Middle and High School Curriculum

# NUTRITION 101

LESSON TWO

## VITAMINS AND MINERALS

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# NUTRITION 101

## LESSON 2
## Vitamins and Minerals

### INSTRUCTIONAL AND STUDENT FRIENDLY OBJECTIVES

Students will will know what nutrients are, what they do in the body, and what foods they can be found in.

### HANDOUTS

- Nutrient and Food Source Chart
- Optional: Cloze Handout and Student Notes

### OVERVIEW OF CONTENT

- Introduction to nutrients: vitamins, minerals, phytonutrients, free radicals & antioxidants
- Review, Q&A, conclusion

### DIRECT INSTRUCTIONS

Students may use either the Cloze Note Taking format or the Student Notes as you present the following information regarding "Vitamins and Minerals."

### QUOTATION

Discuss Hippocrates quote.

"*Let food be thy medicine and medicine be thy food.*" Hippocrates

Who was Hippocrates?
What are some foods that promote health with certain illnesses?

# 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).

- 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)

*Side note*

*If the body is not obtaining nutrients from our foods, the body will regain its balance by tapping into its own nutrient reserves. The body does this because it does not want to be sick; however, overtime, health problems will arise.*

Teacher side note

Refer to the Nutrient and Food Source Chart for further discussion.

INTRODUCE 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 and include vitamins A,D, E and K.

Teacher side note

Fat-soluble vitamins are stored in the liver and fatty tissues.

## INTRODUCE MINERALS

- Minerals are inorganic substances, which means 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.

*Side note*

*Calcium, magnesium and potassium help create an alkalinity in the body whereas, sulfur and phosphorus, lower the alkalinity creating a more acidic environment. This will be discussed further in lesson 5, Acid/Alkaline Balance.*

## INTRODUCE 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.

a. Carotonoids:

- 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
- Isoflaones: soybeans

## INTRODUCE ANTIOXIDANTS

First, briefly discuss free radicals in the body.

- 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 is it 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 radicals 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):

### Coenyme 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; very cleansing, it boosts the immune system and helps fight off any free radicals.

### Teacher's note

Discuss where you will find these nutrients (Nutrient and Food Source Chart).

*Side note*

*The best way to obtain these antioxidants is to eat a diet packed with colorful whole foods.*

## SUMMARY ACTIVITY

- Lesson 3 presents Protein, Carbohydrates, and Fats.
- Present the following quotation to students at the conclusion of Lesson 2. They are to consider its meaning and prepare to make comments in a classroom discussion before beginning Lesson 3.

## QUOTATION

"*Eat food, not too much, mostly plants.*"
Michael Pollan

Who is Michael Pollan?
Do you agree with Michael? If so, why? If not, why?

## SUGGESTED HOMEWORK

1. Choose and research a nutrient and research in detail how it affects our health. For example, if you chose "calcium," you could discuss its effect on bone health.

2. Choose, research, and report in detail on how certain nutrients and their food sources help certain organs of the body. For example, you could research the top nutrients and food sources for your skin.