



Living Things in Soil - Teacher's Notes

Living Things in Soil

There are more living things in a handful of soil than there are humans on the surface of this Earth. Most of these live in the top 30cm of soil and are too small to see without the aid of a microscope. These microorganisms are mostly bacteria and fungi.

Scientists classify things (or separate them into groups with similar characteristics). The first separation is into "**Living**" and "**Non-living**" things. Into the "Living group" goes anything that is alive or has ever been alive. A dog goes into the "Living" group, as does a newspaper because the newspaper was once part of a living tree. Anything "dead" is placed in the "Living" group. Into the "Non-living" group goes little bits of rock, sand and silt.

Classify these things into living or non-living groups

Object	Living	Non-living
Worm	X	
Diamond		X
Wooden table	X	
Metal fork		X
Tree	X	
Insect	X	
Plastic bag		X
Cotton T-shirt	X	
Marble table top		X
Student	X	
Sand		X





Living Things in Soil - Teacher's Notes

ASIDE

This classification system is a little simplistic as plastic is classified as non-living but it is made from the fossilised remains of ancient sea and land creatures changed by forces within the Earth to petroleum. Similarly some marble is metamorphosed limestone with fossils. However our students need to know that dead is not non-living for external testing.

The "Living" component of soil is very important in controlling its fertility. This is why we compost living material to add to soil and improve it. Most of our modern medicines are made from bacteria and fungi found in the soil. Since they are too small to see without magnification we shall be classifying larger living things found in soil.

When we further classify things we put them into groups that have similar structures, like in the supermarket where all fresh vegetables are found in one spot, fresh meat in another and cool drinks in another.

We next classify living things into "Plants" and "Animals"





Living Things in Soil - Teacher's Notes

In the picture above, the worms, dead leaves and newspaper pieces are **all** first classified as living, as are the dead roots, stem and pieces of stick.

Which of the larger living things in the photograph are plants? **Dead leaves, newspaper, stem and sticks**

Which of the larger living things in the photograph are animals? **Worms**

Activity: Classifying what can be seen in soil

HINT This activity may be difficult in the heat of summer unless your compost bin or worm farm is kept away from extreme heat. Worms burrow deep to escape heat.

Materials

- Good garden soil with compost. (Visit the school's vegie patch and worm farm or chat up the gardener.) Keep the soil in a dark place or throw a cloth over the container
- Hand lenses, magnifying glasses or electronic magnifiers such as Proscopes. Students with iPhones can use the screen magnifier. A lot can be seen just using your eyes.
- White plates, trays, Petri dishes or even white paper

Please remind students that their magnifying lens should be hard up against their cheekbone all the time they are viewing the soil. It does not move! The object they are viewing should be well lit and brought close to the face until clearly in focus.

Ask the students not to handle the worms as they breathe through their moist sensitive skin and are easily damaged.

Students should be able to see at least eight living things and two non-living things.





Living Things in Soil - Teacher's Notes

More information and activities for a lower ability class can be found in the Year 2 PALMS package.

Observation

Living things		Non-living things
Plants	Animals	
Leaves, sticks, roots, white fungi, rotting vegetables, seeds, mulch	Worms, insects, insect shells, centipedes, millipedes, insect larvae and pupae, paper	Sand, rocks, metal, concrete,

Extension: Teacher Demonstration - Good Brown Soil

All living things on Earth are based on the element carbon. Carbon atoms are able to make the long and complex chains, which are necessary for life. When living things die the carbon is released back into the soil or air to be reused to create more life.

If you can **safely** burn some paper, wool, hair or bread in a sink or in a barbeque students will see the characteristic brown/black colour of carbon. Perhaps these could be prepared at home. Dog hair burns well and smells particularly pungent.

When most living things die they decompose in soil and form carbon rich humus. Humus is not really a fertiliser for plants. Instead it changes the outside chemistry of mineral grains (non-living) in soil so they increase its water holding power and provide a good environment for bacteria, which can remove nitrogen gas from the atmosphere.

Soil is a very large carbon store. Generally speaking, the more humus it contains the better condition it is in and the browner it appears. Soil specimens from the verge of the road, school lawn and potting mix can then





Living Things in Soil - Teacher's Notes

be compared to see which has the most useful carbon.

These pictures are of soil from the nature strip alongside the road outside my house and the other is soil from my vegetable garden. Student can be asked to guess which soil contains the most humus?



The soil on the left has more carbon (humus)

Too much humus in soil can make it become too acidic for plants other than those which grow in damp marshy peaty areas. 10% humus is enough to make soil fertile and 30% is generally too much. Fungi such as these are classic decomposers. Of course the part we see at the surface is only a very small portion of the fungus. Most of it comprises the mycelium threads underground.

