

Ministry of Higher Education
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Practical Ecology
SOIL WATER AND AIR
3rd lab.
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OBJECTIVES

- Learning the definition and important aspects of soil
- Functions of soil
- Water and air temperature

What is Soil?

- Soil is one of the three major natural resources, alongside air and water. It is one of the marvelous products of nature and without which there would be no life



Soil functions are :-

- Food and other biomass production
- Environmental Interaction: storage, filtering, and transformation
- Biological habitat and gene pool
- Source of raw materials
- Physical and cultural heritage
- Platform for man-made structures: buildings, highways

Importance of Soil

- **Soil is our life support system. Soils provide anchorage for roots, hold water and nutrients. Soils are home to myriad micro-organisms that fix nitrogen and decompose organic matter, and armies of microscopic animals as well as earthworms and termites. We build on soil as well as with it and in it.**



What is the soil made of ?

Soil is made up of three main components

- minerals that come from rocks below or nearby.
- organic matter which is the remains of plants and animals that use the soil.
- living organisms that reside in the soil.



- The proportion of each of these is important in determining the type of soil that is present. But other factors such as climate, vegetation, time, the surrounding terrain, and even human activities (eg. farming, grazing, gardening etc.), are also important in influencing how soil is formed and the types of soil that occur in a particular landscape.



Soil and Health

Healthy soil is very important for human health because what is in the soil affects the health and quality of the food we eat that is derived from it.

For example, soil is the main source of trace elements (e.g. iodine and cadmium), which are taken up by crops and plants, before being consumed by us. However, the human body only needs tiny amounts of these trace elements – too much or too little can make us ill



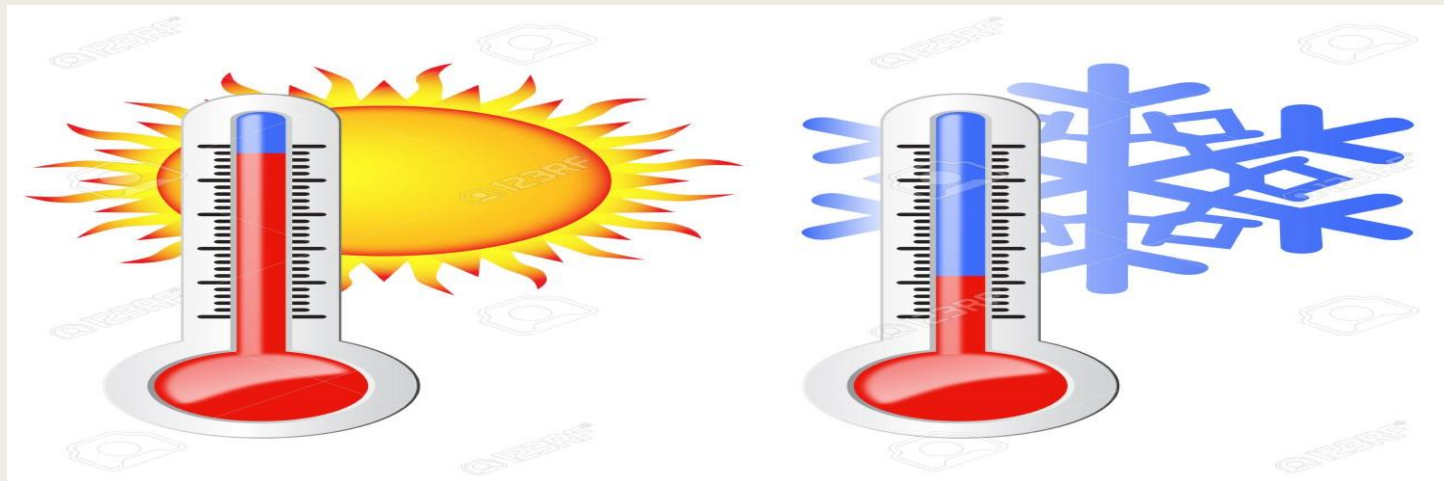
What is the Ideal soil ?

Ideal Soil Temperatures for Planting The perfect temperature for planting varies dependent upon the variety of vegetable or fruit. Planting before it is time can reduce fruit set, stunt plant growth and prevent or reduce seed germination. Plants such as tomatoes, cucumbers and snap peas benefit from soils at least 60 F (16 C.).



What is Temperature

Temperature is a measure of the average heat or thermal energy of the particles in a substance. Since it is an average measurement, it does not depend on the number of particles in an object. In that sense it does not depend on the size of it. For example, the temperature of a small cup of boiling water is the same as the temperature of a large pot of boiling water. Even if the large pot is much bigger than the cup and has millions and millions more water molecules



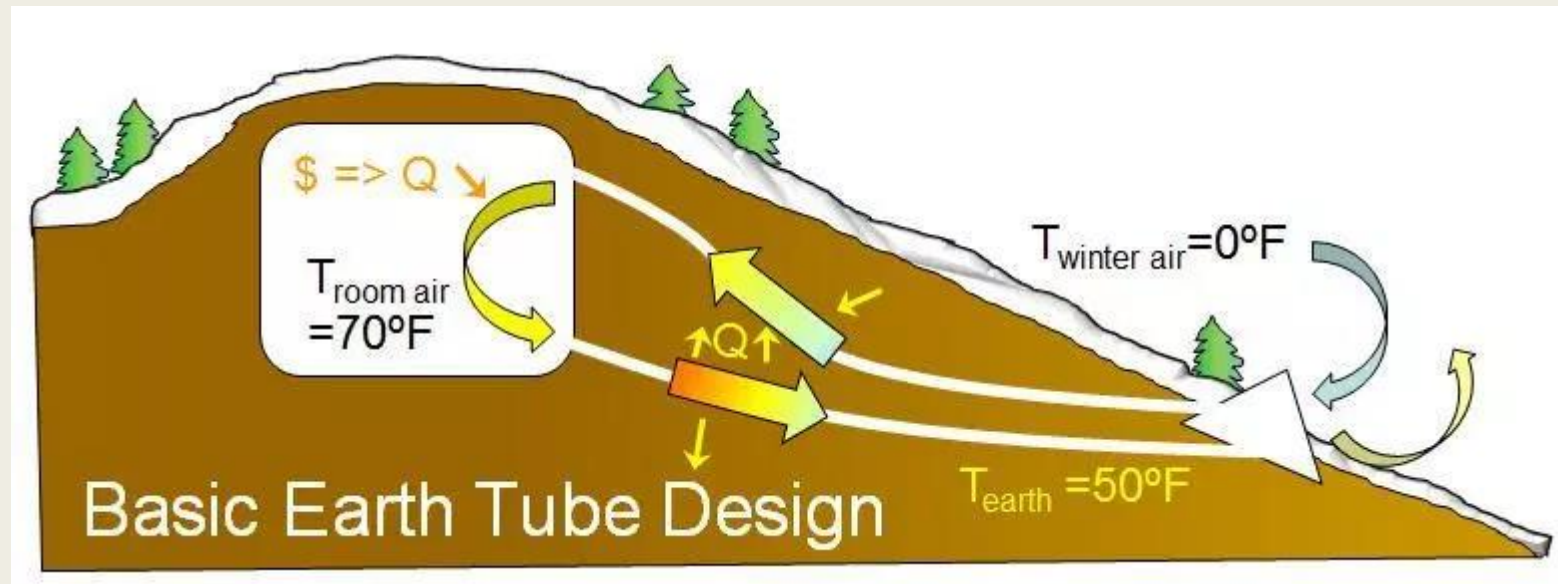
How we can measure temperature ?

- Temperature is measured with a thermometer which converts the readings into degrees on a temperature scale (commonly Fahrenheit or Celsius).



Soil Temperature

Soil temperature is simply the measurement of the warmth in the soil. Ideal soil temperatures for planting most plants are 65 to 75 F. (18 to 24 C.). Nighttime and daytime soil temperatures are both important.



Why is soil temperature important?

- Soil temperature directly affects plant growth. In other words, nearly every crop slows down its growth when soil temperatures are below 90C and above 50 0C.
- Germination of various seeds requires different soil temperature ranges. For example, maize starts to germinate at soil temperatures from 7 to 100C.
- Most organisms within soil thrive at temperatures between 25-350C.
- Nitrification requires a soil temperature of 320C.



Air temperature

- Air temperature is a measure of how hot or cold the air is. It is the most commonly measured weather parameter. More specifically, temperature describes the kinetic energy, or energy of motion, of the gases that make up air. As gas molecules move more quickly, air temperature increases.



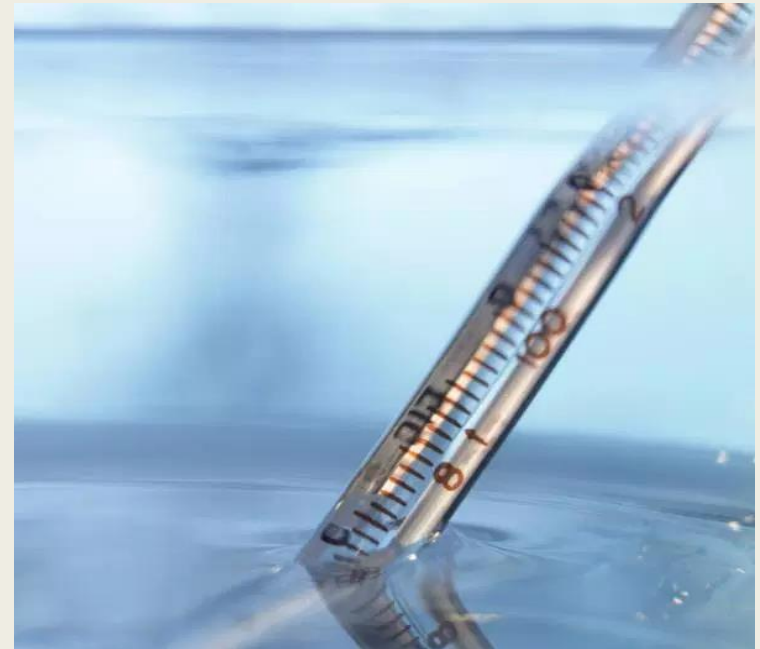
Why is air temperature important ?

- **Air temperature** affects the growth and reproduction of plants and animals, with warmer temperatures promoting biological growth. Air temperature also affects nearly all other weather parameters. For instance, air temperature affects:
 - the rate of evaporation
 - relative humidity
 - wind speed and direction
 - precipitation patterns and types, such as whether it will rain, snow, or sleet.



Water Temperature

- The temperature of hot tap water should be around 50 degrees Celsius. For cold tap water, the temperature is roughly 7 degrees Celsius. These temperatures are estimates and vary according to season and geographical location. Tap water temperature is much like room temperature in that it depends on the local conditions.



How does temperature affect water quality?

Temperature impacts both the chemical and biological characteristics of surface water. It affects the dissolved oxygen level in the water, photosynthesis of aquatic plants, metabolic rates of aquatic organisms, and the sensitivity of these organisms to pollution, parasites and disease



Thank you for your attention 😊 😊

■ ANY QUESTION ????????????