

Scientific Method:

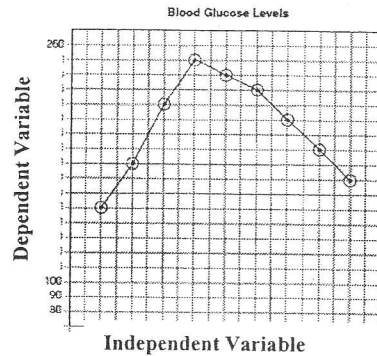
- State the problem
- Form a hypothesis
- Run an experiment
- Analyze data through charts and graphs
- Draw a conclusion based on the data

Helpful Tips

- Repeat the experiment
- Use large samples
- Identify the control group & the experimental group
- Control groups may be given a placebo.

Graphing:

- Circle each point
- Don't connect the line to zero unless there is a value for zero
- If asked to draw axis intervals, make sure you stick to a constant interval and use as much of the graph as possible.

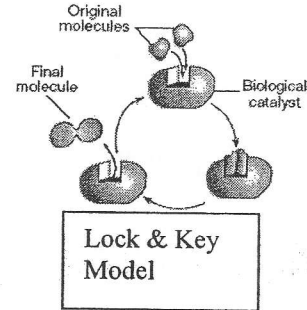
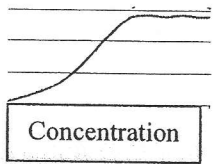
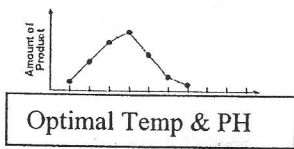


Biochemistry:

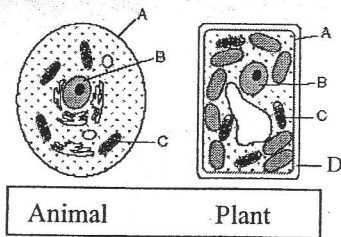
<u>Organic Molecules</u>	<u>Mono</u>	<u>Poly</u>
Carbohydrates:	Glucose	Starch, Glycogen, Cellulose
Lipids:	Glycerol & fatty acids	
Proteins:	Amino acids	Polypeptides, Enzymes, Receptors
Nucleic Acids	Nucleotides	DNA, RNA,

Enzymes: Catalysts made up of amino acids that speed up chemical reactions.

3 Factors affecting enzymes: Temp, PH, Concentration



Cells:



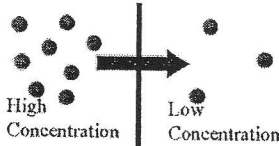
A= Cell Membrane determines what goes in and out of the cell. Contains Protein Receptors & Antigens.
 B= Nucleus contains the genetic info (DNA)
 C= Mitochondria makes ATP
 D= Cell Wall provides structure and support

Organelle → Cell → Tissue → Organ → Organ System → Organism

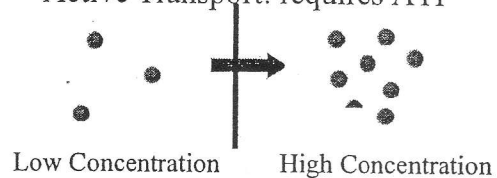
Organelle	Process Involving Chemical Reactions that Occur in the Organelle	How the Process is Important to the Functioning of the Organism
mitochondrion	respiration	provides energy for life functions
chloroplast	photosynthesis	provides food for plant
ribosome	protein synthesis	makes structural molecules (or chemical messengers which control cell responses)
nucleus	mitosis or meiosis or DNA replication	reproduction

Cell Transport:

Passive Diffusion: requires no ATP

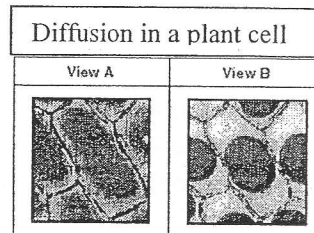
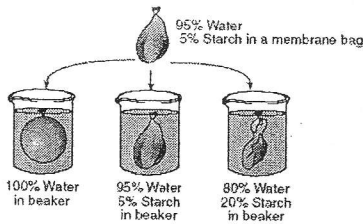


Active Transport: requires ATP

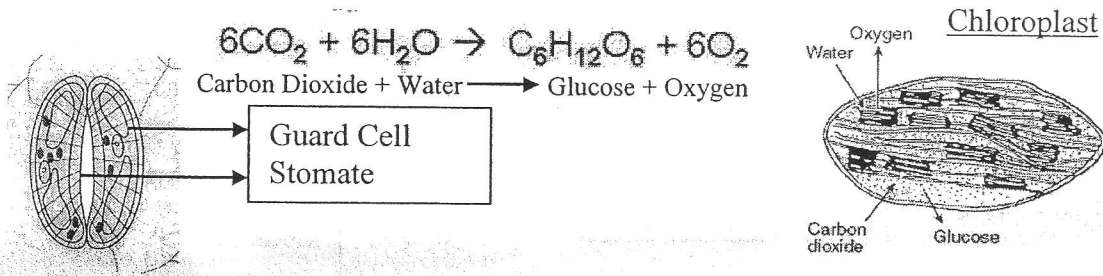


Osmosis: Passive: Water moves from More Pure → Less Pure

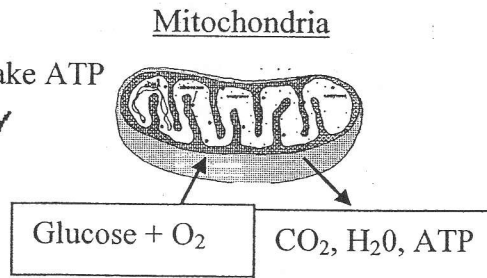
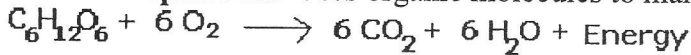
Diffusion in an animal cell



Photosynthesis: Autotrophs make organic food from inorganic molecules.



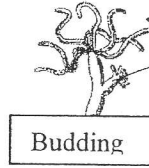
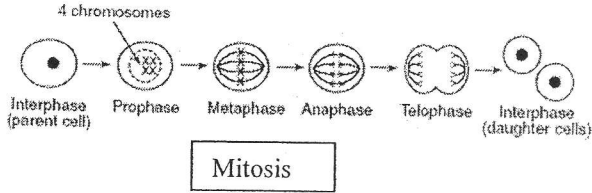
Cellular Respiration: Uses organic molecules to make ATP



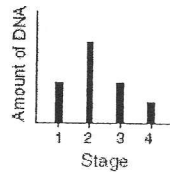
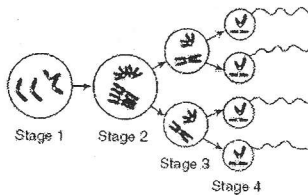
Anaerobic Respiration: In the absence of Oxygen, the organic molecules ferment into Alcohol + CO₂ or Lactic Acid.

Cell Division: Before a cell can split, the DNA must replicate itself.

Asexual Reproduction produces 2 daughter cells that are clones (growth & repair)



Sexual Reproduction produces 4 gametes with half the amount of DNA as the original parent.



DNA Content In Each Stage

Genetics:

Nucleus → Chromosome → Genes → Nucleotide

Both DNA & RNA are made up of nucleotides

Nucleotide

Genes are turned on and turned off.

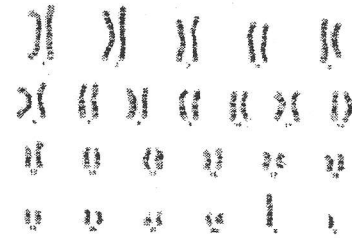
Chromosomes with many genes

The environment can affect the expression of a gene.

DNA → RNA → Protein

RNA travels to the Ribosome to make the protein

AUU } ILE (Isoleucine)	ACU } THR (Threonine)	AAU } ASN (Asparagine)	AGU } SER (Serine)
AUC } ILE (Isoleucine)	ACC } THR (Threonine)	AAC } ASN (Asparagine)	ACC } SER (Serine)
AUA } MET (Methionine)	ACA } THR (Threonine)	AAA } LYS (Lysine)	ACA } ARG (Arginine)
AUC } MET (Methionine)	ACC } THR (Threonine)	AAG } LYS (Lysine)	ACG } ARG (Arginine)

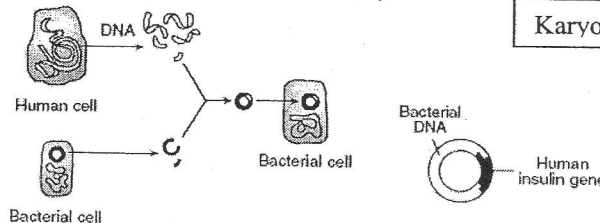


Karyotype

DNA: Double Stranded, Remains in Nucleus, Contains A,T,G,C
 RNA: Single Stranded, Leaves the Nucleus, Contains A,U,G,C

Biotechnology:

We can engineer human hormones such as insulin, by splicing human DNA into a Bacterial Plasmid



Mutation: Alteration of DNA resulting in a misshapen protein (chemicals & radiation.)

Gel Electrophoresis: A restriction enzyme cuts the DNA at a specific base sequence. The fragments migrate towards the positive end of the gel (DNA is negatively charged). The smaller fragments move faster. Species with the same bands have similar DNA and show common ancestry.

Unknown Species	Species A	Species B	Species C	Species D
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—
—	—	—	—	—

Evolution:

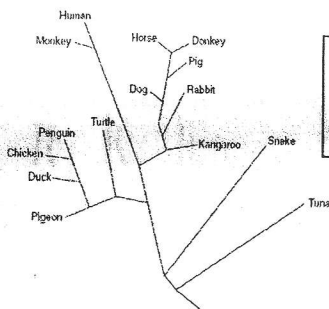
Essay: Due to sexual reproduction and mutations, there are **variations** within the species. Some varieties are better **adapted to the environment** than others. **Overproduction** of the species leads to competition for limited resources. Those better adapted survive and **pass their genes on to the next generation**. Those not well adapted die and their genes are not passed on.

Lamarck: Use and disuse. He believed in the passing on of acquired traits, but he was wrong. The only way to change the information the next generation receives is by mutation of the gametes. Alterations of body cells are not passed on.

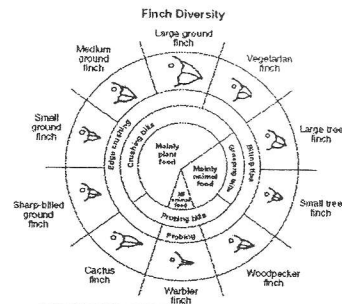
Darwin: Natural selection and survival of the fittest (read essay).

Proof of common ancestry:

1. Comparative Anatomy
2. Comparative Biochemistry (DNA & Proteins)
3. Comparative Cytology (Cell Organelles)
4. Comparative Embryology
5. Fossils
6. Geographic Isolation (Darwin's Finches)



Phylogenetic tree showing common ancestry.



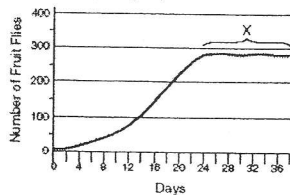
Different food sources on each island made some finches better adapted to the environment than others.

Ecology: The interaction of living things and the environment

Producer/Autotroph: makes food.

Consumer/Heterotroph: consumes food.

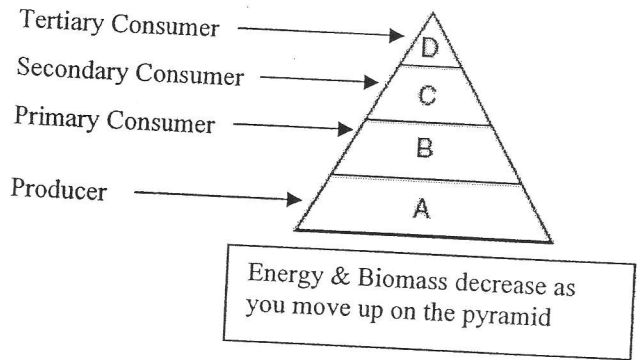
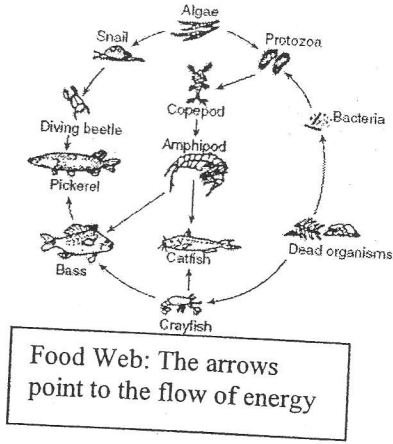
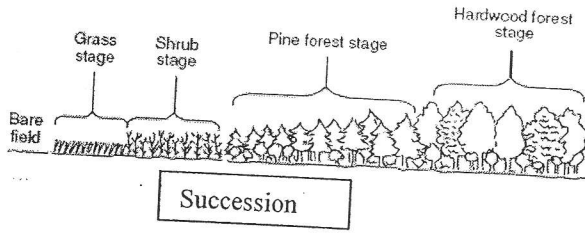
Decomposer: recycles the nutrients back to the soil (circle of life)



Carrying Capacity



These birds occupy different niches to avoid competition.



Physiology:

Pair 1		Pair 2		Pair 3	
Muscle Movement of the skeleton	Nervous Controls senses and processing	Respiratory Diffuses O ₂ in & CO ₂ out of the blood	Digestive Breaks down nutrients for diffusion into blood	Circulatory Transports nutrients and O ₂ to body cells	Excretory Filters cellular waste from the blood.

Immune System: Some white blood cells make antibodies which bind to antigens on foreign cells and some white blood cells engulf and destroy the antigen.
Pathogen: Something which causes disease.
Vaccinations promote immunity.

Human Reproduction:

