

Middle and High School Curriculum

NUTRITION 101

LESSON TWO VITAMINS AND MINERALS

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student
notes





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NUTRITION 101

LESSON 2

Vitamins and Minerals

STUDENT-FRIENDLY OBJECTIVE

I will understand what nutrients are, what they do in my body, and what foods they can be found in.

WHAT ARE NUTRIENTS?

- Nutrients are essential chemicals found in the environment that humans need to live and grow. They are used in the body to build and repair tissues, regulate many body processes, support metabolism, maintain proper nerve and muscle function, help in growth of important body tissues (bones to grow tall), and aid in boosting immune systems.
- Nutrients are naturally found in whole foods. Nutrients can be found in many fortified (meaning they are added) processed foods, and supplements (such as vitamin or mineral supplements).



Vitamin K helps special cells stick like glue to help stop you bleed. Get your vitamin K reserves by eating dark green veggies.

- Nutrients include carbohydrates, fats, proteins, vitamins, minerals, water and oxygen. An essential nutrient is one that needs to be obtained from an external source.
- Nutrient deficiencies (from either not ingesting enough nutrients or the body requiring more due to an illness or the body not properly absorbing) may include the following:
 - Beri beri (thiamine or B1 deficiency)
 - Scurvy (vitamin C deficiency)
 - Anemia (iron deficiency)
 - Bone loss (calcium, magnesium, phosphorus and /or vitamin d)

Vitamins

- Vitamins are organic substances, which means that plants or animals make them. Basically, the body needs vitamins in order to function properly, and it needs different vitamins to help perform specific activities like produce energy, protect cells from damage, guide mineral utilization, and regulate cell and tissue growth. If the body doesn't get enough of the vitamins it needs, deficiencies will occur and altered function that over time may foster illness development.

There are two categories of vitamins:

a) **Water-soluble vitamins** need to dissolve in water before your body can absorb them.

Unfortunately, our bodies cannot store these (hence the name “water soluble”) vitamins, so whatever the body does not use once through the system, it will most likely sweat or urinate out. They include...

- vitamin C and the B-complex vitamins (B6, B12, niacin, riboflavin, folate, thiamine).

b) **Fat-soluble vitamins** can be stored in the body. They include...

- vitamins A,D, E and K.



Kale is an excellent source of calcium, iron, vitamins A and C, and chlorophyll.

Minerals

- Minerals are inorganic substances, which means that they come from soil and water that has been absorbed by plants and animals that we ingest. There are main minerals and trace minerals (of which you need only small amounts every day).
- Many minerals support body cells and structures. For example, calcium and phosphorus help build bones, and iron is an essential part of red blood cells.
- Minerals also work to regulate many body processes. Sodium and potassium are important to nervous system function. Chromium helps keep blood glucose levels stable and balanced. The trace mineral, selenium, works with vitamin E as an antioxidant: something that prevents cells from being damaged by oxygen.
 - a. **Main minerals include:** potassium, magnesium, calcium, phosphorus, sodium
 - b. **Trace minerals include:** chromium, copper, iodine and iron.
- Sometimes people believe minerals are only found in animal products because they know that milk is a good source of calcium and meat is rich in iron; however, all of the food groups have foods rich in minerals.



Fruits and vegetables are good sources of potassium. Whole grains are rich in magnesium, selenium, and chromium. Nuts and seeds are good sources of copper and manganese. Red meats are particularly good sources of iron and zinc.



Broccoli has almost as much calcium as whole milk!

Phytonutrients

- Phytonutrients protect and fight off diseases in our bodies. They give the color to most plants and their job is the same in both plants and humans: keep plants and humans healthy; therefore, the more colored whole fruits and vegetables you eat, the more disease fighting nutrients you will be ingesting. People, who eat a diet of mostly fruits and vegetables, tend to live a longer healthier life. Different types of phytonutrients include...

a. Carotenoids:

- Think **red**.
Lycopene: tomatoes, watermelon, pink grapefruit.
- Think **yellow** and **orange**.
Beta- Carotene: Carrots, sweet potatoes, winter squash.
(Beta-carotene will convert to vitamin A in the body)
- Think **green**.
Lutein: leafy greens like kale, spinach.


b. Flavonoids or Bioflavonoids:

- Anthocyanins: most colored fruits
- Flavones: fruits and vegetables
- Isoflavones: soybeans

Antioxidants

FREE RADICALS

- The human body is made up of many cells, which are composed of different types of molecules that have atoms joined by chemical bonds. Normally these bonds do not split; however, a free radical is an unstable molecule (referred to as oxidation). This means that it originally was happily paired up, albeit due to reasons stated below, the bonds split. This process creates



an unstable molecule – free radical - which becomes highly reactive and desperate in search to become stable again. In the time that it is frantically searching, it may steal from a healthy cell in your body, thus leaving it damaged.

Sources of free radicals (the creators of bond splitting) come from an abundant of places, such as:

- pollution
 - smoke
 - UVB and UVA rays
 - chemicals
-
- Free radical damage may create inflammation, contribute to cancers and other disease, cause some premature wrinkles, and sagging skin.
 - This all might seem frightful; however, our bodies are quite amazing at fighting these free radicals off. Antioxidants will inhibit this from occurring by either not allowing it to happen or breaking the cycle.

Below are a few antioxidants (others include vitamin e and glutathione):

Coenzyme Q 10

- Co Q 10 is present in almost every cell (mitochondria) and is an essential factor in ATP production (think energy). The heart, immune system, and the gastric lining use this antioxidant in the greatest amount. CoQ10 appears to recycle vitamin E - another antioxidant.

Alpha Lipoic Acid

- It is both fat and water-soluble and does a very good job at protecting our eyes from free radical damage. It also does some recycling and rejuvenating of other antioxidants. Alpha lipoic acid aids in stabilizing blood sugars (an added bonus).

Vitamin C

- Vitamin C is a simple, accessible vitamin found in many different forms (capsule and powder) and in many favorite foods. Each morning, squeeze half a lemon into a glass of water; this is very cleansing, boosts the immune system, and helps fight off any free radicals.



Troubled by skin blemishes?

Try getting more zinc in your diet – pumpkin seeds, spinach, and even mushrooms!