

FOOD SCIENCE SCAVENGER HUNT

DESCRIPTION: This SET activity will expose participants to food science and scientific processes of food production, while combining healthy living practices. Throughout the lesson participants will develop food safety, research and development, and critical thinking skills.

AUDIENCE AGE: 4th grade – 12th grade

ACTIVITY TIME: approximately 15-30 minutes

OBJECTIVES:

- To engage students in discovery of food processing additives
- To explore how and why food processing additives are used
- To explore careers in food science

MATERIALS:

- Food Science Scavenger Hunt Worksheet
- Pencil
- Optional: Computer with internet for additional research as desired

ENGAGE/INVESTIGATIVE PHENOMENA:

An additive is defined as a substance added to something in small quantities to improve or preserve it (make things last longer).

For centuries various ingredients have been used as functional additives in a variety of food. Historically and still today salt and sugar is used to preserve meats, fish, and fruit. Herbs and spices improve flavor and vinegar helps preserve in the form of pickling.

EXPLORE/ACTIVITY/LAB:

1. Using the provided table of commonly used food additives at the end of this document choose 10 additives with your preferred difficulty and list them in the “Food Additive to Find” column.
2. Go “hunting” for the listed ingredients in your kitchen at home. As additives are found fill in the “Where was it Found” column.
3. Once all 10 items are found, use hints from the packages where the additive was found, common knowledge, the “commonly used food additives” table or general research to discover what the additive is used for and possibly what it was derived from.



EXPLAIN:

Today's growing population needs food that is safe, nutritional, flavorful, convenient and affordable. Food additives and advancement in food technology can help make the goal of feeding our world by 2050 possible.

Many consumers have concerns about additives because they are unfamiliar with their names and purposes. Whether we eat a fresh picked Louisiana strawberry or a store-bought chocolate chip cookie, everything we consume is made up of chemical compounds that determine its flavor, color, texture and nutritional value.

All food additives are carefully regulated by governmental authorities and health organization to ensure safety and accountability.

ASSOCIATED CAREERS:

- Flavor Technologist
- Product Development Scientist
- Packaging Engineer
- Food and Meat Scientist
- Nutritionist/Dietitian
- Food Technologist
- Food Safety/Quality Assurance Manager
- Research and Development Technician
- Produce Buyer
- Food Biotechnology
- Food Production Supervisor
- Food Engineer

COMMONLY USED FOOD ADDITIVES

DIFFICULTY LEVEL	FOOD ADDITIVE	COMMON USE	EXAMPLES OF WHERE TO FIND
Advanced	Butylated Hydroxytoluene (BHT)	Freshness	Cereals, boxed potatoes, chips
Advanced	Calcium (propionate or sorbate)	Preservative Antimicrobial agent	Bread, soft drinks, processed meats
Advanced	Calcium disodium EDTA	Preservative, Color preserving agent, Flavor agent	Mayo, salad dressings, canned beans, soft drinks
Advanced	D-Alpha-Tocopherol	Vitamin E, nutrient supplement	Milk alternatives
Advanced	Hydrolyzed soy, wheat or vegetable protein	Flavor enhancer, Emulsifier, thickeners	Instant ramen, processed meats, soups, chips, snack foods, dips
Advanced	Monosodium Glutamate (MSG)	Flavor enhancer	Instant ramen, chips,
Advanced	Natamycin	Natural mold inhibitor	Shredded cheese,
Advanced	Potassium bromate	Dough strengthener, Leavening agent	Bread and baked goods
Advanced	Silicon dioxide	Anticaking agent	Cajun seasoning, instant ramen
Advanced	Sodium Ascorbate (derivative of ascorbic acid)	Maintains freshness	Milk alternatives
Advanced	Sodium Benzoate	Preservative	Soy Sauce, lemon-lime soda
Easy	Cane Sugar	Sweetener	Popsicle, bread, soft drinks, seasonings, sauces
Easy	Chicken broth	Ingredient for flavor	Instant ramen, soup
Easy	Chocolate	Ingredient for flavor	Cookies, candy bar, ice cream
Easy	Dehydrated vegetables	Ingredient for flavor	Instant ramen, boxed pasta salad
Easy	Distilled Vinegar	Flavor enhancer, preservative	Salsa, mustard, mayo, pickles
Easy	Egg	Binder, thickener	Mayo, Mustard,
Easy	High Fructose Corn Syrup derived as byproduct of corn production	Sweetener	Soda, white bread, cookies,
Easy	Soybean oil	Reduce dusting or flavor enhancer	Mayo, boxed pasta salad

Easy to Moderate	Stevia	Sweetener	
Easy to Advanced	Celery powder or juice	Natural preservative (with nitrites)	"uncured" meats
Easy to Advanced	Paprika Extract	Natural color additive	Strawberry shredded wheat cereal
Easy to Advanced	Salt Sodium chloride	Flavor enhancer, preservative	Soy Sauce, Salsa, pickles, canned vegetables, sauces
Easy to Moderate	Beet Juice	Natural color, flavoring agent	Popsicle, juices
Easy to Moderate	Brown Rice Syrup derived as byproduct of rice production	Sweetener	Strawberry shredded wheat cereal,
Easy to Moderate	Cherry Puree	Ingredient for flavor and color	Popsicle
Easy to Moderate	Lactose	Flavor enhancer, nutritive sweetener, stabilizer or thickener	Sour cream and onion chips,
Easy to moderate	Pectin	Emulsifier, firming agent, thickener	Jelly, jam, yogurt
Moderate	Ascorbic Acid	Vitamin C and freshness	Popsicle, fruit juices, cereals, fruit flavored candies, processed meats
Moderate	Aspartame, Sucralose, Saccharin,	Non-nutritive sweetener	Soda, white bread, sauces
Moderate	Beta carotene	Coloring agent	Soup
Moderate	Blue 1, Red 40, Yellow 5, and Yellow 6	Artificial Food Color	Chips, popsicles, hard candies
Moderate	Enzymes	Emulsifier or processing aid	Yogurt, string cheese,
Moderate	Folic Acid	Nutrient supplement	Bread
Moderate	Gelatin	Stabilizer or thickener	Strawberry shredded wheat cereal,
Moderate	Guar Gum	Stabilizer or thickener	Popsicles,
Moderate	Sucralose	Nutritive sweetener	
Moderate to Advanced	Calcium Carbonate	Nutritional additive (calcium replacement)	Almond and soy beverage, white bread,
Moderate to Advanced	Calcium chloride	Flavor agent (salty) Preservative	Canned tomatoes, pickles
Moderate to Advanced	Carrageenan derived from seaweed	Emulsifier, stabilizer, thickener	
Moderate to Advanced	Citrate (potassium, sodium, calcium)	Flavoring agent pH control (buffering) Nutritive Agent	Almond beverage, lemon lime soda

Moderate to Advanced	Citric Acid	Antimicrobial agent, enzyme, flavor enhancer	Popsicle, Strawberry shredded wheat cereal, lemon-lime soda, chips, chips,
Moderate to Advanced	Maltodextrin or Dextrose derived from corn, rice, potato starch or wheat	Thickener, stabilizer Anticaking agent,	Better than Bouillon, chips,
Moderate to Advanced	Modified food starch (corn, potato, tapioca, wheat)	Thickener Stabilizer Emulsifier	Soup, Instant ramen, chips, bread, various instant foods
Moderate to advanced	Potassium chloride naturally occurring mineral derived from potash mining	Salt replacer	Boxed pasta salad, cereals, frozen entrees
Moderate to advanced	Potato Starch	Anticaking agent Thickener Binder	Shredded cheese,
Moderate to advanced	Saccharin	Non-nutritive sweetener	
Moderate to Advanced	Sodium Erythorbate	Maintains freshness and cure accelerator	Bacon, cured meats, beverages
Moderate to Advanced	Sodium Nitrite	Form of salt for preservation	Bacon, cured meats
Moderate to Advanced	Sodium phosphate	Thickener Preservative Leavening agent Emulsifier	Bacon, processed meats, canned tuna, boxed mashed potatoes
Moderate to Advanced	Soy Lecithin	Emulsifying Stabilizing	Almond beverage, Bread, cookies
Moderate to Advanced	Xanthan Gum	Thickener Stabilizer	Salad dressing
Moderate to advanced	Yeast (autolyzed, hydrolyzed)	Flavoring agent	Soy sauce, cheese sauce, chips, soups
Moderate to advanced	Yeast extract	Flavor enhancer, Fermenting aid	Instant ramen, white bread,
Moderated to Advanced	Lactic acid	Preservative, curing or pickling agent, flavor enhancer	Chips, bread

Sources:

<https://www.accessdata.fda.gov/scripts/fdcc/index.cfm?set=FoodSubstances&id=XANTHANGUM>

<https://www.meatinsstitute.org/index.php?ht=a/GetDocumentAction/i/125382>

<https://www.cargill.com/salt-in-perspective/potassium-chloride-food-faqs>

FOOD SCIENCE SCAVENGER HUNT WORKSHEET

FOOD ADDITIVE TO FIND	WHERE WAS IT FOUND?	WHY WAS IT USED?

