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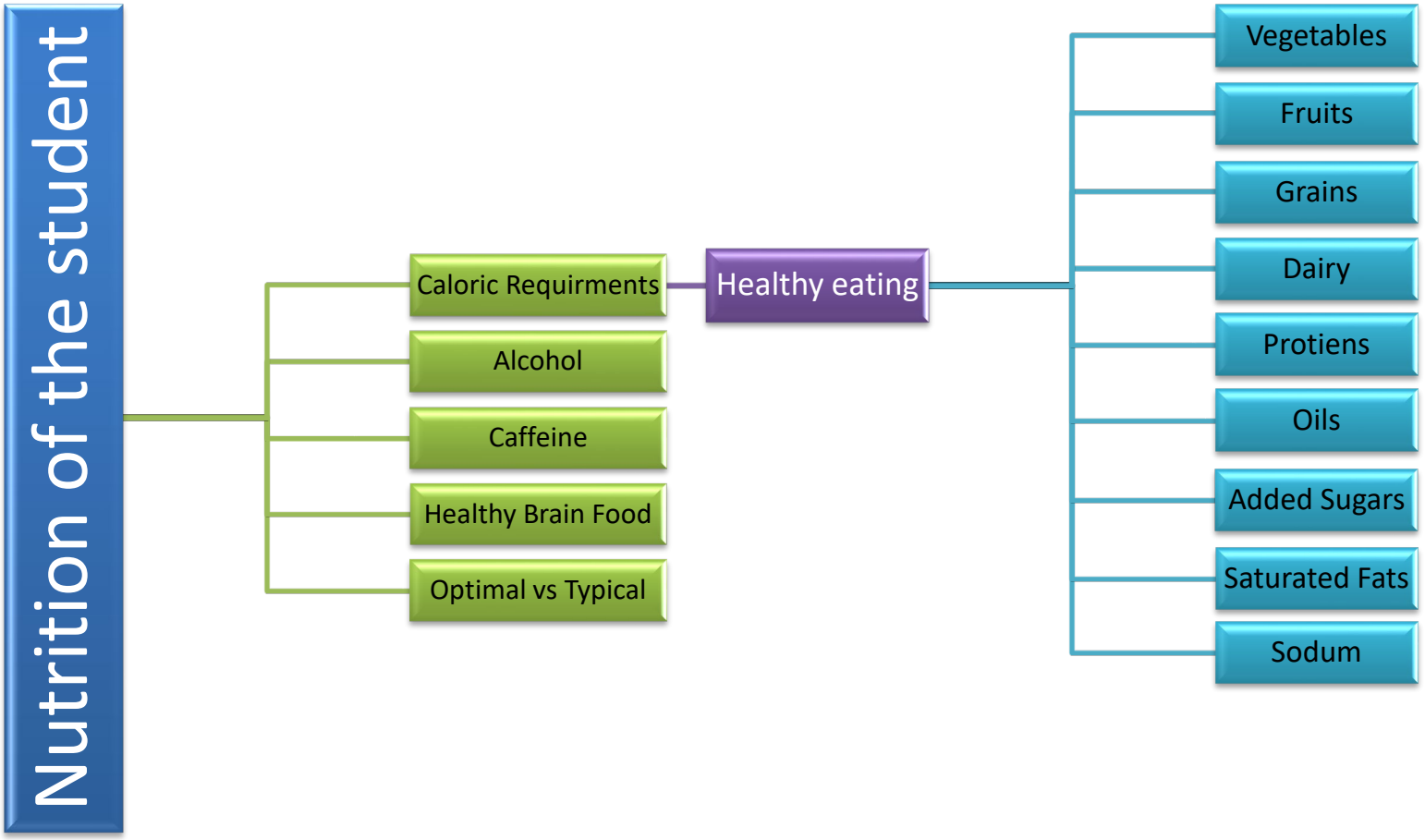
Wellness 4A: Nutrition for the Student



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NUTRITION FOR THE STUDENT

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NUTRITION FOR THE STUDENT: UNIT OBJECTIVES

The desired outcome of this unit is for students to learn various nutritional facts, proper diets of nutrition, and planning for specific activities in a student cadet's life.

Plan of Action:

1. Understand caloric requirements for sustainment
2. Define and apply estimated energy requirements (EER).
3. Define Basal Metabolic Rate (BMR)
4. Compare and contrast and apply macronutrients and micronutrients.
5. Define carbohydrates, simple and complex carbohydrates.
6. Apply Recommended Dietary Allowance (RDA)
7. Understand empty calories and apply steps to avoid them
8. Understand and apply the FIT nutrition model, and its role in “meal prepping”
9. Compare the difference between a portion and a serving size
10. Define and give examples of the 6 sub-categories of vegetables.

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NUTRITION OF THE STUDENT: UNIT OBJECTIVES

11. Express reasons why vegetables are difficult for an individual to have in their daily diet.
12. Define nutrient-dense foods
13. Apply the difference between hypokalemia and hypokalemia.
14. Understand the chemical grains become in the digestion process
15. Understand and define the key vitamins/minerals grains contain
16. List the similarities and differences of whole grains, refined grains, and enriched refined grains
17. Understands dairy products chemical contents
18. Define probiotics and prebiotics give examples of where to find each.
19. Understand vitamins/minerals found in dairy products
20. Understand proteins roles in body functions/body chemistry

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NUTRITION OF THE STUDENT: UNIT OBJECTIVES

21. Explain nonessential amino acids, essential amino acids, and amino acids role/functions in the body
22. Express where to find proteins in various foods.
23. Understand various nutrients found in oils
24. Define and understand the roles of sugars, glucose, isomers, cellulose, disaccharides, polysaccharides, and glycogen
25. Understand and explain in relative terms type 1 diabetes, type 2 diabetes, hyperglycemic, and hypoglycemic.
26. Compare and contrast saturated and unsaturated fats.
27. Identify two types(subtypes) of trans fats
28. Relate sodium's role to hypertension
29. Understand sodium's overall role in body chemistry
30. Understand and apply blood pressure classification levels to their identifications.

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NUTRITION OF THE STUDENT: UNIT OBJECTIVES

31. Define alcohol
32. Explain why alcohol is a psychoactive drug.
33. Explain and relate the Brain Blood Barriers (BBB) roles with alcohol
34. Evaluate the outcome information on alcohol abuse, alcoholism, fetal alcohol syndrome, and cirrhosis.
35. Explain the combination of energy drinks and alcohol
36. List issues and prospective positives caused by caffeine use
37. List and explain various brain foods for large concentration days or events
38. Explain with reason why aspartame is possibly dangerous
39. Define adenosines triphosphate (ATP)
40. Discuss and reason optimal vs typical health perspectives or dietary intakes.

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NUTRITION OF THE STUDENT : CALORIC REQUIREMENTS FOR A STUDENT

Objectives: Cadets will be able to

- Understand caloric requirements for sustainment
- Define and apply estimated energy requirements (EER).
- Define Basal Metabolic Rate (BMR)
- Compare and contrast and apply macronutrients and micronutrients.
- Define carbohydrates, simple and complex carbohydrates.

Essential Question:

How do we use scientific systems of caloric intake?

CALORIC REQUIREMENTS FOR A STUDENT

- **Estimated Energy Requirements (EER)** are equations that are used to predict energy maintenance factoring in height, weight, age, and sex.
- **Basal metabolic rate (BMR)** is the rate of the energy expenditure (calories burned) of a person after they have slept for 8 hours and fasted for 12 hours in the supine (laying down) position in a hospital or laboratory setting, essentially it's the "do nothing" but breathe for 16 hours metabolic rate.
- **Resting Metabolic rate (RMR)** is a test that is the same test except it does not require the patient to stay at the hospital because the values were identical
- **Macronutrients** are types of food that provides the energy that is required in our diet. The three basic categories of macronutrients are fats, carbohydrates, and proteins.

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CALORIC REQUIREMENTS FOR A STUDENT

Table A2-1. Estimated Calorie Needs per Day, by Age, Sex, and Physical Activity Level

MALES

AGE	Sedentary[a]	Moderately active[b]	Active[c]
11	1,800	2,000	2,200
12	1,800	2,200	2,400
13	2,000	2,200	2,600
14	2,000	2,400	2,800
15	2,200	2,600	3,000
16	2,400	2,800	3,200
17	2,400	2,800	3,200
18	2,400	2,800	3,200
19-20	2,600	2,800	3,000
21-25	2,400	2,800	3,000
26-30	2,400	2,600	3,000
31-35	2,400	2,600	3,000
36-40	2,400	2,600	2,800
41-45	2,200	2,600	2,800
46-50	2,200	2,400	2,800
51-55	2,200	2,400	2,800

FEMALES[d]

AGE	Sedentary[a]	Moderately active[b]	Active[c]
11	1,600	1,800	2,000
12	1,600	2,000	2,200
13	1,600	2,000	2,200
14	1,800	2,000	2,400
15	1,800	2,000	2,400
16	1,800	2,000	2,400
17	1,800	2,000	2,400
18	1,800	2,000	2,400
19-20	2,000	2,200	2,400
21-25	2,000	2,200	2,400
26-30	1,800	2,000	2,400
31-35	1,800	2,000	2,200
36-40	1,800	2,000	2,200
41-45	1,800	2,000	2,200
46-50	1,800	2,000	2,200
51-55	1,600	1,800	2,200

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CHECK ON UNDERSTANDING

1. What does EER stand for?
2. According to the table, moderate exercising females and males at 16 have the same caloric need (T/F)
3. Basal metabolic Rate and Resting Metabolic Rate are not the same test; what makes them different?

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NUTRITION OF THE STUDENT: HEALTHY EATING PATTERNS FOR A STUDENT

Objectives:

Cadets will be able to

- Define carbohydrates, simple and complex carbohydrates.
- Apply Recommended Dietary Allowance (RDA)
- Understand empty calories and apply steps to avoid them
- Understand and apply the FIT nutrition model, and its role in “meal prepping”
- Compare the difference between a portion and a serving size

Essential Question:

How do intake amounts (caloric, and physical amounts) have precise outcomes?

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HEALTHY EATING PATTERNS FOR A STUDENT

- **Carbohydrates** are the body's main source of energy
  - there are two types simple and complex.
- **Simple carbohydrates** are sugars, including basic table sugar, fructose sugar from fruit, and sucrose, mostly found in soft drinks, they are the quick fuel.
- **Complex carbohydrates** are carbohydrates that take longer to digest because their chemical structure is harder to break down, such as bread, beans, and vegetables.
- **Micronutrients** are items that the body needs smaller amounts of such as vitamins and minerals.

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HEALTHY EATING PATTERNS FOR A STUDENT

- **Dietary Reference Intake (DRI)** designates the recommended amounts of micronutrients needed to be consumed.
- **Recommended Dietary Allowance (RDA)** tells us the minimum amount of nutrients to maintain and meet the health needs of most people.
- **Adequate Intake (AI**) is commonly used when the RDA of a micronutrient is not sufficient.
- **Tolerable Upper Intake Level (UL)** is the maximum number of a vitamin or mineral that can be consumed without causing a health risk

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HEALTHY EATING PATTERNS FOR A STUDENT

empty calories are foods that are full of simple carbohydrates like candy, pastries, and sugary soft drinks

HEALTHY EATING PATTERNS FOR A STUDENT

FIT formula for nutrition.

- **Frequency**, eating three meals a day with planned snacks.
- **Intensity** the calories are measured to its relative amount and balancing the 5 food groupings.
- **Time** matching the intervals of a regular schedule in spacing them out morning, noon, and evening.

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HEALTHY EATING PATTERNS FOR A STUDENT

- A **portion** is the amount of food on the plate. It can be under or over the recommended serving.
- A **serving** is what is recommended for each component of food as shown in

TABLE 16.3 Recommended Number and Size of Servings

	Calorie range			
Food group	<2,200	2,200–2,800	>2,800	Serving size examples
Grain	6 servings	9 servings	11 servings	1 slice bread; 1/2 cup cooked cereal, rice, or pasta; 1 cup cold cereal; 1/4 cup wheat germ; 1 6-in. (15 cm) tortilla
Vegetable	3 servings	4 servings	5 servings	1 cup raw leafy vegetables, 1/2 cup other vegetables (chopped or cooked), 3/4 cup vegetable juice, 1/2 cup cooked vegetables
Fruit	2 servings	2 or 3 servings	3 or 4 servings	1 orange, 3/4 cup fruit juice, 1 cup cooked fruit
Dairy	2 or 3 servings	2 or 3 servings	2 or 3 servings	1 cup milk or yogurt, 1 1/2 cups ice cream, 1 1/2 oz. (43 g) cheese
Protein	2 servings	3 servings	3 servings	2–3 oz. (57–85 g) cooked meat, poultry, or fish; 1/2 cup cooked dried beans; 2 tbsp. peanut butter; 1/4 cup nuts or seeds; 1 whole egg

More information about servings of specific foods is available in the student section of the Fitness for Life website.

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CHECK ON UNDERSTANDING

1. Define the FIT Formula as it relates to nutrition.
2. What is the academic word for quick fuel?
3. _____ are found in pastries and soft drinks.

NUTRITION OF THE STUDENT: VEGETABLES

Objectives:

Cadets will be able to

- Define and give examples of the 6 categories of vegetables.
- Express reasons why vegetables are difficult for an individual to have in their daily diet.

Essential Question:

How are vegetables crucial to human body chemistry and overall health?

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Vegetables

There are 6 categories of Vegetable:

- **Dark green** vegetables are veggies such as broccoli, spinach, and kale
- **Orange** vegetables are items like carrots, butternut squash, pumpkin, and tomatoes
- **Dried peas** are the various peas such as black-eyed peas, chickpeas, and green peas
- **Beans** are a type of protein but are still a vegetable, some examples of those are, black beans, pinto beans, and kidney beans
- **Starchy** vegetables are potatoes, corn, yams, and sweet potatoes
- The **other** category for vegetables is a compilation of various veggies, such as onions, artichokes, celery, cucumbers, and many others

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Vegetables
Eating Vegetables are difficult

- **Taste/texture:** some people simply dislike the taste or texture of certain vegetables
- **Economics:** accessing fresh veggies is hard due to stores not carrying quality produce, or the money it costs to buy fresh veggies
- **Food experiences:** individuals may have had a negative interaction with some or all veggies as a younger child
- **Habits:** people will not eat veggies because it's not part of their daily routine
- **Culture:** can play a part in the type or amount of vegetables in someone's diet

Vegetables
Eating Vegetables are difficult (cont.)

- **Geography:** where the person may live, there are no fresh vegetables
- **Advertising:** the media does not promote healthy eating
- **Social factors:** the individual has not enjoyed that particular item because of how someone else prepared them
- **Health concerns:** food allergies and digestive impacts
- **Emotions:** stress may affect the overall eating habits
- **Green food/sustainability:** even though it is a vegetarian diet base, the cruelty-free element makes some vegetables inaccessible for those who follow that ideal, due to them being grown using animal products

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CHECK ON UNDERSTANDING

1. List 3 reasons why choosing vegetables may be difficult?
2. All vegetables are carbohydrates? (T/F)
3. Which category of vegetables has more varieties?

NUTRITION OF THE STUDENT: FRUITS

Objectives:

Cadets will be able to

- Define nutrient-dense foods
- Apply the difference between hypokalemia and hypokalemia.

Essential Question:

How is body chemistry dependent on elements found in fruits?

Fruits

Nutrient-dense foods are considered the opposite of empty calorie foods, meaning they are full of vitamins and minerals. Fruits in diet have been found to be a factor in brain health, improving cognitive function.

- Some fruits are high in water content, sometimes containing between 80%-99% of water. Examples are watermelons, cantaloupes, strawberries, apples, grapes, oranges, pears, and pineapples




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Fruits
Potassium & Body Chemistry

Potassium is an element which is needed for the human body to function, impacting the body systems that involve the kidneys, blood plasma, and intracellular fluid. An imbalance of potassium can cause issues such as muscle weakness, cramps, breathing issues, and constipation.

- **Hypokalemia** is an insufficient amount of potassium in the body. Too little or too much potassium can cause the heart to abnormally contract, leading to death.
- **Hyperkalemia** is high levels of potassium in the blood, usually disrupting the electrical impulses and signals and mostly a result of a kidney dysfunction.

Potassium can be found in fruits like bananas, apples, and apricots

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CHECK ON UNDERSTANDING

1. What is the difference between Hyperkalemia and Hypokalemia?
2. Nutrient-dense is the opposite of empty-calorie (T/F)
3. What is the largest component of fruits like watermelons, apples, and pears?

NUTRITION OF THE STUDENT: GRAINS

Objectives:

Cadets will be able to

- Understand the chemical grains become in the digestion process
- Understand and define the key vitamins/minerals grains contain
- List the similarities and differences of whole grains, refined grains, and enriched refined grains

Essential Question:

How are different types of grains needed for overall health and what are the benefits of each?

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Grains

- Grains are the most well-known carbohydrate
- Whole grains are considered a nutrient-dense type of food
- Whole grains are usually high in potassium
- Grains are full of starch molecules, turning into glucose in the body.
- The starches turn into chains and there two different chains
  - **amylose** contains hundreds of glucose units
  - **amylopectin** contains thousands of glucose units

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Grains
Vitamins and Minerals

The following minerals and vitamins are laid out by function:

- **Zinc's** major functions include protein along with DNA production, healing wounds, boosting the immune system, and assisting in growth.
- **Iron** is carries oxygen and supports in energy production
- **Magnesium** produces protein, aiding in muscle contraction and nerve transmissions.
- **Niacin** is a vitamin that assists in energy metabolism

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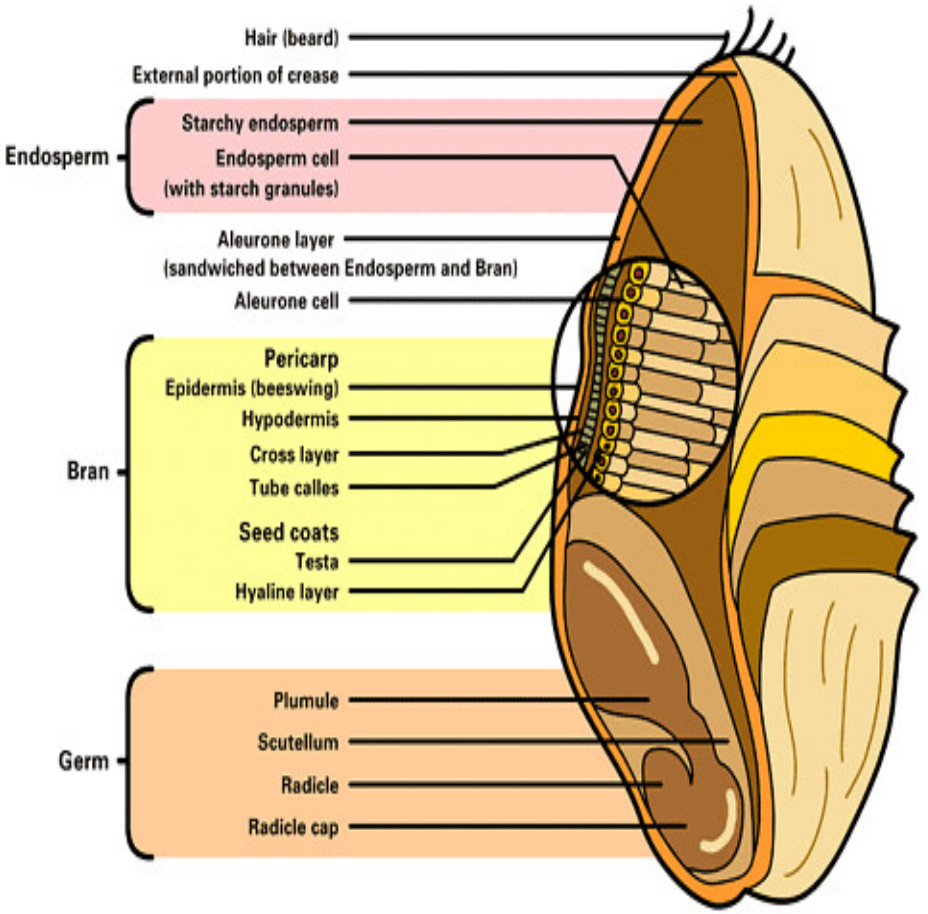
Grains
Anatomy of Grains

- **Whole grains** are comprised of grains with whole kernels.
- Anatomy of grain is defined by the
  - **bran** (outside/shell)
  - the **germ**(the innermost segment),
  - the **endosperm** (the largest inside portion)
- These are items like oatmeal, buckwheat, whole cornmeal, quinoa, and brown rice.



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CHECK ON UNDERSTANDING

1. What are the three structures in the grain anatomy?
2. Which are healthier, refined grains or enriched refined grains?
3. Grains turn into _____ in the body to be used as fuel.

NUTRITION OF THE STUDENT: DAIRY

Objectives:

Cadets will be able to

- Understand dairy products' chemical contents
- Define probiotics and prebiotics and give examples of where to find each
- Understand vitamins/minerals found in dairy products

Essential Question:

How are dairy products in various forms essential to intake of elements that are connected to the body's functioning?

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Dairy

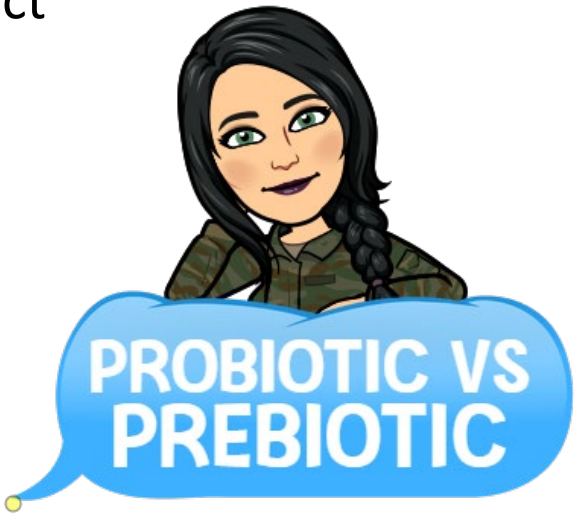
- Dairy is an important component of maintaining overall health and body chemistry
- All dairy contains **lipids,** which are fatty acids
- There are three types of lipids:
  - **triglycerides** make up 95% of lipids ingested, found in fried food, cheeses, whole milk, and vegetable oil
  - **phospholipids** only makes up 2% of lipids found in foods, and their job is to enclose fat cells while in transport through the bloodstream
  - **sterols** are the least common but the most known lipid because their full name is cholesterol and their major function is producing sex hormones (testosterone, estrogen, etc.), vitamin D, and bile salts.

Dairy

Some dairy products have things called probiotics and prebiotics

Both are considered good/friendly bacteria that aid digestion

- **Probiotics** are lactic acid bacteria, also known as lactobacilli. They are added as a live culture bacteria to food items that go through a fermentation process, such as yogurt and Kefir
- **Prebiotics** are soluble fibers that fuel the growth of select bacteria to grow in the large intestinal tract



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Dairy

Dairy is full of vitamins and minerals the body needs to maintain function.

- **Calcium** the chemical element that builds and maintains bones, aids in blood clotting, and aids in muscular and nerve functions.
- **Phosphorous** aids in the maintenance of teeth and bones, and supports the release of energy from nutrients.
- **Vitamin B_2** also known as riboflavin, breaks down proteins and carbohydrates.
- **Vitamin B_{12}** chemical name cobalamin, is the element that supports in the formation of nucleic and amino acids.
- **Vitamin D** helps the body absorb calcium and phosphorous

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Dairy

- Dairy comes in four categories:
  - **Milk** including skim milk, flavored milks, lactose-free, 2%, and whole milk. Also includes substances like frozen yogurt, ice cream, puddings, sherbets, and smoothies.
  - **Non-dairy calcium** such as soymilk and rice milk
  - **Cheese** is any of the three different types of cheeses, including naturally *hard* cheeses such as cheddar, mozzarella, Swiss, and many more, and *soft* cheeses like brie, cottage cheese, feta, and ricotta, as well as *processed cheeses* like cheese spreads and America cheese.
  - The **yogurt** category includes all yogurts and soymilk yogurts

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CHECK ON UNDERSTANDING

1. _____ makes up 95% of all lipids?
2. My common name is cholesterol, but my scientific name is_____?
3. In order for the body to be able to absorb calcium milk also provides what vitamin?

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NUTRITION OF THE STUDENT: PROTEINS

Objectives:

Cadets will be able to

- Understand protein's roles in body functions/body chemistry
- Explain nonessential amino acids, essential amino acids, and amino acids role/functions in the body
- Express where to find proteins in various foods.

Essential Question:

How do proteins and elements within proteins impact the body and what foods are they are found in?

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Proteins

Proteins are a class of nitrogen-containing biomolecule composed of amino acids.

- Proteins are the main component of the cell, used to grow, repair and maintain muscles and connective tissues, assist in the production of hemoglobin, enzymes, and hormones, control acid to base balance, maintain osmotic pressure in the blood, support the formation of antibodies/disease protection and produce energy.
- **Amino acids** are components of proteins that the body needs to either self-create or acquire from a diet source. They are considered the building blocks because of the connection to growing and building muscles and other body tissues
- **Nonessential amino acids** are produced by the body, but the body does not [illegible] on them.
- **Essential Amino acids** are the 8-9 (adults/children) amino acids that the body cannot self-create/synthesize and must be part of daily food intake.

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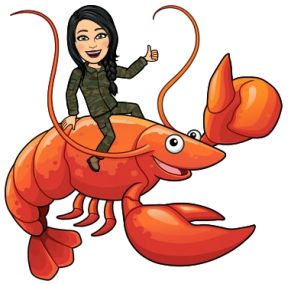
Proteins

- **Meats** consist of beef, ham, lamb, bison, rabbit, venison, and pork
- **Poultry** includes chicken, duck, goose, and turkey
- **Beans and peas** are lentils, pinto beans, black beans, kidney beans, and edamame, among others
- **Soy products** include tempeh, tofu, and veggie burgers
- **Eggs** include chicken eggs and duck eggs
- **Nuts and Seeds** include almonds, peanuts, pecans, pumpkin seeds, sunflower seeds, and walnuts
- **Seafood** is a misleading name, as not all items in the category come from the ocean. It has its three subcategories:
  - *finfish* like catfish, cod, seas bass, snapper, trout, and tuna
  - *shellfish* such as clams, crab, lobster, oysters, shrimp, mussels, squid, and octopus
  - *canned fish* are items like anchovies, sardines, and tuna



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CHECK ON UNDERSTANDING

Check on Understanding:

1. _____ is a self-created or synthesized amino acid that is not vital.
2. Protein has no shared elements/items in any other food group (T/F)
3. Name at least 2 functions of proteins in the body.

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NUTRITION OF THE STUDENT: OILS

Objectives:

Cadets will be able to

- Understand various nutrients found in oils

Essential Question:

What are oils in nutrition and what is their role in human health?

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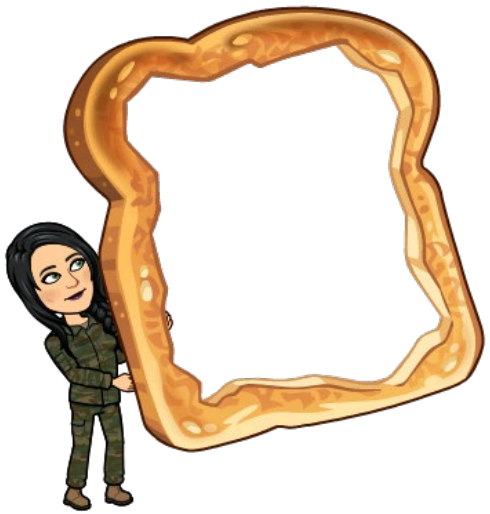
Oils

- **Oils** are a type of lipid and are primarily fat in liquid form
- Oils are not its own food group but does provide significant nutrients
- Since oils are fat the intake of them must be limited.
- **Omega -3 fatty acid** is an oil mostly found in fish and is a healthy portion of the daily diet.



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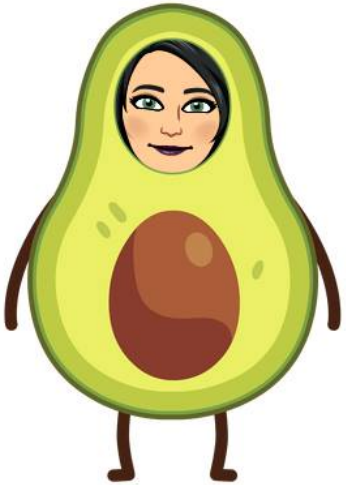
Oils



- **Polyunsaturated fatty acids (PUFA)** are things like corn oil, olive oil, and canola oil.
  - Some oils are primarily used in a manner to flavor food such as walnut oil and sesame seed oil. Some foods naturally have oils in them such as various nuts, certain fish, and avocadoes. Condiments like mayonnaise, salad dressings, and squeeze margarine are mostly made up of oils
- **Monounsaturated fatty acids (MUFA)** are oils found in plant-based items, vegetables, and fruits.
- Poly and monounsaturated fats do not elevate the bad (LDL) cholesterol levels in the blood supply.
- Most oils contain vitamin E that is important to vision, reproduction, and the health of your blood, brain and skin. It is an antioxidant, protecting cells and the body against cancer and other diseases.

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CHECK ON UNDERSTANDING

1. _____ is fat in liquid form.
2. What oil is mostly found in fish?
3. What does MUFA stand for?

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NUTRITION OF THE STUDENT: ADDED SUGARS

Objectives:

Cadets will be able to

- Define and understand the roles of sugars, glucose, isomers, cellulose, disaccharides, polysaccharides, and glycogen
- Understand and explain in relative terms type 1 diabetes, type 2 diabetes, hyperglycemic, and hypoglycemic.

Essential Question:

What is sugar's role in body functions, and how does it impact overall health?

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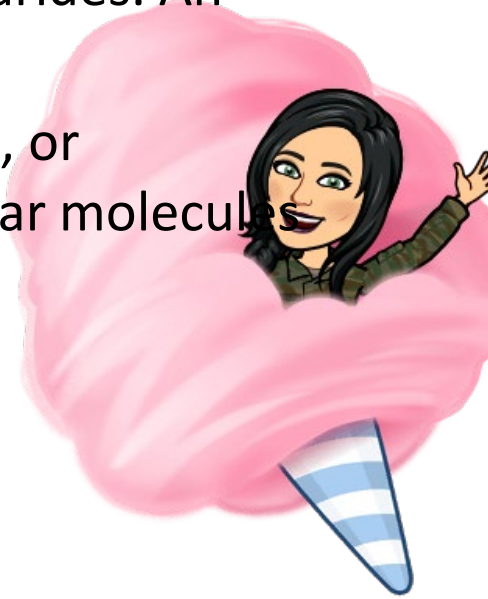
Sugars

- Sugar is an organic compound that the body uses as fuel or energy to complete work.
  - The everyday name for **monosaccharide** is simple sugar or glucose
- **Glucose** is a simple sugar with the molecular formula $C_6H_{12}O_6$.
- **Fructose** is fruit sugar, often bonded to glucose to form sucrose
- **Disaccharide** is comprised of two or more monosaccharides. An example of a disaccharide is sucrose.
- **Polysaccharide** is a carbohydrate (e.g. starch, cellulose, or glycogen) whose molecules consist of a number of sugar molecules bonded together



Sugars

- **Cellulose** is a structural component some plants have and is a polysaccharide that the human body cannot digest. A common example of this is celery. Celery chemically and biomedically is famous for burning more calories to chew it than a human can gain from eating it.
- **Glycogen** is a polysaccharide that is deposited in muscle cells and is stored for it to be used as energy in the form of glucose

Sugars in the Body

Sugar is needed for the body to function. It is involved in the circulation of the blood, and in order to enter that circulation, sugars are ingested, digested by the body, and sent to the intestinal cells to the capillaries to the blood vessels.

- The simple way to imagine how the process goes is that the blood vessels are a highway and blood is the vehicle on the highway. The converted sugars are the engine in the vehicle. The brain's key fuel to function comes from sugar, but it's not an excuse to overdo it on sugary sodas. Both too much sugar and not enough sugar in the body are bad for organs and the brain

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Diabetes

- **Diabetes mellitus** is commonly named simple diabetes and is characterized by the blood glucose levels being high, also known as hyperglycemia.
- **Hyperglycemia** results in insufficient production of insulin due to a malfunction in the pancreas. This is known as Type 2 diabetes.
- **Type 2 diabetes,** also referred to as **non-insulin-dependent diabetes mellitus (NIDDM),** simply put does not produce enough insulin or is insulin resistant.
- **Insulin resistance** is a condition where the body does not respond to insulin. This causes hyperglycemia.
- Type 2 diabetes is also a health problem associated with being obese or overweight

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Diabetes

- **Type I diabetes** is due to the inability to produce insulin as needed sufficiently, due to failure of the **β-Cells (beta-cells)** inside the pancreas. This type is also known as **Insulin-dependent diabetes mellitus (IDDM). S**imply put, the pancreas produces little to no insulin**.**
- **Hypoglycemia** is a <u>low</u> blood sugar level. It mostly happens with Type I diabetes but can happen to anyone if there is not enough glucose in the body to support work or energy. Exercise can improve glycemic control resulting in fewer hypoglycemic episodes

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CHECK ON UNDERSTANDING

Check on Understanding:

1. _____ means the blood sugar in too high.
2. Chemical equation or name for glucose is C__H__O__
3. What type of diabetes is due to the inability to produce insulin?

NUTRITION OF THE STUDENT: SATURATED AND UNSATURATED FATS

Objectives:

Cadets will be able to

- Compare and contrast saturated and unsaturated fats.
- Identify two types(subtypes) of trans fats

Essential Question:

What are the types of fats and what is their connection to cardiovascular health?

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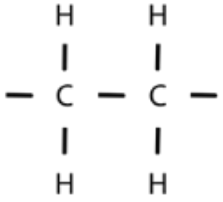
Saturated and Unsaturated Fats

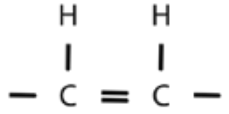
- **Fatty acids** are long chains of carbon with hydrogen atoms combined.
- **Saturated fat** is an acid where each carbon atom has 4 single bonds.
  - Saturated fats are normally **solids** at room temperature. They are found in food like beef, lamb, pork, lard, cream butter, and cheese.
- **Unsaturated fat** has one or more double bonds making it easier to metabolize/absorb
  - Unsaturated fats (mono or poly) are oils and **liquid** at room temperature.

Saturated Fat



No double bond indicates the carbon is fully saturated with hydrogen.

Unsaturated Fat
(cis configuration)



Double bond indicates the carbon is not fully saturated with hydrogen.

Saturated and Unsaturated Fats

- **Trans-fat** are unsaturated fats, naturally occurring and artificial
- **Naturally occurring trans-fat** occurs in the gut of animals and food made from various animals' meat and milk.
- **Artificial trans-fat** occurs in the process of adding hydrogen to vegetable oils in order to solidify them more, such as foods like doughnuts, cakes, margarine, crackers, frozen pizzas, and cookies. These fats are called hydrogenated.

Fat and Cardiovascular Disease

- Researchers have not been able to prove that saturated fats are bad for you. They have generally been connected with heart disease, but studies have not proven this.
- Trans-fats are bad for you!
- Unsaturated fats may help lower your risk for heart disease.
- Polyunsaturated fats (Omega-3 and Omega-6 fatty acids) are healthy and needed by the body

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CHECK ON UNDERSTANDING

1. _____ has 4 single bonds to each carbon atom.
2. All trans-fat is good for you T/F?
3. Of the types of fat, which is the best for your health?

NUTRITION OF THE STUDENT: SODIUM

Objectives:

Cadets will be able to

- Relate sodium's role to hypertension
- Understand sodium's overall role in body chemistry
- Understand and apply blood pressure classification levels to their identifications

Essential Question:

What is the role of sodium on the brain and body's basic functions?

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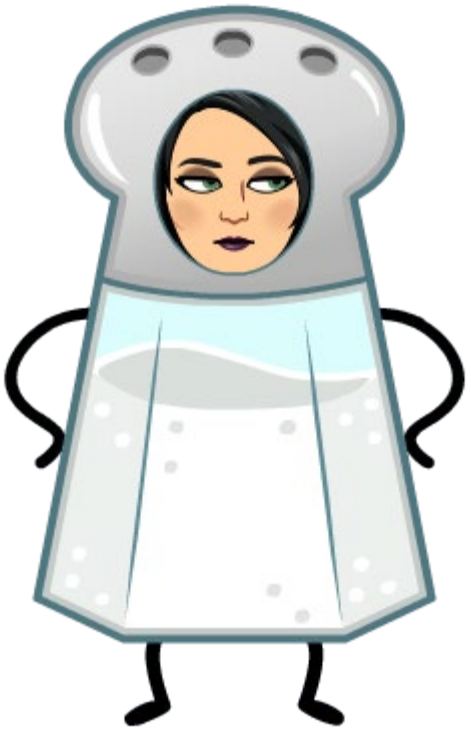
Sodium

- **Sodium (Na)** is an element on the periodic table of elements, but usually refers commonly to salt.
- Regulates blood volume, membrane functions, impulses of nerves and aid in muscle contraction
- Table salt, is actually **NaCl**, sodium chloride, which like most salts disassociate or dissolves in water



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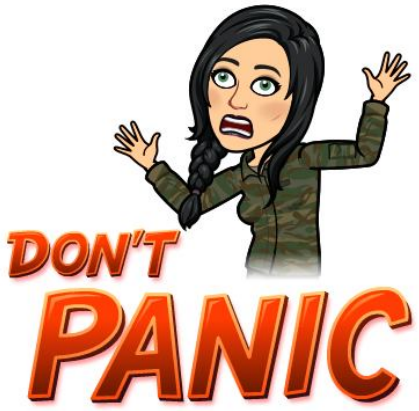
Sodium

- Sodium has many types because it bonds with different elements such as sodium bicarbonate (baking soda) and sodium citrate (from citric acid/ citrus fruits).
- Due to western diets, sodium depletion is highly unlikely because most preserved foods contain sodium. Sodium is found mostly in packaged and canned foods, such as soups, lunch meats, frozen dinners, burritos, tacos, and pizzas

Sodium & Hypertension

- Sweating allows for the loss of salts and minerals through exercise. Having too much of certain minerals can cause negative effects. Too much sodium can cause high blood pressure and lead to hypertension.
- **Hypertension** is defined as abnormally high blood pressure, *stage 1* at $\frac{140-159}{90-99}$, *stage 2* at greater than or equaled to $\frac{160+}{100+}$.
  - Hypertension causes the heart to work harder than it should and over time it can lead to scarring of the heart and losing its elasticity, which may lead to stroke.
- **Prehypertension** classified as $\frac{120-139}{80-89}$.



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Blood Pressure

- **Blood pressure** is the amount of pressure applied/pressed on the vessel walls by the blood.
- **Systolic blood pressure (SBP)** is represented by the higher number and means it's the amount of pressure in the artery during ventricular systole (when heart contracts).
- **Diastolic blood pressure (DBP)** is the amount of pressure represented by the lower number during ventricular diastole (when the heart refills with blood).
  - An average/normal blood pressure at rest is usually $\frac{120}{80}$, can be defined as less than 120 over 80

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Sodium & Blood Pressure

Sodium **maintains fluid balance**, which is why it plays a key role in blood pressure control. There is a direct relationship between sodium intake and blood pressure. Reducing sodium to 2.3 grams sodium (6 g table salt) daily is linked with decreased blood pressure levels.

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CHECK ON UNDERSTANDING

1. Sodium's chemical name is?
2. Too much sodium has no effects on the body T/F?
3. What is considered an average/normal blood pressure?

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NUTRITION OF THE STUDENT: ALCOHOL

Objectives:

Cadets will be able to

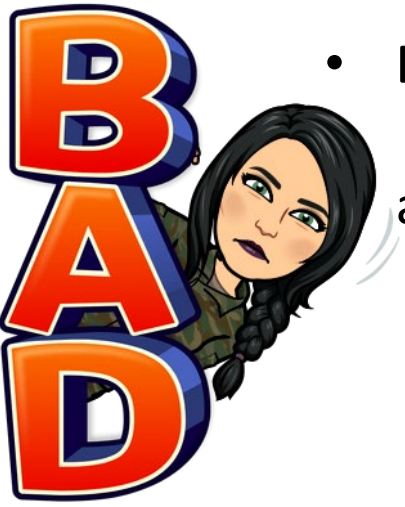
- Define alcohol
- Explain why alcohol is a psychoactive drug.
- Explain and relate the Brain Blood Barriers (BBB) roles with alcohol
- Evaluate the outcome information on alcohol abuse, alcoholism, fetal alcohol syndrome, and cirrhosis.
- Explain the combination of energy drinks and alcohol

Essential Question:

How is alcohol destructive to the human body, vital organs, and damaging to the brain?

Alcohol

- **Alcohol** is a beverage that is a psychoactive drug, this substance is volatile and is also known as *liquor* or its chemical name of *ethanol.*
- **Psychoactive drug** this means that when the substance is ingested it crosses the *blood-brain barrier* affecting the actions of the body, altering the mood, thinking, decision making, memory, motor control, and social behavior.
  - *Drinking alcohol is detrimental to the overall health of a human; overtime abuse of amount and frequency will damage the liver whose function is to filter or metabolize the substance.*
- **Binge-Drinking** by definition is when a male consumes five or more alcoholic drinks, and a female consumes four or more alcoholic drinks by volume. This type of behavior is extremely dangerous and will lead to degrading health complications



Alcohol

- The **blood-brain barrier (BBB)** is the barricade for the neural tissue in the central nervous system from the general blood circulation.
- **Alcohol abuse** is the overuse of drinking alcohol that results in behavioral and/or physical effects due to the overindulgence.

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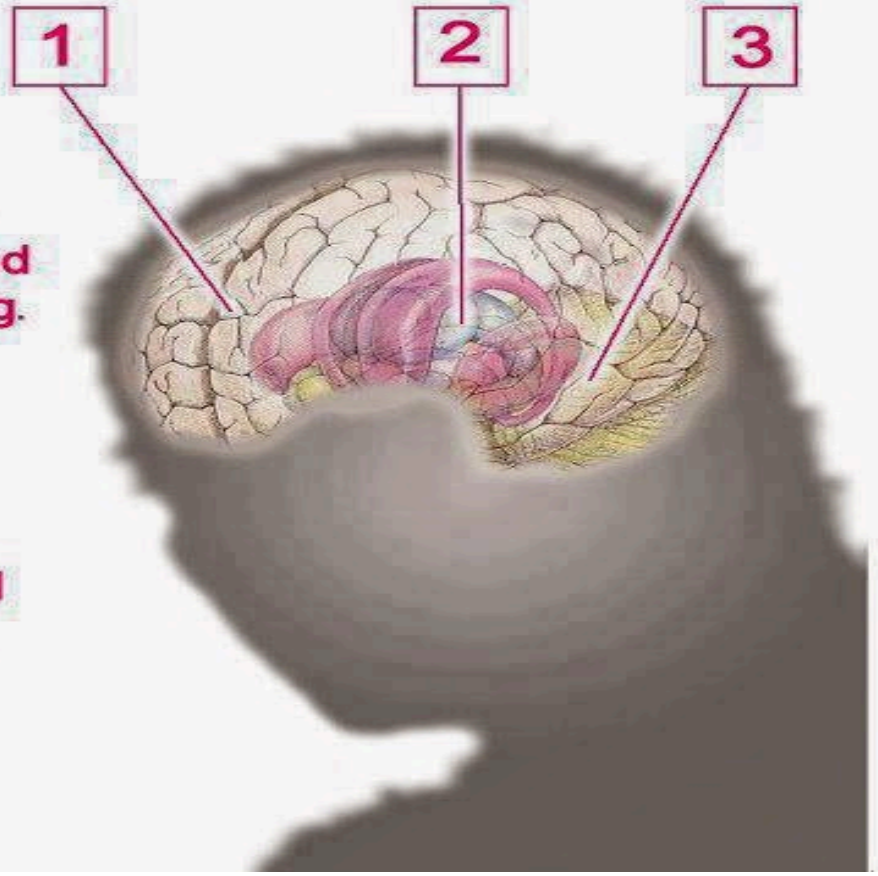
Alcohol

HOW ALCOHOL ATTACKS THE BRAIN

A guide to the sequential damage alcohol inflicts on neural tissue

1.
First, alcohol affects the forebrain and **assaults motor coordination and decision making.**

2.
Then, alcohol knocks out the midbrain, and you **lose control over emotions and increase chances of a blackout.**

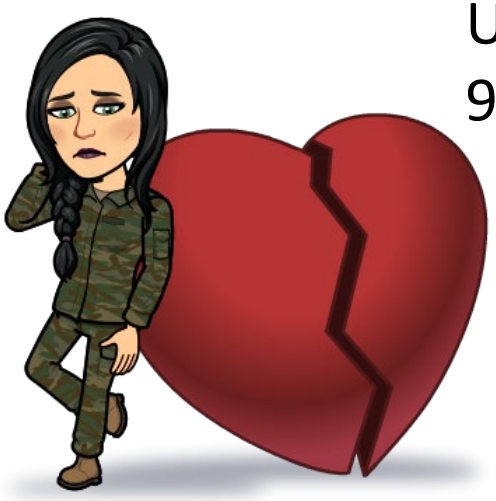


3.
Finally, alcohol batters the brainstem as it **affects heart rate, body temperature, appetite and consciousness,** a dangerous and potentially fatal condition.

Alcohol

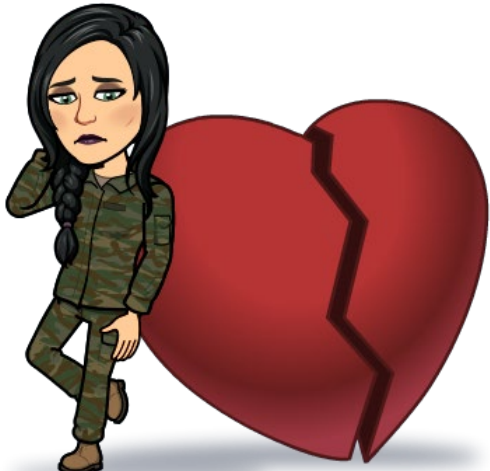
Alcoholism is the continuing/unending abuse of drinking alcohol paired with physiological changes aligned with addiction.

- Statistics express that alcohol affects 10 million Americans, it is a leading cause of expensive health problems (car accidents, innocent death victims, property, etc.), accounts for over 200,000 deaths in the United States a year and is responsible for 60-90% of all documented liver disease cases.



Alcohol

- **Fetal alcohol syndrome (FAS)** is a condition assumed by a newborn due to a pregnant woman drinking while pregnant, with characteristics of deformities/defects such as small head, slow growth, and scientifically termed mental retardation.
- **Cirrhosis** a liver disease that is characterized by the destruction of hepatocytes replacing healthy tissue in the liver with fibrous tissue/scar tissue which will lead to liver failure.



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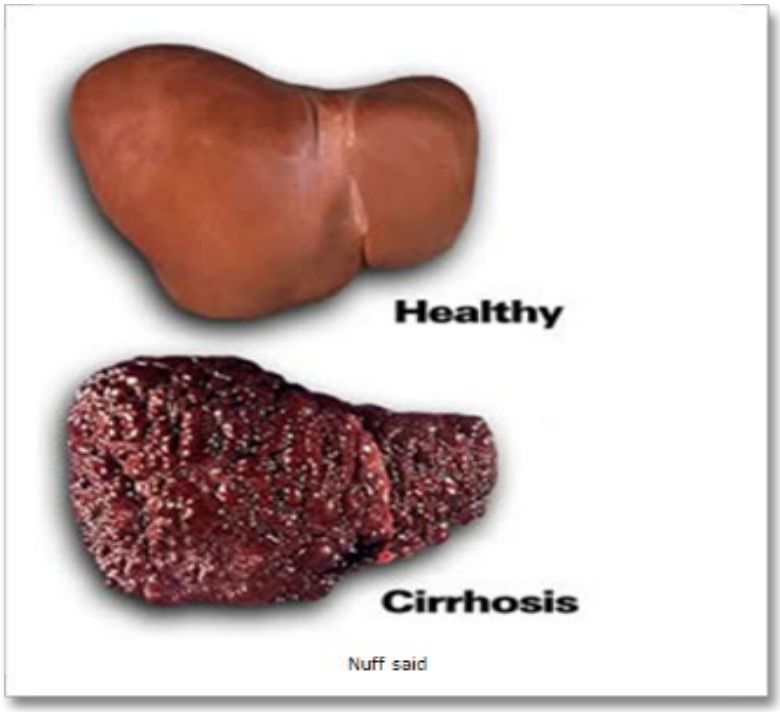
Alcohol



Cirrhosis is a deadly disease. As it progresses it leads to multisystem failure and advanced deterioration of the body.

- Rupturing submucosal tissues
- Jaundice
- Hypertension
- Disorientation of the brain function, confusion, or the inability to communicate.

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CHECK ON UNDERSTANDING

1. Alcohol is not considered a psychoactive drug T/F?
2. Define alcoholism.
3. What organ is most affected by cirrhosis?

NUTRITION OF THE STUDENT: CAFFEINE

Objectives:

Cadets will be able to

- List issues and prospective positives caused by caffeine use

Essential Question:

How does caffeine interact with the human body?

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Caffeine

- **Caffeine** is a central nervous system (CNS) stimulant, chemical, or drug, and is widely consumed
- It is found in coffee, soft drinks/soda, teas, and energy drinks.
- It is also available as an over-the-counter medication.
- It has a proposed/suggested benefit of improving alertness, energy, ability to concentrate, reaction time, and prolonging endurance.
  - Through studies, the proven effect was as follows: increased alertness, concentration, elevated mood, but decreased reaction time and fatigue.
  - Even though it's widely accessible and not regulated consuming it with risks such as nervousness, restlessness, insomnia, headaches, gastrointestinal problems, & tremors
  - a withdrawal of intake can result in distress of the gastrointestinal tract, fatigue, and irritability.

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Caffeine

- **Diuretic:** speeds up water excretion from the body
- **Psychotropics:** a category of drug known as mood changers. They alter the central nervous system pattern of functioning and change or alter the mental state or mood. They also can be highly addictive agents. Caffeine is a psychotropic drug.
- **Withdrawal** is the physical and psychological suffering symptoms when an individual stops or is prevented from in taking drugs, substances, etc.

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CHECK ON UNDERSTANDING

1. Caffeine is not considered a drug T/F?
2. Name 3 proposed benefits of caffeine.
3. What symptoms result in the withdrawal from caffeine in the body?

NUTRITION OF THE STUDENT: HEALTHY BRAIN FOOD FOR TEST DAY

Objectives:

Cadets will be able to

- List and explain various brain foods for large concentration days or events
- Explain with reason why aspartame is possibly dangerous
- Define adenosines triphosphate (ATP)

Essential Question:

Does eating a collection of health foods improve performance in concentration?

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Heathy Brain Food for Test Day

- Eating healthy helps you prepare for any important day, such as test day, academic presentations, and other tasks that take a large amount of concentration.
- Science has not proven that the body responds to particular foods, but only that eating healthy can encourage emotional response-control in humans.
- Food and a healthy balance of combinations of food are symbolic in traditions, cultures, and special events; birthdays, weddings, funerals, graduations, sporting events, festivals, etc.
- In order to remain alert, the brain must metabolize 6 grams of glucose per hour from the blood, in order to not slide into a state of confusion, coma, or death.

Heathy Brain Food for Test Day

- The **B*lueberry*** is linked to brain health because it has a high content of anthocyanins.
- **Anthocyanins** are a powerful antioxidant that decreases inflammation.
- **Adenosine** (adenosine triphosphate) (ATP) is a caffeine-*like* organic compound that provides energy to drive processes in cells. It energizes the brain to function fully in alertness.

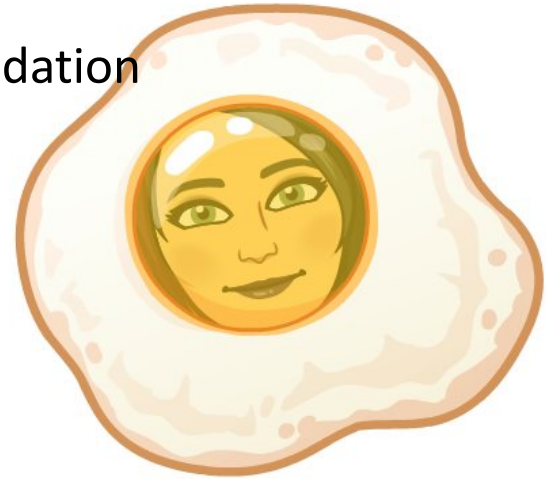
Heathy Brain Food for Test Day

- Foods for brain health in terms of focus are
  - Carbohydrates with caloric limits
  - Digestible carbohydrates
  - Water
  - Vitamins
  - Minerals
- Stay away from artificial sweeteners such as **aspartame** which is *possibly* linked to brain tumors, autism, emotional disorders, etc.

Heathy Brain Food for Test Day

- Omega-3 fatty acids and Omega-6 essential fatty acids are a key supplement source found in fish, poultry, and grain-fed animals.
- Vitamin C is a supplement that aids in brain health within limits.
- *White rice* contains **Thiamin (B_1)** a vitamin whose role is to be an energy source and in charge of manufacturing neurotransmitters required for RNA, DNA, and ATP; deficiency in this vitamin can cause brain and heart issues.

- **Choline** is a beneficial compound found in egg yolk, wheat, meat, and fish.
- In order to improve brain functionality, the CDC recommendation is to increase fruit and vegetable intake



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CHECK ON UNDERSTANDING

Check on Understanding:

1. It is scientifically proven that food for the brain has an exact path. (T/F)
2. _____ is the antioxidant that the blueberry contains.
3. The vitamin/supplement _____ is found in white rice.

NUTRITION OF THE STUDENT: OPTIMAL VS TYPICAL SAMPLE MENUS

Objectives:

Cadets will be able to

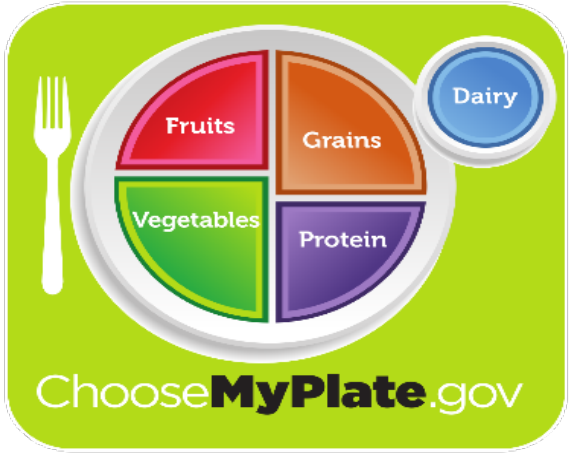
- Discuss optimal vs typical health perspectives or dietary intakes.

Essential Question:

What kind of impact on overall health do different menu types of food products have?

Optimal vs Typical Sample Menus

- The important thing about eating healthy/ healthier it is to meet the needs specific to you.
- **Optimal health perspective** choices are based on habitual routines and making intentional food choices
  - Moderation in eating and in taking nutritional rich foods. This is completed through the following: fill half the plate with vegetables and fruits, one quarter with lean meat/protein, poultry or fish, one quarter with a grain/rice, one serving of dairy



Optimal vs Typical Sample Menus

- **Typical health perspective** is a look at the reality of what many people eat. Some choices are healthy, many are not. No food is forbidden if taken in moderation, but that is not the typical American diet.
  - The USDA did a longitudinal study spanning from 1970-2005, it tracked what individuals in the United States were consuming over a protracted period.

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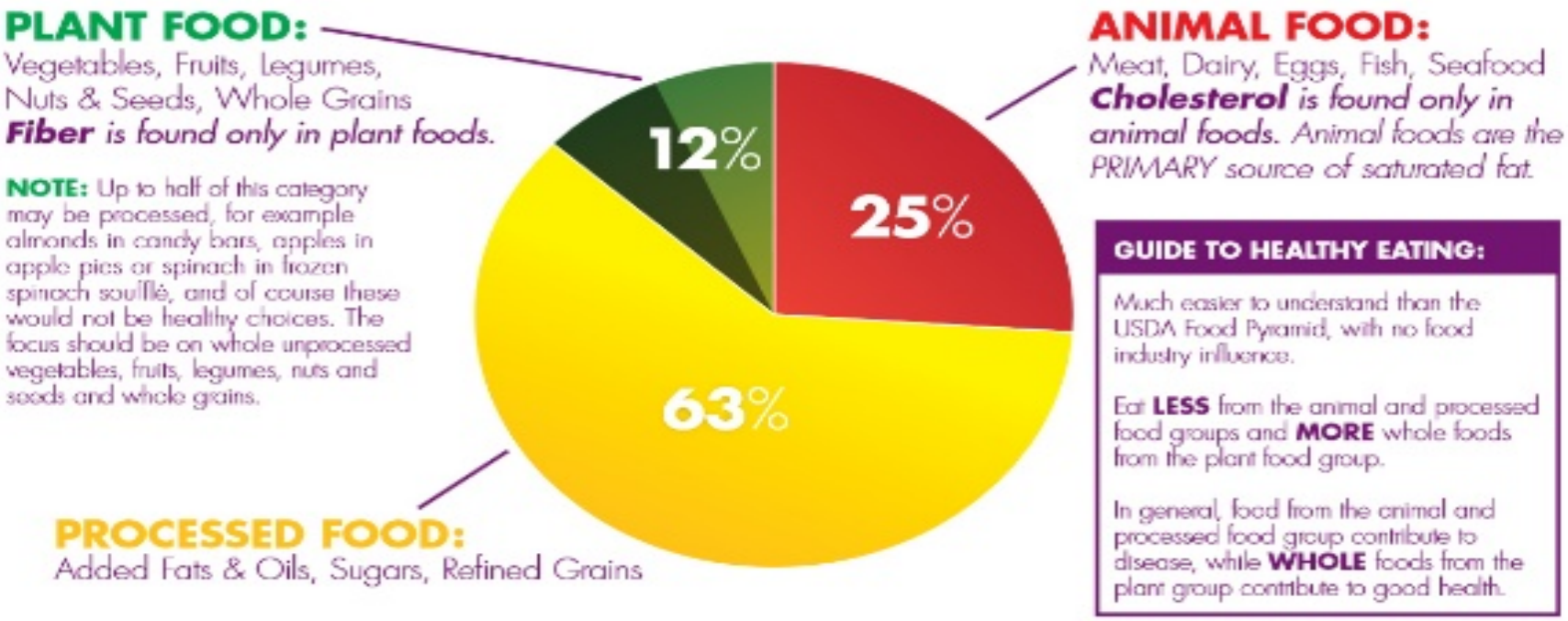
Typical Food Choices

U.S. FOOD CONSUMPTION
AS A % OF CALORIES



Source: USDA Economic Research Service, 2009; www.ers.usda.gov/publications/FIB33; www.ers.usda.gov/Data/FoodConsumption/FoodGuideIndex.htm#calories
New York Coalition for Healthy School Food * www.healthyschoolfood.org
Special thanks to Joel Fuhrman, MD, author of *Disease Proof Your Child: Feeding Kids Right* * Graphics by MichelleBando.com
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Optimal Menus

SAMPLE 2-WEEK MENUS

	DAY 1	DAY 2	DAY 3	DAY 4
BREAKFAST	**Peanut Butter Raisin Oatmeal:** *1 cup cooked oatmeal* *1 Tbsp peanut butter* *¼ cup raisins* **Beverage: 1 cup orange juice**	**Cereal with Fruit:** *1 cup toasted oat cereal* *1 medium banana* *½ cup lowfat milk* **1 hard-cooked egg** **Beverage: Water, coffee, tea**	**Scrambled Eggs:** *2 eggs* *2 Tbsp lowfat milk* *1 tsp vegetable oil* **2 turkey sausage links** **1 slice whole-wheat toast** *½ tsp tub margarine* *1 tsp jelly* **Beverage: 1 cup apple juice**	**Banana Walnut Oatmeal** **1 large orange** **Beverage: 1 cup lowfat milk**
LUNCH	**Tuna-Cucumber Wrap:** *1 8" flour tortilla* *3 oz tuna (canned in water)* *2 Tbsp mayonnaise* *5 cucumber sticks* **¼ cup lowfat vanilla yogurt** **Beverage: 1 cup lowfat milk**	**Green Salad with Honey Lemon Chicken:** *1 cup romaine lettuce* *3 oz sliced Honey Lemon Chicken** *3 slices tomato* *5 slices cucumber* *2 Tbsp vinaigrette dressing*** **1 slice whole-wheat bread** *½ tsp tub margarine* **1 Chocolate Chip Yogurt Cookie*** **Beverage: 1 cup lowfat milk**	**One Pan Spaghetti*** **Side Salad:** *1 cup romaine lettuce* *3 medium slices tomato* *5 slices cucumber* *1 Tbsp vinaigrette dressing*** **1 slice whole-wheat bread** *½ tsp tub margarine* **Beverage: 1 cup lowfat milk**	**Green Salad with Tuna:** *1 cup romaine lettuce* *3 oz tuna (canned in water)* *¼ cup sliced carrots* *2 Tbsp vinaigrette dressing*** **1 slices whole-wheat bread** *1 tsp tub margarine* **Shake-A-Pudding*** **Beverage: 1 cup lowfat milk**
DINNER	**Honey Lemon Chicken*** **Brown Rice Pilaf** **1 cup peas and corn:** *½ cup corn (frozen)* *½ cup green peas (frozen)* *1 tsp tub margarine* **1 Chocolate Chip Yogurt Cookie*** **Beverage: 1 cup lowfat milk**	**One Pan Spaghetti*** *(includes ground beef and tomato sauce)* **½ cup steamed broccoli (frozen)** *½ tsp tub margarine* **1 white roll** *1 tsp tub margarine* **Shake-A-Pudding*** **Beverage: 1 cup lowfat milk**	**Polenta with Pepper and Cheese** *(includes black or kidney beans)* **1 cup cooked green beans (frozen)** *1 tsp tub margarine* **1 Chocolate Chip Yogurt Cookie*** **Beverage: 1 cup lowfat milk**	**Marinated Beef** **Mashed potatoes:** *1 cup cooked potatoes* *1 Tbsp lowfat milk* *2 tsp tub margarine* **1 cup mixed vegetables (frozen)** *1 tsp tub margarine* **Beverage: Water, coffee, tea**
SNACKS	**Carrot Sticks with Dip:** *½ cup carrot sticks* *2 Tbsp hummus* **6 whole-grain crackers**	**Popcorn (3 cups popped)** *2 Tbsp kernels* *1 tsp vegetable oil* **1 large orange**	**Pretzels and Dip** *½ cup pretzels* *1 Tbsp hummus* **1 medium banana**	**Banana Bread*** *½ tsp tub margarine* **1 cup grapes**

Two weeks of sample healthy menus are in the supplementary information provided with this lesson.

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Optimal vs Typical Sample Menus

Sample Menus for a 2000 Calorie Food Pattern

Use this 7-day menu as a motivational tool to help put a healthy eating pattern into practice, and to identify creative new ideas for healthy meals. Arranged over a week, this menu provides the recommended amounts of key nutrients and foods from each food group. The menus feature a large number of different foods to inspire tasty and satisfying variety in food choices. They are not intended to be followed day by day as a specific prescription for what to eat.

Spices and herbs can be used to season. Try spices such as chili powder, cinnamon, cumin, curry powder, ginger, nutmeg, mustard, garlic powder, onion powder, or pepper. Try fresh or dried herbs such as basil, parsley, cilantro, chives, dill, mint, oregano, rosemary, thyme, or tarragon. Also try salt-free spice or herb blends.

While this 7-day menu provides the recommended amounts of foods and key nutrients, it does not fit a particular cost. Based on national average food costs, adjusted for inflation to March 2011 prices, the cost of this menu is less than the average amount spent for food, per person, in a 4-person family.

DAY 1

BREAKFAST

Creamy oatmeal (cooked in milk):
- *½ cup uncooked oatmeal*
- *1 cup fat-free milk*
- *2 Tbsp raisins*
- *2 tsp brown sugar*

Beverage: 1 cup orange juice

LUNCH

Taco salad:
- *2 ounces tortilla chips*
- *2 ounces cooked ground turkey*
- *2 tsp corn/canola oil (to cook turkey)*
- *¼ cup kidney beans**
- *½ ounce low-fat cheddar cheese*
- *½ cup chopped lettuce*
- *½ cup avocado*
- *1 tsp lime juice (on avocado)*
- *2 Tbsp salsa*

Beverage:
1 cup water, coffee, or tea**

DINNER

Spinach lasagna roll-ups:
- *1 cup lasagna noodles(2 oz dry)*
- *½ cup cooked spinach*
- *½ cup ricotta cheese*
- *1 ounce part-skim mozzarella cheese*
- *½ cup tomato sauce**

1 ounce whole wheat roll
- *1 tsp tub margarine*

Beverage: 1 cup fat-free milk

SNACKS

2 Tbsp raisins
1 ounce unsalted almonds

DAY 2

BREAKFAST

Breakfast burrito:
- *1 flour tortilla (8" diameter)*
- *1 scrambled egg*
- *⅛ cup black beans**
- *2 Tbsp salsa*

½ large grapefruit
Beverage:
1 cup water, coffee, or tea**

LUNCH

Roast beef sandwich:
- *1 small whole grain hoagie bun*
- *2 ounces lean roast beef*
- *1 slice part-skim mozzarella cheese*
- *2 slices tomato*
- *¼ cup mushrooms*
- *1 tsp corn/canola oil (to cook mushrooms)*
- *1 tsp mustard*

Baked potato wedges:
- *1 cup potato wedges*
- *1 tsp corn/canola oil (to cook potato)*
- *1 Tbsp ketchup*

Beverage: 1 cup fat-free milk

DINNER

Baked salmon on beet greens:
- *4 ounce salmon filet*
- *1 tsp olive oil*
- *2 tsp lemon juice*
- *½ cup cooked beet greens (sauteed in 2 tsp corn/canola oil)*

Quinoa with almonds:
- *½ cup quinoa*
- *½ ounce slivered almonds*

Beverage: 1 cup fat-free milk

SNACKS

1 cup cantaloupe balls

DAY 3

BREAKFAST

Cold cereal:
- *1 cup ready-to-eat oat cereal*
- *1 medium banana*
- *½ cup fat-free milk*

1 slice whole wheat toast
- *1 tsp tub margarine*

Beverage: 1 cup prune juice

LUNCH

Tuna salad sandwich:
- *2 slices rye bread*
- *2 ounces tuna*
- *1 Tbsp mayonnaise*
- *1 Tbsp chopped celery*
- *½ cup shredded lettuce*

1 medium peach
Beverage: 1 cup fat-free milk

DINNER

Roasted chicken:
- *3 ounces cooked chicken breast*

1 large sweet potato, roasted
½ cup succotash (limas & corn)
- *1 tsp tub margarine*

1 ounce whole wheat roll
- *1 tsp tub margarine*

Beverage:
1 cup water, coffee, or tea**

SNACKS

¼ cup dried apricots
1 cup flavored yogurt (chocolate)

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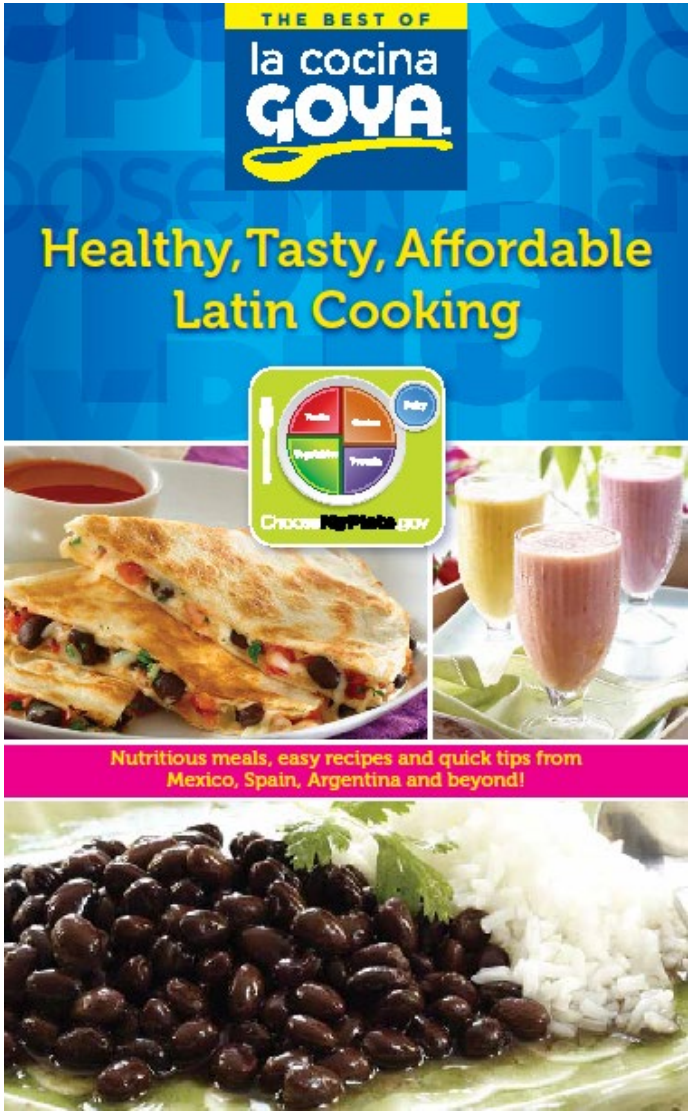
Optimal vs Typical Sample Menus



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CHECK ON UNDERSTANDING

1. The typical health perspective represents a nutritious diet (T/F)
2. What slogan does the government use for health guidance for planning meals?
3. Using context clues, what does longitudinal mean?