(Biology\_EOC\_review)

1. **Macromolecules**
2. **Carbohydrates (pg 45-46)**
3. What elements make up carbohydrates?

Carbon, hydrogen and oxygen

1. Circle the letter of each sentence that is true of carbohydrates
   1. Starches and sugars are examples of carbohydrates
   2. Living things use them as their main source of energy
   3. The monomers in sugar polymers are starch molecules
   4. Plants and some animals use them for strength and rigidity
2. Single sugar molecules are also called monosaccharides (these are the **monomers** of carbohydrates)
3. What are polysaccharides?

Chains of more than 2 monosaccharides (2 monosaccharides = disaccharide)

1. How do plants and animals store excess sugar?

Plants: starch Animals: glycogen

1. **Lipids (pg 46-47)**
2. What elements make up lipids?

Carbon, hydrogen and oxygen

1. Lipids are composed of a glycerol head and fatty acid tails.
2. Circle the letter of each way that fats are used in living things
   1. As part of biological membranes
   2. To store energy
   3. To give plants rigidity
   4. As chemical messengers
3. **Nucleic Acids (pg 47)**
4. What elements make up nucleic acids?

Carbon, hydrogen, oxygen, nitrogen and phosphorus

1. The monomers that make up nucleic acids are known as nucleotides
2. A nucleotide consists of what three parts?

A sugar, phosphate and nitrogen base

1. What is the function of nucleic acids in living things?

Carry and transmit genetic information

1. Name two kinds of nucleic acids: DNA and RNA
2. **Proteins (pg 47-48)**
3. What elements make up proteins?

Carbon, hydrogen, oxygen, and nitrogen

1. Proteins are polymers of molecules called amino acids.
2. What are four roles that proteins play in living things?
3. Carry oxygen through the blood stream (Hemoglobin)
4. Act as a catalyst
5. Growth and repair
6. As a part of our immune system
7. **Enzymes (pg 49-53)**
8. Complete the table about chemicals in a chemical reaction

|  |  |
| --- | --- |
|  | Definition |
| Reactants | What goes into a reaction |
| Products | What comes out of a reaction |

1. The energy needed to get a reaction started is called the activation energy
2. What is a catalyst?

Something that speeds up a chemical reaction

1. Proteins that act as biological catalysts are called enzymes
2. What do enzymes do?

Speed up chemical reactions by lowering the reactions activation energy

1. The reactants of enzyme-catalyzed reactions are known as substrates
2. Why are the active site and the substrates in an enzyme-catalyzed reaction often compared to a lock and key? The substrate fits perfectly with the enzyme meant to interact with it, not unlike how a key and lock fit with one another.
3. What two things can affect enzyme potential?

Temperature and pH

1. True or False: enzymes are reusable.
2. **Cells**
3. **Prokaryotes and eukaryotes (pg 172-173)**
4. Circle the letter of each sentence that is true about prokaryotes
   1. They grow and reproduce
   2. Many are large, multicellular organisms
   3. They are more complex than cells of eukaryotes
   4. They have cells membranes and cytoplasm
5. Are all eukaryotes large, multicellular organisms?

No, some eukaryotes can even be microscopic! (remember our protists!)

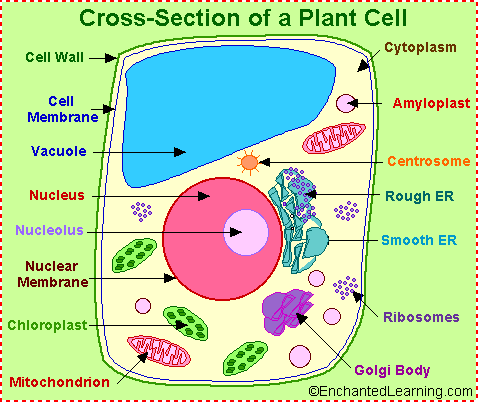
1. Complete the table below

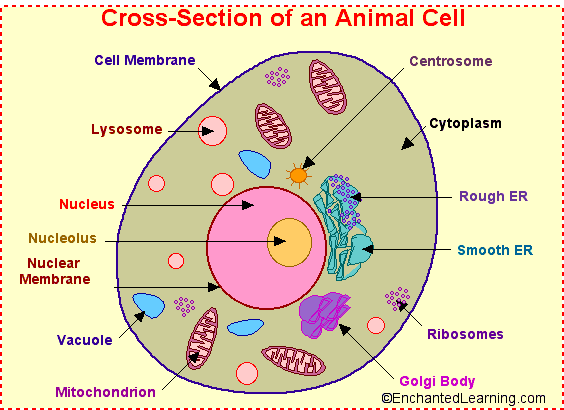
|  |  |  |
| --- | --- | --- |
| **Category** | **Definition** | **Examples** |
| Prokaryote | Organisms whose cells lack nuclei and membrane bound organelles | Bacteria |
| Eukaryote | Organisms whose cells contain nuclei and membrane bound organelles | Plant and animal cells |

1. **Eukaryotic cell structure (pg 174-181)**
2. What is an organelle?

Any of a number of organized or specialized structures within a living cell.

1. Label the images below





1. Circle the letter of each structure that animal cells contain
   1. Chloroplasts
   2. Lysosomes
   3. Mitochondria
   4. ER
2. Circle the letter of each structure that plant cells contain
   1. Cell wall
   2. ER
   3. Lysosomes
   4. Chloroplast
3. Describe the function of each of the following organelles
   1. Nucleus: the cell’s command center. Controls functions of the cell and houses genetic material.
   2. Ribosomes: Protein synthesis
   3. Vacuoles: hold water and waste materials
   4. Mitochondria: cellular respiration
   5. Chloroplasts: photosynthesis
   6. Cell membrane: provide structure and support for the cell while allowing select materials into and out of the cell
   7. Cell wall: provide structure and support for the cell
4. **Cell Boundaries (pg 182-189)**
5. What are the functions of the cell membrane?

provide structure and support for the cell while allowing select materials into and out of the cell

1. The core of nearly all cell membranes is a double-layered sheet called a(n) phospholipid bilayer
2. What is the main function of the cell wall?

Structure/support

1. What are plant cell walls mostly made of?

Cellulose

1. What is diffusion?

Movement of molecules from an area of high concentration to low concentration.

1. What is meant when a system has “reached equilibrium”?

The system has reached a constant, even concentration

1. What is osmosis?

Movement of **WATER** from an area of high concentration to an area of low concentration.

1. What happens during the process of facilitated diffusion?

Protein channels allow for larger molecules to move through the membrane from areas of high concentration to areas of low concentration.

1. What is the role of protein channels in the cell membrane?

To allow large molecules to move in and out of the cell

1. The energy-requiring process that moves material across a cell membrane against the concentration difference is called Active transport
2. **Photosynthesis and Respiration**
3. **Photosynthesis (pg 204-207)**
4. What occurs in the process of photosynthesis?

Radiant energy from the sun is converted into glucose

1. Write the overall equation for photosynthesis using words.

Sun + carbon dioxide + water 🡪 glucose + oxygen

1. Write the overall equation for photosynthesis using chemical formulas.

Sun + CO­­­­2 + H2O 🡪 C6H12O2  + O2

1. Plants gather the sun’s energy with light-absorbing molecules called pigments.
2. What is the principal pigment in plants?

Chlorophyll

1. Circle the letters of the regions of the visible spectrum in which chlorophyll absorbs light very well.
   1. Blue-violet
   2. Green
   3. Red
   4. Yellow
2. In what organelle does photosynthesis take place?

Chloroplast

1. List 3 factors that could affect rates of photosynthesis.
   1. Temperature
   2. pH
   3. The availability of resources
2. **Cellular respiration (pg 221-225)**
3. What is cellular respiration?

The process of converting energy stored in glucose molecules into usable energy (ATP)

1. Write the equation for aerobic cellular respiration using words.

oxygen + glucose 🡪 water + carbon dioxide + ATP

1. Write the equation for aerobic cellular respiration using chemical formulas.

O2 + C6H12O6 🡪 H2O + CO2 + ATP

1. How many phosphates are in ATP?

3

1. How is energy released from ATP?

The third phosphate is removed and energy is released

1. How much ATP is gained during aerobic respiration? (net gain)

36

1. What is fermentation?

Cellular respiration in the absence of oxygen

1. Because fermentation does not require oxygen, it is said to be anaerobic
2. What are the two types of fermentation?
   1. Lactic acid
   2. Alcoholic
3. What organisms use alcoholic fermentation?

plants

1. What organisms use lactic acid fermentation?

animals

1. How much ATP is gained during fermentation? (net gain)

2

1. **DNA, RNA and Protein Synthesis**
2. **DNA (pg 287-294)**
3. What is the makeup of a nucleotide?

A sugar, phosphate an nitrogen base

1. The four bases found in DNA are Adenine, Thymine, Cytosine and Guanine
2. What forms the backbone of a DNA chain?

Sugar and phosphate

1. According to Chargaff’s rules, the percentages of adenine are equal to those of thymine and the percentages of cytosine are equal to those of guanine in a DNA molecule.
2. The DNA molecule is shaped like a(n) double helix and contains 2 strands.
3. Complete the flow chart below to describe the process of DNA replication.

The DNA molecule unwinds, or unzips into 2 strands

Two new complimentary strands are produced using the rules of Chargaff.

Each strand serves as a(n) template, or model, to produce two new strands.

1. What is the complementary strand of bases for a strand with the bases TACGTT? ATG CAA
2. True or False: Each DNA molecule resulting from replication has one original strand and one new strand.
3. **RNA (pg 300-306)**
4. List three main differences between RNA and DNA
   1. RNA is single stranded and DNA is double stranded
   2. RNA contains ribose and DNA contains deoxyribose
   3. RNA contains uracil and DNA contains thymine
5. What is the importance of the cell’s ability to copy a single DNA sequence into RNA?

DNA can’t leave the nucleus. mRNA is needed to copy the DNA and take the code to the ribosomes.

1. What is the complementary strand of mRNA bases for a DNA strand with the bases TACGTT? AUG CAA
2. Complete the table below about the types of RNA

|  |  |
| --- | --- |
| **Type** | **Function** |
| mRNA | Carries copies of the instructions for assembling amino acids from DNA to the rest of the cell. |
| Ribosomal RNA | Part of the ribosome. |
| tRNA | Transfers each amino acid to the ribosome to help assemble proteins. |

1. **Protein synthesis (pg 300-306)**
2. What occurs during transcription?

DNA is copied by mRNA

1. Where does transcription occur?

The nucleus

1. What is a codon?

A set of 3 bases that codes for an amino acid.

1. What occurs during the process of translation?

mRNA is fed through the ribosome. As it feeds through, it is “read” three bases at a time. The corresponding tRNA molecule connects with the mRNA and releases an amino acid. As this process repeats itself, the growing chain of amino acids are linked together by peptide bonds.

1. Where does translation take place?

The nucleus

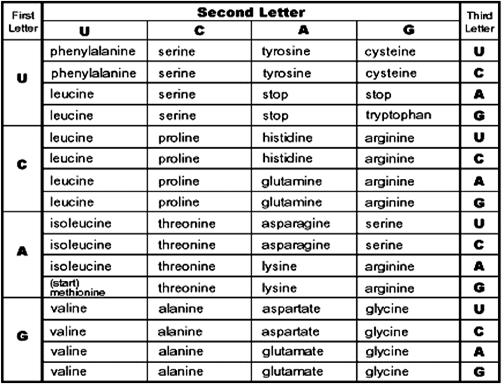
1. What is an anticodon?

A set of three bases on a strand of tRNA (and during translation, it is how the tRNA knows what order to put the amino acids in)

1. Using the chart below, determine the sequence of amino acids coded for by the following strand of DNA: ACT TTG CGA ATG

mRNA: UGA AAC GCU UAC

Amino acids: Stop Asparagine Alanine Tyrosine



1. **Mutations (pg 307-308)**
2. What are mutations?

 A **Mutation** occurs when a DNA gene is damaged or changed in such a way as to alter the genetic message carried by that gene

1. True or False: chromosomal mutations result from changes in a single gene.
2. Mutations that occur at a single point in the DNA sequence are point mutations.
3. A mutation involving the insertion or deletion of a nucleotide is a(n) frameshift mutation.
4. Complete the table of types of chromosomal mutations.

|  |  |  |
| --- | --- | --- |
| **Type** | **Description** | **Examples** |
| Deletion | Removal of part or all of a chromosome | ABC**-**DEF  AC-DEF |
| Duplication | An extra copy of part or all of a chromosome | ABC-DEF  ABBC-DEF |
| Inversion | Part of a chromosome becomes oriented in the reverse of its usual direction. | ABC-DEF  AED-CBF |
| Translocation | Part of a chromosome is moved to another. | ABC-DEF GHI-JKL  ABC-JKL GHI-DEF |

1. Mutations are a source of variation in species
2. What is polyploidy? Having too many copies of each chromosome.
3. **Cell division**

**A. The Cell Cycle (pg 245)**

1**.** The period of growth in between cell divisions is called interphase.

2**.** What is the cell cycle?

The cycle of cell growth and division.

3. Interphase is divided into what three phases?

G1, S, and G2

4. What happens during the G1 phase?

The cell grows

5. What happens during the S phase?

DNA replicates

6. What happens during the G2 phase?

The cell continues to grow and prepare for cell division

1. **Mitosis (pg 246-248)**
2. What are the four stages of mitosis?
   1. Prophase
   2. Metaphase
   3. Anaphase
   4. Telophase
3. Name the phase described below.
   1. The chromosomes move until they form two groups near the poles of the spindle Anaphase
   2. The chromosomes become visible. The centrioles take up positions on opposite sides of the nucleus. Prophase
   3. A nuclear envelope re-forms around each cluster of chromosomes. The nucleolus becomes visible in each daughter nucleus. Telophase
   4. The chromosomes line up across the center of the cell. Metaphase
4. What is the ending product of mitosis? 2 identical daughter cells
5. **Meiosis**
6. What does it mean when two sets of chromosomes are homologous?

They contain DNA for the same traits.

1. Define diploid.

2n. Having 2 of each chromosome.

1. Define haploid.

n. Having 1 of each chromosome

1. Why is meiosis described as a process of reduction division?

By dividing a second time without replicating the DNA again, you are reducing the number of chromosomes in the resulting cells.

1. What are the two distinct divisions of meiosis?
   1. Meiosis 1
   2. Meiosis 2
2. How does a tetrad form in prophase I of meiosis?

Each chromosome is paired with its homologous pair

1. What results from the process of crossing-over during prophase I?

Genetic variation. During crossing-over, the chromosomes exchange genetic material.

1. What is nondisjunction? List two disorders that arise from this.

Nondisjunction occurs when the chromosomes fail to separate evenly. Some examples of disorders caused by nondisjunction include Down, Klinefelter’s and Turner’s syndrome.

1. **Genetics**
2. **Genes and Dominance (pg 264-265)**
3. Define the following terms.
   1. Genes: a segment of DNA that codes for proteins
   2. Hybrids: breeding of two different species
   3. Traits: features of organisms
   4. Alleles: versions or “flavors” of genes.
4. State the principle of dominance.

If a dominant trait is present it will always be expressed

1. True or false: an organism with a recessive allele for a particular form of a trait will always exhibit that form.
2. **Probability and Punnett Squares (pg 267-269)**
3. How to geneticists use Punnett squares? To predict possible genetic combinations in offspring
4. Complete the Punnett square below.

Parents: Tt X Tt

|  |  |  |
| --- | --- | --- |
|  | **T** | **t** |
| **T** | **TT** | **Tt** |
| **t** | **Tt** | **tt** |

1. Define the following terms
   1. Genotype: the genetic make-up of an individual (aa)
   2. Homozygous: the same alleles (AA, aa)
   3. Phenotype: the physical appearance of an individual (tall)
   4. Heterozygous: one dominant and one recessive allele (Aa)

\*\*\*Make sure you know HOW to do Punnett squares!!!\*\*\*\*

1. Complete the table of the different patterns of inheritance.

|  |  |  |
| --- | --- | --- |
| **Type** | **Description** | **Examples** |
| Incomplete | One allele is not completely dominant over another. The heterozygous phenotype is somewhere between the two homozygous phenotypes. | Red flowers: RR  White flowers: WW  Pink flowers: RW |
| Codominance | Both alleles contribute to the phenotype of the organism. | Red flowers: RR  White flowers: WW  Red and white stripes: RW |
| Multiple Alleles | Genes have more than two alleles. | Blood type  (IA, IB, i) |
| Polygenic | Two or more genes control a trait. | Skin color, height |

1. **Blood Types**

8. Fill in the blood type chart below.

|  |  |  |
| --- | --- | --- |
| **Blood Type** | **Genotype** | **Can receive blood from** |
| A | IAIA or IAi | A, O |
| B | IBIB or IBi | B, O |
| AB | IAIB | A, B, AB, O |
| O | ii | O |

9. Could a child with type B blood have parents with type A and B blood? Draw a Punnett square to support the answer. Yes, the mother would have to be heterozygous.

1. **Human Genetics and Disease (pg 341-353)**

10. What is a karyotype?

A diagram showing the number and visual appearance of the chromosomes in the cell nuclei of an organism or species

11. What can be seen using a karyotype?

Chromosomal abnormalities

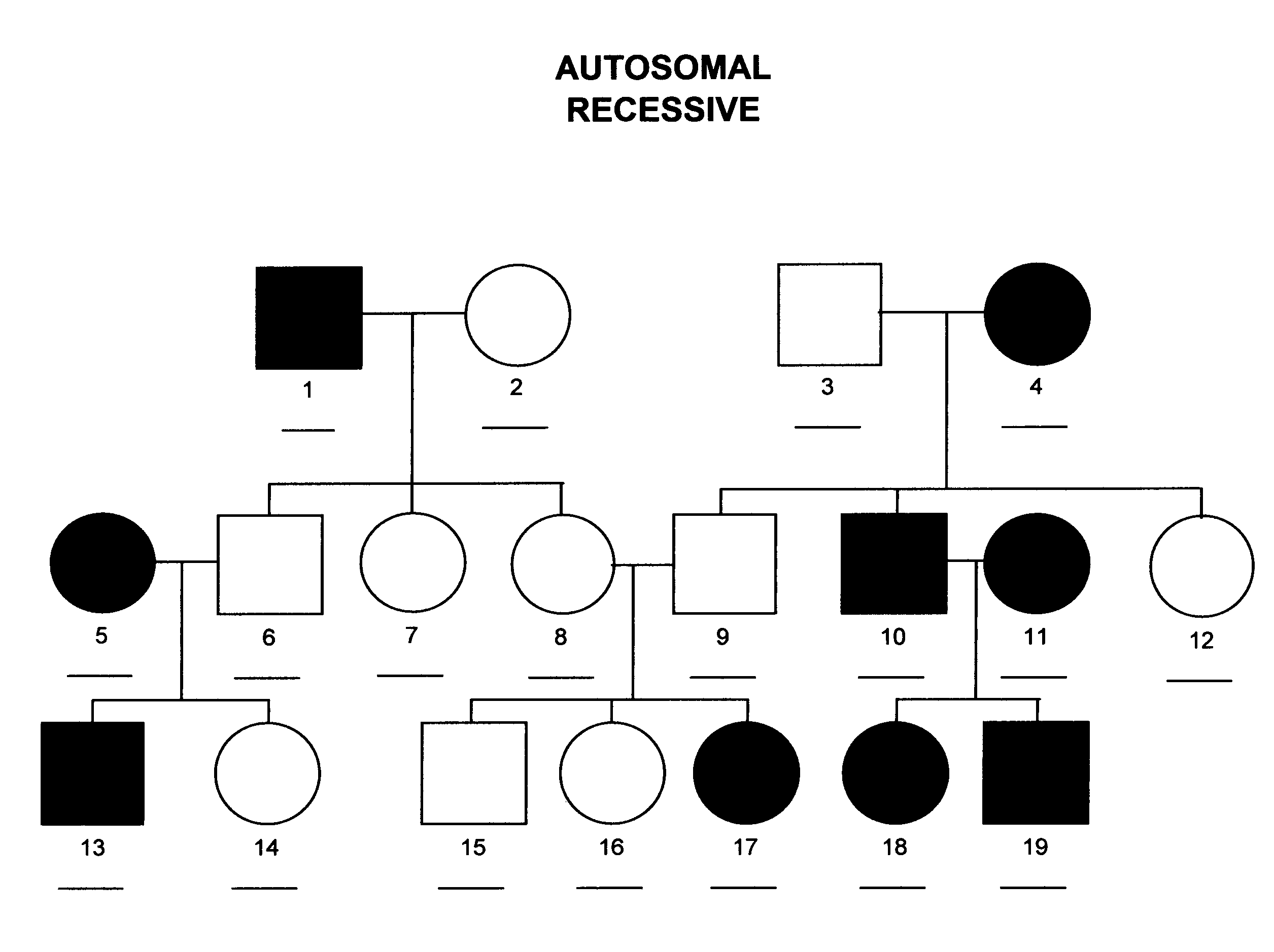
12. What does a pedigree show?

A family tree that traces the genetic inheritance pattern of one trait

13. What does a circle represent in a pedigree? A Square?

Circle= female Square=male

14. Fill in the genotype for each person in the pedigree below.



1. rr
2. R\_
3. Rr
4. Rr
5. rr
6. Rr
7. Rr
8. Rr
9. Rr
10. rr
11. rr
12. Rr
13. rr
14. Rr
15. R\_
16. R\_
17. rr
18. rr
19. rr

15. What is huntington’s disease?

A dominant disease marked by slowed mental processing with typical onset around mid-thirties. It is a fatal disease.

16. What is sickle cell anemia?

A recessive disease in which a person’s blood cells become sickle shaped (like a crescent moon)

17. How is sickle cell linked to malaria resistance?

Carriers have just enough sickle cell trait that they do not host the parasite well and tend to be resistant

1. What is cystic fibrosis?

A recessive disorder marked by excessive mucus production and difficulty breathing.

1. What are sex linked genes?

Genes that are found on the sex chromosomes

1. List 3 disorders that are linked to the X chromosome.

Colorblindness, hemophilia and male pattern baldness

1. Why do men show sex linked disorders more often than women?

Men only have one X chromosome. Women have two, making it much more likely they will inherit a dominant version of the trait.

22. Complete the Punnett square to show how colorblindness is inherited. (remember, colorblindness is recessive)

|  |  |  |
| --- | --- | --- |
|  | Xc | Y |
| XC | XCXc | XCY |
| Xc | XcXc | XcY |

1. **Biotechnology**

**A. Cellular Transformation (pg 327-329)**

1. What occurs during transformation? A cell takes in foreign DNA (DNA from another organism)

2. Complete the flow chart to show the steps in transforming bacteria.

restriction enzymes are used to cut both the bacterial plasmid and the desired DNA from the donor.

A plasmid, or circular DNA molecule, is removed from a bacteria.

The modified plasmid is inserted back into the bacteria and the bacteria begins making new proteins.

The DNA from the donor species is inserted into the bacterial plasmid forming recombinant DNA

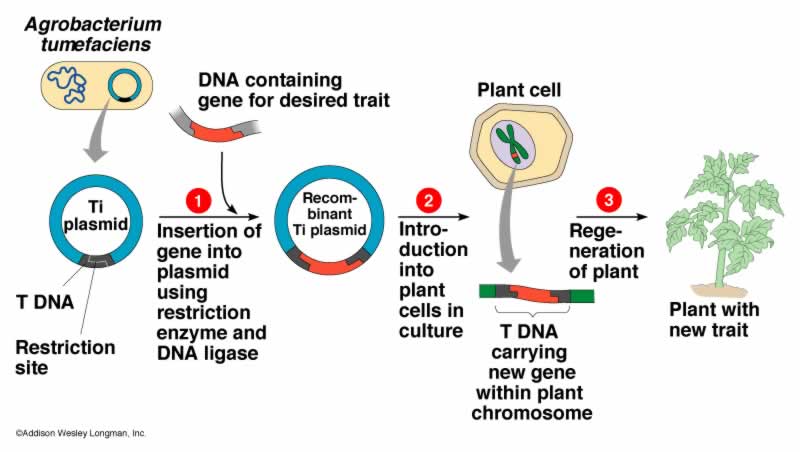
1. **Transgenic organisms (pg 331-333)**
2. Why would a scientist want to create transgenic organisms?

To incorporate useful genes from other organisms into organisms of interest

1. What is a transgenic organism?

An organism containing DNA from a different organism

1. Describe how to make a transgenic organism.



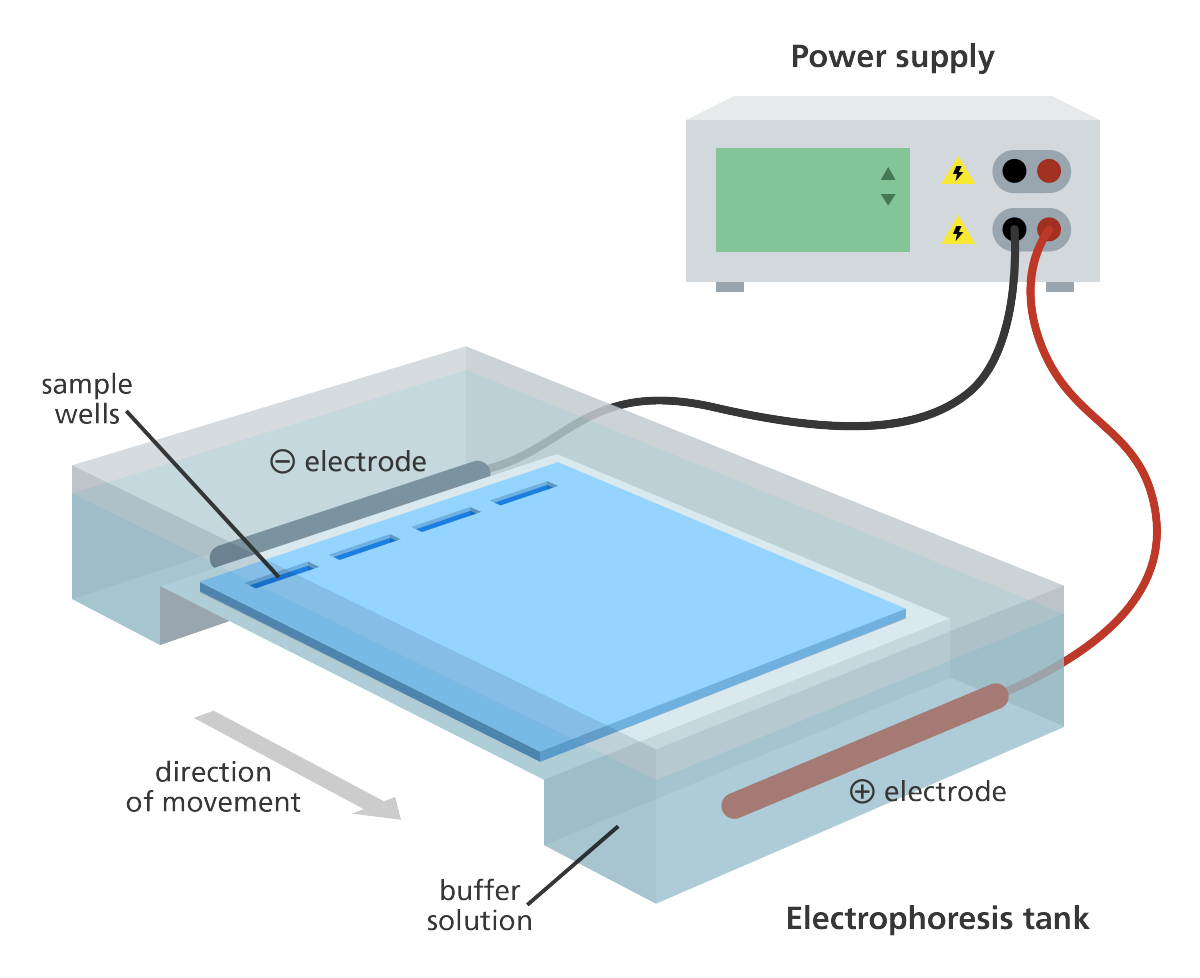
1. Circle the letter of each sentence that is true about transgenic microorganisms
   * + - 1. Transgenic bacteria will never produce useful substances in the health industry.
         2. Transgenic bacteria produce human proteins cheaply and in great abundance.
         3. People with insulin-dependent diabetes are now treated with pure human insulin.
         4. In the future, transgenic organisms may produce raw materials for plastics.
2. Many transgenic crops, such as bT corn, contain genes that produce a natural pesticides, so the crops do not have to be sprayed with pesticides.
3. Circle the letter of each item that might soon be produced by transgenic plants.
   * + - 1. Human antibodies
         2. Plastics
         3. Rot-resistant foods
         4. Vitamin A-enriched rice
4. **Stem Cells**
5. When an egg is fertilized, the first cells are called stem cells.
6. Why are stem cells important?

They are incredibly versatile. Stem cells found in the blastocyst can become any cell type in the body (eyes, liver, heart, etc) while adult stem cells (fround in places like your skin and bone marrow) can only become cells of that tissue (so stem cells from the bone marrow can only make cells associated with blood.)

1. What do we call the process by which stem cells become specialized?

Differentiation

1. True or False: Adults do not have any stem cells in their body. Adult stem cells can be found anywhere in our body that regenerates (for example skin cells, or blood cells that regenerate in the bone marrow)
2. All cells contain the same DNA. During differentiation, different genes are “turned” on and off.
3. **DNA fingerprinting**
4. Biologists use restriction enzymes to cut DNA molecules at a specific sequence of nucleotides to make smaller fragments.
5. During gel electrophoresis, DNA fragments are separated and analyzed.
6. In the diagram below, label the positive and negative ends of the gel and identify the location of the longer and shorter fragments.



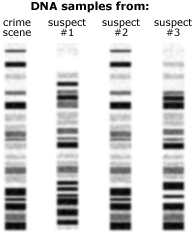
Smaller fragments

Larger fragments

Positive end

Negative end

1. Use the gel below to determine who committed the crime.

**Suspect 2 (just match the bands)**

1. **Evolution and Classification**

**A. Inherited Variation and Artificial Selection (pg 379)**

Differences among individuals of a species are referred to as variation.

True or False: Genetic variation is found only in wild organisms in nature.

What is artificial selection?

Selection done by humans (for example, dogs. We decide what traits are passed on and what traits are not)

1. **Evolution by Natural Selection (pg 380-382)**

Define the following terms

Fitness: an organisms ability to survive and reproduce

Adaptation: any genetic change that helps increase an organisms fitness

Natural selection: “survival of the fittest” the process through which those best adapted to their environment continue to live and reproduce. Those not well suited die.

What does the phrase “struggle for existence” mean?

All organisms must fight to stay alive. Those who are best fit will live, the others will die.

True or False: Adaptations can be physical characteristics but not more complex features such as behavior. Behavior can be an adaptation too! Think mating rituals, hibernation, estivation, etc)

Explain what Darwin meant by the phrase “survival of the fittest”. Those most fit for their environment will continue to survive and reproduce

Circle each statement that is true about natural selection.

It selects traits that increase fitness

It takes place without human control

It can be observed directly in nature

It leads to an increase in a species’ fitness

Principle that living species descend, with changes, from other species over time is referred to as descent with modification

The principle that all species were derived from common ancestors is known as common descent.

According to Darwin’s theory, what happens to individuals whose characteristics are not well suited to their environment?

They die and eventually become extinct

What is geographic isolation?

A geographic barrier prevents 2 populations of the same species from reproducing. Over time, enough variation accumulates in each population that they become different species.

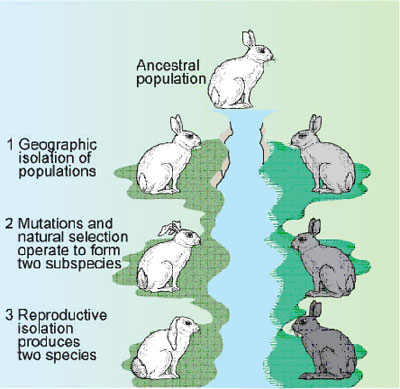
What is reproductive isolation?

Two populations that used to be the same species have acquired enough genetic differences and are now unable to reproduce and produce viable offspring.

What is temporal isolation?

The timing of mating for two populations does not line up, so the populations no longer mate with one another.

How do each of the types of isolation contribute to the creation of new species?



1. **Evidence of Evolution (pg 382-385)**

List four types of evidence for evolution

Embryology

Fossils

DNA analysis

Structural formations (homologus and vestigial structures)

How do fossils that formed in different rock layers provide evidence of evolution?

You can actually see the change over time in each fossil

How did Darwin explain the existence of similar but unrelated species?

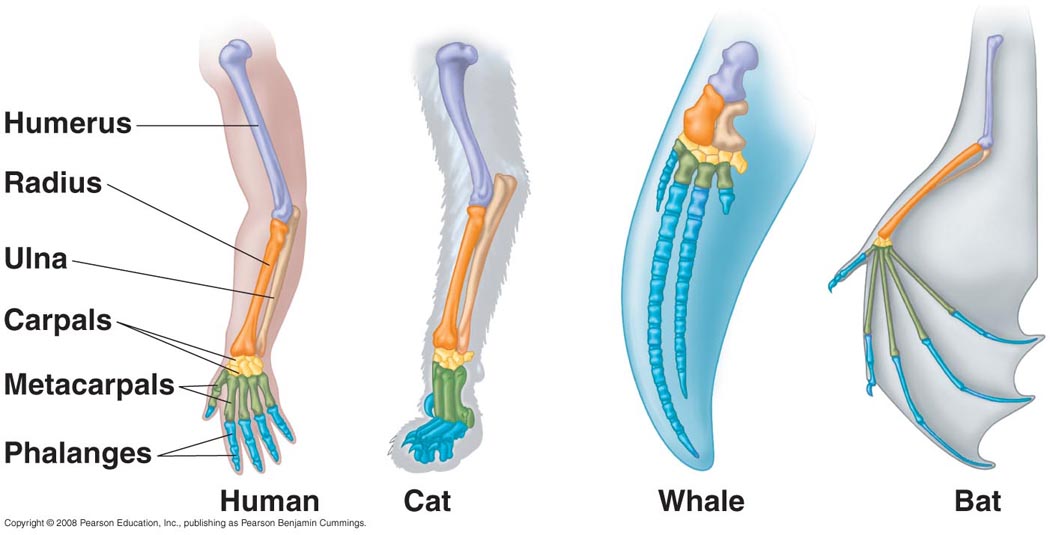
They were responding to similar pressures and ended up with similar mutations.

Structures that have different mature forms but develop from the same embryonic tissues are called homologous

Organs that are so reduced in size that they are just vestiges, or traces, of homologous organs in other species are called vestigial

Structures that have the same function but developed from different embryonic tissues are called analogous

The structures pictured below are homologous structures.



1. **Classification (pg 447-450)**

The science of classifying organisms and assigning them universally accepted names is known as taxonomy

The two word naming system developed by Linnaeus is called binomial nomenclature

Circle each statement that is true about binomial nomenclature

The system is no longer used today

Each species is assigned a two-part scientific name

The scientific name is always written in italics

The second part of the scientific name is capitalized.

What is the genus of the grizzly bear, *Ursus arctos*? Ursos

A group or level of organization is called a taxonomic category, or taxon

The largest taxonomic category in Linnaeus’s system is the kingdom, and the smallest is the species.

1. **Cladograms (pg 453)**

Circle the letter of each sentence that is true about cladistics analysis

It considers only traits that are evolutionary innovations

It considers all traits that can be measured

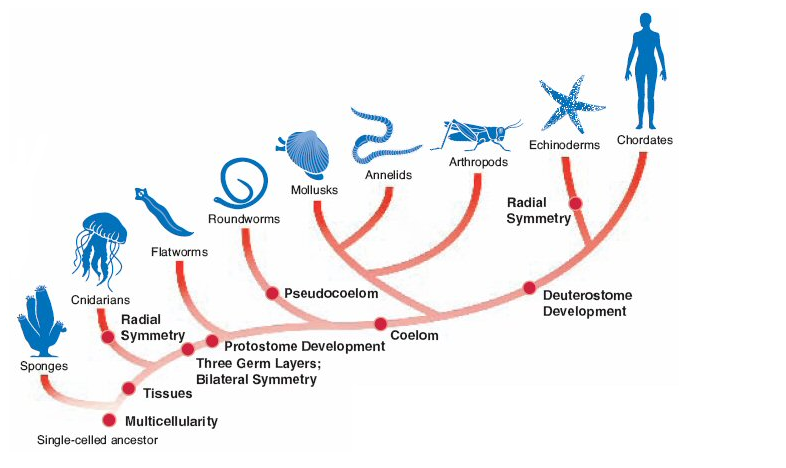
It considers only similarities in body structure

It is a method of evolutionary classification

A diagram that shows the evolutionary relationships among a group of organisms is called a cladogram.

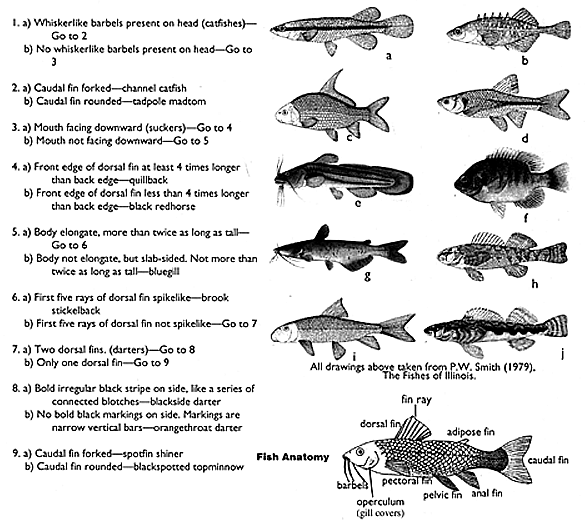
Using the cladogram below, what group is most related to humans? Least related? Most: echinoderm

Least: sponges



1. **Dichotomous Keys**

Identify the organisms below using the dichotomous key. OMIT, sorry…the picture is too hard to read. Just remember to always start at the first clue when reading a dichotomous key. Then continue to follow the prompts until you have arrived at a name!



1. **The Immune System**

**A. Infectious disease (pg 1031-1035)**

* 1. Any changes, other than injury, that disrupts the normal functions of the body is a(n) disease.
  2. What are scientists trying to identify when they use Koch’s postulates?

The cause of an illness.

* 1. List 2 ways bacteria can cause illness.

Some damage cells and tissues directly by breaking down the host's cells for food. Others release toxins that interfere with the host's normal activity

* 1. List 3 ways that infectious disease is spread.

1. person to person contact

2. exchange of bodily fluids through wounds or openings

4. vectors

5. food borne pathogens

* 1. Animals that carry pathogens from person to person are called vectors.
  2. Compounds that kill bacteria without harming the cells of humans or animals are called antibiotics.
  3. What is antibiotic resistance? Why is it an issue?

Antibiotic resistance is when a bacteria can no longer be killed by antibiotics. Since we consume so many antibiotics, we are speeding up natural selection and creating “super bugs” that can no longer be treated by antibiotic medications.

* 1. How do antiviral drugs fight viral diseases?

The prevent the virus from entering the cell to reproduce.

1. **The Immune Response (pg 1036-1042)**
   1. The body’s main defense against pathogens is the immune system
   2. What is the job of the body’s first line of defense?

To keep out pathogens.

* 1. List four components of the body’s first line of defense.

1. Skin
2. Mucus
3. Sweat
4. tears
   1. True or False? The body’s most important nonspecific defense is the skin.
   2. How does mucus help protect the body from disease?

It traps viruses and bacteria, preventing them from going further into your body

* 1. When does the body’s second line of defense come into play?

When pathogens enter your body

* 1. White blood cells called macrophages engulf and destroy bacteria.
  2. What is the immune response?

A series of specific defenses to remove pathogens from the body

* 1. A substance that triggers the immune response is known as a(n) antigen.
  2. List the two different immune responses.

Humoral response and cell mediated response

* 1. What is a vaccination? the injection of a weakened or mild form of a pathogen to produce immunity.
  2. How do vaccines work? Vaccines stimulate the immune system to create millions of plasma cells ready to produce specific types of antibodies should you ever be exposed to the pathogen.

1. **Ecology**

**A. Levels of Organization (pg 64)**

1. Complete the table about levels of organization.

|  |  |
| --- | --- |
| **Level** | **Definition** |
| Species | Organisms that are able to reproduce and produce offspring that are able to reproduce |
| Population | A group of individuals that belong to the same species and live in the same area. |
| Community | Groups of interacting populations in the same area at the same time |
| Ecosystem | a biological community of interacting organisms and their physical environment |
| Biome | A group of ecosystems that have the same climate and dominant communities. |

**B. Energy Flow (pg 67-73)**

1. What are autotrophs?

Organisms that are able to make their own “food”

1. What is chemosynthesis?

Organisms that are able to make their own “food” without going through the process of photosynthesis (they involve other compounds and chemical reactions)

1. Heterotrophs are also called consumers
2. Complete the table about types of heterotrophs.

|  |  |  |
| --- | --- | --- |
| **Type** | **Definition** | **Examples** |
| Herbivore | Heterotroph that eats only plants | Cows, rabbits |
| Carnivore | Heterotroph that eats animals | Lion, Tiger |
| Omnivore | Heterotroph that eats both plants and animals | Humans, bears, crows |
| Detritivore | Heterotroph that eats dead, decaying matter | Worms |
| Decomposer | Heterotroph that decomposes dead matter outside of itself then absorbs it | Fungi |

1. How does energy flow through an ecosystem?

It is passed up the food chain

1. What does a food web link together

Food chains

1. What is a trophic level?

A feeding level

1. In a food web, what organisms make up the first trophic level?

Producers

1. What does a consumer in a food chain depend on for energy?

Producers! Ultimately it all relies on the sun.

1. What is an ecological pyramid?

a graphical representation designed to show the biomass or bio productivity at each trophic level in a given ecosystem

1. Why is only part of the energy stored in one trophic level passed on to the next level?

The other 90% is either lost as heat or used up by the lower organisms

1. How much energy is passed from one trophic level to the next?

10%

1. What is biomass?

Total mass of living things in a given area.

1. What does a biomass pyramid represent?

Total mass present in each trophic level

1. What does a pyramid of numbers show?

The number of organisms in each trophic level

1. **Symbiotic Relationships**
2. Fill in the chart below about symbiotic relationships.

|  |  |  |
| --- | --- | --- |
| **Type** | **Definition** | **Example** |
| Parasitism | One organism benefits while the other is harmed | A tick on a human |
| Commensalism | One organism is benefitted while the other is neither harmed nor helped | A bird building it’s nest in a tree |
| Mutualism | Both organisms benefit | The sea anemone and clown fish |

1. **Cycles of Matter (pg 74-80)**
2. Water can enter the atmosphere by evaporating from the leaves of plants in the process of transpiration
3. Circle the letter of each process involved in the water cycle.
   1. Precipitation
   2. Evaporation
   3. Runoff
   4. Fertilization
4. Why is carbon especially important to living systems?

All living things contain carbon and use it to synthesize other compounds that are essential to life (like….proteins and DNA)

1. What are the three large reservoirs where carbon is found in the biosphere
   1. As carbon dioxide gas in the atmosphere
   2. As dissolved carbon dioxide in the ocean
   3. As coal, petroleum, and calcium carbonate rock found undergorund
2. In what process do plants use carbon dioxide?

Photosynthesis

1. What human activity releases carbon dioxide into the atmosphere?

Burning fossil fuels

1. Why do all organisms require nitrogen?

To make proteins and nucleic acids

1. What is nitrogen fixation?

The process of converting N2 (atmospheric nitrogen) into ammonia compounds. This is usually done by bacteria (though lightning can do it too!)

1. What is denitrification?

The process of converting nitrogenous compounds back into N2 (atmospheric nitrogen)

1. What role does denitrification play in the nitrogen cycle?

It returns nitrogen to the atmosphere for the cycle to continue

1. Circle the letter of each statement that is true about the phosphorus cycle.
   1. Phosphate is released as rocks and sediments wear down.
   2. Plants absorb phosphate from the soil or from water
   3. Phosphorus is abundant in the atmosphere
   4. Organic phosphate cannot move through food webs.
2. Why is phosphorus essential to living things?
3. **Humans and the Ecosystem**

**A. How Populations Grow (pg 119-123)**

1. Circle the letter of each sentence that is true about populations
   1. They can grow rapidly
   2. They can decrease in size
   3. They may stay the same size from year to year
   4. They stay the same size until they disappear
2. What 3 factors can affect population size?

Birth rate, death rate, and immigration/emigration rates

1. Define immigration.

Organisms from another area join a different population

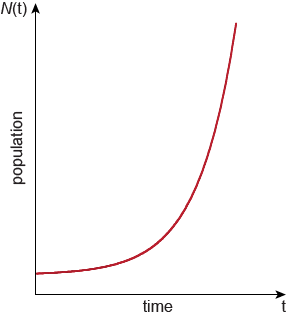
1. Define emigration.

Organisms leaving a population for another

1. When does exponential growth occur?

When the birthrate is greater than the death rate and there is a constant rate of reproduction.

1. The graph below demonstrates exponential population growth.



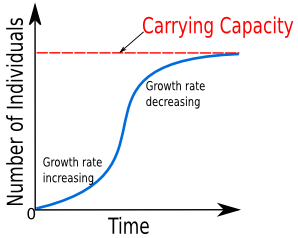
1. Circle each statement that is true about exponential growth
   1. It continues until organisms cover the planet
   2. It continues at the same rate as resources become less available
   3. It does not continue in natural populations for very long
   4. It continues in natural populations until the birthrate increases.
2. When resources become less available, how does population growth change?

It slows or stops

1. When does logistic growth occur?

Following a slow down or halt in population growth

1. What is carrying capacity? The number of organisms an area could indefinitely support
2. The graph below demonstrates logistic population growth.



**B. Limits to Growth (pg 124-127)**

1. What is a limiting factor?

Any factor that prevents a population from continuing to grow

1. What is a density-dependent limiting factor?

A limiting factor that depends on the number of organisms in an area

1. When do density dependent factors become limiting?

Once they near the carrying capacity (when a population is at high density)

1. When do density dependent factors operate most strongly?

When a population is high density

1. When a population becomes crowded, what do organisms compete with one another for? EVERYTHING! Mostly food, shelter, water, and mates
2. A limiting factor that affects all populations in similar ways, regardless of population size, is called a(n) density-independent limiting factor
3. What are example of density-independent limiting factors?

Temperature, natural disasters, pollution, etc

1. **Renewable and Non-renewable Resources (pg 144-149)**
2. Complete the table about types of environmental resources.

|  |  |  |
| --- | --- | --- |
| **Type of Resource** | **Definition** | **Examples** |
| Renewable | an organic natural resource which can replenish to overcome usage and consumption | Water, wind, solar power |
| Non-renewable | an organic natural resource which cannot replenish to overcome usage and consumption | Fossil fuels! |

1. What is sustainable development?

economic development that is conducted without depletion of natural resources

1. How do human activities affect renewable resources?

We often use them faster than they can be replenished or we contaminate them so they are no longer usable

1. What is a pollutant?

A substance or condition that contaminates air, water, or soil

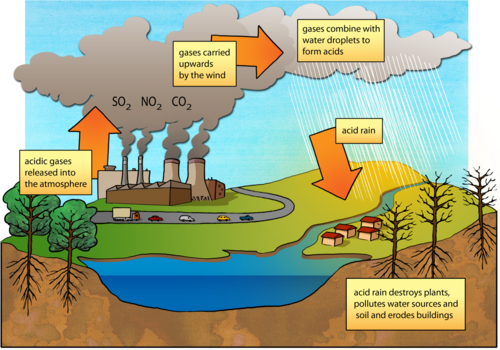
1. How does burning fossil fuels affect the environment?

Releases CO2 into the atmosphere 🡪 Global warming

1. What does acid rain contain that kills plants and harms soil?

Acid

1. How is acid rain formed?



1. What is global climate change?

And increase in the average temperature of the earth

1. **Biodiversity (pg 150-156)**
2. What is biodiversity?

The variety of life in the world or in a particular habitat or ecosystem

1. Why is biodiversity important?

All organisms depend on one another. Greater biodiversity leads to greater stability in ecosystems

1. When does extinction occur?

All of the organisms of a given species die.

1. What is DDT?

A pesticide that was used widely to kill mosquitos

1. What two properties of DDT make it hazardous over the long term?

its non biodegradable and can be picked up by all organisms

1. What is biological magnification?

the process whereby certain substances such as pesticides or heavy metals move up the food chain

1. Plants and animals that have migrated to places where they are not native are called invasive
2. Why do invasive species reproduce rapidly and increase their population?

They do not have any natural predators or competition in their new environment.

1. **Animal Behavior**

**A. Elements of Behavior (pg 871-876)**

1. How do biologists define behavior?

The acts or reactions that an organism, an individual or a system produces in response to a particular circumstance

1. What is a response?

A reaction to something

1. True or False: Animal behaviors are not influenced by genes.
2. Explain how natural selection works in the evolution of behaviors in a population.

Those with useful behaviors continue to grow and reproduce while those with less useful behaviors die

1. What is innate behavior?

A behavior an organism is born already knowing how to do

1. What is learning?

knowledge acquired through experience, study, or being taught

1. List the four major types of learning.

Habituation, classical conditioning, operant conditioning, insight learning

1. What is classical conditioning?

An animal makes a mental connection between a stimulus and some kind of reward or stimulus

1. What is operant conditioning?

An animal learns through repeated practice in order to receive a reward or avoid a punishment

1. When does insight learning occur?

An animal applies something it has already learned elsewhere.

1. What is the purpose of imprinting?

It keeps animals close to their mother who protects them and leads them to resources

**B. Patterns of Behavior (pg 878-882)**

1. Define the following terms.
   1. Dormancy: a period in an organism's life cycle when growth, development, and (in animals) physical activity are temporarily stopped
   2. Migration: seasonal movement of animals from one region to another.
   3. Circadian rhythms: behavioral cycles that occur in daily patterns
   4. Estivation: prolonged torpor or dormancy of an animal during a hot or dry period
   5. Hibernation: a state of inactivity and metabolic depression
2. Circle the letter of each statement that is true about courtship
   1. Courtship behaviors help animals identify healthy mates
   2. In courtship, an individual sends out a stimuli to attract the opposite sex
   3. Fireflies have an intricate dance to indicate their readiness to mate
   4. Courtship rituals always involve a single behavior.
3. A group of related animals of the same species that interact closely and often cooperate with one another is called a(n) animal society
4. What are the advantages of having animal societies?

They are able to work together and cooperate

1. What is a territory?

A specific area that is occupied and protected by an animal or group of animals

1. When does competition occur?

When two or more organisms require a limited resource

1. What is communication?

The passing of information from one organism to another

1. Some animals communicate using pheremones, chemical messengers that affect the behavior of other individuals of the same species.