Mutations

I. Definitions
        Mutant vs Wild type
        Genotype vs Phenotype
        Mutation vs Allele
        Nomenclature: strains, genes, and gene products
        Auxotrophic mutants
                Biosynthetic Catabolic
        Conditional mutations
                Heat Sensitive Cold Sensitive
        Resistant mutations

II. Inheritance in Bacteria
        Random Mutation vs Directed Change (genetic adaptation)
                Darwin and Lamarck revisited
        Testsing the hypothesis
        Luria-Delbruck Experiment
                Newcombe Experiment
                Lederbergs Experiment
*All say random mutation can occur but none exclude directed change as a second mechanism
                Cairnsian mutagenesis

III. Calculating the Mutation Rate
        Mutation rate= #mutation events/#cell generations
                Cell Generations
        # of mutational events
        Calculating mutation rates from bacterial cultures
        Calculating mutation rates by sampling time intervals
                Factors affecting the Mutation Rate
                        True affectors: Growth rate Media, "Target Size", Hot Spots
                        Masking affectors: phenotypic lag

IV. Types of Mutations
        Base pair changes
                Transitions- A:T >> G:C
                Tranversions- A:T >> C:G or T:A
        Frameshift Insertion Deletion
        Inversion Insertion Duplication
        Missense vs Nonsense mutations
        Characterization Questions
                Is it leaky?
                Whats its reversion rate?
                Can you find supressors?
                        Intragenic supressor
Intergenic supressor
                Nonsense supressors
                TRNAs/partial supression/'sicko's

V. Genetic Analysis
        Selections and Screening
                Positive Selection
                Negative Selection
                        Mutagenize, Replica plating, Enrichment
        Complementation
         Cloning
        Recombination
                Mapping mutations
                Supressor analysis
                Gene replacements