Quizlet

Biology Unit 1

Terms in this set (65)

For something to be alive they need to have the characteristics:	Movement Reproduction Sensitivity (Response to surroundings) Homeostasis (internal condition control) Growth Respiration Excretion (waste excretion) Nutrition
Movement	- All living organisms can move - Plant move part of their body - Animals are locomotive (whole body)
Reproduction	- the production of offspring by a sexual or asexual process. - Offspring characteristics depend on DNA (information shared through cell division) - Asexual Rep. : Organisms divide into two (plants, bacteria) - Sexual Rep. : stem cells offspring takes DNA from both male and female (mix)
Sensitivity	- Organisms have the ability to respond to surroundings - Organisms can avoid dire situations - Humans have more functions responding to stimulus - Plants respond slower through slight movements ex. Nervous system vs Sunflower
Homeostasis (Control of Internal Conditions)	- Organisms go through homeostasis to regulate their internal conditions within their limits ex. Sweating to cool body temp. if it is too high. ex. Plants w/ little water prevent water vapor from escaping on warm days.
Growth	- All organisms grow and develop - Sexual reproduction: Offspring starts as an egg (zygote) and divides, slowly increasing size. - Plants start as a single stem, and continuously grow. - Plants develop fruits, which act as seeds for offspring.

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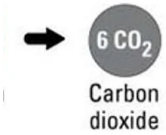
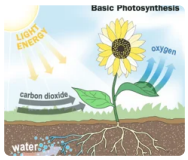
Respiration	- Happens in mitochondria - Release of energy stored within the body (chemical reaction) - Oxygen utilized, CO2 and water released as waste. - Energy stored for later used. (Breathing is not respiration) 
Excretion	- Metabolic reactions produce unwanted waste products. - Excretion: how waste products are removed. ex. CO2 from respiration ex. Oxygen from photosynthesis ex. Urea from kidneys ex. Water from plants
Nutrition	- Obtaining food - convert into energy - energy is used in various processes - Provides molecules to make up lining material - Autotrophic: Self feeding (Plants) - Heterotrophic: different feeding (Animals) - Saprotrophic: Feed on non living matter (fungi, bacteria) 
There are 5 kingdoms (organisms)	Animalia (Animal) Plantae (Plant) Fungi Protista (Protoctists) Monera (Bacteria)

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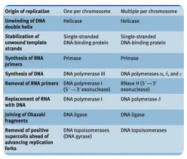
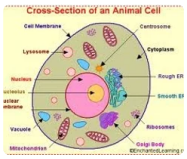
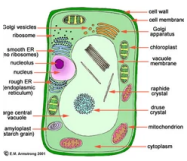
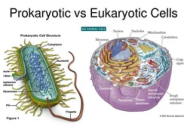
Eukaryotic vs Prokaryotic	Eukaryotic: - Contains nucleus - Distinct Membrane - Both unicellular and multicellular - Plants, Animal, Fungi, Protoctists Prokaryotic: - No nucleus - Nuclear material (chromosomes) in cytoplasm - Smaller than eukaryotic cells - Too small to have chloroplast or mitochondria - Bacteria 
Animals	- No chloroplasts - No cell wall - Store Carbohydrates (as glycogen) - Nervous coordination (nervous system) - Locomotive 
Plants	- Chloroplasts present (photosynthesis) - Cell wall present (cellulose) - Store carbohydrates (starch, sucrose) 
Fungi	- No photosynthesis - Cell wall present (chitin) - Body made of Mycelium - thread like hyphae - Saprotrophic (feed on decaying matter) - Parasitic (feed on living material) - Store carbohydrates (glycogen) 

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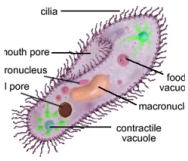
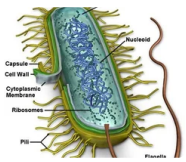
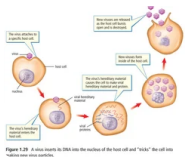
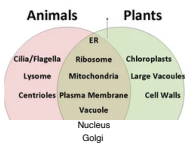
Protoctist	- Diverse group (dont fit other group types) - Microscopic and Unicellular (can be chains) - Often aquatic - Some have animal cell features (amoeba) - Some have plant cell features (algae) - photosynthesis ex. Paramecium 
Bacteria	- Unicellular w/ different shapes - Cell wall, cell membrane, cytoplasm, plasmids present - No nucleus (Chromosomes of DNA) - Some can do photosynthesis - Most are parasites, saprobiontic, decomposers (feed on dead organism) 
Viruses	- Pathogen - Microorganisms that cause disease - Very small particles (differ in shape/size) - Lack cellular structure - DNA or RNA covered in protein - Exist and reproduce only in living cells - Not considered alive - missing some characteristics ex. Bacteriophages: viruses that infect bacteria ex. Influenza 
The fundamental unit of all living things (matter):	cells
Organelles and Features in both Plant and Animal:	- Cytoplasm - Mitochondria - Ribosomes - Nucleus - Cell membrane 

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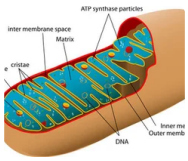
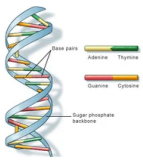
Cytoplasm	- Where cellular activities take place - Thick watery liquid - Organelles float and move within the cytoplasm (looks like small particles through microscope)
Mitochondria	- Sausage shaped organelles - Small specs under microscope - Enable Aerobic Respiration 
Ribosomes	- Complex particles (too small under microscope) - Enable protein synthesis (making proteins - enzymes) - Millions of ribosomes in one cell
Nucleus	- Where genetic information of cell is stored (DNA) - Info located in DNA (forming chromosomes) - Nucleus appears denser than cytoplasm - Info for cell features held in genes - Nucleus determines cell substances and controls its activities 
Cell Membrane	- Boundary between cytoplasm and surroundings - Controls what materials go in and out of cell (diffusion or active transport) - Many materials are kept in the cell. Some are prevented from entering.
Organelles and Feature only in Plants:	- Chloroplast - Cell Wall - Vacuole
Chloroplasts	- Sometimes found in bacteria and protoctists - Green disc shaped organelles - Enables photosynthesis - Green color present from chlorophyll pigment - Can be seen under microscope - Many plant cells do not have chloroplasts (roots)

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Cell Wall	- Plant cells surrounded by tough wall (composed of polymer glucose - cellulose) - Provides strength and protection for plants - Prevent deformation - Fungi - Cell Walls made of chitin - Bacteria - Cell wall made of polymer of sugars and Amino Acids
Vacuole	- Large region at center of plant (separated from cytoplasm by membrane) - For storage of minerals and water - Cell sap pushes cytoplasm providing cell rigidity - Animals can sometimes have small vacuoles
Specialized Cells have different functions:	- Root Hair Cell (plants) - Increases surface area for water absorption - Guard Cell (Plants) - Controls opening/closing of Stomata - Red Blood Cell (Animals) - No nucleus, contains hemoglobin, carries oxygen through body - Nerve cell - (Animals) nerve fiber sends nerve impulses
Levels of Organization:	- Large organisms are made of many individual cells that are categorized into levels: 1. Organelles: Parts inside a cell w/ specific functions. 2. Cells: The basic unit of a living organism 3. Tissue: Collection of similar cells w/ specific functions in organs. 4. Organ: Collection of tissues, each with assigned functions. 5. System: Grouped organs w/ assigned function within the organism
Stem cells and cell differentiation:	- All multicellular organisms start as one fertilized egg cell (zygote) - The zygote splits into two, and process repeats until body is made up of billions of cells - As human embryo grows, genes in cells are switched on or off (active/inactive) differentiating each other (250 types) - Totipotent (cell potential) stem cells have potential to become any kind of specialized cell - The final combination of genes determine what specialized cells they become - Human adults have a small number of stem cells that transform when different cells are damaged/killed by accident or disease

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Stem Cell Therapy:	- Stem cells are used in biomedical research as 'stem cell therapy', where they are injected into damaged areas to replace the missing cells of the organ - To get the stem cells, we have to get them from human embryos (cause Ethical Dilemma) - A solution is to get differentiated cells from adults and turn them into stem cells - A drawback is that when injected, they are expected to divide by natural body signals, but if it fails, it can lead to cancer Disadvantages: - Rejection - Ethical Beliefs - Viral Infections
What are Biological Molecules	Building blocks that make up the body
Water:	- Most abundant in all living cells (often in vacuoles) - Substances are found dissolved in water inside the cytoplasm, between cels, and inside transport systems. - Acts as a lubricant (peristalsis - contraction and relaxation of muscles) - Water forms the basis of liquids for transport - Respiration of sugar forms water - Significant in reaction w/ CO2 during production of sugar in photosynthesis - Pant growth needs a lot of water, which forms cell sap in vacuoles. A larger vacuole makes the cell turgid and provides support
Elements of Carbohydrates - Made of...	Hydrogen, Carbon, Oxygen Carbo - Hydr - ate Simple sugars
Elements of Lipids - Made of...	Hydrogen, Oxygen, Carbon, Nitrogen, Phosphorous Fatty acids, glycerol
Elements of Proteins - Made of...	Hydrogen, Oxygen, Carbon, Nitrogen, Sulfur Amino Acids
What are the purposes of Carbohydrates? Where do we get them from?	Used by the body for aerobic respiration to release energy. Also used for structural support. We get them from foods (pasta, potato) in the form of starch.

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Examples of Carbohydrates:	- Glucose - Maltose - Sucrose - Lactose - Starch - Glycogen - Cellulose - Chitin
Glucose:	- $C_6H_{12}O_6$ - Monosaccharide - Plants obtain glucose through photosynthesis - Animals obtain glucose from digested food - Glucose is used by cells for respiration (broken into CO_2 and H_2O + energy ATP in aerobic respiration) - Energy bonding the atoms released (ATP) ex. Sugary Drinks, Grapes, Honey
Maltose, Sucrose, Lactose	- Disaccharides - Maltose made of 2 glucose molecules joined - Sucrose made of 1 glucose and 1 fructose joined ex. Maltose: French Bread, Pancakes ex. Sucrose: Cookies, Chocolate
starch, glycogen	- Polysaccharides - Glucose molecules can be stored - Plants: Glucose stored as starch (efficient way of storing in small spaces) - Starch is insoluble, and cannot be washed away easily - Animals: Glucose stored as glycogen - Glycogen is insoluble, and smaller than starch - Starch breaks down into maltose - Glucose stored in the liver as glycogen and released when body glucose level in blood drop too much ex. Starch: Potatoes/fries, banana

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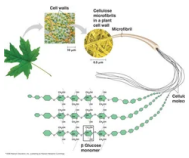
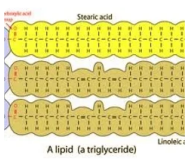
Cellulose (and chitin)	- Makes plant cell wall - Polysaccharide - Made up of chains of glucose molecules - Chains twist to become strong fibers and wrap around a plant (support) - Humans do not have enzymes to breakdown cellulose, but herbivores have bacteria (intestines) that digest cellulose - In woody plants, cellulose cell walls are reinforced with lignin (a stiff substance) 
What is Starch good for? What does it save sugars as? Where can it be found?	It is good for storage It saves sugars as glycogen It can be found in the Liver, and Muscle cells (for respiration)
There are three types of saccharides... What are examples of each?	- Monosaccharides (single) - Glucose, Fructose - Disaccharides (two/double) - Maltose, Sucrose, Lactose - Polysaccharide (many) - Cellulose (cell wall), Starch, Glycogen, Chitin (fungi cell walls)
Random - what are bacteria cell walls made of?	Peptidoglycan
All carbohydrates have a formula: What is the formula for a Hexose? What is the formula for a Pentose? What does Oligo(saccharides) mean?	Formula is: C H2 O Hexose: C6 H12 O6 Pentose: C5 H10 O5 Oligosaccharides means 3 to 10 monosaccharides
Example of Lipids What does a triglyceride have? (Lipids molecules)	Fats, Oils, Waxes, Hormones 3 fatty acids connected to 1 glycerol 

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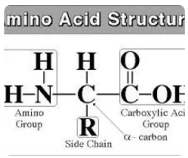
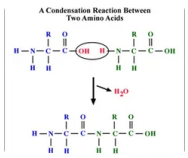
Lipids:	- Energy-rich organic compounds - Lipids are hydrophobic (do not mix with water) - Cell membranes are mostly lipids - Lipids can store chemical energy to be used when lacking food - When there is excess energy, lipid adipose (fat) cells swell - In humans, adipose cells are located just under skin (provide insulation, conserving heat, protecting skin from damage, and a 'shock absorber')
What are the functions of Proteins?	- Growth and repair of tissues - Hemoglobin (RBC) - TRANSPORT (of oxygen) - Enzymes - METABOLIZE (speed up reactions) - Antibodies - NEUTRALIZE (immune system)
Proteins:	- Composed of a chain of Amino Acids - Made up of a selection of 20 different amino acids - The larger, the more amino acids contained - Chains twist to specific shapes, which determines its biological properties - Plants make Amino Acids by using nitrate ions from soil. - Animal, Fungi, Bacteria: get Amino Acids from nutrition. - Amino acids are not stored in human bodies
Structure of Amino Acids	
Formation/bonding of Amino acids (to make a protein)	Two amino acids bond, removing OH from the right and H from the left, making water (which is removed in dehydration synthesis) This forms a peptide bond (or a glycosidic bond) The opposite happens when two amino acids break to form a monomer from a polymer) monosaccharide - monosaccharide 

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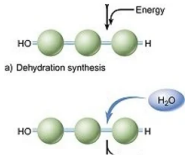
Dehydration Synthesis or Hydrolysis	Dehydration Synthesis: Removes a water molecule forming a new bond (joining monomers into polymers) - In starch Hydrolysis: Breaks a polymer, and adds a water molecule (breaking polymers into monomers) - In Salt NaCl 
Testing: Reducing Sugars (solution, method, colours)	Benedicts test (Benedicts solution - Blue) Works with monosaccharides and disaccharides - both reducing sugars. - Unknown Solution - Add Benedicts solution - Heat test tubes with water for around 5 minutes (precipitate - compound is formed) - If clear blue, there is no reducing sugars - If Green, there is low reducing sugars - If Orange, there is medium reducing sugars - If Brick Red, there is high reducing sugars. For sucrose: - Can be hydrolysed into glucose and fructose by adding dilute (not concentrated) Hydrochloric Acid (HCl) - sucrose is a non reducing sugar, made out of glucose and fructose which are reducing sugars. - Boil for 5 minutes with only HCl (acid solution) - Add sodium hydrogen carbonate (NaHCO3) (base solution) to neutralize. - Add Benedicts solution and heat for 5 mins - Sample will change color to brick red if there is a high concentration of reducing sugars.
Testing: Proteins (solution, method, colours)	Biuret Test (Biuret Reagent - Blue) - Unknown Solution - Add Biuret Reagent - Shake for every drop If no peptide bonds present - Stays clear If peptide bonds present - turn purple
Testing: Lipids (solution, method, colours)	Emulsion Test (many forms: lipids, oil, fat, hormones) - Ethanol (alcohol) is added to fat and oils (clear color) - Test tube is shaken (with cap) - Lipids dissolve in ethanol - Add solution to pure water (insoluble) If separated - positive (cloudy/milky emulsion forms)

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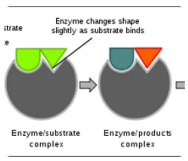
Testing starch (solution, method, colours)	Iodine - Orange Brown - Unknown Solution - Add few drops of Iodine If starch is present - turn Blue-Black If starch not present - stays iodine color (orange brown)
Enzymes:	- Metabolic reaction is a chemical reaction occurring in a living cell - Most metabolic reaction are catalyzed by enzymes (biological catalysts) - Enzymes speed up metabolic reactions. They do not permanently change from the reactions - Enzymes are proteins. Their properties are based on their protein structure
Series of Enzyme reactions	- A different enzyme catalyses each time ex. Starch (Amylase) ---> Maltose (Maltase) ---> Glucose 
process of enzymes	- Active site - where molecules (substrates) of reactions meet. - Shapes of active site precisely fits one substrate only - The substrate meets at the active site to make product of the reaction - Active site catalyses reaction by lining up substrates to exchange atoms w/ each other - Reactions can occur without any requirements (heating, etc) - When a product is made, it is released from the active site which is then replaced by a set of substrates - Enzymes are unchanging, therefore, can repeat the process many times over 
Enzymes (continued):	- Product of an enzyme catalysed reaction becomes substrate of another reaction. (Starch - Maltose - Glucose) - Metabolic pathway - High temp. or extreme pH can cause an enzyme to become denatured - enzyme changes shape and precise fit is lost - Enzymes work best in Optimum Conditions - particular conditions - If not in optimum condition, they work less or do not work at all

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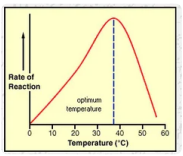
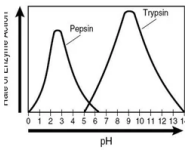
Temperature (enzymes)	- Low temp. (water freezing point) - enzymes and substrate molecules are slower (due to lack of kinetic energy). Enzyme rates slow down. - In higher temperatures, enzymes and substrates move faster, and therefore rate of reaction increases. - If above optimum working temp, enzyme shape can distort (denature) - Denatured enzyme cannot catalyze reactions - Denatured enzyme cannot return to original shape ex. Humans - optimum temp. of 37° c ex. Plants - optimum temp. of 15° c (roughly) 
pH (enzymes)	- Most enzymes in cells work at optimum pH of 7 - pH condition can vary outside of a cell ex. In stomach (protease pepsin), enzymes work best at pH of 2 ex. In mouth (salivary amylase), enzymes work best at pH of 8 
Common Enzymes examples:	- Maltase (small intestine) Sub: Maltose Prod: Glucose - Amylase (pancreas) Sub: Starch Prod: Maltose - Lactase (small intestine) Sub: Lactose Prod: Glucose and Galactose - Trypsin (small intestine) Sub: Protein Prod:Amino Acids (and peptides) - Lipase (pancreas) Sub: Lipids Prod: Fatty acids and Glycerol