LESSON PLAN
KS2 SCIENCE - PLANT GROWTH
PART ONE

Length of lesson: Two lessons, each one lasting one hour. One hour lesson for setting up experiment and one hour lesson for findings. (Also include designated time each day for two weeks to record pupils' observations.)

Lesson objectives:

To investigate what plants need for life and growth.

To understand what makes a fair test.

To make a prediction about what will happen.

Lesson outcomes:

All students will be able to predict which plant they think will grow well/not grow well.

Most students will be able to provide a reason for their prediction and will be able to explain why a fair test is important.

Some students will be able to indentify the independent and dependent variables.

National curriculum link:

KS2 Science, Year 3 Plants
Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant.

Pupils conduct an experiment over two weeks to compare the effect of different factors on plant growth.

Preparation:
- Pupils will work in groups - each group to have four pots, four broad beans (or other suitable seeds such as runner beans), labels and enough soil for four pots
- One prediction and recording sheet per child

Starter/warm up:
Begin the lesson by looking at Rose and Kiilu's story as an example of the problems that can occur with farming in eastern Africa. Rose grows a variety of crops. Why would growing crops be important for Rose? (Food and money). But Rose's crops didn't grow well, and every day was a struggle to feed her grandchildren. Why might it have been difficult for Rose to grow her crops? Focus on specific challenges such as there being little rainfall.

Whole class teaching:
Discuss what the children think plants need to grow and survive. Have they ever planted seeds before? What happens if we do not water plants/keep them in the dark/give them no soil? Ask children if they know how plants get their energy? Explain that they convert sunlight into energy. When growing plants we need to think about different factors such as the amount of light, water, temperature and nutrients from soil.

Explain that all plants need water and sunlight and when growing plants we must also consider temperature and soil but these vary according to the plant. Some plants for example need warmer condition than others. Explain that they are going to set up an investigation to see how plant growth could be affected by amount of light, water and soil. Ask pupils if they have any ideas about how they could do this. Explain that they will be growing beans (similar to beans which are grown in Kenya) under different conditions: (1) light, water and soil; (2) no water; (3) no light; (4) no soil. Each group will have four plants to pot up, and monitor throughout the week. Ask pupils to think about how we can ensure this is a fair test? Refer to independent variables and dependent variables e.g. same amount of water, same place for light, same type and amount of soil. Why is a fair test important?

Independent work:
Children to work in mixed ability groups to set up the investigation. Each group will have four plant pots/plastic cups to pot up and label. Each pot will have slightly different conditions, as outlined on the recording sheet. Children to write a prediction about what they think will happen. eg Which plant will grow the best/the worst? Encourage pupils to provide their reasons.

Plenary:
Look at the recording sheet and discuss how to record the observations each day over the next week.

LESSON PLAN
KS2 SCIENCE - PLANT GROWTH
PART TWO

Length of lesson: one hour

Lesson objectives:

To explore what plants need for life and growth.

Lesson outcomes:

All students will be able to describe what conditions plants need to grow (water, light, soil).

Most students will be able to explain the conditions that plants need to grow. (sunlight gives energy, soil gives nutrients).

Some students will be able to suggest ideas for further investigations e.g. type of soil, amount of water, temperature.

National curriculum link:

KS2 Science, Year 3 Plants
Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant

Pupils conduct an experiment over two weeks to compare the effect of different factors on plant growth.

Preparation:
- One conclusion sheet per child
- Each pupils' prediction sheets from previous lessons and their recording sheets from the investigation

Starter/warm up:
In groups, pupils to look at their results and answer together about which plant grew best and what happened to each of the plants that were missing one key element. Why do they think that happened?

Whole class teaching:
Discuss what pupils have found out. Were their predictions correct? Were there any surprises? Recap why plants need sunlight, water and soil to grow.

Independent work:
Pupils to write a conclusion, prompted by their conclusion worksheet.

Extension work:
Ask pupils to think about what they could investigate further and write a short paragraph.

Plenary:
Recap Rose's story. Rose wasn't able to grow enough crops to feed her grandchildren - why not? What do pupils think happened to the crops she tried to grow? (Not enough water, dry land, bad quality seeds, not having the tools needed to work the land). What would it be like for farmers in Africa when their seeds don't grow? How might Farm Africa have tried to help? Explain to pupils that Farm Africa helped Rose and a group of farmers to learn more about growing crops - helping them to choose the best crops to grow and how to care for them. They also helped Rose access good-quality seeds and tools and taught them how to sell their crops as a group. She now harvests enough to feed her family and have some left over to sell, which helps pay for her grandchildren's school costs.

Next Steps:

To explore how a plant's requirements vary from plant to plant - comparing environments in eastern Africa's farms with UK's farms in order to understand that plants adapt and vary. Eg Some survive in hotter conditions (linked with where does our food come from?). You might want to consider growing plants for a fundraising plant sale.

Name: ………………………………………………………**Date:** ………………………

Learning objectives: ……………………………………………………………………

<u>My prediction</u>

<u>Which plant do you think will grow the best?</u>

I think plant number(s) ……………with ……………………………

…………………………………………… will grow the best because

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

<u>Which plant or plants do you think will not grow very well?</u>

I think plant number(s) ……………with ……………………………

…………………………………………… will not grow very well

because …………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

Name: .... **Date:** ....

Learning objectives: ....

Recording sheet

Observe changes each day.
Has the plant grown? Has anything changed?
What can you see?

Day	Plant 1 Water, sunlight, soil.	Plant 2 Sunlight, soil but no water.	Plant 3 Water, soil but no light.	Plant 4 Water, sunlight but no soil.
Day 1				
Day 2				
Day 3				
Day 4				
Day 5				
Day 6				
Day 7				
Day 8				
Day 9				
Day 10				

Name: .... **Date:** ....

Learning objectives: ....

<u>My conclusion</u>

<u>Were my predictions correct? If not what was different?</u>

....

....

....

....

<u>Which plant grew the best? Why?</u>

Plant .... with .... grew the best. I

think this happened because ....

....

....

<u>Did any plants not grow? Why?</u>

Plant .... with .... did not grow. I think

this happened because ....

....

....

<u>What did I find out about plant growth?</u>

....

....

<u>What could I investigate now to find out more?</u>

....

....

....

ROSE AND KIILU'S STORY

Part 1

Kiilu is 12 years old and lives with Rose, his grandmother, in Kitui, Kenya. Rose has been a farmer all her life, and still carries out the hard work of planting, weeding and farming her land so that she can earn enough to feed her grandchildren and send them to school.

But in the drought-prone area of Kitui, the crops that she grows such as maize often wither and die when the rains fail.

"I have to feed my grandchildren and often we go hungry. Because the rains are unreliable – sometimes they are good and then the next season they are not – I am not always able to harvest enough food for my family." – Rose
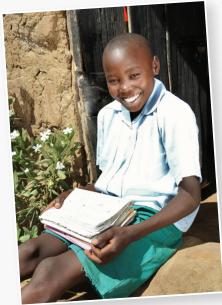
Rose not only needs a good harvest to feed her growing grandchildren, she also needs to sell some of her crop to pay for school costs, such as books and uniforms. When there is no harvest, Kiilu cannot go to school.

"I feel sad when I have to miss class because we cannot afford the costs. When you return to school it is not easy to catch up with the other students." – Kiilu

Part 2

Farm Africa is a charity that helps farmers like Rose learn how to use their land to grow crops that will grow well even when the rains fail.

Farm Africa taught Rose about nutritious crops such as sorghum and green grams (mung beans). These crops are drought-tolerant – they grow even when there is only a small amount of rain. Rose also took part in training programmes, learning techniques such as using animal manure as fertiliser, and digging trenches to retain water. Rose is now able to reap a good harvest, even when the rains fail.

"The green grams are doing especially well, I love eating them in the stew my grandmother cooks because they are nice and sweet." - Kiilu

Rose is also part of a Farmers' Group. Together with her fellow farmers, they have learnt business skills, and now sell their crops in bulk to fetch a better price.

With the money she earns, she is able to pay school costs for Kiilu, meaning he doesn't have to miss out on his lessons. Just like his grandmother, Kiilu likes to learn new things. He's also learning how to farm from his grandmother.

"She always tells us what she has learnt from Farm Africa, she takes us out to the farm to show us how to take care of the crops and how to use certified seeds. It is important for my grandmother to get advice on farming because then she can guide us on how to do it well." – Kiilu

FARM AFRICA