**Dear Educator,**

During these uncertain times, Nutrients for Life Foundation wants to help you reach your students with engaging and relevant resources. These resources meet standards for middle school grade levels. Search state standards here: https://nutrientsforlife.org/for-teachers/educator-resources/

**Digital Middle School Resources Available:**

- Dirt on Soil Science Reader -downloadable pdf
- Soil Science Reader - downloadable pdf
- Learn the Nitrogen Cycle with "The Nitrogen Cycle Challenge"

**Plants Need Essential Nutrients**

Students can complete activity one and two to identify that plants and humans need essential nutrients. The students will identify what those nutrients are and compare them.

Now that students understand that plants need essential nutrients, they can look at how nutrient deficiencies can impact plant growth and producing food. Ask students to go to the website **https://nutrientsforlife.org/product/humanity-against-hunger/** and complete the activity Humanities Against Hunger. At the village students help with the food crisis in Africa. As they encounter three maize farmers, each face a different crop problem. Using a field manual, they must analyze each situation, offer a diagnosis and then recommend a remedy.

How does this apply to everyday food production?

- Go to **https://nutrientsforlife.org/for-teachers/video-library/** and watch the video: *Live From the Farm: Chapter 2: Strawberry Production at Hinton Farms* After students watch the video ask them to answer these two questions.
  - What is plastic mulch and why does Hinton Farms use it?
  - What is the drip tape under the plastic used for?
- Go to **https://nutrientsforlife.org/for-teachers/video-library/** and watch the video: *Live From the Farm: Chapter 4: Process and Methods of Fertigation* After students watch the video ask them to answer these two questions.
  - What is fertigation?
  - What kind of samples do they take and why?

Soil is the Foundation

- Go to **https://nutrientsforlife.org/for-teachers/video-library/** and watch the video: *The Science Behind Sports Turf Management Videos: Chapter 2: Soil is the Foundation*

  After students watch the video ask them to answer these two questions.
  - What are they looking for in the soil test?
  - How will the field management use the test results?

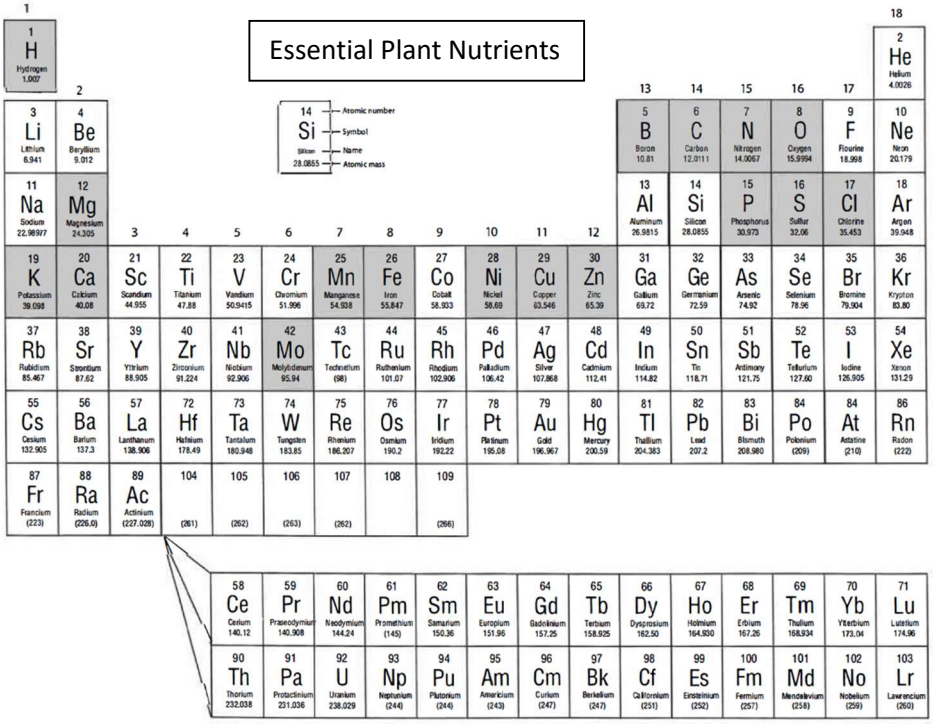
What is the importance of nutrients?

- Go to **https://nutrientsforlife.org/for-teachers/video-library/** and watch the video: *The Science Behind Sports Turf Management Videos: Chapter 4: The Importance of Nutrients*

  After students watch the video ask them to answer these two questions.
  - What is slow release nitrogen?
  - How do the fertilizers used on the field impact the environment?

An essential element…..

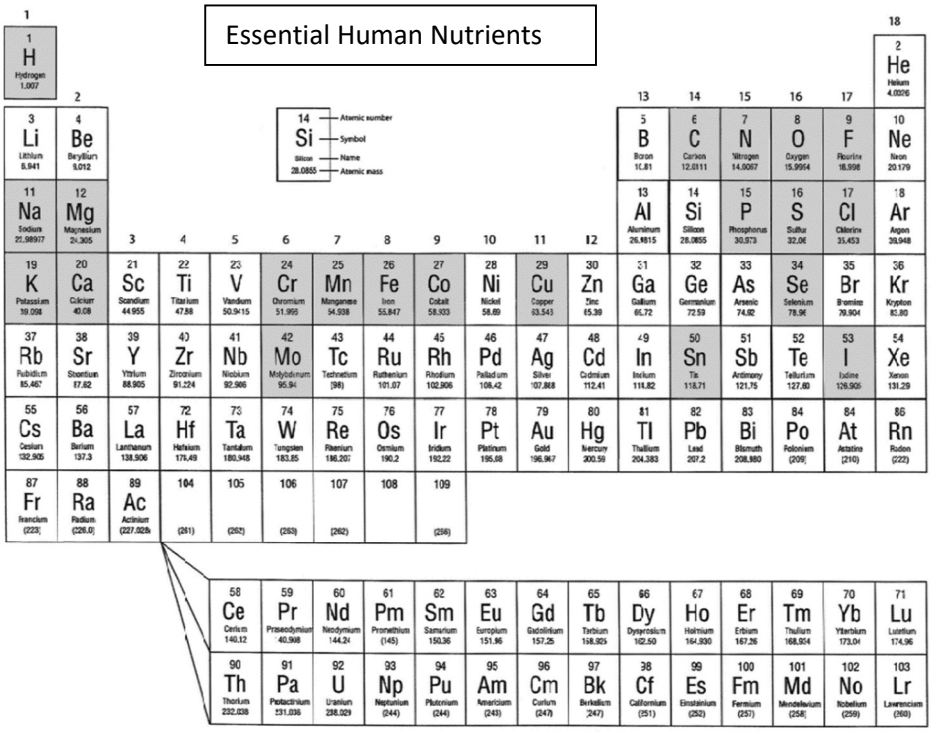
1. is required for a plant to complete its life cycle;
2. cannot be replaced by another element;
3. is directly involved in the plant's metabolism; and
4. is required by many different plants.




Activity 1: There are 17 elements essential for plants growth.

3 are macronutrients
3 are nonminerals
3 are secondary elements
8 are micronutrients

Research the essential nutrients for plants and identify which nutrients are in each category.




Activity 2: Create a Venn diagram to compare the essential nutrients of plants vs the essential nutrients of human.