

# Plant Based Diets and Diabetes Outcomes

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Indian Health Services

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# Objectives

Upon completion of the presentation, participants will be able to:

1. Examine current research regarding plant-based diets and diabetes outcomes
2. Identify various plant-based protein sources regarding availability, cost, and options for incorporating into existing recipes.
3. Provide patients with reliable sources of information on plant-based diets

# Vegetarian Nutrition

a dietetic practice group of the

Academy of Nutrition  
and Dietetics



# Introduction

Ancestral foods and a plant based approach to diet may:

- Prevent and manage diabetes
- Help with weight management
- Prevent other chronic diseases

# Standards of Care in Diabetes 2023 Guidelines

- Plant based diets lower risk of developing diabetes
- SOC Guidelines defined plant based as:
  - vegetarian
  - plant based that include some meat
  - DASH Diet

# Plant Based Diets and Diabetes

# Plant Based Diet and Diabetes Risk

Qian, Hiu, and Lu (2019)

- 9 studies with 307,099 total participants were analyzed
- A total of 23,544 cases of diabetes
- Higher compliance with a plant based diet reduced risk of diabetes (RR: 0.77, 95% CI: 0.71-0.84)
- Diets higher in “healthier” plant foods reduced risk further (RR:0.70, 95% CI: 0.62-0.79)

# EPIC-Oxford Study and Diabetes

Key, Papier, and Tong (2021)

- BMI at recruitment
  - 1 kg lower in vegetarians than meat eaters
  - 2 kg lower in vegans than meat eaters
- Weight gain over 5 years
  - Meat eaters gained 400 grams per year
  - Vegetarians had similar results
  - Vegans gained 300 grams per year
- 22% lower risk of ischemic heart disease for vegans and vegetarians



# EPIC-Oxford Study and Diabetes

Key, Papier, and Tong (2021), continued

- Risk for diabetes
  - 35% lower in vegetarians before BMI was in model
  - 47% lower in vegans before BMI was in model
- Risk for diabetes with BMI included:
  - Risk was not significantly different from meat eaters for vegetarians or vegans
  - Lower BMI in vegans and vegetarians accounted for the lowered risk of diabetes

# Metabolic Profiles

Chiu (2015)

- MJ Health Screening database cohort study
- 1994-2008, Taiwan
- 315,033 subjects
  - 4414 lacto-ovo vegetarians
  - 1588 lacto-vegetarians
  - 1913 vegans
- Vegetarians had lower WC, BMI, SBP, FBG, TC, and LDL.
  - With adjustments for age, sex, PA, alcohol consumption, and education
- Risk of obesity dropped by 7% for every year on vegan diet

# Kidney Disease Prevention

# Plant-Based Diets and Kidney Disease National Kidney Foundation Guidelines

Joshi, McMackin, and Kalantar-Zadeh (2020)

## Recommendations:

- Increase proportion of plants in the diet
- Reduce total protein
- Reduce animal protein

# Cancer

# Cancer and Plant Based Diets

Tantamango-Bartley et al. (2012)

- Vegan diet had the lowest risk of cancer (HR: 0.84; CI: 0.72-0.99)
- Vegetarian diet was associated with lower rate of GI associated cancers (HR: 0.75; 95% CI: 0.60-0.92)

# Cancer Incidence by Diet Type Compared to Meat Eaters

Key, et al. (2014)

- Fish eaters had 12% lower incidence of cancer
- Vegetarians had 11% lower incidence of cancer
- Vegans had 19% lower incidence of cancer
- Plant based diets were protective for some types of cancer

# Health Benefits of Native Indigenous Plants



# Benefits of Traditional Indigenous Foods

Native American plant-based food diversity and health benefits 7

**TABLE 1** Phenolic bioactive-linked antioxidant and antihyperglycemic properties of selected traditional food plants of Native Americans and comparisons with contemporary varieties

Food plant	Total soluble phenolic concentration (mg/g)	Total DPPH based antioxidant activity (% inhibition) <sup>1</sup>	In vitro anti-hyperglycemic property relevant $\alpha$ -amylase enzyme inhibitory activity (%)	In vitro anti-hyperglycemic property relevant $\alpha$ -glucosidase enzyme inhibitory activity (%)	
Traditional corn	Purple corn (41)	8.0	77	ND	51
	Dark-red corn (38)	0.5	38	32	35
	Oaxacan green corn	1.2	55	34	22
Contemporary corn	Yellow corn	0.2–0.5	10–30	20–50	10–20
Traditional beans	Hidatsa red beans	1.4	45	68	18
	Hopi black bean	2.0	78	82	30
	Algonquin speckled bean	1.8	77	78	8
	Arikara yellow bean	1.6	72	48	27
	Andean legume (41)	4.0	40	ND	20
	Jack bean	1.2	60	50	20
Contemporary beans	Black bean	1.5	65	30–50	30
	Red kidney bean	1.8	72	50–70	34
Traditional squash	Round orange pumpkin (38)	0.2	33	60	50
	Gete okosomin squash	0.3	10	36	50
Contemporary squash	Butternut	0.3	10	20	10
	Buttercup	0.4	20	35	15
Traditional grains	Wild rice	0.1	25	ND	16
	Quinoa (41)	2.3	86	ND	30
Contemporary grain	White rice	0.02	5	ND	ND

<sup>1</sup>DPPH, 2,2-Diphenyl-1-picrylhydrazyl; ND, not detected.

# Moving towards a Plant Based Diet

# Start Gradually

- Meatless Mondays
- Substitute plant protein for meats
- Consume traditional plant based protein recipes more frequently
- Try a new recipe once a week

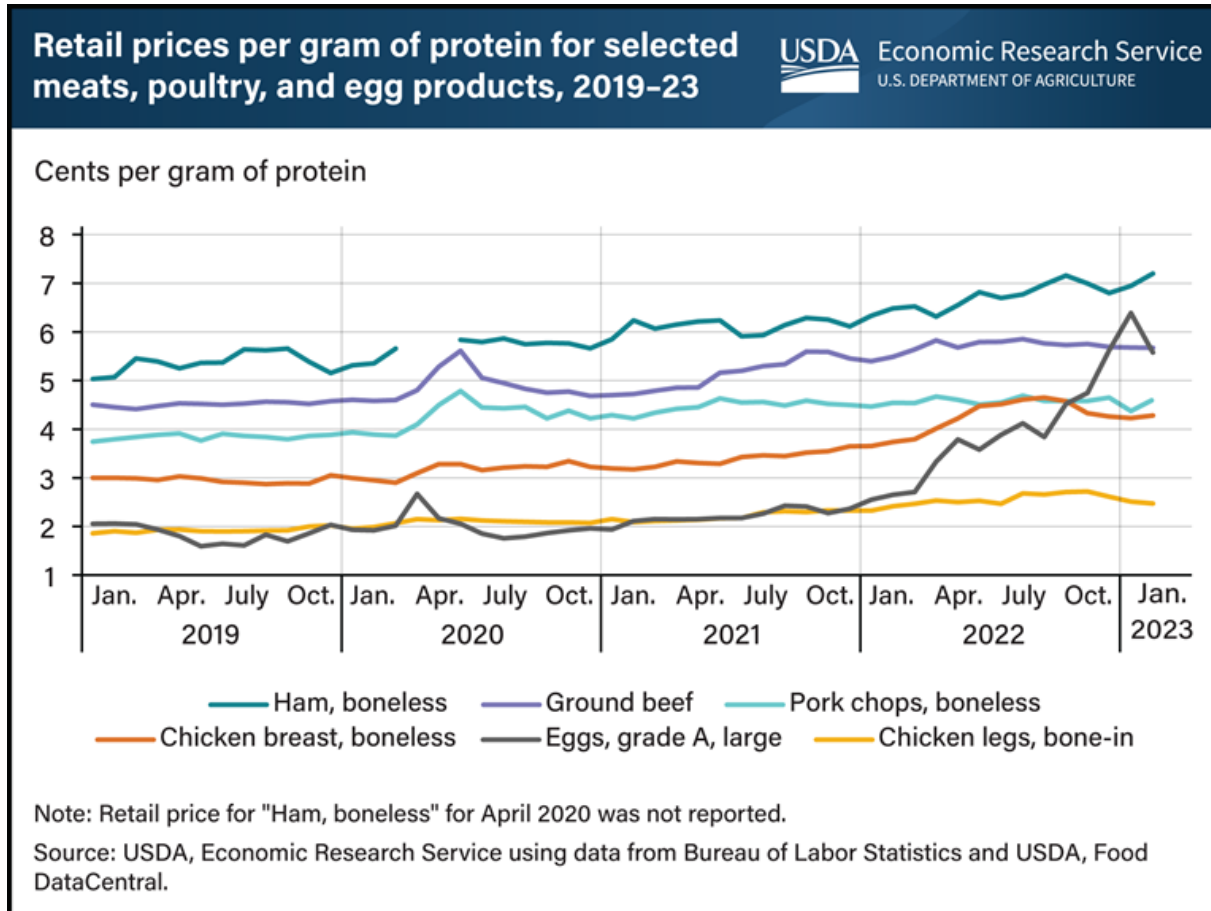
# Fill Up with Fruits and Vegetables

- Eat fruits and vegetables first
- When still hungry after a meal, have seconds of vegetables
- Fruit is nature's dessert. Avoid adding sweeteners
- Forage and garden to increase access
- Utilize preservation methods for out-of-season access.

# Healthy Plant Proteins

- Legumes and lentils
- Nuts and seeds
- Quinoa
- Tofu and edamame
- Soy milk
- Frozen and refrigerated meat analogs\*
  - High in sodium
  - Expensive

# Cost per gram of animal protein



<https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=106132>. Accessed 3/19/2023.

# Dried Beans (legumes): an inexpensive protein source

**Pinto beans—Average retail price per pound and per cup equivalent, 2016**

Form	Average retail price		Preparation yield factor	Size of a cup equivalent		Average price per cup equivalent
Canned <sup>1</sup>	\$0.80	per pound	0.65	0.386	pounds	\$0.48
Dried <sup>2</sup>	\$1.09	per pound	2.399	0.386	pounds	\$0.17

<sup>1</sup>The liquid contents of the can are discarded prior to consumption. Based on the Food Patterns Equivalents Database (FPED), ERS assumes that 65 percent of the gross weight of the can's contents is solid and 35 percent is liquid medium. The FPED cup equivalent weight for canned pinto beans is the weight of the solids and not of the liquid medium in which the legume is packed. The preparation yield factor for canned pinto beans in the above table does not account for any further preparation that occurs prior to consumption.

<sup>2</sup>Dried pinto beans must be cooked prior to consumption. The USDA Food and Nutrient Database for Dietary Studies (FNDDS) reports that cooking one ounce of dry pinto beans yields 68 grams of cooked vegetable, indicating a preparation yield of about 239.9 percent.

Source: Calculated by USDA, Economic Research Service, from 2016 IRI Infoscan data; USDA Food and Nutrient Database for Dietary Studies (FNDDS), 5.0; and the Food Patterns Equivalents Database (FPED) 2013-14 as well as the FPED's accompanying Methodology and User Guide.

st Comparison

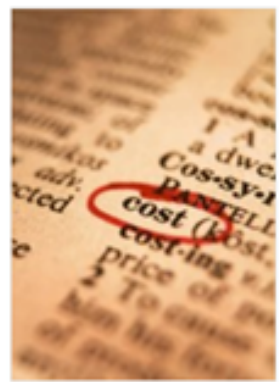
# Protein Cost Comparison

| [Share](#)

I know that protein foods usually cost the most. What is the difference in cost? My family really likes beef, chicken and pork. How can I stretch my budget and still provide their favorite foods?

Here are some examples of the average cost per serving for different types of protein foods:

Protein food	Serving size	Cost per serving (\$)
Ground beef (lean, extra-lean)	4 ounces	1.18
Beef (round roast, USDA choice, boneless)	4 ounces	1.16
Pork chop (boneless)	4 ounces	1.00
Chicken breast, boneless	4 ounces	0.82
Pinto beans (canned, drained)	½ cup	0.19
Eggs, grade A, large	1	0.16
Pinto beans (dry)	½ cup	0.07



Source: U.S. Department of Agriculture, Economic Research Service. Retrieved March 2013 from [www.ers.usda.gov/data/meatpricespreads/](http://www.ers.usda.gov/data/meatpricespreads/)

To save money, watch for sales on meat and poultry. Consider buying "family-sized" or "bulk" packages of meat and poultry. Often, whole chickens cost less per pound than cut-up chickens. You can repackage the meat in recipe-sized amounts and freeze at home. Be sure to label with the purchase date. To learn more about freezing foods, see the "Food Freezing Guide" (FN403) available at [www.ag.ndsu.edu/pubs/yf/foods/fn403.pdf](http://www.ag.ndsu.edu/pubs/yf/foods/fn403.pdf)

Stretch your protein foods with other ingredients, such as pasta, rice, beans and vegetables, in casseroles, soups and stews. Make chili with a combination of ground or cubed beef and kidney beans. Try omelets with vegetables, cheese and cubed ham. As you can see from the chart, dry beans are very economical. Learn more about using them in the "Steps to Economical Meals" cookbook at [www.ag.ndsu.edu/pubs/yf/foods/fn1595.pdf](http://www.ag.ndsu.edu/pubs/yf/foods/fn1595.pdf)



# Protein content of ½ cup of pinto beans

<b>Nutrition Facts</b>	
about 26 servings per container	
<b>Serving size 1/4 cup (35g) dry</b>	
<b>Amount per serving</b>	
<b>Calories</b>	<b>120</b>
<b>% Daily Value*</b>	
<b>Total Fat</b> 0g	<b>0%</b>
Saturated Fat 0g	<b>0%</b>
Trans Fat 0g	
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Sodium</b> 0mg	<b>0%</b>
<b>Total Carbohydrate</b> 22g	<b>8%</b>
Dietary Fiber 5g	<b>18%</b>
Total Sugars <1g	
Includes 0g Added Sugars	<b>0%</b>
<b>Protein</b> 7g	
Vitamin D 0mcg	0%
Calcium 40mg	4%
Iron 1.8mg	10%
Potassium 490mg	10%
<small>* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.</small>	

<b>Nutrition Facts</b>	
about 3.5 servings per container	
<b>Serving size 1/2 cup (130g)</b>	
<b>Amount per serving</b>	
<b>Calories</b>	<b>110</b>
<b>% Daily Value*</b>	
<b>Total Fat</b> 0.5g	<b>1%</b>
Saturated Fat 0g	<b>0%</b>
Trans Fat 0g	
<b>Cholesterol</b> 0mg	<b>0%</b>
<b>Sodium</b> 130mg	<b>6%</b>
<b>Total Carbohydrate</b> 20g	<b>7%</b>
Dietary Fiber 6g	<b>21%</b>
Total Sugars 1g	
Includes 0g Added Sugars	<b>0%</b>
<b>Protein</b> 6g	
Vit. D 0mcg 0%	• Calcium 60mg 4%
Iron 1.9mg 10%	• Potas. 360mg 8%

Great Value Dried Pinto Beans.  
Walmart.com. Accessed 3/19/2023

Great Value Canned Pinto Beans.  
Walmart.com. Accessed 3/19/2023

# Vegetarian Recipes Utilizing Indigenous Plants

Midwest/Mountain Plains

# Vegetarian Wild Rice Bowl

- Contains traditional foods such as fresh foraged Milk Weed shoots and pods; Lamb's Quarters; Purslane, Wild Onions
  - Legumes and rice provide good source of complementary proteins
  - Substitutions can be made as needed:
    - White rice, frozen or canned spinach, etc.
- <https://www.usda.gov/sites/default/files/documents/vegetarian-wild-rice-bowl.pdf>

# Vegetarian Recipes Utilizing Indigenous Plants

Western/Southwestern Regions

# Pinto Bean Dip with Pine Nuts

- Ingredients:
  - 2 cups cooked pinto beans
  - 1 cup freshly foraged pine nuts, roasted
  - ¼ cup water or bean juice
- Many pine trees produce edible seeds, but the pinyon pine is source of most pine nuts sold in the US.
- <https://www.usda.gov/sites/default/files/documents/pinto-bean-dip-roasted-pine-nuts.pdf>

# Peach California Huckleberry Smoothie

- Ingredients:
  - 1 can peaches
  - ½ cup freshly foraged huckleberries
  - ½ cup evaporated milk or almond milk
  - Ice (optional)
- <https://www.usda.gov/sites/default/files/documents/peach-california-huckleberry-smoothie.pdf>

# Northern Climates including Alaska

# Harvesting Indigenous Plants



# Northern Plains: Prickly Pear Cactus



Great Plains prickly pear (*Opuntia polyacantha*). Photo by Mary Lata and Rana Tucker, USDA

\*Possible Health Benefits: [Mayo Clinic Website](#)

# Berry Fruit Leather

- Foraged berries
- Lemon juice

Alaska Native Tribal Health Consortium Store Outside Your Door  
YouTube video <https://youtu.be/1HdQ-uaTTvk>

- Additional Guidance:
  - Recipe and Food Safety Information
  - North Dakota State University
  - <https://www.ndsu.edu/agriculture/extension/publications/food-preservation-making-fruit-leathers>

# Gardening

# It Grows in Alaska

(University of Alaska Fairbanks)

- Green Beans
  - <https://itgrowsinalaska.community.uaf.edu/2020/07/20/you-can-grow-bush-pole-runner-and-fava-beans-in-alaska/#more-510>
- Winter Squash
  - <https://itgrowsinalaska.community.uaf.edu/2022/08/12/growing-winter-squash-in-alaska/>
- Corn
  - <https://itgrowsinalaska.community.uaf.edu/2020/04/09/corn-the-holy-grail-of-alaska-gardeners/>

# Extending the Growing Season

https://itgrowsinalaska.community.uaf.edu/2020/10/08/stretch-your-growing-season-into-the-fall-with-season-extension-techniques-and-cold-hardy-vegetables/

Cold frames can be insulated and/or heated (hot bed). You can even make a rudimentary cold frame with straw bales. If you're willing to add heat to a cold frame (known as a hot bed) or high tunnel, you can extend the growing season even further into the winter.

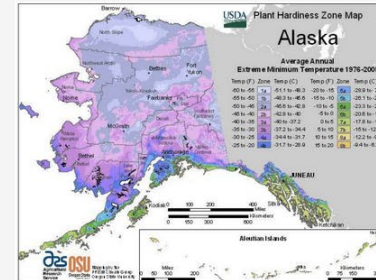


Old windows can be used to create a cold frame.

Hoop houses and [high tunnels](#) are another option. They provide a little less



All About Alliums—Knowing Your Onions, Shallots, Garlic and Leeks



What Your Plant Hardiness Zone Won't Tell You About Your Garden's Climate



<https://itgrowsinalaska.community.uaf.edu/2020/10/08/stretch-your-growing-season-into-the-fall-with-season-extension-techniques-and-cold-hardy-vegetables/>

# Strategies to Increase Access to Gardens

- School, community, and individual gardens
- Extension and other groups provide education
- Wide variety of potential funding sources

<https://extension.sdstate.edu/native-american-gardens>

<https://www.fns.usda.gov/tn/team-nutrition-garden-resources>

# Three Sisters Stew

- Chickasaw Nation Governor's Website Recipe
  - Corn (frozen)
  - Yellow squash (cubed)
  - Red potatoes (peeled and cubed)
  - Onions (diced)
  - Canned tomatoes
  - Canned kidney beans
  - Canned black eyed peas
  - Quick cooking barley
  - Garlic
  - Pepper
  - Water

<https://chickasaw.net/Our-Nation/Culture/Foods/Three-Sisters-Stew.aspx>

# American Indian Health and Diet Project (AIHDP) University of Kansas

https://aihd.ku.edu/recipes/index.html




**AIHDP**  
American Indian Health and Diet Project  
A website devoted to recovering the health of Indigenous peoples.

Home Blog Foods Recipes Gardens Ponds Exercise Health Diet Kids

## Recipes



The slogan "Decolonize Your Diet" and the bumper stickers, pins, aprons, clocks, hats, etc. with the Anti-fry bread logo was created by me in 2000 and is at Cafe Press.



Truly "traditional" indigenous recipes contain no Old World foods, and that means no fry bread, pasta, pies, cakes, nor any other dish containing wheat,

## Soups, Stews, Stocks

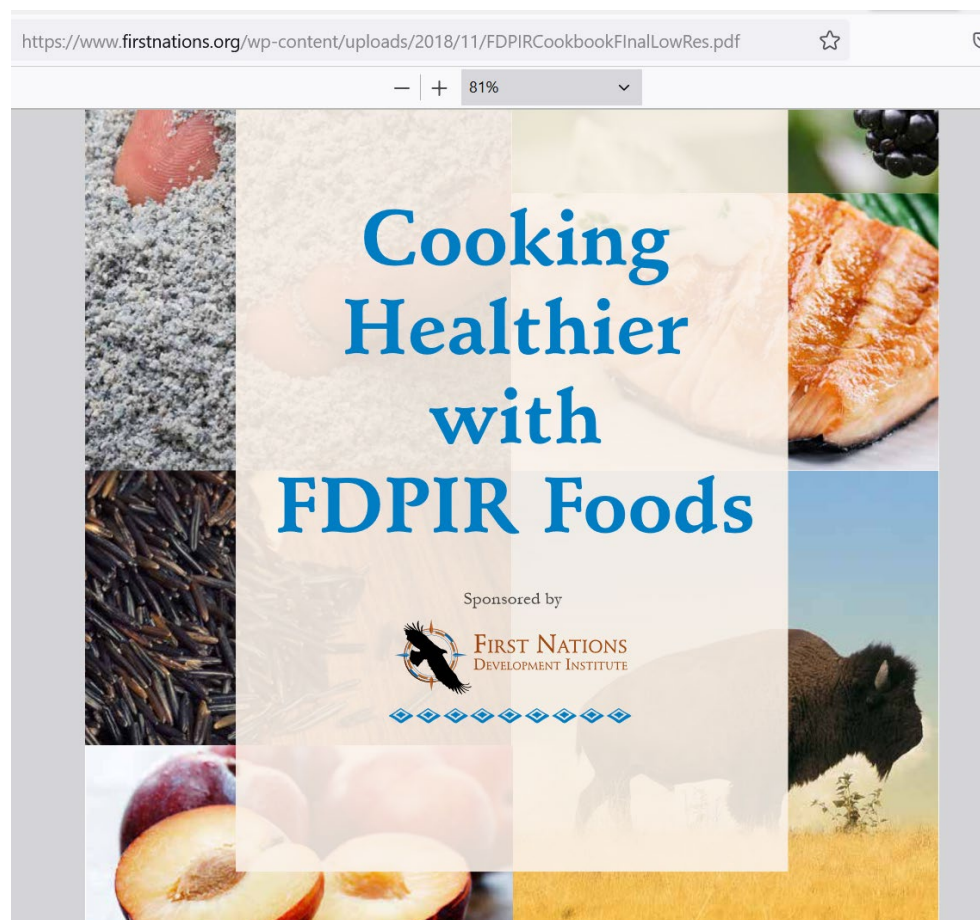
- Butternut Squash Soup
- Choctaw Stew
- Corn Soup
- Crock Pot Elk Stew
- Gazpacho
- Osage Strip Meat Soup
- Turkey Soup
- Tortilla Soup
- Vegetable, Turkey and Game Stock

## Chips, Dips, Condiments

- Bean Salsas
- Chile and Onion Relish
- Grape Salsa
- Guacamole Dip
- Mango Salsa
- Chili pepper flakes
- Popcorn
- Roasted Pumpkin Seeds
- Super Dip
- Sweet Potato Salsa
- Tomato Salsa
- Tortilla Chips
- Wojapi-dish, dessert and sauce



# Cookbooks to utilize foods from FDPIR



<https://www.firstnations.org/wp-content/uploads/2018/11/FDPIRCookbookFinalLowRes.pdf>

# Physician's Committee for Responsible Medicine and the Navajo Nation Partnership

- Fighting Diabetes with Ancestral Plant Based Foods
  - Resources
    - <https://www.pcrm.org/good-nutrition/healthy-communities/native-american-resources>

# Navaho Nation and PCRM Partnership Videos

- [Intro to the Power to Heal](#)
- [Navajo Nation PSA: Native Healthy Can be Tasty](#)
- [Power to Heal-Beans Cooking Tutorial](#)
- [Power to Heal-No Fry Bread Cooking Tutorial](#)

# MY NATIVE AMERICAN POWER PLATE

## Powerful plant food for a long and healthy life

### A return to food from Mother Earth

When you eat Power Plate food, go for color and variety. Eat enough to be comfortably full, 3-4 times a day.

#### ENJOY:

- **FRUIT:** Mother Earth's candy! Packed full of energy, vitamins, and fiber. Enjoy fresh, frozen, canned in water, or dried.
- **VEGETABLES:** Mother Earth's vitamins and minerals! Enjoy fresh, frozen, steamed, roasted, baked, dried, or canned.
- **BEANS:** Packed with protein, no cholesterol!
- **CORN, POTATOES, AND WHOLE GRAINS** (not processed): These fill us up without filling us out!
- **NUTS or SEEDS:** Eat about a handful a day.
- **WATER**
- **PHYSICAL ACTIVITY**
- **ADEQUATE REST**

#### AVOID:

- **ANIMAL PRODUCTS** – not needed for health at any age
- **HIGHLY PROCESSED FOOD** – products with white flour, added sugar, or added fat like lard or oil
- **CIGARETTE SMOKING**

INCLUDE VITAMIN B12 FOR HEALTHY BLOOD AND NERVES.



Here's how nutritionists of one tribe created a Power Plate.



"I lost 284 pounds, I reversed my diabetes, and now I am without medications. It's the power of Diné (Navajo) plant-based food."

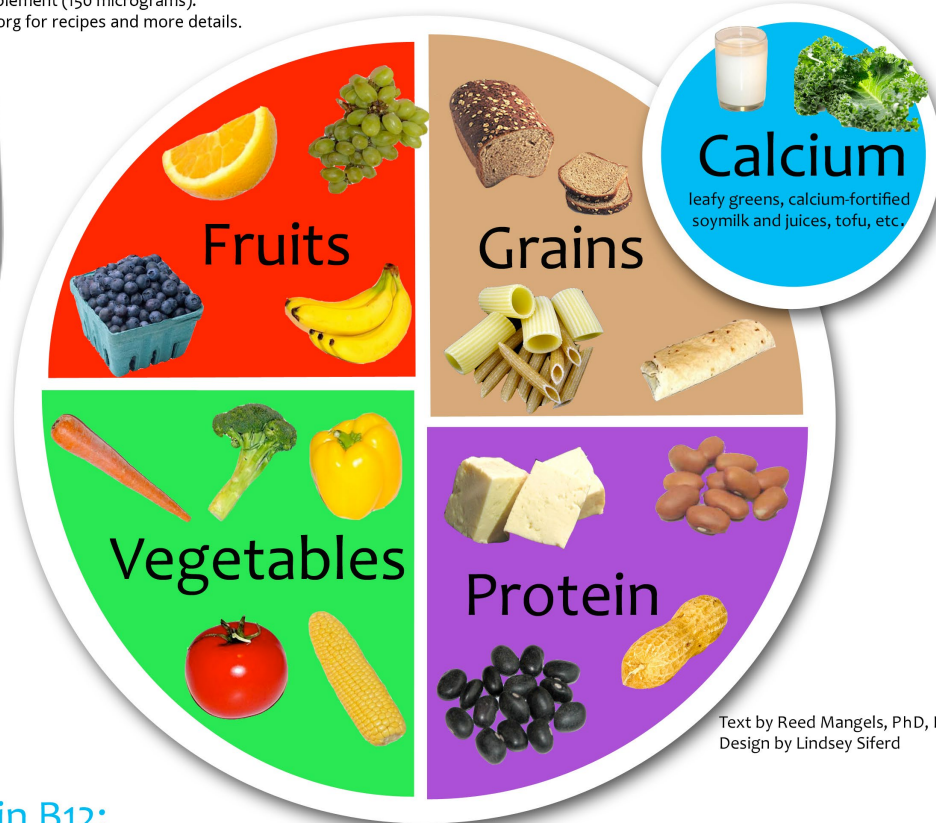
Lyle Estity—Navajo Nation

Powerful for:  
■ Weight Control ■ Diabetes ■ Heart Disease  
■ Cancer Prevention & Survival

# Vegan MY ^ PLATE

## Nutrition Tips:

- \*Choose mostly whole grains.
- \*Eat a variety of foods from each of the food groups.
- \*Adults age 70 and younger need 600 IU of vitamin D daily.  
Sources include fortified foods (such as some soymilks) or a vitamin D supplement.
- \*Sources of iodine include iodized salt (3/8 teaspoon daily) or an iodine supplement (150 micrograms).
- \*See [www.vrg.org](http://www.vrg.org) for recipes and more details.



Text by Reed Mangels, PhD, RD  
Design by Lindsey Siferd

## Vitamin B12:

Vegans need a reliable source of vitamin B12. Eat daily a couple of servings of fortified foods such as B12-fortified soymilk, breakfast cereal, meat analog, or Vegetarian Support Formula nutritional yeast. Check the label for fortification. If fortified foods are not eaten daily, you should take a vitamin B12 supplement (25 micrograms daily).

### Note:

Like any food plan, this should only serve as a general guide for adults. The plan can be modified according to your own personal needs. This is not personal medical advice. Individuals with special health needs should consult a registered dietitian or a medical doctor knowledgeable about vegan nutrition.



The Vegetarian

Resource Group P.O. Box 1463 Baltimore, MD 21203 [www.vrg.org](http://www.vrg.org) (410) 366-8343

Image used with permission

# School Resources

- American Indian Traditional Foods in USDA School Meals Programs A WISCONSIN FARM TO SCHOOL TOOLKIT
- <https://dpi.wi.gov/sites/default/files/imce/school-nutrition/pdf/amer-ind-trad-foods-toolkit.pdf>
- *This resource includes guidance for procurement, incorporating traditional foods, and nutrition education activities (taste tests, school gardens, etc.)*

# Indigenous Food Sovereignty Initiative

<https://www.usda.gov/tribalrelations/usda-programs-and-services/usda-indigenous-food-sovereignty-initiative>

# Additional Resources

- Vegetarian Nutrition Resource List. Food and Nutrition Center. National Agricultural Library. US Department of Agriculture. [www.nal.usda.gov/fnic/pubs/vegetarian.pdf](http://www.nal.usda.gov/fnic/pubs/vegetarian.pdf)
- Academy of Nutrition and Dietetics Vegetarian Nutrition Practice Group <http://vndpg.org>
- Choosemyplate.gov [www.choosemyplate.gov/healthy-eating-tips/tips-for-vegetarian.html](http://www.choosemyplate.gov/healthy-eating-tips/tips-for-vegetarian.html)
- Vegetarian Resource Group [www.vrg.org](http://www.vrg.org)
- Academy of Nutrition and Dietetics Nutrition Care Manual <https://www.nutritioncaremanual.org/>



# RD Educational Handouts

## Current Resources 2020-2022

The following RD Resources are FREE handouts for VN members looking for more information on plant-based diets and nutrition.

Choline <b>(NEW!)</b>	<a href="#">Download RD Version (PDF)</a> <a href="#">Download Consumer Version (PDF)</a>
Vegetarian Nutrition and Immune Health <b>(NEW!)</b>	<a href="#">Download RD Version (PDF)</a> <a href="#">Download Consumer Version (PDF)</a> * <a href="#">References</a>
Plant-based Diets in Chronic Kidney Disease <b>(NEW!)</b>	<a href="#">Download RD Version (PDF)</a> <a href="#">Download Consumer Version (PDF)</a> * <a href="#">References</a>
Vegetarian Nutrition for School-Aged Children <b>(NEW!)</b>	<a href="#">Download RD Version (PDF)</a> <a href="#">Download Consumer Version (PDF)</a> * <a href="#">References included in resource</a>

Questions?

Thank You!