



School Gardening
Resources

PRIMARY LEVEL

BORD BIA
IRISH FOOD BOARD

Understanding Soil For School Gardening





Time of Year	All year round
Resources Needed	4x2 litre clear, empty plastic bottles.
Cross Curriculum Relevance	SESE: Living things, environmental awareness & care, recording, observing Maths: Measuring, counting, estimating, recording, active learning Literacy: Writing, spelling Informal Curriculum: Discover Primary Science



Components of Soil

Air, Humus, Minerals, Water, Bacteria, Rocks.

All Hairy Men Will Buy Razors

SOIL	
Air	Organisms in the soil need the oxygen in the air to live. Plant roots also require this oxygen. Earthworms aerate it by tunnelling as they forage for food.
Humus	Humus makes up about 5% of the solid matter in soil. It is formed from dead animals and plants. This is a dark material which adds nutrients to the soil for plants to absorb. It also helps to retain moisture and combines with mineral particles to produce a good, crumbly soil structure.
Minerals	Mineral particles in soil are sand, silt and clay. These are made from the long weathering of rock. Nitrogen, phosphorous, potassium, calcium, iron are soil nutrients. These are brought from the above mineral particles, plus organic matter. Nitrogen (N) encourages leaf and shoot growth and the production of chlorophyll; phosphorous (P) encourages good root formation; potassium (K) encourages flowers and fruit production. Nitrogen for shoots; phosphorus for roots; potassium for fruits.
Water	Water is essential for plant growth. It allows nutrients to move around for plants to use to grow.
Bacteria	Living organisms in soil include microorganisms or microbes, which are bacteria, fungi, algae. These decompose organic matter, improve soil structure and add nutrients to the soil. Creatures, such as earthworms, millipedes, slugs and snails, which eat detritus or decaying matter are called detritivores.
Rocks	There are three types of rock: igneous, sedimentary and metamorphic. Soil is made up of tiny particles of rock. Soil containing a high proportion of large particles is sandy; soil containing a large proportion of fine particles is clayey; soil with roughly an even proportion of each is loamy. The underlying bedrock determines the type of soil found in an area.



Soil Experiments

1

Get a 2-litre clear plastic bottle and cut off the neck and shoulder. Put 2 handfuls of soil into the container. Add water to cover. Shake vigorously using cardboard as a lid. Leave overnight to settle. Children will be able to observe the different layers. Label these layers. Repeat with soil from different parts of the school ground and make note of any differences.

HUMUS
CLAY
SILT
SAND
GRIT

2

Get 3 containers as above. Put clay in one, loam in the second and sandy soil in the third. Shake and observe the layers. Which one has the most humus? (Floats on top).

3

Investigate how porous soil is. Cut the top parts from the shoulder up off 4x2 litre plastic bottles. Tie small pieces of J-cloth around the openings. Using these top parts as funnels place them over the cut bottles. Three quarters fill each funnel with clay soil, sandy soil, peaty soil and loamy soil. Pour equal amounts of water into each and leave for an hour. Measure the amount of water in each to determine which soil is most/least porous.



4

Use an apple to demonstrate the thin layer of soil on which we depend for our food:

- ★ Slice off roughly three quarters of the apple. This represents the amount of water covering the earth. Insert a cocktail stick with a label of 'water'.
- ★ Slice the remaining quarter in half. One eighth of the earth's surface is inhospitable mountains and ice caps. Label this piece 'inhospitable'.
- ★ Slice the remaining one eighth in half. One sixteenth of the Earth's surface is too wet, dry or rocky. Label this piece 'unsuitable'. The remaining one sixteenth is suitable for food production.
- ★ Slice the remaining one sixteenth in half. One thirtieth is covered with roads, houses, buildings etc., so only one thirtieth is remaining to grow food for humans and animals.

5

Outdoors, use a pH kit to test the soil. These kits can be purchased in a garden centre. Use soil that is approx. 5cm below surface.

A soil is either acidic (sour), neutral or alkaline.

NEUTRAL = PH 7.0
A pH reading between 6.5 and 7.0 is suitable for most plants. (Indicated by green on soil tester).
ALKALINE = ABOVE 7.0
Indicated by blue on soil tester.
ACIDIC = BELOW 6.0
Suitable for heathers, rhododendrons, azaleas, camellias. (Indicated by red on soil tester).



6

Check soil health by digging out a 30cmx30cm square of soil to a depth of 15cm. Count the earthworms. There should be at least 10 if it is healthy.