

**RELAX!  
HERE'S A LESSON  
WORTH TEACHING.**

## Fertilizer101

Appropriate for All Ages



## RESOURCES AVAILABLE TO TEACHERS

Other teaching aides are also available including:

- Videos
- Posters
- PowerPoint Presentations
- Visual Aids
- Full Curriculum for Teachers
- Activities

Visit our website to order your support materials today. The time you invest in our cause will come back to you many times over as you see the eyes of both young and old audiences respond to the information you share.

[www.nutrientsforlife.org](http://www.nutrientsforlife.org)

## YOUR VOICE OUR RESOURCES

Nutrients for Life is a nonprofit organization that provides information and resources to educators and individuals like you, to help inform the public about the vital role that fertilizer plays in feeding the world. The information we have compiled is science-based and user-friendly. It has been successfully implemented by educators across the country. Through a grassroots effort, we can spread the word about soil health to students of all ages and to adult organizations that are always looking for programs. Our story is not only important, but it is interesting and serves a vital role in educating consumers and decision-makers in the future.

**IF YOU  
DON'T TELL  
YOUR STORY,  
WHO WILL?**

**Your story matters.  
Soil science matters.**



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# Fertilizer Basics For All Ages

Here is a quick, but effective lesson that you can use at a moments notice.

*Visual aids: Fans, each labeled with one of the primary nutrients N, P, or K. Ideally, have N in green, P in yellow and K in pink/red. Fertilizer bag or label to show the nutrients. Optional: Nutrients for Life NPK poster.*

This lesson is found in NFLF’s curriculum, *Nourishing the Planet in the 21st Century*.

When going to the classroom, bring a copy of the curriculum and accompanying NPK poster to gift to the teacher.

All NFLF resources are free.

## PROCEDURE



**NITROGEN**

1) Explain that no matter what you grow, it needs the three primary nutrients N, P and K. In science, we call nitrogen “N.” Ask for a volunteer and have them represent “N” as part of the NPK team with the provided visual aid. Nitrogen (N): About 78% of earth’s atmosphere is made of nitrogen. However, most plants can’t use the nitrogen

directly from the air, so it must be converted. Plants need nitrogen to be green and healthy. Without nitrogen, plant leaves will be weak and yellow. Some plants require a lot of Nitrogen, so N is the first member of the NPK team.



**PHOSPHORUS**

2) Ask for a volunteer to represent P. The second member of the team is P, which stands for Phosphorus. What color is the visual aid? (Yellow!) Why do you think phosphorus is represented as yellow? Without phosphorus the plant cannot conduct photosynthesis. The leaves of a plant take in energy from the sun and turn it into energy for the plant.

Phosphorus or Phosphate rock is mined in four states in the United States, Florida, North Carolina, Idaho and Utah. Phosphorus also helps encourage plants to grow strong and healthy roots, as well as helps the plant produce quality seeds, flowers, and fruit.



**POTASSIUM**

3) Ask for the final volunteer to represent K. Scientists call Potassium K. When mined, Potassium looks like a pink rock. Potassium protects plants against diseases and helps the plants when it is cold or dry. It also helps the food you buy stay fresh. Potassium affects the



plant shape, size and taste of the produce.

4) Have students give the NPK Team volunteers a round of applause. Optional questions include asking students what each N, P and K stands for as well as why it is needed by the plant as a review.

5) Now, ask the students how we add these nutrients back to the soil if they are missing. Fertilizers! Show students a fertilizer bag or label and explain the three numbers represented on the bag. Every plant needs a specific amount of these nutrients, similar to a recipe when cooking. Some need more nitrogen, some need more phosphorus. Farmers send soil samples to agronomists, or soil scientist to find out how much they need to add to their fields. Farmers strive to be environmentally friendly, as well as economical.



6) Next, relate that we as humans need NPK as well. Ask students, “where do we get these nutrients for our bodies?”We get it from the plants that we eat. They got it from the soil. Use the NFL NPK poster as a visual aid to reiterate.

## OVERVIEW

It doesn’t matter if it’s corn in the Midwest, bananas in Hawaii, oranges in Florida, or almonds in California, every plant needs three main nutrients to survive. With this lesson students will learn the importance of nitrogen, phosphorus, and potassium.

Healthy soil = healthy plants and  
healthy plants = healthy people

## MAJOR CONCEPTS

- The three primary macronutrients ALL plants need to grow are nitrogen (N), phosphorus (P) and potassium (K)
- Plants need a total of 17 nutrients for healthy growth
- Nutrients must be added to the soil, as they are taken up and used by the plant
- Fertilizers help plants grow healthy and increase food production

# NUTRIENTS

## FOR LIFE

Humans and plants need many of the same nutrients to grow big and strong.

Humans need a variety of proteins, carbohydrates, minerals, and vitamins to stay healthy. Besides the primary nutrients NPK, plants need small amounts of secondary nutrients, such as calcium and sulfur, and micronutrients, like iron and zinc.

**N**  
**NITROGEN EQUALS STRONG PLANTS**  
Nitrogen makes plants grow strong and healthy.

**P**  
**PHOSPHORUS MOVES ENERGY**  
Phosphorus helps plants with photosynthesis. It stores and moves energy around the plant.

**K**  
**WATER IS POTASSIUM'S FRIEND**  
Potassium helps plants control and use water efficiently.

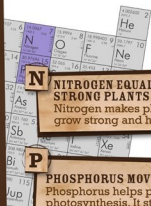
NUTRIENTS COME FROM THE SOIL THAT HELP THE PLANT GROW AND PRODUCE FOOD

NUTRIENTS COME FROM FOOD GROWN IN THE SOIL

**K**  
**POTASSIUM HELPS THE HEART**  
Humans need potassium, like plants do. Potassium helps control muscles and the rhythm of the heart.

**Fe**  
**IRON HELPS MOVE OXYGEN**  
Iron helps the body make hemoglobin that moves oxygen and hemoglobin through the blood. This is similar to phosphorus moving energy around the plant.

**Ca**  
**CALCIUM EQUALS STRONG BONES**  
Calcium helps humans have strong bones, like nitrogen helps plants have strong stalks.







# NITROGEN

**Nitrogen (N):** Plants need nitrogen to be green and healthy. Without nitrogen, plant leaves will be weak and yellow.



# POTASSIUM

**Phosphorus (P):** Phosphorus helps plants to grow strong and healthy roots. Phosphorus also helps the plant produce quality seeds, flowers and fruit. Phosphorus helps a plant resist disease, too.



# PHOSPHORUS

**Potassium (K):** Potassium protects plants against diseases and helps the plants when it is cold or dry. It also makes the food you buy stay fresh.



## **Fertilizer 101**

It doesn't matter if it's corn in the Midwest, bananas in Hawaii, oranges in Florida, or almonds in California, every plant needs three main nutrients to survive. With this lesson students will learn the importance of nitrogen, phosphorus, and potassium.

Visual Aids: Three hats, shirts, or name tags each labeled with one of the primary nutrients N, P, or K. Ideally, have N in green, P in yellow and K in pink/red. Fertilizer bag or label to show the nutrients. Optional: Nutrients for Life NPK poster.

Time: 5-10 minutes

- 1) Explain that no matter what you grow, it needs the three primary nutrients N, P and K. In science, we call nitrogen "N." Ask for a volunteer and have them represent "N" as part of the NPK team with the provided visual aid. Nitrogen (N): About 78% of earth's atmosphere is made of nitrogen. However, most plants can't use the nitrogen directly from the air. So, scientists have figured out a way to make it into a form that plants can use (Haber-Bosch process) through various types of fertilizers. Plants need nitrogen to be green and healthy. Without nitrogen, plant leaves will be weak and yellow. Some plants require a lot of Nitrogen, so N is the first member of the NPK team.
- 2) Ask for a volunteer to represent P. The 2<sup>nd</sup> member of the team is P, which stands for Phosphorus. What color is the hat\*? Yellow! Why do you think our phosphorus hat is yellow? Without phosphorus the plant cannot conduct Photosynthesis. The leaves of a plant take in energy from the sun and turn it into energy for the plant. This is called photosynthesis. Phosphorus also helps encourage plants to grow strong and healthy roots, as well as helps the plant produce quality seeds, flowers, and fruit. Phosphorus can even help a plant resist disease, too.
- 3) Ask for the final volunteer to represent K. Scientists call Potassium K. Potassium when mined looks like a pink rock. It's mined either underground in the southeastern part of the United States or in the mountains in the northwest region. Potassium protects plants against diseases and helps the plants when it is cold or dry. It also helps the food you buy stay fresh.

- 4) Have students give the NPK Team volunteers a round of applause. Optional questions include asking students what each N, P and K stands for as well as why it's needed by the plant as a review.
- 5) Now, ask the students how we add these nutrients back to the soil if they are missing. Fertilizers! Show students a fertilizer bag or label and explain the three numbers represented on the bag. Every plant needs a specific amount of these nutrients, similar to a recipe when cooking. Some need more nitrogen, some need more phosphorus. Farmers send soil samples to agronomists, or soil scientist, to find out how much they need to add to their fields. They don't too little or their plants won't grow well, and they want too much. Farmers strive to be environmentally friendly, as well as economical.
- 6) Next, relate that we as humans need NPK as well. Ask students, "where do we get these nutrients for our bodies?" We get it from the plants that we eat. They got it from the soil. Use the NFL NPK poster as a visual aid to reiterate.

Healthy soil=healthy plants and healthy plants=healthy people

To view a demonstration of this activity, go to: [YOUTUBE](#) of Rick's demo.