The Nutrition of Soy

Instructional Guide

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Illinois NGSS INTEGRATED BIOLOGY STANDARDS SUGGESTIONS:

Molecules to Organisms-Structures and Processes

HS.LS1: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

Science and Engineering Practices

Developing and Using Models

Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.

- Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2)

Disciplinary Core Ideas

Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level.
(HS-LS1-2)

Crosscutting Concepts

Systems and System Models

Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales.
(HS-LS1-2)

Objective: Students will form groups and choose one of the six types of whole soy food dishes being presented. They will then research their choice and do a comparison study with other groups to determine which of the six types of whole soy foods would be the most beneficial as a main meal/entrée, vegetable side dish, dairy replacement, or snack. Through research, Students will learn the nutritive value of whole soy foods and the many benefits for the American diet.

Assessment: Each group will do a short technology-based presentation (power point, video etc.) on the nutritive value of the sample soy food they have chosen and how it would fit into a meal. Each student will then write a two-paragraph reflection letter on what they learned about soy, and their current opinion of adding it to their diet.

Key points: Modeling a relationship between whole soy foods and nutrition. Showing the importance of food and nutrition to the human body. Comparing and analyzing the nutrition facts of whole soy food choices with other similar food options. Using research and experimentation to determine the best balance of nutrition, value, and taste for food decisions.

Materials: Soybean fact sheets (what are whole soy foods; the nutrition facts of soy), access to Internet to research whole soy food options and nutrition facts data. Paper and writing utensils for notes.

Preparation and time duration: Assume 15 minutes to cover the lesson. Allow students the rest of the period to do research and discuss with other groups which of the six choices would fit the criteria in the objective.

Elicit: Do a KWL chart about what students know about soybeans, whole soy foods, and the nutritional profile of different whole soy foods. Discuss why soybeans can be an important part of the American diet (nutritional profile, a complete protein, sustainability compared to similar products, cost, and prevention of diet-related diseases).

Engage: Show the videos (soy nutrition and the science behind soy) to get the students engaged in the lesson.

https://www.youtube.com/watch?v=QD4x96EsQng

https://www.youtube.com/watch?v=FFiUIIbD-UA

https://www.youtube.com/watch?v=rqqG0qYPU6U

Explore: There is a lot of information about using soy as a primary source of protein, but can soy work in a western diet? The students' job is to research the nutritional value of this legume and use that information to decide what would work for different types of meal additions. Students will form groups and choose one of the six types of whole soy food dishes being presented. They will then research their choice and do a comparison study with other groups to determine which of the six types of soy would be the most beneficial as a main meal/entrée, as a vegetable side dish, dairy replacement, or snack.

Explain: Finding a protein that can be part of a healthy diet and not break the bank can be daunting, especially for families on a limited budget. In today's economic times, buying the basics, such as eggs and meat, has increased in cost from 30-50%. Soy has come to the forefront as a high-quality, protein rich food source that is reachable for all economic levels. Discuss why eating a complete protein is important for the human body, as almost everything in our bodies is based on amino acids, the building blocks of proteins, and only animals and certain plants have all the essential amino acids we need to live. Our bodies do not make these essential amino acids. We have to obtain them from the food we eat.

Having soy in a human diet makes sense, but can we eat a diet of soy and get all the other essential nutrients our bodies need also? Is soy a better side kick than the main character in a meal? Your students' job is to find this out! Have the students make a list of what type of nutrition a body would need to grow and put this list where everyone can add to it. Can soy serve as an adequate replacement for meat or dairy? How does soy compare nutritionally to meat, dairy, and other beans? Do a comparison of this list of soy vs meat/dairy/beans and discuss the results.

Elaborate: Break the students into groups and, based on what was seen on the video and what was just covered, have the students do literary research on soybean nutrition and what is needed nutritionally in a human diet. Once the research is completed, students will need to decide which soy example they are going to use, come up with a research question, hypothesis, and then apply what they have learned to the example they have chosen as to which category it would be best fitted for: main meal/entrée, side dish, dairy alternative, or snack.

Evaluate: Each group will do a short technology-based (power point, video etc.) presentation on the nutritive value of the sample whole soy food they have chosen and how it would fit into a meal. Each student will then write a two-paragraph reflection letter on what they learned about soy, and their current opinion of adding it to their diet.

Evaluation is based on how well the presentation is written and presented and on the conclusion of the students. Suggest having students debate their decision for what part of the meal their choice should be used for; if they can successfully argue why their choice should be used based on their research, then this provides evidence that they understand the concept.

Extend: Have students do a round robin where each group defends their decision as to where their whole soy food sample should be optimally used/included in a daily meal plan. The group's job is to convince the other groups why their decision is the best.

Have a dietician speak to the class about nutrition and how important it is to have a healthy balanced diet.

Have students put together a soy-based meal including cost analysis and serve it to the class!
Teachers: be sure to check for soy allergies before allowing this project to proceed.

Additional Resource:

The Soy Nutrition Institute **https://sniglobal.org/**