

# 05\_ Essential Vitamins and Minerals, Phytochemicals and Functional Foods

Content Area: **Science**  
Course(s):  
Time Period: **Full Year**  
Length: **15 Blocks**  
Status: **Published**

## **General Overview, Course Description or Course Philosophy**

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- The course tests the students' understanding of the relationships between diet, lifestyle, and the prevention of disease. The student is expected to understand digestion, absorption, and metabolism of protein, carbohydrates, fat, vitamins, and minerals. Additionally, evaluating nutrition claims and food labels are expected student learning outcomes. This is a Rutgers University Course and students receive 3 college credits for passing the end of semester examination provided by the university. There is an examination fee associated with this course for college credit. All information discussed in the course description is the basis of the examination at the end of the semester.

## **OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS**

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- Characteristics of vitamins
- Identification of water-soluble vitamins
- For each vitamin: major bodily function, signs and symptoms of deficiency, major food sources
- The Water-Soluble Text Vitamins: B Vitamins and Vitamin C.
- Highlight: Vitamin and Mineral Supplements.
- The Fat-Soluble
- Vitamins: A, D, E, and K.
- Highlight: Antioxidant
- Nutrients in Disease Prevention.
- Each trace mineral has roles in the body, signs and symptoms of deficiency/toxicity
- Functional foods
- Types of Trace Minerals.
- Phytochemicals and Functional Foods.

## **CONTENT AREA STANDARDS**

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SCI.HS-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
SCI.HS-LS1-3	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.
SCI.HS-LS1-7	Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.

## **RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)**

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VHEL.9-12.9.4.12.H.1	Demonstrate language arts knowledge and skills required to pursue the full range of postsecondary education and career opportunities.
VHEL.9-12.9.4.12.H.2	Demonstrate mathematics knowledge and skills required to pursue the full range of postsecondary education and career opportunities.
VHEL.9-12.9.4.12.H.3	Demonstrate science knowledge and skills required to pursue the full range of postsecondary education and career opportunities.
VHEL.9-12.9.4.12.H.16	Employ critical thinking skills (e.g., analyze, synthesize, and evaluate) independently and in teams to solve problems and make decisions.
VHEL.9-12.9.4.12.H.17	Employ critical thinking and interpersonal skills to resolve conflicts.

## **STUDENT LEARNING TARGETS**

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### **Declarative Knowledge**

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Students will understand that:

- We have different types of Fat-Soluble, Vitamins: A, D, E, and K.
- We have different types of water-soluble vitamins
- Antioxidant aid in preventing cancer
- Proper nutrition (vitamin & minerals) can aid in disease prevention.
- Each trace mineral has roles in the body, signs and symptoms of deficiency/toxicity
- There are types of Functional foods
- There are types of Trace Minerals.

- We have Phytochemicals and Functional Foods that aid in proper nutrition.

## **Procedural Knowledge**

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Students will be able to:

- Identify the different types of Fat-Soluble, Vitamins: A, D, E, and K.
- Identify the different types of water-soluble vitamins
- Recall how antioxidant aid in preventing cancer
- Recall proper nutrition (vitamin & minerals) can aid in disease prevention.
- Recognize that trace mineral have roles in the body, signs and symptoms of deficiency/toxicity
- Identify types of functional foods
- Identify types of trace Minerals.
- Investigate phytochemicals and Functional Foods that aid in proper nutrition.

## **EVIDENCE OF LEARNING**

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### **Formative Assessments**

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- Attendance/Participation/Group Discussion – Students are expected to attend all classes and participate in classroom discussions and group activities.
- Unit Assignments – Each unit will have specific assignments geared to meet unit objectives. These assignments can be completed as homework or in class, as time permits.
- Course Project

### **Summative Assessments**

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- Benchmarks – departmental benchmark given at the end of MP1, MP2, and MP3
- Alternative Assessments
  - Lab inquiries and investigations
  - Lab Practicals
  - Exploratory activities based on phenomenon
  - Gallery walks of student work
  - Creative Extension Projects
  - Build a model of a proposed solution
  - Let students design their own flashcards to test each other
  - Keynote presentations made by students on a topic
  - Portfolio

## **RESOURCES (Instructional, Supplemental, Intervention Materials)**

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<https://www.eatright.org/health/wellness/healthful-habits/functional-foods>

<https://stanfordhealthcare.org/medical-clinics/cancer-nutrition-services/reducing-cancer-risk/phytochemicals.html>

<https://pubmed.ncbi.nlm.nih.gov/27160996/>

<https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/phytochemical>

## **INTERDISCIPLINARY CONNECTIONS**

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SCI.9-12.SEP.1.a.1	that arise from careful observation of phenomena, or unexpected results, to clarify and/or seek additional information.
SCI.9-12.SEP.1.a.2	that arise from examining models or a theory, to clarify and/or seek additional information and relationships.
SCI.9-12.SEP.1.a.3	to determine relationships, including quantitative relationships, between independent and dependent variables.
SCI.9-12.SEP.2.a	Evaluate merits and limitations of two different models of the same proposed tool, process, mechanism or system in order to select or revise a model that best fits the evidence or design criteria.
SCI.9-12.SEP.2.b	Design a test of a model to ascertain its reliability.

SCI.9-12.SEP.2.c

Develop, revise, and/or use a model based on evidence to illustrate and/or predict the relationships between systems or between components of a system.

SCI.9-12.SEP.2.d

Develop and/or use multiple types of models to provide mechanistic accounts and/or predict phenomena, and move flexibly between model types based on merits and limitations.

## **ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS**

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See link to Accommodations & Modifications document in course folder.