



Soil Components - Teacher's Notes

Soil Components

Garden soil is part:

1. Minerals (broken bits of rock. Non-living things)
2. Humus (living things and their products)
3. Water and air
4. Mulch

Please note that in Science we classify as "living things" anything that has ever lived. Things that are alive, are dead or are their products are all classified as "living".

Minerals are broken pieces of rock, usually the product of weathering and erosion.

Humus is mostly dead and decaying plant and animal material, which has been decomposed. It conditions the soil to improve its water holding power and help it gain nitrogen from the atmosphere. (Compost is mulch in the making).

Mulch is anything added on top of soil to hold it in place, keep plant roots cool or reduce evaporation. Mulch can be tree bark, black plastic or even rocks. Mulch does not necessarily add anything to the soil.

We can measure the amount of these three components of soil by moving dry soil about in a controlled way. This yandying or dry panning separates things according to size and density. Aboriginal people used to separate edible seeds from sand by "panning" them in a flattened container called a "yandy". If you can convince a female Aboriginal elder (or auntie) to demonstrate - so much the better.

Teacher demonstration:

- A tray. The trays under student's desks are perfect but take away





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containers or flat soup dishes will do

- A mixture of dried materials. I have used dry builder's sand, rice dried peas, rice, quandong nuts and metal jewelry.



1. Slightly raising one side of the tray make a smooth, circular shaking movement with the dish for about one minute. (Think - Hula-hoop). The larger and lighter pieces will move to the lower end of the tray (See below).



If you were using soil the larger lighter material would be the mulch.

2. Remove the mulch with your fingers



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3. Return to panning/yandying the tray as before



4. The lighter "living" material will move to the lower side. This represents the rich humus and silt components of soil. The heavier minerals separate to the right

Student activity: Separating Soil





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Materials per group

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

- White plates (paper, plastic or ceramic)
- Dry garden soil
- Hand lens or magnifying glass
- Old newspaper to collect any accidental overflow

Method

1. Place plate on newspaper on desk
2. Add some soil to each student's plate
3. Ask them to gently rotate the plate with one side slightly raised until the parts or components of the soil start separating.
4. They should then observe, using a hand lens or magnifying glass.

Observations

Students should be able to see the three components of dry soil, mulch, humus and minerals. They will have different colours and textures.

Activity 3 Using water movement.

(An annotated photograph is at the end of this activity)

Materials per student or group

- About two tablespoons of garden soil
- A piece of scrap paper to make a cone
- A test tube or small jar with lid
- Water.
- A ruler
- Newspaper to protect the desk







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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 until it is one third full.
3. Fill the test tube or jar with water until it is two thirds full.
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 (Cocktail!) for 30 seconds. Make sure the water and soil are well mixed.
7. Hold the container upright and immobile for at least two minutes.
8. Observe what has happened and draw this into the worksheet provided.
9. Label the layers

Observations

Before	After
	

Estimate the percentage or fraction of soil is humus





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Height of soil including humus _____mm

Height of humus alone _____mm

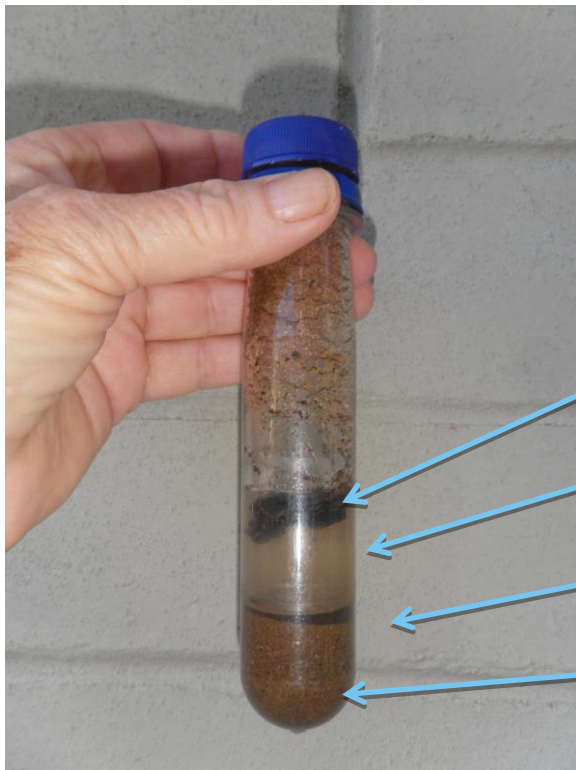
Answers will vary with areas but will likely be between 5 and 20%.

Percentage humus = $\frac{\text{Height of humus alone}}{\text{Height of soil including humus}} \times 100$

= _____%

To be able to grow plants, soil should be over 10% humus.

Do you have good garden soil? **Yes if over 10% humus**



Floating mulch

Water

Very thin layer of humus

Mineral layer

A very poor coastal sandy soil.



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You may like to ask students to draw a column graph of the composition of their soil.

Hints

Always give any graph a title.

Label the axes clearly.

Use a sharp black pencil and a ruler to draw lines.

Colour in the different components of the soil and draw a key for the colours.

