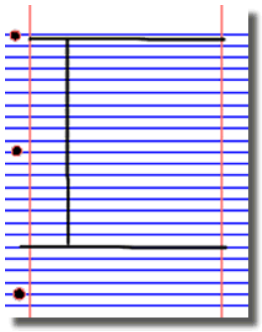
AP Biology Homework Guidelines:

ALL Homework should be saved in a notebook that can be used later as a resource to study for the AP Biology Exam

Possible Homework Strategies and Descriptions:



1. Cornell Notes: Divide paper as shown in diagram to the right. Notes go in the top right box (Don't use complete sentences – diagrams and concept maps are welcome), key points go in the top left, a summary of information goes on the bottom (this should be done in complete sentences).
2. Guided Readings: Each student will answer a set of questions based on information from the textbook.
3. Concept Mapping: Each student will create a concept map about main themes of each chapter. Making connections and relationships from the information given.
4. Traditional Outlines: Each student will read the chapter and generate an outline based on information in the chapter
5. MasteringBiology.com: Each student will log on using their student accounts and answer questions regarding the chapter we are discussing in class.

For ALL Strategies: Please read each through the chapter once. Consider taking notes and drawing diagrams or concept maps. Think about what you have read and follow that up by answering the following questions completely, in detail and in your own words.

GRADING: Please note the due date for each assignment. You are to summit your work on the day it is due. You will receive zero credit for any late work (refer to syllabus for policies.) All work submitted must be your own. You may not collaborate with others on homework or use words that are not your own. If you need to quote the text, include the proper citations. If you choose not to follow the Academic Honor Code proper action will be taken.

Chapter 16 – The Molecular Basis of Inheritance
Due – 11/24

Guided Reading:

1. Summarize the evidence and techniques Watson and Crick used to deduce the double-helix structure of DNA.
2. Describe the structure of DNA. Explain the "base-pairing rule" and describe its significance.
3. Explain the antiparallel arrangement of the DNA strands. Include the difference between the 5' and 3' end of the strands.
4. Describe the process of DNA replication include the key enzymes and proteins (in the order of their functioning) that direct replication.

Chapter 17 – From Gene to Protein
Due – 12/1

Guided Reading:

1. Distinguish between transcription and translation.
2. Define "codon" and explain the relationship between the linear sequence of codons on mRNA and the linear sequence of amino acids in a polypeptide.
3. Explain in what way the genetic code is redundant and unambiguous.
4. Explain how RNA polymerase recognizes where transcription should begin. Describe the promoter, the terminator, and the transcription unit.
5. Explain the general process of transcription, including the three major steps of initiation, elongation, and termination.
6. Explain how RNA is modified after transcription in eukaryotic cells.
7. What is the difference between a spliceosome and ribozymes?
8. Describe the structure and functions of tRNA.
9. What is the role of aminoacyl-tRNA synthetase?
10. How does the structure of a ribosome allow for both mRNA and tRNA to bind to it? Be specific.

11. Describe the process of translation (including initiation, elongation, and termination) and explain which enzymes, protein factors, and energy sources are needed for each stage.
12. Describe what determines whether a ribosome will be free in the cytosol or attached to the rough endoplasmic reticulum.
13. What are the functions of the following types of RNA molecules? mRNA, tRNA, rRNA, snRNA and SRP RNA.
14. Define "point mutations." Distinguish between base-pair substitutions and base-pair insertions. Give examples of each and note the significance of such changes.

Chapter 18 – Microbial Models
Due – 11/3

Guided Reading:

1. List and describe the structural components of viruses.
2. Distinguish between the lytic and lysogenic reproductive cycles, using phage T4 and phage lambda as examples.
3. Describe the reproductive cycle of an enveloped virus. Explain how the reproductive cycle of herpes viruses is different.
4. Describe the reproductive cycle of retroviruses.
5. Explain how viral infections in animals cause disease.
6. Describe the best current medical defenses against viruses. Explain how AZT helps to fight HIV infections.
7. Describe the mechanisms by which new viral diseases emerge.
8. List some characteristics that viruses share with living organisms and explain why viruses do not fit our usual definition of life.
9. Describe the structure of a bacterial chromosome and review the process of binary fission
10. Compare the processes of transformation, transduction, and conjugation.
11. Describe the significance of R plasmids. Explain how the widespread use of antibiotics contributes to R-plasmid-related disease.
12. Using the trp operon as an example, explain the concept of an operon and the function of the operator, repressor, and co-repressor.
13. Describe how the lac operon functions and explain the role of the inducer, allolactose
14. Explain how cyclic AMP and the cyclic AMP receptor protein are affected by glucose concentration.

Chapter 19– The Organization and Control of Eukaryotic Genomes
Due – 12/5

Guided Reading:

1. Explain how histones influence folding in eukaryotic DNA.
2. Describe the structure and functions of the portions of eukaryotic DNA that do not encode protein or RNA.
3. Define and distinguish between the three types of satellite DNA.
4. Using the genes for rRNA as an example, explain how multigene families of identical genes can be advantageous for a cell.
5. Describe the process and significance of gene amplification.
6. Define and explain the significance of transposons and retrotransposons.
7. Explain how genetic recombination during development results in millions of different kinds of antibody molecules.
8. Explain how DNA methylation and histone acetylation affects chromatin structure and the regulation of transcription.
9. Explain the potential role that promoters, enhancers, activators, and repressors play in transcriptional control.
10. Distinguish between proto-oncogenes and oncogenes. Describe three genetic changes that can convert proto-oncogenes to oncogenes.
11. Explain how excessive cell division can result from mutations in the ras oncogenes.
12. Explain why a mutation knocking out the p53 gene can lead to excessive cell growth and cancer.

Chapter 20 – DNA Technology
Due –12/8

Guided Reading:

1. Explain how advances in recombinant DNA technology have helped scientists study the eukaryotic genome.
2. Explain how the creation of sticky ends by restriction enzymes is useful in producing a recombinant DNA molecule.
3. Outline the procedures for cloning a eukaryotic gene in a bacterial plasmid.
4. Describe the polymerase chain reaction (PCR) and explain the advantages and limitations of this procedure.
5. Explain how gel electrophoresis is used to analyze nucleic acids and proteins and to distinguish between two alleles of a gene.
6. Describe the Southern blotting procedure and explain how it can be used to detect and analyze instances of restriction fragment length polymorphism (RFLP).
7. Explain how linkage mapping, physical mapping, and DNA sequencing each contributed to the genome mapping project.
8. Explain how *in vitro* mutagenesis and RNA interference help to discover the functions of some genes.
9. Explain the significance of single nucleotide polymorphisms in the study of the human genome.
10. Explain how DNA technology can be used to improve the nutritional value of crops and to develop plants that can produce pharmaceutical products.
11. Describe the safety and ethical questions related to recombinant DNA studies and the biotechnology industry.

***Bacterial Transformation Lab: 12/10**

***Unit Test – 12/16**

**Dates subject to change*