

# Nutrition

## The Six Essential Nutrients

### MACRONUTRIENTS—

#### 1. \_\_\_\_\_ (CHO)

- Most important energy source; \_\_\_\_\_ calories per gram; inexpensive
- \_\_\_\_\_% of total calories should come from CHO; 10% or less of total CHO should come from simple sugars
- Monosaccharides or “Simple Sugars”: Glucose, Galactose, Fructose
- Disaccharides: Maltose, Sucrose, Lactose
- Polysaccharides or “Complex CHO”
  - \_\_\_\_\_ and \_\_\_\_\_ in plants;
  - \_\_\_\_\_ in animals
  - Glycogen is the storage form of glucose found in skeletal muscle (approx. 350g) and the liver (90g)

#### 2. \_\_\_\_\_

- Lipids—generic term for all fats; \_\_\_\_\_ calories per gram
- \_\_\_\_\_% of calories should come from fat
- \_\_\_\_\_—storage tissue of fat
- Cholesterol—\_\_\_\_\_ (bad) vs. \_\_\_\_\_ (good)
- \_\_\_\_\_ (TG)—composed of glycerol and 3 fatty acids; glycerol base is the part broken off and converted to glucose for energy production:
  - *Saturated*—Each carbon has its full complement of \_\_\_\_\_; solid at room temperature; animal sources; hard to break down and increase blood cholesterol
  - *Monounsaturated*—\_\_\_\_\_ double bond missing, not completely full of hydrogen; liquid at room temperature; vegetable sources
  - *Polyunsaturated*—\_\_\_\_\_ double bonds missing; liquid at room temperature; vegetable sources; easiest to break down

#### 3. \_\_\_\_\_

- \_\_\_\_\_ important energy source; \_\_\_\_\_ calories per gram.
- \_\_\_\_\_% of total calories should come from protein (most people get more than RDA)
- Made up of amino acids:
  - \_\_\_\_\_ *Essential Amino Acids*—\_\_\_\_\_
  - \_\_\_\_\_ *Non-Essential Amino Acids*
- Critical for many functions (tissue growth and repair, antibodies, enzymes, etc) outside of energy; Note: *Time* eaten may be more important than *amount* eaten in terms of muscle/tissue repair

### Metabolism

- Chemical reactions that occur in an organism for the sake of energy production
- Two types:
  - \_\_\_\_\_—the decomposition of “stuff” in the body
  - \_\_\_\_\_—the synthesis of new “stuff” in the body

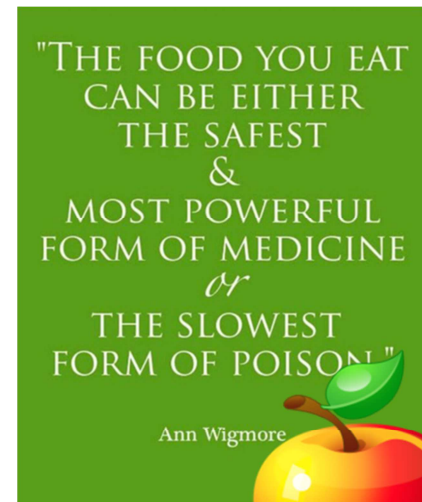
### Where Our Energy Goes

- \_\_\_\_\_% Basal Metabolic Rate or Resting Energy Expenditure (REE)
- 5-10% Thermal Effect of Food (digestion)
- \_\_\_\_\_% Physical activity
- A calorie is \_\_\_\_\_

### micronutrients—

#### 4. \_\_\_\_\_

- Vitamins aid various processes throughout the body and are particularly important for chemical reactions



- Can protect against oxidative damage (anti-oxidants) by capturing free radicals, thus reducing risk of cancer
- Two classes of vitamins:
  - \_\_\_\_\_ -Soluble Vitamins (difficult to overdose on); \_\_\_\_\_ vitamins and vitamin \_\_\_\_\_
  - \_\_\_\_\_ -Soluble Vitamins (risk of overdose is higher); vitamins \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ & \_\_\_\_\_

## 5. \_\_\_\_\_

- Act as *catalysts* for many chemical reactions; come from plant and animal food sources
- There are 24 minerals needed for good health, including Ca, Na, K, Mg, P, Cl, S and *trace minerals* (i.e. iron, iodine and copper)

### Neither a Macro- nor Micro- Nutrient

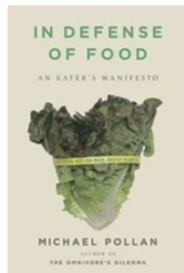
## 6. \_\_\_\_\_

- Necessary for chemical reactions (such as hydrolysis)
- The primary component of blood (plasma) and interstitial/cellular fluids
- Lubricates your joints (synovial fluid)
- Body temperature regulation (sweating)
- Maintains homeostasis
- Amount requirements vary from person to person; urine color (a pale yellow as opposed to clear or dark yellow/amber) and thirst are key indicators of hydration; when thirsty drink WATER
- Can live about \_\_\_\_\_ days without water (as opposed to ~\_\_\_\_\_ days without food)
- Dehydration may result in the following: muscle cramps, headaches, fatigue, decreased blood volume, constipation, poor complexion, stiff joints and hallucinations

### Eating Behaviors and Food Choices

*Influences:* People, Medical Needs, Geography, Occasions, Holidays, Culture, Mood, Time, Money, Advertising...the list goes on and on!

- You CAN eat cake, candy, French fries, etc.! You just need to keep it in *moderation*
- To improve your meals, try substituting healthier ingredients when preparing your favorite foods/ meals
- To manage how much you eat:
  - Eat enough food to cease hunger, not appetite
  - Know foods higher in fiber/protein combat hunger better than refined
  - Use a smaller plate or bowl
  - Have a glass of water or half a piece of fruit before a meal
  - Eat slowly (put your fork down between each bite)—It takes approximately \_\_\_\_\_ minutes for your brain to realize you are full
  - Prepackage your servings



### Michael Pollan's "Eating Guidelines":

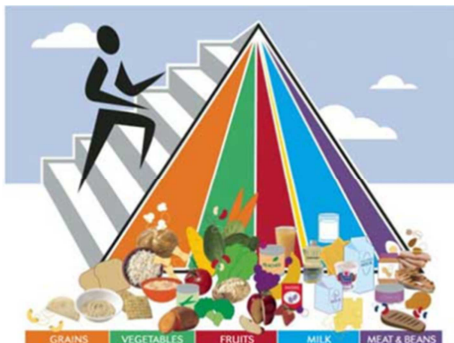
- "Don't eat anything your great grandmother wouldn't recognize as food"
- "Eat mostly plants, especially leaves"
- "You are what what you eat eats"
- "Eat wild foods when you can"
- "Pay more, eat less"
- "Do all your eating at a table"
- "Try not to eat alone"
- "Cook and, if you can, plant a garden"

### Dietary Guidelines: Friend or Foe?

*The Food Pyramid (USDA)—1992*

- Tried to emphasize groups on bottom as a "foundation" to a balanced diet
- One-size-fits-all serving suggestions; what constitutes a "serving"?
- Does not denote between "good" and "bad" fats/oils and carbohydrates

WARNING: Guidelines were influenced by the food industry



*MyPyramid (USDA)—2005*

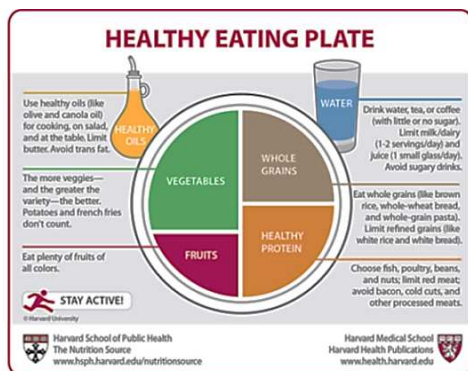
- Tried to get away from the cookie cutter food pyramid; more \_\_\_\_\_ based on age, sex, height, weight and activity level.

- Accounted for \_\_\_\_\_
- Too complicated for users to understand; lots of subtle nuances

WARNING: Guidelines also influenced by the food industry

### MyPlate (USDA)—2011

- Still avoids cookie-cutter; personalized
  - Emphasizes balancing calories
  - Enjoy food, but eat less
  - Avoid oversized portions
  - ½ your plate should be fruits and veggies
  - Drink fat-free or 1% milk
  - Make half of your grains, whole grains
  - Limit foods high in fat, sugar and sodium
  - Drink water instead of sugary drinks
  - Physical activity not emphasized
- WARNING: Still influenced by the food industry



### Healthy Eating Plate (Harvard School of Public Health)—2011

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- Based exclusively on the best available science; not subject to political/commercial pressure from food industry lobbyists

### Food Packaging: Claims & Terms

Claim/Term	Definition/Description
	The food is raw, unprocessed, contains no preservatives and has never been frozen or heated
	Calories have been reduced by at least 1/3, or the fat or sodium by at least ½
	The food contains 25% less of a nutrient or of calories than a comparable food
	Product contains no amount, or only trace amounts, of fat, cholesterol, sodium, sugars or calories
	Low in fat, saturated fat and limited amounts of cholesterol and sodium
	Minimally processed with no artificial or synthetic ingredients; no FDA definition, but working towards one
	No growth hormone/antibiotics used, produced without using most conventional pesticides, fertilizers with synthetic ingredients or sewage sludge, bioengineering, or ionizing radiation
	Proteins formed when white, rye, barley and/or crossbred hybrids of such grain flours are mixed with fluids and physically manipulated; to be considered “free,” product must contain less than 20 parts per million (ppm) gluten
	Chemically/enzymatically hydrogenated unsaturated fats; rarely found occurring naturally; <i>partially hydrogenated oils</i> are the major source in the food industry
	Genetically modified organism; an organism whose genetic material has been altered to achieve a particular goal



## Food Packaging: Nutrition Facts Label

- Established by the FDA; changed in June 2018
- \_\_\_\_\_ (RDA)—the amounts for various nutrients recommended to prevent deficiencies and excesses in most healthy people
- \_\_\_\_\_ (%DV)—per day for a 2,000C diet; <5%=low and >20%=high for a given nutrient

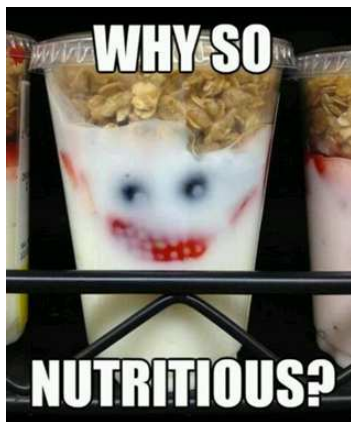
## Food Packaging: Ingredients List

- Ingredients are listed in order of weight (most to least); pay attention to the first 3-5 ingredients...are they sugar, fat, salt/sodium and/or unrecognizable ingredients?
- Can be used to determine if the product likely contains GMO's
- It can identify *hidden sugars* (high fructose corn syrup, dextrose, maltodextrin, etc.) and *trans fats* (partially hydrogenated canola oil); the nutrition facts label may be misleading regarding these ingredients
- Provides food additives—substances added to food intentionally to produce a desired effect:
  - \_\_\_\_\_ (i.e. gums, waxes, gelatins; hydrogenated)
  - \_\_\_\_\_ (i.e. vitamins, minerals, protein)
  - \_\_\_\_\_ (preservatives)
  - \_\_\_\_\_ (i.e. natural flavor, Red 4)
  - Control food's acidity (i.e. alkali)
  - Help age foods



## Investigating Food Packaging Worksheet Toolkit:

- % **Calories from Fat** (30% or less is recommended) =  $\text{Calories from Fat} \div \text{Total Calories}$
- Complex Carbohydrates** (or “Other Carbohydrates”; 50% or greater is recommended) =  $\text{Total Carbohydrates} - (\text{Sugars} + \text{Fiber})$
- % **Daily Values** are to add up to 100% for the day
- The table at the bottom of the nutrition label is *universal* to all foods and food products (not present on new label)
- Ingredients** are listed in order of amount/weight, greatest to least
- Potential **allergens** identified by the food company are bolded at the end of or beneath the ingredients list
- 1g **protein** or **CHO** = 4 calories; 1g **fat** = 9 calories
- GMO's** = any corn, soy, wheat, rice, etc. ingredient or derivative is likely a GMO unless the product is certified organic



**INGREDIENTS:** ENRICHED FLOUR (WHEAT FLOUR, NIACIN, REDUCED IRON, THIAMIN MONONITRATE [VITAMIN B<sub>1</sub>], RIBOFLAVIN [VITAMIN B<sub>2</sub>], FOLIC ACID), CORN SYRUP, SUGAR, SOYBEAN AND PALM OIL (WITH TBHQ FOR FRESHNESS), CORN SYRUP SOLIDS, DEXTROSE, HIGH FRUCTOSE CORN SYRUP, FRUCTOSE, GLYCERIN, CONTAINS 2% OR LESS OF COCOA (PROCESSED WITH ALKALI), POLYDEXTROSE, MODIFIED CORN STARCH, SALT, DRIED CREAM, CALCIUM CARBONATE, CORNSTARCH, LEAVENING (BAKING SODA, SODIUM ACID PYROPHOSPHATE, MONOCALCIUM PHOSPHATE, CALCIUM SULFATE), DISTILLED MONOGLYCERIDES, HYDROGENATED PALM KERNEL OIL, SODIUM STEAROYL LACTYLATE, GELATIN, COLOR ADDED, SOY LECITHIN, DATEM, NATURAL AND ARTIFICIAL FLAVOR, VANILLA EXTRACT, CARNAUBA WAX, XANTHAN GUM, VITAMIN A PALMITATE, YELLOW #5 LAKE, RED #40 LAKE, CARAMEL COLOR, NIACINAMIDE, BLUE #2 LAKE, REDUCED IRON, YELLOW #6 LAKE, PYRIDOXINE HYDROCHLORIDE (VITAMIN B<sub>6</sub>), RIBOFLAVIN (VITAMIN B<sub>2</sub>), THIAMIN HYDROCHLORIDE (VITAMIN B<sub>1</sub>), CITRIC ACID, FOLIC ACID, RED #40, YELLOW #5, YELLOW #6, BLUE #2, BLUE #1.

## Key

- Green** = probable GMO
- Yellow** = added nutrients
- Blue** = color additive
- Red** = texture additive
- Purple** = preservative additive
- Orange** = acid control additive
- Pink** = flavor additive
- Red Circle** = trans fat
- Blue Circle** = hidden sugar

## Nutrition Facts

8 servings per container

**Serving size** 2/3 cup (55g)

**Amount per serving**

**Calories** 230

% Daily Value\*

**Total Fat** 8g 10%

Saturated Fat 1g 5%

Trans Fat 0g

**Cholesterol** 0mg 0%

**Sodium** 160mg 7%

**Total Carbohydrate** 37g 13%

Dietary Fiber 4g 14%

Total Sugars 12g

Includes 10g Added Sugars 20%

**Protein** 3g

Vitamin D 2mcg 10%

Calcium 260mg 20%

Iron 8mg 45%

Potassium 235mg 6%

\* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

## Nutrition Facts

About X servings per container

**Serving size** 3/4 cup (55g)

**Amount per serving**

**Calories** 210

% Daily Value\*

**Total Fat** 5g 7%

Saturated Fat 0.5g 3%

Trans Fat 0g

Polyunsaturated Fat 1.5g

Monounsaturated Fat 2.5g

**Cholesterol** 0mg 0%

**Sodium** 160mg 7%

**Total Carbohydrate** 39g 14%

Dietary Fiber 5g 19%

Total Sugars 8g

Incl. 5g Added Sugars 9%

**Protein** 5g

Vitamin D 2mcg 10%

Calcium 20mg 0%

Iron 16.2mg 90%

Potassium 190mg 4%

Vitamin A 40%

Thiamin 30%

Riboflavin 30%

Niacin 30%

Vitamin B6 30%

Folate 200mcg DFE 50%  
(120mcg folic acid)

Vitamin B12 50%

Phosphorus 15%

Magnesium 10%

Zinc 30%

\* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

### Grocery Shopping with Michael Pollan:

- "Avoid food products that make health claims"
- "Shop the peripheries of the supermarket and stay out of the middle"
- "Get out of the supermarket whenever possible"
- "Avoid food products containing ingredients that are:
  - \_\_\_\_\_
  - \_\_\_\_\_
  - more than \_\_\_\_\_ in number or include
  - \_\_\_\_\_ and other hidden forms of refined sugars"

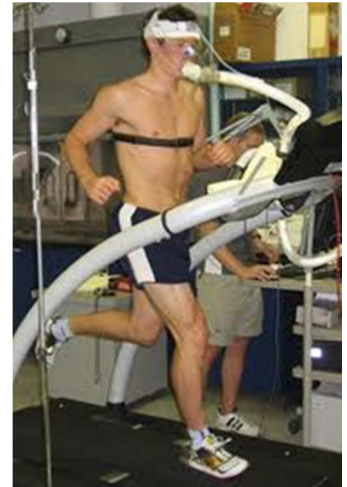
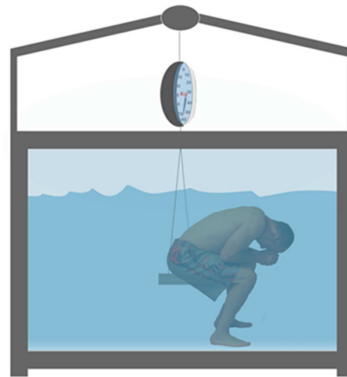
**Ingredients:** Whole Grain Wheat, Cane Sugar, Whole Grain Rolled Oats, Pecans, Wheat Flour, Malted Barley Flour, Rice Flour, Expeller Pressed Canola Oil, Salt, Rice Syrup, Molasses. BHT added to preserve freshness.

**Vitamins and Minerals:** Reduced Iron, Zinc Oxide, Niacinamide (Vitamin B3), Pyridoxine Hydrochloride (Vitamin B6), Vitamin A Palmitate, Riboflavin (Vitamin B2), Thiamin Mononitrate (Vitamin B1), Folic Acid, Vitamin B12, Vitamin D3.

**CONTAINS WHEAT AND PECANS.**

## Good Measures of Health/Fitness

- \_\_\_\_\_
- Basic Medical Diagnostics:
  - \_\_\_\_\_
  - \_\_\_\_\_
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## Fad Diets

- Atkin's Diet, South Beach Diet, Grapefruit Diet, Liquid Diet, Cereal Diet, Cabbage Diet, dietary programs, supplements, starvation, etc...
- Reasons fad diets don't work and/or aren't healthy: \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

## The *AMAZING* "Secret" Diet

How to lose FAT weight *healthfully*...

- \_\_\_\_\_ caloric intake and \_\_\_\_\_ caloric expenditure (i.e. if you eat 2,000 calories, burn 2,500+ to utilize stored glycogen and fat)
- Modify personal eating behaviors (see "Eating and Food Choices" section)
- Choose mono-/poly- unsaturated fats, limit saturated fats and avoid trans fats
- Remain hydrated by drinking W-A-T-E-R (*aim* for a pale yellow urine color)
- Do \_\_\_\_\_ activities mixed with some strength training (more muscle means more calories can be burned)
- The rule of thumb for weight loss/gain is to lose/gain no more than \_\_\_\_\_ pounds a week