

# PLANT TISSUE TESTING

**Student Learning Objectives.** Instruction in this lesson should result in students achieving the following objectives:

- 1 Name the nutrients needed for plant growth.
- 2 Explain why nutrients are essential to plants.
- 3 Explain where and how plants can obtain nutrients.
- 4 Describe environmental conditions that influence nutrient deficiencies.
- 5 Explain where plants can obtain nutrients if inadequate amounts are present in the soil.
- 6 Discuss the nitrogen cycle and its affect on plant nutrition.

**Anticipated Problem:** What are the nutrients needed for plant growth?

I. Plants need a variety of nutrients in order to survive and carry on the necessary metabolic processes of life. Plants require water, carbon dioxide, oxygen, and a variety of essential minerals in order to survive.

A. About 80–85% of the weight of a fresh plant is water. The remaining part of the plant contains elements that are absorbed through the roots and used for plant growth.

B. Plants receive most of the nutrients that they need from the growing media, or in the case of hydroponics, the nutrient solution that the roots are exposed to. In order to maintain healthy plants, a grower must provide the right type and amount of nutrients to the media so that the plants can absorb the nutrients and grow.

C. Plant nutrients can be divided into two groups, macronutrients and micronutrients.

D. **Macronutrients** are needed in large quantities and include atmospheric, primary, and secondary elements.

1. Carbon, hydrogen, and oxygen make up about 90–95% of the weight of the dry matter. These three **atmospheric macronutrients** are nonminerals. Plants acquire carbon, hydrogen, and oxygen from carbon dioxide (CO<sub>2</sub>) and water (H<sub>2</sub>O) through the process of photosynthesis. The rest of the dry weight is made up of minerals.

2. The **primary macronutrients** are nitrogen (N), phosphorus (P), and potassium (K).

3. The **secondary macronutrients** include calcium (Ca), magnesium (Mg), and sulfur (S).