#

# Enhancing Flavor in Foods

**It Makes Sense**

The popping of corn, the crunch of crusty bread, the sight of vibrant red strawberries, the aroma of cinnamon rolls, and the taste of juicy oranges—all five of our senses provide us with perceptions that, when collected, become "flavor." This collective flavor is the primary reason why we eat what we do. Taste is the most important influence on our food choices.

The most often mentioned obstacle to buying healthful foods is concern about food not tasting good. Your message to students should focus on flavor while delivering healthful food!

### **The Five *Senses***

1. Hearing

2. Sight

3. Touch

4. Smell

5. Taste

### **The Components of Flavor**

***Taste***

Our sense of taste comes from our mouth's chemical receptors or taste buds.

These some 10,000 taste buds record five basic tastes:

* sweet
* salty
* sour
* bitter
* umami

Additionally, our mouths' insides feel sensations like the burn of hot chilies, the cooling effect of mint, or the fizz of carbonated beverages.

***Smell***

Although the sense of taste is most often given credit for the appeal or dislike of food, the sense of smell is most often the guilty party. Unlike our limited repertoire of tastes, the number of odors we can detect seems to be unlimited. When we put food in our mouth, the chewing process releases volatile compounds that pass to the olfactory receptor cells at the top of our nasal passages. Our sense of smell is thought to be 10,000 times more sensitive than our sense of taste. Think about the last time you had a cold. Did you complain about foods having no taste?

***Visual***

When food is placed in front of us, sight is one of the first senses that gives us flavor clues. The intensity of the red color of strawberries can help us anticipate their sweetness. Steam rising off the vegetables indicates they are piping hot, and the golden brown of the toast hints at its crispness. It is true that "we eat with our eyes." Just by looking at a tray, your students can anticipate how the food feels and tastes, even before the first bite.

***Texture***

A piece of poached salmon that flakes away under the gentle prodding of a fork hints at the fish's tenderness. On the contrary, when a knife blade refuses to penetrate a piece of meat, it indicates that the meat will be tough and chewy. The velvet smoothness of a mousse, the crunchy crust of bread, and the snap of a sugar snap pea are all texture indicators that give us insight into a food's " taste."

***Temperature***

The temperature of our food affects our perception of its taste. Coldness suppresses sweetness. Bitterness is more intense with a cold solution, and sourness is more intense with a warm solution.

***Sound***

The sizzle of onions when they hit the sauté pan tells us the pan is just the right temperature. The snap of a carrot tells of its freshness. There are many sounds in our culinary world that enhance the *flavor* of foods.

***What can school nutrition operators do?***

The first thing you can do as a food service operator is to take a moment and note how all five senses interact in your operation and in the foods you serve. Look for ways to enhance all aspects of flavor!

**The “Tastes”**

* Sweet, Sour (Acid), Salty, Bitter (Alkaline), Umami

**Flavor in cooking is developed through...**

* the selection of quality ingredients
* the appropriate use of seasonings and flavorings
* the application of processes that capture flavor
* the proper execution of cooking techniques

**Flavor Enhancers**

|  |  |
| --- | --- |
| *Herbs* | Fresh, Dried, Pestos |
| *Spices* | Whole, Ground, Toasted |
| *Aromatic ingredients* | Onions, Shallots, Garlic, Leeks, Ginger |
| *Peppers* | Hot:Ancho, chipotle, jalapeño, poblano, serrano, habanero, Scotch BonnetSweetgreen, red, yellow, orange, purple |
| *Acidic Ingredients* | Vinegars:malt, cider, balsamic, fruit, herb, garlicCitrus:zest or peel, juiceTomatoes:Juice, fresh, canned |
| *Flavorful liquids* | Stocks:vegetable, chicken, beef, fishJuices:fruit or vegetable |
| *Other Condiments* | Horseradish, Wasabi, Ginger, Mustards, Pickle Relishes, Olives, Salsas (Fruit & Vegetable), Ketchup, Infused Oils |
| *Cooking processes* | ExtractionInfusionMarinatingReductions |
| *Cooking methods* | SautéingSearingPoachingRoastingBakingToasting* Toast nuts and seeds to bring out the flavor.
* Roast vegetables for unique, robust flavors.
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**Herbs**

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| --- | --- |
| **Herbs:** | The leaves of annual and perennial low-growing shrubs |
| **Aromatic seeds:** | The seeds of graceful lacy annual plants (anise, caraway, coriander) |

Culinary Herbs

|  |  |  |  |
| --- | --- | --- | --- |
| *Variety* | *Description* | *Peak Season* | *Uses/Affinities* |
| Basil | leaves are pointed green. Purple varieties, large or small-leafed varieties available, and specialty types with cinnamon, clove, and other flavors | Summer/year-round | Flavoring for sauces, pesto sauce, dressings, infusing oils, vinegar, etc. Also available in dried-leaf form. Chicken, fish, and pasta dishes |
| Bay leaf | Smooth, rigid leaf | Summer | Available dried year-round. Used to flavor soups, stews, stocks, sauces and grain dishes |
| Chervil | Similar in shape to parsley, with finer leaves, licorice flavor | Summer | Component of “fines herbes” often used in “pouches” to garnish dishes. Egg, chicken, shellfish, dishes. |
| Cilantro | Similar in shape to parsley, with a pronounced, unique flavor | Mid to late summer | Component of Asian and South/Central American dishes; flavoring for salsas and other uncooked sauces. |
| Dill | Feathery shape with a strong aroma | Late summer | Fresh herbs are used to flavor sauces, stews, and braises (especially Central and Eastern European dishes), and seeds are used in pickles. |
| Marjoram | Small, rounded leaves with a flavor similar to oregano | Throughout summer | Used in Greek, Italian, and Mexican dishes. It is especially suitable for vegetable dishes. |
| Mint | Pointed, textured leaves. Size varies by type, as does particular flavor. | Throughout summer | Mint is used to flavor sweet dishes and beverages, as a “tisane,” and in some sauces. Mint jelly is traditional with lamb. |
| Oregano | Small, oval leaves | Throughout summer | Used with a variety of sauces, with poultry, beef, veal, lamb and vegetables |
| Parsley | Feathered leaves may be curly or flat | Year-round | Component of “fines herbs” and of bouquet garni. Flavoring for sauces, soups, dressings, and other dishes. Garnish. |
| Rosemary | Leaves shaped like pine needles with a pine aroma and flavor | Year-round | Large branches are used as skewers. They are popular in Middle Eastern dishes, grilled foods, and marinades. Dried is nearly as intense in flavor as fresh. |
| Sage | Large leaves may be furry or velvety. Sage-green color | Summer | Popular as flavoring in stuffings, sausages and some stews. Dried, rubbed sage is also available. |
| Savory | Summary savory has a flavor similar to thyme. Winter savory is more like rosemary. | Summer and fall | Used in salads, stuffings, and sauces. |
| Tarragon |  Narrow leaves with pronounced licorice flavor | Summer | Another component of “fines herbs.” Used with chicken, fish, veal, and egg dishes. |
| Thyme | Very small leaves. Varieties with special flavors (nutmeg, mint, lemon, etc.) | Summer | Dried leaves are part of the bouquet garni. They may occasionally be used in place of fresh and to flavor soups, stocks, stews, and braises. |

Source: The New Professional Chef (6th edition). The Culinary Institute of America. New York: Van Nostrand Reinhold. 1996.

**Spices**

Derived from the bark, root, fruit, or berry of perennial plants

Examples:

Bark - cinnamon

Root - ginger

Berry - pepper

Fruit -nutmeg

Spices

*Name Uses/Affinities*

|  |  |
| --- | --- |
| Allspice | Braises, forcemeats, fish, pickles, desserts |
| Anise | Desserts and other baked goods, liqueur |
| Caraway | Rye bread, pork, cabbage, soups, stews, some cheeses, |
| Cardamom | Curries, some baked goods, pickling |
| Cayenne | Sauces, soups, most meats, some fish, and poultry |
| Celery seed | Salads (including cole slaw), salad |
| Chili powder | Chili and other Mexican dishes, curries |
| Cinnamon | Desserts, some baked goods, sweet potatoes, hot beverages, curries, pickles, and preserves |
| Cloves | Stocks, sauces, braises, marinades, curries, pickling, desserts, some baked goods |
| Coriander seeds | Curries, some forcemeats, pickling, some baked goods |
| Cumin | Curries, chili, and other Mexican dishes |
| Dill seeds | Pickling, sauerkraut |
| Fennel seeds | Sausage, fish and shellfish, tomatoes, some baked goods, marinades |
| Fenugreek | Curries, meat, poultry, chutney |
| Ginger | Fresh: Asian dishes, curries, braises: ground dry: some desserts and baked goods |
| Horseradish | Sauces (for beef, chicken, fish), egg salad, potatoes, beets |
| Juniper | Marinades, braises (especially game), sauerkraut, gin, and liqueurs |
| Mace | Some forcemeats, pork, fish, spinach, other vegetables, pickles, desserts, and baked goods |
| Mustard | Pickling, meats, sauces, cheese and eggs, prepared mustard |
| Nutmeg | Sauces and soups (especially cream), veal, chicken, aspics, spinach, mushrooms, potatoes, other vegetables, desserts (especially custards), baked goods |
| Paprika | Braises and stews (including goulash), sauces, garnish |
| Pepper | Stocks, sauces, meats, vegetables, many other uses |
| Saffron | Poultry, seafood, rice pilafs, sauces, soups, some baked goods |
| Star anise | Asian dishes, especially pork and duck |
| Turmeric | Curries, sauces, pickling, rice |

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| **Pepper** |  |
| Black peppercorns | Available as whole berries, cracked, or ground. The Telicherry peppercorn is one of the most prized. Mignonette or shot pepper combines coarsely ground or crushed black and white peppercorns. |
| White peppercorn | Black peppercorns are allowed to ripen, and then the husks are removed. They may be preferred for pale or lightly colored sauces. They are available in the same form as black peppercorns. |
| Green peppercorns | Unripe peppercorns packed in vinegar or brine are also available freeze-dried (they must be reconstituted in water before use). |
| Cayenne | A special type of chili, originally grown in Cayeene in French Guiana, is dried and ground into a fine powder. The same chili is used to make hot pepper sauces. |
| Chili flakes | Dried, whole red chili peppers that are crushed or coarsely ground. |
| Paprika | A powder made from dried sweet peppers (pimientos). Available as mild, sweet, or hot. Hungarian paprikas are considered superior in flavor. |

Source: The New Professional Chef (6th edition). The Culinary Institute of America. New York: Van Nostrand Reinhold. 1996.

**Seasonings Blends** Yield: 1 quart

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| --- | --- | --- | --- | --- | --- | --- |
| **Mexican** *adapted from USDA Recipe, Mexican Seasoning Mix, G-01A* | Onion powderGarlic, granulatedPaprika, smokedCumin, groundChili powder | 1/3 cup1/3 cup1/3 cup1 ¼ cup1 ¾ cup |  | **Barbecue** | Onion powderGarlic, granulatedPaprika, smokedCumin, groundBlack pepper | 1 cup1 cup7/8 cup7/8 cup¼ cup |
| **Buffalo** | Onion powderGarlic, granulatedPaprikaChili pepperRed pepper | 1 cup1 ¼ cup¼ cup1 ¼ cup¼ cup |  | **Ranch** | Garlic, granulatedOnion powder Dill weed Black pepper | 1 ¼ cup1 ¼ cup1 ¼ cup¼ cup |
| **Italian***adapted from USDA recipe, Italian Seasoning Mix, G-01* | Basil, driedOregano, driedMarjoram driedThyme dried | 1 1/3 cup1/3 cup1 cup1/3 cup |  | **Parmesan-Rosemary** | Garlic, granulatedRosemary, crushedParmesan cheese | ½ cup¾ cup2 ¾ cups |
| **Caribbean Spice** | Ginger, groundBlack pepper, groundOrange peel, dried, groundMace, groundCloves, groundBrown sugar | 1 cup1 cup7/8 cup1 tablespoon1 tablespoon1 cup |  | **Spice Rub** | Onion powderGarlic, granulatedPaprikaCumin, groundChili powderBlack pepperBrown sugar | 5/8 cup5/8 cup5/8 cup5/8 cup5/8 cup2 tablespoons¾ cup |
| **Garlic & Herb** | Granulated onionGarlic, granulatedPaprika Oregano leaves Thyme leaves | 1/3 cup2/3 cup1 cup1 cup1 cup |  | **Tandoori** | PaprikaCumin, ground Coriander Cayenne Pepper Ginger, groundTurmeric  | 2/3 cup2/3 cup2/3 cup2/3 cup2/3 cup2/3 cup |

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| ADDING SALT | Salt may be added to these seasoning blends according to your flexibility.Using 1 teaspoon of salt for 50 portions adds about 45 mg of sodium per portion.Using 1 tablespoon of salt for 100 portions adds about 70 mg of sodium per portion. |

Vinegar

"vinegar" comes from the French vin aigre, or sour wine. Vinegar is an acidic liquid produced through fermentation. Souring is a natural process when an alcoholic liquid is exposed to the air. Bacteria present in the air convert the alcohol into a natural acetic acid, and it is this acid that gives vinegar its characteristic sharpness.

Vinegar is an essential ingredient in the kitchen and a highly versatile flavoring. It should be kept in a cool place away from light; it does not need to be refrigerated. If stored correctly, most vinegars can be kept almost indefinitely.

Types Of Vinegar

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| --- | --- | --- | --- |
| Vinegar | Acetic Acid | Flavor | Uses |
| Wine vinegar*France, Italy, Spain*ChampagneSherryBalsamic | At least 6 % acetic acid | Produced from red and white wines, the quality of the vinegar depends on the quality. There are almost as many types of wine vinegar as there are wines. | Wine vinegars are ideal for mayonnaise and all kinds of salad dressings. They are also used in many classic butter sauces, such as béarnaise. |
| Malt vinegar*England* | 4-8 %  | Malt vinegar is made from grain (malted barley) and is strongly flavored.  | It is often used as a pickling vinegar for onions and other vegetables. It is also used in the manufacture of sauces and chutneys. It is best with straightforward food such as fish and chips, cold meats, or when preparing relishes and chutneys. |
| Cider vinegar*North America* | 5-6 % | It has a strong, sharp flavor and should only be used where it complements the other ingredients. | Apple cider vinegar is best for salads, dressings, marinades, condiments, and most general vinegar needs. Cider vinegar is the best choice for deglazing pork chops accompanied by sautéed apples. Used in fruit pickling. |
| Rice wine vinegar*Far East* | 2-4 %  | Japanese rice vinegars are mellow and mild, while vinegar from China is sharp and sometimes slightly sour. | Rice vinegar is popular in Asian cooking and is great sprinkled on salads and stir-fry dishes. Its gentle flavor is perfect for fruits and tender vegetables. |

**Citrus**

* Lemon
* Lime
* Orange
* Grapefruit
* Kumquat
* Tangerine

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| Zest | Use | Tool |
| Fine Zest | Dressings, sauces, cookies | Microplane |
| Coarse zest | Muffins or salads | Zester |
| Citrus peel | Flavoring soups, waterLemon extract powder | Vegetable peeler |

**Zesting citrus:**

* Wash and dry fruit thoroughly before zesting.
* Remove zest from the fruit BEFORE cutting or juicing the fruit.
* Remove ONLY the outer part of the peel; do not include the bitter white pith.

*Citrus Salt*

Kosher salt 1/4 cup

Lemon zest 1 tablespoon finely grated

Lime zest 1 tablespoon finely grated

Orange zest 1 tablespoon finely grated

*adapted from: www.chow.com*

*Citrus Sugar*

Lemon zest 1 teaspoon

Lime zest 1 teaspoon

Grapefruit zest 1 teaspoon

Orange zest 1 teaspoon

Granulated sugar 1 cup

*adapted from: www.marthastewart.com*

# Reduce the Sodium

*What is sodium?*

Sodium is a mineral that everyone needs to regulate body fluids. It also helps nerves and muscles function properly. Sodium is abundant in our food supply.

*Salt or sodium*

* Sodium chloride is the chemical name for salt.
* 90 % of the sodium we consume is in the form of salt. Most of this is found in processed food and food service operations.
* Salt (NaCl) is 40% sodium (Na) and 60% chloride (CL).

*The problem with too much sodium*

* Too much sodium is the leading risk factor for high blood pressure.
* High blood pressure is the major risk factor for heart disease and stroke; both are leading causes of death in the US.
* Americans consume substantially more than recommended, more than 3400 mg daily.

*Recommendations*

* The 2020-2025 Dietary Guidelines for Americans recommend limiting sodium to less than 2300 mg daily (roughly equivalent to one teaspoon of table salt) for the general public.
* Recommend 1500 mg per day for certain populations, such as people with hypertension, prehypertension, or other risk factors for cardiovascular disease.

**Final Rule for Sodium in School Meals**

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| **Age/Grade****Group** | **Current Sodium Limit: In place through June 30, 2027**  | **Sodium Limit: Must be implemented by July 1, 2027 (approximate 15% reduction for lunch and approximate 10% reduction for breakfast from current limits)** |
| **School Breakfast Program** |
| K-5  | ≤ 540 mg | ≤ 485 mg |
| 6-8  | ≤ 600 mg | ≤ 535 mg |
| 9-12  | ≤ 640 mg | ≤ 570 mg |
| **National School Lunch Program** |
| K-5  | ≤ 1,110 mg | ≤ 935 mg |
| 6-8  | ≤ 1,225 mg | ≤ 1,035 mg |
| 9-12  | ≤ 1,280 mg | ≤ 1,080 mg |

Source: <https://www.fns.usda.gov/cn/school-nutrition-standards-updates/sodium>.

Limits apply to the average amount of sodium in lunch and breakfast menus offered during a school week.

*Where is it found*

* Salt, or sodium chloride, is the diet's primary sodium source.
* Processed foods

**Sodium-Rich Ingredients**

Sodium is found in a variety of compounds used as food ingredients. It both preserves food and enhances flavor. Look for added sodium in ingredient lists and check labels for sodium content.

|  |  |
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| Ingredient  | Function |
| Monosodium glutamate (MSG)  | Flavor enhancer |
| Sodium benzoate | Preservative |
| Sodium caseinate  | Thickener and binder |
| Sodium citrate  | Buffer is used to control acidity in soft drinks. |
| Sodium nitrite | Curing agent in meat. |
| Sodium phosphate  | Emulsifier and stabilizer |
| Sodium propionate  | Mold inhibitor |
| Sodium saccharin  | Artificial sweetener |

*Sodium labeling*

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| Label term | Definition |
| Sodium free | Less than 5 mg per serving. |
| Very low sodium | 35 mg or less per serving and, if the serving is 30 g or less or 2 tablespoons or less per 50 g of the food. |
| Low sodium | 140 mg or less per serving and, if the serving is 30 g or less or 2 tablespoons or less, per 50 g of the food. |
| Reduced or Less sodium. | At least 25 percent less per serving than the reference food. |
| Unsalted or no salt added | no salt is added during processing; however, the product may still contain sodium |

**Label Reading**

**Sodium**

**Salt in Cooking**

* Tastes good and is inexpensive.
* Our taste (sensory preferences) for salt can be decreased.
* Make gradual changes to lessen the amount of sodium over time.

*Functions of Salt*

* Added salt improves the sensory properties of virtually every food, making it “taste” better.
* Salt was found to improve the perception of product thickness.
* Salt will enhance other tastes, such as sweetness.
* Used in curing meat and bringing products.
* Used in baking to control yeast.
* Retains moisture.
* Salt removes excess water from cheeses, creating a firmer texture and contributing to reliability, shredding, stretching, and flow characteristics.
* Enhancing raw poultry, beef, pork, and seafood products with sodium-containing (salt, sodium phosphates) solutions to improve the tenderness (juiciness) of leaner cuts of meat.
	+ A regular serving of meat (4 ounces) without enhancement contains 68 mg of sodium.
	+ The same serving of meat injected up to 10 percent of its weight with brine contains 384 mg sodium per serving.

*Strategies for sodium reduction*

* Gradual reduction without students' knowledge
* Use of low-sodium foods
* Modification of the size and structure of salt particles
* Use of substitutes and enhancers

**Salt**

|  |  |  |  |
| --- | --- | --- | --- |
| Salt | Amount | Weight | Sodium (mg) |
| Table salt | 1 teaspoon | 6 grams | 2300 |
| Diamond Crystal kosher salt | 1 teaspoon | 2.8 grams | 1120 |
| Morton kosher salt | 1 teaspoon | 4.8 grams | 1920 |
| Morton sea salt | 1 teaspoon | 5.6 grams | 2240 |
| Diamond Crystal Salt Sense*Ingredients: salt, silicon dioxide, tricalcium phosphate, sodium bicarbonate, dextrose, potassium iodine* | 1 teaspoon | 3.2 grams | 1560 |
| Morton Salt Substitute*Ingredients: potassium chloride* | 1 teaspoon | 3.6 grams | 0 |

**Sodium in Condiments, Sauces, Salad Dressings**

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| --- | --- |
| ***Ingredients naturally low in sodium*** |  |
| Vegetables, fresh, frozenVegetable juices (freshly made)Fruits and fruit juicesVinegarsCitrus juices  | House-made stocksSun-dried tomatoesHerbsSpices |

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| --- | --- |
| ***Ingredients high in sodium*** |  |
| Pre-prepared salad dressingsPre-prepared saucesFood bases (chicken, beef, vegetable, etc.) | Spice salts (garlic salt, celery salt, etc.)Pre-prepared mayonnaiseCanned vegetable juices |

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| **Some high-sodium condiments** |
| Onion saltCelery saltGarlic saltSeasoned saltMeat tenderizerBouillon | Soy sauceSteak sauceBarbeque sauceKetchup | MustardWorcestershire sauceSalad dressingsPicklesChili sauceRelish |

**Mean Sodium Content of Condiments, Sauces, and Salad Dressings**

|  |  |
| --- | --- |
| Packaged food category | mg sodium (mean value) |
| Barbecue sauce, ketchup, steak sauce, marinades | 1081 mg / 100 gm |
| Salsa, dips, dipping sauces, tartar sauces, mustard sauce, sweet and sour sauce | 712 mg / 100 gm |
| Asian-style condiments | 706 mg/tbsp. |
| Salad dressing | 1019 mg / 100 gm |
| Mayonnaise and mayonnaise-type dressing | 713 mg / 100 gm |
| Entree sauces (tomato-based pasta sauces) | 442 mg / 100 gm |
| Entree sauces (gravy, cheese, pizza, Alfredo) | 550 mg / 100 gm |
| Dry seasoning mixes | 415 mg/serving |