

How to Read a Fertilizer Label

Name: _____

Read the following passage and answer the questions that follow.

For healthy growth, all plants require certain nutrients that normally come from the soil. Different types of plants require different amounts of nutrients. Proper balance is necessary. Sometimes the excess of one nutrient can cause the deficiency of another and damage the plant. Soil with added fertilizer nutrients can usually produce more crops and healthier garden plants than soil alone.

The three primary nutrients and their chemical symbols are: Nitrogen (N), Phosphorus (P), and Potassium (K). These are the most important nutrients and are commonly the first in the soil to be depleted. These elements are the ones that most frequently need to be replaced in the soil with some type of fertilizer, however, a total of 17 elements are thought to be essential for plant growth and reproduction. Oxygen, carbon, and hydrogen come from the air and water. Other required nutrients come from water dissolved in the soil. Since plants use up nutrients in the soil, growers often need to replace those nutrients by fertilizing.

Any type of substance that is added to the soil or water to increase the nutrients available to plants is considered a fertilizer. Fertilizers can be in the form of solids, such as stakes or pellets, liquids, or gases.

Soil nutrients can be replenished by either organic or inorganic materials. For example, ground lobster shells and animal manure are good sources of nitrogen; potato skins and banana peels are good sources of potassium; and animal bone meal is a good source of phosphorus. Nitrogen gas from the air can be converted to a form of nitrogen plants can use through chemical reactions. Phosphate rock can be mined and converted to a usable source of phosphorus. Potash is a source of potassium gathered from salt deposits.

Growers and scientists are continually looking for new ways to replenish soils with necessary nutrients for better crop yields. Farmers must match the amount of applied nutrients with the amount of nutrients the plant can use. When this is done, farmers ensure they are not wasting fertilizer and that fertilizers stay on site and are used by plants rather than moving off site to areas where crops are not being grown. Farmers use practices that protect our environment through soil, air, and water quality management. Fertilizer production is heavily regulated in the U.S. with California having some of the most restrictive standards. In addition, the agricultural use of fertilizers is heavily regulated and monitored by many agencies.

In this activity you will learn how to read and understand a fertilizer label. This will enable you to better understand plant nutrients and make the best choice when purchasing a fertilizer for your own lawn, garden, or farm.

How to Read a Fertilizer Label *(continued)*

Reading Questions

1. Name the three primary elements that come from the soil that plants must have for healthy growth.

2. Name two elements that plants get from the air or water.

3. What is the general name for a substance used to put nutrients back into the soil?

4. Why must you follow directions when applying fertilizer?

5. Explain one other thing that you learned from the reading.

Activity

1. Fertilizer labels are written in a standard way so the nutrient content can easily be determined by consumers. The California Department of Food and Agriculture (CDFA), along with the U.S. Department of Food and Agriculture (USDA), make sure that the regulations are followed for labeling foods, fertilizers, pesticides, and other substances.

On the front of any type of fertilizer container there are three numbers. The first number always represents the percentage of nitrogen (N) that is in that particular fertilizer. The second number represents the percentage of phosphorus (P) and the third number represents the percentage of potassium (K). There are also other substances in fertilizers, but the main ingredients are always nitrogen, phosphorus, and potassium.

How to Read a Fertilizer Label *(continued)*

Look at the labels shown below:



- What percentage of the fertilizer is nitrogen in the all purpose fertilizer?

 - What percentage of the fertilizer is nitrogen in the tree and shrub fertilizer?

 - What percentage of the fertilizer is phosphorus in the tree and shrub fertilizer above?

2. Farmers and gardeners use different fertilizers for a variety of reasons. As an example, certain crops or garden shrubs may require more nitrogen than others. If this was the case, the gardener or farmer would use a fertilizer high in the first number, which represents nitrogen. If the soil was too low in phosphorus a good choice might be a fertilizer high in the second number, which represents phosphorus.
- Proper plant growth requires good nutrition, but there can also be too much of a good thing. Plants can be harmed if too much fertilizer is applied. Farmers and gardeners understand that if they use too much of a fertilizer they are wasting money and could possibly harm the plant or allow excess fertilizer to run off the field, lawn, or garden.
- State one reason why fertilizers do not all contain the same amounts of nitrogen, phosphorus, and potassium.

3. A “General Guaranteed Fertilizer Analysis Statement” must appear on each fertilizer container. Look at the GGFAS on the following three fertilizer labels:

How to Read a Fertilizer Label *(continued)*

Lawn King Granular Lawn Fertilizer 17-23-6	
Ammonium Sulfate with Coated Urea Guaranteed Analysis	
Total Nitrogen (N)	17%
Available Phosphate (P ₂ O ₅)	23%
Soluble Potash (K ₂ O)	6%
Sulfur (S)	20%
Directions: Uniformly spread 3 ¾ lb of product per 1,000 sq.ft. Water well immediately after application. Repeat every 4 to 8 weeks. Do not apply near water, storm drains, or drainage ditches. Do not apply if heavy rain is expected. Apply this product only to your lawn and clean up any product that spills onto surfaces other than your lawn. Caution: Keep this product out of reach of children and pets. Wash hands with soap and water after handling product. Avoid contact with eyes and mouth. If product gets in eyes, rinse with water for 15 minutes.	
Net Wt. 35 lbs. Manufactured by: Super Nutrient Source, USA	

Tall Trees Tree and Shrub Fertilizer 11-15-9	
Continued Release Spikes Guaranteed Analysis	
Total Nitrogen (N)	11%
Available Phosphate (P ₂ O ₅)	15%
Soluble Potash (K ₂ O)	9%
Boron (B)	0.02%
Directions: Pound spike into soil at least 2 feet away from the tree trunk and under the drip line of the tree's branches. Apply spikes once in the spring and once in the fall when the soil is moist. Store spikes in a sealed plastic bag in a dry area. Store unused spikes in a sealed, plastic bag. Caution: Keep this product out of reach of children and pets. Wash hands with soap and water after handling product.	
Contains 15 Spikes Manufactured by: Trees R Us, USA	

How to Read a Fertilizer Label *(continued)*

Super-Gro Water Soluble All Purpose Plant Food 8-12-4	
Guaranteed Analysis	
Total Nitrogen (N)	8%
Available Phosphate (P_2O_5)	12%
Soluble Potash (K_2O)	4%
Copper (C)	0.15%
Directions: Add one tablespoon of product to one gallon of water and mix thoroughly. Reapply every 7 to 10 days. Caution: Keep this product out of reach of children and pets.	
Net Wt. 4 lbs. Manufactured by: The Nutrient Connection, USA	

a. According to the three labels listed above which one has the highest percentage of:

- Nitrogen? _____
- Phosphorus (phosphate)? _____
- Potassium (potash)? _____

b. Name three other substances besides nitrogen, phosphorus, or potassium that can be found in fertilizers. _____

4. You have been applying Super-Gro fertilizer to your tomato plants and watering them appropriately. You are disappointed when large brown spots appear on the base of each red tomato. Your local nursery expert says your tomato plants are lacking calcium. Could you use Lawn King or Tall Trees fertilizer to provide calcium to your tomatoes or should you come up with another method? Explain your reasoning.

5. All fertilizer labels have a warning or caution section. These sections inform you on how to properly store the fertilizer and if any protective clothing or eyewear should be used when handling the fertilizer. What do all three of these labels say in the warning section?

How to Read a Fertilizer Label *(continued)*

6. Natural fertilizers are also used commercially. Animal manures are one example of a natural fertilizer and contain many of the same nutrients as chemical fertilizers. Manures also include organic material that improves soil quality, helps prevent soil erosion, and increases the ability of the soil to hold water. The release of nutrients is slower with animal manure than with a manufactured fertilizer. Animal manure is also more labor intensive to apply than manufactured fertilizer. The following table contains information about four types of manure. It shows how many pounds of each nutrient are contained in one ton of animal manure.

Nutrients in One Ton (2,000 lbs.) of Manure			
Type of Manure	Percentage of N	Percentage of P_2O_5	Percentage of K_2O
Chicken	1.6	0.9	0.4
Dairy Cattle	0.6	0.3	0.6
Turkey	2.0	2.0	2.0
Swine	0.5	0.3	0.5

- a. What type of animal manure contains the most:

- Nitrogen (N)? _____
- Phosphorus (Phosphate P_2O_5)? _____
- Potassium (Potash K_2O)? _____

- b. If you were to buy a bag of chicken manure what would the three numbers on the label be?

What would the three numbers be on the bag of cattle manure? _____
Generally, which have higher percentages of N, P, K; manufactured fertilizer or animal manures?

- c. What is at least one advantage to using animal manure over manufactured fertilizers?

- d. What is a disadvantage of using animal manures over manufactured fertilizers?

How to Read a Fertilizer Label *(continued)*

Conclusion

1. List two possible problems with overusing fertilizers.

2. In a well written paragraph, explain how fertilizers are important in your life.

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