Name : KEY Pd: ____

Biology Semester 1 Exam Review Guide

Unit1: Structure and Function

Chapter 1 – Biology in the 21st Century

1. Distinguish between the following key terms:

Biology	the study of life
Hypothesis	a testable prediction for an outcome of an experiment
Variable	feature that is set or tested in experiment independent: set by experimenter; dependent - measured outcome
Controlled experiment	has a control group to compare the experimental group
Theory	idea that has been confirmed by many tested hypotheses
Model	used to show scientific principles in a easy to understand form
Technology	scientific knowledge applied to practical use

2. Distinguish between qualitative and quantitative data.

	Define	Examples
Qualitative	Characteristics of quality of color, shape - not number based	red, large, cold
Quantitative	Characteristics based on measures - number based	2.5 cm, 42 grams

3. Describe the study in mimicry, using king snakes and coral snakes. Identify the control in the experiment. -See notes

Plain brown snakes w/o stripes

4. Apply hypothesis based science to a failed flashlight to fill in the blanks. Draw in arrows showing the sequence of steps used in hypothesis- based science. Include those that show what occurs if the test DOES and DOES NOT support the hypothesis.

Observation: Flashlight does not work

Question: ~~Batteries are dead~~ Why doesn't it work?

Prediction/Hypothesis: ~~If~~ batteries are dead then ~~prediction~~ then with new batteries will make it work

~~Prediction:~~ switch the batteries are dead

Test: Replace the batteries

5. How is communication an important part of science? Describe the benefits scientists gain by sharing information with one another?

Experiments need to be peer-reviewed to be validated

Chapter 8: DNA and the Language of Life

6. Distinguish between the following key terms:

Protein	essential macromolecules made of a chain of amino acids
Amino Acid	build block of proteins have R group that gives different characteristics
Denaturation	the breaking of bonds between amino acids cause protein to ~~[illegible]~~ unfold; causes: heat, acid, etc

7. The 20 amino acids vary only in their R group.

8. How does denaturation affect the ability of a protein to function?
denaturing break bonds and changes shape
mis-shaped proteins do not work properly

9. How do the various kinds of microscopes differ as tools in the study of cells?
   a. Light microscope– used visible light; light passes through object
   b. Electron microscope (SEM, TEM) – can magnify much more than light micro.
   scanning tunneling –

10. Explain why DNA's structure is called "the double helix."
2 sided molecule that twists in a curl, or helix, shape

11. What are the three parts of a nucleotide? Which parts makeup the backbone of a DNA strand?
Backbone – sugar (ribose or dioxyribose) and phosphate group
third part → Base of 1 of 4 options

12. List the two base pairs found in DNA.
A – T
C – G

13. If six bases on one strand of a DNA double helix is AGTCGG, what are the six bases on the complementary section of the other strand of DNA?
TCAGCC

14. What is DNA replication? Describe how DNA replicates by using a template. Explain which strands are new/daughter strands, and which strands are old/parent strands. = exact copy of DNA
DNA unzips, each side is used to make copy using base pairing rules
thus each new strand is 1/2 parent and 1/2 new DNA

15. Distinguish between the following key terms:

Ribonucleic acid (RNA)	nucleic acid made of 1 sided strand, ribose sugar, & the bases A,U C,G mRNA, tRNA, rRNA
Transcription	mRNA copy of DNA made
Translation	mRNA strand used as instructions for making protein using tRNA & rRNA
Codon	3-base code on mRNA
Mutation	Change in base(s) on DNA that causes change in protein

16. Which molecule completes the flow of information from DNA to protein?
DNA → RNA **→ Protein**

17. Describe how a mutation could be helpful rather than harmful.
It can lead to a benefitial trait to occur that helps organism survive

18. How many codons code for the 20 different amino acids? Why is it possible for an amino acid to be specified by more than one kind of codon? Give an example using Fig 11-13. 64 codons; there is multiple codons for same amino acid

19. How many start and stop codons are there? What are they?

1 start = AUG, 3 stop = UAA, UAG, UGA

20. List and describe two types of mutations that can occur within a gene.

POINT MUTATION – one BASE in DNA CHANGE, LEADS to different amino acid
insertion - BASED added - leads to many different amino acids
deletion Base removed " " "

21. Give an example of a mutagen/carcinogen.

mutagen cause DNA BASE change mutation
carcinogen cause cell cycle disruption and irregular cell growth

22. What important discovery has led to the development of modern genetic engineering techniques?

CRISPR

23. Define Codons:

3 BASES ON mRNA that code for amino acid

24. How many codons are in the following nucleotide sequences? How many amino acids would each sequence code for?

a. AAATCACGC — 3 codons, 3 AA
b. ATCCTTTAGGAA — 4 codons, 4 AA

25. Use the following Codon chart to identify the amino acid sequence for the following nucleotide sequences:

Second Position

First Position (5' end)	U	C	A	G	Third Position (3' end)
U	UUU Phe, UUC Phe, UUA Leu, UUG Leu	UCU Ser, UCC Ser, UCA Ser, UCG Ser	UAU Tyr, UAC Tyr, UAA Stop, UAG Stop	UGU Cys, UGC Cys, UGA Stop, UGG Trp	U C A G
C	CUU Leu, CUC Leu, CUA Leu, CUG Leu	CCU Pro, CCC Pro, CCA Pro, CCG Pro	CAU His, CAC His, CAA Gln, CAG Gln	CGU Arg, CGC Arg, CGA Arg, CGG Arg	U C A G
A	AUU Ile, AUC Ile, AUA Ile, AUG Met	ACU Thr, ACC Thr, ACA Thr, ACG Thr	AAU Asn, AAC Asn, AAA Lys, AAG Lys	AGU Ser, AGC Ser, AGA Arg, AGG Arg	U C A G
G	GUU Val, GUC Val, GUA Val, GUG Val	GCU Ala, GCC Ala, GCA Ala, GCG Ala	GAU Asp, GAC Asp, GAA Glu, GAG Glu	GGU Gly, GGC Gly, GGA Gly, GGG Gly	U C A G

a. AUGCCCCUG — start(Meth) - Pro - Leu
b. AUGACAAAAGGU — start/Meth - Thr - Lys - Gly
c. UCUCAUAAC — Ser - His - Asn

26. Give an explanation for the following.

a. GAA --> GUA — POINT Mutation

27. What are the DNA Replication Base Pairing Rules:

a. A pairs with T
b. C pairs with G

28. What are the DNA--> RNA Base Pairing Rules of Transcription?

a. A pairs with U
b. C pairs with G

29. What does it mean when we say that DNA replication is semi conservative

when replicated one of the sides of ~~the~~ each of the new molecules is from the parent strand

Human Anatomy and Physiology

30. Identify the levels of structure in the human body

Level of Organization	Description
Cell	basic level of all life
TISSUE	Group of cells working together to perform a specific function
ORGAN	various tissues working together to form a structure with a specific job
ORGAN SYSTEM	various organs working together to perform tasks in the body
organism	all organ systems connected to make the whole organism function

31. Identify the four major tissue categories and describe their functions-

Tissue Category	Function/ Description	Microscopic image
Epithelial	protective layer on outside of body and lining organs	Skin
Nervous	Sends messages around body & coordinates response	Brain
Muscle	connects to bones to allow movement	Heart muscle
Connective	allow O_2/CO_2 and other materials to be moved through body	Blood

32. Define homeostasis and explain its importance

Definition	Importance
regulation of body's internal environment	allow temperature, chemistry, and other conditions to remain optimum for protein function

33. Describe how body temperature homeostasis is regulated by negative feedback-

If the body gets too warm, sweat is produced which cools the body back to normal

34. What is the function and related structures of the following body systems?

	Function	Structures in the System
The Excretory System	Removes liquid waste from body	Kidney, ureter bladder, urethra
The Cardiovascular System	Moves blood and its CO_2 / O_2 / nutrients throughout the body	Heart, vessels blood

Unit 2: Heredity: Inheritance and Variation of Traits

35. Contrast the two main ways that organisms reproduce

	Definition	Examples
Sexual Reproduction	two parent contribute genetic information for offspring	humans
Asexual Reproduction	One parent provides genetic info	budding, fragmentation, binary fission

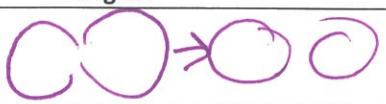
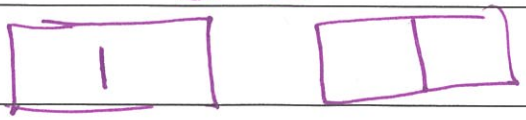
36. Name the stages of the cell cycle and explain in words and draw a diagram of what happens during each stage

Phase	Description
G1	growth and normal life of cell
S	Synthesis - exact copy of DNA made
G2	growth and preparation for cell division
Mitotic Phase	Division of the two copies of DNA into 2 identical cells

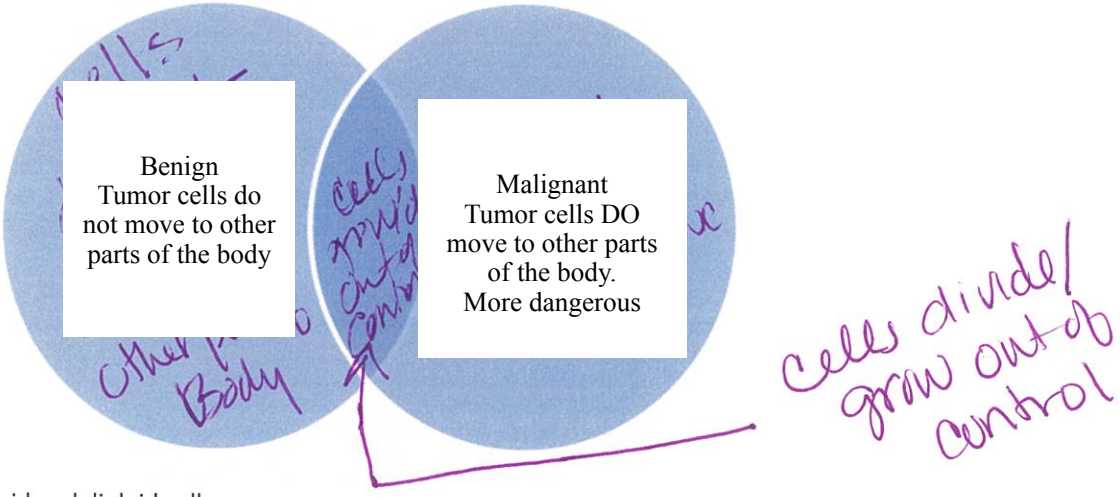
37. Name the stages of **mitosis** and explain in words and draw a diagram of what happens during each stage

Stage	Explanation	Diagram
Prophase	chromosomes condense nucleus dissolves.	
Metaphase	~~DES~~ chromosomes with their Sister chromatids line up at center	
Anaphase	Sister Chromatids separate and go to opposite sides of cell	
Telephase	cytoplasm begins to divide	

38. **Explain** and **diagram** how cytokinesis differs in plant and animal cells.

	Explain	Diagram
In Animal Cells	cell membrane "pinches" in half	
In Plant Cells	cell wall forms in middle and forms 2 cells	

39. Compare benign and malignant tumors



40. Contrast haploid and diploid cells

Haploid	Only one of the homologous pairs present, gametes
Diploid	Both homologous pairs present in cell; body cells

41. Summarize the process of meiosis