

Plant Fertilizers

N-P-K

Plant fertilizers do not provide food for plants. Plants synthesize their own food from CO₂ and water utilizing energy from the sun. However, fertilizers do provide macronutrients that are essential in the growth and reproduction of plants.

The essential macronutrients required by plants are **nitrogen, phosphorous** and **potassium**. Fertilizers contain these elements in salt form.

Nitrogen is utilized for lush green growth and strong, sturdy tissue. Nitrogen is found in amino acids, the building blocks of proteins. It is also found in chlorophyll and DNA. Plants with a nitrogen deficiency have yellow leaves. Older leaves yellow as they lose essential nutrients that are transported to new growth.

Phosphorous is required for flowers that also produce fruit. Phosphorous is found in DNA, ATP energy molecules and in the phospholipid membrane of cells. Phosphorous is also required for photosynthesis. Plants that have a phosphorous deficiency have stunted flowers and fruit and can develop a purple coloration as the green chlorophyll required for photosynthesis is lacking.

Potassium is required for strong root and shoot growth. Potassium is required by enzymes essential in plant metabolism. It protects plants against extremes including drought and excessive temperatures of hot and cold. Potassium is required by plants for winter hardiness. A deficiency results in stunted growth.

Reading the Label: 15-10-5

The numbers on a bag of fertilizer tell the percentages of nitrogen, phosphorus and potassium. For example, a 15-10-5 fertilizer has 15% nitrogen, 10% phosphorous and 5% potassium. The bag contains 30% nutrients. The remaining material in the bag is “filler” that has no value*. A 100-pound bag of 15-10-5 fertilizer has 15 pounds of nitrogen, 10 pounds of phosphorous, 5 pounds of potassium and 70 pounds of filler. Numbers from several fertilizers are given below.

Table 1: FERTILIZERS	N-P-K
All Purpose Plant Food	28-8-6
Brand X Tomato and Vegetable	9-12-12
Brand Y Tomato and Vegetable	18-18-21
Quick Start	4-12-4
Brand X Rose Food	9-18-9
Brand Y Rose Food	18-24-16
Brand X Bloom Booster	10-16-10
Brand Y Bloom Booster	15-30-15
Brand X Lawn Fertilizer	20-0-5
Brand Y Lawn Fertilizer	15-5-18

(*If additional nutrients are included, they are noted on the bag.)

Smart Buys

Refer to Table 1 to answer the following questions regarding fertilizers.

1. Why is the name “food” misleading on the plant labels?

2. Of the three numbers noted in fertilizers, which number is consistently higher in Bloom Booster and Rose Food?

Why is a higher number beneficial for this macronutrient in these fertilizers?

3. Which lawn fertilizer is better for fall applications in colder climates?

4. Why does a tomato plant fail to produce fruit if fertilized with Brand X Lawn Fertilizer?

5. Compare Brand X Tomato and Vegetable Food with Brand Y Tomato and Vegetable Food. If both bags are 20 pounds and have the same cost, which gives the better buy?

Justify your response.

6. Which fertilizer would be better for increasing the yield on a peach tree, All Purpose Plant Food or Brand Y Bloom Buster?

Justify your response.

TEACHER ANSWER SHEET

Smart Buys

Refer to Table 1 to answer the following questions regarding fertilizers.

1. Why is the name “food” misleading on the plant labels? **Plants make their food. Fertilizer provides macronutrients essential for producing food, much like vitamins in maintaining health.**

2. Of the three numbers noted in fertilizers, which number is consistently higher in Bloom Booster and Rose Food? **The middle number.**

Why is a higher number beneficial for this macronutrient in these fertilizers noted? **The middle number shows phosphorous, the macronutrient essential for flowers.**

3. Which lawn fertilizer is better for fall applications in colder climates? **Brand Y.**

Justify your response. **It provides potassium for winter hardiness.**

4. Why does a tomato plant fail to produce fruit if fertilized with Brand X Lawn Fertilizer? **The fertilizer will increase the growth of shoots and roots rather than flowers that will become fruits.**

5. Compare Brand X Tomato and Vegetable Food with Brand Y Tomato and Vegetable Food. If both bags are 20 pounds and have the same cost, which gives the better buy? **Brand Y.**

Justify your response. **The nutrients add up to 57%, a higher percentage than the 33% of the Brand X Fertilizer.**

6. Which fertilizer would be better for increasing the yield on a peach tree, All Purpose Plant Food or Brand Y Bloom Buster? **Brand Y Bloom Buster**

Justify your response. **Brand Y Bloom Buster has a higher middle value (phosphorous) that will increase the flowers needed to produce fruit.**