Mendelian Genetics

Classical Genetics Background

Phenotypes: what are they? Give some examples…
How many alleles per trait did Mendel study?
A gene codes or controls a certain trait
Whats a gene pool?
Define Allele:
How is a trait represented by alleles? Letter examples…
If, for example, you look at a pair of your chromosomes, you got one allele from each parent…

Each allele is on the same part on each of these chromosomes

How is a dominant allele different from a recessive one?
Give examples of homozygous dominant alleles…
Give examples of homozygous recessive alleles…
Give examples of heterozygous alleles…
Gregor Mendel – father of modern genetics who worked with peas

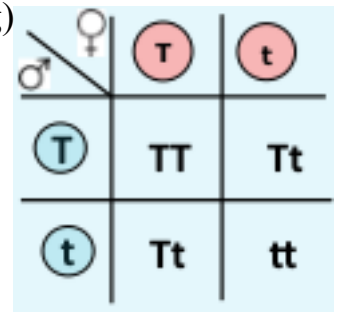
- he studied one trait at a time…monohybrid crosses

Monohybrid cross- comparing or looking at only one trait
What is a **"true breeding" or "pure line"** pea plant…or any other organism?
What do P^1 , F^1 , F^2 mean or how are they achieved?

Punnett Squares

STEPS:

CREATE a LEGEND	(eg) T = tall t = short
DETERMINE GENOTYPE of PARENTS	(eg) Tt X TT
MAKE GAMETES (to place on Punnett)	(eg) T, t & T, T
COMPLETE PUNNETT	(eg)



Ratios

Know how to make a phenotype and genotype ratio
From a Punnett square

Mendels Laws

- LAW OF SEGREGATION
    - -all individuals have two copies of a gene
    - -these copies separate during ANAPHASE I so only one is provided to gamete
    - -once gametes are reunited (fertiliztation) the newly formed organism will have two copies
    - -helps give rise to variation

-LAW OF INDEPENDENT ASSORTMENT

- -the alignment of chromosomes in METAPHASE is completely random and thus the alignment of alleles in chromosomes is random
- -gives rise to variation

TEST CROSS

-used to determine an UNKNOWN parents genotype by production of offspring with a KNOWN HOMOZYGOUS RECESSIVE individual

-depending on the offspring PHENOTYPES we can tell the unknown parents genotype

Summary of TEST results and what they mean?

1. **If some recessive (short) individuals show up then the genotype of the unknown is HETEROZYGOUS (Tt)**
2. **If no recessives (short) show up then the genotype is <u>probably</u> <u>HOMOZYGOUS DOMINANT (TT)</u>**