**Quick Reference Guide to Standard 5—Vitamins, Minerals and Water**

*Good things come in small packages! Vitamins and Minerals are essential to the body in small amounts, but are absolutely vital to life and indispensable to body functions. Vitamins are organic compounds that make possible the processes by which nutrients are digested, absorbed, metabolized or built into body structures. Minerals are inorganic substances found in trace amounts in food, but, like vitamins are essential to life.*

*This standard discusses water-soluble vitamins C and folate (Vitamin B9) and all the fat-soluble vitamins: ADEK (“I’m ‘adek’ted to fat”). The mineral section covers calcium (Ca), iron (Fe) and the electrolytes sodium (Na) and potassium (K). This standard also finally covers water—sports hydration, dehydration-- water, the one thing we can’t live without!*

*To round out this standard, the final objective discusses nutrient retention in the preparation of fruits and vegetables, and the farm-to-table (aka “farm-to-fork” or “gate-to-plate”) process that makes Food Science what it is today. There are excellent links to all this information, so without further ado: Vitamins, Minerals and Water!*

**Standard 5—Sources and Functions of Vitamins, Minerals and Water**

***Objective 1—Identify water-soluble vitamins (C and folate in particular) and fat-soluble vitamins: sources, functions and deficiencies.***

***Objective 2—Identify minerals calcium, iron, and electrolytes sodium and potassium: sources, functions and deficiencies***

<http://www.nlm.nih.gov/medlineplus/encyclopedia.html> Government website for fact sheets on every vitamin and mineral.

[Mineral Chart](http://www.iom.edu/~/media/Files/Activity%20Files/Nutrition/DRIs/New%20Material/6_%20Elements%20Summary.pdf) and [Vitamin Chart](http://www.iom.edu/~/media/Files/Activity%20Files/Nutrition/DRIs/New%20Material/7_%20Nutrients%20Summary.pdf) These are DRI charts from the Institute of Medicine. It includes all the minerals and vitamins, but it shows sources, functions, and age levels.

<http://www.spectracell.com/media/uploaded/3/0e2747083_1388158470_303nutrientchart1013-pdf.pdf> Nutrient Deficiency chart

[Deficiency Diseases and Images](https://www.dropbox.com/sh/laroplhwk59a8s7/AAAYeBzCrJF-zAgQo3W8b2H_a/STANDARD%205--Vitamins?dl=0&preview=Vitamin%2C+Mineral+Deficiencies+Diseases+and+Information+May+2015.docx) –Links to information and images of deficiency diseases.

<http://fnic.nal.usda.gov/fnic/interactiveDRI/dri_results.php>

***fast interactive site giving a personal profile of dietary needs.***

***Objective 3—Identify functions of water in the body, dehydration and sports hydration***

<http://www.cdc.gov/nutrition/everyone/basics/water.html> Basics of water.

[Sports Nutrition and Hydration](http://www.uen.org/cte/facs_cabinet/downloads/ConferenceProceedings/2014/nutrition/SportsNutrition.pdf) from the 2014 Conference. This is in the UEN file cabinet, but the link takes you directly to the pdf of the Prezi made for the Conference.

***Objective 4—Preparation of Fruits and Vegetables to retain optimal nutrition; Farm-to-Table process***

[***http://www.fruitsandveggiesmorematters.org/***](http://www.fruitsandveggiesmorematters.org/) Best. Database. Ever! Information on fruit and vegetable storage, nutrition information,. Quick information, fun site.

[A World Without Food Science](http://www.ift.org/knowledge-center/learn-about-food-science/world-without-food-science.aspx) Tremendous video by the Institute of Food Technologists showing what Food Science means to our food supply.

[*USDA Tables of Nutrient Retention*](http://www.ars.usda.gov/SP2UserFiles/Place/80400525/Data/retn/retn06.pdf)Charts of nutrient retention according to preparation.

***Performance Objective 8: Preparation and nutritional/cost comparison of canned/frozen produce vs. fresh produce.*** [Nutrient and Cost Analysis--Chicken Stir Fry, fresh and frozen, 2015](https://www.dropbox.com/sh/laroplhwk59a8s7/AAAbTIpmY4L8-j0KQJSJWtF6a/STANDARD%205--Vitamins/Nutrient%20and%20Cost%20Analysis%20of%20Chicken%20Stir%20Fry--June%202015.docx?dl=0&preview=Nutrient+and+Cost+Analysis+of+Chicken+Stir+Fry--June+2015.docx)

**Standard 5—Vitamins and Minerals—Vocabulary**

**Bone density**: The degree of mineralization of the bone structure, a measurement of strength in the bone.

**Calcium (Ca):** Principal macromineral needed for building bones and teeth.

**Dehydration:** Condition that exists when the body is starved for water.

**Electrolytes:** Minerals that can be ionized and carry an electrical charge in the body.

**Fat-soluble vitamins:** Vitamins ADEK, mostly absorbed in the lymph system and stored in the liver and other fatty tissue.

**Fluid and electrolyte balance:** The proper ratio of fluid to minerals in each part of the body.

**Folate:** Water-soluble B9 vitamin that helps prevent spina bifida in infants. Folic acid is the form added to foods and supplements.

**Hemorrhage:** Excessive bleeding. Vitamin K is a clotting agent, if it is low the blood may have a difficult time clotting, leading to hemorrhaging.

**Iron-deficiency anemia:** Lack of healthy red blood cells caused by lack of micronutrient iron

**IU:** International Units, a measurement of fat-soluble vitamin activity

**Minerals:** Inorganic substances essential in microscopic amounts for health.

**Night blindness:** An early symptom of vitamin A deficiency manifested by an abnormally slow recovery to sight after a flash of light.

**Osteomalacia:** Vitamin D deficiency disease in adults (like rickets in children).

**Osteoporosis:** Weakening of bone mineral structures due to age or calcium or vitamin D deficiency.

**Pica:** A craving for nonfood substances, usually caused by a vitamin deficiency.

**Polyphenol oxidase:** The enzyme that leads to browning of cut fruits. Polyphenol oxidase catalyzes an oxidation reaction that causes normally white or lightly colored plant pigments to become brown. This can be reversed by adding a *reductant* like ascorbic acid or sulfites.

**Precursors:** Form of vitamins that occur in food, that are converted into a usable form of the vitamin after eating the food.

**Prehypertension:** Blood pressure levels that predict hypertension (high blood pressure).

**RAE:** Retinol Activity Equivalents, a measurement of vitamin A activity

**Rickets:** Disease of vitamin D deficiency in children; characterized by bowed legs and poor bone growth.

**Scurvy:** Vitamin C deficiency disease characterized by rashes or bleeding gums and loosened teeth.

**Spina bifida:** Birth defect characterized by incomplete closure of the bony structure encasing the spinal cord. Folate helps to prevent this defect.

**Vitamin deficiency diseases:** Diseases caused by an insufficient amount of a vitamin or mineral, and can be reversed or stopped by ingesting that vitamin or mineral.

**Vitamins:** Organic compounds essential to life and body functions, but only needed in tiny amounts.

**Water-soluble Vitamins:** Vitamins absorbed directly into the bloodstream, vitamin C and all the B vitamins. There is very little storage of these vitamins, so they must be eaten frequently.

**Xerophthalmia:** A type of blindness that occurs from a vitamin A deficiency.