

## Method (calculating the organic content)

The dry soil sample may now be used to find the amount (percentage) of organic matter in the soil.

Set up the heating apparatus and use a sand bath to strongly heat the soil sample to burn off the organic matter in the evaporating dish. This will give a strong smell, similar to burning peat. Cool the evaporating dish and weigh.

Reheating for another period of time and reweighing to obtain two successive readings the same will improve the accuracy of the result for this part of the investigation.

Soil sample	Mass of container + dry soil/g	Mass of container + burned soil/g	Mass of organic matter (g)/50 g soil	Percentage organic content/%



## Learning Activities/ Questions

Calculate the moisture and organic content of a range of soils as described above. Suggest reasons for any differences between the different soil samples.

1. Explain how to calculate percentage soil moisture from the mass of water in 50 g soil.
2. Explain why it is necessary to calculate soil moisture before organic content (rather than the other way around).

3. Explain why the moisture content of sandy soil is usually much less than that in a clay soil.
4. Give two reasons why the organic content for the same soil in a field can be quite different when tested (assume the method was carried out correctly).

## Key Terms

Inorganic content

Organic content (humus)

Soil moisture



## Web Resources/Links

[www.soil-net.com/](http://www.soil-net.com/)



GCSE

## Agriculture and Land Use Soil Practicals

For first teaching from September 2013

For first award in Summer 2014



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# FACT FILE

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## Unit 1: Soil Practicals



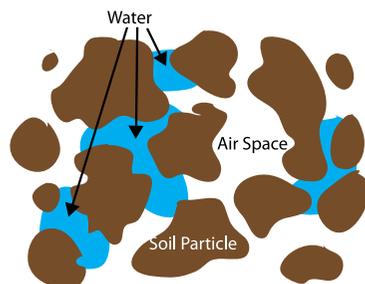
### Learning Outcomes

#### Students should be able to:

- Oven dry a soil sample and calculate its moisture content
- Burn off organic matter and calculate the percentage present in a soil sample.

### SOIL MOISTURE AND ORGANIC CONTENT

Productive soils contain rock particles (inorganic content), water, air and organic matter. The organic content (sometimes called humus) is mainly dead and decaying plant material that sticks to the rock particles and fills up much of the space between them. It has important roles in providing soil nutrients and helping bind the inorganic particles together. The water and air fill up the remaining space as shown in the diagram below.



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**Note:** In the above diagram the soil particles represent both the rock particles (inorganic content) and the organic content.

The physical properties of a soil will determine which plants and crops will be most successful in that soil.

It is possible to calculate the amount (or percentage) of water (soil moisture) and organic content in a soil using the practical techniques described below.

#### Calculating the amount of moisture (water) and organic content in a soil sample

##### Typical apparatus

- Evaporating dish
- Metal tray
- Oven/microwave oven and dessicator
- Bunsen burner
- Tripod
- Wire gauze
- Bench mat
- Safety glasses
- Oven gloves
- Sand bath
- Tongs

#### Method (calculating the soil moisture)

Obtain a soil sample by digging up a grass sod and taking a small sample of the soil below it without large roots. Examine the soil sample and remove any living organisms. Weigh the evaporating basin and add 50 g of soil to it. Place the evaporating dish and soil in a microwave oven and heat on high for around 5 minutes. Check the sample and if it appears damp heat for another few minutes. Allow to cool. When cool, check it again to ensure it is dry. Place the evaporating dish and contents overnight in a dessicator. (The dessicator stage is not necessary if the soil is totally dry and has been given sufficient time to cool).

Remove the evaporating dish and reweigh. Reheating for another period of time and reweighing to obtain two successive readings the same will improve the accuracy of the result as this makes sure that the soil has been totally dried.

A laboratory oven set at around 100°C may be used instead of the microwave. In this case, the soil can be left overnight in the oven and the mass of the soil measured the next day. Reheating for another period of time and reweighing to obtain two successive readings the same will improve the accuracy of the results for the reason described earlier.

#### Do not throw out the soil sample at this stage.

Soil sample	Mass of container/g	Mass of container + soil/g	Mass of container + dried soil/g	Mass of water(g) /50g soil	Percentage soil moisture/%