

Plants, growth . . . and needing some inspiration?

Cress . . . probably the most boring plant in the world!

I am always keen to promote an interest in plants and was forced to agree with my pupils. So I looked for something more stimulating. Now we use wheat, which grows vigorously, and when everyone has their own seedlings it has an immediate and positive effect on pupils' interest and motivation. Wheat grows reliably straight and uniform, and its size makes it easy to handle. Cress, on the other hand, is fragile, tends to germinate, grow a bit and then fall over!

Investigating growth and nutrition in plants can be fraught with misunderstanding. Is growth mere inflation? If plants make their own food why is 'Baby Bio' used? How can we avoid confusing germination with growth? What is a healthy plant? How are plants like animals? How do humans and other animals grow? What do they need in order to grow? How are they different from plants?

At KS2 pupils need to learn about the effect of 'air, water, light, and temperature on plant growth'. At this stage the word 'photosynthesis' can remain a mystery to the pupils, but by doing a range of simple experiments, they will have some clear evidence to evaluate, and can decide for themselves the importance of light, water and temperature to a growing plant. With results from a whole class there should be sufficient to make a clear judgement.

If, like me, you are always looking for more science time, include the measuring skills and the bar charts in the following numeracy lesson . . . perfect!

The experiment described (see *Teacher's page*) utilises a number of well-established SAPS ideas with a few more thoughts to let you see how I use these in a lesson. This approach usually works well and seems to keep the interest of the children. The resources needed are fairly simple (and cheap) and you are advised to grow the wheat seedlings before you have the class.

Resources

- **Film pots** - these are easy to obtain in most photo processing labs. To make holes in the base of the pot, heat a large nail until it is hot and gently slide it into the base of the pot.
WARNING! noxious fumes so do this away from the children
You can re-use these film pots dozens of times, so it is worth the effort!
- **Coloured wool** - this makes it much easier to identify seedlings later on.
- **Rulers** - use these to measure from the top of the film pot every time, to make it fair and simple.
- **Plastic labels** - just cut 'V' shapes out of yoghurt pots.
- **Permanent markers** - constant watering means anything else is useless, and the children want their own seedlings back!
- **Pre-grown wheat seedlings** - Wheat can be bought very cheaply from health food stores or pet food shops. Make a hole in the bottom of a **film pot**, fill with **compost** and push about 10 grains of **wheat** into the compost, just covered. Sow enough for every child to have their own pot. It will take about a week before they are ready to be used for the experiment. Keep them warm, damp and in the light.



Judy Vincent wishes to acknowledge support from the Gatsby Foundation while she held a Gatsby Teacher Fellowship

Judy Vincent, Hartest Primary School, Suffolk

How does light affect the growth of plants?

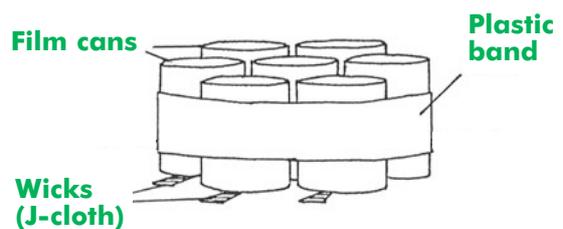
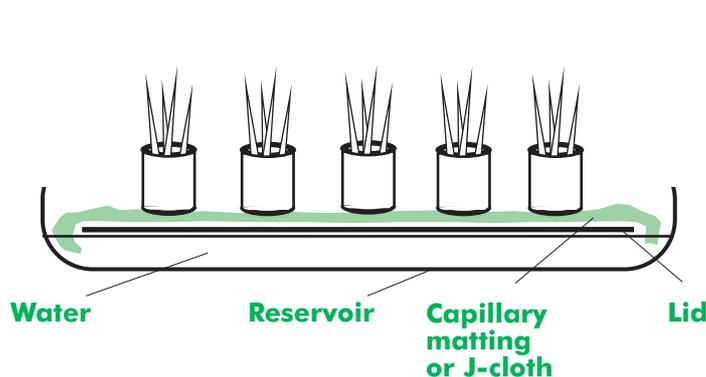
This is a simple experiment, suitable for KS2 pupils, to compare the growth of plants in different conditions. Three growth factors can be successfully investigated: **light**, **water** and **temperature**. Avoid confusion and test one at a time! So here we look at light and you can devise other similar experiments to look at other factors.

What do they know about growth? How does it happen? What is the difference between blowing up a balloon and the change from being a baby into the stage they are now at? They should see that growth is not mere inflation, but a more complex process. Then let them look at a pot of wheat seedlings and predict what they would expect to happen to them in time.

An experiment to find out about light

- Arrange the pupils in groups of three and let each put their wheat seedlings in different light conditions. These could be dark (maybe in a cupboard), bright light and dim light. Try to avoid big temperature variations.
- Use the pupil's page (opposite) to help them with each step.
- Name each pot of seedlings with a plastic label, using a permanent marker pen.
- When the children have measured their chosen seedling and selected their site, collect up the pots in three trays.
- Leave the seedlings for at least four or five days, but check them regularly as the temperature may speed up or slow down their growth.

Watering needs to be equal and fair. (Check that the pupils know why.) Remember that they are testing only one variable (light). That means that water and temperature should be the same for all seedlings. The seedlings need to be damp. A self-watering system is very useful. If you use this, you don't have to take them home for the weekend! (See, for example, SAPS student sheet 1)



A simple way to stabilise the pots for the duration of the experiment is shown in *Osmosis 11* (1996)

- Time's up! Collect the three trays of seedlings and let the pupils see what has happened before you return the individual pots.
- Record their observations. Use the Pupil's sheet to record their own seedling measurement.
Important - They need to subtract their first measurement to find how much it has actually grown. If pupils write this figure on a 'post-it', then stick it on the board with columns headed dark, bright or dim, it will then be easy to compare the growth in the different conditions.

Now what do they think about growth? They have seen them lengthen. What exactly does that mean - stretch? inflate? more tissue? Is it enough to just grow taller? What do they look like? Does being 'healthy' matter? USE the evidence to conclude and evaluate findings and record these in their books.

- Before you throw them out, the seedlings could be gently washed to observe the roots. Washing retains almost all of the root, knocking the soil off *doesn't*!

Some good ideas for further work (see SAPS website www.saps.org.uk).

Growing radishes - Student Sheet 9

Osmosis 11 - stabilising film pots

The watering system - Student Sheet 1

Light bank information from SAPS Head Office

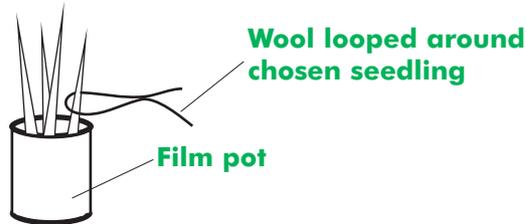
Information on fast plants - see: www-saps.plantsci.cam.ac.uk/qanda_fast.htm

Primary Osmosis No 23 for KS2 curriculum links

Do plants need light to grow?

Today we are going to find out about different things that plants need to grow. First we will see if light makes any difference.

This is your own pot with some wheat seedlings.



- Write your name on the label and push it into the pot beside the seedlings.
- Choose a seedling. Tie a piece of wool loosely round your seedling.
- Measure the height of your seedling. Start measuring at the top of your film pot.

Write down your answer here.

My seedling is cm tall.

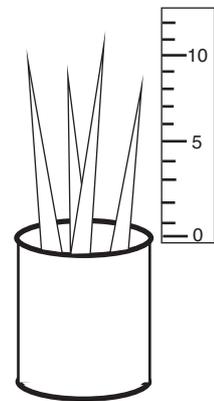
- In your group, put one pot in bright light, one pot in the dark and one in dim light.
- Water your pot every day. (Your teacher may do this for you.)
- Wait for 4 or 5 days, then measure your seedling again.

Record your answers here

After 4 days: My seedling is cm high

At the start: My seedling was cm high

My seedling has grown cm



- Now look at the seedlings in other pots. Then answer these questions.
 1. Which seedlings are the tallest?
 2. Which seedlings look the healthiest?
 3. What else could you measure to find out about growth of seedlings?
 4. Does light make a difference? Use all the information to say what you have found out in this experiment.
- 5. Choose where to put the pot with your seedling for a further 4 or 5 days. Then look at it again. Can you explain what has happened?
- 6. What else do you think could affect the growth of wheat seedlings?

Scottish Curriculum links on the SAPS website

Your quick guide to activities with plants for level A (of the Revised 5-14 Guidelines)

We have made promises . . . and now the next phase is beginning to roll into place.

For our Scottish colleagues, we are making good progress in drawing up a table that will help you identify activities appropriate to the delivery of the curriculum. For the framework, we are using the 'Improved Science Education (ISE) 5-14 Framework for Planning'.

You can locate an activity through the Attainment Target descriptors, identified by their code number. Even if you do not use the ISE framework as the basis for your teaching, you can still make links to suitable activities through the codes.

More links and a new batch of resources are coming soon - so watch our website for further information.

Here is just a taster for level A . . .

ISE 5 – 14 Group	Attainment Target Descriptors	Links to activities on SAPS website
2: Introducing Living Things	LT-A1.2 Sort living things into broad groups according to easily observable characteristics	1. A key for identifying British trees and shrubs
	LT-A2.3 Give the conditions needed by animals and plants in order to remain healthy	1. A propagator for small plants or seedlings - <i>Osmosis 14</i> (Supermarket Science) 2. What do plants need to grow? How does light affect growing plants? - <i>Osmosis 21</i>
	LT-A3.1 Recognise and name some common plants and animals found in the local environment	1. A key for identifying British trees and shrubs
	LT-A3.2 Give examples of how to care for living things in the environment	1. A propagator for small plants or seedlings - <i>Osmosis 14</i> (Supermarket Science) 2. Planting instructions for rapid-cycling brassicas - <i>Student sheet 1</i> 3. Growing and caring for rapid-cycling brassicas - <i>Student sheet 2</i>
	LT-A3.3 Give some examples of seasonal changes taking place in the appearance of plants	1. Fruits and seeds and how they are dispersed - <i>Osmosis 23 (Primary)</i>