Team Resource Packet

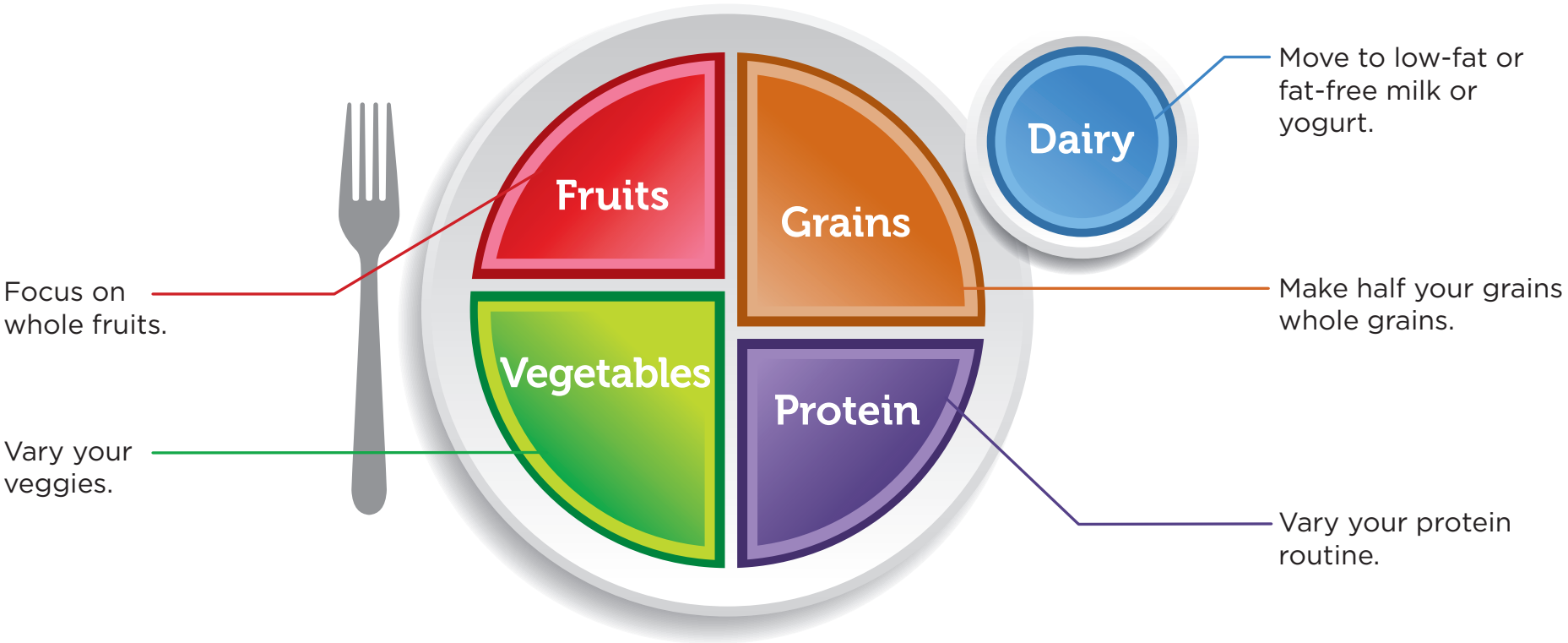
District 12

The members of Texas A&M AgriLife will provide equal opportunities in programs and activities, education, and employment to all persons regardless of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation or gender identity and will strive to achieve full and equal employment opportunity throughout Texas A&M AgriLife.

USDA United States Department of Agriculture

MyPlate, MyWins: Make it yours

Find your healthy eating style. Everything you eat and drink over time matters and can help you be healthier now and in the future.



ChooseMyPlate.gov

Limit

Limit the extras.

Drink and eat beverages and food with less sodium, saturated fat, and added sugars.

MyWins

Create 'MyWins' that fit your healthy eating style.

Start with small changes that you can enjoy, like having an extra piece of fruit today.

Fruits	Vegetables	Grains	Dairy	Protein
Focus on whole fruits and select 100% fruit juice when choosing juices. Buy fruits that are dried, frozen, canned, or fresh, so that you can always have a supply on hand.	Eat a variety of vegetables and add them to mixed dishes like casseroles, sandwiches, and wraps. Fresh, frozen, and canned count, too. Look for "reduced sodium" or "no-salt-added" on the label.	Choose whole-grain versions of common foods such as bread, pasta, and tortillas. Not sure if it's whole grain? Check the ingredients list for the words "whole" or "whole grain."	Choose low-fat (1%) or fat-free (skim) dairy. Get the same amount of calcium and other nutrients as whole milk, but with less saturated fat and calories. Lactose intolerant? Try lactose-free milk or a fortified soy beverage.	Eat a variety of protein foods such as beans, soy, seafood, lean meats, poultry, and unsalted nuts and seeds. Select seafood twice a week. Choose lean cuts of meat and ground beef that is at least 93% lean.

Daily Food Group Targets — Based on a 2,000 Calorie Plan

Visit SuperTracker.usda.gov for a personalized plan.

2 cups	2½ cups	6 ounces	3 cups	5½ ounces
1 cup counts as:	*1 cup counts as:*	*1 ounce counts as:*	*1 cup counts as:*	*1 ounce counts as:*
1 large banana 1 cup mandarin oranges ½ cup raisins 1 cup 100% grapefruit juice	2 cups raw spinach 1 large bell pepper 1 cup baby carrots 1 cup green peas 1 cup mushrooms	1 slice of bread ½ cup cooked oatmeal 1 small tortilla ½ cup cooked brown rice ½ cup cooked grits	1 cup milk 1 cup yogurt 2 ounces processed cheese	1 ounce tuna fish ¼ cup cooked beans 1 Tbsp peanut butter 1 egg

Water

Drink water instead of sugary drinks.

Regular soda, energy or sports drinks, and other sweet drinks usually contain a lot of added sugar, which provides more calories than needed.

Activity

Don't forget physical activity!

Being active can help you prevent disease and manage your weight.

Kids ≥ 60 min/day | Adults ≥ 150 min/week

MyPlate, MyWins

Healthy Eating Solutions for Everyday Life

ChooseMyPlate.gov/MyWins

Center for Nutrition Policy and Promotion
May 2016
CNPP-29

USDA is an equal opportunity provider, employer, and lender.

10 tips
Nutrition Education Series

choose MyPlate

10 tips to a great plate

Making food choices for a healthy lifestyle can be as simple as using these 10 Tips.
Use the ideas in this list to *balance your calories*, to choose foods to *eat more often*, and to cut back on foods to *eat less often*.

1 balance calories

Find out how many calories YOU need for a day as a first step in managing your weight. Go to www.ChooseMyPlate.gov to find your calorie level. Being physically active also helps you balance calories.

2 enjoy your food, but eat less

Take the time to fully enjoy your food as you eat it. Eating too fast or when your attention is elsewhere may lead to eating too many calories. Pay attention to hunger and fullness cues before, during, and after meals. Use them to recognize when to eat and when you've had enough.

3 avoid oversized portions

Use a smaller plate, bowl, and glass. Portion out foods before you eat. When eating out, choose a smaller size option, share a dish, or take home part of your meal.

4 foods to eat more often

Eat more vegetables, fruits, whole grains, and fat-free or 1% milk and dairy products. These foods have the nutrients you need for health—including potassium, calcium, vitamin D, and fiber. Make them the basis for meals and snacks.

5 make half your plate fruits and vegetables

Choose red, orange, and dark-green vegetables like tomatoes, sweet potatoes, and broccoli, along with other vegetables for your meals. Add fruit to meals as part of main or side dishes or as dessert.

6 switch to fat-free or low-fat (1%) milk

They have the same amount of calcium and other essential nutrients as whole milk, but fewer calories and less saturated fat.

7 make half your grains whole grains

To eat more whole grains, substitute a whole-grain product for a refined product—such as eating whole-wheat bread instead of white bread or brown rice instead of white rice.

8 foods to eat less often

Cut back on foods high in solid fats, added sugars, and salt. They include cakes, cookies, ice cream, candies, sweetened drinks, pizza, and fatty meats like ribs, sausages, bacon, and hot dogs. Use these foods as occasional treats, not everyday foods.

9 compare sodium in foods

Use the Nutrition Facts label to choose lower sodium versions of foods like soup, bread, and frozen meals. Select canned foods labeled "low sodium," "reduced sodium," or "no salt added."

10 drink water instead of sugary drinks

Cut calories by drinking water or unsweetened beverages. Soda, energy drinks, and sports drinks are a major source of added sugar, and calories, in American diets.

USDA United States Department of Agriculture
Center for Nutrition Policy and Promotion

Go to www.ChooseMyPlate.gov for more information.

DG TipSheet No. 1
June 2011
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Be a BAC Fighter

Make the meals and snacks from your kitchen as safe as possible. **CLEAN:** wash hands and surfaces often; **SEPARATE:** don't cross-contaminate; **COOK:** to safe temperatures, and **CHILL:** refrigerate promptly. Be a BAC Fighter and reduce your risk of food borne illness!

Visit "Ask Karen" at *FoodSafety.gov* to ask a food safety question

Call the USDA Meat & Poultry Hotline:
1-888-MPHotline (1-888-674-6854)

FDA Food Information Line
1-888-SAFEFOOD (1-888-723-3366)

See ***www.fightbac.org*** for free downloadable brochures, fact sheets, stickers, and other great stuff! Materials for educators can be ordered through the on-line BAC store!

The mission of the non-profit Partnership for Food Safety Education is to end illness and death from food borne infection.

Please go to ***www.fightbac.org*** for more information on how you can get involved and to sign up to receive food safety e-cards!

Sign up to be a BACFighter at www.fightbac.org

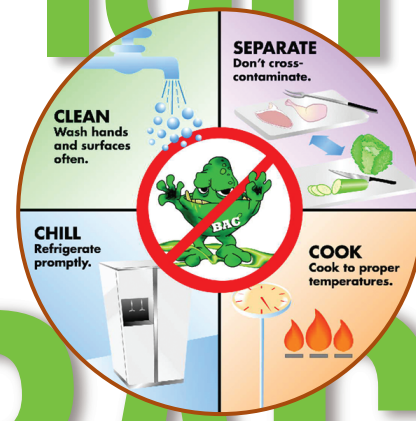
Apply the heat... and Fight BAC!®

Cooking food to the safe temperature kills harmful bacteria. So *Fight BAC!*® by thoroughly cooking your food as follows:

SAFE MINIMAL INTERNAL TEMPERATURES *As measured with a food thermometer*	
Beef, pork, veal and lamb (roast, steaks and chops)	145°F with a 3-minute "rest time" after removal from the heat source.
Ground Meats	160°F
Poultry (whole, parts or ground)	165°F
Eggs and egg dishes	160°F Cook eggs until both the yolk and the white are firm. Scrambled eggs should not be runny.
Leftovers and casseroles	165°F
Fin Fish	145°F
Guidelines for Seafood	
Shrimp, Lobster, Crabs	Flesh pearly and opaque
Clams, Oysters and Mussels	Shells open during cooking
Scallops	Milky white, opaque and firm

2011 PFSE

FIGHT BAC!®



FIGHT FOODBORNE BACTERIA

Four Simple Steps to **Food Safety**

www.fightbac.org

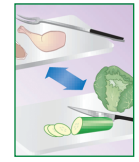
BAC (foodborne bacteria) could make you and those you care about sick. In fact, even though you can't see BAC—or smell him, or feel him—he and millions more like him may have already invaded the food you eat. But you have the power to *Fight BAC!*®.

Foodborne illness can strike anyone. Some people are at a higher risk for developing foodborne illness, including pregnant women, young children, older adults and people with weakened immune systems. For these people the following four simple steps are critically important:

CLEAN: *Wash hands and surfaces often*

Bacteria can be spread throughout the kitchen and get onto hands, cutting boards, utensils, counter tops and food. To ***Fight BAC!***®, always:

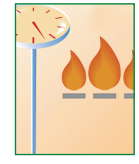
- Wash your hands with warm water and soap for at least 20 seconds before and after handling food and after using the bathroom, changing diapers and handling pets.
- Wash your cutting boards, dishes, utensils and counter tops with hot soapy water after preparing each food item and before you go on to the next food.
- Consider using paper towels to clean up kitchen surfaces. If you use cloth towels wash them often in the hot cycle of your washing machine.
- Rinse fresh fruits and vegetables under running tap water, including those with skins and rinds that are not eaten.
- Rub firm-skin fruits and vegetables under running tap water or scrub with a clean vegetable brush while rinsing with running tap water.



SEPARATE: *Don't cross-contaminate*

Cross-contamination is how bacteria can be spread. When handling raw meat, poultry, seafood and eggs, keep these foods and their juices away from ready-to-eat foods. Always start with a clean scene—wash hands with warm water and soap, and wash cutting boards, dishes, countertops and utensils with hot water and soap.

- Separate raw meat, poultry, seafood and eggs from other foods in your grocery shopping cart, grocery bags and in your refrigerator.
- Use one cutting board for fresh produce and a separate one for raw meat, poultry and seafood.
- Never place cooked food on a plate that previously held raw meat, poultry, seafood or eggs.



COOK: *Cook to safe temperatures*

Food is safely cooked when it reaches a high enough internal temperature to kill the harmful bacteria that cause illness. Refer to the chart on the back of this brochure for the proper internal temperatures.

- Use a food thermometer to measure the internal temperature of cooked foods. Make sure that meat, poultry, egg dishes, casseroles and other foods are cooked to the internal temperature shown in the chart on the back of this brochure.
- Cook ground meat or ground poultry until it reaches a safe internal temperature. Color is not a reliable indicator of doneness.
- Cook eggs until the yolk and white are firm. Only use recipes in which eggs are cooked or heated thoroughly.
- When cooking in a microwave oven, cover food, stir and rotate for even cooking. Food is done when it reaches the safe internal temperature as measured with a food thermometer.
- Bring sauces, soups and gravy to a boil when reheating.

CHILL: *Refrigerate promptly*

Refrigerate foods quickly because cold temperatures slow the growth of harmful bacteria. Do not over-stuff the refrigerator. Cold air must circulate to help keep food safe. Keeping a constant refrigerator temperature of 40ºF or below is one of the most effective ways to reduce the risk of foodborne illness. Use an appliance thermometer to be sure the temperature is consistently 40ºF or below. The freezer temperature should be 0ºF or below.

- Refrigerate or freeze meat, poultry, eggs and other perishables as soon as you get them home from the store.
- Never let raw meat, poultry, eggs, cooked food or cut fresh fruits or vegetables sit at room temperature more than two hours before putting them in the refrigerator or freezer (one hour when the temperature is above 90ºF).
- Never defrost food at room temperature. Food must be kept at a safe temperature during thawing. There are three safe ways to defrost food: in the refrigerator, in cold water, and in the microwave. Food thawed in cold water or in the microwave should be cooked immediately.
- Always marinate food in the refrigerator.
- Divide large amounts of leftovers into shallow containers for quicker cooling in the refrigerator.
- Use or discard refrigerated food on a regular basis. Check USDA cold storage information at ***www.fightbac.org*** for optimum storage times.

Food Safety

FACT SHEET

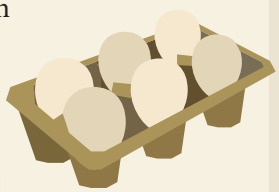
Texas A&M AgriLife Extension

BASIC GUIDELINES

No running around the preparation area

Keep trash off the floor and counters

Sanitize all work surfaces prior to starting food preparation

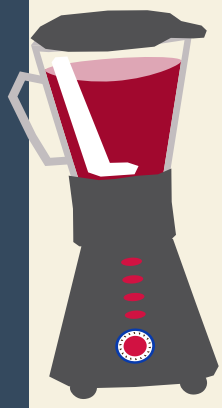


Start with clean utensils, totes, and equipment/supplies

Place eggs in a small bowl to prevent them from rolling onto the floor before you can use them

Before preheating an oven, move oven racks to the needed positions

Keep raw foods separate from ready to eat foods



Be sure an appliance is in the "off" position before plugging it in,

Keep portable appliances unplugged when not in use

Avoid using any appliance with a frayed or worn cord

Use a barrier when handling foods if possible. (Gloves, spoons, spatulas, tongs, deli tissue, wax paper etc.)

Gloves may only be used for one task and must be changed if damaged or anytime they become contaminated, this includes if a participant touches a part of their exposed skin, or if they perform a task such as touching trash

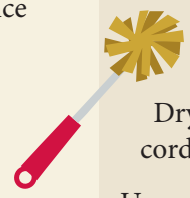
Hold by the edges to put on hands, do not blow into them or roll them up your hands

Have gloves that fit, and are not too big

Wipe up all spills immediately with paper towel, cloth or mop

Keep cupboard doors and drawers closed unless in use

Turn handles of sauce pans away from the walk area when being used



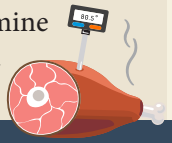
Clean and sanitize utensils between uses

Dry hands well before using electric cords or appliances

Use only dry hot pads or oven mitts, damp ones conduct heat

Always open oven, stove or microwave door/lid a crack to vent some steam before looking and tilt lid away from you so steam is released away from your face

Use a thermometer to determine doneness of foods, clean and sanitize after each use



Have a plan for where you'll go with a pan when you take it out of the oven or off the stovetop,

Have cooling racks and counter savers in place

Always turn the burners/skillets off when finished

Disconnect appliances by pulling out the plug, not by tugging on the cord

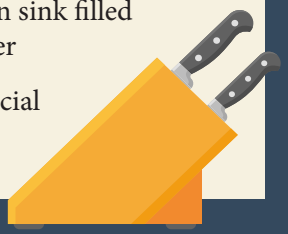
Unplug small appliances before cleaning

Always use a cutting board to protect yourself and the counter

Do not hold the food in your hand to cut it, even if it is only an apple

Wash knives and sharp objects separately

Never place knives in sink filled with soapy dish water



Store knives in a special compartment or holder

PERSONAL HYGIENE

Have hair restraint cap, chef's hat, bandana, visor, or hair net etc. (keeps hair from contacting exposed food)

No jewelry or big ear rings (risk of contamination)

Do not wear clothing that is loose or drapes below your wrists

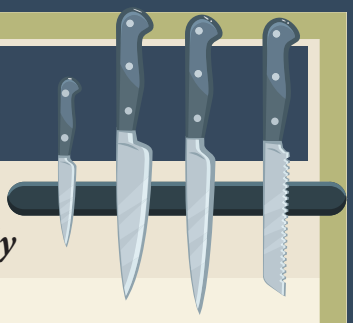
No chewing gum or eating while prepping or presenting

Open cuts/sores MUST be completely covered with waterproof bandage AND covered with a glove if on the hand

Do not compete if you have persistent discharge from eyes, nose and mouth or are exhibiting symptoms of a foodborne illness (ie. vomiting and/or diarrhea)

Use clean aprons/clothing and closed toed shoes

KNIFE SAFETY



Select the correct knife for the job and cut into the cutting board away from your body

CHEF'S KNIFE

A chef's knife is usually the largest knife in the kitchen, with a wide blade that is 8" to 10" long. Choose a knife that feels good and balanced in your hand. The knife should have a full tang. This means that the blade should go all the way through the handle for the best wear and stability.

PARING KNIFE

Paring knives are generally 2-1/2-4" in length. The most often used knife in the kitchen. It is ideal for peeling and coring fruits and vegetables, cutting small objects, slicing, and other hand tasks.

UTILITY KNIFE

Utility knives are longer than paring knives but smaller than chef's knives, usually around 5-8" long. They are also called sandwich knives because they are just the right size for slicing meats and cheeses.

BONING KNIFE

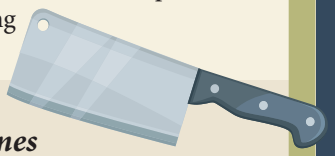
This knife has a more flexible blade to curve around meat and bone. Generally 4-5" long.

BREAD KNIFE

Bread knives are usually serrated. Most experts recommend a serrated knife that has pointed serrations instead of wavy serrations for better control and longer knife life. You must use a sawing motion when using a serrated knife.

CAN OPENER

Used to open sealed metal cans. Hold the handle of the can opener, not the sharp edge. After the lid has been cut off the can, pick it up carefully and discard. Look for pieces of the label or metal shavings from the can in the food after opening (physical contamination)



Keep Knives sharp!
Sharp knives are safer than dull ones

PREVENTATIVE MEASURES

PREVENTING FIRE

Keep a fire extinguisher in the kitchen & know how to use it

Avoid leaving the kitchen if you have food cooking or baking, if you must leave, carry a timer with you to remind you to return on time

Always turn the oven or stove top to off when finished

Smother a grease fire with a tight-fitting lid, never use water it will spread

Clothing on fire: remember stop, drop, roll to smother it

ELECTRIC SHOCK

Avoid using any appliance with a frayed or worn cord

Keep portable appliances unplugged when not in use

Be sure an appliance is in the "off" position before plugging it in

Never insert metal utensils in electrical appliances that are plugged in

TEXAS A&M AGRILIFE EXTENSION

Know Your Nutrients

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Extension Program Specialist
Healthy Lifestyles
4-H Youth Development
Texas A&M AgriLife Extension

Reviewed By:
Danielle Krueger, MPH, RD, LD

Minerals

Calcium
Chromium
Copper
Flouride
Iodine
Iron
Magnesium
Phosphorus
Selenium
Zinc

Electrolytes

Sodium
Chloride
Potassium
Water

Macro Nutrients

Protein
Fat
Carbohydrates
Fiber

Fat Soluble Vitamins

Vitamin A
Vitamin D
Vitamin E
Vitamin K

Water Soluble Vitamins

Vitamin C
Vitamin B1 (Thiamin)
Vitamin B2 (Riboflavin)
Vitamin B6
Vitamin B12
Niacin
Folate

Texas A&M AgriLife Extension

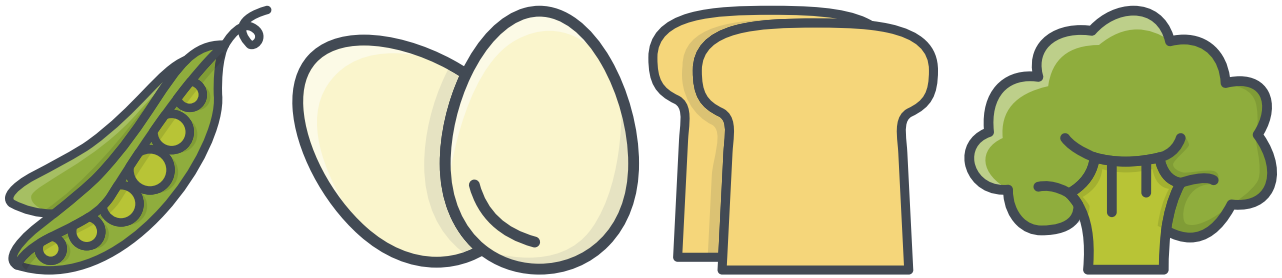
MACRO NUTRIENTS

PROTEIN
FAT
CARBOHYDRATE
FIBER

LET'S TAKE A CLOSER LOOK...

PROTEIN		FIBER	
AMINO ACIDS Protein is found in plant and animal foods. Protein is made up of units called amino acids, which are linked to one another in long chains. The sequence of amino acids determines each protein's unique structure and function. There are 20 different amino acids in two categories:		**DIETARY FIBER** Dietary fiber, or fiber, is a type of carbohydrate found in plant foods. Dietary fiber is bound together in such a way that it cannot be readily digested in the small intestine. There are two classifications of dietary fiber:	
ESSENTIAL AMINO ACIDS are required for normal body functioning, but cannot be made by the body. They must be obtained from food. Nine are considered essential.	**NONESSENTIAL AMINO ACIDS** can be made by the body from essential amino acids consumed in food or in the normal breakdown of body proteins. Eleven are considered nonessential.	**SOLUBLE FIBER** dissolves in water to form a thick gel-like substance in the stomach. It is broken down by bacteria in the large intestine and provides some calories.	**INSOLUBLE FIBER** does not dissolve in water and passes through the gastrointestinal tract relatively intact and, therefore, is not a source of calories.

FOOD SOURCES



MACRO NUTRIENTS	**FUNCTION:** *What does it do?*	**SOURCES:** *Where is it found?*	**DEFICIENCY:** *What happens if I don't get enough?*
Protein	• Builds and repairs all body tissue • Helps build blood • Helps form antibodies to fight infection • Supplies energy at 4 calories per gram	• Animal Protein: meat, fish, poultry, eggs, milk, cheese, yogurt • Nuts and nut butters • Soy • Vegetable Protein: legumes (peas, beans), whole grain breads and cereals	• Fatigue • Loss of appetite • Edema • Poor growth
Fat	• Transports fat-soluble vitamins (A,D,E,K) and essential fatty acids needed for body's proper use and storage of fat • Supplies energy at 9 calories per gram	• Butter or Margarine • Egg yolk • Meat with fat • Shortening or oil • Palm and coconut oil • Salad dressing • Whole milk dairy products	• Eczema • Stunted growth • Diarrhea • Loss of hair
Carbohydrate	• Supply glucose to spare protein • Help the body use other nutrients • Good source of energy • Supplies energy at 4 calories per gram to all body cells	• Bananas • Breads and cereals • Corn • Dried fruits • Flours and cornmeal • Honey • Pasta • Potatoes and sweet potatoes • Sugar, syrup, jam, and jellies • Rice	• Loss of energy • Fatigue • Ketosis
Fiber	• May help lower cholesterol • Improves bowel motility (moves food through digestive tract) • Gives feeling of fullness without extra calories, promoting satiety and weight loss	• Beans • Broccoli • Carrots • Enriched grain products such as: cereals, bread, noodles, tortillas, brown rice, oatmeal • Peas • Spinach • Whole grains	• Diarrhea

WATER SOLUBLE VITAMINS

VITAMIN C
VITAMIN B1
(THIAMIN)
VITAMIN B2
(RIBOFLAVIN)
NIACIN
VITAMIN B6
VITAMIN B12
FOLATE

LET'S TAKE A CLOSER LOOK...

Vitamins

Vitamins are essential substances that the human body needs for proper growth, development, and function. Vitamins are organic substances which are made by plants and animals and then eaten by humans..

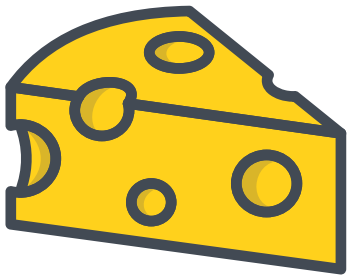
There are 13 known vitamins:
A,C,D,E,K, and the B vitamins (thiamin (B1), riboflavin (B2), niacin (B3), pantothenic acid (B5), pyridoxal (B6), cobalamin (B12), biotin, and folate/folic acid.
Vitamins are classified as water soluble and fat-soluble.

Water Soluble Vitamins

Water Soluble vitamins require water for absorption into the body.
The body flushes out excess water soluble vitamins in the urine.

FOOD SOURCES






WATER SOLUBLE VITAMINS	FUNCTION: *What does it do?*	SOURCES: *Where is it found?*	DEFICIENCY: *What happens if I don't get enough?*
Vitamin C	• Antioxidant • Collagen and connective tissue formation • Immune function • Wound healing • Promotes iron absorption	• Broccoli and brussels sprouts • Citrus fruits and juices • Green leafy vegetables • Green or red peppers • Kiwifruit or strawberries • Tomatoes	• Sore or bleeding gums • Poor wound healing • Pain in joints, bones, & muscles • Bruising easily • Hair and tooth loss
Vitamin B1 (Thiamin)	• Helps produce energy from carbohydrates in all cells • Nervous system function	• Beans, Peas and Lentils • Nuts and seeds • Pork • Whole and enriched grain products	• Poor appetite • Constipation • Depression • Cardiac failure
Vitamin B2 (Riboflavin)	• Helps produce energy from carbohydrates in all cells • Growth and development • Red blood cell formation	• Eggs • Enriched grain products • Meats, poultry, and seafood • Milk and Yogurt • Mushrooms	• Sore tongue and mouth, swelling also • Burning and itching eyes
Niacin	• Cholesterol production • Helps produce energy from carbohydrates in all cells • Digestion • Nervous system function • Promotes normal appetite	• Beans • Beef • Nuts • Pork, poultry, and seafood • Whole and enriched grain products	• Loss of appetite • Diarrhea • Dermatitis (skin irritations) • Confusion and Disorientation • Anxiety
Vitamin B6	• Immune function • Nervous system function • Protein, carbohydrate, and fat metabolism • Red blood cell formation • Turns tryptophan into niacin	• Chickpeas • Fruits (other than citrus) • Potatoes • Salmon • Tuna	• Anemia • Nervous irritability • Dermatitis (skin irritations) • Convulsions • Weakness • Abdominal pain
Vitamin B12	• Conversion of food into energy • Nervous system function • Red blood cell formation • Regeneration of folate	• Dairy Products • Eggs • Fortified cereals • Meats, poultry, and seafood	• Anemia • Nerve damage
Folate	• Prevents neural tube defects (birth defects) • Red blood cell formation	• Asparagus • Avocado • Beans and peas • Green leafy vegetables • Orange juice	• Anemia • Fatigue • Brain and Spinal cord defects in infants due to mother's deficiency during pregnancyw

FAT SOLUBLE VITAMINS

VITAMIN A
VITAMIN D
VITAMIN E
VITAMIN K

LET'S TAKE A CLOSER LOOK...

Vitamins

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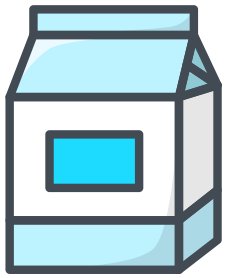
A,C,D,E,K, and the B vitamins (thiamin (B1), riboflavin (B2), niacin (B3), pantothenic acid (B5), pyridoxal (B6), cobalamin (B12), biotin, and folate/folic acid.
Vitamins are classified as water soluble and fat-soluble.

Fat Soluble Vitamins

Fat soluble vitamins require fat for absorption and are stored in the liver and adipose (fatty tissue) of the body. By storing fat soluble vitamins in fatty tissues, the body can tap into these reserves when needed. Fat soluble vitamins are not excreted easily and when eating excess amounts levels can build up and become toxic.

FOOD SOURCES

FAT SOLUBLE VITAMINS	**FUNCTION:** *What does it do?*	**SOURCES:** *Where is it found?*	**DEFICIENCY:** *What happens if I don't get enough?*
Vitamin A	• Normal cell growth and development • required for immune function • supports reproduction • Promotes vision • Protects from infections • Red blood cell formation • Skin and bone formation • Helps keep skin healthy	• Cantaloupe • Carrots • Dairy products • Eggs • Fortified cereals • Green leafy vegetables • Pumpkin • Red peppers • Sweet potatoes	• Faulty bone and tooth development in infants • Poor growth • Night blindness
Vitamin D	• Promotes absorption of calcium and phosphorus • Helps keep bones and teeth strong • Helps cell growth • Immune function • Nervous system function	• Eggs • Exposure to sunlight • Fish • Fish liver oil • Fortified cereals and dairy products • Fortified orange juice • Fortified soy beverages	• Rickets (soft, fragile bones, enlarged joints, bowed legs) • Chest, spinal and pelvic bone deformities • Convulsions
Vitamin E	• Formation of red clood cells • Acts as an antioxidant to protect essential fatty acids and vitamin A	• Fortified cereals and juices • Green vegetables • Nuts and seeds • Peanuts and peanut butter • Vegetable oils	• Anemia in premature infants • Problems of nervous system
Vitamin K	• Assists in blood clotting • Regulates calcium metabolism	• Butterfat (is synthesized in intestine by beneficial bacteria) • Deep green leaves (alfalfa, spinach, cabbage) • Egg yolk • Liver	• Impairs blood clotting • May reduce bone strength

MINERALS

CALCIUM
CHROMIUM
COPPER
FLOURIDE
IODINE
IRON
MAGNESIUM
PHOSPHORUS
SELENIUM
ZINC

LET'S TAKE A CLOSER LOOK...

MINERALS

Minerals are essential substances that the human body needs for proper growth, development, and function. Minerals are inorganic substances that are not made by living things, but rather are found naturally in soil and water.
Minerals are absorbed by plants which are then eaten by humans or other animals. Humans can obtain minerals through plants or by eating animal products.

Only some minerals (listed below) are essential for body processes and functions. The other trace minerals not listed are not essential for the body and fuctions.
Minerals can be broken down into two categories:

MAJOR MINERALS
(needed in 100 milligrams per day or more)

calcium
phosphorus
magnesium
sulfur

TRACE MINERALS
(required in much smaller amounts by the body)

iron
iodine
zinc
chromium
maganese
selenium
fluoride
copper

FOOD SOURCES




MINERALS	FUNCTION: *What does it do?*	SOURCES: *Where is it found?*	DEFICIENCY: *What happens if I don't get enough?*
Calcium	• Blood clotting • Bone and teeth formation • Muscle and heart contraction • Nervous system function	• Dried peas and beans • Fortified juice and soy milk • Greens (kale, broccoli, collards, etc.) • Milk and dairy products	• Abnormal heart rhythms • Fragile bones • Osteoporosis
Chromium	• Insulin function • Protein, carbohydrate, and fat metabolism	• Broccoli • Fruits and fruit juices • Meats and turkey • Whole grains	• Inability of cells to use glucose for energy
Copper	• Collagen and connective tissue formation • Aids in red blood cell formation from iron stores • Nervous system function	• Crustaceans and shellfish • Nuts and Seeds • Organ meats such as liver • Whole grains and Lentils	• Anemia
Flouride	• Makes teeth resistant to decay; most effective in young children	• Water (1 part per million is added to some municipal water supplies)	• None known
Iodine	• Growth and development • Metabolism • Thyroid hormone production	• Iodized table salt (76 ug/g of salt) • Seafood	• Stunted growth • Endemic goiter
Iron	• Growth and development • Immune function • Red blood cell formation • Helps change beta carotene to vitamin A • Produces collagen	• Beans and peas • Dark green vegetables • Meats, poultry, and seafood • Raisins • Whole grain, enriched, and fortified breads	• Anemia
Magnesium	• Immune function • Muscle contraction • Normal heart rhythm • Aids in making body proteins • Structural component of bones and teeth • Regulates blood glucose levels and blood pressure	• Avocados and Potatoes • Bananas • Beans and peas • Dairy products • Green leafy vegetables • Nuts and seeds • Wheat bran and whole grains	• Tremors • Growth failure
Phosphorus	• Builds strong bones and teeth • Energy production and storage	• Beans and peas • Dairy products • Meats, poultry, and seafood • Nuts and seeds • Whole grain, enriched, and fortified breads	• Bone loss • Pain
Selenium	• Antioxidant • Promotes immune function • Promotes thyroid function	• Eggs • Enriched pasta and rice • Meats, poultry, and seafood • Nuts and seeds • Whole grains	• Brittle hair and nails • Hair loss
Zinc	• Promotes tissue growth and development • Immune function • Nervous system function • Protein formation • Wound healing	• Beans and peas • Beef, poultry, and seafood • Dairy products and fortified cereals • Nuts • Whole grains	• Poor wound healing • Decresed taste ability

ELECTROLYTES

SODIUM
CHLORIDE
POTASSIUM
WATER

LET'S TAKE A CLOSER LOOK...

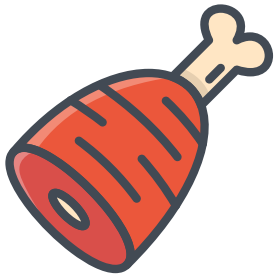
Electrolytes

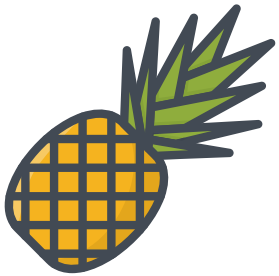
Electrolytes are minerals in body fluids such as blood, tissues, sweat and urine.
Electrolytes help to transmit nerve impulses in your body.
Electrolytes include sodium, potassium, and chloride.
When dehydrated, the body does not have enough fluid and electrolytes to function properly.

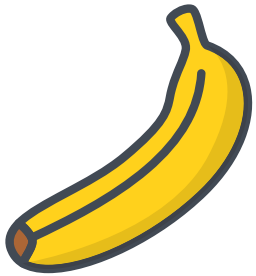
Electrolytes help:

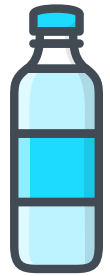
- Balance the amount of water in the body
- Balance the body's acid/base (pH) level
- Move nutrients to cells
- Move wastes out of cells
- Help nerves, muscles, the heart, and brain function properly

FOOD SOURCES









ELECTROLYTES	FUNCTION: *What does it do?*	SOURCES: *Where is it found?*	DEFICIENCY: *What happens if I don't get enough?*
Sodium	• Regulates fluid balance • Influences blood pressure and blood volume • Muscle contraction • Nervous system function	• Breads and rolls • Cheese • Cold cuts and cured meats • Mixed meat dishes • Mixed pasta dishes • Pizza • Poultry • Sandwiches • Savory snacks • Soups • Table Salt	• Fatigue • Profuse sweating • Muscle cramps • Dizziness • Nausea • Diarrhea
Chloride	• Regulates fluid balance • Helps nerve transmission.	• Celery • Green leafy vegetables • Lettuce • Olives • Pineapple • Rye • Table salt and sea salt • Tomatoes	• Heat cramps • Hair loss • Tooth loss • Muscle cramps
Potassium	• Normalizes blood pressure regulation • Regulates fluid balance • Muscle contraction • Nervous system function	• Bananas and most fruits • Dairy products • Dried peas • Meats • Orange juice • Peanuts and other nuts • Potatoes • Spinach • Yogurt	• Weakness • Poor muscle tone • Heart abnormalities • Muscle cramps • Loss of appetite
Water	• Transports nutrients • Transports waste • Lubricates joints • Regulates body temperature • Cell hydration	• High-moisture solid foods such as: soups, watermelon, and meats • Juices • Water	• Dehydration • Constipation

REFERENCES

Adapted From:

Bielamowicz, M.K. Texas A&M AgriLife Extension Service (2011). Nutrient needs at a glance. Retrieved from http://counties.agrilife.org/hood/files/2015/11/Nutrient-Needs-at-a-Glance.pdf

National Institute of Health (2015, February). Definitions of health terms: vitamins. Retrieved from https://medlineplus.gov/definitions/vitaminsdefinitions.html

National Institute of Health (2018, February). Vitamins and minerals. Retrieved from https://nccih.nih.gov/health/vitamins

National Institute of Health (2015, February). Definitions of health terms: minerals. Retrieved from https://medlineplus.gov/definitions/mineralsdefinitions.html

National Institute of Health (2018). Fluid and electrolyte balance. Retrieved from https://medlineplus.gov/fluidandelectrolytebalance.html

National Institute of Health (2016, December). Definitions of health terms: nutrition. Retrieved from https://medlineplus.gov/definitions/nutritiondefinitions.html

Runnels, C. (n.d.). Nutrition concepts. Retrieved from https://texas4-h.tamu.edu/wp-content/uploads/Nutritional-Concepts.pdf

NUTRITION CONCEPTS

MACRONUTRIENTS

Carbohydrates
Found in breads, cereals, fruits, vegetables, sugar and potatoes.

How it helps the body:

- good source of energy
- fiber in fruits and vegetables aid in eliminating wastes from the body

Protein
Found in cheese, meat, fish, nuts, eggs, peanut butter, grains, and dried beans.

How it helps the body:

- sometimes called your body's "building blocks"
- aids growth
- replaces worn - out cells
- helps resist diseases

Fats
Found in oil, butter, margarine, nuts and seeds, poultry skin, salad dressing, meats and cheeses.

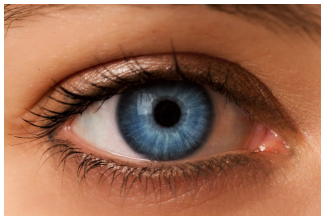
How it helps the body:

- carries some vitamins (A, D, E, & K) to your cells
- supplies energy
-

FAT SOLUBLE VITAMINS

Vitamin A
Found in yellow, orange and green vegetables, yellow fruits, fat of some animals, fish, milk, eggs, and liver.

How it helps the body:



- protects eyes, helps night vision
- helps keep skin healthy
- heals wounds

Vitamin D
Found in fatty fish, liver, eggs, and butter. Usually added to milk. Your body produces it when you're in sunshine.

How it helps the body:

- needed for using calcium and phosphorus
- helps build strong bones and teeth

Vitamin E

Found in plant tissues: vegetable oils, green leafy vegetables, nuts, legumes; meats

How it helps the body:

- helps protect body tissue from free radical damage
- plays role in red blood cell formation

Vitamin K

Found in deep green leaves, liver, egg yolk, butterfat, produced in intestines by beneficial bacteria

How it helps the body:

- plays role in blood clotting

WATER SOLUBLE VITAMINS

B Vitamins (thiamin, riboflavin, niacin, folic acid, B6, B12)

Found in meats, beans, whole grains, enriched breads, cereals, and vegetables (including dark leafy green).

How it helps the body:

- keeps eyes, skin, and mouth healthy
- helps keep appetite and digestion in working order
- helps use protein, fat, and carbohydrates
- helps develop brain and nervous system

Biotin

Found in liver, and smaller amounts in meats and fruits

How it helps the body:

- helps synthesize fat, glycogen (carbohydrates stored in muscle and liver), and amino acids (building blocks of protein)

Vitamin C

Found in citrus fruits (oranges), melons, and green leafy vegetables (broccoli, spinach, and cabbage).

How it helps the body:

- helps heal wounds and broken bones
- helps the body make blood vessels, bones, and teeth
- helps keep body cells and tissues strong and healthy

Choline

Found in egg yolks, milk, peanuts, soy, wheat germ, livers (beef, veal, and turkey)

How it helps the body:

- plays role in cell structure in cell membranes
- promotes brain and memory functions

MINERALS/ELEMENTS

Calcium
Found in milk and other dairy products.

How it helps the body:

- helps form healthy bones and teeth
- helps blood clot
- makes nerves and muscles react normally

Chromium
Found in brewer's yeast, liver, meat, cheese, whole-grain cereals, and broccoli.

How it helps the body:

- works in carbohydrate, protein, and fat metabolism

Copper
Found in liver, shellfish, meats, nuts, legumes, and whole-grain cereals.

How it helps the body:

- helps absorption and use of iron to form hemoglobin in red blood cells

Fluoride
Found in water.

How it helps the body:

- makes teeth resistant to decay – most effective in young children
- moderate levels in bone may reduce osteoporosis

Iodine
Found in iodized table salt, seafood, plants grown in iodine-rich soils, and dairy products.

How it helps the body:

- important part of thyroid hormones: thyroxine and triiodothyronine

Magnesium
Found in whole-grain cereals, nuts, legumes, meats, milk, green leafy vegetables.

How it helps the body:

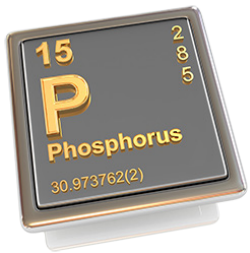
- activates enzymes involved in protein synthesis
- helps muscles and nerves work
- helps regulate blood sugar levels and promotes normal blood pressure

Manganese
Found in legumes, whole-grain cereals, nuts, tea.

How it helps the body:

- activates many enzymes used in carbohydrates and protein metabolism
- plays a role in bone formation

Phosphorus
Found in breads, cereals, lima beans, meat, poultry, fish, meat alternates, milk, cheese, yogurt.



How it helps the body:

- builds strong bones and teeth
- releases energy from fat, protein, and carbohydrates
- aids in formation of genetic material, cell membranes, and enzymes

Iron
Found in dark green leafy vegetables, liver, meat, egg yolks, and dry beans.

How it helps the body:

- helps blood cells carry oxygen to all parts of the body
- protects against some forms of anemia

Selenium
Found in organ meats, seafood, cereal foods, and plants grown in selenium-rich soil.

How it helps the body:

- antioxidant
- lessens breakdown of vitamin E

Zinc
Found in seafood, liver and other organ meats, meats, fish, wheat, yeast.

How it helps the body:

- part of many enzymes and proteins
- plays role in immune function, protein synthesis, and wound healing
- controls information from gene to gene so living things develop and function

ELECTROLYTES

Sodium
Found in table salt, cheddar cheese, ham, snack foods, most processed foods.

How it helps the body:

- maintains fluid balance and nerve transmission

Chloride
Found in table salt, barley, wheat, green leafy vegetables, melon, and pineapple.

How it helps the body:

- helps maintain normal pH of blood
- maintains fluid balance and nerve transmission

Potassium
Found in bananas, orange juice, most fruits, potatoes, dried peas, peanuts, nuts, dairy products, and meats.

How it helps the body:

- maintains fluid balance and nerve transmission

Water
Found in water, juices, beverages, high-moisture solid foods (soups, watermelon, meats, etc.)

How it helps the body:

- transports nutrients
- transports waste
- lubricates joints
- regulates body temperature
- cell hydration

The Texas A&M AgriLife Extension Service provides equal opportunities in its programs and employment to all persons, regardless of race, color, sex, religion, national origin, disability, age, genetic information, veteran status, sexual orientation, or gender identity.

E-589
7/11

TEXAS A&M AGRILIFE EXTENSION

Nutrient Needs at a Glance

Extension Nutrition Specialists
The Texas A&M System

Glossary

Adequate Intake (AI): set when there is no data to set the RDA

Acceptable Macronutrient Distribution Range (AMDR): range of intake for an energy source that reduces risk of chronic disease while providing essential nutrients. Excess leads to weight gain and increased risk of chronic disease.

Anorexia: loss of appetite

Antioxidant: a substance that prevents the deterioration or rancidity of fats

Ataxia: inability to coordinate voluntary muscles

Cachexia: general physical wasting and malnutrition

Cheilosis: cracks at the corner of the mouth

Coenzyme: compound that forms the actual part in an enzyme after combining with a protein component

Daily Values: (DVs): the amount of a nutrient needed daily as determined by the Food and Drug Administration (FDA)

Dermatitis: inflammation of the skin

Desquamation: loss of a layer of skin

Dietary Reference Intakes (DRIs) general term for a set of reference values for planning and assessing nutrient intakes of healthy people

Eczema: an inflammatory condition of the skin characterized by redness and itching

Edema: abnormal accumulation of fluid in the body

Glucose Tolerance Factor (GTF): a dietary agent that facilitates the reaction of insulin

Gram (g): metric unit of mass equal to one thousandth (10^{-3}) of a kilogram

Hemorrhagic: loss of blood from blood vessels

Ketosis: a condition caused by abnormal burning of fat in the body

Macronutrients: nutrients—proteins, fats, carbohydrates, others—needed by the body in large amounts

Microgram (µg - mcg): one millionth of a gram

Milligram (mg): one thousandth of a gram

Neural Tube Defects (NTD): birth defects due to failure of the neural tube to develop properly during fetal development

Osteomalacia: softening of bones in adults

Osteoporosis: porous, brittle bones

Photophobia: sensitivity to light

Recommended Dietary Allowances (RDA): the amount of nutrients needed to promote good growth and optimum health in people ages 25 to 50

Rickets: bone deformation in children

Scurvy: weakened cartilages and connective tissue

Tolerable Upper Intake Level (UL): highest daily intake that will not cause adverse effects

Xerophthalmia: an eye condition that can lead to blindness

References

Data compiled by the Standing Committee on the Scientific Evaluation of Dietary Reference Intakes for Nutrients Reports (*www.nap.edu*), the Food and Nutrition Board, Institute of Medicine, National Academy of Sciences, Washington, DC: National Academy Press, 1997-2010.

Center for Nutrition Policy and Promotion (*www.cnpp.usda.gov/dietaryguidelines.htm*); Office of Dietary Supplements, National Institute of Health, 2010.

Revised by Mary Kinney Bielamowicz, PhD, RD, LD, Regents Fellow, Professor and Extension Nutrition Specialist, and Sharon F. Robinson, PhD, RD, LD, Associate Professor and Extension Nutrition Specialist, The Texas A&M System, assisted by Dietetic Interns Kelsey Kinsella, Misty Cram, Kelly Vaughan, 2009; Molly Cernosek, 2011.

Estimated safe and adequate daily dietary intakes of selected vitamins and minerals

DRI's	Age range	RDA* (bold)/AI*		AMDR*	Functions in the body	Sources	Deficiency
Nutrients (macro*)		**Males**	**Females**	**M + F**			
Protein (g/d) (grams*/day)	1–8 years 9–18 years 19–50 years 51–70 years	**13–19** **34–52** **56** **56**	**13–19** **34–46** **46** **46**	5–30 10–30 10–35 10–35	• Builds and repairs all body tissue • Helps build blood • Helps form antibodies to fight infection • Supplies food energy at 4 calories per gram	Animal protein: meat, fish, poultry, eggs, milk, cheese, yogurt Vegetable protein: legumes (peas, beans), whole grain breads and cereals, nuts, peanut butter, soy	Fatigue, loss of appetite, edema*, poor growth
Fat (g/d)	1–8 years 9–18 years 19–50 years 51–70 years	– – – –	– – – –	25–40 25–35 25–35 20–35	• Supplies 9 calories per gram (more energy in a small amount of food) • Transports fat-soluble vitamins and essential fatty acids needed for body's proper use and storage of fat	Butter, margarine, shortening, oil, salad dressing, palm and coconut oil, egg yolk, meat with fat, whole milk, cheese, peanut butter	Eczema*, retarded growth, diarrhea, loss of hair
Carbohydrates (g/d)	1–8 years 9–18 years 19–50 years 51–70 years	**130**** **130**** **130**** **130****	**130**** **130**** **130**** **130****	45–65 45–65 45–65 45–65	• Supply energy at 4 calories per gram to all body cells • Supply glucose to spare protein • Help the body use other nutrients	Breads, cereals, flours, cornmeal, rice, macaroni, noodles, spaghetti, Irish and sweet potatoes, corn, dried fruits, bananas, sugar, syrup, jam, jellies, preserves, honey	Loss of energy, fatigue, ketosis*
Fiber (g/d)	1–8 years 9–18 years 19–50 years 51–70 years	14–20 25–31 31–34 28	14–17 22–25 25–28 22	None determined	• May help lower cholesterol • Improves bowel motility • Gives feeling of fullness without extra calories, promoting satiety and weight loss • Contains phytic acids that tie up minerals, which can prevent absorption	Whole grains (wheat, unmilled rice, oats) or enriched products: cereals, bread, noodles, tortillas, brown rice, oatmeal Vegetables: broccoli, spinach, carrots, beans, peas	Diarrhea; excess fiber makes bulk, which may prevent eating enough food energy or nutrients; high-fiber diets for elderly, very young or those on low-calorie diets may cause nutrient deficiencies
Water-soluble vitamins		**RDA*/AI***		**UL***	**Functions in the body**	**Sources**	**Deficiency**
		Males	**Females**	**M + F**			
Vitamin C **Ascorbic Acid** (mg/d) (milligrams*/day)	1–8 years 9–18 years 19–50 years 51–70 years	**15–25** **45–75** **90** **90**	**15–25** **45–65** **75** **75**	400–650 1,200–1,800 2,000 2,000	• Helps wounds heal • Promotes iron absorption • Helps the body maintain collagen (fibrous part of protein for cell structure) • Acts as an antioxidant	All citrus fruits, fruit juices, strawberries, cantaloupe; green or red peppers, raw cabbage, spinach, broccoli, turnip greens, collards, mustard greens, kale, tomatoes, Irish or sweet potatoes	Scurvy*, sore or bleeding gums, poor wound healing, pain in joints, bones, muscles
Vitamin B_1 – Thiamin (mg/d)	1–8 years 9–18 years 19–50 years 51–70 years	**0.5–0.6** **0.9–1.2** **1.2** **1.2**	**0.5–0.6** **0.9–1.0** **1.1** **1.1**	None determined	• Helps the body use carbohydrates for energy • Maintains appetite and muscle tone • Involved in nervous system function	Meat (especially pork), liver, heart, kidney, poultry, eggs, milk, dried peas and beans, nuts, whole-grain or enriched bread and cereals	Poor appetite, constipation, depression, apathy, cachexia*, edema*, cardiac failure, cheilosis*
Vitamin B_2 – Riboflavin (mg/d)	1–8 years 9–18 years 19–50 years 51–70 years	**0.5–0.6** **0.9–1.3** **1.3** **1.3**	**0.5–0.6** **0.9–1.0** **1.1** **1.1**	None determined	• Functions as a part of a coenzyme* that assists in energy release • Helps in metabolism of amino acids	Milk, cheese, ice cream, organ meats, eggs, fish, dark green leafy vegetables, enriched breads and cereals	Cheilosis*, scaly desquamation* around nose and ears, sore tongue and mouth, burning and itching eyes, photophobia*
Niacin (mg/d NE*) *Nicotinic acid* *Nicotinamide*	1–8 years 9–18 years 19–50 years 51–70 years	**6–8** **12–16** **16** **16**	**6–8** **12–14** **14** **14**	10–15 20–30 35 35	• Coenzyme* for carbohydrate metabolism • Promotes normal appetite	Meat, liver, poultry, fish, dried peas and beans, nuts (especially peanuts), whole-grain or enriched cereals and breads, milk, cheese, yogurt	Anorexia*, diarrhea, dermatitis*, confusion, anxiety
Vitamin B_6 (mg/d) *Pyridoxine* *Puridoxal* *Pyridoxamine*	1–8 years 9–18 years 19–50 years 51–70 years	**0.5–0.6** **1.0–1.3** **1.3** **1.7**	**0.5–0.6** **1.0–1.2** **1.3** **1.5**	30–40 60–80 100 100	• Coenzyme* for protein utilization • Helps convert the amino acid tryptophan to the vitamin Niacin • Helps convert complex carbohydrates to simple carbohydrates	Meat, poultry, fish, sweet potatoes, vegetables, whole grains, fortified cereals	Anemia, nervous irritability, convulsions, weakness, ataxia*, abdominal pain, dermatitis*
Choline (mg/d)	1–8 years 9–18 years 19–50 years 51–70 years	200–250 375–550 550 550	200–250 375–400 425 425	1,000 2,000–3,000 3,500 3,500	• Plays a role in cell structure in lipids in the cell membranes • Promotes brain and memory functions • Gives to own manufacture in the body	Egg yolks, milk, peanuts, soy, wheat germ, livers (beef, veal and turkey)	When low during pregnancy, an increased risk of birth defects; low choline leads to increased risk of cardiovascular disease
Vitamin B_{12} (µg/d) (micrograms*/day) *Cobalamin*	1-8 years 9-18 years 19-50 years 51-70 years	**0.9–1.2** **1.8–2.4** **2.4** **2.4**	**0.9–1.2** **1.8–2.4** **2.4** **2.4**	None determined	• Helps maintain nerve tissue and normal blood formation • Regeneration of folate	Animal foods: organ meats, muscle meats, fish, poultry, eggs, milk; fortified cereals	Anemia, neurologic disorders

Folate (µg/d) *Folic acid* *Folacin*	1–8 years 9–18 years 19–50 yeas 51–70 yeas	**150–200** **300–400** **400** **400**	**150–200** **300–400** **400** **400**	300–400 600–800 1,000 1,000	• Helps red blood cells mature • Interrelated with vitamin B_{12} utilization • Folic acid supplement*** during pregnancy recommended	Organ meats, deep green leafy vegetables, muscle meats, poultry, fish, eggs, whole-grain or fortified cereals	Anemia, fatigue, gastrointestinal disturbances, inadequate intake during pregnancy related to neural tube birth defects (NTD)*
Biotin (µg/d)	1–8 years 9–18 years 19–50 years 51–70 years	8–12 20–25 30 30	8–12 20–25 30 30	None determined	• Coenzyme* in synthesis of fat, glycogen (carbohydrate stored in muscle and liver), and amino acids (protein building blocks)	Liver, and smaller amounts in meats and fruits	Because data on biotin's adverse effects are limited, caution may be needed
Fat-soluble vitamins		**RDA*/AI***		**UL***	**Functions in the body**	**Sources**	**Deficiency**
		Males	**Females**	**M + F**			
Vitamin A (µg/d RAE*) *Retinol, Retinal Carotene* *Retinol Activity Equivalent: 1 RAE = 1 µg Retinol	1–8 years 9–18 years 19–50 years 51–70 years	**300–400** **600–900** **900** **900**	**300–400** **600–700** **700** **700**	600–900 1,700–2,800 3,000 3,000	• Promotes growth and normal vision, and protects against night blindness • Helps keep skin and mucous membrane linings healthy and resistant to infection • Large amounts are toxic	Dark leafy green or deep yellow vegetables (carrots, winter squash, cushaw, pumpkin, sweet potatoes); yellow fruits (peaches, cantaloupe, apricots); liver, fish liver oils, dairy foods, butter, margarine, egg yolks	Faulty bone and tooth development in infants, poor growth, xerophthalmia*, night blindness
Vitamin D (iu/d) *D Calciferol* *D_2 Ergocalciferol* *D_3 Cholecalciferol*	1–8 years 9–18 years 19–50 years 51–70 years	600 600 600 600	600 600 600 600	4,000 4,000 4,000 4,000	• Synthesized in skin by ultraviolet light • Functions to regulate amount of calcium/phosphorus absorbed in the blood to mobilize and mineralize the bone • Large amounts are toxic • Needed to fight off bateria and viruses	Fish liver oils and flesh, fortified milk, exposure to sunlight. Minute amounts in butter, liver, egg yolk, salmon and sardines	Rickets* (soft, fragile bones, enlarged joints, bowed legs); chest, spinal and pelvic bone deformities; convulsions; osteomalacia*
Vitamin E (mg/d) *Alpha[3]-, beta-, gamma-tocopherol*	1–8 years 9–18 years 19–50 years 51–70 years	**6–7** **11–15** **15** **15**	**6–7** **11–15** **15** **15**	200–300 600–800 1,000 1,000	• Not stored in body to any extent • Related to action of selenium • Reduces oxidation of vitamin A, carotenes and polyunsaturated fatty acids	Plant tissues: wheat or rice germ, vegetable oils, green leafy vegetables, nuts, legumes; meats (other animal foods are poor sources)	Anemia in premature infants, problems of nervous system
Vitamin K (µg/d) *Phylloquinone (K_1)* *Menaquinone (MK_n)* *Menadione*	1–8 years 9–18 years 19–50 years 51–70 years	30–55 60–75 120 120	30–55 60–75 90 90	None determined	• Bile is necessary for absorption of the vitamin • Needed to form prothrombin in blood • Sulfa drugs and antibiotics interfere with absorption • Large amounts are toxic	Deep green leaves (alfalfa, spinach, cabbage), liver, egg yolk, butterfat, (is synthesized in intestine by beneficial bacteria)	Prolonged clotting time, hemorrhagic* disease in newborn infants
Minerals/Elements		**RDA*/AI***		**UL***	**Functions in the body**	**Sources**	**Deficiency**
		Males	**Females**	**M + F**			
Calcium (mg/d)	1–8 years 9–18 years 19–50 years 51–70 years	700–1,000 1,300 1,000 1,200	700–1,000 1,300 1,000 1,200	2,500 2,500 2,500 2,500	• Needed to build bones and teeth; helps clot blood • Helps muscles contract and relax normally. Delays fatigue	Milk, cheese, ice cream, greens (kale, broccoli, collards, turnips, mustard), dried peas and beans, fortified juice, soy milk	Retarded bone mineralization, fragile bones, rickets*, osteomalacia*, osteoporosis*
Chromium (µg/d)	1–8 years 9–18 years 19–50 years 51–70 years	11–15 25–35 35 30	11–15 21–24 25 20	None determined	• Works along with insulin in carbohydrate, protein and fat metabolism; glucose tolerance factor (GTF)*	Brewer's yeast, liver, meat, cheese, whole-grain cereals, broccoli	Inability of cells to use glucose for energy
Copper (µg/d)	1–8 years 9–18 years 19–50 years 51–70 years	**340–440** **700–890** **900** **900**	**340–440** **700–890** **900** **900**	1,000–3,000 5,000–8,000 10,000 10,000	• Aids absorption and use of iron to form hemoglobin in red bloods cells	Liver, shellfish, meats, nuts, legumes, whole-grain cereals	Anemia
Fluoride (mg/d)	1–8 years 9–18 years 19–50 years 51–70 years	0.7–1 2–3 4 4	0.7–1 2–3 3 3	1.3–2.2 10 10 10	• Makes teeth resistant to decay; most effective in young children • Moderate levels in bone may reduce osteoporosis*	Water (1 part per million is added to some municipal water supplies)	None known
Iodine (µg/d)	1–8 years 9–18 years 19–50 years 51–70 years	**90** **120–150** **150** **150**	**90** **120–150** **150** **150**	200–300 600–900 1,100 1,100	• Integral part of thyroid hormones: thyroxine and triiodothyronine	Iodized table salt (76 µg/g of salt), seafood, plants grown in iodine-rich soils, dairy products	Cretinism (stunted growth with mental retardation); endemic goiter
Iron (mg/d)	1– 8 years 9–18 years 19–50 years 50–70 years	**7–10** **8–11** **8** **8**	**7–10** **8–15** **18** **8**	40 45 45 45	• Part of blood hemoglobin and myoglobin • Enzyme involved in energy metabolism • Involved in oxygen transport	Liver, organ meats, meat, poultry, egg yolk, enriched and whole-grain breads, cereals, legumes, dark green vegetables, black strap molasses, peaches, apricots, raisins, prunes, oysters	Anemia (frequent in infants, preschool children, teenage girls and pregnant women)

Magnesium (mg/d)	1–8 years 9–18 years 19–50 years 51–70 years	**80–130** **240–410** **400–420** **420**	**80–130** **240–360** **310–320** **320**	65–100 350 350 350	• Activates enzymes involved in protein synthesis • Helps muscles and nerves work • Helps regulate blood sugar levels and promotes normal blood pressure	Whole-grain cereals, nuts, legumes, meats, milk, green leafy vegetables	Tremors, growth failure
Manganese (mg/d)	1–8 years 9–18 years 19–50 years 51–70 years	1.2–1.5 1.9–2.2 2.3 2.3	1.2–1.5 1.6 1.8 1.8	2–3 6–9 11 11	• Activates many enzymes used in carbohydrate and protein metabolism • Bone formation	Legumes, whole-grain cereals, nuts, tea	None known
Phosphorus (mg/d)	1–8 years 9–18 years 19–50 years 51–70 years	**460–500** **1,250** **700** **700**	**460–500** **1,250** **700** **700**	3,000 4,000 4,000 4,000	• Builds strong bones and teeth • Releases energy from fat, protein and carbohydrates during metabolism • Aids in formation of genetic material, cell membranes and enzymes	Breads, cereals, lima beans, meat, poultry, fish, meat alternates, milk, cheese, yogurt	Found widely in foods, so deficiency is rare. Bone loss characterized by weakness, anorexia*, malaise, and pain
Selenium (µg/d)	1–8 years 9–18 years 19–50 years 51–70 years	**20–30** **40–55** **55** **55**	**20–30** **40–55** **55** **55**	90–150 280–400 400 400	• Antioxidant • Lessens breakdown of vitamin E	Organ meats, seafoods, cereal foods and plants grown in selenium-rich soil	Hair and nail brittleness and loss
Zinc (mg/d)	1–8 years 9–18 years 19–50 years 51–70 years	**3–5** **8–11** **11** **11**	**3–5** **8–9** **8** **8**	7–12 23–34 40 40	• Component of many enzymes (carbonic anhydrase and anhydrase carboxypeptidase) and proteins • Controls information from gene to gene so living things develop and function • Plays role in immune function, protein synthesis, and wound healing.	Seafoods, liver and other organ meats, meats, fish, wheat, yeast. Plant foods are generally low in zinc	Poor wound healing, decreased taste ability
Electrolytes		**RDA*/AI***		**UL***	**Functions in the body**	**Sources**	**Deficiency**
		Males	**Females**	**M + F**			
Sodium (g/d)[4]	1–8 years 9–18 years 19–50 years 51–70 years	1–1.2 1.5 1.5 1.3	1–1.2 1.5 1.5 1.3	1.5–1.9 2.2–2.3 2.3 2.3	• Found in extracellular fluid (blood) • Maintains fluid balance and nerve transmission	Table salt, cheddar cheese, ham, snack foods, most processed foods, salt (sodium chloride) and sodium benzoate/phosphate are added	Fatigue caused by profuse sweating, vomiting and diarrhea
Chloride (g/d)	1–8 years 9–18 years 19–50 years 51–70 years	1.5–1.9 2.3 2.3 2	1.5–1.9 2.3 2.3 2	2.3–2.9 3.4–3.6 3.6 3.6	• Helps maintain normal pH of blood (7.35) • Maintains fluid balance and nerve transmission	Table salt (sodium chloride), barley, wheat, green leafy vegetables, melon, pineapple	Heat cramps, hair loss, tooth loss
Potassium (g/d)[4]	1–8 years 9–18 years 19–50 years 51–70 years	3–3.8 4.5–4.7 4.7 4.7	3–3.8 4.5–4.7 4.7 4.7	None determined	• Found inside the cell • Maintains fluid balance and nerve transmission	Bananas, orange juice, most fruits, potatoes, dried peas, peanuts, nuts, dairy products, and meats	Weakness, poor muscle tone, heart abnormalities, apathy (lack of energy)
Water (liters/day)	1–8 years 9–18 years 19–50 years 51–70 years	1.3–1.7 2.4–3.3 3.7 3.7	1.3–1.7 2.1–2.3 2.7 2.7	None determined	• Transports nutrients • Transports waste • Lubricates joints • Regulates body temperature • Cell hydration	Water, juices, beverages, high-moisture solid foods (soups, watermelon, meats, etc.)	Dehydration, constipation

* See Glossary for definitions
**Average minimum amounts of glucose used by brain
***Supplement during pregnancy of 400 µg or mcg folic acid plus folate intake of a varied diet

[1] NE (niacin equivalent) is equal to 1 mg of niacin or 60 mg of dietary tryptophan
[2] RAE = Retinol activity equivalents. 1 retinol equivalent = 1 µg retinol or 6 µg beta-carotene
[3] α-tocopherol includes the only form (RRR-a-tocopherol) that occurs naturally in foods and with variations of this form in fortified foods and supplements.
[4] Estimated sodium and potassium minimum requirements. AI* has been set for healthy individuals and the UL* may be too high for persons with hypertension.

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Altering Recipes for Good Health

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Artful Recipe Altering

For several years, health professionals have advised Americans to eat less fat, sugar, and salt, and to eat more fiber. The USDA's ChooseMyPlate.gov website, based on the *Dietary Guidelines for Americans* (2010), reflects these recommendations.

To make an eating plan or healthy diet that follows the *Dietary Guidelines for Americans*, take the following actions:

- emphasize fruits, vegetables, whole grains, and fat-free or low-fat dairy and milk products;
- include lean meats, poultry, fish, beans, eggs, and nuts; and
- keep it low in saturated fats, trans fats, cholesterol, salt (sodium), and added sugars.

Visit ChooseMyPlate.gov to help you in selecting an eating plan based on current eating patterns, health status, daily exercise plan, and potential risk for health problems linked to diet, such as obesity, diabetes, or heart disease. Perhaps a change to some cooking methods may be in order.

Recipes = Chemical Formulas

Recipes specify the ingredients, proportions, and methods necessary to produce a quality product. Companies and publishers spend time and money testing recipes for consumer use. Any change made in the recipe will produce a slightly different product from the one that was tested and published. Some changes you may like and others you may not.

Recipes for combined foods, such as casseroles and soups, are more flexible than others. A cookie recipe is more adaptable than a cake recipe. Recipes for most baked products can be altered, but recipes for any preserved product, such as pickles, salsa, jellies, or candies should not be changed at all.

Modifying a recipe may produce a product that doesn't meet your expectations. For example, a cake made with less fat will not have the same flavor or texture as the high-fat version. Cookies with less sugar or fat will still be acceptable but might not look or taste the same as those made by the original recipe. Substituting skim milk for whole milk in puddings, soups, and sauces will give a product that is less rich and creamy but has less fat and calories.

Ingredients that can Be Changed

Most people either fail to notice much difference or accept the difference that results when the following kinds of changes are made.

Reduce sugar by one-third. For example, if a recipe says to use 1 cup of sugar, use ⅔ cup. This change works best in canned and frozen fruits and in making puddings and custards. In cookies and cakes, try using ½ cup sugar per cup of flour. For quick breads and muffins, use 1 tablespoon sugar per cup of flour. To enhance the flavor when sugar is reduced, add vanilla, cinnamon, or nutmeg.

Reduce fat by one-third. For example, if a recipe calls for ½ cup of fat, use ⅓ cup. This method works best in gravies, sauces, puddings, and some cookies. For cakes and quick breads, use 2 tablespoons fat per cup of flour.

Omit salt or reduce by one-half. For example, if a recipe calls for ½ teaspoon salt, use ¼ teaspoon. This method may be more acceptable if you gradually reduce the amount of salt each time you make the recipe. Herbs, spices, or salt-free seasoning mixes can also be used as flavor enhancers. Do not eliminate salt from yeast bread or rolls; it is essential for flavor and helps the texture.

Substitute whole grain and bran flours. *Whole wheat flour* can replace from one-fourth to one-half of the all-purpose flour. For example, if a recipe has 3 cups all-purpose flour, use 1½ cups whole wheat flour and 1½ cups all-purpose flour.

Oat bran or oatmeal (that has been ground to flour consistency in a food processor or blender) can replace up to one-fourth of the all-purpose flour. For example, if a recipe has 3 cups all-purpose flour, use ¾ cup oat bran or ground oatmeal and 2¼ cups all-purpose flour.

Bran cereal flour is made by grinding a ready-to-eat cereal such as Bran Buds® or 100% Bran® in a blender or food processor for 60 to 90 seconds. It can replace up to one-fourth of the all-purpose flour. For example, if a recipe calls for 2 cups all-purpose flour, use ½ cup bran flour and 1½ cups all-purpose flour.

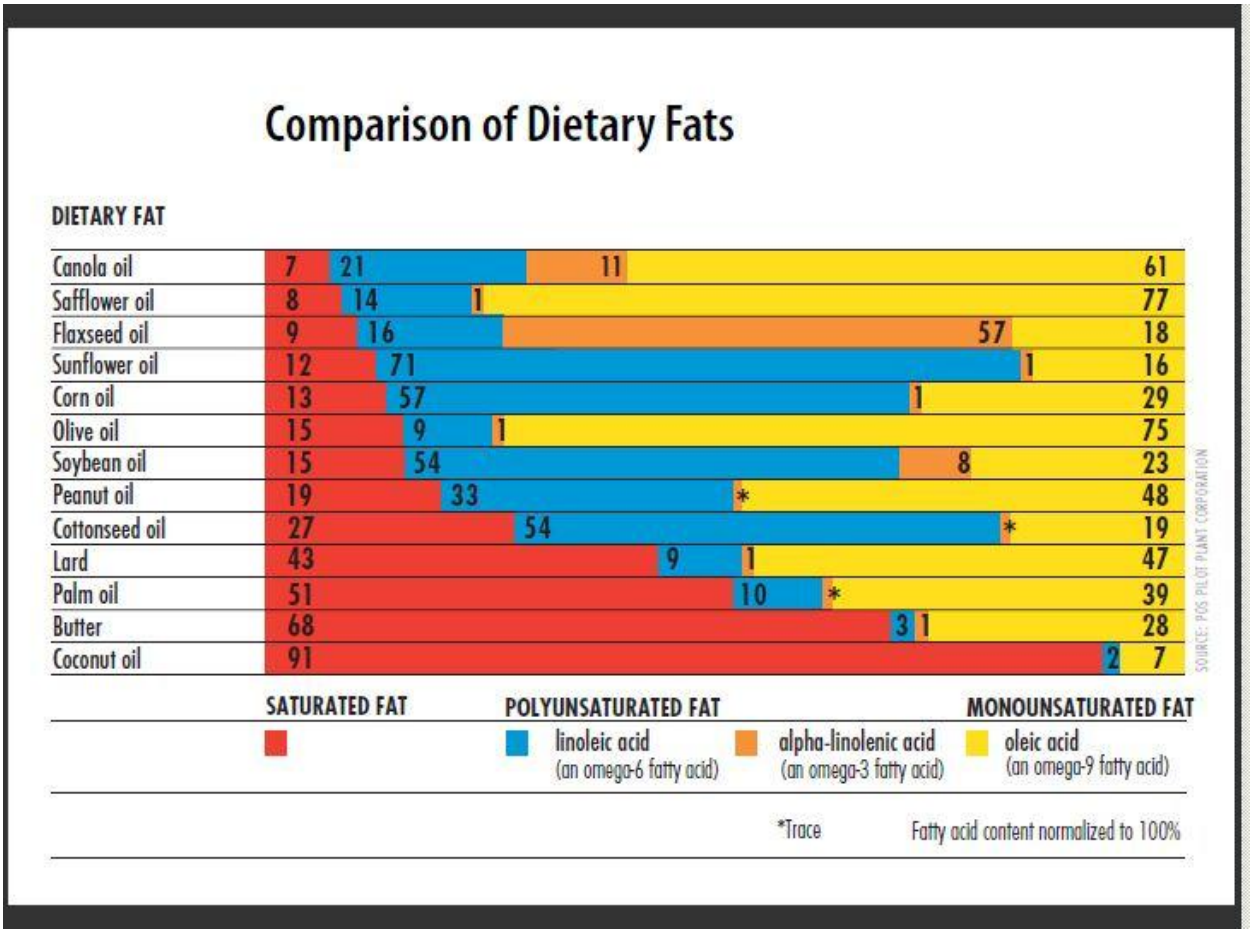
Detect Fat

All fats and oils are high in calories, but you can make a healthier choice by selecting those with less saturated fat. Some sources of saturated fat include animal products and tropical oils such as palm kernel or coconut oil. Another fat of concern is trans fatty acids or trans fats (partially hydrogenated vegetable oil). Trans fatty acids are found in stick margarine, vegetable shortening, and some prepared foods such as cakes, cookies, crackers, and commercially fried foods. Trans fats occur naturally in small quantities in meats (beef, pork, lamb), butter, and milk. Since 2006, trans fats have had to be identified on the food label. Likewise, when you use lower-fat dairy products, you reduce fat, calories, and cholesterol.

Fat and Oil Comparison

Type of fat or oil	Cholesterol (mg/Tbsp.)	Saturated fat or oil
Coconut oil	0	77%
Butter	33	54%
Palm oil	0	51%
Beef fat	14	51%
Animal fat shortening	0	44%
Lard	12	41%
Cottonseed oil	0	27%
Vegetable shortening (Crisco)	0	26%
Margarine	0	18%
Soybean oil	0	15%
Olive oil	0	14%
Peanut oil	0	13%
Corn oil	0	13%
Sunflower oil	0	11%
Safflower oil	0	9%
Canola oil	0	6%

From *Small Steps Make a Big Fat Difference,* Puritan Oil, Proctor and Gamble, 2000. This chart provides only the amounts of cholesterol and saturated fats that may cause blood cholesterol levels to increase.



Canola Oil Council of Canada, 2012, https://canola-council.merchantsecure.com/canola_resources/product45.aspx . This chart provides the amounts of saturated fat, polyunsaturated fat (linoleic and alpha-linolenic acids), and monounsaturated fat (oleic acid).

Fats are not always interchangeable, as shown in the examples below:

- Oil is 100 percent fat; margarine is an emulsion containing 80 percent fat and 20 percent water ("lite" margarine-type spreads contain a higher proportion of water). Substituting 1 cup oil for 1 cup margarine adds more fat than the recipe intended. Consequently, cookies will feel and taste greasy.
- A well-textured cookie depends on thorough creaming of the fat and sugar. Oil cannot be creamed, so substituting it for a solid shortening is likely to change both texture and volume.
- Can lite margarine-type spreads be substituted for solid shortening when baking? It is possible, but it cannot be a direct substitution. Since lite or diet margarines have more water, the amount of liquid in the recipe also must be reduced. Rather than substituting reduced-fat margarines, try using less of the regular margarine. You won't have to alter the amount of liquid, and you will save calories.

Milk Product Comparison

(Values are approximations for general comparisons; check the labels for specific values.)

Milk products (1 cup)	Calories	Fat (g)	Cholesterol (mg)
Whipping cream (Heavy cream, fluid)	832	90	336
Medium cream (25% fat)	590	61	208
Light cream	470	46	159
Half and half (half milk, half cream)	315	28	89
Whole milk	150	8	33
2 percent milk	120	5	18
1 percent milk	100	3	10
Skim milk	85	trace	4
Evaporated whole milk	340	19	74
Evaporated skim milk	200	1	9

From *Food Values of Portions Commonly Used*, 19th edition. New York: Harper and Row. 2009.

Did You Know?

You can use reduced-fat sour cream, low-fat or non-fat yogurt, or cottage cheese instead of regular sour cream in sauces and dips. Skim milk can be used instead of whole milk in most recipes. Evaporated milk can be substituted for whipping cream, and evaporated skim milk can be substituted for regular evaporated milk in some recipes.

Ingredient Substitutions that Are Heart-Smart

By making a few substitutions and changes, you can still prepare your favorite recipes and reduce your intake of calories, fat, and cholesterol.

INSTEAD OF	TRY	BEST CHOICE
Butter	60/40 margarine - butter blend	Margarine or reduced calorie margarine
Sour cream	Lite sour cream	Mock Sour Cream
2 whole eggs	1 whole egg plus 2 egg whites	4 egg whites, commercial egg substitute, or Homemade Egg Substitute
Whole milk	2% milk	Skim milk
Cream	Evaporated milk	Evaporated skim milk
Cream cheese	Light cream cheese or Neufchâtel®	Yogurt Cheese
Whipped cream or non-dairy whipped topping	Non-fat whipped topping	Non-fat whipped topping or no-fat whipped topping
Cheddar, Colby, Swiss Cheese	Cut down on the amount you usually eat	Select part-skim mozzarella, reduced-fat natural cheese, farmer cheese, or low-fat processed cheese
Cottage cheese	Low-fat cottage cheese	Non-fat ricotta or cottage cheese
Baking chocolate (1 ounce)	3 tablespoons powdered cocoa plus 1 tablespoon cooking oil	3 tablespoons powdered cocoa plus 1 tablespoon cooking oil
Mayonnaise	Lite mayonnaise	Half cholesterol-free mayonnaise and half non-fat yogurt
Salad dressing	Reduced-fat dressing	Fat-free dressing
Chicken with skin	Remove skin *after* cooking	Remove skin *before* cooking
Regular ground beef	Lean ground beef	Use extra lean ground beef or lean ground turkey

Recipes for Reduced Fat Substitutes

To save money as well as calories, make your own low-fat substitutes by using the recipes that follow.

No-Fat Whipped Topping

1 tablespoon unflavored gelatin
2 tablespoons boiling water
½ cup non-fat dry milk powder
a cup ice water
2 tablespoons lemon juice
3 tablespoons sugar
1 teaspoon vanilla

1. Dissolve gelatin in boiling water.
2. In a thoroughly chilled small bowl, beat milk and ice water.
3. Beat in lemon juice.
4. Add sugar and vanilla, and beat to soft peaks.
5. Add gelatin mixture and beat.

Yield: about 1½ cups

Calories: 12 per tablespoon

Mock Sour Cream

1 cup lowfat cottage cheese*
2 tablespoons skim milk
1 tablespoon lemon juice

Combine all ingredients using a blender or food processor.

Yield: about 1 cup

	Sour Cream	**Mock Sour Cream**
	Per Tablespoon	
Calories	26.0	14
Fat, grams	2.5	0
Cholesterol, mg	5.0	1

*Use non-fat cottage cheese, if available.

Another option is to use a blender to combine equal amounts of low-fat or non-fat cottage cheese with low fat or non-fat plain yogurt.

Casserole Sauce Mix

Use this recipe instead of canned cream soups in casserole recipes. It has about one-third the calories.

2 cups non-fat dry milk powder
¾ cup cornstarch
¼ cup instant reduced sodium chicken or beef bouillon
½ teaspoon dried crushed thyme
½ teaspoon dried crushed basil
¼ teaspoon pepper

1. Combine all ingredients using a blender or food processor. Store in an airtight container.
2. To prepare a substitute for one can of condensed cream soup in recipes, stir together a cup dry mix and 1¼ cups water in a saucepan.
3. Cook and stir until thickened.

Yield: Equivalent to 9 cans condensed soup

Calories: 107 per cup of dry mix **Fat:** 1 gram

Homemade Egg Substitute (for Cooked Products Only):

Because this recipe contains raw eggs, do not use it in uncooked products such as eggnog and ice cream.

¼ cup non-fat dry milk powder
1 teaspoon vegetable oil
6 egg whites

1. Combine all ingredients (using a blender or electric mixer) until the mixture is smooth.
2. Store in covered container in the refrigerator for up to 2 days, or freeze in ¼ cup portions; thaw overnight in the refrigerator.

Yield: 1 cup; ¼ cup is equivalent to 1 egg.

	Large Egg	**Homemade Egg Substitute**
Calories	79.0	70.0
Fat, grams	5.6	3.5
Cholesterol, mg	213.0	<1.0

Yogurt Cheese

Use this recipe as a substitute for cream cheese in spreads or in desserts and frostings. Make your own spreads by mixing with cinnamon, orange peel, dried fruit, jam, or herbs.

32 ounces plain non-fat or low-fat yogurt made without stabilizers or gelatin

1. Line a strainer with a double layer of cheesecloth or with a paper coffee filter; place it over a bowl.
2. Pour yogurt into the lined strainer. Cover it with plastic wrap and refrigerate.
3. Allow it to drain for 8 to 24 hours, until the liquid has drained into the bowl and the yogurt is thick and spreadable. The longer it drains, the more whey is expressed and the firmer the cheese.
4. Remove the cheese from the cloth and refrigerate in an airtight container.

	Cream cheese	**Yogurt cheese**
	Per tablespoon	
Calories	49.0	5
Fat, grams	4.9	0
Cholesterol, mg	15.5	0

Did You Know?

The amount of saturated fat in the diet has a much greater effect on blood cholesterol than does the amount of cholesterol in the diet.

Remove the Fat

Healthy eating involves recognizing habits that may not be so healthy and then taking steps to change them. For example, think about the foods you ate yesterday. Which ones contained fat? Write them down in the left column below. What lower-fat foods could you have chosen instead? Write them down in the right column.

Foods eaten		Lower fat choices
	Breakfast	
	Snack	
	Lunch	
	Snack	
	Dinner	
	Snack	

Fat Substitute Facts

Some consumers are interested in lowering their fat intake with the use of fat substitutes. Fat substitutes help reduce the intake of high-fat foods with reduced fat substitutes of familiar foods. These fat substitutes do contain about the same number of calories as carbohydrates and protein, so they should be eaten within the context of a healthful diet using moderation and variety.

Fat Substitutes in Processed Foods

Modified foods may be labeled as light (lite), reduced calorie, or reduced fat. These foods may be made from a fat-reduced formula or contain a commercial fat substitute with fewer calories per gram than fat. Two major types of fat substitutes are carbohydrate-based and protein-based.

- **Carbohydrate-based fat substitutes** such as modified starches, dextrins, cellulose, and gums work by combining with water to provide a thicker texture and appearance, as in fat-free salad dressings.
- **Protein-based fat substitutes** made of skim milk protein provide the sensation of creaminess as well as improving appearance and texture. Low-fat cheese made with a protein-based substitute has an appearance and texture close to full-fat cheese.

Both types of fat substitutes contribute some calories, although less than that contributed by fat. Often, a combination of ingredients is used to create higher quality reduced-fat products.

What Types of Foods Use Fat Substitutes?

Foods commonly high in fat such as margarines, salad dressings, mayonnaise, cheese, sour cream, and frozen desserts have used fat substitutes with varying degrees of success. Now you can buy low-fat ice creams with either a protein-based fat substitute or a combination of starches and gums. Many baked goods and some candies are also made using fat substitutes to help reduce their fat.

Cutting Fat in Foods

	Traditional Recipe *(grams of fat)*	**Made Using Fat Substitute** *(grams of fat)*
Margarine, 1 tablespoon	7-12	0-6
Salad dressing		
Creamy, 2 tablespoons	11-21	0-8
Clear, 2 tablespoons	5-20	0-6
Mayonnaise, 1 tablespoon	11	0-5
Cheese		
Hard, 1 ounce	8-11	4-5
Processed, 1 ounce	7-9	0-4
Cream cheese, 2 tablespoons	9-10	0-5
Sour cream, 1 tablespoon	2-5	0-1
Ice cream, ½ cup	7-26	0.3-2

Source: Pennington, J.A.T. Bowes & Church's Food Values of Portions Commonly Used, 19th edition. Philadelphia: J.B. Lippincott Company, 2009; and Facts about Fat Substitutes Nutrition Fact Sheet, National Center for Nutrition and Diabetes, 2004.

What Are Some Fat Substitutes on the Market Today that Are Approved by the Food And Drug Administration?

- Simplesse® = protein-based fat substitute
- Olestra® = synthetic triglyceride modifications with sugar molecules containing long chain fatty acids

Recipes for Using Fat Substitutes
To find recipes for baking or for other food preparation using fat substitutes, contact consumer information at the following numbers:

- Simplesse® Fat, CP Kelco Company: 1-678-247-7300 or 1-800-535-2687 http://www.cpkelco.com/products/index.html
- Olean® (Olestra®), Proctor and Gamble Consumer Hotline: 1-800-477-8899 or e-mail at http://www.pgfoodingredients.com/
- For all others, contact the company directly for consumer information about the products' use in food preparation.

Three contacts about the safety of using fat substitutes:

- Academy of Nutrition and Dietetics' (ANAD) Hotline: 1-800-366-1655; 1-800-877-1600; www.eatright.org
- American Heart Association 1-800-AHA-USA; 1-800-(242-8721) http://www.americanheart.org
- Food and Drug Administration, Consumer Inquiries**:** 1-888-INFO-FDA (463-6332), http://www.fda.gov

Detect Sugar

At least 21 different forms of simple carbohydrates are identified as sugars. All provide calories, but there are few nutrients. Sugar is a necessary ingredient in many products because it provides sweetness and bulk.

What Health Concerns Are Related to Sugar?

Health concerns about sugar consumption are not as strong as they were 20 years ago. The only health problem strongly linked to sugar is tooth decay. Studies have found that most people consume small to moderate amounts of sugar within the context of healthful meals.

Sugar is not "bad" in terms of being harmful. But its use should be monitored because it contains more calories than nutrients. Eating too many sugary foods can cause individuals to bypass more nutritious foods or to take in more calories than needed and thus lead to weight gain. Weight gain and/or obesity lead to degenerative diseases such as cardiovascular disease, diabetes, hypertension, and it may aggravate other diseases such as arthritis.

What about Sugar Substitutes?

Sugar substitutes make the food sweeter with few calories and no nutrients. They don't have the functional properties of sugar, and some are adversely affected by heat. The five alternate sweeteners, approved by the U.S. Food and Drug Administration (FDA), on the market today are: saccharin, aspartame, acesulfame-K, sucralose, and neotame. Neotame is available only in processed foods and not for table use to date (2007). The more purified forms of Stevia – Purevia®, and Truvia® – received the Generally Recognized As Safe (GRAS) rating from FDA (2009).

Fruit juices, honey, and molasses are offered as sugar substitutes for baking and cooking. However, the sugar they provide is no more nutritious than other forms of sugar. The amounts used are seldom enough to provide meaningful vitamins or minerals.

To Reduce Sugar

- To cut down on sugar, try new recipes or adjust old ones by using one-third less. To add flavor, use more vanilla or spice.
- Satisfy your longing for something sweet with fruits for snacks and desserts. Eat baked sweets and candies less frequently and/or in smaller portions.
- Read labels of commercially prepared products; many are high in sugar. Whenever possible, substitute home-prepared items made with less sugar.
- Recognize that the following are names of sugars: sucrose, sorbitol, maple syrup, corn syrup, high fructose corn syrup, glucose, fructose, mannitol, molasses, dextrose, maltose, honey, and lactose.
- If you are trying to lose weight and/or have diabetes, then select alternate or non-caloric sweeteners, such as: saccharin (Sweet'N'Low®), aspartame (Equal® or NutraSweet®), acesulfame-K (SweetOne®), or sucralose (Splenda®). Saccharin, sucralose, or acesulfame-K can be used for cooking because they are not destroyed by heat. Aspartame is a protein-derivative and is destroyed by heat, losing its flavor.

To find recipes for baking, cooking, or preserving food and other techniques regarding the use of these products, contact the company's consumer representative:

- **Saccharin - Sweet'N'Low®** Hotline: 1-800-231-1123; 1-800-221-1763
- **Aspartame, Neotame - NutraSweet® or Equal®**: 1- 800-323-5316 (**Equal®**); or 1-800-323-5321 (**NutraSweet®)**
- **Acesulfame-K - SweetOne®**: 1-800-544-8610; or **Sunette®** 1-800-344-5807
- **Sucralose - Splenda®**: 1-800-777-5363

For all other questions about non-nutritive sweeteners, contact the following organizations:

- Academy of Nutrition and Dietetics' (ANAD) Hotline: 1-800-366-1655; 1-800-877-1600; www.eatright.org
- American Diabetes Association's Hotline 1-800-232-3472 or 1-800-342-2383 http://www.diabetes.org
- American Heart Association 1-800-AHA-USA; 1-800-242-8721 http://www.americanheart.org
- Food and Drug Administration, Consumer Inquiries**:** 1-888-INFO-FDA (463-6332), http://www.fda.gov

Non-Nutritive Sweetener Conversion Chart

Sugar	2 teaspoons	¼ cup	a cup	½ cup	1 cup
Non-nutritive Sweeteners					
Saccharin					
Sweet N' Low ® packet	1	3	4	6	12
Sweet N' Low ® bulk	1	1 tsp.	1¼ tsp.	2 tsp.	4 tsp.
Sweet N' Low ® liquid *for other brands, see food label for sugar equivalents	20 drops	½ tsp.	2 tsp.	1 Tbsp.	2 Tbsp.
Aspartame					
Equal®/NutraSweet® packet	1	Not in bulk packages Not recommended for cooking/baking			
Acesulfame-K					
SweetOne® packet *Sugar Twin®, Weight Watchers®, Sucaryl®, Adolphs®, and Sweet 10®	1	3	4	6	12
Sucralose					
Splenda®: *(equivalent of sugar)*	2 teaspoons	¼ cup	a cup	½ cup	1 cup

Detect Fiber

Dietary fiber is the undigested material left after nutrients are absorbed from food. Both insoluble fibers (such as in wheat, fruits, and vegetables) and soluble fibers (such as in oats, legumes, apples, and citrus fruits) are important. Study the high fiber choices in this section and use your imagination to find ways to include them more often. Here are three general reminders.

1. Fruits, vegetables, and grains have fiber; animal products do not.
2. The closer a fruit, vegetable, or grain is to its original, natural state the more fiber it will have. An apple has more fiber than applesauce, which has more fiber than apple juice.
3. Substitute a high-fiber food for a low-fiber one to increase your daily fiber supply.

Fiber Substitutes

Instead of	Try	For
Chinese noodles canned onion rings croutons/bacon bits	bran cereal	casserole toppings
cornflakes graham crackers bread crumbs	crushed bran cereal wheat or oat bran	dessert crusts and crumb toppings, in meatloaf, for chicken/fish coatings
white rice	brown rice barley, wheat kernels	casseroles, soup, stir fry, side dishes
chocolate chips	half chips & half raisins	cookies, bars

Add bran cereals, oat bran, and wheat bran to streusel toppings, chili, sloppy joes, sandwich spreads, and spaghetti sauce; or use as a topping for baked potatoes and salads. Bran cereal flour can be substituted for up to one-fourth of the all-purpose flour to increase fiber content. Bran cereals can contain 30 grams of fiber or more per cup. Check labels for exact amounts.

Look on the **Ingredients Listing** on a label for whole grains, cellulose, and other fiber sources such as cellulose, wheat gluten, or starch, etc. Look at the **Nutrition Facts** on a label to find the amount of both total carbohydrates and dietary fiber. As a general rule, a food is considered **a good source of fiber** if it has between 3 to less than 5 grams of fiber, or **high-fiber** if it has 5 or more grams of fiber.

Do You Know which Food Groups Provide the Most Fiber?

Take a look at these foods and the relative amount of fiber each group provides.

Food Groups	Grams Fiber per Serving
breads	1-3
whole fruits, cereals and grains	2
starchy vegetables	3
nonstarchy vegetables	1B4
beans, peas, and lentils	6

Know Your Flours

When a recipe lists flour as an ingredient, we assume it means all-purpose flour. To increase your success rate when substituting other flours, we need to review why flour is used.

The gluten that is formed when protein from wheat flour is combined with liquid gives dough its elasticity and baked products their structure. Flours from other grains have little or no gluten-forming protein. Using specialty flours may result in a reduced volume and a "heavier" finished product, as well as changes in color, flavor, and nutritional value. When using specialty flours:

- Stir whole-grain flours with a spoon before measuring but do not sift. Spoon into the measuring cup and level with a metal spatula.
- Decrease the oven temperature by 25 °F, and increase the baking time because the dough is likely to be more compact.
- For yeast breads, add all of the specialty flour first. Then work the all-purpose or bread flour into the dough. The doughs are mixed and kneaded for a shorter time because of the higher proportion of non-gluten-forming materials. The dough also requires a shorter rising time.

Flour Substitutes

As a thickening: 1 tablespoon flour = ½ tablespoon cornstarch, potato starch, rice starch, or arrowroot starch
or = 1 tablespoon quick-cooling tapioca
or = 2 teaspoons tapioca

Self-rising flour: Add 1½ teaspoons of baking powder and ½ teaspoon of salt per cup of all-purpose flour

How Much Fiber Is in Flour?

All-purpose flour is a highly refined ingredient; consequently, it has very little fiber. If you want to increase fiber in home-baked products, you can substitute other flours in many products. Here's how some flour choices compare in fiber content:

LEAST FIBER		MOST FIBER		
All Purpose Flour	**Medium Rye Flour**	**Cornmeal**	**Oat Flour***	**Whole Wheat Flour**

** To make oat flour, put oatmeal in the blender, and blend about 60 seconds. Store in the refrigerator or freezer because of its high- fat content.*

To ensure that whole-wheat fiber (not caramel coloring nor molasses) is present, read labels on bread products. By law, a product labeled "whole wheat" must be made from 100 percent whole-wheat flour. Wheat bread may have varying proportions of enriched white flour and whole-wheat flour. The type of flour present in the largest amount is listed first on the ingredient label.

Allergies to Wheat?

Replacement substitutes for one cup of flour are:

• Barley flour	½ cup	**OR**	½ cup rye flour + ½ cup potato flour
• Corn flour	1 cup		**or**
• Corn meal	¾ cup		b cup rye flour + a cup potato flour
• Potato starch flour	e cup		**or**
• Rolled oats	1a cup		e cup rye flour + a cup rye flour
• Rice flour	1¼ cup		(10 tablespoons)
• Rye flour*	1¼ cup		**or**
• Rye meal*	1 cup		1 cup soy flour + ¾ cup potato starch flour

***NOTE:** Some individuals who are allergic to wheat may also be sensitive to gluten, a protein found in wheat and other grains. Grains that contain gluten are barley (and malt), rye, oats, wheat, and triticale. If a person is allergic to wheat, it is a good idea to check with his or her health care provider to see if foods that contain gluten should also be eliminated from the diet.

Detect Salt

Salt, the traditional seasoning of choice, has been linked to high blood pressure. Eat no more than 2300 mg/day or no more than 700 milligrams (mg.) per meal. For persons with hypertension or those who are more sensitive to the effects of sodium (such as blacks and middle-aged and older adults), eat even less sodium during the day (around 1500 milligrams) as advised by the *Recommended Dietary Guidelines for Americans*, 2010.

Have you been told to cut down on sodium? Then you will find the information on labels very helpful. When you're buying packaged foods, always check the labels to make sure the product does not contain too much sodium.

Do you know what to look for to help you cut sodium in your meal plan when selecting foods in the grocery store? Here's how you do it. Select single foods with no more than 400 milligrams of sodium in a single serving; entrees should have no more than 800 milligrams of sodium.

As a result of many people needing to reduce the sodium content of their meals, many no-salt and low-salt seasoning mixes are now on the market. Also, by using the following herb and spice guides and recipes for low-sodium seasonings, you can make them at home.

Herb and Spice Guide

Spices and herbs can be used to enhance the flavor of a fat- or sodium-reduced food. Experiment with small amounts to find an acceptable seasoning level. Powdered herbs are stronger than crumbled, and dried herbs are stronger than fresh herbs. If a recipe calls for ¼ teaspoon powdered herb, you can use ¾ to 1 teaspoon crumbled or flaked, or 2 teaspoons fresh herb.

What's the Difference between an Herb and a Spice?

- Herb (ûrb,hûrb) n. leaves of plants and shrubs with non-woody stems
- Spice (spis) n. comes from bark, roots, fruit, seeds, or flowers of plants

When adding herbs or spices, take a tip from professional recipe developers. Start with 1 teaspoon of a mild herb (dried) or spice (such as oregano, basil, cumin, and cinnamon) per six servings. Use only ¼ teaspoon of a strong herb or spice (such as rosemary, cloves, nutmeg, ginger, mustard, allspice) per six servings. Try these herbs and spices with the following foods:

Beef (see also Meat Loaf): allspice, basil bay leaf, caraway seed, chervil, chili powder, cinnamon, cloves, coriander, cumin, curry powder, dill, fennel, garlic, ½ Greek seasoning to ½ pepper, ginger, lemon pepper, marjoram, oregano, paprika, pepper, rosemary, savory, tarragon

Breads: anise, caraway seed, cardamom, cinnamon, coriander, dill, fennel, nutmeg, parsley, poppy seed

Cheeses: basil, caraway seed, cayenne, celery seed, chervil, chives, coriander, cumin, dill, jalapeño pepper, marjoram, oregano, parsley, pepper, sage, thyme

Dips: cayenne, chili powder, chives, curry powder, dill, oregano, parsley, pepper, sage

Eggs: basil, cayenne, celery seed, chervil, chili powder, chives, cumin, curry powder, dill, marjoram, mustard seed, oregano, paprika, parsley, pepper, rosemary, saffron, sage, savory, tarragon, thyme, turmeric

Fish: basil, bay leaf, cayenne, celery seed, chervil, cumin, curry powder, dill, ginger, lemon pepper, marjoram, mustard seed, oregano, paprika, parsley, pepper, saffron, sage, savory, tarragon, thyme, turmeric

Fruits: allspice, anise, basil, cardamom, cinnamon, cloves, curry powder, fennel, ginger, mace, mint, nutmeg, rosemary, poppy seed

Grains: basil, celery seed, chili powder, cumin, curry powder, dill, marjoram, mint, oregano, parsley, pepper, rosemary, saffron, savory, thyme

Jams and Jellies: allspice, bay leaf, cardamom, cinnamon, mace, mint, nutmeg

Lamb: basil, bay leaf, chervil, cinnamon, cloves, cumin, curry powder, dill, garlic cloves, lemon pepper, marjoram, mint, nutmeg, oregano, parsley, pepper, rosemary, saffron, sage, savory, thyme

Lentils: basil, bay leaf, caraway seed, chives, tarragon, thyme, turmeric

Liver: basil, bay leaf, caraway seed, chives, tarragon, thyme, turmeric

Marinades: allspice, bay leaf, cayenne, celery seed, chili powder, cloves, ginger, mustard seed, oregano, parsley, rosemary, tarragon, turmeric

Meat Loaf: chili powder, cumin, curry powder, marjoram, nutmeg, oregano, parsley, pepper, sage, savory, thyme

Pasta: basil, oregano, parsley, pepper, poppy seed

Pickled vegetables: allspice, bay leaf, cardamom, cinnamon, cloves, coriander, dill, ginger, mint, mustard seed, pepper, tarragon, turmeric

Pork: allspice, basil, bay leaf, caraway seed, chervil, cinnamon, cloves, coriander, fennel, ginger, marjoram, nutmeg, pepper, rosemary, sage, savory, thyme

Poultry: basil, bay leaf, chervil, coriander, curry powder, dill, ginger, lemon pepper, marjoram, paprika, parsley, pepper, rosemary, saffron, sage, savory, tarragon, thyme, turmeric

Relishes: allspice, cayenne, chili powder, cloves, coriander, ginger, mace, tarragon

Salad Dressings: caraway seed, celery seed, chervil, chili powder, chives, coriander, curry powder, dill, ginger, mint, mustard seed, paprika, parsley, pepper, poppy seed, tarragon, turmeric

Shellfish: basil, bay leaf, cayenne, curry powder, marjoram, oregano, paprika, parsley, saffron, sage, savory, tarragon, thyme

Soups and Stews: allspice, basil, bay leaf, caraway seed, cayenne, celery seed, chervil, chili powder, chives, cloves, coriander, curry powder, dill, ginger, marjoram, oregano, paprika, parsley, pepper, rosemary, saffron, tarragon, thyme

Stuffings: basil, marjoram, oregano, pepper, rosemary, sage, savory, tarragon, thyme

Vegetables:

Artichoke: bay leaf, coriander, parsley, savory, thyme

Asparagus: chives, lemon pepper, marjoram, mustard seed, parsley, tarragon, thyme, turmeric

Beans, dried: allspice, bay leaf, celery seed, chili powder, cloves, cumin, jalapeño pepper, mint, mustard seed, oregano, sage, savory, tarragon, turmeric

Beans, lima: cumin, dill, marjoram, mustard seed, oregano, sage, savory, tarragon, thyme

Beans, snap: basil, caraway seed, chili powder, dill, marjoram, mustard seed, savory, tarragon, thyme

Beets: allspice, anise, bay leaf, caraway seed, cinnamon, dill, fennel, ginger, mustard seed, savory, tarragon, thyme

Broccoli: caraway seed, dill, mustard seed, oregano, tarragon

Brussels sprouts: basil, caraway seed, dill, mustard seed, sage, thyme

Cabbage: caraway seed, celery seed, cumin, dill, fennel, mustard seed, nutmeg, oregano, paprika, savory, tarragon, turmeric

Carrots: allspice, anise, bay leaf, caraway seed, cinnamon, cloves, dill, fennel, ginger, mace, marjoram, mint, nutmeg, parsley, rosemary, sage, thyme

Cauliflower: caraway seed, celery seed, coriander, dill, mace, nutmeg, paprika, parsley

Corn: chili powder, chives, oregano, parsley, sage, savory

Cucumber: basil, chives, cinnamon, cloves, dill, mint, parsley, pepper, tarragon

Eggplant: basil, marjoram, oregano, parsley, sage, thyme

Greens, dark leafy: allspice, basil, mace, marjoram, nutmeg, oregano, tarragon

Greens, salad: basil, celery seed, chervil, chives, dill, lemon pepper, marjoram, oregano, parsley, pepper, sage, savory, tarragon

Mushrooms: chives, dill, marjoram, parsley, tarragon, thyme

Onions: caraway seed, curry powder, mustard seed, nutmeg, oregano, parsley, sage, thyme, turmeric

Parsnips: chervil, dill, marjoram, parsley, rosemary, sage, thyme

Peas: allspice, basil, chervil, chives, dill, marjoram, mint, oregano, poppy seed, rosemary, sage, savory, tarragon, thyme

Potatoes, sweet: allspice, cardamom, cinnamon, cloves, ginger, mace, nutmeg

Potatoes, white: basil, bay leaf, caraway seed, celery seed, chives, dill, lemon pepper, mustard seed, oregano, parsley, pepper, poppy seed, rosemary, savory, tarragon, thyme

Pumpkin: allspice, cardamom, cinnamon, cloves, ginger, mace, nutmeg

Squash, summer: chervil, lemon pepper, marjoram, parsley, pepper, savory

Squash, winter: allspice, basil, cardamom, cinnamon, cloves, fennel, ginger, mace, mustard seed, nutmeg, rosemary

Squash, zucchini: lemon pepper, marjoram, oregano, parsley

Tomatoes: basil, bay leaf, celery seed, chervil, chili powder, dill, lemon pepper, oregano, parsley, sage, savory, tarragon, thyme

Turnips: allspice, dill, mace, nutmeg, paprika, thyme

Vegetable juices: basil, bay leaf, oregano, parsley, pepper, tarragon

Seasonings without Salt

One teaspoon of salt has about 2,000 mg of sodium. Substantially reduce your sodium intake by substituting. Any of the following seasonings can be used.

Zesty Herb Seasoning
Sodium: 47 milligrams per teaspoon

Grated peel of 1 lemon
2 tablespoons ground cinnamon
1 tablespoon ground mace
1 tablespoon dried basil leaves, crushed
1 tablespoon dried thyme leaves, crushed
1 tablespoon dried rosemary leaves, crushed
2 teaspoons paprika
1 teaspoon salt and potassium chloride mixture (a purchased product with half the sodium of table salt)
1 teaspoon pepper
1 teaspoon ground cloves
½ teaspoon ground nutmeg
½ teaspoon ground allspice

1. Combine all ingredients. Refrigerate in covered container.
2. Sprinkle as desired over meat, poultry, or fish before broiling or baking.

Oriental Spice
Sodium: About 1.6 milligrams per teaspoon

1 teaspoon fresh grated lemon peel
¼ teaspoon anise seed, crushed
¼ teaspoon fennel seed, crushed
¼ teaspoon ground cinnamon
¼ teaspoon ground cloves
¼ teaspoon ground ginger

1. Combine all ingredients. Refrigerate in covered container.
2. To use, sprinkle as desired over poultry or meat stir-fry dishes.

Herbed Seasoning
Sodium: 0.65 milligrams per teaspoon

2 tablespoons dried dill weed or basil leaves, crumbled
2 tablespoons onion powder
1 teaspoon dried oregano leaves, crumbled
1 teaspoon dried celery seed
½ teaspoon lemon pepper (sodium-free)

1. Combine all ingredients in small bowl and blend well.
2. Spoon into shaker and use with poultry and fish.
3. Store in cool, dry place.

Spicy Blend
Sodium: 0.59 milligram per teaspoon

2 tablespoons dried savory, crushed
1 tablespoon dry mustard
2½ teaspoons onion powder
1¾ teaspoons curry powder
1¼ teaspoons ground pepper
1¼ teaspoons ground cumin
½ teaspoons garlic powder

1. Mix thoroughly and place in shaker. Store in cool, dry place.
2. Use with main dishes.

Shaker Spice Blend
Sodium: 1.78 milligrams per teaspoon

5 teaspoons onion powder
2½ teaspoons garlic powder
2½ teaspoons paprika
2½ teaspoons dry mustard
1¼ teaspoons thyme leaves, crushed
½ teaspoon ground pepper
¼ teaspoon celery seed

1. Mix thoroughly and place in shaker.
2. Use at table on main dishes, vegetables, soups or salads.

Did You Know?

Health professionals recommend a daily sodium intake below 2,300 milligrams (mg). About one third of the average intake of sodium comes from salt added to food during cooking or at the table. Read the ingredients listing and nutrition information on food labeling in all processed food.

Modifying Recipes

Reason for ingredient		Amount usually used	Result of reducing ingredient
Candies			
Fat	Adds to rich flavor and helps prevent large crystals from forming.	Amount varies widely.	May be coarser in texture.
Sugar	Needed for crystallization, proper consistency, texture, and flavor.	About 3 cups sugar per cup liquid.	Do not change recipe. May drastically affect the volume, texture, and consistency.
Salt	Helps balance and round out the flavor.	Amount varies widely.	May change flavor.
Cakes			
Fat	Contributes to tenderness, fine grain, and texture.	2 to 4 tablespoons fat per cup of flour.	May seem less moist and flavorful.
Sugar	Contributes to tenderness, flavor, texture, moistness, and browning.	½ to 1⅓ cup sugar per cup of flour	Flavor may be less sweet; becomes stale faster. May have paler crust, less color, more open texture, more rounded top, and be drier.
Salt	Adds flavor.	Variable.	Little effect.
Canned and Frozen Fruit			
Sugar	Helps to preserve firm texture and bright color.	½ to 1⅓ cups sugar per cup water for syrup; ¼ to ⅓ cup sugar per pint of frozen fruit (dry pack).	Texture may be less firm. Flavor may be less sweet. Color may be less bright.
Canned Vegetables			
Salt	Adds flavor.	1 teaspoon salt per quart.	Flavor may change.
Cooked Fruits			
Sugar	Helps retain fruit shape and texture during cooking. Increases transparency so brighter.	½ cup sugar per cup water (too much sugar causes fruits to shrink and become firm).	Texture likely to be softer; color likely to be less bright; flavor will be less sweet.
Cookies			
Fat	Increases tenderness.	¼ to ½ cup fat per cup flour.	May make cookies less tender.
Sugar	Contributes to sweetness, browning, and tenderness. Melts during baking so cookie spreads out.	⅓ to 1⅓ cups sugar per cup flour.	Flavor will be less sweet; cookie will be tougher and paler. With less sugar to melt, cookie won't spread as much.
Salt	Adds flavor.	¼ to ½ teaspoon salt per cup flour.	May alter flavor slightly.

Reason for ingredient		Amount usually used	Result of reducing ingredient
Custards and Puddings			
Fat	Causes eggs to coagulate at higher temperature so consistency is softer.	1½ to 3 tablespoons sugar per cup milk.	Consistency will be firmer, and baking time may be shorter.
Salt	Adds flavor.	⅛ teaspoon salt per cup milk.	Flavor may change.
Ice Cream			
Fat	Fat (in cream) helps make a smooth texture and aids incorporation of air during freezing; also gives a rich flavor.	Liquid is usually about half milk and half cream.	Using a milk product that is lower in fat reduces the richness, creaminess, and smoothness of the ice cream.
Sugar	Lowers freezing point and lengthens freezing time so ice cream will be softer at a given temperature. Contributes to smooth texture. Adds sweetness.	½ cup sugar to each cup of milk or cream.	Texture may be coarser. Ice cream will be harder and less sweet. Freezing time will be shorter.
Salt	Adds flavor.	Amount varies.	Little effect.
Main Dishes			
Salt	Adds flavor.	1 teaspoon salt per 4 to 6 servings. 1 teaspoon salt to each pound ground beef.	Little effect.
Pasta, Rice, Legumes			
Salt	Adds flavor.	1 teaspoon salt to each cup of uncooked pasta, rice, legumes.	May change flavor.
Pickles			
Sugar	Contributes to crisp texture. May act as a preservative if enough is used.	Highly variable	Never change recipe. May cause texture changes and/or spoilage.
Salt	Essential in brine to permit growth of desirable micro-organisms and produce acid for preventing spoilage.	Highly variable	Never change recipe. May cause texture changes and/or spoilage.
Quick Breads			
Fat	Increases tenderness.	1 to 4 tablespoons fat per cup of flour.	May be less tender and less moist.
Sugar	Contributes to sweetness, tenderness, browning, moistness, and volume.	1 to 4 tablespoons sugar per cup of flour.	May result in a less sweet, less tender product with a greater tendency to dry out.
Salt	Adds flavor.	¼ to ½ teaspoon salt per cup of flour.	May affect flavor slightly.

Reason for ingredient		Amount usually used	Result of reducing ingredient
Sauces and Gravies			
Fat	Separates the flour or starch granules to prevent lumpiness.	1 to 3 tablespoons fat per cup liquid.	Smooth sauces can be made with less fat. If no fat is used, blend starch or flour with cold liquid. Flavor will be milder.
Salt	Adds flavor.	¼ teaspoon salt per cup liquid.	Little effect.
Sweet Spreads (Jellies, Jams, Preserves, Butters)			
Sugar	Essential for jelling and protecting against spoilage.	Highly variable.	Do not change recipes for sweet spreads unless they are to be frozen or refrigerated. They are carefully balanced to produce a high-quality product that will not spoil.
Yeast Breads and Rolls			
Fat	Increases tenderness and enhances keeping quality. Large amounts decrease volume.	1 to 3 teaspoons fat per cup of flour in bread; 1 to 4 tablespoons fat per cup flour in rolls.	May reduce keeping quality.
Sugar	Contributes to a soft texture, sweet flavor, and brown crust. Provides food for yeast during fermentation. Small amounts of sugar increase the rate of fermentation; large amounts of sugar depress yeast action.	Up to 1 tablespoon sugar per cup of flour in bread; ½ to 2 tablespoons sugar per cup flour in rolls.	May affect rate of fermentation. May not be as tender or moist. Rolls may not brown as quickly.
Salt	Inhibits yeast fermentation. Improves texture. Adds flavor. Has a slight toughening effect on the gluten.	¼ to ½ teaspoon salt per cup flour.	May cause yeast to grow too rapidly, resulting in a poor texture. Satisfactory bread needs some salt.

Revising Recipes

The first point to remember when revising recipes is that all changes for modifying recipes are experiments. Some work very well. Others are less satisfactory. Reviewing the guidelines on the previous pages will help you understand some of the chemistry involved in using specific ingredients in certain types of recipes. The following examples show how some ingredients can be reduced or changed to produce a product that is healthier. The decision of whether or not to change a recipe instead of serving it less frequently or in smaller portions is your choice.

Grandma's Meatballs

Changing ingredients as well as the cooking method makes a difference here. Using less total meat provides an adequate 3-ounce cooked serving (instead of 5 ounces).

Original	**Revised**
2 pounds 85% lean ground beef	1½ pounds extra lean ground beef
½ cup chopped onion	½ cup chopped onion
2 eggs	2 egg whites
¼ cup milk	¼ cup skim milk
½ cup rolled oats	½ cup rolled oats
½ teaspoon ground allspice	½ teaspoon ground allspice
salt and pepper to taste	salt and pepper to taste
Omit or use less butter for frying	1 teaspoon cooking oil or pan spray or bake

In large bowl, mix all ingredients except oil. Shape into 12 meatballs. Place on boiler pan or shallow baking pan that has been sprayed with nonstick spray coating. Bake at 325 °F until browned, or cook in skillet. Serve with rice, pasta, or potatoes.

Yield: 6 servings

Approximate nutritional values per serving:

352 calories	210 calories
21 grams fat	8 grams fat
54% calories from fat	5% calories from fat
172 mg cholesterol	66 mg cholesterol

Hashed Brown Potato Casserole

Substituting reduced fat ingredients is an easy change to make. Using bran cereal is a way to increase fiber. Avoid using crushed crackers that are likely to have a higher fat content.

Original	**Revised**
2 pounds frozen hash brown potatoes, thawed	2 pounds frozen hash brown potatoes, thawed
¼ cup chopped onion	¼ cup chopped onion
1 teaspoon salt	Omit salt
¼ teaspoon pepper	¼ teaspoon pepper
8 ounces cheddar cheese, shredded	8 ounces reduced fat cheddar cheese, shredded
8 ounces dairy sour cream	8 ounces light dairy sour cream
1 can cream of chicken soup	1 can cream of chicken soup (99% fat free, 25% reduced sodium)
½ cup corn flake crumbs	½ cup crushed bran cereal
2 tablespoons butter	Omit butter

Spray a 13X 9 X 2-inch baking pan with non-stick spray coating. Add thawed potatoes, onion, and pepper. Combine cheese, sour cream, and soup; stir into potato mixture. Sprinkle crushed cereal over the top. Bake, covered at 350 °F for 50 minutes.

Yield: 12 servings

Approximate nutritional values per serving:

225 calories	166 calories
14 grams fat	6 grams fat
54% calories from fat	29% calories from fat
36 mg cholesterol	18 mg cholesterol

Did You Know?

When using a regular — not lite or microwave variety — brownie or cake mix, substitute ½ cup plain non-fat yogurt for the 2 eggs and ½ cup oil to cut down on fat.

Brownies

Serving size and frequency of eating are important factors in deciding when to change sweet baked products. This example offers the alternative of replacing margarine with applesauce.

Original	Moderate	Low Fat
½ cup margarine	¼ cup margarine	Omit
	¼ cup unsweetened applesauce	½ cup unsweetened applesauce
1 cup sugar	1 cup sugar	1 cup sugar
1 egg	1 egg	2 egg whites
1 teaspoon vanilla	1 teaspoon vanilla	1 teaspoon vanilla
¾ cup flour	¾ cup flour	¾ cup flour
¼ cup cocoa	¼ cup cocoa	¼ cup cocoa
¼ teaspoon baking powder	¼ teaspoon baking powder	¼ teaspoon baking powder
c teaspoon salt	c teaspoon salt	c teaspoon salt
½ cup chopped Texas pecans	¼ cup chopped Texas pecans	Omit Omit

Spray a 9H9H2-inch baking pan with nonstick spray coating; set aside. In mixer bowl, combine applesauce, sugar, egg whites, and vanilla. Stir in flour, cocoa, baking powder, and salt. Pour into pan and bake at 350 °F for 20 to 25 minutes.

Yield: 16 servings

Approximate nutritional values per serving:

153 calories	117 calories	78 calories
9 grams fat	5 grams fat	0.2 grams fat
49% calories from fat	34% calories from fat	3% calories from fat
13 mg cholesterol	13 mg cholesterol	0 mg cholesterol

Homemade Ice Cream

Safety First: This is a typical cooked custard ice cream because the egg mixture is cooked before freezing. The cooking step will destroy any salmonella bacteria that might be present in raw eggs. If your favorite homemade ice cream recipe uses raw eggs and you don't want to convert it to a cooked custard ice cream, substitute whole liquid pasteurized eggs available from some supermarkets.

Original	**Lower Fat**
2 cups sugar	2 cups sugar
¼ cup cornstarch	¼ cups cornstarch
¼ teaspoon salt	¼ teaspoon salt
4 cups whole milk	4 cups 2 percent milk
4 eggs, beaten	4 eggs, beaten
2 tablespoons vanilla	2 tablespoons vanilla
4 cups whipping cream	4 cups half and half

Mix sugar, cornstarch, and salt in the top of a double boiler. Gradually blend in 4 cups milk. Cook over hot water, stirring occasionally until thickened, 12B15 minutes. Stir in a small amount of the hot cornstarch mixture into the beaten eggs; then stir the eggs into the remaining cornstarch mixture. Continue cooking, stirring constantly 4B5 minutes longer, or until the mixture is about the consistency of pudding. Chill thoroughly. This step is essential for a smooth ice cream. Stir in vanilla and remaining milk or cream. Pour into a 1 gallon ice cream freezer and freeze according to manufacturer's directions. Remove the dasher; add mixture of ice and salt to freezer, if needed, cover with heavy blanket and allow ice cream to harden about 2 hours.

Yield: About 1 gallon in a standard ice cream freezer, 32 ½-cup servings.

Approximate nutritional values per serving:

182 calories	115 calories
13 grams fat	5 grams fat
61% calories from fat	36% calories from fat
72 mg cholesterol	41 mg cholesterol

Pumpkin Bread

This recipe can also be baked in two mini-loaf pans (check for doneness after 50 minutes).

Original	**Moderate Fat**	**Low Fat**
¾ cup pumpkin	1 cup pumpkin	1 cup pumpkin
½ cup sugar	1 cup sugar	½ cup sugar
½ cup vegetable oil	a cup vegetable oil	2 tablespoons vegetable oil
1 egg white	1 egg white	2 tablespoons plain lowfat yogurt
1 cup all-purpose flour	¾ cup all-purpose flour	¾ cup all-purpose flour
½ cup whole wheat flour	¾ cup whole wheat flour	¾ cup whole wheat flour
1 teaspoon baking powder	1 teaspoon baking powder	1 teaspoon baking powder
1 teaspoon baking soda	1 teaspoon baking soda	1 teaspoon baking soda
1 teaspoon ground cinnamon	1 teaspoon ground cinnamon	1 teaspoon ground cinnamon
¼ teaspoon salt	¼ teaspoon salt	¼ teaspoon salt
½ cup chopped nuts	½ cup raisins	½ cup raisins

In large mixer bowl, beat together pumpkin, sugar, oil, and eggs or yogurt. In a medium bowl, combine the flours, baking powder, baking soda, cinnamon, and salt. Add to pumpkin mixture, stirring just until moistened. Stir in the nuts or raisins. Pour into a greased 9H5H3-inch loaf pan. Bake in preheated 350 °F oven for about 1 hour, or until a wooden toothpick inserted near the center comes out clean. Cool on a wire rack for 10 minutes; remove from the pan and cool completely.

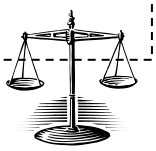
Yield: 16 slices

Approximate nutritional value per slice:

155 calories	127 calories	105 calories
9 grams fat	5 grams fat	3 grams fat
53% calories from fat	32% calories from fat	17% calories from fat
0 mg cholesterol	0 mg cholesterol	0 mg cholesterol

Did You Know?

Comparing numbers — of calories and grams of fat or fiber, for example — is one way to select which foods to eat. But specific numbers fail to reflect flavor, cost, or individual status. Healthy eating means learning to balance both the variety and quantity of foods eaten over several days.



U.S. Department of Agriculture's ChooseMyPlate.gov

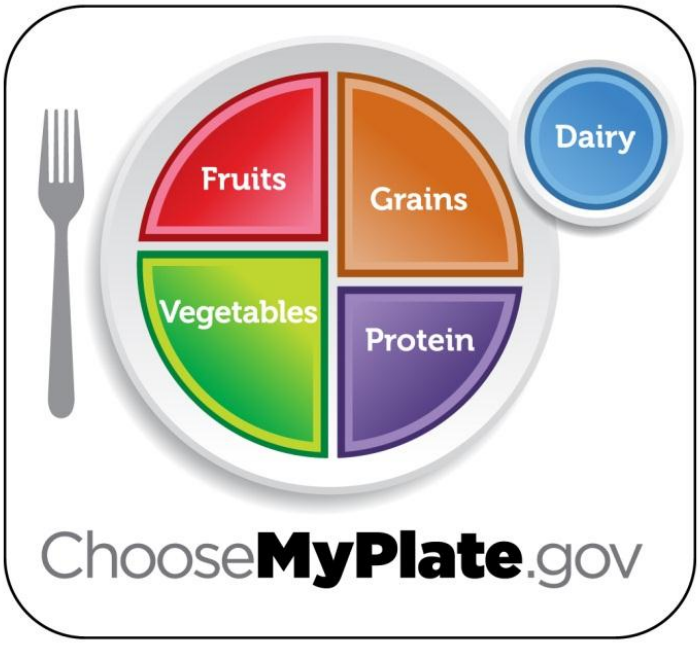
The federal government's new food icon, *MyPlate* (ChooseMyPlate.gov), serves as a reminder to help consumers make healthier food choices. *MyPlate* is a new generation icon with the intent to prompt consumers to enjoy their food, avoid oversized portions, and think about building a healthy plate at meal times. Consumers can seek more information to help them with these decisions at: www.ChooseMyPlate.gov.

MyPlate emphasizes the recommended amounts of foods seen on the plate, with each food group in a representative color (grains, vegetables, fruits, dairy, and protein foods). The food group proportions to select plus those to increase (more whole grains, half plate fruits/vegetables, and fat-free dairy choices) are illustrated on *MyPlate* and should approximate the total daily food intake. Read food labels to compare sodium in processed foods (soup, bread, frozen meals), and choose the foods with lower numbers. Drink water instead of sugary drinks.

The *MyPlate* icon is based on recommendations from the 2010 Dietary Guidelines for Americans*. This dietary advice is to promote healthful lifestyles through wise food choices and daily physical activities to reduce the risk of major chronic disease. It is for people 2 years of age or older.

After you type in your age and activity level into the ChooseMyPlate.gov website, you will access recommendations for the kinds and amounts of food to eat with Daily Food Plan. The SuperTracker helps you plan, track your daily foods eaten and physical activity, plus other interactive tools. The *MyPlate* website offers the *10 Tips for Nutrition Education Series.* Then you are provided in-depth information about the various food groups, standards or measurements, and physical activity.

*Reference: U.S. Dept. of Health and Human Services 2010 Dietary Guidelines for Americans, July, 2011, www.Dietary Guidelines.gov.



Additional Information

Research-based information and/or publications that may be available at local county Texas A&M AgriLife Extension Service offices:

- Dietary Guidelines for Americans, 2010
- Food Allergies Bulletin, Texas A&M AgriLife Extension Service
- Special Food Needs Dietary Guide, D-1284, 2012
- The Sodium Content of Your Food, B-1400, 2011
- USDA's ChooseMyPlate.gov, 2011
- Nutrient Needs at a Glance, E-589/E-589S (English/Spanish), 2011

References:

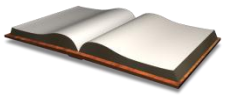
Altering Recipes ✓reduce, ✓substitute, ✓omit, North Central Regional Extension Publication, 473. June 1993.

Hooper, L. (ed.) The Healthy Heart Cookbook, Oxmoor House. 1992.

Handbook of Food Preparation, American Family & Consumer Science Association. 91 Edition. Kendall/Hunt Publishing Company. 2001.

Inglett, G.E. USDA Develops Tasty-No-Cal, High Fiber Fat Substitute. Biopolymer Research, Agricultural Research Service, USDA, Peoria, IL. 61604, 1997.

Pennington, J.A.T. Bowes & Church's Food Values of Portions Commonly Used. 19th Edition. Philadelphia. J.B. Lippencott Company. 2009.



For Cookbooks and Recipes for Specific Conditions:

- Academy of Nutrition and Dietetics'(ANAD) Hotline: 1-800-366-1655; 1-800-877-1600; www.eatright.org
- American Diabetes Association's Hotline 1-800-232-3472 or 1-800-342-2383 http://www.diabetes.org
- American Heart Association 1-800-AHA-USA; 1-800-242-8721 http://www.americanheart.org
- National Heart, Lung and Blood Institute (NHLBI), National Institutes of Health (NIH), *Your Guide to Lowering Your Blood Pressure with Dash*, http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/new_dash.pdf

4-H FOOD CHALLENGE TEAM WORKSHEET *- use back of sheet for additional space.*

Knowledge of MyPlate (Write the food and in what food group it belongs):		
Food	MyPlate	Number of servings needed each day

Nutrient Knowledge (Know what this dish contributes to the diet):		
Food	Nutrients/Vitamins	What do they do for my body?

Food Preparation (Know the steps in the preparation of the food):	
Steps	What was prepared/performed in this step?

Food Safety (List food safety concerns associated with this dish.):

Serving Size Information (Accurately calculate the cost of the dish and the cost per serving):		
Ingredient	Total cost of Ingredient	Cost per measurement
TOTAL:		
Total cost per serving:		