

Spice It Up

Subjects Taught: Science, Health, Nutrition, Social Studies

Grade Levels: 6th-12th Grade

Brief Description: This lesson is a sensory exploration of the herbs and spices that create food scents and flavors with a mystery twist- geographic and cultural examination. Herb growing in the garden will be encouraged. Students will be asked to explore antioxidants, vitamins, minerals and phytonutrients that herbs provide.

Objectives: Students will:

1. Grow herbs in the school garden.
2. Describe how herbs and spices flavor and enhance the foods we eat.
3. Explore a specific cultural recipe and describe the use of spices and herbs.
4. Research phytonutrients and create a poster project with details.
5. Compare and contrast claims versus scientific evidence the use of herbs for nutritional enhancements, medicinal preventatives and alternative medications by researching and debating their use, benefits and possible harm.

Life Skills: Appreciating, assessing credibility, comparing similarities and differences, debating, evaluating, examining claims, researching and understanding cause and effect

Materials Needed:

- Herb seeds

- Potting soil
- Peat pots
- Computers with Internet access

Time:

Activity One: Two, 30-minute sessions

Activity Two: Two, 45-minute sessions plus time for student research

Activity Three: 45 minutes plus time for student research

Activity Four: Two, 45-minute class periods plus time for student research

Preparation:

1. Gather materials to plant seeds and transplant seedlings.
2. Plan an area in the school garden for growing herbs.
3. Ensure students will have Internet access.

Vocabulary: herbs, phytonutrients, spices

Background Information:

Herbs and spices have been used by people for centuries for culinary, medicinal and even religious purposes. In general, herbs are considered those flavorings that come from the vegetative part of the plant, most often leaves and roots. Herbs such as parsley, bay leaves, oregano, summer savory, thyme, sage, basil, and marjoram are leaves. Spices are most often seeds, seed pods, and fruit (usually dried). Black pepper, chili pepper, nutmeg, sesame, mace, mustard, vanilla, chocolate, kola, celery seed, turmeric, and almond are seeds, seed pods or fruit. Of course, there are exceptions – ginger is from a root,

Florida Standards Met At-A-Glance

National Next Generation Science	MS-LS2-1, HS-ESS3-1
English /Language Arts	6.RI.1.2, 6.RI.3.8, 7.RI.3.8, 8.RI.1.2, 8.RI.3.8, 8.RI.3.9, 910.RI.1.1, 910.RI.3.8, 1112.RI.1.1, 1112.RI.3.7, 6.W.1.1, 6.W.1.2, 6.W.3.7, 6.W.3.8, 7.W.1.1, 7.W.1.2, 7.W.2.6, 7.W.3.7, 7.W.3.8, 8.W.1.1, 8.W.1.2, 8.W.2.6, 8.W.3.7, 8.W.3.8, 910.W.1.1, 910.W.1.2, 910.W.2.6, 910.W.3.7, 910.W.3.8, 910.W.3.9, 1112.W.1.1, 1112.W.1.2, 1112.W.2.6, 1112.W.3.7, 1112.W.3.8, 1112.W.3.9, 6.SL.1.1, 6.SL.1.2, 6.SL.2.5, 7.SL.1.1, 7.SL.2.4, 7.SL.2.5, 8.SL.1.1, 8.SL.2.4, 8.SL.2.5, 910.SL.1.1, 910.SL.1.2, 910.SL.2.4, 910.SL.2.5, 1112.SL.1.1, 1112.SL.1.2, 1112.SL.2.4, 1112.SL.2.5, 68.RST.1.2, 68.RST.3.7, 68.RST.3.8, 910.RST.3.9, 1112.RST.1.2, 1112.RST.2.6, 68.WHST.1.1, 68.WHST.2.6, 68.WHST.3.7, 68.WHST.3.9, 910.WHST.1.1, 910.WHST.3.7, 1112.WHST.1.1, 1112.WHST.3.7, 1112.WHST.3.9
Social Studies	SS.6.G.1.4, SS.8.E.3.1, SS.912.A.1.6
Health	HE.6.B.1.1, HE.6.B.1.7, HE.6.B.3.1, HE.6.B.3.4, HE.7.B.1.1, HE.7.B.1.7, HE.7.B.3.1, HE.7.P.2.1, HE.8.B.1.1, HE.912.B.1.1



cinnamon is from the bark of a tree, saffron is the actually stamens of crocus flowers.

Plants produce chemicals for a number of reasons - to repel or discourage pests from eating them, to encourage pollinators and to encourage some animals to eat them and disperse the seeds while repelling others. For example, scientists have discovered that mammals can experience the heat of spicy hot peppers while birds cannot. Pepper seeds traveling through the digestive systems of mammals are damaged or even digested by some mammals. When the remnants are spread in the animal's waste, the seeds are no longer capable of germinating and producing new plants. However, pepper seeds digested by a bird pass through its system unharmed, are spread in the environment, and then germinate and produce new plants. So the bird is the preferred consumer of pepper fruits. Mammals are not. The hot spice of the peppers dissuades mammals from consuming peppers leaving them available for birds to eat.

Herbs and spices have been used for thousands of years as medicines long before modern medicine developed drugs. Some plants do produce chemicals that are beneficial as medicines. In fact, even today, about a quarter of all modern medicines are synthesized from plants. Willow bark tea has been used by many societies to relieve pain and reduce inflammation. The active property is salicylic acid, which is a plant hormone, and is the ingredient that makes aspirin effective at reducing pain and inflammation as a metabolite of aspirin. Modern research is currently examining medicinal claims about a wide range of herbal remedies and possibilities of plant materials. It is finding truth in some claims, cancer cures in others and no substance at all in others. The whole field of anti-oxidants and phytonutrient research (such as the often-hyped resveratrol) is just beginning.

Plants produce chemicals that provide a wide array of scents and flavors. Human use these in cooking to create an immense

variety of foods. Each culture has specific flavors that make their cuisine unique and part of their culture. Some of these flavors and scents will be well known by students and others will be new experiences.

Herbs in the Kitchen

Herbs are one of the easiest plants to grow and are in almost every dish of every meal we eat. Herbs added to food can make the difference between dull and delicious. Herbs are also used as an ingredient in soaps, shampoos, perfumes, bath powders and skin moisturizers. Almost half of all medicines include herbs as a significant ingredient, whether extracted from the actual plant or synthesized in the lab. Herbs can also be appreciated as decorative items and crafted into wreaths and potpourris.

With the renewed interest in locally grown, natural and organic food and medicines, people are rediscovering the many inherent benefits and uses of herbs. The importance of herbs is based on their ability to comfort and uplift which can be enjoyed simply by looking at, sniffing or observing them grow, bloom and bear seeds and eventually sharing them with others. Examples of popular herbs include: mint, lavender, basil, rosemary, parsley, sage, thyme and aloe vera.

Easy ways to use herbs:

- Freshen breath
- Flavor food
- Garnish foods
- Add to beverages
- Help with personal hygiene
- Used as medicine
- Debug indoor and outdoor spaces
- Neutralize odors
- Used as a sleep aid

An herb (pronounced 'erb' with a silent 'h' in the U.S.) is defined as any part of a plant with culinary, aromatic, cosmetic, insecticidal, insect-attracting or dye-making characteristics. Herbs are easily grown in temperate climates. The most useful part of the herb plant is the leaf or flower. The difference between herbs and spices are that spices are described as strongly flavored, aromatic substances, that primarily come from bark, root, berry or pods grown on a vine, shrub or tree. Spices grow best in tropical regions of the eastern hemisphere as they don't grow well in temperate climates or home gardens.

Herbs are easy to grow and widely available, but are sometimes mistaken for weeds or other non-edible/toxic plants. Herbs can be started from seeds or cuttings and grown in small informal plots or incorporated in your existing gardens as well as in pots on sunny windowsills. It's important to identify an herb before eating it as there are many look-alikes and plants look different at different times of the year and in different climates. These look-alike plants can be toxic or even fatal depending on the amount eaten.

Source: Ortho's Guide to Herbs, Created and Designed by the Editorial Staff of Ortho Books
Author – Monica Brandies

Activity One:

1. Grow herbs in the school garden: basil, chives, dill, oregano, parsley, rosemary, sage and tarragon are easily grown and several will be familiar scents to students.
 - a. Plant seeds in peat pots indoors to begin growth six to eight weeks prior to planting the school garden.
 - b. Transplant seedlings into the school garden after the danger of frost has passed.
 - c. Once the plants are growing well, keep them trimmed by harvesting the leaves and prevent the herbs from flowering and setting seed. Annual plants will often die after setting seed.
2. When the herbs are growing well, snip off portions of leaves and stems, crush to release the essential oils and place them into small paper bags.
3. Using a blind smelling test by placing herbs in paper bags, have students sniff the herbs and try to identify what the herb is and/or what foods this herb might be used in. Place a number on each bag and have the students write down what they think they smell. Once the entire class is done guessing go over the correct answers.
4. Have students select one of the herbs grown in the school garden and research what vitamins, minerals and/or phytonutrients the herb provides.
5. Discuss the commonly used delineation between herbs and spices. Herbs are commonly referred to as the leaves and stems of non-woody plants that are generally grown in temperate regions. Spices are commonly referred to as the seeds, fruit, woody portions, or flavorings grown in tropical regions.

Activity Two:

1. Use “Spices History” video by Taylor Roberts at www.youtube.com to introduce the variety of spices and herbs, the cultural connections, and sensory delights. This video has only images, words, and music. Discuss that the food flavors we enjoy today come from around the world and some right at home and they have quite a history.
2. Have students select a food that is unique to their cultural heritage that contains herbs and spices.
 - a. Instruct the students to either obtain a family recipe for that food or seek a recipe online.
 - b. From the recipe, determine what the major ingredients are and especially which herbs and spices are used.
3. Using the Internet, have students view “Cultural Interactions with Spices and Herbs” www.youtube.com and decide what they like and don’t like about this presentation and the previous one and use it to guide their own research and production of a PowerPoint presentation or video. NOTE: If your school has

prohibitions on use of YouTube, many clips can be downloaded outside of school and broadcast from a laptop computer. Or it may be possible to obtain special permission for a single use.

4. As a class, create an evaluation rubric to use for evaluating presentations.
5. Have students prepare and present electronic enhancements detailing the use of specific herbs and spices in a dish representative of his or her ancestral or current culture.
 - a. Research where the fruit and vegetable ingredients and the herb and spices that contribute to the uniqueness of their recipe originated, and how these herbs and spices traveled to the location of the culture the recipe represents. In addition, describe where these herbs and spices are produced today, and how or when their families consume these food items.
 - b. Use this information to create either a PowerPoint presentation or video and post the video online with either a cultural or herbal connection in the title.
 - c. Present the program to the class.
6. Members of the class ask questions, score each presentation, give the presenter feedback, and provide the teacher with the score using the rubric developed by the class.

Activity Three:

1. Introduce the topic that herbs are in the news as nutritional enhancements, preventative medicinal approaches, or curative alternatives to modern medicines.
2. Discuss how herbal treatments have been used as medicines for thousands of years. In fact, for most of that time those were the only medicines available and there is validity to that use. Today, more than 25 percent of our medicines come directly from plant sources. We are learning more every day not just about nutrition but about phytonutrients. Ask: “What are phytonutrients?”
3. Have students research phytonutrients and create a poster project in teams of two or three students. Good information sources can be found at the USDA and Agri-Food Canada. Also Web MD has a good summary written by USDA Scientists at www.webmd.com.

Activity Four:

1. Ask students what herbal supplements they have heard of and make a master list. If they have not heard of any, assign them to read magazines, watch television doctor shows or morning talk shows that discuss herbal remedies, watch infomercials for nutritional supplements, visit websites or online health food stores and read the claims of herbal supplements.

2. Divide the class into three groups and prepare for a debate on the use of herbal supplements as nutritional supplements that improve human health, and prevent and cure disease.
 - a. One group should research the positives of herbs that are currently being promoted and/or sold as nutritional supplements, or preventative or curative disease measures and be the “pro” side of the debate.
 - b. The second group should research the negatives to challenge those claims and be on the “con” side of the debate.
 - c. The third group will be the judges and decide the outcome of the debate. This group should have no more than five team members. This group will develop a rubric to evaluate the debate, research challenges they can make to the debaters on both sides and create questions to pose during the debate.
 - d. The debate should include: 1. Opening statements from both sides. 2. A challenge by both sides. 3. Following each opening statement, judges should pose questions and solicit responses to those questions from both sides. 4. Closing statements from both sides. The scoring rubric should contain all those components for scoring.
3. Have students access the National Center for Complementary and Alternative Medicine at the National Institutes of Health at www.nccam.nih.gov, which is an excellent source of information for a summary of the research findings that are based on sound, peer-reviewed science. Prepare for a debate about the advisability of using these herbs for their promoted purpose. Include whether they are effective for their promoted purpose, if the research is conclusive, if research is being conducted and if there are any warnings



for consuming this herb or interactions with medicines or foods. Require students to provide a list of sources used to support their claims and indicate that they will receive a grade on their reference list.

4. Conduct the debate and have students score the process and results.
5. Discuss the information presented and what evaluating the claims means to students. Ask if debating the use of these products has informed the students, encouraged the use of these items or discouraged the use of these items. What process will the student use in the future to examine claims about the health benefits of these products?

Evaluation Options:

1. Evaluate student contributions to the success of the school garden.
2. Assess student cooperation, participation and contributions to the scoring rubric.
3. In activity two, use the scoring rubric to evaluate the presentations and incorporate the scores of classmates in your score and let them know in advance how much weight their peers' scores will count. (50/50, 60/40, 40/60).
4. Have students make a list of dishes that would not have the same recognizable smells and flavors without herbs and spices.
Examples:
Sage, onion – turkey dressing
Oregano, garlic and bay leaves – pizza
Cinnamon, nutmeg – apple pie
Ginger – ginger bread, ginger snaps, ginger ale
Bay leaves, onion, garlic – spaghetti
Cinnamon – cinnamon candies and gum
Garlic, mustard seed, celery seed – sweet bread and butter pickles
Dill, garlic – dill pickles
Ginger, cinnamon – pumpkin pie
Vanilla – vanilla ice cream, vanilla frosting, vanilla pudding, sugar cookies
Garlic, soy sauce, onions – Chinese foods
Basil, garlic – pesto sauce
5. Evaluate student poster projects on phytonutrients.
6. Assess student performance on the debate, including the list of references, thoroughness of research, ability to make the case both pro and con, the rubric developed, questions developed and the scoring and ability to answer questions on herbal uses as nutritional supplements or medicinal alternatives.

Extensions or Variations:

1. Use the History of Spices video to clear up some misconceptions about historic spice use www.youtube.com
2. Use the Florida Agriculture in the Classroom lesson “Around the World in 500 Years” at the Teacher Center of its website at www.faitc.org that discusses how trade and travel introduces invasive species.
3. Have a chef come in or work with the culinary arts department to cook with the herbs, determine food pairing, or just discuss how to cook with herbs and spices for healthy low sodium options.

Resources:

“Cultural Interactions with Spices and Herbs,” University of Hawaii
www.youtube.com

National Center for Complementary and Alternative Medicine, National Institutes of Health
www.nccam.nih.gov

Roberts, Taylor. “Spice History” video.
www.youtube.com

Frequently Asked Questions about Phytonutrients, Web MD
(Written by USDA Scientists)
www.webmd.com

Spice It Up!

Sample Pre-Post Assessment

1. List three uses for herbs.
2. Pick three herbs and identify how they are used in dishes of different cultures.
3. What are phytonutrients? Give an example.
4. Describe how to evaluate medical claims of those selling herbal supplements.