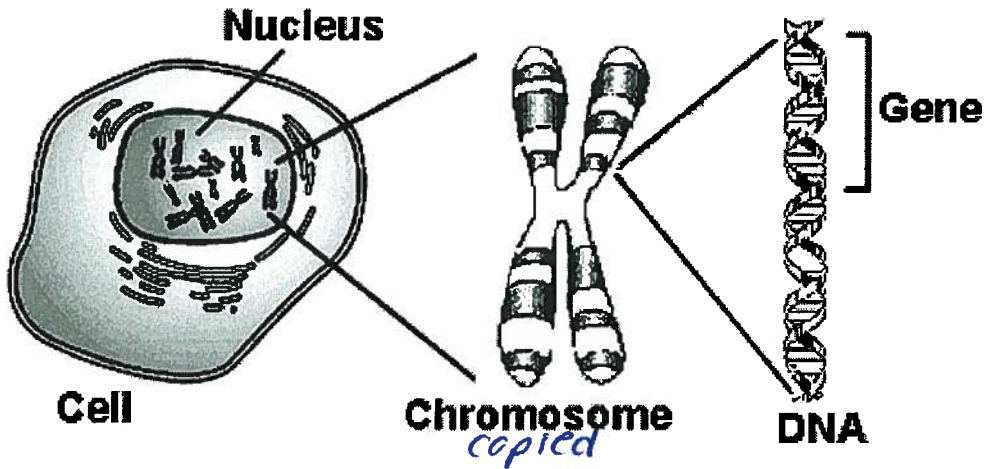


Genetics Basics

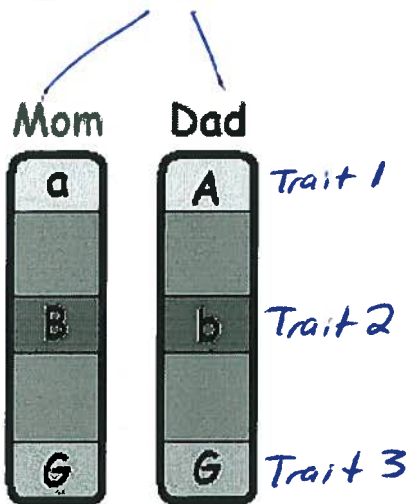
Interphase copies chromosomes prior to mitosis or meiosis

Genes are instructions for proteins



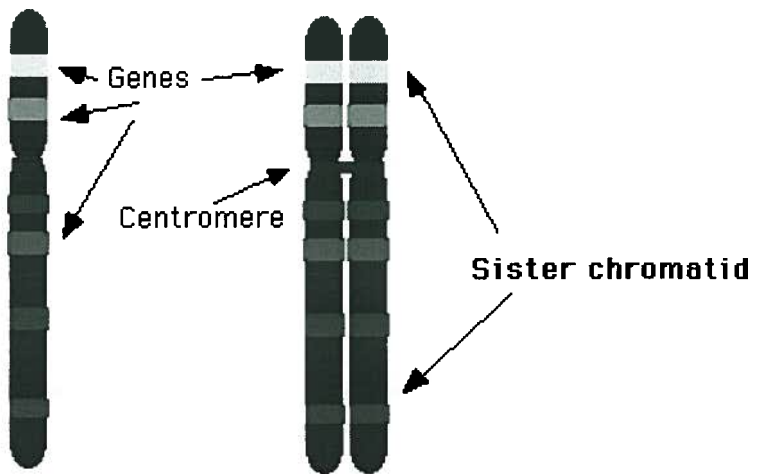
egg/sperm
Sex cells produced in meiosis are haploid. They contain one set of each kind of chromosome.

When sex cells/gametes unite in fertilization, they become diploid. This creates a zygote with 2 of each kind of chromosome.



- 2 Chromosomes
- 3 Genes/traits
- 6 Alleles

(DNA) Chromosome Terminology



Unduplicated

Duplicated

Mendelian Genetics

Trait/Gene = lecture
 S = Smooth (Dom)
 s = wrinkled (rec)

Mendel's Work

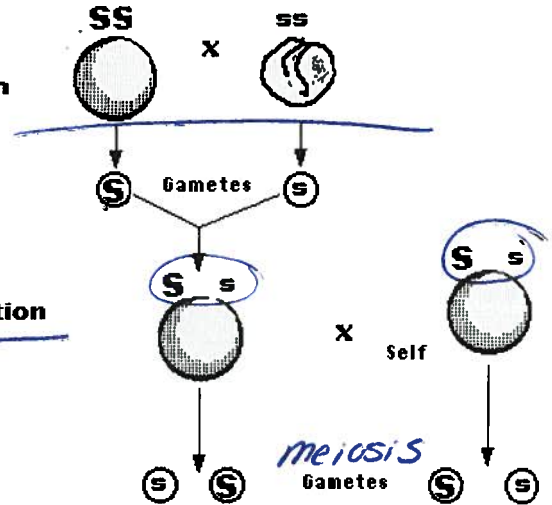
USED Pea Plants
 Why??

- Easy and quick to grow
- See traits/data easy
- He could control the fertilization

Genotype

Homozygous Dominant x Homozygous Recessive

P Parental generation



P Generation

F₁ generation

F₂ generation

F1 Generation

ALL Heterozygous Dominant Offspring

Smooth

Heterozygous x Heterozygous

Ss x Ss
 Smooth x Smooth

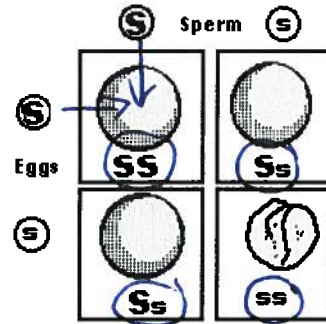
F2 Generation

3:1 ratio for Phenotype

3/4 75% Smooth
 1/4 25% wrinkled

1:2:1 ratio for Genotype

1/4 25% SS homozygous Dom.
 1/2 50% Ss heterozygous Dom.
 1/4 25% ss homozygous Rec.



Punnett square

Shows all possible outcomes

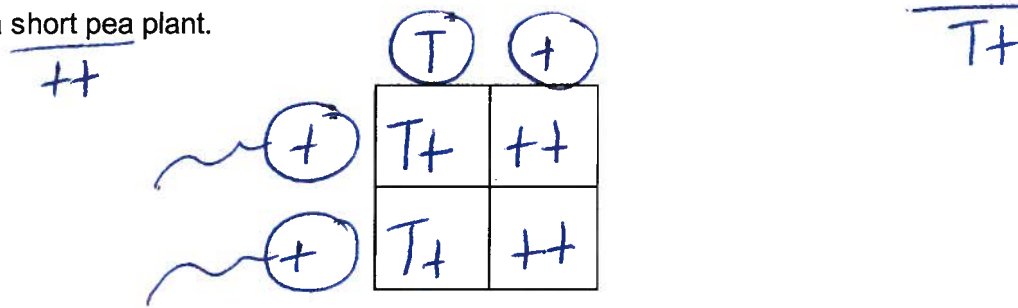
of fertilization

RESULTS of Mendel's Work

- Dominant & Recessive Genes/Alleles
- F₁ Generation showed the Dominant Phenotype
- Law of Segregation, alleles/gene pairs split in meiosis
- Each parent contributes ONE gene/allele to the offspring for a trait

Practice Problem

1. Tall pea plants (T) are dominant to short pea plants (t). Show a cross between a heterozygous tall pea plant and a short pea plant.



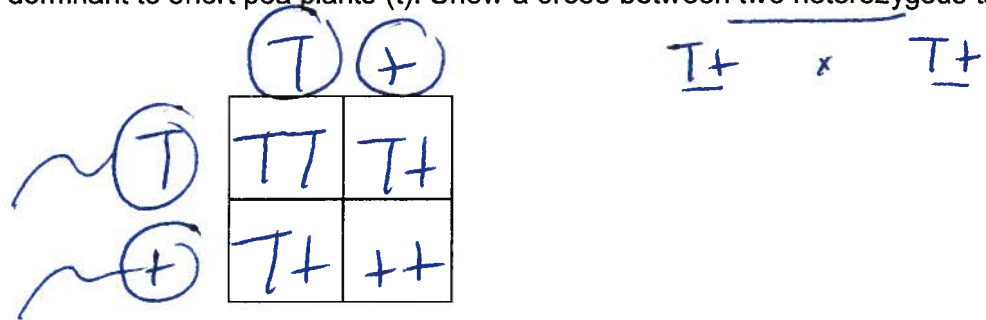
- a. What are the genotypic ratios?

$\frac{1}{2} 50\% Tt, \frac{1}{2} 50\% tt$

- b. What are the phenotypic ratios?

$\frac{1}{2} 50\% Tall, \frac{1}{2} 50\% Short$

2. Tall pea plants (T) are dominant to short pea plants (t). Show a cross between two heterozygous tall pea plants.



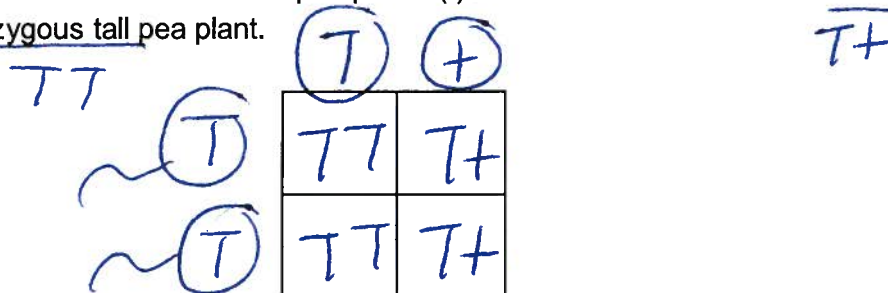
- a. What are the genotypic ratios?

$\frac{1}{4} 25\% TT, \frac{1}{2} 50\% Tt, \frac{1}{4} 25\% tt$

- b. What are the phenotypic ratios?

$\frac{3}{4} 75\% Tall, \frac{1}{4} 25\% Short$

3. Tall pea plants (T) are dominant to short pea plants (t). Show a cross between a heterozygous tall pea plant and a homozygous tall pea plant.



- a. What are the genotypic ratios?

$\frac{1}{2} 50\% TT, \frac{1}{2} 50\% Tt$

- b. What are the phenotypic ratios?

$100\% Tall$