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Indoor Garden Experiments | KS2

BEE GREEN AND ONLY PRINT IF YOU HIVE TO :)

Preparation and safety

Each season, nature will bring you the resources that you need. However, if you do not have a natural setting or lack certain natural items, try to collect these in advance of your sessions. Make a habit of going out for a walk at weekends – you'll improve your own physical and mental health, which is good for you, and you'll collect your missing items. You can also encourage parents to get collecting through your newsletters! Make your world one big healthy, Muddy community. You will get an idea of the types of resources that you need each season. The only resource that you may need to buy is air-drying clay.

Weather-wise, we will provide you with ideas for all types of weather. The only time that we advise you NOT to go outside is on extremely windy days and during thunderstorms. Otherwise, there's no excuses - get yourself out there!

Always risk assess with the children present. As you enter the natural environment, spend 30 seconds talking about the dangers that the weather conditions may present, such as slippery surfaces and hot sun. If possible, offer the children a solution to any issues, such as seeking out a safe, shady area if the sun is too hot. Keep sticks low and only use stones no bigger than the palm of the children's hands. remind them to use feet first then hands when collecting from the floor and wash hands thoroughly after.

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Plant Reproduction Experiments

Regrowth From Offcuts

First of all, ask your children if they know a way of creating identical plants. One way of reproducing plants is through asexual reproduction; by creating genetically identical clones of a parent plant. Cuttings are a popular method called 'plant propagation'. Cuttings can be taken from leaves, stems or roots, then placed in soil or water and encouraged to grow to reproduce an identical, new plant. You may want to discuss with your children why you would want to recreate identical plants or vegetables using this method. Plant breeders and gardeners may choose to use this method of taking 'cuttings' as they want to regrow plants with desirable characteristics.

Have a go with a rose bush or geranium, by following these simple steps:

1. Take a 5cm cutting underneath a leaf joint from a side stem, which branches off the main stem.
2. Cut away any leaves from the edges of this cutting, just leaving the ones at the top end of the stem.
3. Place the cutting in a jar of water- allow the top leaves to show and not be wet.
4. Ensure the jar has access to some sunlight but do not place directly in the sun.
5. Over the next few days, watch for roots growing in the jar of water.
6. Once roots have sprouted and started to fill the jar, then plant your cutting into your own container of soil.

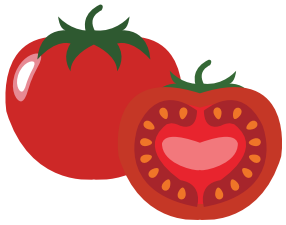
'My garden is my most beautiful masterpiece'.

– Claude Monet

Grow From Seed

Why go out and buy seeds when they are already in the fruit and vegetables we have at home? Lots of fruits and vegetables have seeds on the inside or outside you can pick out and use:

- Peppers
- Tomatoes
- Strawberries
- Lemons



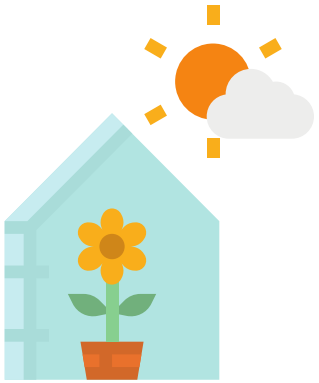
You could grow these seeds in your own mini greenhouse or pots using recycled containers. Yogurt pots, fruit punnets and jam jars work perfectly as planting trays or flower pots!

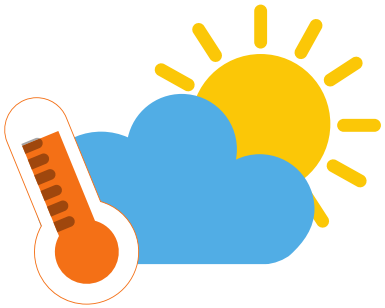
Greenhouses

What Is A Greenhouse?

Before the children start making their own indoor greenhouses, find out what they already know about them. What is a greenhouse? How does it work? Why do plants grow better inside them?

A greenhouse is usually an outdoor building made from panelled glass, with glass walls and a glass roof. In the daytime, the sunlight shines into the greenhouse and the glass walls and roof trap the sun's heat. Inside the greenhouse, it is lovely and warm and keeps the air and plants inside warm too.





Why Do Greenhouses Help Plants To Grow?

Plants do not like to be too warm or too cold - greenhouses help protect them from extreme temperatures. The warmth and humidity from a greenhouse helps to encourage healthy plant growth. In order to grow successfully, plants need moisture, warmth and light. The glass walls of the greenhouse often reflect the sunlight and keep the heat in. The heat from the daytime stays longer in the greenhouse and shields the plants from colder night-time temperatures.

The Greenhouse Effect

Whilst the children are creating their own mini greenhouses, this is the perfect opportunity to take the learning a little wider. Take this opportunity to think about the Greenhouse Effect on Earth. Ask the children, 'Do you know what the Greenhouse Effect is?' Now they know how a garden greenhouse works, could they work out what is meant by the Greenhouse Effect?

A greenhouse warms up by the heat of the sun, keeping the air inside cosy and warm. The greenhouse effect works in much the same way on Earth. Gases in the atmosphere, such as carbon dioxide, trap the earth's heat, which is very similar to the glass roof of a greenhouse! These 'heat-trapping' gases are also known as greenhouse gases. During the daytime, the sun shines through the atmosphere and the Earth's surface warms up in the sunlight. Some of the heat is trapped by the greenhouse gases in the atmosphere. That's what keeps our Earth at a warm 14 degrees Celsius, on average.

If you wanted to delve a little deeper, the children could research into the effects of greenhouse gases on the Earth.

Why not try an outdoor eBook?

DIY Indoor Greenhouses

Mini Green House Experiments

Discuss with the children the different types of greenhouses they can create (go through the examples below). The children can design their own greenhouse with their choice of plant or vegetable seeds. To make this into an experiment, the children will need to be testing something e.g., which container allows their seed to grow well or tall?

Once the children have chosen their seed, they need to place the same number of seeds into their mini greenhouses with the same amount of water each day. They need to make a prediction as to which container will work best and why. Which container will keep the plant the warmest? Why? Is glass a better insulator than plastic? Is the height and length of the greenhouse important? Does the amount of space that the plant has to grow impact on the growth?

Then, over time, compare which plants/vegetables have grown the best by collecting data, measuring the plants with a ruler. The children can present their findings with a graph, take observational photos or write a summary of their results.

Depending on what they choose to grow they may need to transfer their plants over to larger pots, if they get too big for their mini greenhouse/container. You may want to consider buying compact/smaller-sized growing plants for indoor growth.

'To plant a garden is to believe in tomorrow'

- Audrey Hepburn

What To Plant:

We recommend trying out these vegetables:

- Sweet peas
- Runner beans
- Chillies
- Tomatoes
- Kale
- Carrots

We recommend trying out these herbs:

- Basil
- Mint
- Rosemary
- Parsley
- Sage
- Thyme

(look for dwarf, miniature or compact varieties as these are best for indoor growth)

When To Plant It:

Sowing your seeds indoors means you can start off your plants earlier than the guide on the packet, which helps you extend your growing season. Using this technique, you can start some as early as January, like sweet peas.

With the herbs shown above, these can be grown all year round if you place them on a warm, sunny windowsill.

Why not try an outdoor eBook?

DIY Indoor Greenhouses

Vegetable Punnet Propagator

For the first experiment, the children will be making a propagator out of vegetable punnets. A propagator is like an incubator for your seeds - a mini greenhouse made of plastic with vents - so you can manage the temperature inside.

Once the children start looking for see-through containers which can hold plants in, they will notice them everywhere! There is no need to buy a plant pot or propagator ever again! Ask the children to have a look through the cupboards, fridge or recycling and see what they can find! Ask your children to look for 2 or 3 plastic punnets which are see-through and can fit together, or maybe one punnet which already has a lid. It is useful to have an extra tray to put underneath to drain off excess water. A mushroom punnet works well for the bottom layer and is often a darker colour, whilst a strawberry or cut-up melon punnet fits well on top!

Using a pencil, pierce some holes in the bottom punnet, then fill with compost or soil and level off. Follow the instructions on the seed packet as to how far apart to plant the seeds. Afterwards, place the extra tray underneath and the see-through punnet on top. Place the propagator somewhere warm, but not directly in the sunlight. A sunny windowsill will do. Remember to turn it regularly or the seedlings will grow towards the light and become weak and spindly.

'Gardening is learning, learning, learning. That's the fun of them. You're always learning .'

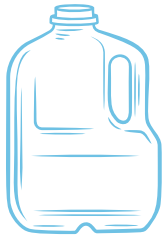
– Helen Mirren

DIY Indoor Greenhouses

Egg Box Greenhouse

For this experiment, all that is needed is an egg box and you can reuse a clean sandwich bag. Cut the egg box in half and use the lid as a tray to go underneath! Pierce a few holes in the bottom of the egg box for drainage of excess water. The benefit of an egg box is that, for larger plants, one seed can be placed in each egg holder. Simply fill the egg box with compost and place the seeds in, according to the instructions. Water the seedlings so that the soil is moist but not waterlogged. Then, cover the whole egg box with a large sandwich bag. Circulation is as important as warmth, so leave room for air to move. Prop up the plastic bag with chop sticks or pencils. The sandwich bag acts like glass greenhouse walls to keep moisture and heat trapped in.

Bottle Greenhouses



For this experiment, all that is needed is a plastic milk bottle. Cut the milk bottle in half. Simply fill the bottom half of the milk bottle with compost and place the seeds in according to the instructions. Water the seedlings so that the soil is moist. Then, cover with the top part of the milk bottle. Simple!

The children could compare different types of bottles as well, testing out different colours and transparencies of plastic bottles to see if it makes a difference to the greenhouse and the growth of the seeds.

'There are no gardening mistakes, only experiments.'

- Janet Kilburn Phillips

Why not try an outdoor eBook?

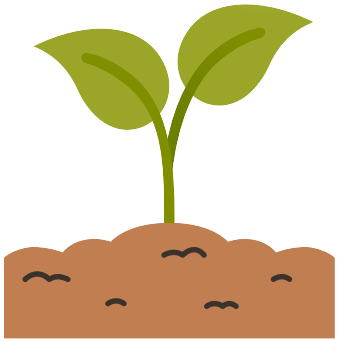
Planting Conditions Experiments

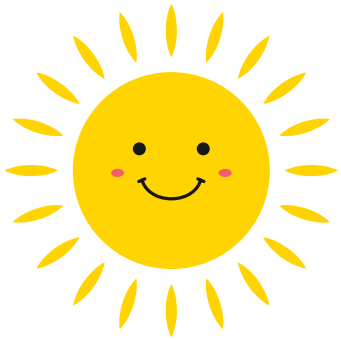
Before taking part in any experiments surrounding planting conditions, ask your children, 'What are the best conditions for a plant to grow?'

Then, these question could help them delve a little deeper:

Why is watering a plant important?
How could pollution effect growth?
How can quality of the soil effect the growth of a plant?
What is the ideal temperature?
How much water do they need?
Do plants need direct sunlight to survive?

Ask the children to do their own research, or choose one of these questions that they would like to focus on for their own experiment.





Why not try a maths scavenger hunt or literacy treasure hunt? Take it outside. Read it on your tablet. With a task at the end of each page.

What Do Plants Need To Grow?

In order for a plant to grow well, it needs:

Water and Nutrients
Most plants get water and nutrients from the soil. Watering a plant is important as, when the plant carries up the water from its roots in the soil, it will also carry up the nutrients in the water. Some gardeners give their plants a fertiliser to help them grow.
The most important nutrients for plants' growing needs are: nitrogen, phosphorus and potassium. Nitrogen is necessary for making green leaves, phosphorus is needed for making large flowers and robust roots, and potassium helps the plants fight off disease.

Soil and Air
In order to make their own food and grow, plants use the process of photosynthesis. During the process of photosynthesis in green plants, the light energy is captured and used to convert water, carbon dioxide and minerals into oxygen and energy-rich organic compounds. If the air quality is poor, due to smoke or pollutants, this can be harmful to plants as it can reduce the amount carbon dioxide they can take in. Similarly, if the soil is poor then less nutrients can be absorbed, plus it can make it harder for the roots to anchor into the soil.

Temperature and Light
Sunlight is needed for plants to make their own energy and food for photosynthesis to take place. Particularly polluted environments could block out the sun. Or, if a plant is placed in a dark environment, it will be much harder to grow! With little light, plants can become weaker and produce less flowers and fruits. Temperature is also important so that they do not get too hot and wilt or do not get too cold and freeze.

Time and Space
Plants need enough space to grow and for their roots and leaves to spread out. If they are too close together, this can sometimes stunt their growth. They also need time to grow. Plants cannot grow overnight - they can take days, weeks, months and years!

Planting Conditions Experiments

Planting Temperature Experiment

First of all ask the children to pot their chosen plants in recycled containers, such as a yogurt pots or jars. Then, explain to them that this experiment is to find out how different places inside the house or setting, with varied temperatures, may effect plant growth. Allow the children to decide on the places they wish to place their plant. Try to find places with noticeably different temperatures. If possible, get the children to use a thermometer to test out the temperatures. Take a walk around the setting, at the start of the session, to find the best places for this experiment. The children could put their plant on a windowsill, in the fridge, in the freezer or by a radiator. Of course, some of these places will also change the amount of light and air available. The children may wish to place ice around their plant or place within a cool box.

This experiment will need to be carried out over a few days to see the results.

Seed Spacing Experiment

For this experiment, the children need two equally-sized pots. These can be recycled containers, so could be yogurt pots, fruit punnets or glass jars. The children are going to explore the effect of spacing out seeds on the growth of the plant. In the first container, the children need to place lots of seeds inside while, in the second, they only need to place a few which are well spaced out.

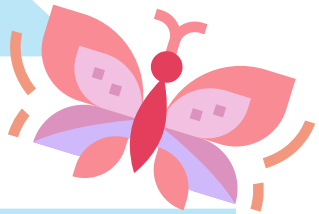
What will grow better - seeds spread further apart or seeds planted closer together? Why? Ask the children to think about nutrients, roots and leaves of the plant and why space and soil is important. The children will need to treat the pots the same and have all the other conditions identical, such as sunlight and watering, so that it is a fair test. This experiment will need to be carried over a few days to see the results.

Plant Nutrition Experiment

In order for plants to make their own food via photosynthesis, they need carbon dioxide, sunlight and water. They can also gain extra nutrients from the soil they are planted in. For this experiment, the children can compare the growth of two plants in two different types of soil. Perhaps, one in a compost with extra nutrients and one which is grown from natural soils. Alternatively, they could compare the amount of water given to two sets of plants. Or even, compare one plant with direct sunlight and with only a little sunlight.

The children will need to ensure they have the same number of seeds, equally spaced out and in the same sized pots and in the same location and only alter the chosen variable.

Indoor Garden Experiments
Home Learning Activities



Find more free and home friendly resources to help your child learn on our website.

Have a go at some of these fun and simple learning tasks.

- Using the tops of carrots, place them in a small, shallow dish with a little water and watch the carrot tops grow. Once roots have sprouted, replant them in a larger container with soil.
- Cut a plastic bottle in half and fill with sand, soil and pebbles, and place your own plants inside. Place the top half back on and create a mini biome. How about planting some cacti inside?
- Collect up some tomato tins and grow your own tomato seeds inside. Create your own tin-can window garden.
- Using glass jars grow your own herbs and make your own mini herb garden.
- Get creative and decorate some bottles or yogurt pots to create fun flower pots.

"To us, family means putting your arms around each other and being there." -Barbara Bush