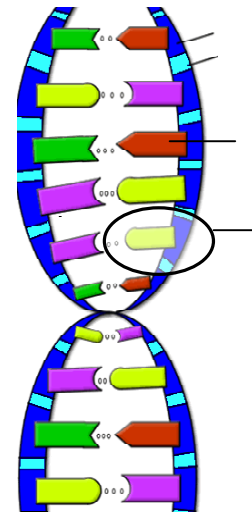


# DNA, Genetics & Evolution Test

## STUDY GUIDE

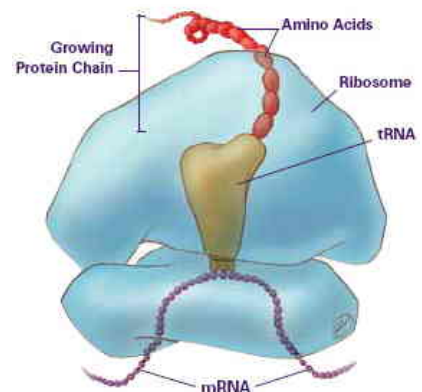
1. For the DNA shown here, label the nucleotide, sugar, phosphate, and nitrogenous base...
2. What 3 components make up each nucleotide?
3. Which bases are paired together?
4. Which bases are purines?
5. How many rings do purines have in their structure?
6. Which bases are pyrimidines?
7. How many rings do pyrimidines have in their structure?
8. Which are longer... purines or pyrimidines?
9. What is the name for the overall shape of DNA?
10. Describe 3 ways in which RNA differs from DNA...



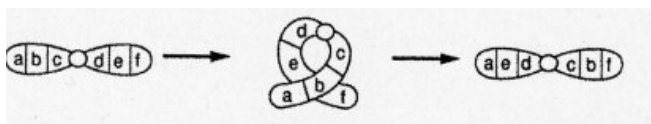
11. Label the DNA, RNA polymerase and mRNA in the diagram shown here...
12. What is the name of this process?
13. What is the RNA polymerase doing?
14. Where is this taking place?
15. What is being made during this process?

16. The last step of this process will remove introns. What is this called? Why does it happen?

17. What is the process for the picture shown to the right?
18. What is being read? How is it read?
19. What is being produced?
20. What is elongation?
21. What role does tRNA play in this process?



22. What are codons and anticodons?



23. What type of mutation is shown to the left?
24. What type of mutation causes the codon sequence of a gene to be read differently?

25. What is the difference between a missense mutation and a nonsense mutation?
26. What changes in a silent mutation?

- 27. What is the genotype of an individual who is homozygous dominant for brown eye color?
- 28. What is the phenotype of an individual who has two different alleles for eye color?
- 29. Is a carrier heterozygous or homozygous in genotype?

30. Solve the following monohybrid problem...

Round seeds are dominant to wrinkled seeds. Show a cross between a plant that is heterozygous and a plant that is homozygous recessive. Show your genotypic and phenotypic ratios as well.

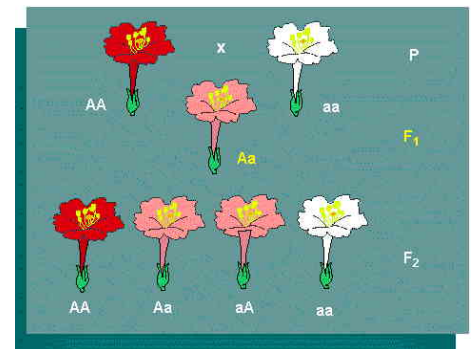

Genotypic: \_\_\_\_\_  
 Phenotypic: \_\_\_\_\_

31. Solve the following dihybrid problem...

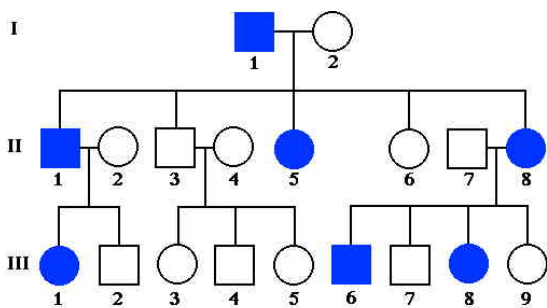
Round seeds are dominant to wrinkled and tall plant height is dominant to dwarf height. Cross two plants that are both heterozygous. Show only your phenotypic ratio.


Phenotypic: \_\_\_\_\_

- 32. What do the P, F<sub>1</sub> and F<sub>2</sub> stand for in this picture?
- 33. What exception to Mendel's laws of inheritance does this picture resemble?
- 34. Name 1 other exception to Mendelian laws and describe how it works...




35. For an X-lined recessive trait, show a punnett square cross between a carrier female and an affected male...



- 35. If a recessive trait is shaded in on the pedigree shown here, what are the genotypes of the two sons in generation II?
- 36. What is the genotype of the mother in generation I?
- 37. How do we show a "carrier" on a pedigree?

- 38. Describe at least 2 applications of genetic engineering...
- 39. Define 'vector' and 'transgenic organism'...

40. Define 'adaptation'...
41. Describe Darwin's 4 main points to his theory of natural selection...
42. List 3 major causes of evolution in populations...
43. Describe the difference between homologous and analogous structures...  
How are vestigial structures evidence for evolution?

44. The Hardy-Weinberg formulas allow us to calculate the frequency of alleles in a population. If 4% of a population has the recessive phenotype for a given trait, calculate the genotypic, allele and phenotypic frequencies for this population...

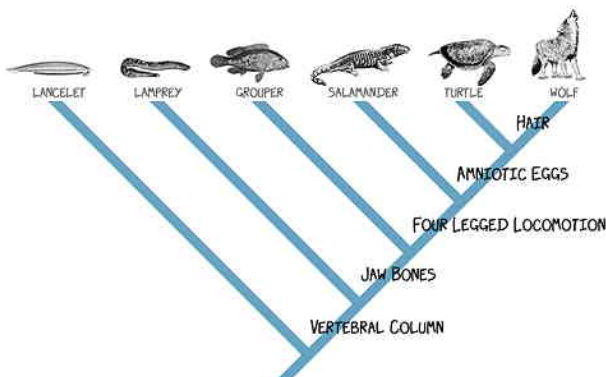
RR =                      R =                      Dominant =  
Rr =                      r =                      Recessive = 4%  
Rr =


45. Reproductive barriers keep species isolated from each other. Describe the difference between premating isolation and postmating isolation. Describe an example for each.
46. Which form of natural selection favors the extremes? Which favors one range of a trait?
47. How would you draw stabilizing selection in graph form?

48. Define 'geologic time'. Determine the era, period, and epoch of the first reptiles using the time scale shown. How long ago was this?

49. What is the difference between the relative age of a fossil and its absolute age? How is the 'half-life' of an element used for finding the age of a fossil?

50. According to the cladogram shown below, what is a structural difference between a lamprey and a grouper? What is a synapomorph for a salamander and a turtle?



Geologic Time Scale				
Era	System & Period	Series & Epoch	Some Distinctive Features	Years Before Present
<b>CENOZOIC</b>	<b>Quaternary</b>	Recent	Modern man.	11,000
		Pleistocene	Early man; northern glaciation.	1/2 to 2 million
	<b>Tertiary</b>	Pliocene	Large carnivores.	13 + 1 million
		Miocene	First abundant grazing mammals.	25 + 1 million
		Oligocene	Large running mammals.	36 + 2 million
		Eocene	Many modern types of mammals.	58 + 2 million
Paleocene	First placental mammals.	63 + 2 million		
<b>MESOZOIC</b>	<b>Cretaceous</b>		First flowering plants; climax of dinosaurs and ammonites, followed by Cretaceous-Tertiary extinction.	135 + 5 million
	<b>Jurassic</b>		First birds, first mammals dinosaurs and ammonites abundant.	181 + 5 million
	<b>Triassic</b>		First dinosaurs. Abundant cycads and conifers.	230 + 10 million
<b>PALEOZOIC</b>	<b>Permian</b>		Extinction of most kinds of marine animals, including trilobites. Southern glaciation.	280 + 10 million
	<b>Carboniferous</b>	Pennsylvanian	Great coal forests, conifers. First reptiles.	310 + 10 million
		Mississippian	Sharks and amphibians abundant. Large and numerous scale trees and seed ferns.	345 + 10 million
	<b>Devonian</b>		First amphibians; ammonites; fishes abundant.	405 + 10 million
	<b>Silurian</b>		First terrestrial plants and animals.	425 + 10 million
	<b>Ordovician</b>		First fishes; invertebrates dominant.	500 + 10 million
<b>Cambrian</b>		First abundant record of marine life; trilobites dominant.	600 + 50 million	
<b>Precambrian</b>			Fossils extremely rare, consisting of primitive aquatic plants. Evidence of glaciation. Oldest dated algae, over 2,600 million years; oldest dated meteorites 4,500 million years.	

ADDITIONAL NOTES...