

Heredity Notes

Gregor Mendel = Father of Genetics

- monk – gardener for his monastery
- Worked with garden peas because they were:
 - easy to grow
 - had a short generation time
 - could control their matings

Mendel's 1st Principle: The Principle of Segregation

Took characteristics with 2 different traits and crossed them

(P = parental generation)

Purple x white

F₁ always showed just 1 trait

(F₁ = 1st filial generation)

- Trait that showed is Dominant

↓ Allowed to self-pollinate Purple x Purple

F₂ both traits show up again

(F₂ = 2nd filial generation)

- Trait that was “hidden” before but now reappeared = Recessive
- F₂ ratio of dominant: recessive was always 3:1
Dom Rec
- Could be explained if hereditary information was determined by two “factors”
 - One from the mother, one from the father, which combine when gametes form

Principle of Segregation = every individual carries a pair of genes for each trait that separate during gamete formation

Consequences of Segregation:

- Alleles = different forms of a gene
- Represented by a letter
 - Must use the same letter for both
- Ex. Yellow = Y Green = y for seed color
- Homozygous = when the two alleles carried are the same
Ex. YY or yy
- Heterozygous = when the two alleles are different
Ex. Yy
- Each gamete (sex cell) contains only ONE allele for each gene

- In fertilized eggs, alleles are paired up
 - If homozygous, that trait is expressed
 - If heterozygous, the dominant trait may be expressed

Phenotype = the physical trait expressed ("what you see") ex. yellow vs green
Genotypes = the actual allele pairs ("what's in the genes") ex. YY/Yy/yy

Use a Punnett Square to help you solve problems.

- 1) Put one parent's two genes across the top two columns
- 2) Put the other parent's two genes on the sides next to the rows
- 3) Copy the letters in the columns below them or the rows beside them
 - Put any capital letters first!

EXAMPLE: In pea flower color, purple (P) is dominant over white (p)

P Homozygous purple x Homozygous white

PP x pp

F₁ All Pp (purple)

↓ allowed to self-fertilize (Pp x Pp)

F₂ 1/4 PP 2/4 Pp 1/4 pp (genotypes)
 3/4 purple 1/4 white (3:1 ratio!!!) (phenotypes)

