**Foods and Nutrition**

**4.1, day 1 Nutrients and Energy**

1. 6 categories of nutrients
   1. Carbohydrates
   2. Fats
   3. Proteins
   4. Vitamins
   5. Minerals
   6. Water
2. What nutrients do for you
   1. Give you energy, build and repair your body, keep your body processes going
3. Getting enough nutrients
   1. RDA’s (Recommended Dietary Allowances) – guidelines based on age and gender
   2. Daily Values – daily nutrient levels that consumers can use as a quick reference
   3. Getting too few nutrients will lead to:
      1. Nutrient deficiency – shortage of a nutrient which causes poor health or lack of energy
      2. Malnutrition – not getting enough nutrients due to a food shortage
   4. Getting too many nutrients will lead to:
      1. Organ damage and obesity
4. Energy and Calories
   1. Calorie – unit used to measure energy
      1. ½ of your total calories should come from carbohydrates
      2. No more than 30% of your calories should come from fats
      3. 12-15% of your calories should come from proteins
      4. Human body uses 1200 calories or more a day for all of the basic living processes (eating, sleeping, breathing)
         1. Basal Metabolic Rate (BMR) – amount of energy used for everyday body functions
   2. Physical activity will use calories
   3. The more physically active you are the more calories you burn
   4. Number of calories needed based on activity level
      1. Inactive women/older adults – 1600 calories
      2. Children/teen girls/active women/inactive men – 2200 calories
      3. Pregnant women – 2200+ (you need 300 calories in addition to what you would typically consumer)
      4. Teen boys/active men/very active women – 2800 calories

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**4.1, day 2 notes Carbohydrates and Fats**

1. Carbohydrates

A. Simple Carbohydrates – sugars including monosaccharides and disaccharides

* 1. Monosaccharides – simplest form of sugar molecules, cannot be broken down into a simple sugar
  2. Disaccharides – can be broken down into two monosaccharide molecules
  3. Sources of simple carbs – sugars, syrups, candy, jams, jellies, pastries, dried fruit

B. Complex carbohydrates – sugars including polysaccharides

1. Polysaccharides – can be broken down into more than two monosaccharide molecules (many molecules)
2. Sources – cereal grains, legumes, pasta products, breads, crackers, potatoes, squash, corn

C. Function of carbohydrates

1. Furnish body with energy
2. Help body digest fats
3. Carbohydrates make food more palatable (agreeable to your stomach)
4. Allow body to use proteins for growth and maintenance instead of energy

D. Fiber – component of complex carbohydrates

1. Most foods high in complex carbohydrates are good fiber sources
2. Dietary fiber is a plant material that can’t be digested
3. Helps your digestive tract work properly
4. If rich in fiber may prevent cancer, especially colon

E. Too much or Too little

1. Deficiency – lack of energy, loss of weight, tiredness
2. Excess – can lead to weight gain
3. Fats

A. Fats are essential to Health

* 1. Fat is a food and a nutrient
  2. Fat gives meals flavor and texture
  3. As a nutrient it supplies energy and other important tasks

B. Types of fat

1. Fatty acids – chemical chains containing carbon, hydrogen, and oxygen
   * 1. Different types of fatty acids contain different amounts of hydrogen
     2. Saturated fatty acids – fatty acids that have as many hydrogen atoms as they can hold
        1. Solid at room temperature
        2. Examples: butter, margarine, fat in meat, poultry, dairy products
     3. Unsaturated fatty acids – fatty acids that have fewer hydrogen atoms than they can hold
        1. May be monounsaturated or polyunsaturated
        2. Liquid at room temperature
        3. Hydrogenation – adding hydrogen to an unsaturated fat to make it solid
        4. Examples: vegetable oils, nuts
     4. Monounsaturated fatty acids – missing one hydrogen atom
     5. Polyunsaturated fatty acids – missing two or more hydrogen atoms
2. Cholesterol – fatlike substance found in every cell in the body
   * 1. Functions
        1. Part of skin tissue
        2. Aids in transport of essential fatty acids
        3. Produces hormones
     2. Body makes all the cholesterol you need!
     3. Found only in animal products – meat, fish, egg yolks, dairy products
     4. High cholesterol = heart problems

C. Functions of Fat

1. Fats protect internal organs from injury and insulate the body from shock and temperature change
2. Carry fat-soluble vitamins
   * 1. If you don’t consume fat your body can’t use vitamins A, D, E, K

D. Sources of Fat

1. Visible – butter, margarine, marbling in meat
2. Invisible – eggs, whipped cream, baked products

E. Too much or Too little

1. Deficiency – loss of weight and energy
2. Excess – weight problems, heart disease, cancer

F. Final thoughts on fats

1. No more than 30% of your total calories in your daily diet should come from fat
2. No more than 10% of your total calories should come from saturated fat
3. Cholesterol should be less than 300 mg a day

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**4.1 Day 3 notes: Proteins**

1. Proteins – chemical compound found in every body cell
   1. Made of small building block units called amino acids
      1. 20 amino acids
      2. 9 of these are essential acids – which means they must be supplied in the food you eat because your body can’t produce them
   2. Complete proteins
      1. Contain all 9 essential amino acids
      2. Support growth and normal maintenance of body tissues
      3. Found in animal foods
   3. Incomplete proteins
      1. Missing one or more the essential amino acids
      2. Found in plant foods (nuts)
2. Functions of proteins
   1. Provide amino acids which the body needs for growth, maintenance, and repair of body tissues
   2. Aids in the formation of enzymes, hormones, and antibodies
   3. Provides energy
3. Sources of proteins
   1. Lean red meats, poultry, fish, milk products, eggs, dried beans and peas, nuts
4. Too much or Too little
   1. Deficiency – loss of weight, lack of energy, lack of protein in children may stunt growth
   2. Excess – too much is converted into fat

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**4.2 Day 1 Notes, Fat Soluble Vitamins (A,D,E,K)**

1. Fat soluble vitamins – dissolve in fat in foods and in body
   1. Store fat-soluble vitamins in body fat and in your liver
2. Vitamin A (5,000 International Units)
   1. Functions
      1. Needed for eyes to adapt to darkness
      2. Promotes normal growth of healthy skin and hair
      3. Helps body resist infection
   2. Sources – body gets Vitamin A in two forms:
      1. As vitamin itself in foods such as liver, egg yolk, whole milk, butter, fish oils
      2. As provitamin carotene, which body converts to Vitamin A
         1. Found in foods such as spinach and squash
   3. Too much or Too little
      1. Deficiency – eyes become sensitive to light, skin becomes rough and susceptibility to disease may increase, night blindness and stunted growth
      2. Excess – fatigue, headaches, nausea, vomiting
3. Vitamin D (400 IU)
   1. Functions
      1. Promotes growth of bones and teeth
      2. Helps body use calcium and phosphorus
   2. Sources
      1. Egg yolks, liver, sardines, tuna, fish liver oil
      2. Some foods are fortified with vitamin D – milk and butter
      3. Sunlight
   3. Too much or Too little
      1. Deficiency – body will not be able to use calcium and phosphorus, rickets or bone abnormalities
      2. Excess – nausea, diarrhea, loss of weight, kidney and lung damage, bone deformities
4. Vitamin E (30 IU)
   1. Functions
      1. Antioxidant helpful for red blood cells and cells in the lung
      2. Helps form muscles
      3. Protects other nutrients from damage
   2. Sources
      1. Fats, oils, whole grain breads and cereals, liver, eggs, whole milk, leafy green vegetables
   3. Too much or Too little
      1. Deficiency – usually only occurs in premature babies, may cause impaired reflexes and coordination, difficulty walking, weak muscles
      2. Excess – bleeding in the brain causing stroke, muscle weakness, fatigue, nausea, diarrhea
5. Vitamin K (80 micrograms)
   1. Functions
      1. “blood clotting” vitamin - helps liver make substance called prothrombin, which is a protein blood needs to clot
   2. Sources
      1. Green leafy vegetables, cauliflower, broccoli, organ meats, egg yolks, fish
   3. Too much or Too little
      1. Deficiency – hemorrhaging (uncontrollable bleeding)
      2. Excess – only if take too many vitamin K supplements, which have been banned by the FDA, liver damage

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**4.2 Day 2, Water-Soluble Vitamins**

1. Water-Soluble vitamins – dissolve in water

A. Cannot be stored in body for later use

B. important to continually get these vitamins

C. Taking too much water-soluble vitamins can cause kidneys to work too hard to remove excess vitamins

II. Vitamin C (ascorbic acid) (60 mg a day)

A. Functions

i. helps in formation and maintenance of collagen, a protein that is part of connective tissue (connective tissue holds your body cells together)

ii. makes wall of blood vessels firm

iii. helps form hemoglobin (substance in red blood cells)

iv. helps body fight infection

v. maintains healthy teeth and gums

vi. helps wounds heal

B. Sources

i. citrus fruits, tomatoes, strawberries, kiwi, potatoes, broccoli, cabbage

ii. Water and heat will break down the vitamin c, essentially destroying the benefits of it

C. Too much or Too Little

i. deficiency – poor appetite, weight loss, soreness of joints, bleeding gums, bruising, loss of teeth, anemia

ii. excess – increases risk of urinary stones, may cause diarrhea

III. Thiamin (Vitamin B1)(1.5 mg a day)

A. Functions

i. helps body release energy from food

ii. forms coenzymes, which breakdown carbohydrates

iii. promotes normal appetite and digestions

iv. keeps nervous system healthy and prevents irritability

B. Sources

i. wheat germ, pork products, legumes, whole grain and enriched cereals

C. Too much or Too little

i. deficiency – nausea, apathy, loss of appetite, numbness in feet and ankles and cramping pains in legs

IV. Riboflavin (Vitamin B2) (1.7 mg a day)

A. Functions

i. forms coenzymes, which breakdown carbohydrates

ii. helps cells use oxygen

iii. helps keep sin, tongue, and lips normal

iv. helps prevent scaly, greasy areas around the mouth and nose

v. helps body resist infection

B. sources

i. organ meats, milk, eggs, leafy green vegetables, broccoli, whole grain and enriched cereal products

ii. sunlight destroys riboflavin

C. Too much or Too little

i. deficiency - swollen and cracked lips and skin lesions

ii. excess – liver toxicity

V. Niacin (vitamin B6) (20 mg a day)

A. Functions

i. helps keep nervous system, mouth, skin, tongue, and digestive tract healthy

ii. helps cells use other nutrients

B. Sources

i. liver and kidney, peanuts, salmon, tuna, sunflower seeds

ii. high temperatures destroy niacin

C. Too much or Too little

i. deficiency - skin lesions and digestive problems

ii. excess – liver toxicity

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**4.2 Day 3, Water Soluble Vitamins**

1. Vitamin B6 (pyridoxine) (2 mg)

A. Functions

i. helps nerve tissues function normally and plays role in regeneration of red blood cells

ii. takes part in breakdown of proteins, carbohydrates and fats

iii. helps in energy production

iv. helps protect against infection

B. Sources

i. chickpeas, beef liver, poultry, tuna salmon, fortified cereals

C. Too much or Too little

i. Deficiency – skin lesions, soreness of the mouth, smooth red tongue

ii. Excess – nerve damage

II. Folic Acid (Folate, vitamin B9) (400 micrograms)

A. Functions

i. helps body produce normal blood cells

ii. good cardiovascular health

iii. iimportant in the diets of pregnant women because prevents severe birth defects affecting the brain and spinal cord

B. Sources

i. broccoli, asparagus, leafy veggies, legumes, liver, yogurt, strawberries, bananas, oranges, whole grain cereals

ii. synthetic form is better for you than the food form

C. Too much or Tool little

i. deficiency – inflammation of tongue, diarrhea, digestive disturbances, neural tube defects, cardiovascular problems

ii. excess – extreme high doses can cause stomach problems

III. Vitamin B 12 (cobalamin) (6 micrograms)

A. Functions

i. promotes normal growth

ii. helps protect against pernicious anemia – chronic disease characterized by abnormally red blood cells and neurological disturbances, such as depression and drowsiness

B. Sources

i. animal protein foods such as meat, poultry, fish, eggs, dairy

C. Too much or Too little

i. deficiency - sore tongue, weakness, loss of weight, apathy, nervous disorders

II. excess – numbness in arms, hands, and face

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**4.3 Day 1, Minerals**

I. Mighty Minerals

A. bones – need calcium, phosphorus, and magnesium

i. most important during teen years

ii. if body doesn’t get enough, it will take these away from your bones which will result in osteoporosis

a. bones become porous and can break easily

B. Blood – important to get enough minerals like iron to prevent anemia which makes you feel tired and weak

i. most important for women due to reproductive health

II. Calcium(1000 mg a day)

A. Function

i. builds and strengthens bones and teeth

ii. helps blood clot

iii. keeps heart muscles and nerves working properly

iv. helps regulate the use of other minerals in the body

B. Sources

i. milk and milk products, greek yogurt, whole fish, leafy green vegetables, broccoli

C. Too much or Too little

i. deficiency – poor bones and osteoporosis

ii. excess – can lead to heart attack and strokes, best to get from food sources instead of supplements to prevent this

III. Sodium (1.5 g per day), Chloride (3.8 g per day), and Potassium (4.7 g per day)

A. Functions

i. These three nutrients work as a tem to maintain the balance of fluids in body

ii. controls osmosis – process where fluids flow in and out of the cells through the cell walls

iii. helps nervous system and muscles function properly

iv. helps cells absorb nutrients

B. Sources

i. sodium is in processed foods

ii. sodium and chloride are found in table salt

iii. potassium is found in meat, milk, bananas, citrus fruits, and dark green leafy vegetables

C. Too much or Too little

i. deficiency – severe diarrhea, vomiting

ii. excess – too much sodium and chloride can lead to high blood pressure, too much potassium can lead to problems with heart rhythm

IV. Iron(8 mg for males, 18 mg for females)

A. Functions

i. helps form hemoglobin, which is a protein pigment found in red blood cells

a. hemoglobin takes oxygen from lungs and carries it to cells throughout body

B. Sources

i. body stores iron and uses it over and over again

ii. liver, egg yolks, legumes, leafy green vegetables, meats

C. Too much or Too little

i. deficiency – anemia can occur – blood lacks red blood cells, hemoglobin, or total volume

ii. excess – hemochromatosis which causes arthritis, cancer, liver problems, diabetes, heart disease

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**4.3 Day 2, Minerals and Water**

1. Iodine (150 micrograms a day)

A. Functions

i. essential part of thyroxine – which is the hormone produced by the thyroid gland

a. thyroxine increases oxidation rates in body cells

B. Sources

i. seafood and seaweed, iodized salt

C. Too much or Too little

i. Deficiency – thyroid gland has to work hard to produce enough thyroxine and can enlarge which is called endemic goiter, if not enough during the prenatal period and early childhood mental retardation may occur

ii. excess – goiters or a depressed thyroid activity

II. Zinc (11 mg a day)

A. Functions

i. helps certain enzymes release oxygen from lungs

ii. aids in digestion of proteins

iii. helps heal wounds and form blood

B. Sources

i. meat, poultry, seafood, eggs, milk

C. Too much or Too little

i. deficiency – poor night vision or poor wound healing

ii. excess – rare, but can cause problems with copper absorption

III. Fluoride(4 mg a day)

A. Functions

i. helps prevent dental carries

ii. maintains healthy bones

B. Sources

i. drinking water, toothpaste

C. Too much or Too little

i. deficiency – cavities

ii. excess – brown stains on teeth

IV. Water (8- 8 oz glasses a day minimum 64 oz., new recommendation is ½ of your body weight in ounces)

A. Functions

i. aids in proper digestion and cell growth and maintenance

ii. lubricates the joints and body cells and helps regulate body temperature

iii. carries nutrients, eliminates waste

B. Water intake and excretion

i. 80% of water intake come from liquids you drink

ii. 20% of water intake comes from food you eat

iii. body excretes water through kidneys as urine

iv. excretes remaining water through skin and lungs

v. body loses 2 to 3 quarts of water a day