



# New Terms

1. **Aerating:** Adding air to the growing media.
2. **Anchorage:** Plant roots and stems becoming stabilized or “anchored” in their growing media. In hydroponics systems, devices or systems must anchor plants in the absence of soil.
3. **Geponics:** Growing plants in the soil found on the earth’s surface. Geponics can be looked as the “opposite” of hydroponics.
4. **Hydroponics:** The art and science of crop production in liquid media.
5. **Nutrient:** The mineral quantities plants need to obtain optimum growth.
6. **Nutrient solution:** The replacement of soil in a hydroponic solution that supplies the plant with nutrients, water, air, and anchorage.
7. **Primary nutrients:** The mineral nutrients plants need in the greatest quantities: Nitrogen (N), Phosphorus (P), and Potassium (K).
8. **Respiration:** The process by which the plant sugars produced in photosynthesis are used up (or burned) to produce energy for the plant’s life processes.
9. **Transpiration:** Evaporation or loss of water through plant surfaces.



# Plant Nutrients

Nutrients are essential to plant growth because they provide a constant source of food and energy. Without nutrients, the plant will not complete its life cycle in a normal manner. With prolonged deficiency, the plant will not survive. The primary nutrients involved in plant growth are nitrogen (N), phosphorus (P), and potassium (K).

The effects of these nutrients can be visually observed under many conditions:

## Nitrogen (N)

**Optimum:** Plants with the optimum amount of N are dark green and high in protein content.

**Deficient:** Nitrogen deficiency is detected by a light green color. The lower leaves turn yellow and brown as they dry up. The plant is stunted, making the stem short and slender.

**Excess:** Too much N causes the plant to become very leafy. Flowering will be delayed.

## Phosphorus (P)

**Optimum:** P stimulates root formation and growth, provides plants with a healthy start, and stimulates flowering and seed development.

**Deficient:** Phosphorus is needed for growth and flowering. If P is not provided, the plant grows slower and delays flower and pod development. The leaves in a P-deprived plant are dark green with purple or red appearing along the veins. Lower leaves turn yellow and brown as they dry up. The plant stem becomes short and slender.

## Potassium (K)

**Optimum:** At optimum levels, K increases vigor and disease resistance. It also is important for the formation of starches and sugars.

**Deficient:** Chlorotic (yellowing) leaves result from K deficiency. Necrotic (tissue death) spots between the veins, margins, or leaf tips appear. The plant stem becomes slender.