

Name _____

There are 10 questions worth a total of 100 points. Please write complete sentences. You may use the back of any page, arrows are always appreciated.

- (10 points) What experiment (describe it) determined that DNA is the molecule of inheritance? (There are two to choose from, pick one.)
- (10 points) Compare and contrast DNA and RNA.
- (8 points) What are the key differences between a pluripotent stem cell and a multipotent stem cell? Give an example of each.
- (10 points) Draw the following structures and then circle the atoms that are involved in hydrogen bonding of a GC pair in a double helix.

GMP (guanosine monophosphate)
Cytosine

- (10 points) In order to determine if a mutation has occurred, DNA is sequenced using the Sanger (dideoxy) method. **Briefly explain** how this method works and then give the sequence of DNA that is represented by the following gel. **Be sure to label the 5' and 3' end of the DNA.**

1 2 3 4

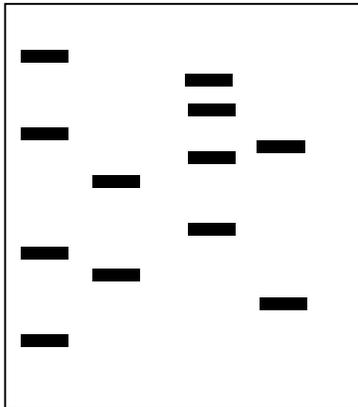


Figure1, DNA sequencing gel for a dodecamer (12 bases) piece of DNA.

Lane 1: dATP, dGTP, dCTP, dTTP, ddTTP
 Lane 2: dATP, dGTP, dCTP, dTTP, ddCTP
 Lane 3.: dATP, dGTP, dCTP, dTTP, ddATP
 Lane 4: dATP, dGTP, dCTP, dTTP, ddGTP

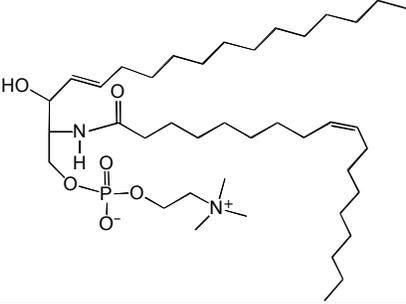
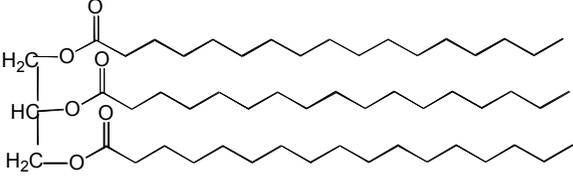
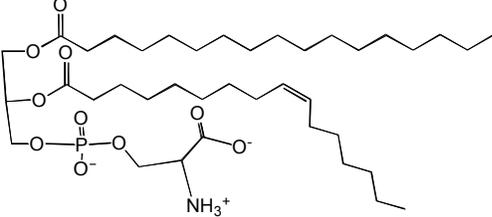
7. (16 points) Cloning is the process of making an exact duplicate. Describe the following three vectors that are used to get foreign DNA into a cell for cloning. What are the advantages and disadvantages of each of these?

- YAC
- BAC
- Phage
- plasmid

8. (15 points) PCR is used for both DNA finger printing and STR locus analysis. Compare and Contrast these two forensic analysis tools.

9. (4 points) It has been postulated that the risk of coronary heart disease may be diminished by consuming a diet that is high in omega-3 fatty acids. Fish from very deep water are an excellent source of these fatty acids. Explain why a deep water fish would have a high concentration of unsaturated fatty acids. What is an omega-3 fatty acid? Give an example

10. (9 points) Identify each type of lipid molecule. Where are they located and what is their function?

Type of lipid	Function	Location	Structure
			
			
			

10. (8 points) Draw structures for the following:

- Oleic acid
- Arachidonic acid
- Linolenic acid
- Palmitic acid