Bio I
Notes: Monohybrid and Dihybrid Crosses

Punnett square:

Monohybrid Cross

- Explanation:

- Mendel's work: *purple flowers x white flowers*

Law of Segregation:

Example – Monohybrid cross

- *A male that is heterozygous for purple hair is crossed with a woman who is a purebred for orange hair. What would be the result of this cross? What is the phenotypic and genotypic ratio of their children?*
  (Purple hair = **P** and orange hair = **p**)

Example – Monohybrid cross

- *If a man that is a purebred with big ears marries a heterozygous woman for this trait, what is the possibility that their first child might express the dominant trait?*
  (Big ears = **B** and little ears = **b**)

Example

- *A couple is heterozygous for the gene for a big nose. They are about to have a child and hope that it has a small nose. Do they have a chance? How much of a chance?*
  (Big nose = **B** and little nose = **b**)

Dihybrid cross:

Two of the seven characteristics that Mendel studied were seed color and seed shape. Seeds can be either yellow or green. They can also be round (smooth) or wrinkled. Mendel decided to cross a purebred plant possessing yellow seeds with a purebred plant possessing smooth seeds. What were his results?

(**Y** = yellow, **y** = green, **R** = smooth (round), **r** = wrinkled)

He then decided to let the offspring of the F_1 generation self-pollinate. What were his results?

- Phenotypic ratio:

Law of Independent Assortment:

Example – Dihybrid Cross

- *A man with hairy ears and is heterozygous for a unibrow marries a woman that is a carrier for both traits. What is the chance that their children will be normal?*

  (Non-hairy ears = **H**, Hairy ears = **h**, Unibrow = **B**, Two eyebrows = **b**)

Example – Dihybrid Cross

- *If a blue-eyed female is married to a heterozygous brown-eyed male and the female is left-handed as is the male, with brown eyes being dominant over blue eyes and right-handedness dominate over left-handedness, what will the offspring of this couple look like?*