Educator Resource Page

Sorghum at School
The Sorghum Story

An integrated curriculum for 3rd to 6th Grades

What is Sorghum?

Sorghum is an ancient grain that is gaining popularity with American consumers as a tasty, nutrient-rich, naturally gluten-free whole grain. Delicious and versatile with a neutral, nutty flavor, sorghum is a stand-out in both sweet and savory bowls, baked goods, entrées, soups, breading, salads and even popped as a snack! [1]

WHAT IS AN ANCIENT GRAIN?

While there is no precise definition of the term "ancient grain," the Whole Grains Council describes ancient grains as those that have been essentially unchanged for at least the last several hundred years.[1] Genetic material from an archaeological dig near the Egyptian-Sudanese border dates sorghum to 8,000 BCE.[2]

Nutrition

Sorghum earns the title as Nature's Super Grain™ because of its rich nutrient profile. A complex carbohydrate which is naturally gluten-free, sorghum contributes a wealth of nutrients to the diet, including protein, iron, zinc, fiber, niacin, thiamin, vitamin B6, copper, magnesium, phosphorus, selenium and manganese.[3] See glossary below for more on these important nutrients.

Research on sorghum in human health also highlights many plant-based compounds that contribute to blood sugar control, cancer prevention and a reduced risk of heart disease.[4] Sorghum grain is considered a functional food because it includes phenolic acids, flavonoids, and phytosterols, which are plant-based chemicals being studied for their anti-inflammatory and health-promoting effects.[4,5,6]

The Dietary Guidelines for Americans, 2020-2025 reports that while most Americans eat plenty of refined grains, 98 percent of Americans currently fall short when it comes to whole grain intake.[7] Whole grain sorghum and whole grain sorghum flour can help to close that nutrition gap. The USDA MyPlate food guide recommends making half of the grains consumed whole grains, and includes sorghum in the MyPlate whole grains gallery.[8]

Why Teach About Sorghum?

The USDA recently approved whole grain sorghum and whole grain sorghum flour for school meal programs.[9] As a result, your students will be seeing sorghum in their cafeteria meals and after school snack programs. Acceptance increases when students have the chance to taste and learn about new foods.[10]

In addition, the story of sorghum encompasses a number of subject areas including health, history, geography, environmental science and plant science.

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Studying Sorghum

History & Geography

Sorghum has long been an important grain for humans and continues to be a dietary staple for 500 million people in 30 countries in Africa and Asia.[11] As an ancient grain, people have eaten and used sorghum for millennia in Northeast Africa. The earliest known record of sorghum comes from an archeological dig at Nabta Playa, near the Egyptian-Sudanese border, dated 8,000 BCE.

Sorghum spread throughout Africa and along the way adapted to a wide range of environments from the highlands of Ethiopia to the semi-arid Sahel region of North Africa.[2]

The first report of sorghum in North America is attributed to Benjamin Franklin's 1757 writings about "broomcorn," a variety of sorghum used in broom making.[2]

While not indigenous to the Americas, Native populations in the Southeastern United States have long embraced sorghum as an important cultivated crop, utilizing all parts of the plant with a particular emphasis on the production of sweet syrup from the stalks. The Coharie tribe in North Carolina has relied on sorghum as a staple subsistence crop.[12]

Modern-day sorghum production is firmly centered in the United States, the world's leading producer and exporter of sorghum. The Sorghum Belt extends from South Dakota to Texas. Kansas leads the nation and world in production with nearly six million acres devoted to growing sorghum.[2]

Environmental Science

Sorghum is a sustainable agricultural crop that thrives in challenging environments while giving back to the soil and ecological systems.[13]

- **Water Conservation** - Termed The Resource Conserving Crop™, sorghum can be grown in drought conditions and generally requires 30 percent less water than similar grains. Rain is the primary source of water for 91 percent of the sorghum acres in the United States, thereby minimizing the strain on stressed water systems.
- **Soil Health** - In addition to conserving water, sorghum uniquely builds and improves soil health during its growing cycle. The sorghum plant regenerates soil by retaining nitrogen and other soil nutrients. The stalks purposefully left standing in fields after harvest add nutrients, reduce soil compaction, capture moisture and reduce wind erosion.
- **Carbon Sequestration** - Sorghum removes harmful carbon from the atmosphere and stores it safely in the soil, cleaning our air and helping to fight climate challenges. And sorghum farmers who reduce their soil tillage as a conservation practice ensure that carbon stays in the ground.
- **Wildlife Habitats** – Sorghum helps wildlife populations thrive, providing a preferred food choice for quail, pheasants and many other species of birds and deer. The leaves and stalks left after harvest provide protection from the elements for wildlife during harsh winters and extreme summer heat.

Other Uses

While the emphasis of this lesson is on the food and nutrition value of sorghum, various forms of sorghum are also used worldwide for animal feed, biofuel, building material, fencing, pet food, and even floral arrangements.[2]

Sorghum grows and matures very quickly. Some varieties have as few as 100 days from planting to harvest. It likes warm soil and sunshine, so it is usually planted in the late spring or early summer and harvested in the fall.

Teaching Tips

Practice Role Modeling

Students respond well to the reinforcement of adult role modeling.

- Talk about your experience with sorghum. If you have not yet tried sorghum, discuss the ways you are looking forward to using and tasting sorghum.
- If you try sorghum at home, discuss it with your classroom and ask whether their family has eaten dishes made with sorghum or sorghum flour.
- On their activity sheet, students are asked to set a goal. Share examples of a personal goal that you may have for including whole grain sorghum in your diet.

Keep it Clean & Safe

As you prepare the food activity in your classroom, be sure to handle food safely and discourage food sharing among students. Reinforce and demonstrate the importance of hand washing and a clean food preparation area.

The "Fight Bac" site is a good resource for food safety education materials and resources. The site is located at www.fightbac.org/

Family Handout

Ask students to share the Starring Sorghum family handout with their parents and/or caregivers. Ask them to complete the crossword puzzle and make one of the recipes together at home.

Lesson Enhancement Ideas

1. Ask your school foodservice director to give a brief talk to the students and encourage them to try the new sorghum dishes in the cafeteria.

2. Show students the "Sorghum at School" video, which provides a great overview of sorghum's history, growth, environmental impact and nutrition. Scan the QR Code below to access this and other resources.

3. Ask students to write a story or poem and/or create artwork which features what they have learned about sorghum. Possible topics include recipes and tasting, growing and harvesting or the positive environmental aspects of sorghum. Post these in the classroom or school cafeteria.

4. If you have a school garden, consider planting sorghum in the spring and monitoring its progress through the growing season. Since sorghum fixes nitrogen, it makes a great cover crop that will enrich garden soil. Ask students to devise a chart to track progress of the sorghum plants using the Sorghum Growth and Development poster.

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Glossary/Vocabulary

Archaeology: The study of human history and prehistory through the excavation of sites and the analysis of artifacts and other physical remains.

B Vitamins: Eight vitamins that help release the energy from food (niacin, thiamin, riboflavin, vitamin B6, vitamin B12, folic acid, pantothenic acid, and biotin).

Carbohydrates: The body's major source of energy, carbohydrates are found in grains, starchy vegetables, fruits, milk, and sugar.

Copper: Assists in the development of red blood cells and helps with iron absorption.

Fiber: A type of carbohydrate that the body does not digest. Fiber helps promote digestive health, blood sugar control and certain fibers can lower cholesterol.

Grain: One of the five major food groups in the MyPlate food guide, grain-based foods contain the nutrient-rich seeds of various grasses.

Iron: Strengthens the immune system and carries oxygen in red blood cells and muscle cells.

Magnesium: Aids in calcium absorption and supports muscle function.

Manganese: Necessary for many chemical actions in the body, such as processing carbohydrates and glucose.

MyPlate Food Guide: The official food guide for the United States. MyPlate includes food group targets for five food groups (fruits, vegetables, grains, protein foods, and dairy), as well as guidance on fat and sugar intake.

Niacin: One of the eight B vitamins, niacin helps release the energy from food. More than 400 enzymes require niacin for reactions in the body.

Nutrient: Over 40 different compounds found in food that are required by the body to live, grow, and stay healthy.

Panicle: The group of flowers on the sorghum stem which fill with small, round seeds.

Phosphorus: Helps form healthy bones and teeth.

Phytonutrient: Plant compounds with multiple health promoting roles, including the protection of body cells, reduction in inflammation, and prevention of chronic disease. Examples include phenolic acids, flavonoids, and phytosterols.

Potassium: A mineral that regulates heartbeat and body fluids.

Protein: A nutrient needed by the body for growth and repair. Protein provides essential amino acids, which are building blocks for bone, muscle, skin, antibodies and enzymes. Protein is found in meat, poultry, seafood, eggs, nuts, legumes, dairy and whole grains.

Refined Grain: The remaining grain left after the outer layer is removed, which includes just the starchy portion known as the endosperm.

Seed: The edible part of many nutritive grasses and plants that is used to propagate additional plants.

Selenium: Helps protect cells from oxidation and promotes a healthy immune system.

Thiamin: One of the eight B vitamins, thiamin helps release the energy from food and also plays a role in maintaining a healthy nervous system.

Vitamin B6: One of the eight B vitamins, vitamin B6 helps release the energy from food, promotes brain development and has a role in maintaining a healthy immune system.

Whole Grain: The entire grain or seed (including bran, germ, and endosperm) that is used in food products. Whole grains have more fiber, nutrients and antioxidants than refined grains.

Zinc: A mineral necessary for immune function, healing, taste perception, growth and development.

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References

1. What is an ancient grain? Ancient Grains | The Whole Grains Council. Retrieved October 3, 2022, from https://wholegrainscouncil.org/whole-grains-101/whats-whole-grain/ancient-grains

2. Sorghum 101. Sorghum Checkoff. (2021, November 23). Retrieved December 16, 2022, from https://www.sorghumcheckoff.com/sorghum-101/

3. Whole grains: An important source of essential nutrients. The Whole Grains Council. Retrieved October 10, 2022, from https://wholegrainscouncil.org/whole-grains-101/health-studies-health-benefits/whole-grains-important-source-essential-nutrients

4. Simnadis, T. G., Tapsell, L. C., & Beck, E. J. (2016). Effect of sorghum consumption on health outcomes: A systematic review. Nutrition Reviews, 74 (11), 690–707. https://doi.org/10.1093/nutrit/nuw036

5. Frankowski, J., Przybylska-Balcerek, A., & Stuper-Szablewska, K. (2022). Concentration of pro-health compound of sorghum grain-based foods. Foods, 11(2), 216. https://doi.org/10.3390/foods11020216

6. Xu, J., Wang, W., & Zhao, Y. (2021). Phenolic compounds in whole grain sorghum and their health benefits. Foods, 10(8), 1921. https://doi.org/10.3390/foods10081921

7. U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans, 2020-2025. 9th Edition. December 2020. Available at https://www.dietaryguidelines.gov/

8. Food Group Gallery. MyPlate. Retrieved October 10, 2022, from https://www.myplate.gov/eat-healthy/food-group-gallery#grains

9. Sorghum announced as newest addition to USDA Food Buying Guide. (2022, July 20). Retrieved October 3, 2022, from https://www.prnewswire.com/news-releases/sorghum-announced-as-newest-addition-to-usda-food-buying-guide-301589647.html

10. Evidence-Based Recommendations and Best Practices for Promoting Healthy Eating Behaviors in Children 2 to 8 Years. Retrieved December 8, 2022, from https://healthyeatingresearch.org/wp-content/uploads/2021/10/her-heg-summary.pdf

11. Around the globe. Sorghum Checkoff. (2022, January 7). Retrieved December 16, 2022, from https://www.sorghumcheckoff.com/sorghum-101/around-the-globe/

12. Honoring native foodways. The University of North Carolina at Pembroke. (2022, August 19). Retrieved October 31, 2022, from https://www.uncp.edu/departments/american-indian-studies/honoring-native-foodways

13. Sustainability. Sorghum Checkoff. (2022, April 6). Retrieved October 10, 2022, from https://www.sorghumcheckoff.com/sustainability/

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