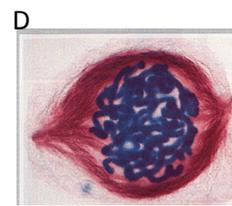
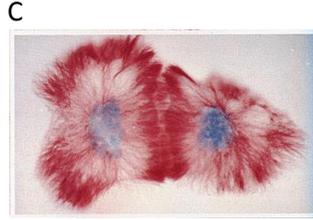
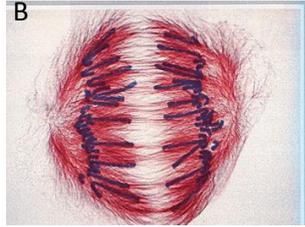
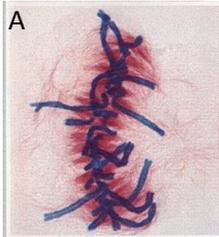


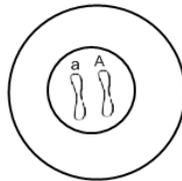
## Honors Final Exam Review Guide

### The Cell Cycle

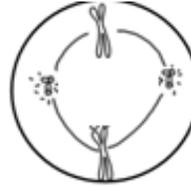
1. The cell cycle of a normal has 4 major stages (G1, S, G2 and mitosis). What is the cell doing in each of these phases?
2. Sometimes cells enter a phase called G0. What happens here?
3. A) Which of the 4 phases of the cell cycle are considered part of interphase? B) In one sentence summarize what happens in interphase.
4. What kinds of cells result from **mitosis**? How much DNA do they have compared to the original parent cell?
5. The human cells below are going through mitosis. A) Which phase of mitosis is each of the 4 cells in? B) How many chromosomes are there in each cell?



6. Given that the parent G1 cell looks like this:



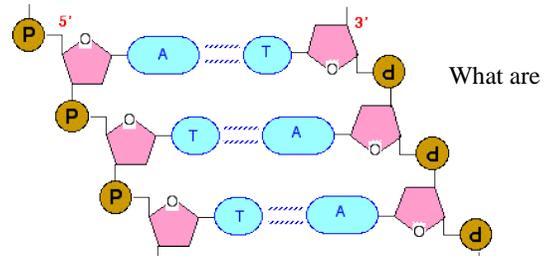
Determine if the cells below are going through mitosis or



7. Describe crossing over. When is it most likely take place?
8. Describe a nondisjunction.
9. How would a karyotype of a **boy with trisomy 21** look different than a normal girl karyotype?
10. Compare and contrast a human somatic cell and gamete. Explain the ideas of haploid and diploid in your response.

### DNA and RNA structure

11. Why does the cell need both DNA and RNA?
12. DNA and RNA are both made of repeating monomers called nucleotides. the three parts to a nucleotide?
13. To the right is a picture of DNA. Label the following:
  - a. Sugar
  - b. Phosphate
  - c. Base
  - d. Hydrogen bond
  - e. Covalent bond
14. All of the bases that make up RNA and DNA (ATGCU) can be classified as purines and pyrimidines. Which ones are which?
15. The leading strand of DNA reads TAC GGT GTA AGT
  - a. How will the mRNA read?
  - b. How will the tRNA read?
  - c. What will the amino acid sequence be?(you will need to use a codon chart)
16. Compare and contrast introns and exons.
17. Protein synthesis happens in two steps: Transcription and Translation. Describe what happens in each step. Be sure to talk about DNA, mRNA, complementary base pairs, RNA polymerase, ribosomes tRNA, codons, anticodons and amino acids.
18. Summarize the process of DNA replication.

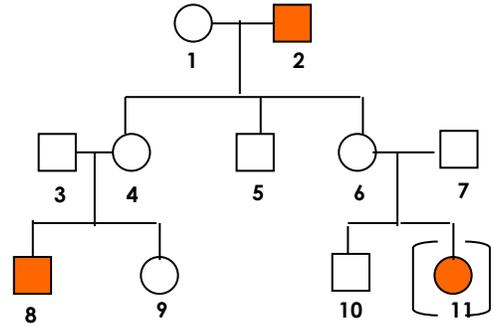


What are

### Genetics

19. What is a genotype? What is a phenotype? How are they related?
20. In a rabbits, brown fur (B) is dominant over white fur (b). If two rabbits heterozygous for brown fur were crossed, what percent of their offspring would you expect to be white?
21. In a cross between a homozygous brown bunny and a white bunny, what percent would you expect to be white?

22. The family tree to the right traces a still unnamed genetic disorder through a family. Based on the patterns you see in the tree, is the genetic disorder dominant or recessive? Explain.
23. Colorblindness is an **x-lined** trait that is **recessive**. What are the possible genotype for A) a colorblind female? B) a colorblind male C) a normal male D) a normal female
24. How would you write the genotype of a male that has an X-linked dominant disorder? Are this man's sons or daughters more likely to have such disorder? Explain.
25. What are the possible genotypes for the following blood types?
  - a. A blood
  - b. B blood
  - c. AB blood
  - d. O blood
26. Is it possible for a mother who has AB blood to have a child with O blood? Explain.
27. Which blood types are suitable for transfusion into people with AB- blood and B+ blood? Explain your reasoning.
28. What is gene linkage? Why does it explain how some traits (like freckles and red hair) are more often inherited together?
29. What is the difference between incomplete dominance and co dominance?
30. Hair color and eye color are examples of polygenic inheritance. What is polygenic inheritance? Why can it lead to so many different phenotypes?
31. In a cross between two heterozygous tall and yellow pea plants, what percentage of offspring would be heterozygous for both traits?



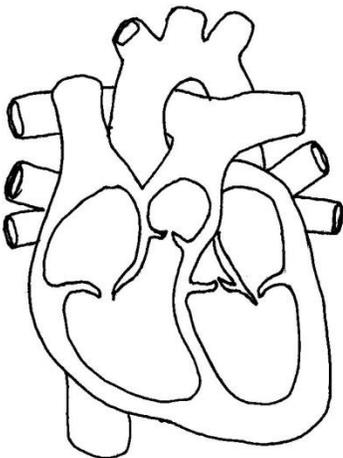
### Evolution

32. Define evolution.
33. Describe two methods used establish the evolutionary relationships. In other words, how could you determine if two species are closely related?
34. Which type of traits can and cannot be passed on to offspring?
35. Give an example of three adaptations to an environment.
36. Describe how genetic variation arises in a population. How do new genes and traits come about?
37. Describe the process of evolution through natural selection. Include the ideas of competition, mutation, and inheritance in your response.
38. Give an example of natural selection.
39. Compare and contrast natural selection and artificial selection.
40. Give an example of how an environmental change could cause evolution.
41. Describe how each of the following can cause a change in the gene pool, or evolution
  - a. Sexual Selection
  - b. Natural Selection
  - c. Mutation
  - d. Immigration and Emigration
  - e. Genetic Drift

### Body Systems

The picture to the right is of your respiratory system. Use the words below to correctly label the picture.

- |                   |            |           |                |
|-------------------|------------|-----------|----------------|
| a. Bronchial tube | d. trachea | c. Larynx | f. Capillaries |
| b. Pharynx        | e. alveoli |           |                |



42. What is the function of the alveoli?
43. What is the function of the capillaries?
44. What are the major structures of the excretory system?
45. What are the major functions of the excretory system? What is a nephron?
46. Describe how the production and excretion of urine.
47. Label and color code the heart in the diagram below. Use red for oxygenated blood and blue for deoxygenated blood.
48. Label the aorta and vena cava.
49. Compare and contrast the central and peripheral nervous system.
50. Draw a neuron. Label the dendrites, synapse, axon and myelin sheath.

