

## Humus in Soil – Teacher Notes

**Mulch** is dry material that has not decomposed. It can be made of organic material and non-organic material such as stones. The Israelis placed three large stones around each tree trunk when they planted out in the desert. Mulch is mostly added as a protective layer on top of the soil to minimise moisture loss, reduce weeds and eventually break down to provide nutrients.

**Composting** is the process of breaking down living things and their products to enrich soil. Homes built away from town sewerage can have composting toilets. Worms, bacteria and fungi help process the material.

**Humus** is the end product of composting. It is made of decomposed organic material (living and dead things).



*Worms composting my kitchen scraps and shredded newspaper*

Both humus and mulch float when soil is mixed well with water.

### Student Activity

#### Please Note

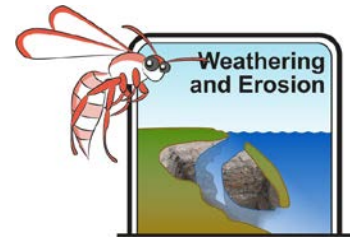
Science uses the expression “living” for anything that is alive or has been alive. In this case both compost and mulch are classified as “living”. “Non-living” is used for things that have never lived. In this case the small mineral rock fragments are “non-living”.

**Please remove any worms or insects from the soil before starting.**



#### Materials per student or group

- A spoon
- About two tablespoons of good garden soil. The school’s vegetable patch might provide this
- A piece of scrap paper to make a cone. This reduces spillage when filling the test tube
- A test tube or small jar with lid
- Water
- A ruler



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### Method

1. Place the paper cone with the open end downwards leading into the test tube or jar.
2. Feed soil down the cone into the test tube or jar.
3. Two thirds fill the test tube or jar with water.
4. Draw what you see in the before column.
5. Place your thumb over the top of the test tube to seal it or screw the lid firmly onto the jar. If your thumb is too narrow to seal the top of the test tube you can use the pad of flesh at the base of your thumb.
6. Shake the tube or jar well for 30 seconds. Make sure the water and soil are well mixed.
7. Hold the container upright and immobile to two minutes.
8. Observe what has happened at the top of the water and draw this into the worksheet provided (after).



### Observations

<b>Before</b>	<b>After</b>

What did you observe after the soil contents had settled after two minutes?

**Dark humus floated to the top of the water in the test tube**

The material that floated is called humus. Humus is made from living things and their products.

How thick is the humus layer? **Will vary but measurement should include both number and unit.**

**E.g. 2cm**

How thick is the rest of the soil? **As above e.g. 8cm**

What percentage of the soil is humus?  **$\frac{\text{Humus}}{\text{Total}} \times 100$**

**Humus + Rest of soil e.g. 25%**

Good soil is 10% humus or more. Was the soil you tested good soil? Explain your answer. **The soil was good as it had over 10% humus.**

What could your school use to make good garden humus? List 4 free things your school could use to make their own humus or compost. **Shredded paper & newspaper, food preparation scraps and meal scraps, dead leaves and grass clippings**

EXTRA for experts - what do worms have to do with good soil?



**Worms with bacteria and fungi break down scraps in the compost bin and in the soils to provide humus that fertilises and conditions the soil making nutrients accessible to plants. Worms also aerate the soil and allow water to penetrate it more easily.**