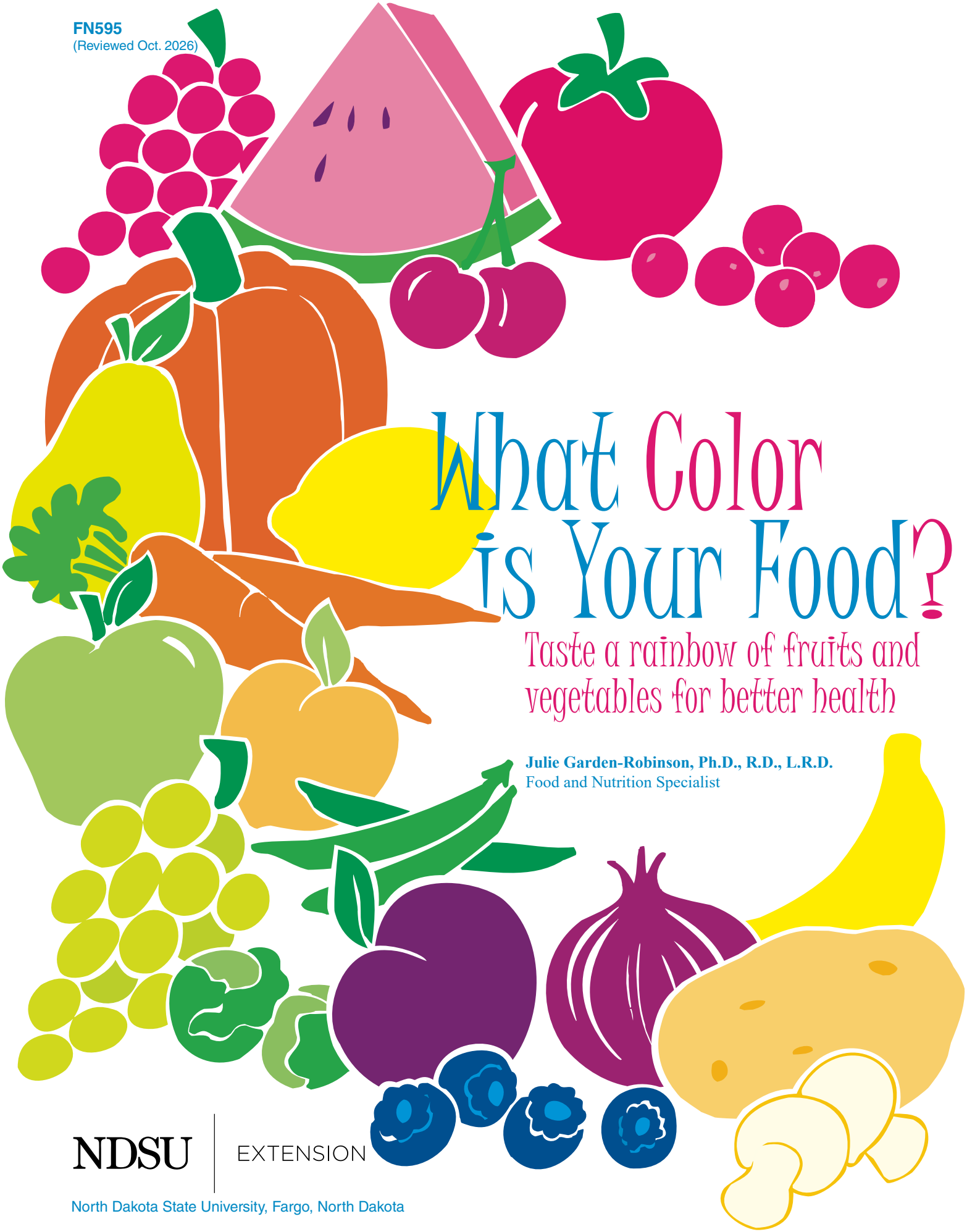
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What Color is Your Food?

Taste a rainbow of fruits and vegetables for better health

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People need different amounts of fruits and vegetables depending on their age, gender and amount of daily physical activity.

For example, the recommendation for a 40-year-old male who gets about 60 minutes of daily physical activity is 2 cups of fruit and 3½ cups of vegetables. The recommendation for a 15-year-old female who gets less than 30 minutes of daily physical activity is 1½ cups of fruit and 2½ cups of vegetables.

To meet their daily goal, most people need to increase the amount of fruits and vegetables they eat every day. All product forms count – fresh, frozen, canned, dried and 100% juice. Whole fruits, however, usually contain more fiber than juice.



Eat more fruits and vegetables every day!

People who eat more generous amounts of fruits and vegetables as part of a healthy diet are likely to have reduced risk of chronic diseases, including strokes, type 2 diabetes, some types of cancer, and perhaps heart disease and high blood pressure.

Sample the spectrum of fruits and vegetables

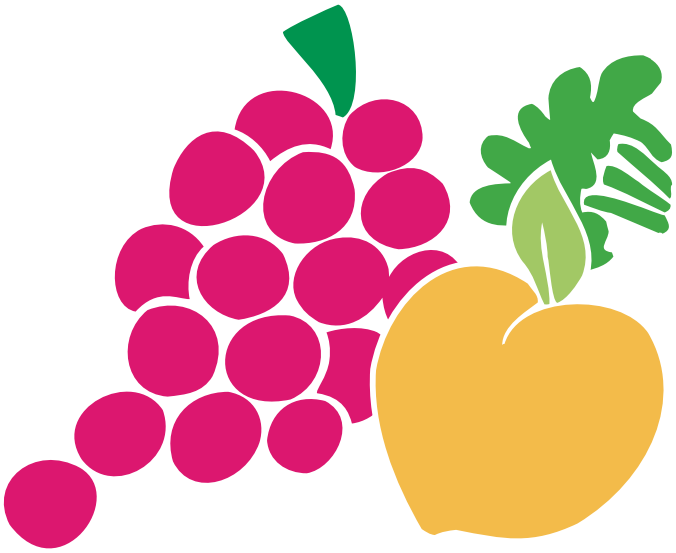
Scientists are regularly reporting new health benefits associated with fruits and vegetables. Eating more fruits and vegetables is a worthwhile goal. Eating a variety of different colors of fruits and vegetables every day is a new way of thinking about meeting the goal.



What's a serving size anyway?

Recommendations for fruits and vegetables are now in cups. The following equal one cup:

1 small apple
1 large banana
2 cups of raw greens
12 baby carrots
1 large orange
1 large bell pepper
1 medium grapefruit
1 large sweet potato



Healthy reasons
to eat a rainbow of colorful fruits and vegetables

Red fruits and vegetables are colored by natural plant pigments called "lycopene" or "anthocyanins." Lycopene in tomatoes, watermelon and pink grapefruit, for example, may help reduce risk of several types of cancer, especially prostate cancer. Lycopene in foods containing cooked tomatoes, such as spaghetti sauce, and a small amount of fat are absorbed better than lycopene from raw tomatoes.

Anthocyanins in strawberries, raspberries, red grapes and other fruits and vegetables act as powerful antioxidants that protect cells from damage. Antioxidants are linked with keeping our hearts healthy, too.

These are some examples of the red group:

- Red apples
- Beets
- Red cabbage
- Cherries
- Cranberries
- Pink grapefruit
- Red grapes
- Red peppers
- Pomegranates
- Red potatoes
- Radishes
- Raspberries
- Rhubarb
- Strawberries
- Tomatoes
- Watermelon

Orange/yellow fruits and vegetables are usually colored by natural plant pigments called "carotenoids." Beta-carotene in sweet potatoes, pumpkins and carrots is converted to vitamin A, which helps maintain healthy mucous membranes and healthy eyes. Scientists have also reported that carotenoid-rich foods can help reduce risk of cancer, heart disease and can improve immune system function.

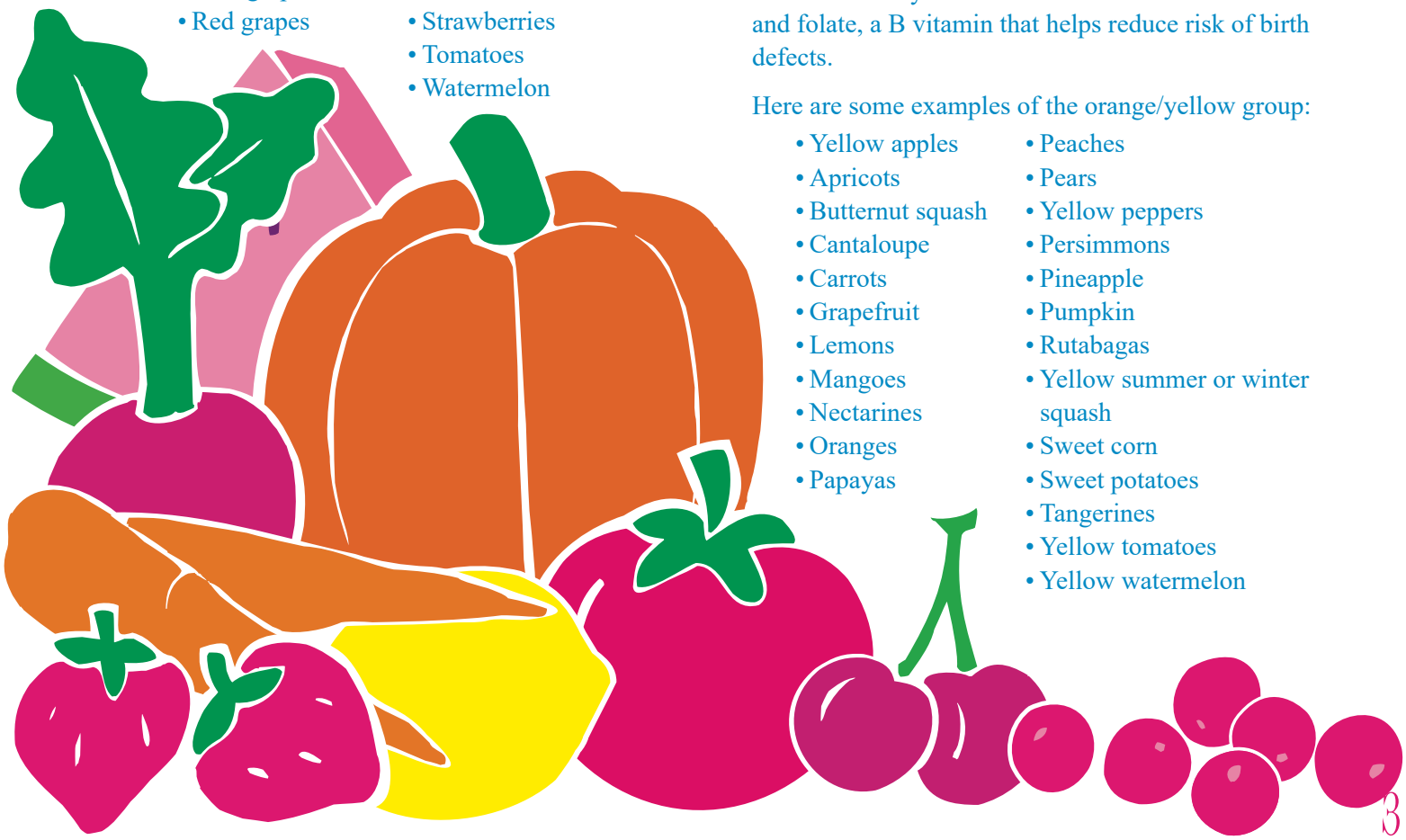
One study found that people who ate a diet high in carotenoid-rich vegetables were 43% less likely to develop age-related macular degeneration, an eye disorder common among the elderly, which can lead to blindness.

Carotenoids also may be good for your heart. One study found that men with high cholesterol who ate plenty of vegetables high in carotenoids had a 36% lower chance of heart attack and death than their counterparts who shunned vegetables.

Citrus fruits like oranges are not a good source of vitamin A. They are an excellent source of vitamin C and folate, a B vitamin that helps reduce risk of birth defects.

Here are some examples of the orange/yellow group:

- Yellow apples
- Apricots
- Butternut squash
- Cantaloupe
- Carrots
- Grapefruit
- Lemons
- Mangoes
- Nectarines
- Oranges
- Papayas
- Peaches
- Pears
- Yellow peppers
- Persimmons
- Pineapple
- Pumpkin
- Rutabagas
- Yellow summer or winter squash
- Sweet corn
- Sweet potatoes
- Tangerines
- Yellow tomatoes
- Yellow watermelon



Green fruits and vegetables

are colored by natural plant pigment called "chlorophyll." Some members of the green group, including spinach and other dark leafy greens, green peppers, peas, cucumber and celery, contain lutein. Lutein works with another chemical, zeaxanthin, found in corn, red peppers, oranges, grapes and egg yolks to help keep eyes healthy. Together, these chemicals may help reduce risk of cataracts and age-related macular degeneration, which can lead to blindness if untreated.

The "indoles" in broccoli, cauliflower, cabbage and other cruciferous vegetables may help protect against some types of cancer. Leafy greens such as spinach and broccoli are excellent sources of folate, a B vitamin that helps reduce risk of birth defects.

Here are some examples of the green group:

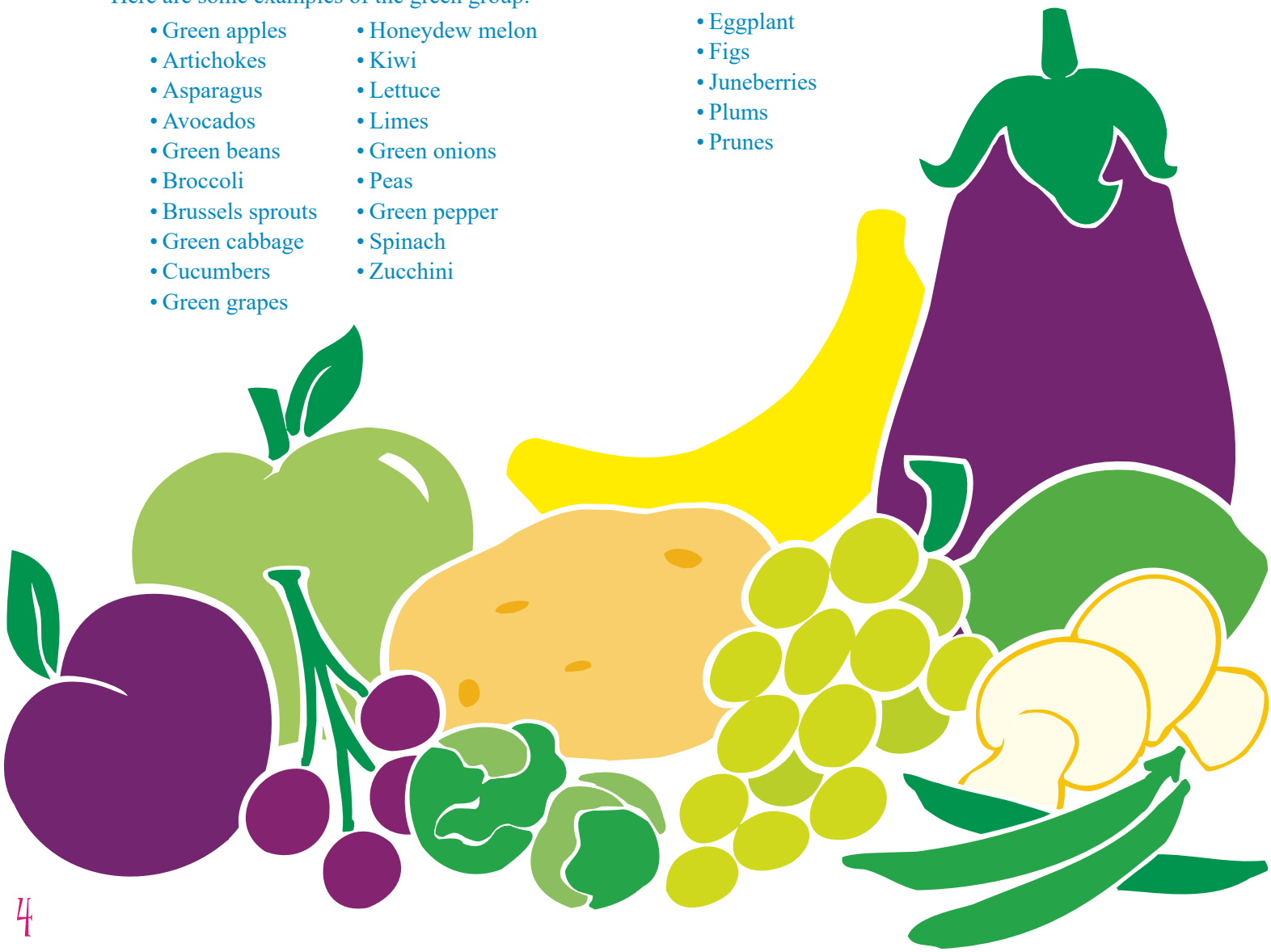
- Green apples
- Artichokes
- Asparagus
- Avocados
- Green beans
- Broccoli
- Brussels sprouts
- Green cabbage
- Cucumbers
- Green grapes
- Honeydew melon
- Kiwi
- Lettuce
- Limes
- Green onions
- Peas
- Green pepper
- Spinach
- Zucchini

Blue/purple fruits and vegetables

are colored by natural plant pigments called "anthocyanins." Anthocyanins in blueberries, grapes and raisins act as powerful antioxidants that protect cells from damage. They may help reduce risk of cancer, stroke and heart disease. Other studies have shown that eating more blueberries is linked with improved memory function and healthy aging.

Here are some examples of the blue/purple group:

- Blackberries
- Blueberries
- Eggplant
- Figs
- Juneberries
- Plums
- Prunes
- Purple grapes
- Raisins



White fruits and vegetables are colored by pigments called "anthoxanthins." They may contain health-promoting chemicals such as allicin, which may help lower cholesterol and blood pressure and may help reduce risk of stomach cancer and heart disease. Some members of the white group, such as bananas and potatoes, are good sources of the mineral potassium, too.

Here are examples of the white group:

- Bananas
- Cauliflower
- Garlic
- Ginger
- Jicama
- Mushrooms
- Onions
- Parsnips
- Potatoes
- Turnips





How are you doing?

If you're like many Americans, your plate may benefit from some added color from fruits and vegetables.

1. Write down all the fruits and vegetables you ate yesterday, or keep track of what you eat today. Did you have any fruit for breakfast? Lunch? Snacks? Dinner?

_____

_____

_____

_____

_____

2. What color groupings did you try?

_____

_____

Add some color to your plate

This menu for a day is missing fruits and vegetables. Add some fruits and vegetables to each meal or snack, and try to include some fruits and/or vegetables from each color grouping. Keep the main items the same. There are no "right" or "wrong" answers. A colorful menu follows, with a nutrition analysis of both menus.

Menu 1

Breakfast

Oatmeal (1 cup) with low-fat milk (½ cup)
Whole wheat toast (1 slice) with peanut butter (1 tsp.)
Coffee (1 cup)

Lunch

Roast beef (3 oz.) with mustard (1 tsp.) on whole wheat bread (2 slices)
Low-fat milk (1 cup)

Snack

Graham crackers (4)
Ice water

Dinner

Grilled pork chop (4 oz.)
Wild rice blend (½ cup)
Dinner roll (1)
Angel food cake (1 slice) with whipped topping (1 Tbsp.)
Low-fat milk (1 cup)

Colorful and nutritious menu makeover

Menu 2

Breakfast

Oatmeal (1 cup) with **raisins** (¼ cup) and low-fat milk (½ cup)
Whole wheat toast (1 slice) and **raspberry jam** (1 Tbsp.)
Orange juice (¾ cup)
Coffee (1 cup)

Lunch

Roast beef (3 oz.) sandwich on whole wheat bread (2 slices), **lettuce** (2 leaves), **tomato** (1 slice) and **onion** (1 slice)
Vegetable soup (1 cup)
Mini carrots (7)
Low-fat milk (1 cup)

Snack

Graham crackers (4)
Apple slices (1 medium apple)
Ice water

Dinner

Grilled pork chop (4 oz.)
Wild rice blend (½ cup)
Steamed broccoli-cauliflower blend (½ cup)
Spinach and strawberry salad (1 cup greens, ¼ cup berries)
Dinner roll (1)
Angel food cake (1 slice) with whipped topping (1 Tbsp) and **blueberries** (¼ cup)
Low-fat milk (1 cup)

Snack

Banana (1)

Nutrition analysis of menus

As the following table shows, adding fruits and vegetables increases nutrients essential to good health without adding lots of calories and fat. The Nutrition Facts label doesn't list all the beneficial phytochemicals in a more colorful diet – like lycopene and lutein – but they are included in the table below.

Nutrient	Menu 1	Menu 2
*Calories	1667	2010
*Protein (g)	83.6	92.6
*Total carbohydrate (g)	235	335
*Fat (g)	47	43
*Saturated fat (g)	17.6 (88.7% RDI**)	13.5 (68%RDI)
*Sodium (mg)	3,147 (131% RDI)	3,595 (150% RDI)
*Fiber (g)	19 (76% RDI)	36 (145% RDI)
*Sugars, total (g)	44.7	138
*Iron (mg)	11.8 (65% RDI)	17 (94% RDI)
*Calcium (mg)	983 (98% RDI)	1,184 (118% RDI)
*Vitamin C (mg)	8.8 (15% RDI)	250 (417% RDI)
*Vitamin A (IU)	1,745 (35% RDI)	18,261 (365% RDI)
Vitamin E (IU)	7 (24% RDI)	11 (37% RDI)
Folate (µg)	183 (46% RDI)	406 (102% RDI)
Lycopene (µg)	0	1,815
Lutein and zeaxanthin (µg)	0	2,294
Beta-carotene (µg)	15.8	6,173
Vitamin K (µg)	32 (41% RDI)	337 (422% RDI)

*Listed on Nutrition Facts label

**RDI = "Recommended Daily Intake." RDIs are based on U.S. Recommended Daily Allowances.

Key: g = grams; mg = milligrams; IU = International Units; µg = micrograms

Tips to increase fruits and vegetables in your diet

Eat a variety of food groups from all the food groups every day. Check the strategies you will try:

- ❑ Keep cleaned fruits and vegetables in the refrigerator — ready to eat.
- ❑ Have vegetables with low-fat dip for a snack.
- ❑ Try commercial prepackaged salads and stir-fry mixes to save prep time.
- ❑ Add vegetables to casseroles, stews and soups.
- ❑ Drink 100% fruit juice instead of fruit-flavored drinks or soda pop.
- ❑ Have fruit for dessert.
- ❑ Keep a bowl of apples, bananas and/or oranges on the table.
- ❑ Choose a side salad made with a variety of leafy greens.
- ❑ Bake with raisin, date or prune puree to reduce fat and increase fiber.
- ❑ Add lettuce, onions, peppers and/or tomatoes to sandwiches.
- ❑ Order veggie toppings on your pizza.
- ❑ Enjoy fruit smoothies for breakfast or snacks.
- ❑ Pack fresh or dried fruits for quick snacks.



Preserve some nutrients

To preserve nutrients when preparing fruits and vegetables, consider these tips:

- Limit peeling to preserve fiber content.
- Steam, broil, microwave or cook in small amount of water.
- Avoid boiling. Prolonged exposure to water and heat can break down chemicals unstable to high temperatures.
- Serve foods promptly. The longer they stand, the more nutrients are lost.

Fruit and vegetable safety

Improperly handled fruits and vegetables can become contaminated with *Salmonella* and *E. coli,* potentially leading to foodborne illnesses. Fresh fruits and vegetables should be washed well with plenty of running water to be safe. Cross contamination must also be avoided. Follow these tips to keep produce safe from store to home:

- Examine fresh fruits and vegetables for signs of freshness before purchase.
- Pack fresh produce away from meats in the grocery cart and in separate bags.
- Wash hands with warm water and soap for 20 seconds before preparing fruits and vegetables.
- Rinse all fresh produce with running water, using a brush if necessary. Do not use soap.
- Remove outer leaves of lettuce and cabbage.
- Use separate cutting boards for cutting up fresh produce and for meat.
- Clean cutting boards with soap and water. Sanitize with a solution of 1 tsp. bleach per 1 quart water.
- Serve cut-up fresh produce in containers over ice.
- Store cut-up fruits at or below 40 degrees Fahrenheit.

Set some goals

List two goals for adding colorful fruits and vegetables to your diet. Check back in a month to see your progress. Then set some new ones!

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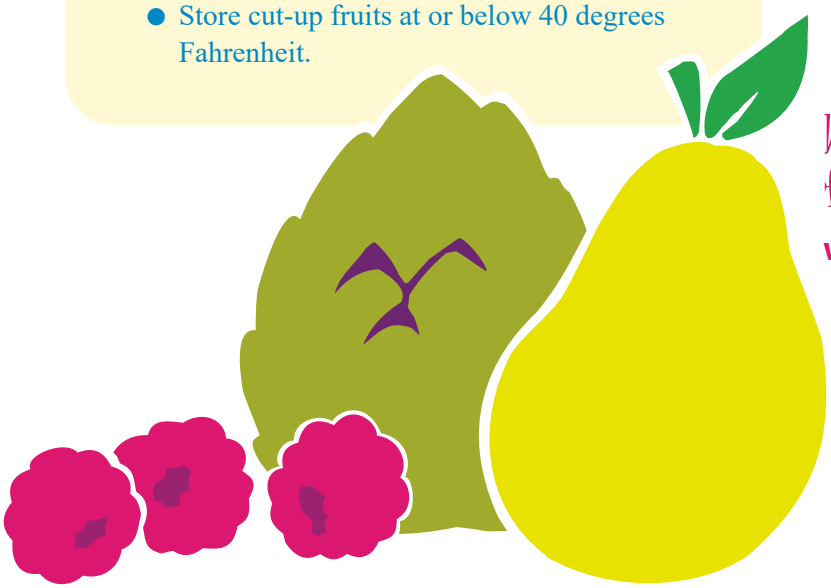
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Web-based resources with fruit and vegetable information:

www.ag.ndsu.edu/food — NDSU Extension food and nutrition site with information about nutrition, preparation and preservation of a variety of foods

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