



Title: Scary Scurvy At Sea

(Health & Nutrition)

Grade(s): 7-8

Introduction: Vitamin C is a colorless crystalline water-soluble vitamin found in citrus fruits and green vegetables. It is made from glucose by organisms. It is required for maintaining healthy connective tissue and is readily destroyed by heat and light. It is also called ascorbic acid. **Scurvy** is perhaps the oldest known deficiency disease. However, its specific relationship to **ascorbic acid** was not recognized until the 20th century. It generally occurs between six and 18 months of age, but can start much earlier in premature babies or those born of mothers who lacked nutritious food during their later stages of pregnancies.

Scurvy is caused by lack of **Vitamin C** or ascorbic acid. Inadequate intake of fresh fruits and vegetables can lead to this condition. The disease is likely to attack the rich as well as the poor, because it arises in the system not from an insufficient diet quantitatively, but from a diet lacking in organic mineral salts so essential to health and vitality.

Learner Objective(s):

- The student will be able to list vitamins found in a variety of foods consumed daily.
- The student will be able to discuss the food sources rich in Vitamin C and the body parts affected by it.
- The student will be able to research how scurvy became prevalent when sailors spent months at sea throughout the early centuries.
- The student will be able to test for the presence of Vitamin C in certain foods.

Florida Sunshine Standards: Math: MA.A.1.3.1, Science: SC.H.1.3.6, Health: HE.A.1.3.10

Competency Based Curriculum: Health: M/J 1-II.2.A, M/J VII-2.B

Materials:

Cornstarch
Water
Iodine
Vitamin C Tablet
Pot
Stirrer
Medicine Dropper
Hot Plate
Teaspoon
Tablespoon
3 Cups

Activity Procedure(s):

1. Pour half of teaspoon of cornstarch into the pot.
2. Pour a cup of water into the pot.
3. Heat and stir the pot of water and cornstarch solution until all the cornstarch is dissolved in the water. After heating, let everything cool.
4. Pour two teaspoons of the solution and one cup of water into one of the cups. Using the medicine dropper, add four drops of iodine into the solution. Your test solution is now done.
5. As an example, fill the second cup with water and drop the Vitamin C tablet into the cup so that the tablet dissolves in water.
6. Pour two tablespoons of the test solution from step 4 into the third cup.
7. Using the medicine dropper, add one drop of the Vitamin C solution into the test solution and stir. Continue adding more drops until a change is noticed.
8. Do not eat or use any of the material after it has been used in this activity. Iodine is poisonous.
9. Observe the color of the test solution once the Vitamin C solution is added.
10. The test solution you have made reacts quickly to the presence of Vitamin C. Only a few drops react visibly with the test solution.

Student Assessment:

Allow students to answer critical thinking skills questions assigned by the teacher.

- a. Why do we group foods according to the predominant vitamins in each food?
- b. How do antioxidant vitamins protect your body from disease?

Allow students to share their observations gathered during the Activity.

Activity Extension(s):

1. Allow the students to bring in a variety of foods or pictures of foods that they like to eat and have them discuss whether or not each item is vitamin-rich and if it has health benefits (**Health/Nutrition**).
2. Encourage students to read *A Simple Experiment on Scurvy*.
(<http://www.people.virginia.edu/~rjh9u/scurvy1.html>)
Discuss what actually occurred onboard the HMS Salisbury in 1747 (**Social Studies**).
3. Explain why certain vitamins are administered daily in milligram (mg.) quantities whereas other similar vitamins are administered in gram (g.) quantities. Is there a major difference in quantity? (**Math**).

Home Learning Activity:

The students will produce shopping lists for the ingredients needed to prepare a vitamin-rich meal. Students will have to identify the predominant vitamin for each food on their list.

Vocabulary: Scurvy, ascorbic acid, Vitamin C

References/Related Links:

<http://www.freshstarts.com/VitaminsAreElementary/>

<http://www.healthlibrary.com/reading/nature/chap50.htm>

<http://library.thinkquest.org>

Scary Scurvy At Sea

Reading Passage

Scurvy became prevalent when sailors began to spend months at sea without fresh vegetables, and in such cases it was usually fatal. In 1795, lime juice was issued to all British naval vessels on the recommendation of the Scottish physician James Lind, who knew that the Dutch had employed citrus fruits for several hundred years; scurvy soon began to disappear among British seamen. Oranges and lemons, higher in Vitamin C content than limes, have supplanted limes as anti-ascorbic agents. Lind wrote in his *Treatise of the Scurvy*. "On the 20th of May, 1747, I took twelve patients in the scurvy onboard the Salisbury at sea. Their cases were as similar as I could have them." Thus began his description of his classic therapeutic experiment on sailors with the scurvy in which various, then proposed remedies, were tested as anti-ascorbic agents. His experiment provided clear evidence of the curative value of oranges and lemons and was also the first example of a controlled clinical nutrition study using human subjects.

Today, it is understood that Vitamin C is a water-soluble vitamin that is necessary for normal growth and development. Vitamin C (ascorbic acid) is found in green peppers, citrus fruits, strawberries, tomatoes, broccoli, turnip greens and other greens, sweet and white potatoes, and cantaloupe. Most other fruits and vegetables contain some Vitamin C; fish and milk contain small amounts. Vitamin C promotes healthy teeth and gums, helps in the absorption of iron, aids in the maintenance of normal connective tissue, and promotes wound healing. It also helps the body's immune system. It is important that Vitamin C be consumed every day since it is not a fat soluble vitamin, and cannot be stored for later use. It is water soluble, therefore it is excreted regularly by the body.

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FCAT Questions

Directions: Read the passage, then answer all the questions below. Answer multiple-choice questions by circling the letter of the answer that you select. Write your answer to the “Read, Think, and Explain” question on the lines provided.

1. Sailors developed scurvy at sea mainly due to which one of the following causes?

- A. Poor body hydration
- B. Lack of vegetable consumption
- C. Rotten food products
- D. Vitamin toxicity

Answer: B

2. Which one of the following food items contains the least amount of Vitamin C?

- A. Lemons
- B. Oranges
- C. Limes
- D. Milk

Answer: D

3. Which one of the following statements is false concerning ascorbic acid?

- A. It is a fat soluble vitamin
- B. Prevents gingivitis
- C. Promotes a healthy immune system
- D. It is found in sweet potatoes

Answer: A

4. Explain how Dr. Lind’s experiment at sea contributed to the prevention of scurvy.


