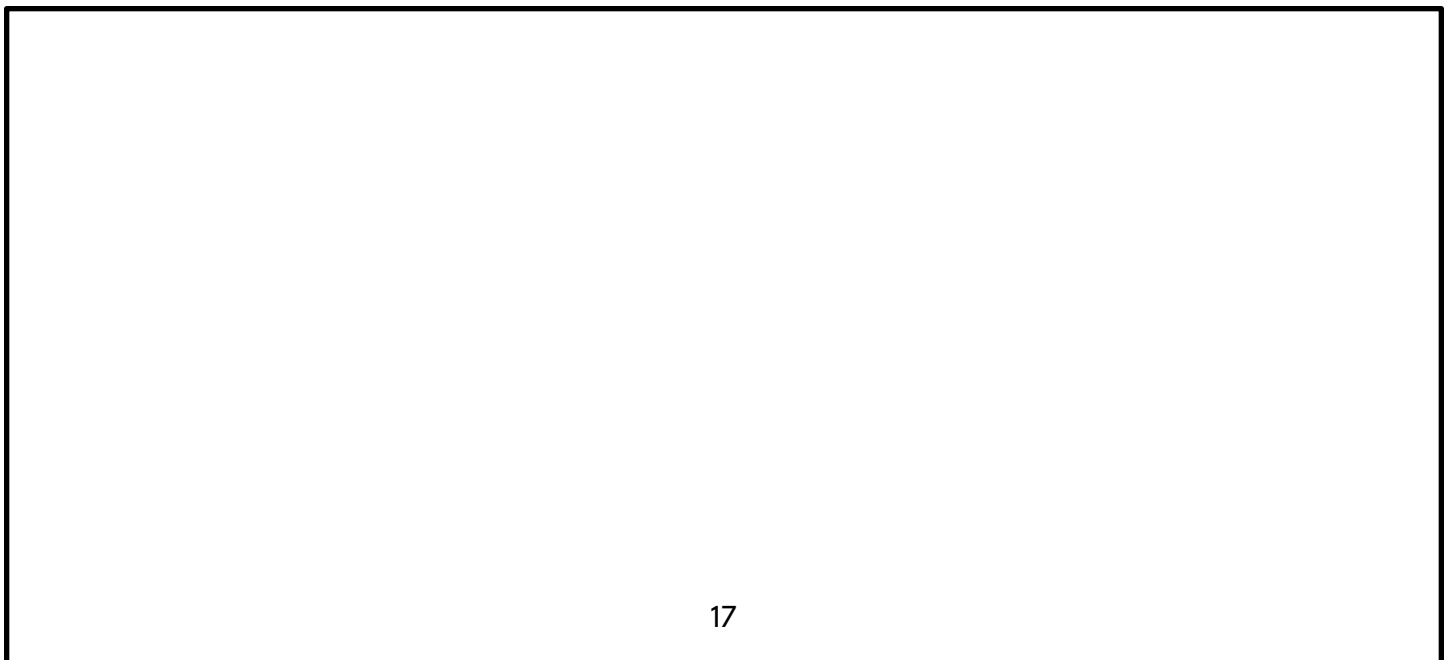


At home activity: Start your own garden!

The holidays are the perfect time to start your own garden at home. You can start one in your back yard, or even in a small courtyard. Begin by choosing a spot that gets enough sunlight for most of the day. Do you have reliable access to water at home? Remember, you will have to water your garden often. We can re-use water so we do not waste it. For example, the dirty water from washing dishes can be used in the garden.

Garden Journal

Draw here!



Session 8: Learning from our elders

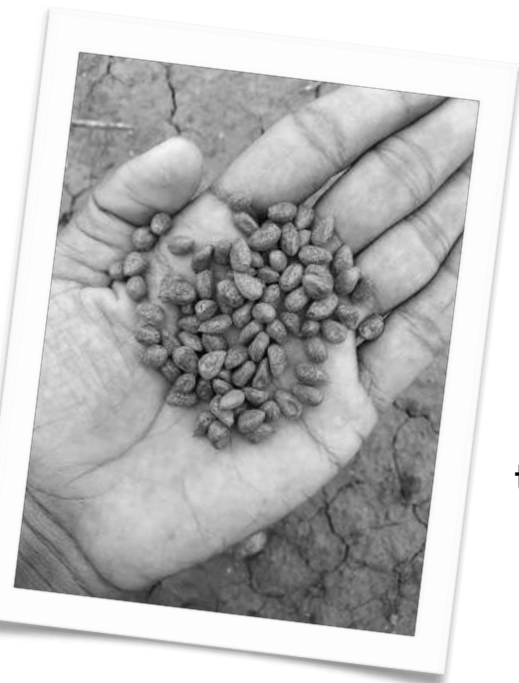
Do your grandparents grow a garden or farm? There is a lot we can learn from our elders about many things, including food gardening. **Listen closely to the stories, songs and names that your elders share with you.** They can connect you with their ancestors and future generations.

Activity preparation: Elder Interview

Talk to your grandparents or other elders in your community and see what you can learn from them. Questions to ask:

- What vegetables and plants did you grow when you were young?
- What are the names for these plants in siSwati, Tsonga or another home language?
- What natural medicine came from the garden?
- How did you save seeds for the next season?
- What advice do you have to help our garden grow well?

Remember what they say so that you can share with your friends and garden club back at school.



Optional activity: Seeds from your grandparents' garden

Ask respectfully: Do your grandparents or elders have seeds or plants from their vegetable garden they can share?

If so, collect some and bring them to our garden after the holidays.

Session 9: Insects in the garden

Have you noticed flowers in the garden? Flowers use their bright colours and sweet smells to attract insects, like bees, butterflies, and beetles. These insects feed on pollen and nectar. This is the yellow sticky and powdery stuff inside flowers.

While they eat, pollen sticks to insects' bodies. When they move to another flower, they carry the pollen with them. This process is called pollination. This helps the plant make fruit and seeds so new plants can grow. Without insects, many flowers wouldn't be able to make seeds or fruit. Without seeds or fruit, we could not survive on earth. Humans, and other animals, need insects!

But some insects can be unhelpful in the garden. Garden pests are insects or animals that eat or damage your plants. Keep a close eye on your plants to make sure pests aren't eating them before you do. Planting herbs like marigolds or basil can keep pests away.

Activity: Insect detective walk! Do you see any signs of insects in the garden? Look very carefully.



Ladybugs eat aphids



Butterflies and bees pollinate flowers



Earthworms help make compost



Aphids suck juices from plants



20
Cutworms can chop off plants and kill them



Scale insects take nutrients from plants

Session 10: Climate change

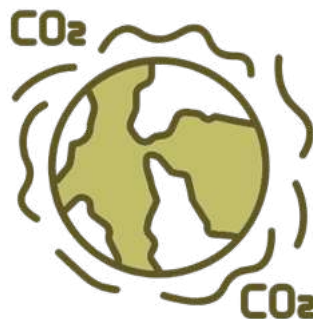
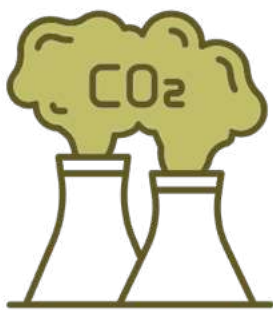
Weather vs Climate

The weather is always changing. It's the temperature and conditions outside right now. For example, if it's raining and windy this morning or if the sun is hot this afternoon, that's the weather.

The climate is the usual weather in a place over many years. For example, Mpumalanga has hot summers, and the Western Cape gets rain in winter. Scientists look at the weather **over 30 years or more** to understand a place's climate.

What is climate change and global heating? Climate change happens because of activities like burning coal, oil, and gas. When humans burn these, they create gases that trap heat in the atmosphere, making the planet warmer. These gasses are like extra blankets around the earth, making it too hot. The atmosphere surrounds the Earth like a bubble and protects us from the harshest rays of the sun and the cold of space.

Climate change means the Earth's climate is changing faster than normal. In the past 20 years, Earth has had some of the **hottest years ever recorded**. This is also called global heating.



It's important to know that most of the extra gases that cause climate change come from **big companies and industries** especially that use a lot of coal, oil, and gas. We need more sustainable choices, for example using renewable, clean energy like solar panels.



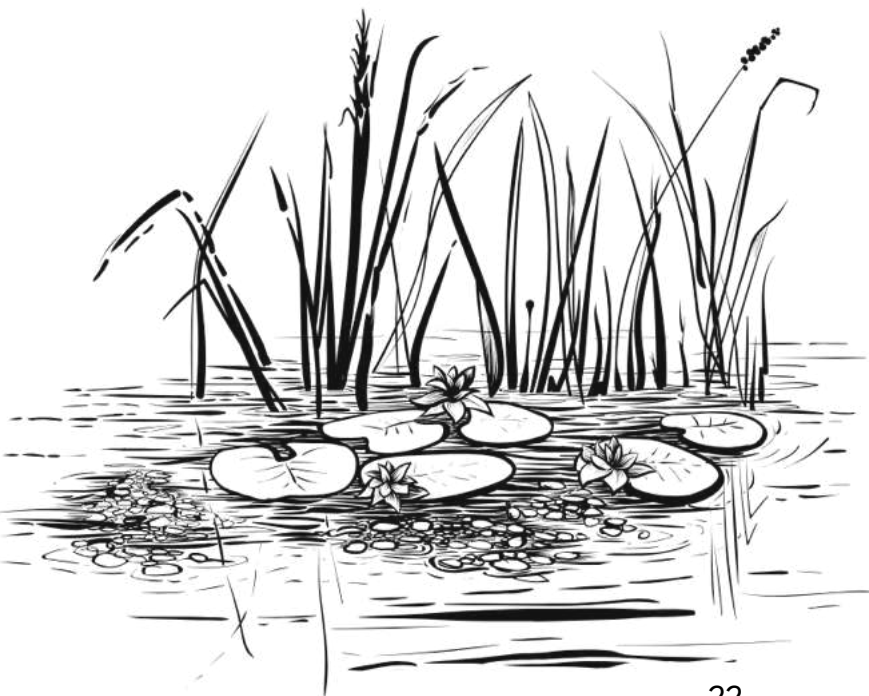
What does climate change mean in South Africa?

- Summers are getting hotter.
- Rain is falling in heavier bursts, leading to floods.
- Droughts are happening more often, causing water shortages.
- Farmers struggle because extreme weather damages crops.
- Some plants and animals are disappearing.



The good news is that lots of people are working to help the people and earth handle climate change. If more people work together to take care of our world, we can make a big difference. By creating this garden, you're joining them.

Healthy soil stores water and carbon, making the garden more resilient during droughts and helping reduce heat. Planting a many different crops and indigenous plants helps food systems survive extreme weather, so everyone has enough food. Gardens support pollinators and wildlife, which keeps ecosystems balanced.



Discussion time:

Do you have questions about climate change? What are other things you can do to help our planet?

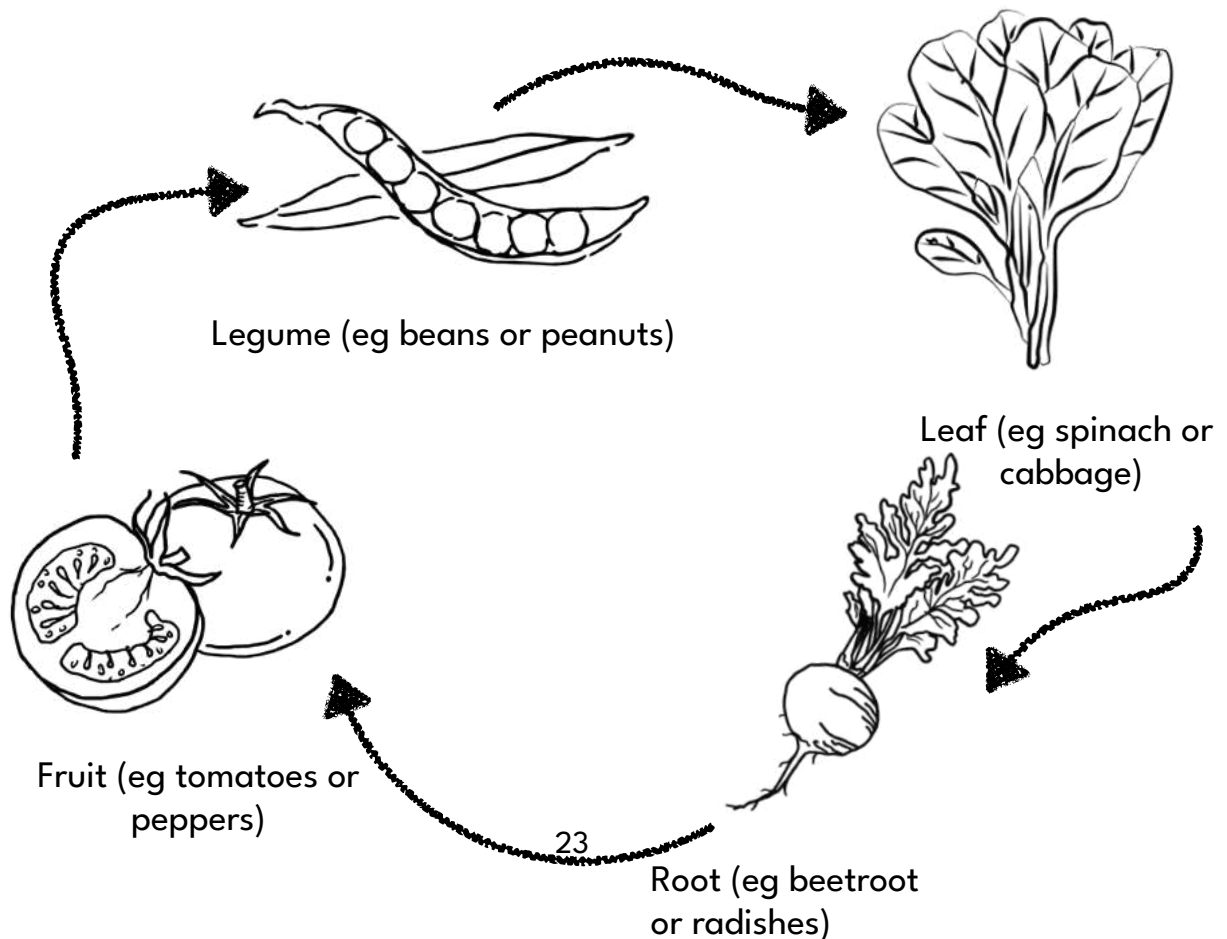
Ecosystems like wetlands help us deal with climate change.

Session 11: Seasonal planting and crop rotation

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24	25	26	27	28	29	30
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Different plants grow best at different times of the year. Planting vegetables and fruits in the right season helps them grow stronger, healthier, and faster. For example, some plants like cooler weather, such as carrots or cabbage, while others, like tomatoes or pumpkins, need warm weather to grow well.

Another important way to keep your garden healthy is crop rotation. This means planting different types of crops in the same spot each season instead of planting the same plant over and over. Crop rotation helps the soil stay full of nutrients and keeps pests away. For example, beans add nutrients to the soil that leafy greens like cabbage need. By planting in the right season and rotating crops, your garden will be stronger, produce more food, and stay healthy year after year. This is a suggested crop rotation cycle:



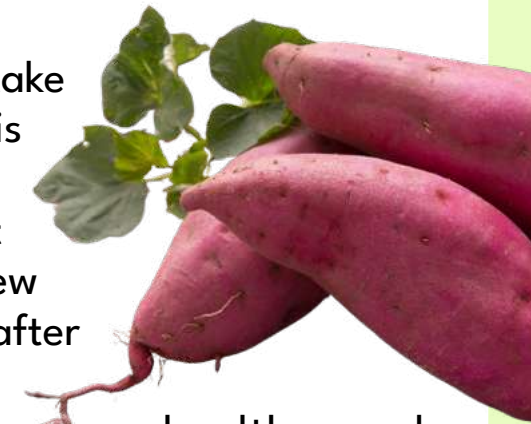
Session 12: Looking to the future and revision

What can we do to make sure our gardens keep on growing?



To make your home garden last, make sure there is always someone who can look after it. You must remember to water it regularly, remove weeds, watch for pests, and plant crops at the right season. Gardening at home does not need to be expensive, for example, you can make your own compost from food and garden scraps, re-use water to irrigate plants, and use recycled containers to start seedlings.

For the school garden, everyone should take turns helping. Make sure someone is always there to water it, plan which crops to plant each season, plant different crops to keep the soil healthy, and involve new learners so the garden continues even after older students leave. By caring for your garden regularly, you are helping it stay full of life for many seasons to come.



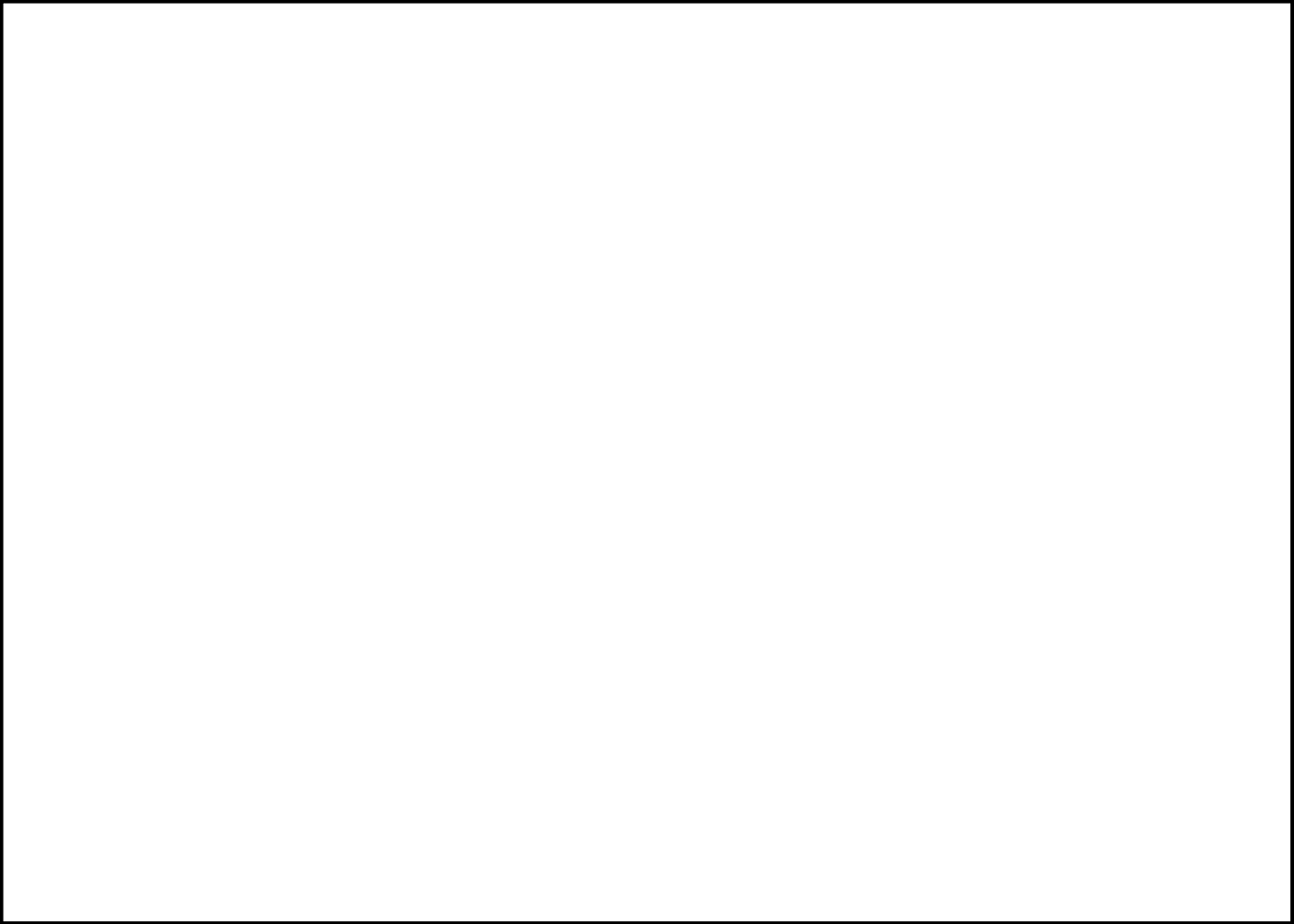
healthy and

Activity: Revision

1. What are the three main types of soil?
2. What is mulch?
3. What is the difference between weather and climate?
4. Name 4 wild animals.
5. Name 4 domestic animals.
6. What's one thing you learned from elders about growing food?
7. Name 2 indigenous plants.
8. Name a helpful insect and explain how it helps the garden.
9. What was your favourite thing about learning to grow food in the garden?



Garden Journal





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