



## **Classroom Teacher Preparation**

### **Chemistry 10: A Vitamin C Experiment**

**Please use the following to prepare for the next SfS lesson.**

#### **Description:**

This lesson introduces students to the useful chemistry process of titration through an exploration of vitamin C in drinks. In the exploration, students predict and then measure the amount of vitamin C in selected drinks by counting the number of drops needed for a color change of an indicator solution. Students are then challenged to explain the molecular processes happening during the titration experiment.

#### **Lesson Objectives – SWBAT (“Students Will Be Able To...”):**

**6<sup>th</sup>-8<sup>th</sup>**

- Compare the amount of vitamin C in various drinks using a titration experiment
- Explain how titration can be used to compare the amount of vitamin C in liquids

#### **Disciplinary Core Idea (DCI)**

*PS1 Matter and its Interactions - PS1.B Chemical reactions*

- (6<sup>th</sup>-8<sup>th</sup>) Reacting substances rearrange to form different molecules, but the number of atoms is conserved. Some reactions release energy and others absorb energy.

#### **Science & Engineering Practice (SEP)**

*Constructing Explanations and Designing Solutions*

- (6<sup>th</sup>-8<sup>th</sup>) Apply scientific ideas, principles, and/or evidence to construct, revise and/or use an explanation for real-world phenomena, examples, or events.

#### **Crosscutting Concept (CCC)**

*Patterns*

- (6<sup>th</sup>-8<sup>th</sup>) Macroscopic patterns are related to the nature of microscopic and atomic-level structure.

#### **Preparation:**

This lesson serves as an introduction to the titration process.

#### **Room Set Up for Activities:**

This activity is designed for students to work at tables in small groups. A clear, flat work surface is necessary, as students will be working with liquids. Access to the sink is helpful for clean up.

#### **Safety:**

As usual, no materials, including the test drinks, should be consumed. DCPIP solution can stain clothing; care should be taken when handling reagents in this lab. Students are using dilute solutions of DCPIP that are considered low hazard. Students should wash their hands with soap at the end of the lab.



## Related Modules:

This lesson may be taught as part of a sequence or group of related modules on **Chemistry**. Other modules in this sequence include:

*Chemistry 2: Chemical Identification* - Students investigate the physical and chemical properties of six similar-looking—but chemically different—substances, and use these observations to attempt to identify the substances.

*Chemistry 6: Acid & Base Titration* - This advanced lesson introduces students to the Brønsted-Lowry theory of acids and bases (hydrogen ion donors/acceptors) and students perform a simple titration to neutralize a base using a color indicator to determine the endpoint.

*Chemistry 7: What's in Our Food?* - Students learn that organic compounds, such as sugars, starches, and proteins, can be identified with the use of chemical indicators. Using these chemical indicators, students test a variety of food samples for the presence of proteins, and simple and complex carbohydrates.

For other module sequences and groups, look here: [www.sciencefromscientists.org/sequences](http://www.sciencefromscientists.org/sequences)

## Standards Covered:

Please click the following link to our website to review the standards covered by this lesson, listed by state: [www.sciencefromscientists.org/standards/](http://www.sciencefromscientists.org/standards/)

Lessons are matched to both national NGSS and local state standards.

## After Our Visit:

*Extend this lesson by playing an online game (or two!) to learn more about sources of various vitamins and minerals.*

Access this Extension activity by visiting the Classroom Post found on our website at [sciencefromscientists.org/cohorts](http://sciencefromscientists.org/cohorts). Use the name of your school/cohort and password to log in.

To help Evaluate, check out our Open Response questions online at [sciencefromscientists.org/open-response-questions](http://sciencefromscientists.org/open-response-questions). They are freely available for all of our lessons for current teachers. Use the password supplied by your instructor to log in.

## Additional Resources:

- Vitamin C Facts: [http://www.myfooddiary.com/Resources/nutrient\\_facts/nutrient\\_vitaminC.asp](http://www.myfooddiary.com/Resources/nutrient_facts/nutrient_vitaminC.asp)
- Measuring vitamin C content in foods and fruit juices: <http://www.nuffieldfoundation.org/practical-biology/measuring-vitamin-c-content-foods-and-fruit-juices>
- Demonstration of vitamin C titration using DCPIP indicator (video, 2:02): <https://www.youtube.com/watch?v=G TqHHgtc4cw>