

# Foods That “Go Together”

When we get dressed to go out on a date, or set the table for a special occasion, we want colors that go together. Just like colors, there are certain food nutrients that go better together. They may increase absorption of a critical nutrient, or help prevent cancer.

Generally, when planning a meal, most people choose foods which are quick, tasty, inexpensive and somewhat healthy for their bodies. Providers in the CACFP program also look for foods which are creditable according to the USDA Creditable Foods Guide. When planning your menus, it's useful to know that some pairing of foods can help improve the nutritional value of a meal.

Some of these you may already know, for example, vitamin C-rich foods help improve the absorption of iron from iron-rich foods, and that vitamin D is necessary for the utilization of calcium from foods. But did you know that marinating meat before grilling helps to decrease the production of carcinogens during the cooking process? And that adding a source of chlorophyll, such as a lettuce salad or green beans, to a red meat meal can help decrease the production of carcinogens during the digestive process? During this correspondence course, we'll cover these topics, give you a one week menu which includes all the go-togethers, along with a few go-together recipes with their CACFP serving sizes. Once you have the information and have practiced using it, you will find it easy to include in your menu planning.

Why is this information so valuable? The nutrients discussed in this course are ones which are more likely to be inadequate in your children's diet, and not enough of these essential nutrients could lead to problems for them later in life. Simply adding a “go-together” food can help your children to absorb more of what they need from a meal or snack.

**Vitamin D, calcium and phosphorus:** One of vitamin D's main functions in the body is to increase the amount of calcium and phosphorus absorbed from foods. A chronic deficiency of vitamin D will eventually show up as weak bones without enough minerals in them, called bow legs or rickets in children. In adults, inadequate vitamin D will cause bone to become weak, called osteomalacia, and eventually lead to osteoporosis and bone breakage. Other potential functions of vitamin D, such as preventing cancer and heart disease, are subjects of ongoing research. Some research has found that vitamin D helps immune function, such as in preventing and treating flu and pneumonia in children<sup>1</sup>. Vitamin D is made in our bodies when we have adequate sunlight, but it depends on many factors, such as how strong the sun is. A person could stand outside all day in a bathing suit in Boston during the winter and not get enough sunshine to produce adequate vitamin D, however during the summer months, it may take only 15 minutes of midday sunshine while wearing a bathing suit. Because of the threat of skin cancer associated with sunburn, many of us avoid taking our children outside in the middle of the day, or slather on the sunscreen before going out. People with dark skin, who use SPF 8 or greater frequently, or who stay covered up most of the time may be at increased risk for vitamin D deficiency. Infants are supposed to be kept from the sun for their first year of life, to prevent future skin cancer, so The AAP recommends that all children over 6 months old receive a vitamin D supplement of 400 IU per day.

The NHANES<sup>2</sup> national nutrition survey of people in the US found that approximately 10% of children ages 1-5 were at risk for vitamin D deficiency or inadequacy, based on their blood levels of the vitamin. That risk increases through childhood, up to 16% for children ages 6 to 11, 33% for children ages 12 to 19 years, 36% for people 20 to 39 years, and 34% for those 40 and over. So many of us, both kids and adults, may not be making, or consuming, enough vitamin D to achieve and maintain good bone health, even though our milk is fortified. Vitamin D circulates around in our body for several days to weeks after making or ingesting it, so you don't have to take vitamin D in the same meal with calcium-rich foods, (or eat cheese while sun-bathing), just as long as people get adequate midday summer sunshine or supplemental vitamin D, and eat calcium-rich foods 3-4 times a day (yogurt, collard greens, turnip greens, cheese, sardines, milk).

**Iron, critical for children's brain development and behavioral health**, is absorbed from food better when combined with citrate or vitamin C-rich foods, such as papaya, bell peppers, melons, citrus fruits, strawberries, fresh pineapple, grapes and broccoli. The type of iron found in meats, heme iron, is absorbed more readily than any other kind of iron, so it is helpful to include red meat or eggs in your menu planning. Vegetarians can get enough iron and zinc from plant sources, but it takes more thought.

Normally, only about 10% of the iron in food consumed actually gets absorbed into the bloodstream, but in people who are iron-deficient, the body allows more in. Children cannot overdose on iron from foods, but taking in too much supplemental iron can be deadly for a child. This is why it is so important to keep iron supplements out of the reach of children. Gummy vitamins, which taste and look like candy, usually do not have iron in them, but even gummy vitamins need to be kept out of reach.

One reason iron is so important for growing bodies is that growth requires oxygen, and oxygen is carried by the iron-rich hemoglobin portion of the red blood cell. In addition, iron is a part of many enzymes that help with biochemical reactions in the body. Iron insufficiency can result in lower mental and motor function, and increase the risk for behavior problems later in life, as teens and young adults (for example: depression, suicide and getting in trouble with authority figures). A lack of iron during childhood can cause permanent brain damage and behavioral problems that stay with a person for the rest of their life. According to the CDC, the most vulnerable age for iron deficiency is age 6 months to three years, and the most vulnerable children are those who drink more than 24 oz of milk per day, have restricted diets or chronic infections, are given cow milk before age 12 months, or not given a good source of iron in their diet<sup>3</sup>. In addition, recent research indicates that children with ADHD may be at higher than average risk for iron deficiency<sup>4</sup>. The take-home message for CACFP providers is to combine iron- and vitamin C-rich foods daily when planning meals and snacks, prepare meats using sensible anti-cancer methods, and to avoid combining iron-rich foods with iron-inhibitors.

Iron absorption is dependent on mechanisms which require copper. Excess zinc intake can cause copper deficiency, which will decrease iron absorption, so people who are taking zinc supplements that are not balanced with sufficient copper may actually be giving themselves copper AND iron deficiency. Which I suppose is a twisted way of just saying that a balanced multivitamin and mineral supplement is best if you supplement.

**Interference! Flag on the play!** Tannins, phytates, oxalates and polyphenols, found in teas, coffee, whole grains, nuts, seeds, dry beans and certain vegetables like spinach, beets, rhubarb and swiss chard, can interfere with the absorption of calcium, magnesium, iron, zinc and other essential minerals. The foods containing these four substances are good foods, but just not when eating iron- and zinc-rich foods. Its best to minimize the interference when serving iron- and zinc-rich foods to children. To decrease oxalate, you can cook oxalate-rich vegetables in water instead of steaming or sautéing them. Making bread using a sourdough technique can break down the phytate. See the enclosed handout for more information on reducing phytate in whole grains. You can also add foods together to help reduce the damage. For example, adding lemon to tea will chemically change the tannins so they are less problematic. If you provide decaf iced tea as a non-creditable water substitute, add lemon juice, and serve with fruits, vegetables, bran muffins and crumpets, but not with meat, fish, mushrooms or eggs. This information about interference with mineral absorption is especially important for people who are growing, and thus require more, such as children and pregnant and nursing women, and for people who don't eat meat or eggs. Although this may not apply to children, it's helpful for pregnant women to know that coffee, which has both oxalic acid and polyphenols, may block iron absorption by up to 60%.

Cooked dry beans have three substances that interfere with iron absorption: phytate, tannin and polyphenols<sup>5</sup>. The bean varieties lowest in tannins are those with white seed coats<sup>6</sup>. Lentils and chick peas have much lower phytate levels than soy, pinto, or navy beans<sup>7</sup> and beans grown with high-phosphate fertilizers will have higher phytate levels than those grown with compost as fertilizer. One way to cook dry beans to reduce the inhibitors is to soak it 12-24 hours in filtered water which has lemon juice or vinegar added, then remove the hulls (seed coat) and discard the soak water before cooking. Cook the beans in a larger than usual amount of water, and discard the cooking broth, especially for beans with dark seed coats. Sprouting or fermenting the beans at room temperatures prior to cooking will reduce phytate levels even more, but there is a danger of growing harmful bacteria that cause food borne illness (even commercial sprout growers have this problem).

Another iron interferer is calcium. Thus, snack time is good for serving iron-rich foods on the CACFP, so there won't be any interference from the calcium in fluid milk. Take a look at the enclosed "go together" menu to see some iron-rich snack food ideas.

Although many fiber-rich foods interfere with iron absorption, fiber is beneficial for children to eat because it helps to prevent constipation, development of diverticulitis<sup>8</sup> and childhood appendicitis<sup>9</sup>. Fiber-rich fruits, vegetables, nuts and whole grains are important sources of essential nutrients: potassium, magnesium, chromium, copper, manganese, molybdenum, phosphorus, selenium, carotenes (i.e. beta carotene, lutein, zeaxanthin), bioflavonoids, essential fatty acids, most B vitamins, vitamin C, vitamin E and vitamin K<sup>10</sup>. All these nutrients play important roles in our children's bodies. As an example, potassium is important for heart and muscle function, fluid balance, energy production and bone strength. People who eat higher levels of fruits and vegetables have lower risk of lung, prostate, bladder, esophagus and stomach cancers<sup>11</sup>, and we know that children develop life-long eating habits before they are 5 years old. While planning meals to avoid iron interference, the fiber-rich foods that contain phytate and oxalate, still need to be included often, just not with iron-rich foods.

Another go-together consideration is that eating red meat with naturally found chlorophyll helps to decrease the toxic effects of red meat on our intestines during digestion<sup>12</sup>. Diets high in red or processed meats and low in green vegetables are known to increase the risk for colon cancer. The trick, then, when choosing foods to serve with iron-rich foods is to find green ones with vitamin C, but low in phytate, tannins, polyphenol and oxalate. It may be difficult to find this all in one food, so on the go-together menu, you will find that the iron-rich snack menus have a green veggie paired with a vitamin C rich fruit. Green peppers are low in phytate and oxalate, high in vitamin C, and have plenty of chlorophyll.

In addition to what goes on during digestion, red meats can develop carcinogens when cooked at high temperatures, such as when grilling or frying. Decrease this by adding a carbohydrate when forming patties or meatballs, marinate the meat before it is cooked, and cook at lower temperatures. It doesn't have to be marinated for a long period of time, but could just be slathered with BBQ sauce or other marinade 5 minutes before grilling. Red meats are a great way to provide high quality iron and zinc in the same package. Taking a few precautions with the way it is prepared and pairing it with the right foods can help improve mineral absorption and reduce cancer risk.

There are some other foods that work well together. When you look at the "go together menu," you will see on most days legumes (dry beans) are paired with whole grain at the lunch meal: quinoa with kidney beans; turtle beans with whole grain crackers, split pea soup with graham crackers, and hummus with whole grain crackers. This is to show that the amino acid profile of beans is complemented by the amino acids in whole grains and dairy. Grains are lacking in lysine and most beans don't have enough methionine, both essential amino acids for humans. Together they make a high quality protein; However in reality, a vegetarian does not need to eat both foods in the same meal, but just within the same 24 hours. This allows all the amino acids to circulate in the blood stream when the body is trying to build proteins.

<sup>1</sup> Battersby AJ, Kampmann B and Burl S. Vitamin D in Early Childhood and the Effect on Immunity to Mycobacterium tuberculosis. Clin Dev Immunol. 2012; 2012: 430972.

<sup>2</sup> Second National Report on Biochemical Indicators of Diet and Nutrition in the U.S. Population. CDC, 2012

<sup>3</sup> Recommendations to Prevent and Control Iron Deficiency in the United States. MMWR 1998; 47 (No. RR-3) p. 5

<sup>4</sup> Cortese S, et al. Iron and attention deficit/hyperactivity disorder: What is the empirical evidence so far? A systematic review of the literature. Expert Rev Neurother 2012;12(10):1227-40.

<sup>5</sup> Petry N, et al. Polyphenols and phytic acid contribute to the low iron bioavailability from common beans in young women. J Nutr 2010;140(11):1977-1982.

<sup>6</sup> Elias LG, De Fernandez DG and Bressani R. Possible effects of seed coat polyphenolics on the nutritional quality of bean protein. J Food Sci. 1979;44(2):524-527.

<sup>7</sup> Reddy NR and Sathe SK, editors. Food Phytates, CRC Press, 2001, p. 118.

<sup>8</sup> Harvard School of Public Health. Fiber: start roughing it! [www.hsph.harvard.edu/nutritionsource/fiber-full-story/](http://www.hsph.harvard.edu/nutritionsource/fiber-full-story/)

<sup>9</sup> Edwards CA and Parrett AM. Dietary fibre in infancy and childhood. Proc Nutr Soc 2003; 62(1):17-23.

<sup>10</sup> Dunne LJ. Nutrition Almanac, Third Edition. Nutrition Search, Inc. McGraw-Hill, 1990, pages 9-92.

<sup>11</sup> Divisi D, et al. Diet and cancer. Acta Biomed 2006; 77:118-123.

<sup>12</sup> De Vogel J, et al. Green vegetables, red meat and colon cancer: chlorophyll prevents the cytotoxic and hyperproliferative effects of haem in rat colon. Carcinogenesis. 2005;26(2):387-393.

## REDUCING THE PHYTATE AND OXYLATE CONTENT OF FOODS

The following list are green vegetables low in phytate and oxylate (eat one of these with red meats):

- Boiled Globe artichokes (boiled)
- Asparagus (cooked)
- Avocado (fresh)
- Lima beans (cooked)
- Broccoli (raw or cooked)
- Brussel sprouts (cooked)
- Chili peppers (raw)
- Chives
- Green bell peppers (raw or cooked)
- Romaine lettuce
- Peas (fresh or frozen, boiled or canned)
- Pickles
- Zucchini squash
- String beans
- Green beans
- Green olives.

The following foods are high in vitamin C, but have a high oxylate content: kiwi, collards, kale, mustard greens, baked or canned sweet potato, fried white potato, tomato paste. Turmeric reduces carcinogen formation during cooking, but has a lot of oxylate, which could reduce iron absorption.

Oxylate content can be reduced in foods such as spinach, collard greens, kale, sweet potatoes and swiss chard by cooking them for a while in lots of water. Southern cooks tend to cook their collard greens a couple hours in water or broth with smoked turkey leg, and add garlic, oil and hot peppers. Yum!

Phytate contains lots of phosphorus, but needs to be broken down in order to access the mineral. In addition, phytate binds with minerals like calcium, magnesium, iron and zinc, making it difficult to absorb into the bloodstream. Phytate can be broken down by various methods, such as sprouting the nut, seed or grain, fermenting, roasting, soaking in acid or making sourdough. One study showed that phytic acid was almost completely broken down in whole wheat bread after 8 hours of sourdough fermentation.

If you want to know more about this topic, a useful article on the subject was written by Ramiel Nagel and posted at [www.westonaprice.org/food-features/living-with-phytic-acid](http://www.westonaprice.org/food-features/living-with-phytic-acid).

There has been research showing that phytate will break down when whole grain flour is combined with buttermilk at room temperature for 24-48 hours, but I wonder about the food safety of that practice? When you have whole grain muffins, waffles, quick bread or pancakes on your menu, you could combine the flour and buttermilk (or yogurt) ahead of time, keep it in the refrigerator for a couple days, and then add the rest of the ingredients just before cooking the batter.

For those of us with less time to spend messing about in the kitchen, the thing to remember is that when shopping for whole grain bread or rolls, choose sourdough varieties or those made with sprouted grain flour.

If you bake bread at home, whether traditional or in the bread machine, you can use sourdough starter to make your dough and set it out overnight to ferment the dough, then bake the following day. In the bread machine, you would use a dough only setting unless your machine has an overnight delay bake option. You can make your own sourdough starter or buy it from [www.KingArthurFlour.com](http://www.KingArthurFlour.com) (\$8.95)

# One week menu of CACFP creditable foods using “Go Together” meal planning

## Portions listed are per child ages 3-5

	<b>Monday</b>	<b>Tuesday</b>	<b>Wednesday</b>	<b>Thursday</b>	<b>Friday</b>
<b>Breakfast</b> Fluid milk Fruit or vegetable Bread or alternate	6 oz milk 1/2 cup banana/strawberry 1/2 slice toast	6 oz milk 2 Tbsp mashed potato 2 Tbsp zucchini shreds 2 Tbsp mashed beans 2 Tbsp chile morita sauce 4 inch corn tortilla	6 oz milk 1/2 cup diced apple & raisins 1/4 cup cooked oatmeal	6 oz milk 1/4 cup grapefruit 1/4 cup red beans in sauce 1/2 whole grain sourdough english muffin	6 oz milk 1/2 cup canned fruit 1 bran muffin
<b>Lunch/Dinner</b> Fluid milk 2 Fruits or vegetables Meat or alternate Bread or alternate  <u>Book to complement your meal</u>	6 oz milk 1/4 cup quinoa salad with kidney beans, 1 oz feta cheese, 1/4 cup cherry tomatoes and cucumber with tahini vinaigrette dressing, 1/2 small green bell pepper ‘boats’ & lettuce ‘sails’ 1 small orange  <u>The Owl and The Pussycat Went To...</u>	6 oz milk cucumber stick logs with 1 Tbsp peanut butter 18 whole grain fish crackers 1/2 cup homemade chicken noodle soup adding 1/4 cup frozen diced carrots and peas 1/4 cup cooked dry rinsed turtle beans  <u>Yertle the Turtle</u>	6 oz milk 1/4 cup split pea soup river 1 1/2 Tbsp nut butter whisked in 1/4 cup broccoli stalk trees 1 mini Babybel lite cheese 6 teddy bear graham crackers 1 endive ‘canoe’  <u>Happy Birthday Moon</u>	6 oz milk 1/2 cup diced tomato, carrots, corn, peas & eggplant or red onion cooked in broth 1/4 cup apple 1/4 cup hummus whole grain crackers  <u>Planting a Rainbow</u>	6 oz milk 1/2 cup apricot, asparagus, avocado, artichoke hearts, or apple 1 1/2 Tbsp almond butter 7 Almond Nut Thin Crackers 1 slice of asiago cheese  <u>Eating the Alphabet</u>
<b>Snack</b> (choose 2) Fluid milk Meat or alternate Fruit or vegetable Bread or alternate	1/2 oz mini homemade beef meatballs or meatloaf cubes ketchup dip 1/2 cup small pieces of cooked broccoli and red bell pepper frech dressing dip	1/4 hard boiled or deviled egg 1/4 cup orange slices 1/4 cup dark romaine lettuce honey mustard dressing	1/2 oz mini ground beef patty 1/4 cup cantaloupe or papaya 1/4 cup green beans italian dressing	1 piece of gingerbread made with blackstrap molasses* this is a bread alternative 1/2 cup pineapple 1 oz lemon sauce	4 inch white flour tortilla 2 Tbsp refried beans 1/4 oz marinated & cooked ground beef 1/2 cup homemade mango salsa



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