Homework 1 - Genomics Part – Q&A

Answer following questions:

1) Going into as much detail as possible, explain which experimental results were instrumental for Watson and Crick when establishing their model for the DNA molecule. Explain the experiments and underline the main conclusions that Watson and Crick used in their original 1953 Nature paper. Try and come up with an alternative model for the DNA molecule that fulfills as many of the same experimental data as possible.

2) Going into as much detail as possible, explain what SNP are and what are they useful for. In case of human medicine, what are the current models that explain that SNP can be associated with disease and pathological states (when addressing this part, consider the location of the SNP with regards to important functional genes or genetic elements)?

3) Scientists have discovered a new organism living in the depths of the ocean. This creature is fascinating because it produces light. Scientists would now like to characterize the genome (1 billions of pb) of this creature and identify the gene responsible for light production. You are in charge of this project and are allocated (almost) infinite ressources. Going into as much detail as possible, describe a protocol, that would allow the sequencing of the genome and the identification of the gene of interest. Justify your experimental choices (sequencing technology, etc..).