

OBJECTIVES for  
Introduction and Chemistry

READ YOUR NOTES. AFTER YOU HAVE STUDIED ALL OF YOUR NOTES FOR THIS TEST, USE THESE OBJECTIVES TO TEST YOUR KNOWLEDGE. IF YOU DO THIS YOU WILL DO BETTER ON THE TEST!!!!!!!!!!!!!! If you only study "answers" to these objectives you will not do as well as you want to do on the test.

1. Describe what is meant by a scientific theory. Is a scientific theory just a guess?
2. Be able to explain the process of the scientific method. Be able to explain the experiments that Pasteur performed including what his hypothesis was and how he proved it. Be familiar with the following components:  
observations                      state a problem                      hypothesis                      prediction  
testing
3. Describe the importance of the following in experiments:  
control group                      blind-studies                      double blind-studies  
placebo                      number of subjects
4. Define the following terms:  
biology                      botany                      zoology                      ecology
5. List and describe the characteristics that are common to all living organisms.
6. Define the following levels of organization:  
atoms                      molecules                      organelles                      cells  
tissues                      organ                      system                      organism  
population                      community                      ecosystem                      biosphere
7. Define elements and atom. Describe the structure of an atom including the location and charge of protons, neutrons, and electrons. Define and give an example of the following:  
ion                      cation                      anion
8. Describe the following types of bonds.  
ionic bonds                      covalent bonds                      hydrogen bonds  
Know whether electrons are donated or shared, whether bonds are polar or nonpolar and give an example of each type of bond.
9. Distinguish between organic and inorganic compounds. Include presence of carbon, types of bonds, size and examples.
10. Describe why water is an important inorganic compound. Be familiar with the following:  
hydrophilic                      hydrophobic                      polar solvent  
specific heat                      heat of vaporization                      lubricant                      cohesion  
surface tension                      capillary action  
Explain why ice floats.
11. Define and give an example of an acid, base and salt. Identify relative acidity and alkalinity from the pH scale. Be able to say if the substances on Fig 3.2 (pg 43) are an acid, base or neutral.

12. Define the term carbohydrate. Identify each of the following:
- |                |              |                |        |
|----------------|--------------|----------------|--------|
| monosaccharide | disaccharide | polysaccharide |        |
| glucose        | galactose    | fructose       |        |
| sucrose        | maltose      | lactose        |        |
| starch         | glycogen     | cellulose      | chitin |
- Know where each of these can be found.
13. List and give functions of several members of the lipid family. Are lipids hydrophilic or hydrophobic?
14. Explain what is meant by a fatty acid, a saturated fatty acid, and an unsaturated fatty acid. Know which foods contain saturated, and unsaturated fats and whether they are liquid or solid at room temperature.
15. Explain the structure of a phospholipid and list where it is found.
16. What are steroid hormones made from? Give 2 examples of a steroid hormone.
17. Define the term protein. Explain what is meant by the following terms:
- |                      |                     |                    |
|----------------------|---------------------|--------------------|
| amino acid           | peptide             | polypeptide        |
| primary structure    | secondary structure | tertiary structure |
| quaternary structure |                     |                    |
18. Explain what is meant by denaturing a protein and explain how this would affect its function.
19. List at least 4 functions of proteins in the body.
20. List the 3 components of all nucleotides. Be able to give 3 examples of nucleotides.
21. Define ATP. Describe the function of ATP and how it is formed from ADP.

Objectives for Organelles, Cell Transport,  
Cell Division and Genetics (Part 1)

1. List the difference between prokaryotic and eukaryotic cells. Give an example of each.
2. Explain why cells are small in size - be able to explain why a smaller cell is more efficient than a larger cell.
3. Name and describe the parts of a cell, giving the function of each part.

cytoplasm	cytosol	nucleus	nucleolus
nuclear envelope	ribosomes	rough endoplasmic reticulum	vesicles
golgi complex	smooth endoplasmic reticulum	lysosomes	mitochondria
microtubules	flagella	cilia	chloroplasts
4. List 3 types of organisms that have a cell wall. What is the function of the cell wall and what is its chemical makeup?
5. Describe the following types of junctions between cells:

desmosomes	tight junctions	gap junctions	plasmodesmata
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6. Be able to draw a small portion of a plasma membrane including the following:

phospholipid bilayer	proteins	cholesterol
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List the function of each of these, including all 4 functions of proteins in the membrane..
7. Be able to describe the process of diffusion from high to low concentration and how molecular weight and temperature affect it.
8. Define osmosis. Explain the importance of the semipermeable membrane. Define each of the following types of solutions and describe what happens when RBCs are placed into them:

isotonic	hypertonic	hypotonic
----------	------------	-----------
9. The plasma membrane is said to have selective permeability. Define the term selective permeability. Explain what selective permeability means functionally to a cell.
10. Describe the process of facilitated diffusion.  
  
Be able to describe how steroids, Na<sup>+</sup>, and glucose get inside the cell.
11. Distinguish between active and passive transport. Name and define the major characteristics of active transport (energy, carrier, specificity, and used to concentrate a chemical).
12. Define and give examples of the following:

endocytosis	phagocytosis	pinocytosis	exocytosis
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Objectives for Organelles, Cell Transport,  
Cell Division and Genetics (Part 2)

13. Define the following terms:
- |                 |                            |                          |
|-----------------|----------------------------|--------------------------|
| somatic cells   | mitosis                    | interphase               |
| DNA duplication | chromosomes (unduplicated) | chromosomes (duplicated) |
14. Name and describe each stage of mitosis. (prophase, metaphase, anaphase and telophase). Define chromatid, spindle fibers, centrosome (centromere), cytokinesis and cell plate.
15. Differentiate between hyperplasia and hypertrophy. List 3 types of cells that divide rapidly, and 1 that does not divide at all as adults.
16. What is a cancer? Are all growths cancerous? Describe how oncogenes and tumor suppresser genes can cause cancer. How is the p53 gene involved with cancer?
17. Define the following terms:
- |              |                    |                       |
|--------------|--------------------|-----------------------|
| meiosis      | reproductive cells | gamete                |
| diploid (2n) | haploid (n)        | homologous chromosome |
18. Explain how meiosis differs from mitosis. Name and describe each stage of meiosis. (interphase, prophase I, II, metaphase I, II, anaphase I, II and telophase I, II). What is a tetrad and why does it form? What is recombination (crossing over) and why does it happen?
- Who was Gregor Mendel? What did he do?
19. Define the following terms:
- |           |            |              |
|-----------|------------|--------------|
| dominant  | recessive  | genotype     |
| phenotype | homozygous | heterozygous |
| allele    | gene       | test cross   |
20. List Mendel's Principles of Inheritance. Be able to explain each of these.
21. Define the following terms and be able to work genetics problems for:
- |                      |                    |
|----------------------|--------------------|
| incomplete dominance | codominant alleles |
|----------------------|--------------------|
22. Be able to work genetics problems similar to those done during lab or lecture.
23. Explain how genes effect each other. Give examples of polygenic inheritance (Labrador fur color), and continuous variation (eye color and height).



## Objectives for Human Genetics and Protein Synthesis

1. Be able to do a dihybrid cross.
2. Be able to explain how to do a karyotype. What information can we learn from it
3. Define X-linked inheritance. List 2 X-linked traits. Be able to do an X-linked cross.
4. Know what the term autosomal recessive disorder means and be able to give 3 examples. What is meant by the term carrier and what is the person's genotype?
5. Be familiar with Huntington's disease and that it is a dominant trait. Be able to analyze a Punnet square of Huntington's disease.
6. Describe what is meant by nondisjunction. For the following syndromes know the cause and symptoms:  
Klinefelter Syndrome                      Turner Syndrome                      Down Syndrome
7. Name the five nitrogen bases and the sugar involved in the structure of DNA and RNA. Be able to correctly pair the nitrogen bases.
8. Describe the process of DNA replication. Include in your answer the following:  
DNA polymerase                      during interphase
9. List 3 differences between DNA and RNA.
10. List the three major types of RNA and give the general function of each. Where are they made?
11. Describe how RNA is transcribed from a DNA molecule. Include the following in your answer:  
template strand                      uracil                      RNA polymerase
12. Define the term gene and list several functions of proteins in the body. How many base pairs does a small gene have?
13. DNA is the genetic code. What does this mean? What is a triplet, codon and anticodon and what do they specify?
14. Describe the process of translation, or protein synthesis. Be sure to state clearly the role of the following:  
rRNA - ribosomes                      mRNA                      tRNA and amino acids  
codon                      anti-codon                      polysome
15. Be able to use a sequence of DNA nucleotides to write the sequence of a mRNA chain, tRNA and amino acids. You will be given a codon assignment sheet.
16. List the organelles of the cell that are involved with posttranslational modification. List 3 types of chemical changes that can occur.
17. Describe the different types of mutations that can occur to DNA. How is a frame shift mutation different than a base-pair substitution? What effect would these mutations have on protein structure and function? Are all mutations fatal?
18. Describe how genes are regulated. Are all genes transcribed in every cell? Why or why not? What is the promotor sequence? What is a Barr body? Do both sexes make Barr bodies? How do calico cats have more than 1 fur color?



## Study Guide Questions for Aerobic Respiration and Photosynthesis

1. Why do we need energy? What do we make because we are not 100% efficient at using energy?
2. Be familiar with and give an example of the following types of energy:  
chemical                      nuclear                      light                      heat  
electrical
3. Why do we need enzymes? Are enzymes destroyed in a reaction? What suffix is associated with enzymes?
4. What type of chemical are enzymes? What does their final structure look like? Review primary, secondary and tertiary structures of proteins.
5. What is the active site of an enzyme? What binds there, how specific is it, and how does the enzyme know if the right substrate has bound to it? What is the enzyme-substrate complex and what happens while it is present? Be able to give an example showing how enzymes are specific.
6. Be familiar with the following terms, and be able to give examples.  
inactive enzymes              cofactor                      coenzyme
7. How do we regulate the amount of enzyme that is present in the cell?
8. Be able to describe the ideal environment for an enzyme including temperature and pH. What pH does pepsin like and why?
9. What denatures an enzyme and what does a denatured enzyme look like? Can it still function? Why or why not?
10. What does an inhibitor do to an enzyme? How does it do this? How is penicillin an inhibitor for bacteria? What steps did scientists have to go through to make an inhibitor for the enzyme HIV uses?
11. Define and give an example of the following terms:  
anabolic reactions              catabolic reactions
12. Be able to write the overall equation for the aerobic catabolism of glucose.
13. Be able to describe what happens in oxidation-reduction reactions. Be able to tell if a compound is oxidized or reduced. Why do redox reactions require a coenzyme? In glucose catabolism, does glucose become oxidized or reduced? Does  $O_2$  become oxidized or reduced?
14. Describe what happens with a phosphorylation reaction.
15. Briefly describe the process of glycolysis and state where in the cell it occurs. State the end product of glycolysis and state the number of ATP molecules produced. Know how many carbons glucose and pyruvate have.
16. Know that pyruvate is converted to acetyl CoA when oxygen is present. What happens to acetyl CoA after it is made?
17. Describe the function of the Krebs Cycle/citric acid cycle and where it is in the cell. List the products of the citric acid cycle (primarily NADH) and know how they are further metabolized.
18. What happens to the carbons that started out in glucose?

19. Describe the function of the electron transport phosphorylation. Understand how the oxygen we breathe is used in this metabolic pathway. Know where in the cell the electron transport phosphorylation is.
20. Where is the enzyme ATP synthase found and what does it make? Where are the  $H^+$  concentrated? How does the concentration of  $H^+$  make ATP?
21. What is the function of  $NAD^+$  and  $NADH$  in metabolism? Which form of  $NAD^+$  is required for the citric acid cycle? Which form do we have more of if we do not have  $O_2$ ?
22. State the number of ATP generated when glucose is metabolized aerobically. Compare this number to when glucose is metabolized anaerobically.
23. What is lactic acid? When and why is it made and what is its fate?
24. Bacteria and yeast also use anaerobic metabolism. What do each of these make, and why are they added to foods?
25. Describe how the glycerol from fat and the fatty acids are broken down. Know where in the cell this process occurs. State the end products of fatty acid metabolism and how many ATP are generated by completely catabolizing a 16 carbon fatty acid.
26. Explain how proteins are catabolized. Include the following  
 amine group                      urea                      ammonia
27. State the body's relative preference for using various types of molecules as a source of energy. What is most of our energy stored as? What can the brain use for energy?
28. What is the main fuel for muscle at rest, the first 20 minutes of exercise, and after 20 minutes of exercise?
29. Be able to write the equation for photosynthesis.
30. Know what colors chlorophyll absorbs and reflects. In what organelle is chlorophyll found? Describe the structure of the following  
 grana                      thylakoid                      stroma
31. Describe what a wavelength is for a light wave and an example of a wavelength shorter and longer than visual light. Know what a photon is.
32. Describe what usually happens to an electron as it absorbs energy from a photon. How is this different when chlorophyll absorbs energy from a photon?
33. Be able to describe the process of the light-dependent reactions. Know where the electron acceptors are in the cell and what happens when electrons are excited. Know where the  $H^+$  are concentrated and why we need a concentrated area. Know where the enzyme ATP synthase is located and its function.
34. Know that water is split during the light-dependent reaction and the source of atmospheric oxygen. What happens to the  $H^+$  from water?
35. Know what happens during the light-independent reactions. What are the substrates and what are the products? Where are the enzymes located? We did not do this in detail.
36. Do plant cells have mitochondria? Do they use  $O_2$  for aerobic metabolism of glucose?

## Objectives for Evolution

1. Define evolution. How is evolution a central concept of biology? How does it explain much of biology?
2. Describe who Darwin was and what he studied. What is the theory of natural selection? Know the name of his book and how there is variation within populations.
3. Describe how Lamarck thought giraffes got their long necks. Contrast this with how Darwin thought giraffes got their long necks.
4. Be able to explain the 4 observations Darwin made about natural selection. What is the modern synthesis?
5. What kind of information can be learned from fossils? Describe how fossils support evolution.
6. Know the different methods scientists use to determine the similarities and differences between organisms. Explain how the following indicate a common ancient ancestor. Be familiar with and be able to give an example of the following:

comparative anatomy	homologous structures	analogous structures
vestigial organs	comparative embryology	genetic code
7. Describe how it is thought that changes in the regulatory factors for embryology led to new structures.
8. Describe the gene-modification hypothesis. Describe how this was used to determine that humans are more closely related to ducks than to moths.
9. Describe the process of DNA-DNA hybridization. What is this process used for?
10. Define the term population. What is a gene pool? Can 1 individual represent the gene pool?
11. Define the term microevolution. How is this different from evolution?
12. What is a mutation? Do all mutations alter the gene pool? Which do and why? Are mutations random?
13. Describe the processes that decrease the variability of the gene pool. Be able to describe and give an example of each of the following:

gene flow	genetic drift	genetic bottleneck
founders effect	inbreeding	
14. Explain how natural selection maintains the variety of the gene pool. Can natural selection make a perfect individual?
15. Why is it important to have variety in the gene pool? Name 2 species that has a small gene pool. What are the consequences for having a small gene pool?
16. Describe and give an example of the following:
  - stabilizing selection (birth weight, lizard size)
  - directional selection (smooth shells, giraffe necks)
  - disruptive selection (birds with large and small beaks)

17. Review the following terms from genetics.  
homozygous                      heterozygous                      dominant                      recessive
18. What proteins does a person make who is heterozygous for sickle-cell anemia? Why do they have a heterozygous advantage against malaria? Where is malaria prevalent? (pg 234)

## Evolution Part 2

19. What is macroevolution? How is this different than evolution and microevolution? Does macroevolution occur in just 1 species?
20. Be able to state the definition of a species.
21. What is allopatric speciation? How do they know that the rabbits on the island off of Portugal are a different species than the rabbits on the mainland?
22. What does it mean to be reproductively isolated? Describe how the following cause reproductive isolation:  
geographical isolation      ecological isolation      temporal isolation      behavioral isolation  
mechanical incompatibility      inability to develop
23. Explain what a mule is and why it can not make gametes.
24. Describe the different patterns of speciation making sure to indicate how they are different including:  
gradual model      punctuation model
25. What is the binomial system of classification? Who developed this system? How many words are there and what language is it in?
26. Be able to define the following terms:  
kingdom      phylum      class      order  
family      genus      species      division  
Be able to group these properly. Be able to match the kingdom → species for humans and cat as done in class.
27. Define taxonomy, taxa, and species. Is there a definition for family, order, class etc?
28. Know the process scientists use to classify organisms. Be familiar with the following:  
systematics      homologous structures      nucleotide sequence
29. Know the kingdoms of life. Which were the last ones formed? Which one do scientists want to split? Why do they want to split it?
30. List at least 3 characteristics that are unique for mammals. Why is the duck-billed platypus a mammal and not a bird?
31. What is extinction? What percent of all species has become extinct? What is the difference between background extinction and mass extinction? What are some potential causes of mass extinction?
32. Be able to describe the continental drift theory. What was Pangea and when did it exist? When did the continents separate? What does this mean for evolution? Are the continents still moving?
33. How old is the earth? What were the conditions on earth at the beginning of time (4 listed in class)? Why do they think there wasn't much O<sub>2</sub> in the atmosphere?
34. Did eukaryotes branch off of the domain bacteria or the domain archaea?
35. Describe the first cells. Were they autotrophs or heterotrophs? Were they anaerobes or aerobes? What organism was the first to use photosynthesis and split water? What happened when there was more O<sub>2</sub> in the atmosphere?

36. What is ozone and when did it form? What is the benefit of ozone?
37. How are mitochondria and chloroplasts different than other organelles? What can they do that other organelles can't do? What is an endosymbiont and how did they form?
38. Be familiar with the order of appearance of the following:
- |   |                       |            |
|---|-----------------------|------------|
| fossils of bacteria, fungi and protists | sponges               | snails     |
| plants                                  | air-breathing animals | fishes     |
|   |                       | amphibians |
39. Be familiar with the Mesozoic and Cenozoic eras including the dominant organisms in each.
- |          |           |             |             |
|----------|-----------|-------------|-------------|
| reptiles | dinosaurs | insects     | gymnosperms |
| mammals  | birds     | angiosperms | ice age     |
40. How did marine animals become land animals?
41. What prevented plants from living on land at first? What disadvantage do ferns and mosses have? What is the advantage of angiosperms over gymnosperms?
42. What is the difference between warm-blooded and cold-blooded animals? What advantages do warm-blooded animals have? How long have humans been on earth?

## Study Guide for Ecology

1. Define the following terms:  
ecology                      biotic                      abiotic                      population  
community                      ecosystem                      biosphere
2. How does a scientist determine population density?
3. Know what an exponential growth curve looks like and what it is called. Why can't an exponential growth continue forever?
4. What is meant by the term biotic potential? What kinds of animals have a high biotic potential? Do humans have a high biotic potential?
5. What is the carrying capacity (K)? What is the growth rate at the carrying capacity? Does the birth rate have to be 0 when a population is at the carrying capacity? Be able to explain a S curve.
6. How do immigration and emigration effect growth rates?
7. List animals that are equilibrium species. Know that they are regulated by density-dependent factors. List several density dependent factors.
8. List animals that are opportunistic species. Know that they are density-independent. List some density-independent factors. Do these species have a high or low biotic potential?
9. Describe how the following life history patterns are different, giving examples of each:  
Type I (humans)                      Type II (birds)                      Type III (insects)
10. Why do scientists look at age distributions? What is the age distribution in an expanding population, stable population and declining population? List a country that is an example for each type of distribution.
11. What percentage of people are under age 15 worldwide? Where do most people live?
12. Know when there were 1 billion, 2 billion and 4 billion people on Earth. How many people are on Earth now?
13. In the 1900's what has happened to the birth rate and death rate worldwide? Be able to use the facts from Mexico as an example.
14. What is the worldwide growth rate now? When do scientists predict that the growth rate will be 0? How many people will be on Earth then?
15. Know the following facts for the US and Africa:  
growth rate                      fertility rate                      life span                      replacement fertility rate
16. Know the worldwide fertility rate. Why isn't the replacement fertility rate 2 and why is it higher in developing countries? Does the age of the mother have any effect on the country's growth rate?
17. What is a community? Be able to define habitat and niche.
18. Can 2 species occupy the same niche? What happens if they try to? Be able to describe the competitive exclusion principle. What is interspecies and intraspecies competition? What is resource partitioning?

19. Be able to describe prey-predator relationships. Be familiar with the following and be able to give an example:
- |                    |                  |                       |
|--------------------|------------------|-----------------------|
| coevolution        | hunting in packs | camouflage coloration |
| warning coloration | mimicry          | aggressive mimicry    |
20. Be able to describe and give an example of the following symbiotic relationships:
- |              |            |           |
|--------------|------------|-----------|
| commensalism | parasitism | mutualism |
|--------------|------------|-----------|
21. Differentiate between primary succession and secondary succession. Be able to give an example of each. Know the order that plants will grow in and what animals are characteristic for each plant type. How long does it take each type of succession to reach a climax community?

## Ecology Cont.

22. Be able to define the term biogeochemical cycles. Can we destroy matter? Is matter always in a useful form?
23. Know where carbon is found. Be familiar with the following:  
CO<sub>2</sub>                      CO<sub>2</sub> in water                      sedimentary rock                      limestone  
cellulose                      fossil fuels
24. Know how carbon cycles through the environment. Include the following:  
carbon fixation                      respiration                      combustion                      erosion  
Which of these process add CO<sub>2</sub> to the atmosphere and which take it out of the atmosphere.
25. Know what percentage of the atmosphere is CO<sub>2</sub> and N<sub>2</sub>. Is the amount of CO<sub>2</sub> going up, down or staying the same?
26. Know where nitrogen is found. Include the following:  
N<sub>2</sub>                      biological compounds (which ones)
27. Describe how nitrogen cycles through the environment. Include the following:  
nitrogen fixation                      *Rhizobium*                      legumes                      cyanobacteria  
heterocysts                      fertilizer                      nitrification                      uptake by plants  
ammonification                      urea (& why we make it)                      uric acid (who makes it)                      denitrification
28. Describe the water cycle including each of the following:  
evaporation                      hydrogen bonds                      water vapor                      condensation  
transpiration                      precipitation                      salty lakes
29. Define and give an example of the following:  
terrestrial autotrophs                      aquatic autotrophs                      heterotrophs  
primary consumers                      secondary consumers                      carnivores                      omnivores  
detritus feeders                      decomposers
30. Describe how energy flows from one organism to the next in a food chain. Is all of the energy passed to the next animal? Why are food chains narrow at the top? Describe what is meant by biological magnification. Be able to give examples of a 1<sup>st</sup> trophic level organism, 2<sup>nd</sup> trophic level etc.
31. Describe what is meant by global warming. What are the causes and the consequences of this?
32. Where is the ozone layer thinning? What is causing this thinning and why is it a problem?
33. Describe what is meant by acid rain. What are the causes of acid rain, where is it generated, where does it fall and what are the consequences?
34. Describe what is meant by biological magnification. Are lipid soluble or water soluble compounds more likely to show this?
35. Define the term biome. Include the following in your answer.  
climate                      temperature                      latitude                      precipitation  
rain distribution
36. Be able to describe the biomes covered in class. For each know  
Location                      Climate                      Rainfall                      Plants  
Animals

Tundra  
Grasslands

Taiga  
Chaparral

Temperate Rain Forest  
Desert

37. Describe the aquatic ecosystems. Differentiate between  
oligotrophic lakes      eutrophic lakes      estuary
38. What is the definition and function of a wetland (either fresh or estuary)? What types of plants and animals are found here? What has been the effect of humans on these?

## Study Guide Questions for the Comprehensive Part of the Final

1. Review the parts of a microscope and how it functions.
2. List the levels of organization from atoms to organism.
3. List the characteristics of ionic, covalent and hydrogen bonds. Be able to list an example of each.
4. What does it mean if something is an organic compound? Give an example of an organic chemical. What kind of bonds does it have? Will it fall apart in water?
5. List characteristics of carbohydrates, lipids, proteins and nucleotides.
6. Know the difference between prokaryotic and eukaryotic cells, listing examples of each.
7. Be able to give an example of polar and nonpolar molecules. Which of these can diffuse across a membrane?
8. Know the function of the following organelles:  
nucleus                      ribosomes                      rough endoplasmic reticulum                      golgi complex  
mitochondria                      lysosomes                      chloroplasts
9. Describe the process of osmosis. Know the definition of hypotonic and hypertonic solutions. Why do carrots stay crisp in water, but wilt in salt water?
10. How is meiosis different than mitosis? Include: the cells which do each process, how many cells each process makes and what happens to the DNA in each process. Know the definition of diploid and haploid cells.
11. Know the difference between autosomal recessive diseases and sex-linked diseases. List 2 examples of each type.
12. Do a cross between 2 carriers for an autosomal disease. What is the chance of having a child with cystic fibrosis? Does it make a difference if it is a son or a daughter? Explain how we hope to cure this disease in the future.
13. What is the function of DNA? Do you need it only when cells divide?
14. Describe the structure of DNA.
15. Know what is made by each of the following processes: DNA replication, transcription, and translation.
16. Why do we need O<sub>2</sub>? What process requires O<sub>2</sub>? What organelle uses O<sub>2</sub>?
17. Briefly describe the process to make ATP from glucose. Include the process that makes most of the ATP, which process makes the waste product CO<sub>2</sub>, and when we would make lactic acid.
18. Name at least 5 kingdoms and at least 6 phyla of animals. Give an example of each.
19. Differentiate between microevolution and macroevolution. Give a specific example of each.
20. Differentiate between homologous and analogous structures. Give an example of each.
21. Give 3 specific and different examples that show that birds and cats have a common ancestor.