

## BIOLOGY FINAL EXAM REVIEW SHEET

### Chapters 10 - 15, 17 - 30

The exam was prepared by the Biology teachers in the science departments of CVHS and DHS.

1. What is a Punnett Square?
2. Cross a black haired dog (Bb) with a brown haired dog (bb).
  - a. What are the genotypes of the offspring?
  - b. What are the phenotypes of the offspring?
  - c. What percentage will have black hair?
  - d. What percentage will have brown hair?
3. What is probability?


4. Explain what is meant by each genotype (allele combination), list how you would represent the genotype in a Punnett square (letters), and describe the phenotype that results from it.

Genotype	Description (Dominant or Recessive Alleles)	Letters (Use H)	Phenotype (Dominant or Recessive Trait)
<b>Homozygous Dominant</b>			
<b>Homozygous Recessive</b>			
<b>Heterozygous</b>			

5. What are hybrids? Give an example.
6. Explain what is meant by each inheritance pattern, describe the phenotype that results from it and provide a specific example.

Inheritance Pattern	Description	Actual Example
<b>Codominance</b>		
<b>Incomplete Dominance</b>		
<b>Multiple Allele Traits</b> (Use Blood Types for example)		
<b>Polygenic Traits</b>		
<b>Sex-linked Traits</b>		

7. Define & describe the inheritance patterns of the following genetic disorders:

a. Sickle cell anemia

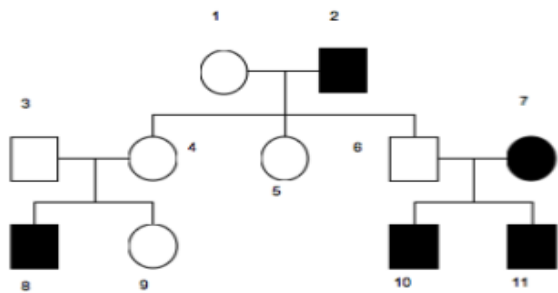
b. Colorblindness

c. Huntington's disease

d. Albinism

8. Explain why the inheritance pattern of sex-linked traits differs from autosomal traits. Which sex chromosomes are most sex-linked traits carried on?

9. Given a parent's blood type be able to determine the offspring's blood type. Use the Punnett square to demonstrate blood type inheritance between a parent who is homozygous for A blood and an O type parent.

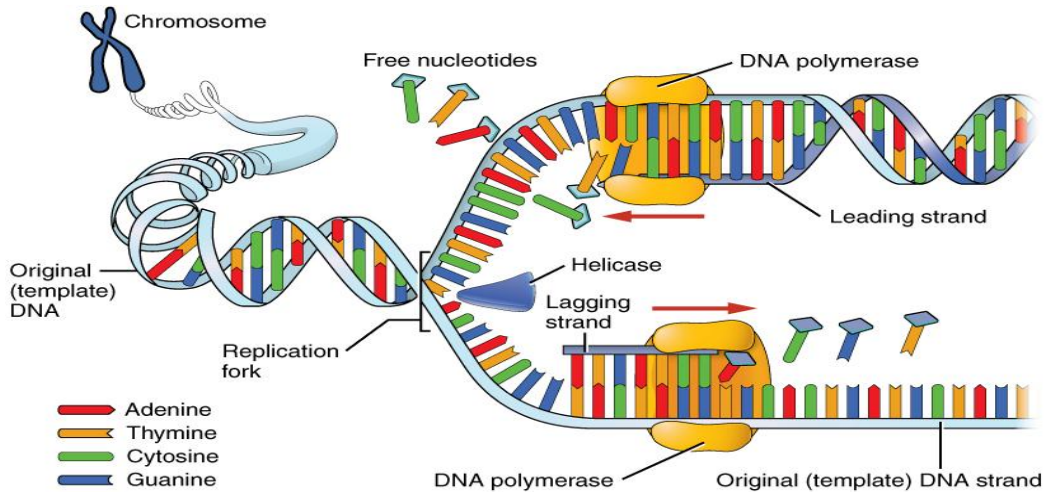



10. Use the pedigree above to answer the following questions about this sex-linked trait. (Review symbols on pg. 299)

- Label each of the individuals in the pedigree with its genotype (if more than one is possible, list all)
- Why do more males have the disease than females?
- Why can a female be a carrier, but a male cannot?
- What is the probability of couple 6 & 7 having another boy?
- What is the probability of couple 3 & 4 having a boy who does not have the disease?
- If person 5 wants to make sure that none of her children have the disease, what type of mate would she need to marry?

11. What was the purpose of the Human Genome Project?

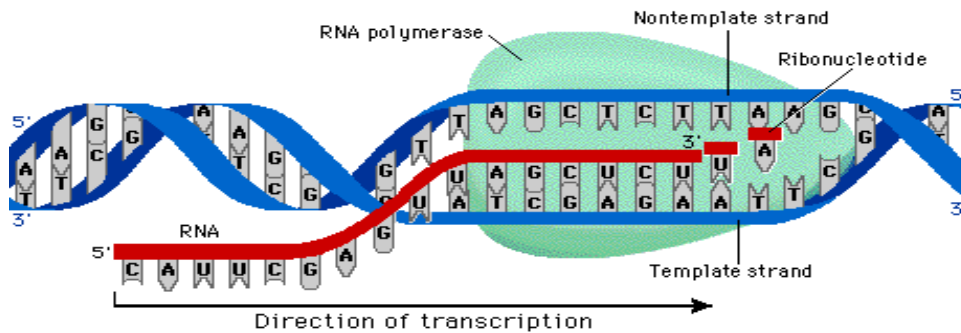
12. Number the correct arrangement from smallest (1) to largest (5): nucleus, DNA, chromosome, nucleotide, and cell.



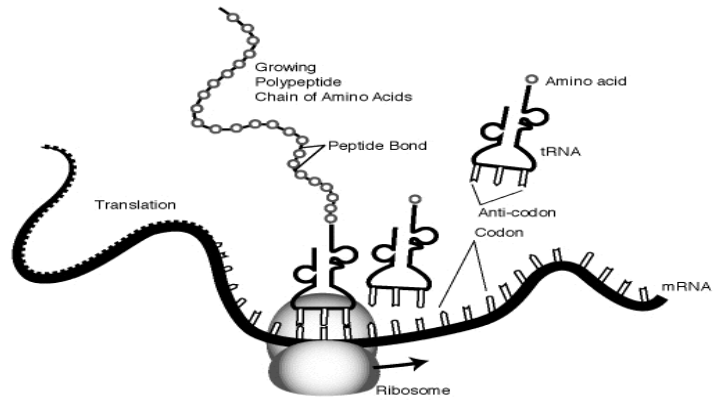
13. Using the picture above, explain the process of Replication.

- What enzyme unwinds and unzips the DNA?
- Where does replication occur? Why?

14. Explain the process of transcription.



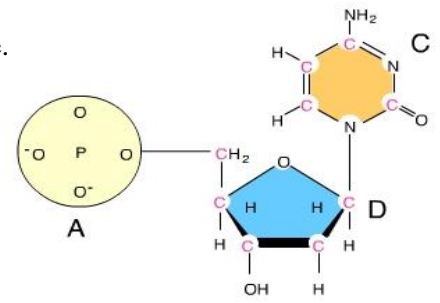
15. Using the picture below, explain the process of translation and where it occurs.



16. Complete the chart below by filling in the function of each in producing amino acids/proteins.

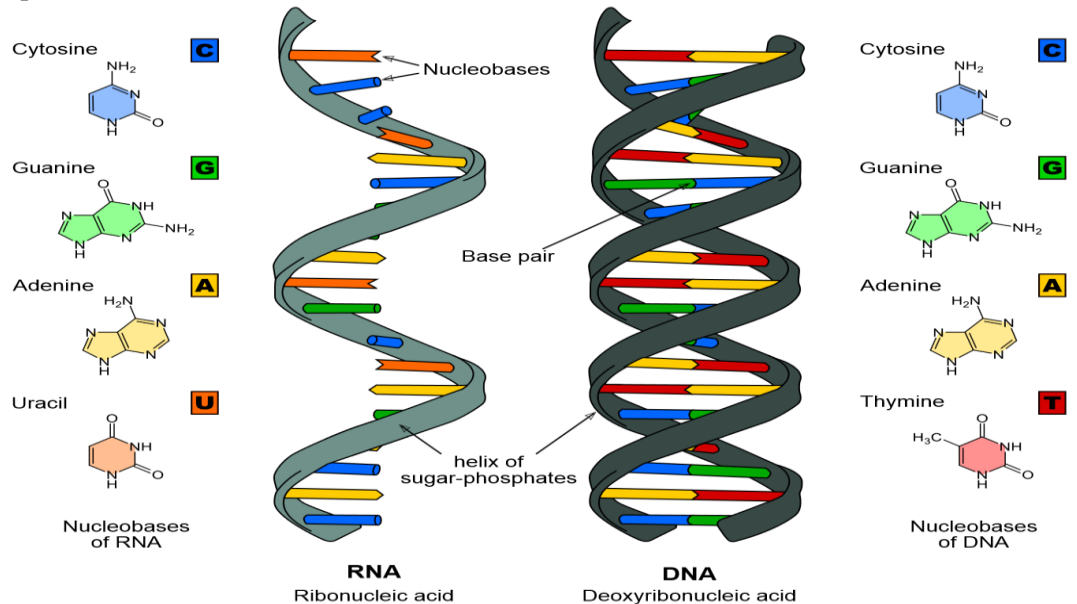
Nucleic Acid	Function
DNA	
mRNA	
tRNA	
rRNA	

17. Define a nucleotide. Label & Describe the 3 parts that make up a nucleotide.



18. Using the picture below, explain the differences between DNA & RNA? (Hint: there are 3 differences)

- 
- 
- 
- 



19. Complete the base pair chart for DNA to DNA, DNA to mRNA, and mRNA to tRNA below

<b>DNA</b>	<b>A – T – C – G</b>
<b>DNA (Base Pair)</b>	
<b>mRNA</b>	
<b>tRNA</b>	

**TAC-CGG-TCA-TTG-CAT-ATC-TGC-ATG-CAT**

20. Using the DNA strand above, complete the following chart using the codon chart on Page. 338, Figure 12.4, to determine the amino acid.

<b>DNA stand code</b>	<b>mRNA strand code</b>	<b>tRNA code</b>	<b>Amino Acid</b>
<b>TAC</b>			
<b>CGG</b>			
<b>TCA</b>			
<b>TTG</b>			
<b>CAT</b>			
<b>ATC</b>			

- What is the start codon?
- What are the stop codons? What do they do?
- How many nitrogenous bases make a codon?
- How many codons produce one amino acid?

21. Genes contain instructions for assembling which important macromolecule?

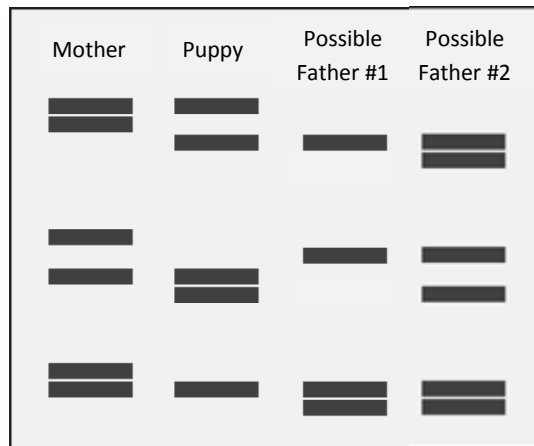
22. Compare the DNA strands in the diagram below, determine what type of mutation has occurred, describe what that means to the resulting protein produced and classify it as either a point or frameshift (insertion or deletion) mutation.

<b>DNA Strands</b>	<b>Type of Mutation</b>	<b>Description</b>
<b>(Original)</b> <b>C-A-T-C-A-T-C-A-T-C-A-T</b>		
<b>(Mutation)</b> <b>C-A-T-C-A-T-G-A-T-C-A-T-C-A-T</b>		

<b>(Original)</b> C-A-T-C-A-T-C-A-T-C-A-T-C-A-T		
<b>(Mutation)</b> C-A-T-C-T-G-A-T-C-A-T-C-A-T		
<b>(Original)</b> C-A-T-C-A-T-C-A-T-C-A-T-C-A-T		
<b>(Mutation)</b> C-A-T-A-C-A-T-G-A-T-C-A-T-C-A-T		

23. What is gel electrophoresis? How is it used to make a DNA fingerprint?

- a. How is it used to solve crimes and for a paternity test?
- b. Know how to read a fingerprint. Using the diagram below, which dog is most likely the father? Justify.



24. What is a test cross? Why would a geneticist perform a test cross?

25. What is genetic engineering? How does this benefit human society?

26. What are restriction enzymes? How are they used in genetic engineering?

27. What are autosomes? How many do normal humans have?

28. What sex chromosomes do females have? Males?

29. How many chromosomes do normal humans have?

30. What is a karyotype? What is it used for?
31. Define transgenic organism.
32. How has the theory of continental drift influenced evolution?
33. What is a geologic time scale? Be able to read/interpret. See figure 14.5 on pg. 397.
34. Know the following terms used in dating fossils:
- a. Relative dating
  - b. Radiometric dating
  - c. Half-life
35. What is Charles Darwin's theory of evolution by natural selection?
- a. Define natural selection
  - b. Define speciation
  - c. Define fitness
36. Explain how natural selection led to the speciation of Darwin's finches on the Galapagos Islands.

37. Define & give examples of the following:

Structures	Definition	Examples
Homologous structures		
Analogous structures		
Vestigial Structures		

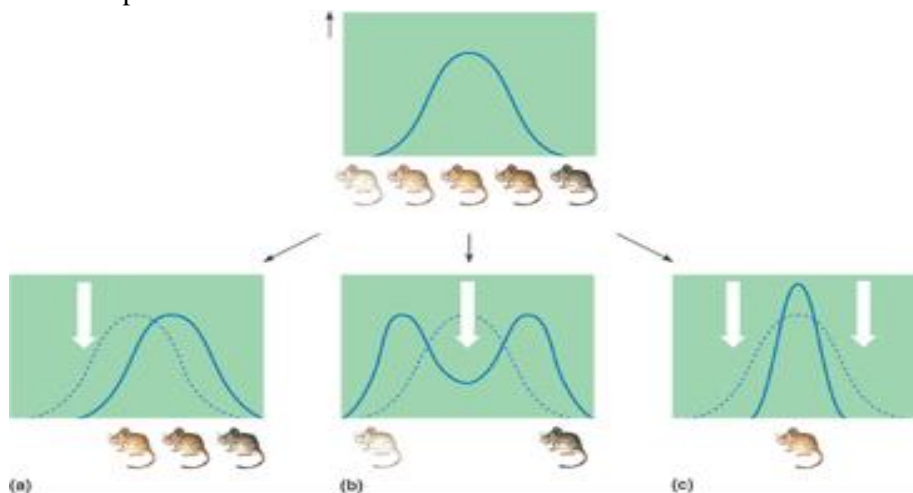
38. How did Darwin view the fossil record?

39. Define & know examples of the following terms used in evolution:

Term	Definition	Example
Geographic isolation		
Adaptive radiation		
Convergent evolution		
Gradualism		
Punctuated equilibrium		

40. Label & Describe what is happening with the original population of mice using:

- a. Stabilizing selection
- b. Directional selection
- c. Disruptive selection





41. Complete the chart by filling in the necessary information.

<b>Domain</b>	<b>Bacteria</b>	<b>Archae</b>	<b>Eukarya</b>			
<b>Kingdom</b>						
<b>Cell Type</b> (Prokaryote or Eukaryote)						
<b>Cell Structures</b>						
<b>Number of Cells</b> (Unicellular or Multicellular)						
<b>Mode of Nutrition</b> (Autotroph or Heterotroph)						
<b>Examples</b>						

42. List the classification taxa (categories) in order from most broad to most specific.

43. Why do scientists classify living things?

44. How are organisms named (2 part name)?

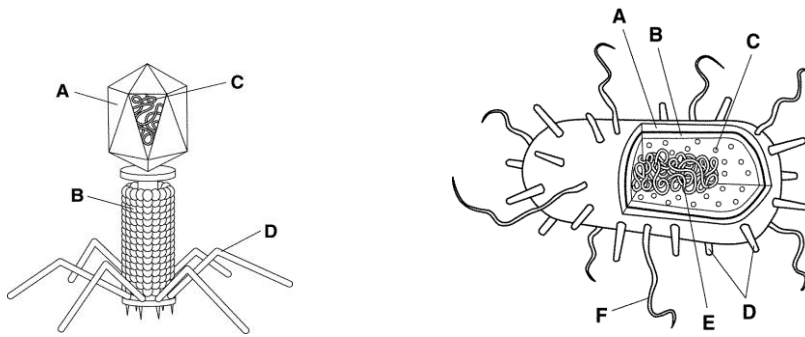
45. What is the difference between Archaeobacteria and Eubacteria?

46. Compare & contrast the following terms:

a. Prokaryote & eukaryote

b. Unicellular & multicellular

47. Identify & know the difference between the structure of a bacteria & a virus.



48. What are the 3 shapes of bacteria?

49. How do bacteria help the environment?

50. How do humans use bacteria (helpful roles)?

51. What are some harmful roles of bacteria?

52. What is the relationship between bacteria & antibiotics?

53. How do bacteria cause disease?

54. How does temperature affect bacteria?

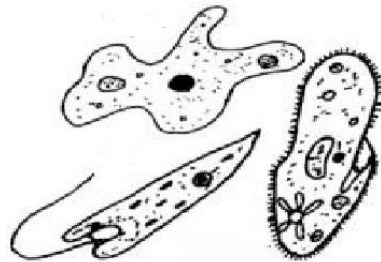
55. Describe the following terms in relation to bacterial reproduction:

a. Binary fission

b. Conjugation

56. What is a pathogen?
57. What is the advantage of a fever?
58. What is a virus? What two macromolecules are they made of?
59. How do viruses cause disease? How can they be treated or prevented?
60. How do infectious diseases spread?
61. How does HIV spread throughout the body?
62. How do we classify viruses?
63. Describe the following ways that a virus can replicate:
- Lytic cycle
  - Lysogenic cycle
64. What is malaria? How is it carried to humans?

65. Using the picture below, label the following protists and explain their movement:



Protists	Movement
Amoeba	
Paramecium	
Euglena	

66. What is the role of fungi in the environment? Give some examples of fungi.

67. Describe the evolution of early (primitive) plants. Use the terms nonvascular, spores, and moss in answer.

68. What is vascular tissue in plants?

a. Name 2 types of vascular tissue.

b. Where is it found?

69. How have animals and plants coevolved to help the reproduction of plants?

70. Define the following terms & why are they called “advanced” plants?

a. Gymnosperms

b. Angiosperms

71. What is the difference between invertebrates & vertebrates?

72. Complete the chart below by describing the major characteristics and provide common examples of each.

	<b>Defining Characteristics</b>	<b>Examples</b>
<b>Arthropods</b>		
<b>Mammals</b>		
<b>Birds</b>		
<b>Amphibians</b>		
<b>Reptiles</b>		

73. Why was the egg an important innovation as animals moved to land?

74. Know the following terms:

a. Ectotherm

b. Endotherm

c. Marsupial

d. Placental

e. Monotreme

f. Notochord

g. Vertebrae

75. What are some unique features of all mammals? What keeps them warm?

76. What does “homeostasis” mean to a living organism? How do organisms maintain homeostasis?

77. How does the human immune system help a person to remain healthy?

78. What is the primary purpose of sweat glands?

79. What is the body’s most important defense to disease?

80. Why is regular exercise important?