



Your Brain Fueled & Fooled by Food

Nutrition

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What is a 'diet'?

Common definition:

- A special course of food to which one restricts oneself, either to lose weight or for medical reasons

For our purposes:

- The kinds of food that a person, animal, or community habitually eats

This is not a 'diet' class!

Overnutrition and undernutrition

Obesity is a growing concern in the U.S. and contributes to a multitude of health problems including:

- **Diabetes: \$247 billion a year**
- Heart disease
- Metabolic syndrome
- Stroke

Underweight:

- Weak immune system
- Fragile bones
- Feeling tired
- Reproductive

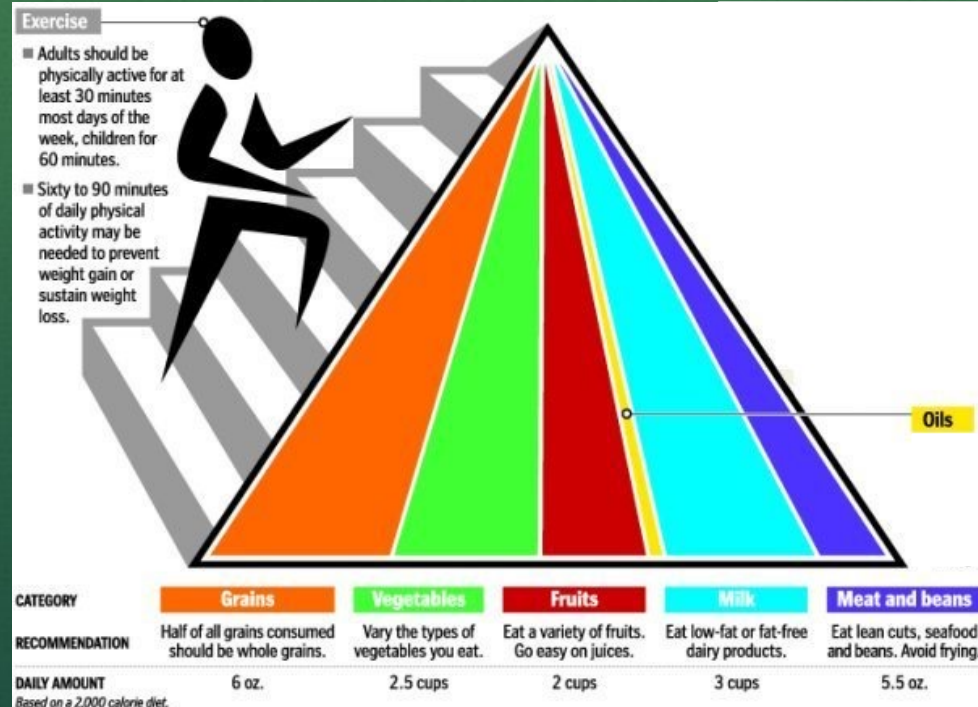
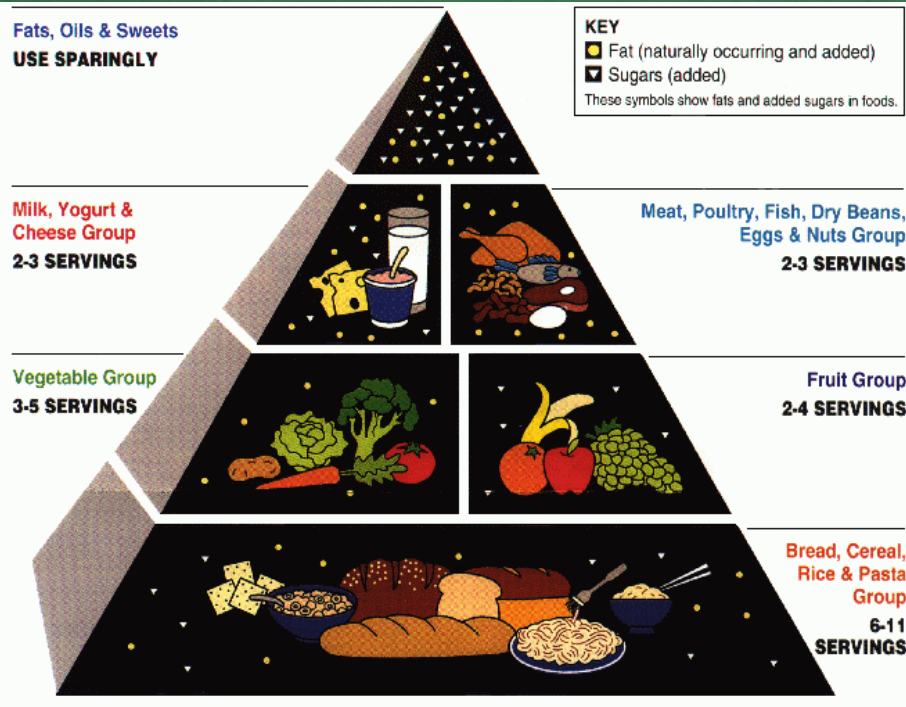


Macronutrients

- Sugar (16 calories/teaspoon)
- Fats (36 calories/teaspoon)
- Protein (16 calories/teaspoon)

Fats aren't bad! They're just calorically dense

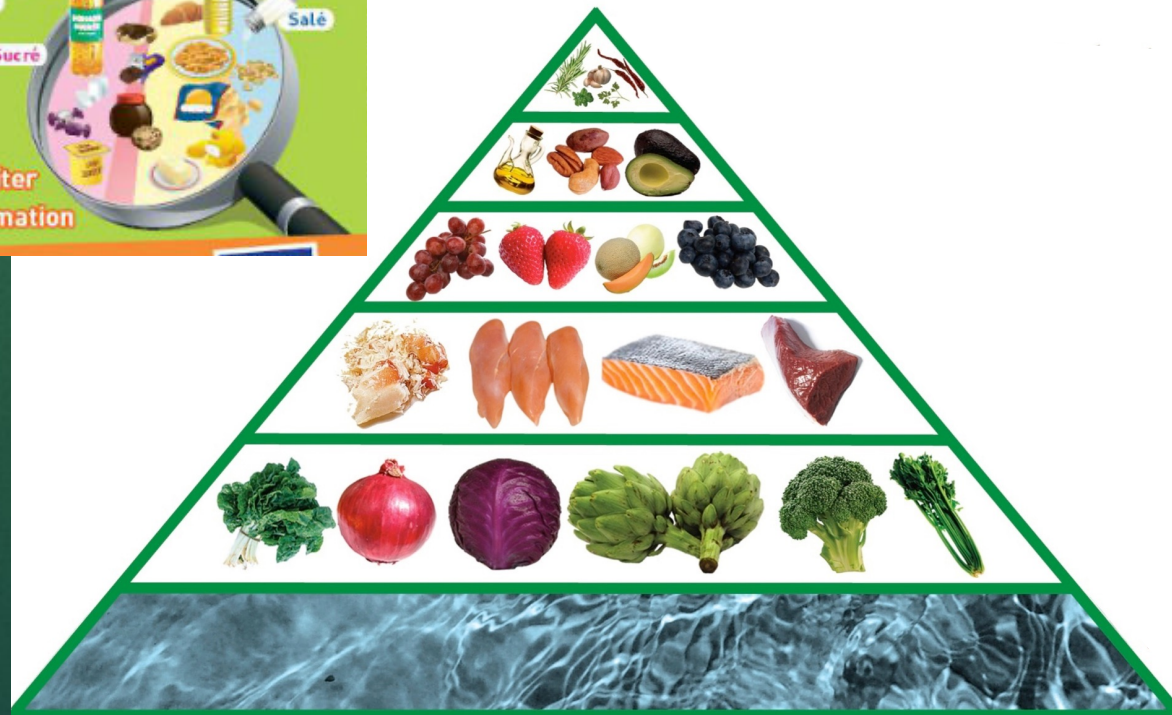
Food Pyramid Old vs. New



Alternative Food Pyramids



Paleo



Do we actually know anything!?

Time of Day?

- Different foods at different times of day?

Lunch!

What is Sugar?



- Carbohydrate (simple vs complex)
- Our Body uses sugar for energy (Fast energy)
- Body stores energy we do not need (fat and glycogen)
- Can come from plants, trees, honey
- Natural vs Artificial



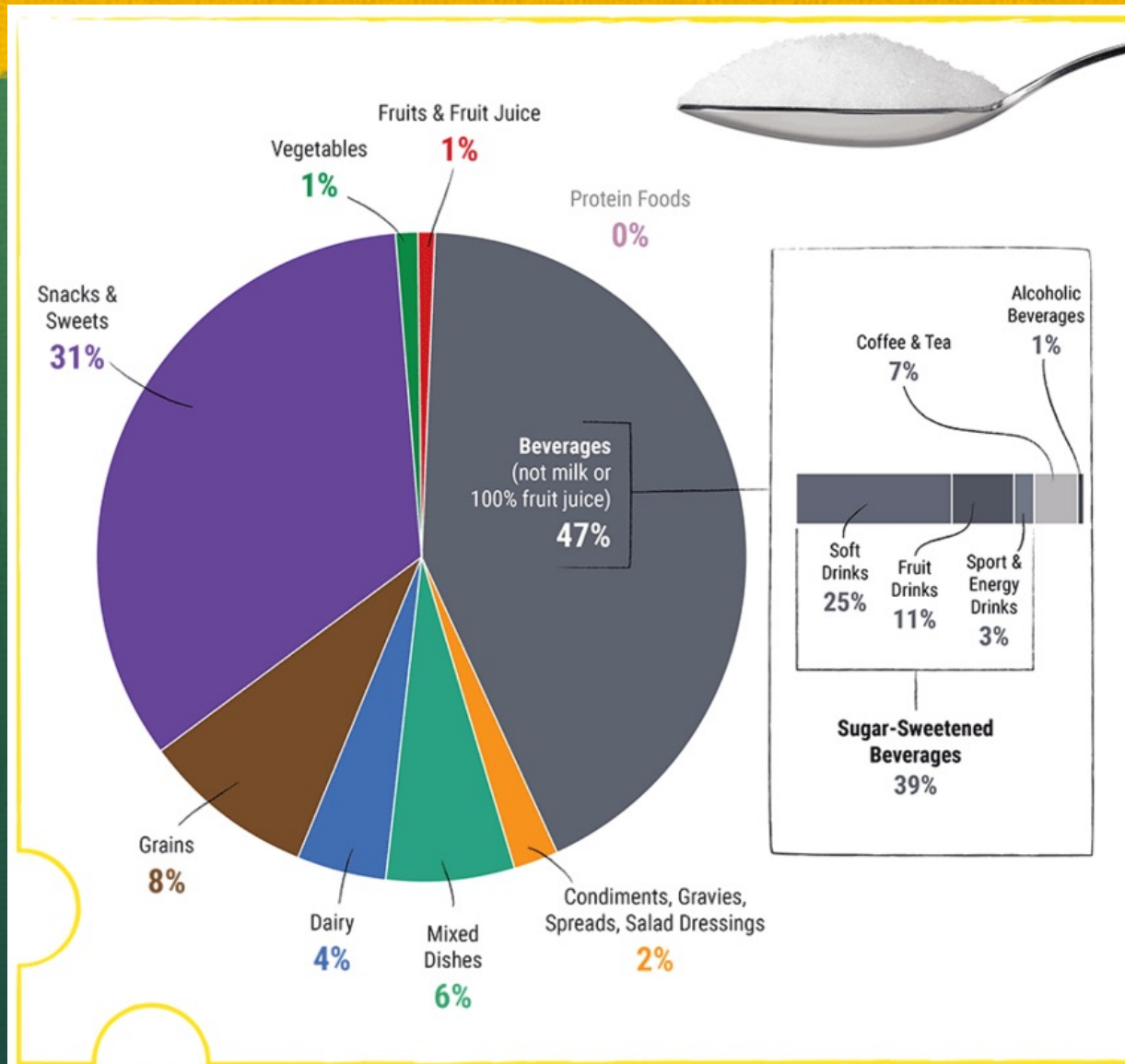
Artificial Sweeteners



- Extremely sweet tasting (Splenda - 600x sweeter, Stevia- 200x sweeter)
- Sweet taste increases appetite; encourage sugar cravings (addictive)
- Only partial activation of “reward pathways” in the brain
- Rats on sweeteners have increased energy intake
- Sweeteners increase blood sugar (mice)
 - **Almost diabetic!**
- Changes gut bacteria



Food Category Sources of Added Sugar in US Population Ages 2 years and Older



Activity: Guess How Much Sugar?

Guess how many teaspoons of sugar in each food

1 sugar cube = 1 teaspoon of sugar (16 calories)

- Banana (1 whole)
- Celery (1 large stalk)
- Clif Bar(1 bar)
- Regular Coke (20 ounces)
- Orange Juice (8 ounces)
- Red Bull (8.4 ounces)
- Almonds (1 ounce)
- M&Ms (1 serving)
- Green Tea Frapp (24 ounce)



Activity: How Much Sugar?

How much Sugar?

- How close were you?
- Which foods have 'added' sugar?
- Anything surprising?

Food	Sugar (tsp)
Banana	6.4
Celery	0.5
Clif Bar	5.2
Regular Coke	15.5
Orange Juice	6.2
Red Bull	6.7
Almonds	1.4
M&Ms	8.1
Mega Big Gulp	58.7
Green Tea Frapp	21.7

What is Fat?

- Concentrated energy source
- Necessary for our body to use many micronutrients
- Makes up cell walls
- Used to make hormones
- Many types:
 - Cholesterol
 - Omega's (essential)
 - Unsaturated
 - Saturated
 - Trans



Cholesterol

Foods High in Cholesterol



Beef brain



Chicken liver



Egg yolk



Shrimps



Cheeseburger

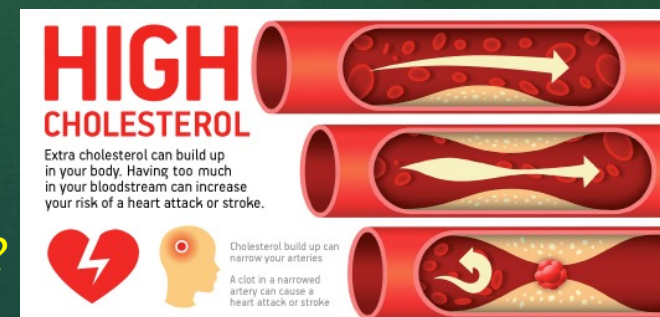


Chicken legs

Is cholesterol bad for you?

- Good cholesterol (HDL) vs 'Bad' cholesterol (LDL)
 - even more complicated than this...
- Necessary for hormone production
- Dietary cholesterol is NOT a major contributor to blood cholesterol level (liver produces 75%)
- Excess sugar:
 - Liver converts to triglycerides (unhealthy fat)
 - Triglycerides are converted to bad LDL

What is the major dietary contributor to blood cholesterol?



What is Protein?

- Fuel source (very inefficient)
- String of one or more 'amino acids'
- Building blocks of life:
 - Muscles
 - Collagen (tissue structure)
 - Cells
 - Neurotransmitters



Amino acids (protein source)

- 22 different types of amino acids
- 'Complete' protein
- Protein Sources:
 - Meat (Fish, chicken/turkey, beef, pork)
 - Eggs
 - Dairy (cottage cheese, milk, yogurt)
 - Oats
 - Legumes (soybeans, lentils, black beans)
 - Nuts and seeds (almonds, pumpkin, peanuts)
 - Vegetables (Spinach)

Caloric Calculations

<u>Food</u>	<u>Calories</u>	<u>Carbs (g)</u>	<u>Fat (g)</u>	<u>Protein (g)</u>
Banana	?	27	0.4	1.3
Celery	?	1.9	0.1	0.4
Clif Bar	?	44	5	10
Regular Coke	?	65	0	0
Orange Juice	?	26	0.5	1.7
Red Bull	?	28	0.2	0.6
Almonds	?	6	14	6
M&Ms	?	34	10	2
Mega Big Gulp	?	220	0	0

Calories Per Gram:

Carbs/Sugar (4 Cal)
 Fat (9 Cal)
 Protein (4 Cal)

$$(4 \text{ Calories} \times \text{Carbs (g)}) + (9 \text{ Calories} \times \text{Fat (g)}) + (4 \text{ Calories} \times \text{Protein (g)}) = \text{Total Calories}$$

24oz Tazo Green Tea Crème Frappuccino (Starbucks)

$$(4 \text{ Cal} \times 91 \text{ Carbs (g)}) + (9 \text{ Cal} \times 18 \text{ Fat (g)}) + (4 \text{ Cal} \times 8 \text{ Protein (g)}) = \text{Total Calories}$$

$$(4 \times 91) + (9 \times 18) + (4 \times 8) = \text{Total Calories}$$

$$(364 \text{ Sugar Calories}) + (162 \text{ Fat Calories}) + (32 \text{ Protein Calories}) = \text{Total Calories}$$

$$32 + 364 + 162 = 558 \text{ Total Calories}$$

Caloric Calculations

Food	Calories	Carbs (g)	Fat (g)	Protein (g)
Banana	105	27	0.4	1.3
Celery	10	1.9	0.1	0.4
Clif Bar	250	44	5	10
Regular Coke	240	65	0	0
Orange Juice	111	26	0.5	1.7
Red Bull	117	28	0.2	0.6
Almonds	163	6	14	6
M&Ms	240	34	10	2
Mega Big Gulp	928	246.4	0	0
Green Tea Frapp	550	91	18	8



Which food is the most balanced or most nutritious?

What are micronutrients?

- Vitamins (organic)
- Minerals (inorganic)
- Phytochemicals (active plant compounds)
- Microorganisms (bacteria)

Vitamins

- Vitamin A (Vision, bone growth, healthy skin)
- Vitamin B (metabolism)
- Vitamin C (bones, blood vessels, and skin)
- Vitamin D (Sunlight, SAD)
- Vitamin E (antioxidant, may prevent Alzheimer's)
- Vitamin K (blood clotting)

Vitamins

	Solubility	Importance	Source?
Vitamin A	Fat	Vision, healthy skin, lower lung cancer risk, antioxidant	Retinoids: beef, liver, eggs, fish, cheese B-Carotene: sweet potatoes, carrots, pumpkin, spinach, mangos
Vitamin B (1-12)	Water	Metabolism, healthy skin, brain, muscle, blood, sleep, appetite, mood	Meat, fish, cheese, eggs, soybeans, potatoes, legumes
Vitamin C	Water	antioxidant, immune system, collagen, certain cancers	Peppers! Oranges, lemons, kale, broccoli
Vitamin D	Fat	Bone strength,	Sunlight! Fatty fish, fortified milk and cereals
Vitamin E	Fat	antioxidant	Plant oils, spices, almonds
Vitamin K	Fat	blood clotting	Cabbage, liver, spinach, kale, sprouts (Gut bacteria make half of requirements)

Important and comes from a range of foods

Where is lettuce?

Minerals

- Calcium
- Chloride
- Chromium
- Copper
- Fluoride
- Iodine
- Iron
- Magnesium
- Manganese
- Molybdenum
- Phosphorus
- Potassium
- Selenium
- Sodium
- Sulfur
- Zinc



Does a big gulb have vitamins and minerals?

Phytonutrients

- Over 4,000!!! Other nutrients found in plants
 - Enzymes, flavinoids, sulfides....
- Anthocyanins (Dark colored fruits and vegetables)
 - Anti-cancer, anti-aging, brain health, body repair

- Blueberries
- Dark grains
- Broccoli sprouts
- Sweet potatoes
- Spinach
- Kale



Microorganisms

- Dark chocolate (prebiotic and probiotic)
- Yogurt
- Kimchi
- Kombucha
- Kefir
- Miso Soup



Take Away Message? EAT EVERYTHING!



Avoid the isles at the grocery store ;)

