

**Science - Year 3**

Plants – Block 3P

# **Roots and Shoots**

Session 4

**Resource Pack**

## Teachers' Notes on Session 4

### **Ongoing Bean Seedling Investigation**

If science sessions are weekly, it will be 3 weeks now since you set up this investigation on requirements for growing strong and healthy plants. Chn will have discovered that excluding some factors (light, water and air) has a profound effect on the appearance of their seedlings while other factors may have a slower and less obvious effect. During this session, chn measure and take notes on their plants as usual. Afterwards chn show seedlings to the class and together discuss any observable effects. This means all chn consider the range of factors under investigation. Later in the session chn will be making drawings and taking notes on all the seedlings that have had a requirement excluded and will compare them to a healthy control specimen. After the session all the seedlings should be returned to their places/ conditions so that one last set of observations can be taken next session.

### **Investigation of how water is transported within plants**

During the session a class investigation will be set up. It is suggested that plastic vases are made from 3 empty squash bottles. Leave 2 bottles as they are, just remove the labels and wash them out – these will each hold 3 stems of white flowers – you may need to cut them down so they are not in danger of tipping over. The last bottle will hold leafy celery stems so you will need to cut it down (by removing the neck and shoulders of the bottle) to make it wide enough. Prepare your bottles ahead of the session. Each vase will be half filled with a concentrated mixture of food dye and water (the darker the better). As the stems take up the water, the stain will be carried upwards through tubular transport vessels called xylem. In the coming days, and hopefully by your next session, the white flowers will change colour showing that the water has travelled up the stems and into the flowers and the leaves of the celery should also change colour. Display the vases where the chn can see them and top up the water if necessary. The chn will enjoy watching them over the coming days.

### **Task – Recording observations of seedlings with notes and drawings**

This task will give chn the opportunity to observe the seedlings from other groups that have had a requirement excluded and compare each to a healthy “control” seedling. Make sure each one is labelled clearly. You may need to redo some of the labels if they have deteriorated (use permanent markers for durability). This activity will keep the remainder of the class busy whilst you take a group at a time to set up the data loggers. Consider whether you will need an extra adult for supervision. Spread the seedlings out over several tables and encourage the chn to circulate round as they complete their task sheet. Explain that they can look at the seedlings in any order.

### **Task – Setting up data loggers**

The task PowerPoint will have led the chn’s thinking into an understanding that Earth plants naturally experience a rhythm of day and night and the changes in temperature and light this brings. Remind them that Zinnia will be thrilled to have data on how temperature and light change over a day and night. A third of a class would give a manageable group size. Manage the time you have so each child gets to do both tasks.

- Take the group to an outside area (because Earth plants naturally live outside)
- Demonstrate the temperature probe or sensor and check that everyone understands this is measuring how warm or cold something is. We want to measure the temperature of the air.
- Show the light probe or sensor and explain it is measuring how bright or dim the light is. If it is a sunny day, demonstrate how the reading varies in sunshine and shade.
- Explain that we could come out and take readings every so often but we want to know what the temperature and light is like at night so we are going to program it to take the readings for us, perhaps every hour for a whole day – although many data loggers will make a continuous recording. Ask how long a whole day is. Yes 24 hours – the time it takes our planet to spin right round.
- Ask what they think will happen to the light level and the temperature at night. Yes we would expect both levels to drop. This is our prediction.
- If your data loggers are not waterproof, consider how to protect them whilst outside, e.g. sealed into a strong, clear plastic bag or a clear waterproof box (remember it needs to let the light in).

Name:

I can record findings with notes and drawings

**What do seedlings need to grow strong and healthy?**

Write notes in the middle column to describe how each plant is looking. Compare it to a bean seedling that has had plenty of every factor. Use words to describe its appearance, e.g. wilting (if droopy), yellowing (if the leaves have changed colour), leggy (if it is tall and weak) or thriving (if it seems healthy). Draw a picture of each seedling in the right hand column to show the differences and colour it using pencil crayons.

Requirement	Notes	Drawing
Seedlings growing without water		
Seedlings growing without light		
Seedlings growing without enough air		
Seedlings growing in a cold place		

Seedlings growing without any/much soil		
Seedlings growing without much space		
Seedlings growing in natural planet Earth conditions (plenty of every factor)		

Plenary Cards

**Soil**

**Warmth**

**Light**

**Water**

**Space**

**Air**

## **Soil**

Plants get their nutrients from the soil and we get ours from our food. If there was no soil, we would have no food so soil is essential to our survival too.

## **Warmth**

Humans need to keep warm. We use clothes to keep our heat in and we use heating in our homes when the weather gets cold.

## **Light**

Sunshine makes us feel happy. We also get a vitamin from sunshine called vitamin D. It helps to make our bones strong and healthy.

## **Water**

We cannot survive for long without water. Adults should drink at least 2 litres a day. Water is essential in everything our bodies do.

## **Space**

Humans need space to work, sleep and play. Being in a very crowded space for too long can make us feel stressed.

## **Air**

We need a gas from the air called oxygen. We breathe it into our lungs constantly and cannot survive without it.