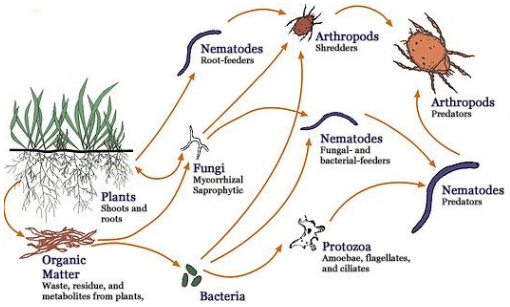
SOIL BIOLOGY

Soil Biology is the third dimension of looking at a soil to determine its health. The respiration within a soil has three distinctive cycles that respire either carbon dioxide or oxygen.

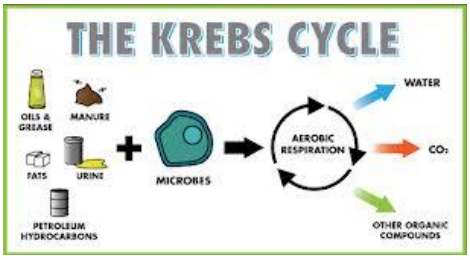
Microbes and Other Soil Organisms (Oxygen to Carbon Dioxide)



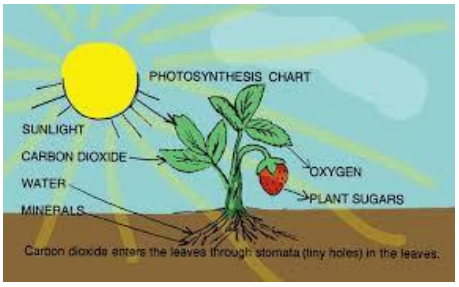
Mainly composed of bacteria, fungi, actinomycetes, along with earthworms and other soil insects. These organisms primarily use oxygen and respire carbon dioxide to the atmosphere. This is the typical cycle under aerobic conditions.

Root Metabolism (Oxygen to Carbon Dioxide)

Plant roots, particularly at night, will use oxygen, and through a series of chemical reactions, produce energy for the plant and respire carbon dioxide. This is known as the Krebs cycle.



Photosynthesis (Carbon Dioxide to Oxygen)



The photosynthetic process is a system used by plants to convert sun energy into chemical energy that is stored in the plant as sugars. These sugars are synthesized from carbon dioxide and water, with oxygen as the by-product. Photosynthesis maintains atmospheric oxygen levels and supplies all of the organic compounds and most of the energy for all life on earth. Measuring the carbon dioxide (CO2) within a soil gives us a direct measure of soil biological activity and the health of a soil. This can be looked at as similar to an athlete's oxygen/carbon dioxide output; the greater the intake/output, the greater the increase in athletic ability. The method to measure CO2 used in our demonstration is called the Solvita CO2 Burst. This procedure uses a CO2 sensitive membrane. In our laboratory we will dry the soil, and then rewet it at a prescribe soil:water ratio and temperature. This method mimics the natural drying/wetting cycle, and has been shown to reflect the amount of microbial activity and the quantity of mineralizeable nitrogen.