MINISTRY OF EDUCATION

SECONDARY ENGAGEMENT PROGRAMME

INTEGRATED SCIENCE

GRADE 9

WEEK 12 **LESSON 1**

Topic: Terrestrial environment

Sub-topic: Soil types

Objective: After readings and observing students will accurately:

List the types of soil

Outline the features of each soil type

Compare and contrast the three soil types in at least one paragraph

Content

Clay

Clay soil is soil that comprises very fine mineral particles and not much organic material. The resulting soil is quite sticky since there is not much space between the mineral particles, and it does not drain well at all.

Clay soil is prevalent in many parts of the United States, and it can be very problematic if you are trying to grow a flower or vegetable garden. While some trees and shrubs grow well in clay, most annuals, perennials, and vegetables don't have roots strong enough to force their way through dense clay. And if spring flower bulbs are your dream, forget it—most bulbs tend to rot over the winter in clay soils.

Clay soils can be improved, however. With some background information and a well-designed strategy, you'll be able to grow flowers and vegetables to your heart's content.

The picture showing wet clay

Properties of clay soil

The small **size** of the particles and their unique crystal structures give clay materials special properties. These properties include **cation exchange** capabilities, plastic behaviour when wet, catalytic abilities, **swelling** behaviour, and low **permeability**.

Advantages of Clay Soil

Even clay soil has some good qualities. Clay, because of its density, retains moisture well. It also tends to be more nutrient-rich than other soil types. The reason for this is that the particles that makeup clay soil are negatively charged, which means they attract and hold positively charged particles, such as calcium, potassium, and magnesium.

Disadvantages of Clay Soil

In addition to the drawbacks mentioned above, clay also has the following negative qualities:

- Slow draining
- Slow to warm in the spring
- Compacts easily, making it difficult for plant roots to grow
- Tendency to heave in winter
- Tendency to be alkaline in pH

Loam

Loam- a soil with roughly equal proportions of sand, silt, and clay.

Properties of loam

By combining these three types of soil, loam gives you the best characteristics of all three. This enables you to grow almost any type of plant without having to add too much to the soil. The clay and silt help retain moisture while the sand keeps the soil from compacting too much. This combination helps with the drainage and means that the soil can just crumble in your hand and yet still hold its shape. As loam doesn't dry out in the summer or get waterlogged in winter, it is an ideal soil all year round.

Picture of loam

Sand

Sand is a granular material composed of finely divided rock and mineral particles. It is defined by size, being finer than gravel and coarser than silt. **Sand** can also refer to a textural class of soil or soil type; i.e., a soil containing more than 85 percent **sand**-sized particles by mass.

Properties of sand

Sandy soils are often known as light soils due to their high proportion of sand and little clay (clay weighs more than sand).

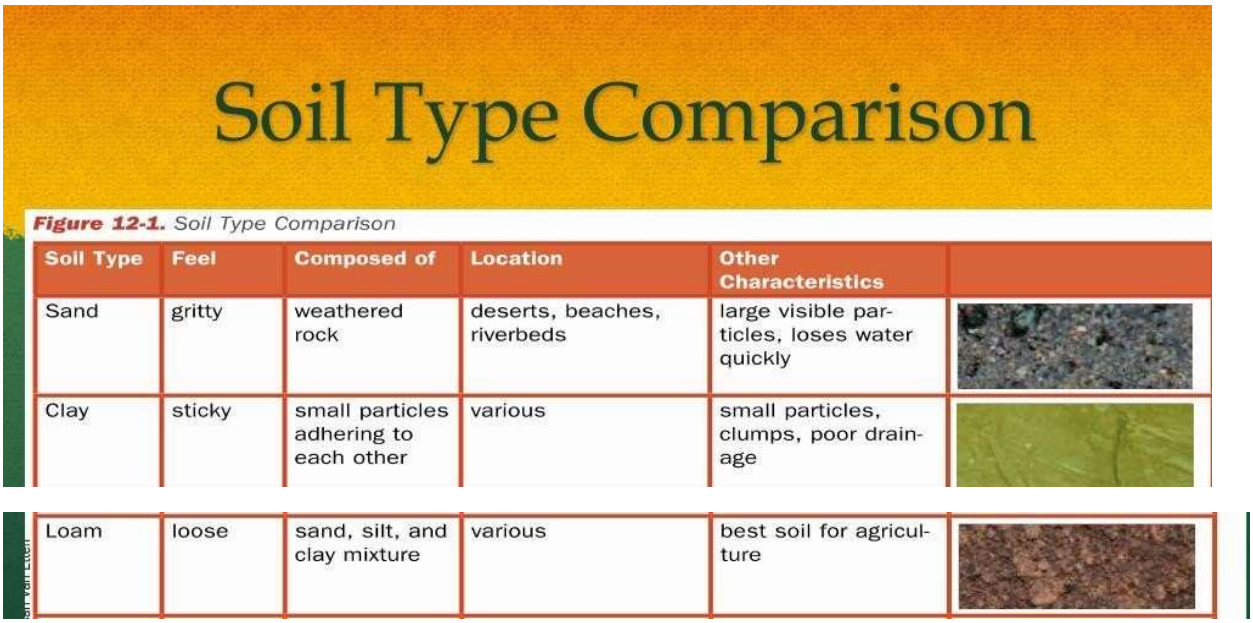
These soils have quick water drainage and are easy to work with. They are quicker to warm up in spring than clay soils but tend to dry out in summer and suffer from low nutrients that are washed away by rain.

The addition of organic matter can help give plants an additional boost of nutrients by improving the nutrient and water holding capacity of the soil.

Picture of sandy soil

Comparison between the three soil types

Sand particles are the largest and clay particles the smallest. Most soils are a combination of the three. The relative percentages of sand, silt, and clay are what give soil its texture. A clay loam texture soil, for example, has nearly equal parts of sand, silt, and clay.



Homework

- Draw the structure of each soil type.

References

- Bernard, Myrna et.al (2003) Science in Daily Life Book 3 (Unit 5) Ministry of Education
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- https://www.purdue.edu/hla/sites/yardandgarden/what-is-loam/
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