



Classroom Teacher Preparation

Chemistry 7: What's in Our Food?

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

Description:

Students start by thinking about the prompt “You are what you eat”. They discuss what food, and therefore people, are made of. Small groups then design tests to identify the presence of different nutrient molecules (sugar, starch, protein, fat) and test common foods for these molecules. After testing, groups share their results and conclusions. Longer classes may play a game classifying foods according to the categories in the USDA “Choose My Plate” graphic.

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

5th-8th

- Identify nutrients that humans need in large amounts to survive *and* explain how our bodies use them
- Analyze experimental data to determine which foods contain a selected macronutrient

Disciplinary Core Idea (DCI)

LS1 From Molecules to Organisms - LS1.C Organization for Matter and Energy Flow in Organisms

- (3rd-5th) Food provides animals with the materials and energy they need for body repair, growth, warmth, and motion. Plants acquire material for growth chiefly from air, water, and process matter and obtain energy from sunlight, which is used to maintain conditions necessary for survival.
- (6th-8th) Plants use the energy from light to make sugars through photosynthesis. Within individual organisms, food is broken down through a series of chemical reactions that rearrange molecules and release energy.

Science & Engineering Practice (SEP)

Planning and Carrying Out Investigations

- (3rd-5th) Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.
- (6th-8th) Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim.

Crosscutting Concept (CCC)

Cause and Effect

- (3rd-5th) Cause and effect relationships are routinely identified, tested, and used to explain change.
- (6th-8th) Cause and effect relationships may be used to predict phenomena in natural or designed systems.

Preparation:

This lesson serves as an introduction so no special preparations are necessary, but it will be helpful if students are familiar with using experimental controls.



Room Set Up for Activities:

Students will work in groups of 3-4 at their desks (with a maximum of 9 groups). They will need a flat, stable surface. The instructors will need an outlet and a safe place to plug in an electric kettle. The instructors will also need a central location to set up materials. Access to a sink is very helpful.

Safety:

An adult must supervise the hot water kettle and distribution of boiling water. Safety goggles must be worn at all times. The testing reagents can stain skin and clothes. Handle glassware and chemicals carefully.

Samples of food will be tested and students should be reminded not to taste anything in the lab. Food items to be tested include Goldfish crackers, egg, apple, marshmallow, cornstarch, gelatin, potato, vegetable oil and yogurt. Please notify the instructor of any students with an allergy to any of these foods.

Related Modules:

This lesson may be taught as part of a sequence or group of related modules on **Chemistry** or **Public Health**. Modules include:

Life Science 18: A Vitamin C Experiment – Students learn about the relationship between nutrition and fresh/processed foods, and then verify this information by measuring the concentration of vitamin C in different forms of orange juice.

Life Science 24: Food Additives – This module allows students to become more aware of what they eat and why as we explore a variety of food additives prevalent in the modern diet of processed foods and how they are used.

Anatomy/Physiology 16: Heart Health – This station-based lesson allows students gain an understanding of the cardiovascular system and an appreciation for the importance of physical activity for heart health.

For other module sequences and groups, look here: 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/

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

After Our Visit:

Extend this lesson by testing cornstarch for starch before and after digestion in saliva.

Access this Extension activity by visiting the Classroom Post found on our website at 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. They are freely available for all of our lessons for current teachers. Use the password supplied by your instructor to log in.

Additional Resources:

- Science & Health Education Partnership Lesson Plan: <http://www.seplessons.org/node/362>
- Macronutrients: <https://www.sciencelearn.org.nz/resources/534-macronutrients>
- "Molecules Gone Wild (Bio Style)" - Macromolecules Song - Gangnam Parody (3:41): <https://www.youtube.com/watch?v=nt9u7CfVoc4&feature=share>
- Macromolecules of Life: <http://www.biology101.org/biologystudyguides/buildingblocksoflife.php>
- Crash Course Biology: "You Are What You Eat" (14:09): <https://www.youtube.com/watch?v=H8WJ2KENIK0>

