CHRISTIAN LIVING EDUCATION

Original Unity of Man and Woman in Humanity

Gen. 2:18 – 24: From the **first act of creation** to the **last act of creation**. The creation of man happened. God created for His necessity to live. **Adam** (fell in solitude) being alone in the world without being like him.

Gen. 2:18: God created the best partner for the man – the female **Eve** (the other half). "It is not good for the man should be alone, I will make him a helper fit for him."

Gen. 2:21: "God put the man asleep, took one of his ribs, covered the wound with flesh, then creating the woman from the man's rib."

Gen. 2:23: "This at last is bone of my bones and flesh of my flesh – she shall be called woman, because she was taken out of man."

Creation of God in woman was described separately and the feature must have before eyes and the same time have the "Image of God in the first narrative creation. The second narrative creation keeps the form of a dialogue between man and God creator.

Woman is created in a sense based on the **same humanity** in spite of the **differences** in constitution bound up with the **sexual differences**, is so evident that the man, on waking up from genetic sleep, expresses it once when he says. (See **Gen 2:25**)

Joy in the other human being, in the second self, **dominates the words** by the man on seeing the woman all this help to establish the full **meaning of original unity.**

Now if a person is good enough to handle his or her self like the person who is in the **right age** and is **responsible** enough to build a home will leave their parent **(Gen 2:24)**. To build their own family, they will seek for the **certain person** who is the **most compatible** with them to be with them and whom they will spend and whom they will spend the rest of their lives with. In that way, a **new family** is built.

According to the Bible, God gave Adam a partner, Eve, because God knows **man is bound to have companion** and **cannot live a lonely life**. This was made so that men in general will have someone **to lend him a hand**. Thus, a **couple is composed of a man and a woman** that is **compatible** with each other because they have **unity** to make their **relationship** work.

Sacramentality of Marriage

What is the Sacrament of Matrimony/Marriage?

- The sacrament made by Jesus Christ to sanctify the lawful union of a Christian man and a Christian woman

What does the Sacrament do for a couple?

1. It unites them in an indissoluble (unbreakable) union until death
2. It makes sanctifying grace grow in their souls
3. It gives them special helps to perform their duties as married people; and
4. To overcome the difficulties that may come into their married life

Who may receive the Sacrament of Matrimony?

- Only those who have been baptized and are free to marry

What is necessary to receive this Sacrament worthily?

- You have to be free of mortal sin
- **Mortal** – great sin, which removes from us the sanctifying grace of God

What kind of sin is it to receive this Sacrament unworthily?

- A mortal sin of sacrilege
- **Sacrilege** – it is to desecrate people, things or places consecrated to God

Who are the ministers of this Sacrament?

- The bride and the groom are the ministers of their marriage

ENTREPRENEURSHIP

Chapter 6 Organizational Plan

- Section of business plan that identifies form of ownership the business venture will take.

Organizational Plan consists:

- Background of the management team
- Organizational structure
- Management team's role, responsibilities and relationship
- Outline of the plan
- Decision-making
- Monitoring
- Evaluation processes

Forms of Ownership

1. Sole proprietorship
2. Partnership
3. Corporation

	SOLE PROPRIETORSHIP	PARTNERSHIP	CORPORATION
Ownership	One person	No limit on no. of partners	No limit on no. of shareholders
Cost and Ease of Starting the Business	Low; easy	Low; relatively easy	High; more difficult
Liability of Owners	Unlimited; risk shouldered by owner alone	Unlimited for general partner; limited for limited partners	Stockholders typically not liable beyond their investment
Shares of Profit and Losses	Owner receives all profits and caries all losses	Depends on partners' investments and on agreements of partners	Stockholders can share in profits through dividends
Management Control	Owner makes all decisions	General partners have equal control, and majority rules	Majority stockholders have control from a legal standpoint
Ability to Raise Capital	Limited	Moderate	High
Transferability of Ownership	Fully transferable	Typically requires consent of partners	Stockholders can sell or buy stock at will
Continuity of Business	Owner's death dissolves the business	Death or retirement of general partner dissolves the partnership	Death or withdrawal of owner(s) does not affect the business's legal existence

Organization Structure

1. **Business owners**
   - Name
   - Qualifications
   - Previous Entrepreneurial Experience
   - Capital Contributions
2. **Management team**
   - Name
   - Job Title, Details and Responsibilities
   - Qualifications
   - Managerial Experience
3. **Business advisers**
   - Also known as Consultants – a group of individuals that the company invites to provide their inputs and insights on how to run the business.

Lesson 7 Financial Plan

- Includes financial projections of new ventures
- It must:
  - Provide a summary of the projected sales, cost of goods sold and general and administrative expenses of the business
  - Anticipate the amount and timing of expected cash inflows and outflows
  - Provide a summary of the assets, projected liabilities and potential retained earnings

Sales Forecast

- Estimated future sales

Operating Budget

- Consists of all revenues and expenses over a period of time which a corporation uses to plan its operation

Projected Income Statement

- It summarizes the profit (or loss) the company expects to generate within the year
- Also referred to as Profit or Loss Statement

Cashflow Projections

- It breaks down how much cash is coming into your business vs. how much is going out

Projected Balance Sheet

- Summarizes the assets, liabilities and net worth of the business
    - **Assets** – refer to everything that the business owns that can be used to create value
    - **Liabilities** – these represent everything that the business owes to bank and creditors
    - **Owner's Equity / Shareholder's Equity** – represents the excess of all assets over all liabilities. This is also known as the net worth of the business.

Breakeven Analysis

- Refers to the volume of sales at which the business neither makes a profit or incurs a loss
- The break-even sales point indicates how many units of the product of the business must sell to cover both variable and fixed cost expenses
    - **Fixed Cost** – pre-determined expenses that remain the same throughout a specific period
        - Salaries
        - Rent
        - Utilities
        - Sale expense
        - Insurance
        - Depreciation
    - **Variable Cost** – it changes over a specific period and is associated directly to the business activity
        - Direct labor materials
        - Commissions
        - Taxes
        - Operational expenses
- Formula to compute the Break-even Quantity
    - $BEQ = \frac{Total\ fixed\ cost}{Selling\ price - Variable\ cost/unit}$

Chapter 8 Managing the Marketing Function

Understanding How Customers Make Decisions

- Operative needs and wants
- Past experiences
- Personal values

Several Stages a Potential Customer Goes Through Before Making a Purchase (sauluhin)

a. Recognizing a need or want
b. Seeking or retrieving information
c. Evaluating choices
d. Making a purchase
e. Assessing the product or service experience

Recognizing a need or want

- Internal stimuli (Ex. Feeling hungry)
- External stimuli (Ex. Seeing a commercial)

Seeking or retrieving information

- It is important for the product or the service to have means of being known to the public and to have features that will make the consumers make it a part of their consideration or choice set.

Evaluating choices

- Consumers may evaluate their options with a rational approach or by responding through their emotions**.**
- **Belief** – something one accepts as true or real
- **Attitude** – a settled way of thinking or feeling about someone or something

Making a purchase

- Consumers make a decision not limited to the product/s alone when purchasing:
    - Where to buy?
    - When to buy?
    - How many items to buy?
    - How to pay the items?

Assessing the product or service experience

- It does not end when the consumers have purchased your product/s. The consumers then on rate their experience then decides whether to buy again or recommend it to others. Your product/s could:
    - Fall short of their expectations
    - Meets their expectations
    - Exceeds their expectations
- How customers react with dissatisfaction
    - Exit option
    - Finding ways to increase brand awareness, to
    - improve the customers' attitude toward the
    - brand, and to project an ethical image to the
    - public may improve brand equity.Voice option

Cultivating Customer Relationships

- An entrepreneur's goal is not to sell their product only once, but to have a high number of sales from satisfied customers. Cultivating a healthy buyer-seller relationship is thus important.
- **Customer Equity**
    - **Three Types of Customer Equity**
        - **Value Equity** – customer's objective assessment of the utility of a product or service based on his perception of what he is giving up for what he is receiving
            - Finding ways to look into issues related to prices, quality and convenience may improve value equity.
        - **Brand Equity** – customer's subjective and intangible assessment of the brand, above and beyond its objectively perceived value
            - Finding ways to increase brand awareness, to improve the customers' attitude toward the brand, and to project an ethical image to the public may improve brand equity.
        - **Relationship Equity** – is the customer's tendency to sticks with the brand above and beyond his objective and subject
            - The business can introduce loyalty programs, community-relations programs, knowledge-building programs to improve relationship equity.

Customer Loyalty

- **Ways to build loyal customers:**
    - Frequency program
    - Personalize customer relationships
    - Add structural ties with the customer

Brand

- It is a category of products that are all made by a particular company
- Choosing brand elements
    - Brand names
    - Logos
    - Symbols
    - Mascots
    - Jingles
    - Slogans
- Qualities to consider:
    - Memorable

- Meaningful
- Likeable
- Humorous

Chapter 9 Managing the Operations Function

Establishing a Business

- Earning a profit is the main objective
- Profit = Revenues – Cost of production
- Production process is the core of business

Operations Management

- Administration of the production and its related activities is referred as "Operations Management of a business enterprise"
- Major component in the implementation of business plan

Concepts of Operations Management

- Management that deals with planning, implementing and monitoring the process of producing goods and services
- Deals with the whole process from planning to assessing the performance of the produced goods
- Involves warehousing, maintenance, inventory and quality control

Operations Manager

- Plans the structure of production
- Identifies the output to be produced, resources needed, procedures on how resources are used
- Supervises the mixing of resources
- Assessing the performance of production

Assessing the Performance of a Business Enterprise

1. Performance Effectiveness
2. Performance Efficiency

Performance Effectiveness

- How the objective is achieved by the output
- How the output addresses the necessity of the
- consumers
- Roberto's MADI questions
- Can also be assessed in terms of:
  - Quality
  - Speed
  - Dependability
  - Flexibility

Performance Efficiency

- How the output is realized through the use of resources
- Evaluation of performance through cost
- Maximizing resources with minimized cost
- Effectiveness and survival in the market are based on the efficiency
- More appropriate evaluation of performance than effectiveness

Framework for Analyzing the Operations of an Enterprise

1. System Approach
2. Value-Chain Approach

System Approach

- Relationship between input and output
- Three major components include:
  - Input
  - Process
  - Output
- Called IPO
- **Inputs**
  - Resource Inputs (5Ms)
    - **Materials** – semi-processed goods that will be subjected to further transformation in the production process.
    - **Manpower** – human resource input used in the production process
    - **Machinery** – represents all man-made physical capital used in the production process
    - **Method –** denotes the process of combining raw materials and how there are going to be transformed using other factor inputs of production
    - **Money –** financial resource used to purchase all the resources

needed by the firm for its operations
    - These are grouped into two:
        - Intermediate Inputs – raw materials
        - Factor Inputs – transforming raw materials into its finished product
- **Process**
    - Various form of transformation that factor inputs perform on the materials.
    - Determined by the type of commodity to be produced and the technology being used in production
    - **5 Various Forms of Transformation**
        - **Physical Transformation** – processing raw materials into altered new products
        - **Locational Transformation** – product changes its location through various means of transportation and communication
        - **Informational Transformation** – knowledge and specialized skills are transmitted to customers
        - **Exchange Transformation** – commodity is transmitted from the supplier to its buyer
        - **Extractive Transformation** – natural resource is taken out from its habitat
- **Output**
    - Result of the production process
    - Most important component
    - **Outputs of Production Based on the Type of Transformation**
        - Outputs from physical transformation
        - Outputs from locational transformation
        - Outputs from information transformation
        - Outputs from exchange transformation
        - Outputs from extractive transformation

Value-Chain Approach

- How factor inputs add in the value of raw materials
- Cost of Processing is consists of the various costs of transforming inputs.
- Value-added:
    - Summation of wages
    - Interest
    - Rent
    - Royalty
    - Profit

Measures of Productivity

- Measuring output relative to the value of inputs used in production
- Output is measured through volume and monetary values
- Input is measured through physical units and monetary values
- A productive business is being able to produce more output per unit of input
- Every factor input differs in physical measures

Measures of Partial Productivity

- Average productivity of labor
- Average productivity of capital
- Marginal productivity of labor
- Marginal productivity of capital

Average Cost

- Reciprocal of average productivity
- Measures of cost:
    - Average cost
    - Marginal cost

Ways of Improving Firm's Productivity

- Increase output per unit of input
- Output-enhancing factor inputs
- Reduce cost of production
- Motivating leaders

Balanced Scorecard – A way of Reckoning Effectiveness

- Reflects not only the output but also the interests of stakeholders
- Various stakeholders:
    - Shareholders
    - Managers
    - Workers
    - Customers
    - Government
    - General Public

Perspectives

- **Learning and growth perspective** requires constant training of the workforce and inculcation among employees
- **Business process perspective** views internal processes
- **Customer perspective** means customer-focused, appealing products and brand loyalty
- **Financial perspective** means accurate financial data reassures shareholders

GENERAL BIOLOGY 2

Lesson 7: Circulatory System

Three Main Features of the Circulatory System

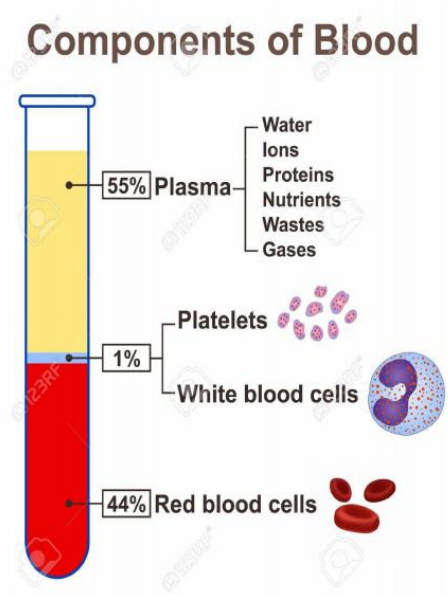
1. **Fluid**: blood/hemolymph
2. **Blood Vessels**: veins, arteries, capillaries
3. **Heart**: pumps out the blood

Types of Circulatory System

1. **Open** – no blood vessel (arachnids, myriapods, crustaceans)
2. **Closed** – has blood vessel (human)

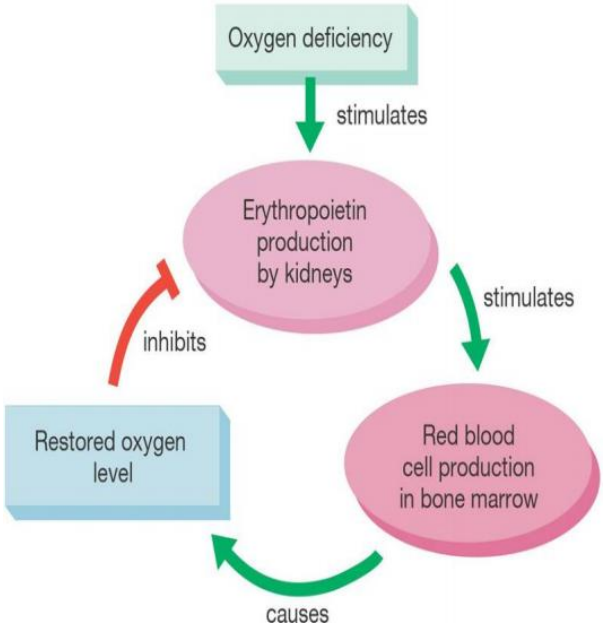
Components of Blood

1. Plasma
2. Red Blood Cells
3. White Blood Cells
4. Platelets



Red Blood Cells

- Disc-shaped cells that lose their nucleus at maturity
- 99% of the blood's cellular component.
- Red color is due to **hemoglobin**.
  - **Hemoglobin**
    - Made up of **four protein strands**.
    - Each hemoglobin molecule can carry **four oxygen atoms**.
    - Presence of oxygen turns hemoglobin bright red.
  - **RBC Lifespan**
    - 4 months / 120 days
    - **Erythropoietin** – is a hormone produced primarily by the kidneys. It plays a key role in the production of red blood cells (RBCs), which carry oxygen from the lungs to the rest of the body.



White Blood Cells

- Defense against diseases

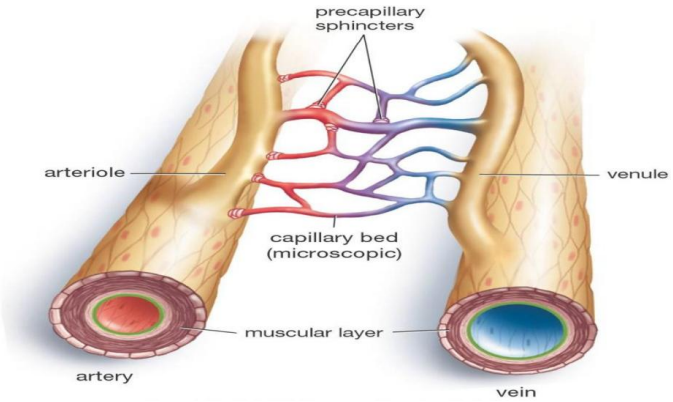
Platelets

- Used in blood clotting.
- A short lifespan, usually about 10 days.
  - **Blood Clotting**
    - Platelets aggregate at the site of a wound.
    - Broken cells and platelets release chemicals to stimulate thrombin production.
    - Thrombin converts the protein fibrinogen into sticky fibrin, which binds the clot.

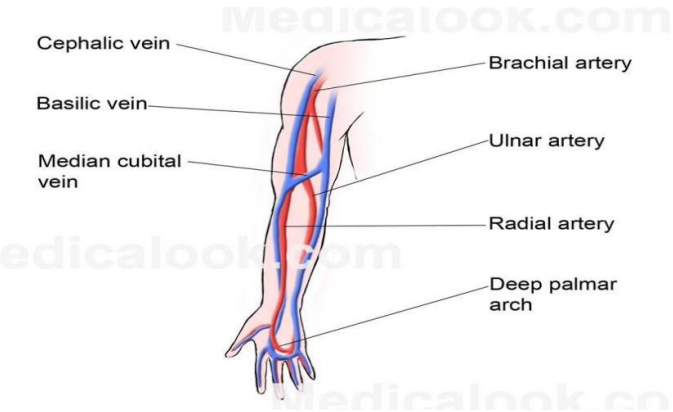
Classes of Blood Vessels

1. Arteries and arterioles
2. Veins and venules
3. Capillaries

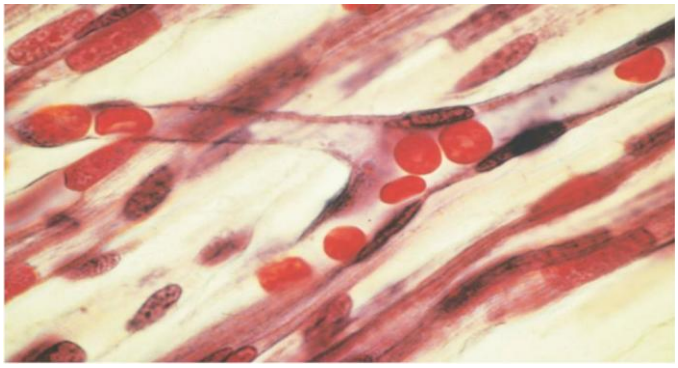
Arteries and Arterioles



Veins



Capillaries



Atherosclerosis

- LDL cholesterol forms plaques in arteries, triggering inflammation.
- The immune system forms a hard cap over the plaque, partially blocking the artery. Caps can rupture, creating clots that can close off an artery.

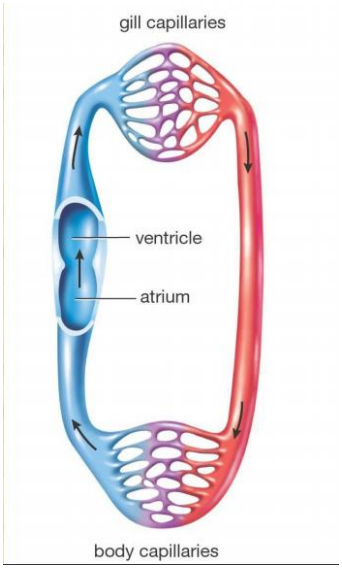
Preventing Heart Attacks

- Both **genetic and environmental factors** contribute to atherosclerosis.
- Low-fat diet that emphasizes high-fiber foods and "good" fats (monounsaturated fats, omega-3 oils).
- Regular exercise

The Vertebrate Heart

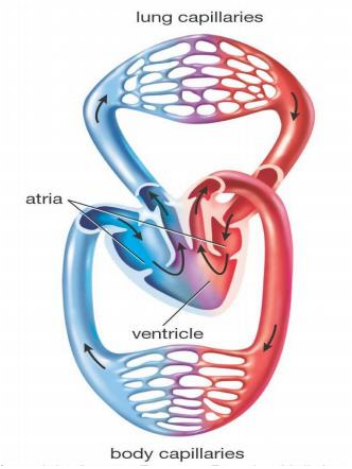
- Two types of chambers
  - **Atria**
  - **Ventricles**

Two-Chambered Heart

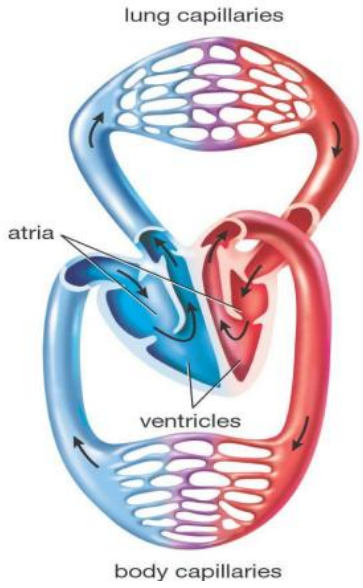
- Seen in fishes
- A single atrium receives blood from the body cells.
- A ventricle sends blood to the gills to collect oxygen.
- 

Three-Chambered Heart

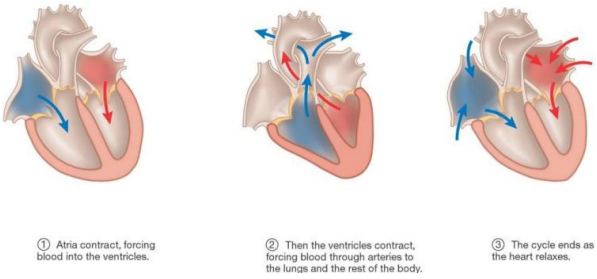
- Seen in reptiles and amphibians
- Separate atria allow some separation of oxygenated and deoxygenated blood, which was an advantage for land organisms.

- 

Four-Chambered Heart

- Seen in birds and mammals
- Allows complete separation of oxygenated and deoxygenated blood.
- 

Dual Pump Operation

- The four-chambered heart acts as two pumps
- 

Sinoatrial Node

- The nervous tissue that times heart beats.
- It causes atria to contract, and sends the signal to the atrioventricular (AV) node to signal the ventricles to contract.

Blood Pressure

1. **Systolic Pressure** – pressure when the heart contracts.
2. **Diastolic Pressure** – pressure between heart beats.

Lesson 8: Nervous System

Two Main Parts of the Nervous System

1. Central Nervous System
2. Peripheral Nervous System

Central Nervous System

- Made up of **brain** and **spinal cord**.

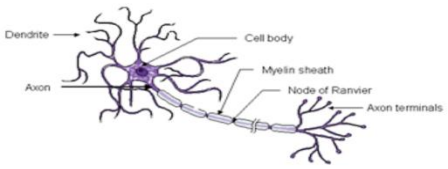
Peripheral Nervous System

- Made up of **all the nerves** that carry messages to and from the central nervous system.

Two Parts of the Peripheral Nervous System

1. **Somatic Nervous System**
   - Relay information between skin, skeletal muscles and central nervous system
   - Reflexes
2. **Autonomic Nervous System**
   - Relay information from central nervous system to organ
     - Sympathetic Nervous System (in motion)
     - Parasympathetic Nervous System (at rest)

Neurons

- The basic unit of structure and function in the nervous system
- Cells that conduct impulses
- Made up of dendrites, cell body and an axon
- 

Three Types of Neurons

1. Sensory Neurons
2. Interneurons
3. Motor Neurons

Brain

- It has three main sections:
    - Cerebrum
    - Cerebellum
    - Brainstem

Cerebrum

- Divided into four lobes:
    - **Temporal Lobe** – having to do with memory, emotion, hearing, and language
    - **Frontal Lobe** – having to do with decision making, problem solving, and planning
    - **Parietal Lobe** – concerned with reception and processing of sensory information from the body
    - **Occipital Lobe** – concerned with vision

Cerebellum

- Muscle coordination is developed here as well as the memory of physical skills.

Brainstem

- Made up of the medulla oblongata, pons and midbrain
    - **Medulla oblongata** controls involuntary activities such as heart rate and breathing
    - **Pons and midbrain** act as pathways connecting various part of the brain with each other

Major Nervous System Diseases		
Disease	**Number of Cases**	**Cost per year**
Chronic Pain	97,000,000	$100 billion
Hearing Loss	28,000,000	$56 billion
Depression Disorders	18,700,000	$30.4 billion
Alzheimer's Disease	4,000,000	$90 billion
Stroke	3,800,000	$40 billion
Epilepsy	2,500,000	$3.5 billion
Traumatic Head Injury	2,000,000	$25 billion
Schizophrenia	2,000,000	$32.5 billion
Parkinson's Disease	1,000,000 to 2,000,000	$25 billion
Multiple Sclerosis	350,000	$2.5 billion
Traumatic Spinal Cord Injury	250,000	$5 billion

Lesson 9: Immune System

Functions of the Immune System

- It is a collection of mechanisms that protects against disease by identifying and killing pathogens and tumor cells
- A **pathogen** is an organism or virus that causes a disease or disorder
- The Immune System detects a wide variety of agents, from viruses, bacteria, fungi and parasites
- Needs to distinguish them from our own healthy cells and tissue

Pathogen Types

- **Infectious Diseases** are caused by a **pathogen** – an organism or virus
- **Pathogens** include various types of **bacteria**, **viruses**, **fungi** and **protists**
- Infectious diseases include: **measles**, **mumps**, **pneumonia**, **chicken pox**, **HIV & AIDS**, etc.

The Body Defenses (Three Lines of Defense)

- 1st Line: Barriers keep pathogens away
- 2nd Line: Inflammatory Response
- 3rd Line: The Immune Response

First Lind of Defense

- Barriers keep pathogens from successfully attacking the body
- **Skin** – waterproof barrier with destructive oils and sweat to help kill off pathogen

- **Breathing Passages** – nasal passages, trachea, bronchi and lungs lines with ciliated epithelial cells that secrete mucus and moved "captures" pathogens up and out of the respiratory tract to be expelled or swallowed
- **Mouth & Stomach** – saliva and stomach acids aid in killing off pathogens

Second Line of Defense

- Inflammatory Response
- Damaged cells trigger the release of **histamines**
- Blood vessels dilate (widen & enlarge) causing increased blood flow
- They leak plasma and white blood cells to the area
- Causes swelling, redness, tenderness and fever

Third Line of Defense

- The Immune Response
- **White Blood Cells** – phagocytes and lymphocytes
- **Phagocytes (Macrophage)** – attack, engulf and eats pathogens and destroys them
    - Three Main Types: ("-phils" latin suffi which means "love"
        - **Basophils** – least abundant WBC, "loves" base type strains
        - **Eosinophils** – "loves" eosin type strains
        - **Neutrophils** – most abundant WBC, "loves" neutral strains
- **Antigen** – usually a protein found on the cell membrane of the pathogen that has attacked the body
- **Antibody** – protein (non-living) that reacts with antigen to mark the pathogen allowing it to be recognized and then eaten by a phagocyte
- **Lymphocytes** – produce antibodies
    - **T Cells** – made in the Thymus Gland
        - Over 10 million in your body, each able to recognize specific antigens. Some attack and kill invading pathogen and some stimulate B cells to activate
    - **B Cells** – made in the Bone Marrow
        - Once activated, they produce thousands of antibodies that attack the pathogen

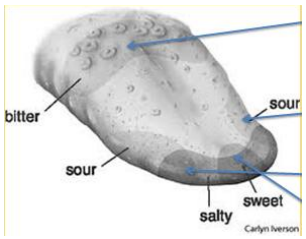
Lecture 10: The Senses

Sense of Touch

- The **skin** allows us to have the sense of touch
- Functions of the skin:
    - Protects the body from infection, injury and water loss
    - Maintains body temperature
        - Help us regulate body temperature through perspiration.
        - Without the nerve cells in our skin, we couldn't feel warmth, cold, or other sensations.
        - **Sweat** – cools off the body
        - **Goosebumps** – keep the heat in
- The nerve endings in your skin can tell you if something is hot, cold, smooth or rough. They can also feel if something is hurting you. Your body has about twenty different types of nerve endings that all send messages to your brain.
- Three Layers of the Skin
    - **Epidermis** (outer layer)
        - It is the tough, protective outer layer.
        - It is about as thick as a sheet of paper over most parts of the body
        - Constantly flaking off and being renewed
    - **Dermis** (middle layer)
        - The dermis contains:
            - **Nerve endings** – how things feel
            - **Blood vessels** – carry blood
            - **Oil glands** – produce sebum
            - **Sweat glands** – produce sweat
    - **Subcutaneous** (bottom layer)
        - Made mostly of fat
        - Helps your body stay warm

- Absorb shocks
- Each hair on your body grows out of a tiny tube in the skin called a **follicle**
- Every follicle has its roots way down in the subcutaneous layer and continues up through the dermis

Sense of Taste

- **Tongue** – is the sense organ that detects flavor
- Inside the grooves of the tongue, there are many **taste buds** which are taste receptors
- Three Functions of the Tongue
  - Eat
  - Taste
  - Speech
- The tongue moves and pushes a small bit of food along with saliva into your **esophagus**, which is a food pipe that leads from your throat to your stomach.
- The top of your tongue is covered with a layer of bumps called **papillae**
- Papillae help grip food and move it around while you chew.
- They contain your taste buds, so you can taste everything.
- Process to taste food:
  - Flavoring chemicals in food dissolve in the **saliva**
  - Stimulates the taste buds to send messages to the **brain**
  - Messages are sent to the brain to give us the **taste** of the food
- Humans have four kinds of taste buds.
- They can detect four kinds of tastes: sweet, sour, salty and bitter.
- Each kind of taste buds is not evenly distributed on the tongue. Thus, certain parts of the tongue are more sensitive to a particular taste than the others.
- 

Sense of Smell

- **Nose** is the sense organ that detects smell.
- There are millions of smell receptors inside our nose.
- Functions of the Nose
  - Smell
  - Taste
  - Breathe
- Process to Smell Food
  - When we breathe, some chemicals enter our nose
    - Chemicals dissolve in the mucus
    - Stimulate the smell receptors to produce messages
    - These messages are sent to the brain to give us the odor of the food
- We use both smell and taste to detect the flavor of food.

Sense of Hearing

- Functions of the Ear
  - Balance
  - Hearing
- Structures of the Ear
  - Outer Ear
    - **Ear Lobe** (pinna) – collects sound waves
    - **Ear Canal** – sound waves pass through to the ear drum
  - Middle Ear
    - **Ear Drum** – thin membrane that vibrates (stretched across ear canal)
    - **Ossicles** – three small bones which help carry the soud waves (hammer, anvil, and stirrup)
  - Inner Ear
    - **Cochlea** – coiled tube in the inner ear (snail shaped) filled with liquid and hair-like cells
    - **Semicircular Canal** – three small tubes in the inner ear which control your balance

        - **Auditory Nerve** – carries impulses from the ear to the brain
- How does it work?
    - Sound waves are collected in the outer ear.
    - Sound waves pass through our ear canal and cause our ear drum to vibrate.
    - These vibrations are sent to our inner ear by the ossicles.
    - The vibrations reach the cochlea. The fluid in the cochlea begins to move, this motion results in the hair cells sending a signal along the auditory nerve to the brain.
    - Our brain receives these impulses and interprets them as a type of sound.
- Ear Problems
    - **Infections** in the middle ear are the most common ear problems. Germs from colds in the nose or throat can spread through the Eustachian tube in the middle and inner ear.
    - **Hearing loss and deafness** – this can result from injury, disease, birth defects, and very loud noises.
    - **Audiologist** is someone who is specially trained to test and help with the problems related to hearing loss.

Sense of Sight

- Function of the Eye
    - Sight
- Structures of the Eye
    - **Cornea** – transparent coating which covers the iris and the pupil at the front of the eye
    - **Iris** – the colored part of the eye that regulates the amount of light entering the eye
    - **Pupil** – the opening at the center of the iris
    - **Lens** – a clear part of the eye behind the iris that helps to focus light or an image on the retina
    - **Retina** – the light-sensitive tissue lining at the back of the eye
    - **Optic Nerve** – a bundle of more than one million nerve fibers that carries visual messages from the retina to the brain
- How does it work?
    - **Light Rays** bounce off an object you are looking at.
    - Light then enters through the outer part of the eye, called the **Cornea**.
    - Next, light rays go through an opening called the **Pupil**.
    - Light passes through the lens on its way to the back of the eye.
    - The retina sees the world upside down, but the **Brain** turns it right side up.
    - When you look at an object, each eye sees a slightly different picture. The brain combines the images into one picture.
- Eye Problems
    - **Pink Eye** can cause redness, itching, inflammation or swelling, and a clear or white, yellow, or greenish gooey liquid to collect in the eyes.
    - **Nearsighted** someone can see stuff that's near, like a book, but has trouble seeing stuff that's far away.
    - **Farsighted** someone can see stuff that's far away, but has trouble seeing up close, like reading the print in a book.
    - **Astigmatism** misshaped cornea or lens causing objects to look blurry
- **Opthalmologist –** a medical doctor who specializes in examining, diagnosing, and treating eyes

Lesson 11: Introduction to Genetics

Genetics – branch of biology that deals with heredity and variation of organisms

Chromosomes – carry the hereditary information (genes)

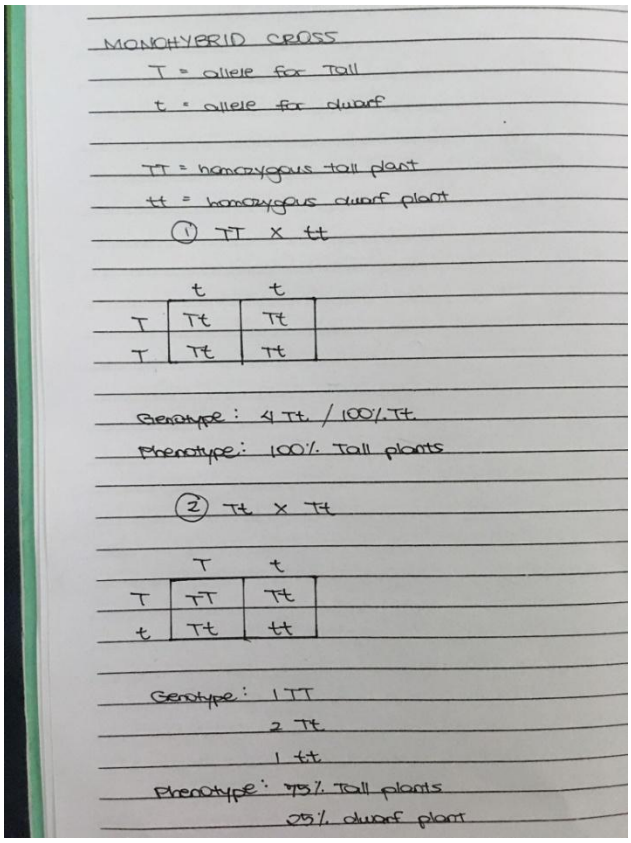
Gregor Johann Mendel

- Austrian Monk, born in what is now Czech Republic in 1822
- Son of peasant farmer, studied Theology and was ordained priest Order St. Augustine.
- Went to the university of Vienna, where he studied botany and learned the Scientific Method
- Worked with pure lines of peas for eight years

Genetics Terms

1. **Gene** – a unit of heredity; a section of DNA sequence encoding a single protein
2. **Genome** – the entire set of genes in an organism
3. **Alleles** – two genes that occupy the same position on homologous chromosomes and that cover the same trait (like 'flavors' of a trait)
4. **Locus** – a fixed location on a strand of DNA where a gene or one of its alleles is located
5. **Homozygous** – having identical genes (one from each parent) for a particular characteristic
6. **Heterozygous** – having two different genes for a particular characteristic
7. **Dominant** – the allele of a gene that masks or suppresses the expression of an alternate allele; the trait appears in the heterozygous condition (capital letter)
8. **Recessive** – an allele that is masked by a dominant allele; does not appear in the heterozygous condition, only in homozygous (small letter)
9. **Genotype** – the genetic makeup of an organism
10. **Phenotype** – the physical appearance of an organism (genotype + environment)
11. **Monohybrid Cross** – a genetic cross involving a single pair of genes (one trait); parents differ by a single trait
12. **P** – parental generation
13. **F_1** – first filial generation; offspring from a genetic cross
14. **F_2** – second filial generation of a genetic cross
15. **Punnett Square** – useful tool to do genetic crosses
    a. **4 boxes** – monohybrid cross
    b. **16 boxes** – dihybrid cross

Monohybrid Cross



Dihybrid Cross