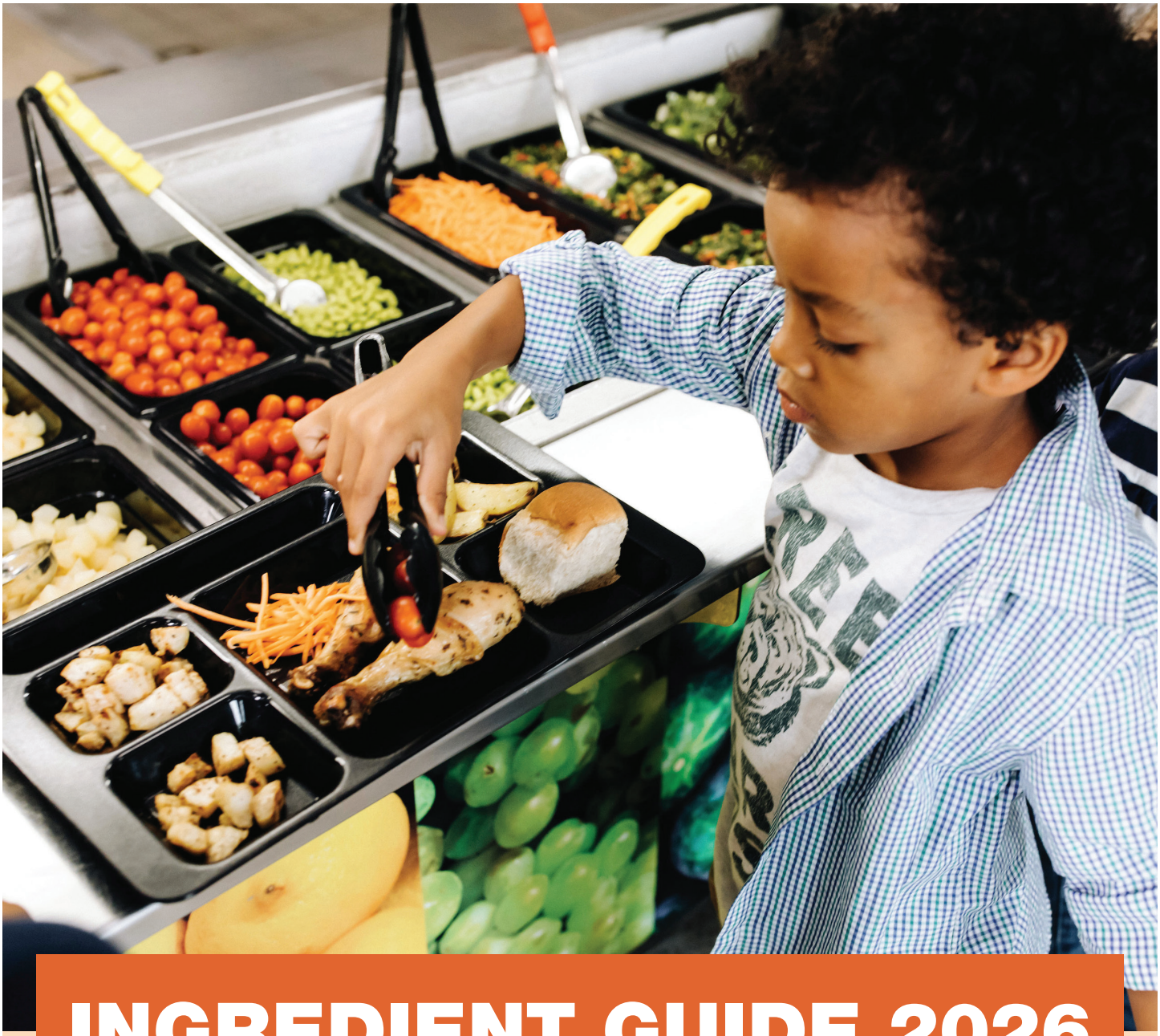


INGREDIENT GUIDE 2026

for Better School Food Purchasing

Last updated November 2026

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This document is a science-based tool created primarily by school nutrition professionals, for school nutrition professionals, in partnership with Center for Science in the Public Interest. The original Ingredient Guide for Better School Food Purchasing was developed in 2014 by school nutrition leaders from seven districts in the upper Midwest region, the nonprofit School Food FOCUS, and Lisa Lefferts, Senior Scientist at Center for Science in the Public Interest. In 2019, updating the Ingredient Guide became a project of FoodCorps' supply chain engagement work group, which was facilitated by Jillian Dy, Director of Supply Chain Engagement. In 2022 FoodCorps was replaced by Life Time Foundation as the co-facilitator and continues to be the collaborative work of the Ingredient Guide Work Group.

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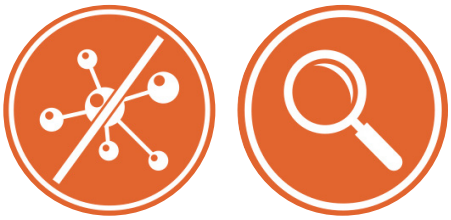
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Ingredient Guide Introduction



This guide is a resource for school food leaders and manufacturers alike who are committed to improving the overall quality, nutritional value and safety of food provided to all students in every school. It highlights unwanted ingredients to eliminate, and those to watch out for as new food products are developed and others are modified.

How To Use:

School districts should decide what works best for their school food programs according to the unique needs of their community. This guide is a tool that can be used by school districts of any size or geographic location to:

- Share with industry partners, manufacturers, food entrepreneurs, brokers and anyone wanting to enter the school nutrition space to guide their decision-making process in the development of new products and alteration of current products intended for schools; it can be used to help clarify expectations and understand market demand.
- Guide purchasing decisions and recipe development; it can be used directly in food bids or RFPs (Requests for Proposal).
- Communicate food philosophy to students and families via school nutrition websites or social media platforms.
- Steer overall menu direction and program vision.
- Overall, if school nutrition operators using this guide have questions about whether or how an ingredient is used, we encourage them to reach out to the manufacturer or vendor.

"Better School Food Purchasing" Definition

A food product should include whole foods like whole grains, fruits, vegetables, proteins or dairy that are minimally processed or in their purest form; simply food made from food. A food product should not include unnecessary ingredients.

Nutrition Statement

The school nutrition leaders who contributed to creating this tool are committed to providing students with healthy, minimally processed, whole foods through school meal programs. In an effort to lead the nation in changing school food for the better, school districts are encouraged to develop menus that align with the age-appropriate recommendations in the 2020–2026 Dietary Guidelines for Americans, and then, when needed, exceed federal nutrition requirements for Child Nutrition programs. Healthy eating patterns are essential for students to achieve their full academic, physical and mental growth potential, and to support long-term health and well-being. Additionally, school districts are encouraged to provide nutrition education through the school food environment so that students will become healthy lifelong consumers.

Environmental and Public Health Impact

The term "healthy" refers not only to what is healthy for the individual, but also what is healthy for the environment, and the public. Food purchases affect, and are affected by, environmental and public health issues such as antibiotic resistance, climate change and chemical contaminants in food, food packaging, water, air, soil, crops and animals. While the focus of this guide is ingredients added to food and their safety or healthfulness to children, districts are also encouraged to:

- Prioritize purchasing foods produced more sustainably (ODPHP, 2020) and locally sourced, using a definition of local appropriate for their school district.
- Increase offerings of plant-based foods, such as vegetables, fruits, whole grains, legumes, nuts and seeds (Leiserowitz et al., 2020).
- Choose products that have third-party verified claims of responsible use of medically important antibiotics (e.g., Certified Organic, Certified Responsible Antibiotic Use, No Antibiotics Ever).
- Minimize or phase out single-use packaging and packaging that contains chemicals of concern, including bisphenols, ortho-phthalates, and per- and polyfluoroalkyl substances (PFAS) (Muncke et al., 2020; Environmental Defense Fund; Muncke, 2021).

Some districts may also wish to consider other third-party verified claims when purchasing commercial products (e.g., American Grassfed, Certified Humane, Animal Welfare Approved, or American Humane Certified).

In these ways, school districts can also help support the regional economy and our surrounding communities, and provide our students opportunities to understand the benefits and importance of healthy food systems.

For example, certified organic foods and seafood that are identified as a "best choice" or "good alternative" on the Monterey Bay Aquarium Seafood Watch list, or similarly certified by other equivalent programs.

Why is this guide needed?

The system for overseeing the safety of substances added to the food supply has been widely criticized (Trasande et al., 2018; GAO, 2010; CSPI, 2015; CSPI, 2017; Pew Charitable Trust, 2013). Some food chemicals have never been formally approved by the FDA because a legal loophole allows industry to self-determine that substances are "generally recognized as safe," or GRAS, and begin using the substance without notifying the FDA. For example, most additives have not been tested for safety according to FDA's testing recommendations, and FDA does not have a policy of using an additional safety factor to better protect children, as do some agencies. FDA also lacks a system for routinely reassessing the safety of substances added to food in order to take into account new scientific information. These are some of the reasons behind the development of this Guide.

Unwanted List



Ingredients that are not acceptable at any level in newly developed products, and should be eliminated over time from existing products.

① ARTIFICIAL COLORS

Synthetic Food Dyes (Blue 1, Blue 2, Green 3, Red 3, Red 40, Yellow 5, Yellow 6)

Description: Synthetic food dyes are colorings added to processed foods to make them look more appealing.

Concern: The scientific literature indicates that synthetic food dyes can affect neurobehavior in some children, according to the State of California and other independent reviews and studies (Lefferts et al., 2016; Conners et al., 1976; CA OEHHA, 2021; Nigg et al., 2012; Sonuga-Barke et al., 2013; Schab et al., 2004; Faraone et al., 2014; Nigg et al., 2014; Arnold et al., 2013; Arnold et al., 2012; Stevens et al., 2011; Stevenson et al., 2014; Bateman et al., 2004; McCann et al., 2007). The 2021 CA OEHHA report represents the most comprehensive and rigorous evaluation of the relationship between synthetic dyes and children's behavior to date (CSPI, 2022). Some dyes are also known to cause allergic or hypersensitivity reactions (Kobylewski et al., 2010). In Europe, foods containing certain dyes (including Red 40, Yellow 5 and Yellow 6) are required to carry a warning label that the dyes "may have an adverse effect on activity and attention in children." In 1990, FDA concluded that Red 3 is a carcinogen, based on studies in animals, and banned some uses of Red 3 (in cosmetics and externally applied drugs), but never finished banning all uses, including in food (CFR, 2020). Animal studies show that certain food dyes or contaminants in food dyes may pose a risk of cancer (Lefferts et al., 2016). Synthetic food dyes also often substitute for actual fruit or other "real" ingredients.

The 2023 California Food Safety Act bans Red 3 (as well as 3 other food additives) from food sold or distributed in the state and goes into effect in 2027 (CSPI, 2023). In September 2024, the California School Food Safety Act banned the six synthetic dyes - Blue 1, Blue 2, Green 3, Red 40, Yellow 5, and Yellow 6 from foods served or sold in public schools in the state of California also effective in 2027 (CSPI, 2024a).

Caramel Color CL 3-4

Description: Caramel color is made by heat treatment of sugar compounds. Class III and IV are made with ammonium compounds as well. These ingredients are commonly found in processed foods such as soy and Worcestershire sauces, chocolate-flavored products, baked goods and precooked meats, but the most significant sources in the diet are colas and caramel-colored beverages.

Concern: When produced with ammonia, caramel coloring contains contaminants (i.e., 2-methylimidazole, 4-methylimidazole), which have been found to cause cancer in animal studies conducted by the National Toxicology Program (NTP) (FDA, 2014). The International Agency for Research on Cancer (IARC), a division of the World

Health Organization, has concluded that 2-methylimidazole and 4-methylimidazole are "possibly carcinogenic to humans" (IARC, 2013a; IARC, 2013b). Furthermore, under Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986, the state of California classifies 2-methylimidazole and 4-methylimidazole as carcinogenic (OEHHA, 2016).

Titanium Dioxide

Description: Titanium dioxide is a synthetic pigment used to make foods white, opaque or brighter in color.

Concern: Food-grade titanium dioxide contains very small particles, called nanoparticles, which evidence suggests can be absorbed and accumulate in the body over time. These titanium dioxide nanoparticles have been linked to DNA damage and harm to the immune system and brain. The European Union recently banned use of titanium dioxide in food over these concerns, but it is still permitted in the U.S (Younes et al., 2021; EFSA, 2021). Like some other artificial colors, titanium dioxide does not have to be listed by name on a food's ingredient label. It can simply be labeled as "artificial color," making it difficult for consumers to entirely avoid foods containing titanium dioxide.

② ARTIFICIAL & UNSPECIFIED NATURAL FLAVORS

Description: The term artificial flavor or artificial flavoring is defined by the Food and Drug Administration (FDA) as "any substance, the function of which is to impart flavor, which is not derived from a spice, fruit or fruit juice, vegetable or vegetable juice, edible yeast, herb, bark, bud, root, leaf or similar plant material, meat, fish, poultry, eggs, dairy products, or fermentation products thereof" (CFR, 1993). The term natural flavor or natural flavoring is defined by the FDA as "the essential oil, oleoresin, essence or extractive, protein hydrolysate, distillate, or any product of roasting, heating or enzymolysis, which contains the flavoring constituents derived from a spice, fruit or fruit juice, vegetable or vegetable juice, edible yeast, herb, bark, bud, root, leaf or similar plant material, meat, seafood, poultry, eggs, dairy products, or fermentation products thereof, whose significant function in food is flavoring rather than nutritional" (CFR, 1993). These types of flavors are commonly found in processed foods such as breakfast cereals, desserts, soft drinks and many other foods.

Concern: The use of artificial and natural flavors indicates the absence of whole ingredients, most often fruits. A standing expert panel sponsored by the Flavor and Extract Manufacturers Association, not the FDA, decides whether flavorings are safe and can be added to food (Neltner et al., 2013). Some people may be sensitive to certain flavoring ingredients (CSPI, 2014). The FDA allows manufacturers to put flavor on ingredient lists without any specifics of what flavors are used. School food service departments are requesting that when natural flavors are used, they include specific details explaining from which ingredients the natural flavors are derived. Many districts have students that are allergic or sensitive to certain ingredients, or who do not want to consume flavors that are derived from animals.

CSPI's 2024 report, "Hidden Ingredients: What are 'Flavors' and 'Spices,' and are they Safe?" provides an in-depth analysis of the use, regulation and issues surrounding the safety of flavors and spices in foods (CSPI, 2024b).

③ ARTIFICIAL PRESERVATIVES

Butylated Hydroxyanisole (BHA)

Description: BHA is an antioxidant preservative that retards rancidity in fats and oils; commonly found in processed products, particularly meats, cereals, potato chips and vegetable oils.

Concern: In the U.S. Report on Carcinogens, the National Toxicology Program within the Department of Health and Human Services lists BHA as "reasonably anticipated to be a human carcinogen" (NTP, 2021).

Butylated Hydroxytoluene (BHT)

Description: BHT is an antioxidant preservative that retards rancidity in oil. It is commonly found in processed foods, particularly cereals, meats and oils.

Concern: Some animal studies of carcinogenicity and chronic toxicity of BHT have shown contradictory results (CSPI, 2014; Nieva-Echevarría et al., 2015). The Center for Science in the Public Interest recommends that BHT be replaced by safer substitutes or left out of foods altogether (CSPI, 2014).

Propyl Gallate

Description: Propyl gallate is an antioxidant used to protect fats, oils and fat-containing foods from going rancid, and is commonly found in meat products, soup bases and potato sticks. It is commonly used in conjunction with BHA and BHT (CSPI, 2014).

Concern: Safety studies published by the U.S. government have shown concerning results. In one study propyl gallate appeared to cause cancers in rats treated with a low dose of propyl gallate as opposed to those treated with a zero dose or high dose (NTP, 1982). The Center for Science in the Public Interest explains that this finding indicates this food additive could be an endocrine disruptor, as well as a carcinogen, and test-tube studies also find endocrine-disrupting effects, but more research is recommended to better understand how this additive affects human health (CSPI, 2014; Pop et al., 2018).

Tert-Butylhydroquinone (TBHQ)

Description: TBHQ is an antioxidant preservative that is used to prevent rancidity. Sometimes it is used in conjunction with BHA, BHT and propyl gallate. It is commonly found in vegetable oil, snack foods, cereals and other fat-containing foods (CSPI, 2014).

Concern: A government animal study showed TBHQ increased the incidence of tumors (CSPI, 2014; Abdo et al., 1996).

④ ARTIFICIAL SWEETENERS & OTHER SUGAR-FREE (Non-Nutritive, Low-Calorie and Reduced-Calorie) SWEETENERS

Description: Artificial and other sugar-free sweeteners include a wide range of sugar substitutes, including but not limited to: Acesulfame Potassium, Advantame, Aspartame, Monk Fruit Extract, Neotame, Saccharin, Stevia Leaf Extract (Rebiana), Sucralose, various Sugar Alcohols (Erythritol, Hydrogenated Starch Hydrolysate, Isomalt, Lactitol, Maltitol, Mannitol, Sorbitol, Xylitol) and Thaumatin. (Cyclamate has been banned in the United States, and Brazzein and Monatin are not yet used/permitted. Low- and reduced-calorie sugars metabolized differently from traditional sugars are discussed below.) These sweeteners are used to improve sweetness in foods or beverages with fewer calories than those produced with caloric sweeteners (e.g., cane sugar, high-fructose corn syrup). These ingredients can be found in a range of products such as diet beverages, baked goods, yogurts and cereals, and are not limited to products labeled as diet or low-sugar.

Concern: Evidence on the safety of these sweeteners for children is lacking. The American Academy of Pediatrics found that "the long-term safety of non-nutritive sweeteners in childhood has not been assessed in humans." A 2018 American Heart Association Scientific Advisory advises against prolonged consumption of low-calorie sweetened beverages by children. A 2019 Consensus Statement on Healthy Beverage Consumption in Early Childhood (ages five and under) by four national health and nutrition organizations finds beverages sweetened with caloric or low-calorie sweeteners "not recommended." A few artificial sweeteners, especially aspartame, but also acesulfame potassium, saccharin, and sucralose may pose a risk of cancer (CSPI, 2014; Landrigan et al., 2021; Belpoggi et al., 2006; Soffritti et al., 2007; Soffritti et al., 2010; Soffritti et al., 2014; Tibaldi et al., 2020; Schernhammer et al., 2012; Soffritti et al., 2016). Sugar alcohols can cause diarrhea or other gastrointestinal distress in sufficient quantities, although this is much less likely with erythritol. A 2026 study suggests erythritol may be linked to heart problems, but further research is needed to confirm this (Witkowski et al., 2026).

⑤ EMULSIFIERS

Brominated Vegetable Oil (BVO)

Description: BVO is an emulsifier and acts as a clouding agent, primarily in soft drinks, by keeping flavor oils in suspension.

Concern: BVO is poorly tested and has been on an interim list from FDA for decades, after being removed from the FDA's list of ingredients "Generally Recognized as Safe" in 1970 (CFR, 2020; CSPI, 2014). BVO is not permitted in Europe. Consuming BVO leaves residues in body fat as well as fat in the brain, liver and other organs. Animal studies indicate that BVO can cause heart lesions, changes in the liver, impaired growth and behavioral development (CSPI, 2014). Some people who consumed extremely large amounts of soft drinks containing BVO have experienced symptoms of bromine toxicity, including headache, fatigue and serious neurological symptoms (Horowitz, 1997). More studies are needed to fully understand the risk, especially for lower levels typically consumed by children (CSPI, 2014; Horowitz, 1997).

Effective August 2, 2024, the FDA revoked authorization allowing use of BVO as a food additive. Manufacturers have one year from the effective date to "reformulate, relabel, and deplete the inventory" of their products containing BVO (FDA, 2024a).

Carboxymethylcellulose (CMC) and Polysorbates

Description: CMC, also called cellulose gum, is an emulsifier and thickening agent used to improve texture, bind water and prevent sugar from crystallizing. It is used in ice cream, pie fillings, jellies, cake icings and diet foods. Polysorbates (polysorbate 60, 65 and 80), also emulsifiers, keep baked goods from going stale and prevent oil from separating out of artificial whipped cream. They are also used in frozen desserts.

Concern: A 2015 study funded by the National Institutes of Health found that both CMC and Polysorbate 80 affected gut bacteria and triggered inflammatory bowel disease symptoms, as well as obesity and metabolic syndrome. They also promoted colitis in mice prone to the disease (Chassaing et al., 2015). It is possible that polysorbates, CMC and other emulsifiers act like detergents to disrupt the mucous layer that lines the gut. Research is needed to determine long-term effects of these and other emulsifiers (CSPI, 2014). CMC is not absorbed or digested, so the FDA allows it to be included with "dietary fiber" on food labels. CMC isn't as healthful as fiber that comes from natural foods (CSPI, 2014).

⑥ FLOUR TREATMENT AGENTS

Bromated Flour/Potassium Bromate

Description: Bromated flours are those that contain the additives potassium bromate or calcium bromate. These additives are flour "improvers" used to strengthen dough, allowing for greater oven spring and higher rising. This type of flour is used in white breads, rolls, crackers and pizza crusts.

Concern: The majority of bromate breaks down in the baking process. However, the main concern is that various animal studies demonstrate an association of potassium bromate with cancer (CSPI, 2014). The International Agency for Research on Cancer considers potassium bromate to be possibly carcinogenic to humans, and the U.S. Environmental Protection Agency considers it to be a probable human carcinogen (IARC, 1999; EPA, 2021). California's Proposition 65 also lists potassium bromate as a carcinogen (IARC, 2013b). Many countries with the exception of the U.S. and Japan have banned bromates (CSPI, 2014).

The 2023 California Food Safety Act banned potassium bromate (as well as three other additives) from food sold or distributed in the state starting in 2027 (CSPI, 2023).

Azodicarbonamide (ADA)

Description: Azodicarbonamide (ADA) is a chemical substance used by commercial bakers as a dough conditioner for bread baking and as a whitening agent in cereal flour (Cañas et al., 1997). ADA is used in baked products such as breads, rolls and pizza crusts.

Concern: During bread making, ADA completely breaks down to form other chemicals, one of which is semicarbazide (SEM). Animal studies have shown that SEM used at high levels has increased the incidence of tumors when fed to female mice (Cañas et al., 1997).

Another chemical that is a result of ADA's breakdown is urethane, a recognized carcinogen (CSPI, 2014; Cañas et al., 1997). The FDA explains that ADA is not necessary for bread making and there are alternative ingredients approved for use available (FDA, 2016).

Potassium Iodate

Description: Potassium iodate is sometimes used as a dough strengthener in bread and rolls. Potassium iodate is a source of iodine, an essential trace element necessary for the body to make thyroid hormones. But too little or too much iodine can be harmful.

Concern: A committee of the World Health Organization concluded that use of potassium iodate as a flour treatment agent was unacceptable because it could result in an excessive intake of iodine (Joint FAO/WHO, 1965). Some people, such as those with thyroid disease, are especially sensitive to iodine intake and should make a special effort to avoid potassium iodate in bread and rolls (CSPI, 2014; Leung et al., 2014). One other possible concern is that iodate breaks down in dough and in the body to form iodide. In a study conducted by Japanese government scientists, high doses of potassium iodide caused cancer in rats, suggesting it may be a weak carcinogen. The same research found that it also increased the potency of a known carcinogen (CSPI, 2014; Takegawa et al., 2000).

⑦ NITRITES/NITRATES AND PROCESSED MEAT

Description: Processed meat is meat that has been transformed through salting, curing, fermentation, smoking, or other processes to enhance flavor or improve preservation. Examples of processed meat include hot dogs (frankfurters), deli meat, ham, sausage, corned beef, beef jerky and canned meat.

Concern: In 2015, the International Agency for Research on Cancer (IARC) at the

World Health Organization classified processed meat as "carcinogenic to humans" (IARC, 2015). IARC found that there was "sufficient" evidence of carcinogenicity in humans, meaning, there is convincing evidence that processed meat causes cancer, in this case, colorectal cancer. If processed meats are served, they should be served infrequently, to reduce risk. While consuming vegetables that are naturally high in nitrates / nitrites are not of concern, the juice and powder of these vegetables can be added to processed meats. The consumption of processed meats that contain either synthetic or natural sources of nitrates are concerning because the combination of added nitrates / nitrites, protein, and heme from the meat helps form N-nitroso compounds like nitrosamines, which can be carcinogenic (CSPI, 2019a?b?; CSPI, 2020). Natural sources of nitrates / nitrites can be listed generally as vegetable juice/powder or specifically as the powder or juice of vegetables naturally high in nitrates including, but not limited to, celery, beets, radish, and leafy greens such as Swiss chard, arugula, and lettuce ((CSPI, 2019a?b?; CSPI, 2020). Natural sources can have as much nitrates / nitrites as conventional products so

there is no reason to think that these natural sources "are any safer than synthetic sources.

⑧ PROPYLPARABEN

Description: Propylparaben is used as an antimicrobial agent (preservative), flavoring agent and adjuvant1 (aids the function or performance of other chemical ingredients) in food products. It is used in some food products including tortillas, icing, and baked goods. Propylparaben is part of a group of chemicals called parabens, which are also widely used in cosmetics and other personal care products.

Concern: A 2002 study reported that propylparaben reduced testosterone levels, sperm production, and sperm count in young rats (Oishi, 2002).2 Due to this study, the European Food Safety Authority (EFSA) did not recommend the use of propylparaben as a food additive (EFSA, 2004).3 In effect, propylparaben is banned from foods in the EU. In 2007, the World Health Authority (WHO) reached the same conclusion as EFSA that propylparaben had adverse effects on the male reproductive system in animals (WHO, 2007).4

More recently, other authoritative bodies have questioned the data from the earlier reproductive toxicity studies. In 2019, Health Canada's Food Directorate did not agree with EFSA's or WHO's conclusions and lists propylparaben as a permitted preservative (Health Canada, 2019).5 In a 2021 report, the EU Scientific Committee on Consumer Safety (SCCS), which assesses the safety of cosmetics, textiles, toys, and other non-food goods in the EU, investigated use of propylparaben in cosmetics and dismissed previous concerns for male reproductive toxicity (SCCS, 2021).6 Unlike earlier SCCS assessments, the 2021 SCCS concluded that although studies indicated a potential for endocrine effects, there was insufficient data to conclusively consider propylparaben an "endocrine disrupting substance." EFSA has not reevaluated the safety of propylparaben as a food additive in light of new evidence.

Propylparaben was banned from foods in California in 2023 (CSPI, 2023)7 and has been banned from school foods in several other states since. It was added to the FDA's list of chemicals under review in 2024 (FDA, 2026).8

Watch List

Ingredients that have the potential to be overused.

These ingredients can be a red flag since they are frequently overused, common in foods of lower nutritional quality, and/or tend to indicate a highly processed food. As a result, school districts and food manufacturers are encouraged to watch out for and limit ingredients like these, and demand transparency and accountability in their use. Items on the Watch List should be scrutinized by buyers, and their function and the amount used must be understood and justified through dialogue between districts and food manufacturers.

Biggest concern: too much added sodium and sugars. The science is clear that added sodium and all added sugars are the food ingredients that pose the greatest dietary threat to human health in the U.S. These two ingredients are included in a vast array of foods and beverages, and consequently consumed in excessive amounts leading to poor health outcomes and serious chronic diseases.

① ADDED SODIUM

Description: Sodium and sodium chloride are added to foods, often during processing, for preservative or flavor purposes. Top sources of sodium in the U.S. diet include, breads and tortillas, pizza, sandwiches, cold cuts and cured meats, soups, chips, crackers and savory snacks, condiments and gravies, grain-based dishes, meat, poultry and seafood dishes, starchy and non-starchy vegetables, and desserts and sweet snacks (CDC, 2024a).

Concern: Salt, at levels present in the diets of most people, is one of the single most harmful substances in the food supply. While the body needs small amounts of sodium to function properly, most Americans are consuming far too much of it, leading to high blood pressure, which in turn is associated with an increased risk of heart disease and stroke (CDC, 2024a). While these health problems typically manifest in adult populations, their precursors start in early childhood (Appel et al., 2015). Children ages 2 to 19 consume more than 3,100 mg of sodium a day, which is over twice the daily recommendation of the American Heart Association (AHA). The AHA recommends that Americans of all ages consume no more than 1,500 mg of sodium a day (AHA, 2018). Sodium levels in school meals are already regulated by the USDA. Sodium limits and tiered reductions are currently in place (USDA, 2012). The inclusion of added sodium on this list is intended to support planned reductions in sodium limits by removing excess added sodium from highly processed food products.

③ ADDED SUGARS

Description: Added sugars are now listed on the Nutrition Facts label (FDA, 2020). Added sugars are caloric sweeteners added to processed and prepared foods

and include but are not limited to: agave, anhydrous dextrose, brown sugar, cane juice, cane sugar, confectioner's powdered sugar, corn syrup, corn syrup solids, crystal dextrose, date sugar, dextrose, evaporated cane juice, fructose, fruit juice concentrate, high-fructose corn syrup, high-maltose corn syrup, honey, invert sugar, isomaltulose, lactose, malt syrup, maltose, maple syrup, molasses, nectars (e.g., peach nectar, pear nectar), pancake syrup, raw sugar, sucrose, sugar, sugar cane juice, trehalose, and white granulated sugar. These types of sweeteners are commonly found in most types of foods and beverages but the major source of these are in sugar-sweetened beverages (e.g., soft drinks, energy drinks, sports drinks, fruit drinks) and desserts/sweet snacks (e.g., cakes, cookies, pies, cobblers, sweet rolls, pastries, donuts, ice cream) (CDC, 2024b). Added sugars do not include naturally occurring sugars found in milk, fruits and vegetables.

Concern: Added sugars contribute calories to your diet but no essential nutrients, and make it difficult to eat healthfully without taking in too many calories.

(CDC, 2023). Excess daily consumption of added sugars, especially in beverages, has been linked to poor nutrient intake, tooth decay, overweight, obesity, diabetes, as well as the development of cardiovascular disease and its associated risk factors (CDC, 2023; CDC, 2024c; Welsh et al., 2010; Fung et al., 2009; Vartanian et al., 2007; Johnson et al., 2009). Since 1999, Americans' consumption of added sugars has decreased but still remains higher than recommended levels (CSPI, 2014; Ervin, 2005-2008; Welsh et al., 2011; Ervin et al., 2005–2010; Bowman et al., 2013–2014). While most everyone enjoys a sweet, the majority of Americans of all ages consume too much of it (Bowman et al., 2013–2014). While it is understood that certain foods and beverages require some level of added sugars, the quantities of these ingredients need to be within reason, and other foods and beverages do not require them. School food professionals may need to be mindful of total grams of added sugar and total calories from such sweeteners to ensure that their menus meet USDA Meal Pattern Guidelines as well as contribute to healthful diets for students throughout the year.

Sugary Syrups (e.g., high-fructose corn syrup, high-maltose corn syrup, high-dextrose corn syrup, corn syrup, tapioca syrup)

Description: These are a subset of added sugars. High-fructose corn syrup (HFCS) and other corn syrups are sweeteners derived from cornstarch and broken down using enzymes or acids into its glucose (also called dextrose) subunits. HFCS is further enzymatically altered to change the natural fructose to glucose ratio. HFCS is an inexpensive caloric sweetener commonly found in processed foods and beverages, and not limited to sweets. Companies are increasingly using substitutes for HFCS that are no healthier.

Concern: Between 1970 and the late 1990s, Americans' annual consumption of high-fructose corn syrup (HFCS) increased from 3.6 pounds per capita to 62.4 pounds, primarily as a result of cheap HFCS available on the market (Putnam et al., 1999). HFCS consumption declined by about 32 percent between 1999 and 2013. It is important to note that all added sugars — not just HFCS — contribute empty calories linked to numerous health problems, including weight gain, type 2 diabetes, metabolic syndrome and high triglyceride levels, which increase the risk of heart disease. All added sugars must be carefully watched and eliminated from food served in schools when not serving a vital functional or culinary purpose. However,

the proliferation of HFCS as a cheap caloric sweetener in the food supply deserves special mention. It is ubiquitous in overly processed, low-quality foods that districts seek to eliminate from their menus.

③ CAFFEINE (Especially Added Caffeine)

Description: Caffeine is a stimulant that can be found naturally in some plant-based foods and drinks, such as chocolate, coffee and tea, and it is also added to many manufactured products. Common sources of added caffeine consumed by children include soda, coffee, tea and energy drinks, and it can also be found in chocolate and some coffee-flavored foods (e.g., ice cream), other beverages (water, juices) and snack foods (mints, gummy candy, chewing gum, peanut butter, energy bars) with added caffeine, lip balms and some skincare products, some over-the-counter medications and supplements (AACAP, 2020).

Concern: Caffeine is one of the few drugs present naturally and added to widely consumed foods. Caffeine can disrupt sleep, cause jitteriness, anxiousness, nausea and headache (AACAP, 2020; FDA, 2024b). Caffeine can also affect calcium metabolism, and caffeinated beverages can displace calcium-rich beverages (ABH, 2019). Caffeine has some benefits, but several authorities recommend against caffeine for children. Caffeine is consumed regularly by children, and some caffeinated products are marketed specifically to children (Temple, 2009). There is currently no proven safe dose for children and the American Academy of Pediatrics advises against caffeine for children under 12, against any use of energy drinks for children and teens, and limiting caffeine to at most 100 mg daily for those 12 to 18 years (AACAP, 2020). Further research is needed to better understand the long-term consequences of children's caffeine consumption (Temple, 2009).

④ NATURAL FLAVORS (Specified)

Description: The term natural flavor or natural flavoring is defined by the FDA as "the essential oil, oleoresin, essence or extractive, protein hydrolysate, distillate, or any product of roasting, heating or enzymolysis, which contains the flavoring constituents derived from a spice, fruit or fruit juice, vegetable or vegetable juice, edible yeast, herb, bark, bud, root, leaf or similar plant material, meat, seafood, poultry, eggs, dairy products, or fermentation products thereof, whose significant function in food is flavoring rather than nutritional" (CFR, 2024).

Concern: These flavors serve no nutritional function and they are commonly found in many kinds of foods of low nutritional value. The use of natural or artificial flavors indicates that the real ingredient has been left out. School districts report that some of their children may have allergic or hypersensitivity reactions to certain ingredients. School food service departments are requesting that when natural flavors are used they include specific details about from which natural ingredients the natural flavors are derived. For example, an ingredient list should include details such as "natural flavors (banana extract)."

CSPI's 2024 report, "Hidden Ingredients: What are 'Flavors' and 'Spices,' and are they Safe?" provides an in-depth analysis of the use, regulation and issues surrounding the safety of flavors and spices in foods (CSPI, 2024b).

⑤ PHOSPHORIC ACID & PHOSPHATES

Description: Different phosphorus compounds are used for myriad purposes, including to inhibit discoloration, keep oil and water mixed together, make foods more acidic, retain moisture, act as mineral supplements, and trap trace amounts of metals that cause food to discolor or go rancid, to name a few (CSPI, 2014; Bird et al., 2021; Ritz et al., 2012; Nadkarni et al., 2014; Calvo et al., 2014).

Concern: Most people consume far more phosphorus than they need, which may have adverse effects on kidney, bone and cardiovascular health, especially for people suffering from kidney disease. Phosphate food additives are inorganic phosphorus, which is more readily absorbed than organic forms of phosphorus that are naturally occurring in food (CSPI, 2014; Bird et al., 2021; Ritz et al., 2012; Nadkarni et al., 2014; Calvo et al., 2014).

⑥ REFINED OR WHITE (including Bleached) FLOUR

Description: Refined or white flour has the germ and bran removed, the parts that contain much of the nutrients and vitamins. Bleached flour is flour that has been treated with an oxidizing agent, most commonly benzoyl peroxide, but azodicarbonamide, chlorine dioxide or other agents may be used to accelerate the natural aging process that results in a whiter color and improves its baking properties (Saiz et al., 2001). USDA regulations specify that at least half of all grain must come from whole grain, the remainder of which must come from enriched grain that has had nutrients added back after refining.

Concern: Refined and bleached flour tends to be used in highly processed foods and have less nutrients and fiber than whole-wheat flour or whole-grain flour. Rarely, benzoyl peroxide may cause reactions in those handling the flour (Adelman et al., 2019).

⑧ SUGARS METABOLIZED DIFFERENTLY FROM TRADITIONAL SUGARS: ALLULOSE & TAGATOSE

Description: Allulose is a naturally occurring sugar that has 70% of the sweetness of table sugar yet only 10% of the calories since it is poorly digested. It also causes only negligible increases in blood sugar and insulin levels. For these reasons, FDA permits allulose to be excluded from the amount of “Total Sugars” and “Added Sugars” listed on Nutrition Facts labels (HHS, 2020). It is being added to a growing number of foods such as ice cream, cereal and protein bars. Similarly, tagatose is a naturally occurring sugar that has 92% of the sweetness of table sugar and is the mirror image of fructose, but is also poorly digested and yields only about one-third as many calories (CSPI, 2014).

Concern: While allulose and tagatose may be perfectly safe replacements for added sugars, too much, like with other poorly digested carbohydrates, can cause gastrointestinal effects such as nausea, diarrhea and abdominal pain. The effects have not been well-studied, and not studied at all in children, who are estimated to consume the highest amounts per pound of body weight, nor in those with digestive disorders like irritable bowel syndrome (CSPI, 2019).

⑨ THICKENING AGENTS

Carrageenan

Description: Carrageenans are large molecules called polysaccharides that are extracted from edible red seaweeds. They are used in foods as gelling, thickening and stabilizing agents, and are found in dairy products (e.g., chocolate milk, skim milk, evaporated milk, milkshakes and instant breakfast power, cottage and cream cheese products, yogurt) dairy alternatives (e.g., almond milk, soy milk), fruit drinks, desserts (i.e., flans and custards, pudding, pie fillings), salad dressings, sauces (i.e., relish, pizza, BBQ), and tofu (CSPI, 2014; Zhanjiang, 1990).

Concern: There is not adequate data on carrageenan to firmly assess its safety, according to European food safety authorities (EFSA, 2018). The composition of carrageenan can vary, with some types and components associated with potential adverse effects, yet there is often not adequate data characterizing the composition of carrageenan used in various studies, and of food-grade carrageenan. It is unclear whether these thickening and texturing agents might cause gastrointestinal problems in people with gastrointestinal diseases (CSPI, 2014). In a very small randomized, double-blind, placebo-controlled clinical trial, carrageenan intake contributed to an earlier relapse in patients with ulcerative colitis in remission, compared to placebo. Small amounts of “degraded” carrageenan may contaminate food-grade carrageenan, and a bit more probably forms in the acidic conditions of the stomach (CSPI, 2014). While undegraded carrageenan does not cause cancer, degraded carrageenan is considered to be “possibly carcinogenic in humans’’ by the International Agency for Research on Cancer, a branch of the World Health Organization (IARC, 1983).



Allergens & Sensitivities

In the 2021 Ingredient Guide for Better School Food Purchasing, the items below were included in Unwanted and Watch Ingredient categories. In addition to the top nine most common food allergies schools are already familiar with (peanuts, tree nuts, soy, wheat, dairy, egg, fish, shellfish, sesame), we have created this new Allergens & Sensitivities category so school districts can be aware of these potentially problematic ingredients and better equipped to minimize reactions and maximize safety for the majority of our students.

Although science has shown that not all people need to avoid these ingredients, even small amounts of them can cause reactions in some students. School districts are encouraged to give preference to products free from the below ingredients since some students may be sensitive and need to eliminate them from their diet. It is important to note that the below list does not encompass all ingredients, allergens and sensitivities to which students might react.

① COLORINGS (Naturally Derived)

Annatto

Description: Annatto is a widely used food coloring obtained from the seeds of a tropical shrub. Its hue is yellow to orange.

Concern: Allergic reactions to annatto (e.g., hives) appear to be more common than allergic reactions to synthetic food dyes. As food manufacturers shift away from synthetic food dyes to naturally derived colorings like these, it will be important to watch for these ingredients as they appear on food labels.

Cochineal Extract/Carmine

Description: Cochineal extract is coloring obtained from the cochineal insect and carmine is a more purified coloring made from cochineal, which creates a stable pink, red, or purple hue in food products.

Concern: While cochineal extract and carmine appear to be safe for most people, a small percentage of individuals can suffer from allergic reactions ranging from hives to life-threatening anaphylactic shock (FDA, 2009). As food manufacturers shift away from synthetic food dyes to naturally derived colorings like these, it will be important to watch for these ingredients as they appear on food labels.

② HYDROLYZED VEGETABLE PROTEIN (HVP)

Description: Hydrolyzed vegetable protein (HVP) is vegetable (often soybean) protein that has been chemically broken down to the amino acids of which it is composed, and used as a flavor enhancer in a wide variety of foods including soups, frankfurters, sauce mixes and beef stew (CSPI, 2014). It should not be confused with isolated vegetable protein (IVP) or textured vegetable protein (TVP), both of which appear to be safe. (IVP is protein that is typically extracted from soybeans but can also be derived from other foods such as peas, and TVP is soy protein that has been combined with chemical additives and processed into granules, chunks, or strips that can function as a meat analog.)

Concern: HVP is often made through the process of acidic hydrolysis of a vegetable protein; and when using hydrochloric acid during the acid hydrolysis process, carcinogenic compounds can be produced, and the resulting product is high in salt (Aaslyng et al., 1998; EFSA, 2016). HVP also contains monosodium glutamate, which some individuals are sensitive to (Scopp, 1991).

③ MONOSODIUM GLUTAMATE (MSG)

Description: MSG is the sodium salt of an amino acid that is used to enhance the meaty (i.e., umami) flavor of foods. It is commonly found in processed foods.

Concern: MSG is commonly used to substitute for flavor, allowing food manufacturers to reduce the use of nutritionally superior ingredients (e.g., using MSG to reduce the amount of chicken needed in chicken soup). For certain sensitive individuals, large amounts of MSG have been linked to adverse reactions including but not limited to headache, nausea, weakness and a burning sensation on the back of the neck, forearms and chest. Some people report difficulty breathing, changes in heart rate or blood pressure, and chest pain (CSPI, 2014; Raiten et al., 1995). However, additional studies with better designs are needed to establish whether such effects occur in sensitive individuals at lower levels normally consumed in foods (CSPI, 2014; Zanfirescu et al., 2019).

④ MYCOPROTEIN

Description: Mycoprotein is protein made from processed mold. The only mycoprotein currently in widespread use is made from a mold called Fusarium venenatum, which is grown in liquid tanks. While the chunks of imitation meat are nutritious, the prepared foods in which they are used may be high in fat or salt (CSPI, 2014; CSPI; Jacobson et al., 2018).

Concern: One controlled clinical study and many reports indicate that this type of mycoprotein can cause adverse effects, including gastrointestinal reactions (nausea, diarrhea, vomiting, abdominal cramps) and allergic reactions (hives, itchy skin, swelling of the throat or mouth, difficulty breathing), sometimes severe enough to warrant medical attention. Two deaths have been linked to it. Because of an objection filed by the Center for Science in the Public Interest (CSPI) in response to a proposed settlement of a class action case, labels for products containing this mycoprotein sold in the U.S. now must state, “Mycoprotein is a mold [member of

the fungi family]. There have been rare cases of allergic reactions to products that contain mycoprotein" (CSPI, 2014; CSPI; Jacobson et al., 2018).

⑤ ARTIFICIAL PRESERVATIVES

Benzoates & Benzoic Acid

Description: Benzoates (e.g., sodium benzoate, potassium benzoate, calcium benzoate) and its close relative benzoic acid are used as preservatives to prevent the growth of microorganisms in acidic foods, and are commonly used in fruit juices, carbonated beverages, pickles and processed foods.

Concern: There is some evidence that benzoates such as sodium benzoate may cause hives, asthma or other hypersensitivity reactions in sensitive individuals (Wibbertmann et al., 2000). Benzoates can also react in beverages that contain ascorbic acid (i.e., vitamin C) or erythorbic acid, a chemical cousin of vitamin C, to form small amounts of benzene, a chemical that can cause cancer in humans (CSPI, 2014). In 2006, the FDA's Center for Food Safety and Applied Nutrition shared findings on their survey of benzene in beverages in which 4 out of 100 beverages with added benzoates had elevated levels of benzene (FDA, 2006). In addition, one cranberry juice beverage product with added ascorbic acid and natural levels of benzoic acid (no added benzoates) had elevated levels of benzene. According to FDA, all five samples were reformulated and retested, with levels below FDA's level of concern. FDA notes that its testing covered a limited number of products, brands and geographic regions, and that levels of benzene are highly variable due to factors such as temperature and light exposure during shipping, handling and storage (FDA, 2006). School districts plan to keep an eye on products containing these types of preservatives.

Sulfites

Description: Sulfites are used as a preservative to prevent discoloration in foods such as dried fruits and processed potatoes (e.g., dried, fried or frozen potatoes).

Concern: This preservative destroys vitamin B1 in foods, thus reducing the foods' nutritional profile. For some sensitive individuals, in particular asthmatics, sulfites can cause severe reactions (CSPI, 2014; Timbo et al., 2004). The U.S. FDA requires that foods that use sulfites as an ingredient or during processing declare its presence on food labels. Sulfites are prohibited from use with certain foods such as raw fruits and vegetables. However, they are still allowed with minimally processed potatoes and dried fruits (FARE, 2004).

The Ingredient Guide for Better School Food Purchasing is a living document, updated regularly to incorporate up-to-date research. The guide is available through IngredientGuide.org (please bold) and the following partner organizations and communities:

- Center for Science in the Public Interest
- Center for Ecoliteracy
- FoodCorps
- Healthy Schools Campaign
- Life Time Foundation
- ScratchWorks
- The Lunch Box (Chef Ann Foundation)
- Tips for School Meals that Rock (Facebook)
- Urban School Food Alliance

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