

## Unit 4

# Soil Texture

Soil classifications depend on soil texture. Soil texture results from the size of the soil particle. The three basic particle sizes from the largest to the smallest are sand, silt, and clay. To help you visualize the difference in particle size, think of sand as a basketball, silt as a baseball, and clay as the point of your pencil. A mixture of the three particle sizes is called loam.

Sandy soils contain no more than 5% of clay. They are open, free draining, quick drying. They are "hungry" soils, with not much plant food and they are often sour and short of lime.

Clay soils contain more than 30% of clay. Organic matter takes a long time to break down in these soils which are often fertile, though sometimes low in phosphates. They cannot be worked when wet and should be cultivated only at certain times.

Loams contain a balanced mixture of light and heavy soil materials such as sand and clay and are the best of all soils. They are naturally fertile, free working, easily drained, and will stand up to dry conditions.

Limey or calcareous soils contain a large proportion of calcium carbonate, either in the form of chalk or limestone, according to the rock below. Chalky soils dry out easily and bake hard in summer; in the winter, frost raises the soil and can lift plants out of the ground.

Peaty soils contain 50% or more organic matter. When well drained these are rich and fertile soils. If they are badly drained, they become sour and difficult to crop. Often high in nitrogen they are usually short of potash and lime. Heavy crops are produced, but the quality may be low.

Rock soils are found in places where large lumps of the subsoil material are present in the topsoil and have not weathered down. Some of these soils are difficult to work and cause heavy wear on cultivating implements.

From a practical farming point of view, the two main types are light and heavy soils. Light soils are easy to work, need less power to cultivate, can be worked at most times of the year, and do not hold water so much. They include sand and gravels, chalky soils and some peaty soils. Heavy soils are more difficult

to work, need more power to cultivate, can only be worked at certain times when they are in the right condition, and hold water. They are naturally more productive and grow heavier crops.

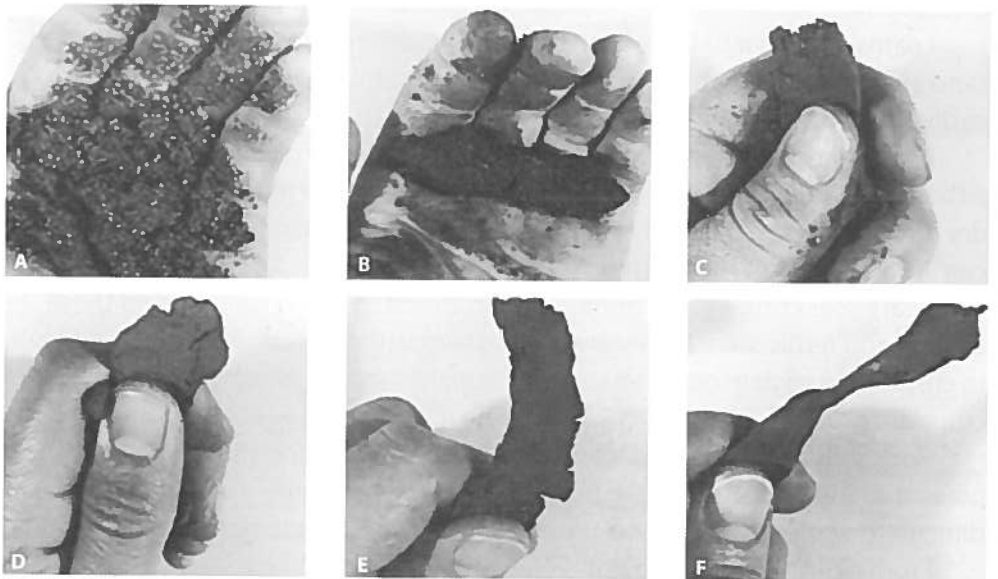
#### How to Tell Soil Type

35 Handling soil is the best test to find the soil type. Simple hand tests can guide you:

1. If a sample of soil feels gritty, it is a sand.
2. If it feels gritty, and makes your fingers dirty, it is a loam.
3. If it feels silky, but you cannot polish it when damp between your fingers, it is silt.
- 40 4. If you can polish it between your fingers, it is clay.



Watch the video titled 'How to Identify your Soil Type'  
<https://www.youtube.com/watch?v=pp-RjCVVdl4>  
 to distinguish between sand and clay soil.



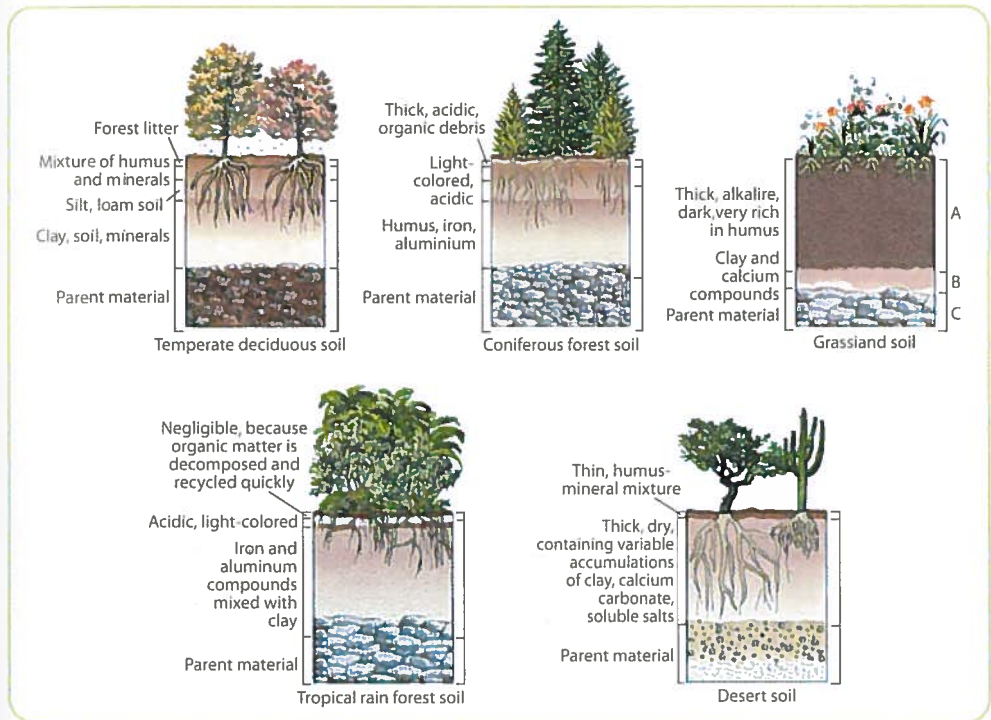
*The appearance of soil samples with texture that are: A. sandy, B. and C. moderately sandy, D. medium, E. moderately clayey, and F. clayey*

[Source: Purdue University/Extension].

**Special Terms**

<b>Calcium carbonate</b>	$\text{CaCO}_3$
<b>Gravel</b>	in the mechanical analysis of the soil, rounded or angular particles of rocks or minerals which are greater in size than coarse sand and up to 3 inches in maximum diameter.
<b>Lime</b>	in narrow sense, calcium oxide, $\text{CaO}$ , but also in agricultural terminology, $\text{CaCO}_3$ , and calcium hydroxide, $\text{Ca(OH)}_2$ .
<b>Loam</b>	a soil which contains 7-27% clay, 28-50% silt and less than 52% sand.
<b>Mineral</b>	a chemical compound or element of inorganic origin.
<b>Nitrogen</b>	a gaseous element, N.
<b>Phosphates</b>	salts of phosphoric acid.
<b>Potash</b>	potassium, K, and various compounds of potassium.
<b>Sour soil</b>	an acid soil.

silt.

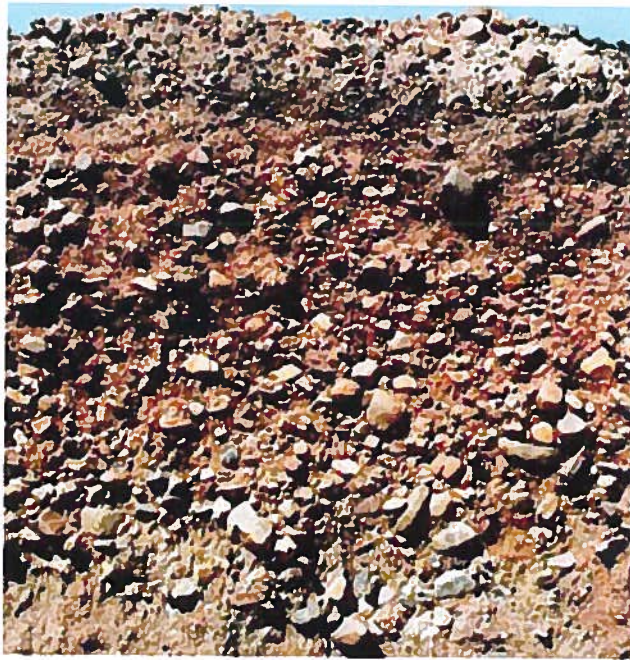


**Differences in Soil Profiles**

## Practice Tasks

### Task 1 True or False?

1. Clay soils are fertile. [ ]
2. The amount of calcium carbonate in limey soils is determined by the rock below. [ ]
3. Chalky soils are essentially very wet soils. [ ]
4. Machinery can be damaged in rock soils. [ ]
5. Light soils are easy to work and are more productive than heavy ones. [ ]
6. The texture of the soil is directly related to the size of the soil particles. [ ]
7. By handling soil, one may analyse its texture. [ ]
8. Soil particles that are gritty may be sand or loam. [ ]



*Weathered Bedrock*

[Source: Purdue University/Extension].

**Task 2** Find the properties of each soil type in the right column and put the appropriate numbers of the left column inside the brackets

- |                        |      |  |
|------------------------|------|--|
| 1. Limey soils contain | [__] | a) can cause damage on farming implements.     |
| 2. Peaty soils contain | [__] | b) are sometimes low in phosphates.            |
| 3. Light soils         | [__] | c) are usually short of potash and lime.       |
| 4. Heavy soils         | [__] | d) a large proportion of chalk or limestone.   |
| 5. Peaty soils         | [__] | e) can be worked at most times of the year.    |
| 6. Clay soils          | [__] | f) more than 50% of organic matter.            |
| 7. Rock soils          | [__] | g) can be worked at certain times of the year. |

**Task 3** List the features of each soil type under the relevant section

50% organic matter, 5% clay, free working, dry out easily, 30% of clay, can become sour if badly drained, contain limestone short of lime, free draining, frost raises the soil, contain clay and sand, stand up to dry conditions, low in phosphates, cultivated only at certain times short of lime.

<b>Clay Soils</b>	<b>Limey Soils</b>	<b>Peaty Soils</b>	<b>Sandy Soils</b>	<b>Loams</b>

**Task 4** Complete the text by using appropriate words from the passage

Farmers use i \_\_\_\_\_ to cultivate the soil; the soil may be l \_\_\_\_\_ or h \_\_\_\_\_. If it is of the second type, i.e. h \_\_\_\_\_ it is p \_\_\_\_\_ and bound to g \_\_\_\_\_ heavier c \_\_\_\_\_. On the contrary, if the soil is l \_\_\_\_\_ it can be w \_\_\_\_\_ more easily and it does not h \_\_\_\_\_ water.

Well d \_\_\_\_\_ soils can be very f \_\_\_\_\_ soils, for example, p \_\_\_\_\_ soils. If this is not the case, then this type of s \_\_\_\_\_ becomes s \_\_\_\_\_. This can affect the c \_\_\_\_\_.

**Task 5** There are many prefixes in words that help us understand their meaning. Look at the following list. Can you guess their meaning?

- sub- \_\_\_\_\_
- hyper- \_\_\_\_\_
- hypo- \_\_\_\_\_
- agri- \_\_\_\_\_
- hydro- \_\_\_\_\_

**Task 6** Write as many words as you can that begin with the above prefixes

- |         |         |
|---------|---------|
| 1 _____ | 2 _____ |
| 3 _____ | 4 _____ |
| 5 _____ | 6 _____ |



**Task 7** A list of 12 words is provided. Identify 8 of them in the word search puzzle below; words can go in any direction and do not share letters

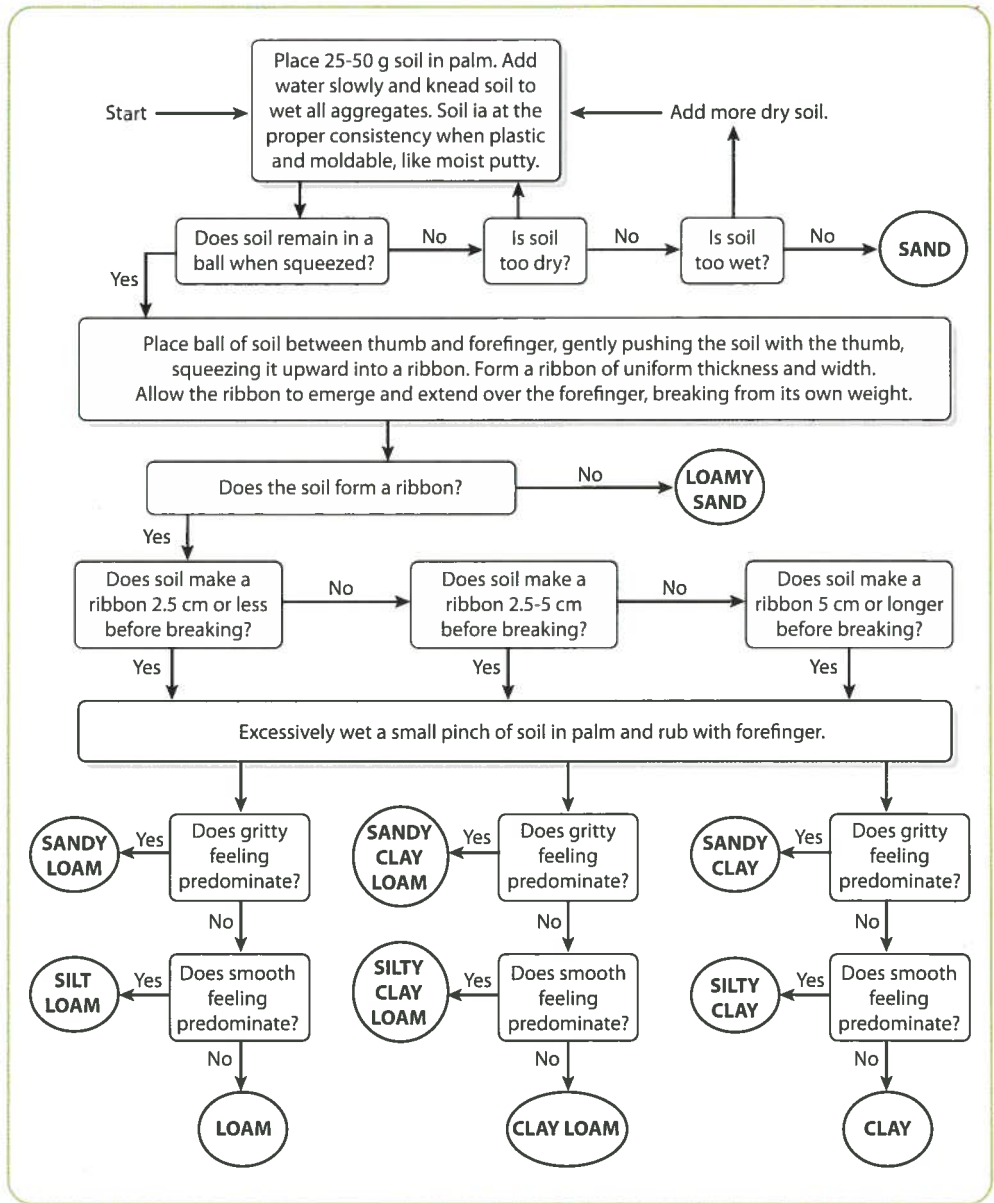
Clay	Light	Lumps
Summer	Frost	Limestone
Silt	Texture	Implements
Limey	Soil	Weathered

**Word Search Puzzle**

E	Z	L	N	L	T	T	G	R	H	K	H	W	M	T
K	V	M	U	L	V	N	S	G	C	O	S	C	N	K
M	B	M	I	V	K	J	T	O	Q	D	O	M	U	X
Z	P	S	Z	D	M	E	B	J	R	T	I	J	Y	F
S	W	G	V	X	X	V	R	C	P	F	L	I	R	X
U	O	C	J	T	I	M	P	L	E	M	E	N	T	S
M	Z	S	U	M	X	M	H	N	J	B	U	H	L	Y
O	O	R	P	Z	B	W	P	Y	X	L	D	F	I	C
U	E	J	E	Q	M	G	U	E	U	E	G	W	M	T
T	H	G	I	L	N	N	C	M	H	K	R	E	E	N
M	P	Q	Z	B	K	Z	B	I	U	F	E	Z	S	E
T	P	F	F	C	V	V	Y	L	B	U	M	Z	T	W
F	R	W	I	O	L	P	H	A	A	X	M	J	O	H
D	E	R	E	H	T	A	E	W	L	T	U	H	N	P
A	N	E	P	Q	V	J	O	Y	D	C	S	K	E	T

**Delve Deeper Into...**

**Analysing Soil Texture by Feel**



*Procedure for Analysing Soil Texture by Feel*