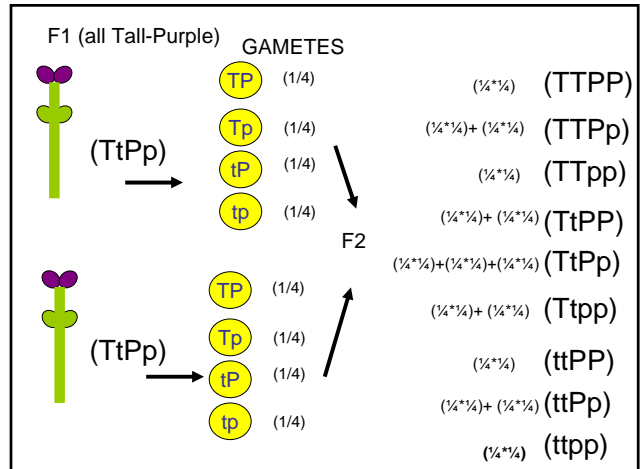
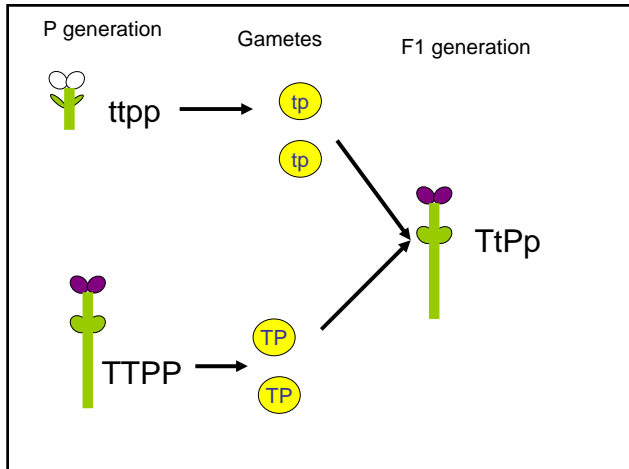
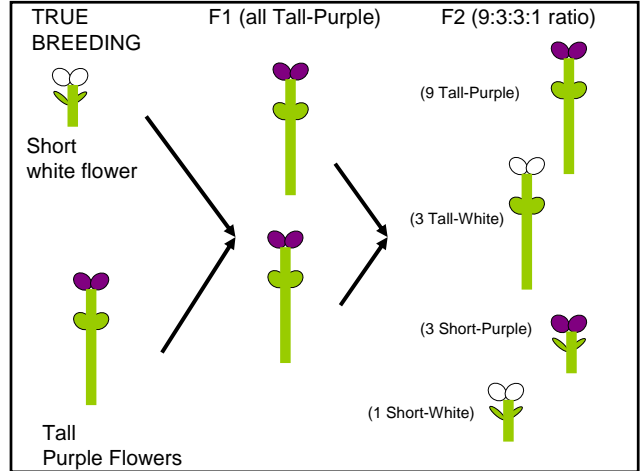


# EXAM IS POSTPONED

- EXAM TWO WILL TAKE PLACE

Monday Feb 26th



	TP	Tp	tP	tp
TP	<b>TTPP</b> tall-purple	<b>TTPp</b> tall-purple	<b>TtPP</b> tall-purple	<b>TtPp</b> tall-purple
Tp	<b>TTPp</b> tall-purple	<b>TTpp</b> tall-white	<b>TtPp</b> tall-purple	<b>Ttpp</b> tall-white
tP	<b>TtPP</b> tall-purple	<b>TtPp</b> tall-purple	<b>ttPP</b> short-purple	<b>ttPp</b> short-purple
tp	<b>TtPp</b> tall-purple	<b>Ttpp</b> tall-white	<b>ttPp</b> short-purple	<b>ttpp</b> short-white

9 tall-purple: 3 tall-white: 3 short-purple: 1short-white

## Terminology

**Genotype** – the genes possessed by an individual (i.e. TTPp or ttPp)

**Phenotype** – The appearance or form of the individual (i.e. Tall and white flowered or short and purple flowered)

**Monohybrid cross** – where only one trait is being studied or observed ( a tall plant crossed with a short plant)

**Dihybrid cross** – where two traits are being studied or observed ( a tall –purple flowered plant crossed with a short – white flowered plant)

## Terminology

**Gene** – allocation on a chromosome that codes for one trait  
**Allele** – alternate forms of a gene

**Homozygous** – both alleles are of the same type (i.e. tt or TT or pp)

**Heterozygous** – the two alleles are of different types (i.e. Tt or Pp)

**Dominant** – an allele that is expressed when only one copy is present

**Recessive** – an allele that is masked when present in the presence of the dominant allele

## Independent Assortment

- Tall Peas Crossed With Short Peas
  - TT x tt → Tt (all tall)
  - Tt x Tt → ¾ tall, ¼ Short
- Purple Peas Crossed White Peas
  - PP x pp → All purple
  - Pp x Pp → ¾ purple, ¼ white
- Tall, Purple peas crossed with Short, White peas
  - TTPP x ttp → TtPp (All tall & purple)
  - TtPp x TtPp → 9/16 tall purple, 3/16 tall white, 3/16 short purple, 1/16 short white

### GAMETES

TtPp → TP, Tp, tP, tp

Probabilities 0.5 x 0.5 = 0.25

## Meiosis and Mendel's Laws

Each cell contains chromosomes.

There are two types of chromosomes:

Homologous and Analogous

There are pairs of homologous chromosomes

Homologous Chromosomes Segregate during metaphase I

Analogous chromosomes Independently Assort during metaphase II

## Mendel's Theory

Law of Independent Assortment

Each pair of alleles segregate independently of other alleles

All possible combination of factors are possible

## POST MENDEL GENETICS

Chromosome segregate and assort like alleles.

Chromosomes contain DNA

Sequence of base pairs in DNA creates alleles

## Definition of Some Terms

- Gene – a locus (site) on a chromosomes that codes for a given trait.
- Allele – Alternate forms of a gene
- Gamete – a reproductive cell that contains  $\frac{1}{2}$  the normal number chromosomes (egg or sperm)
- Zygote – the cell formed by the fusion of two gametes

## Examples and Predictions

- $TT \times tt \rightarrow Tt$
- $Tt \times Tt \rightarrow \frac{1}{4} TT, \frac{1}{2} Tt, \frac{1}{4} tt = \frac{3}{4} \text{ tall } \frac{1}{4} \text{ short}$
- $TT \times Tt \rightarrow ?$
- $tt \times Tt \rightarrow ?$

## Mendel's Theory

### Law of Independent Assortment

Each pair of alleles (gene) segregate independently of other alleles

All possible combination of factors are possible

## Natural Selection and Inheritance

- Assumed parental traits passed to offspring. How?
- Assumed near infinite amount of variations. What was the source of variation?

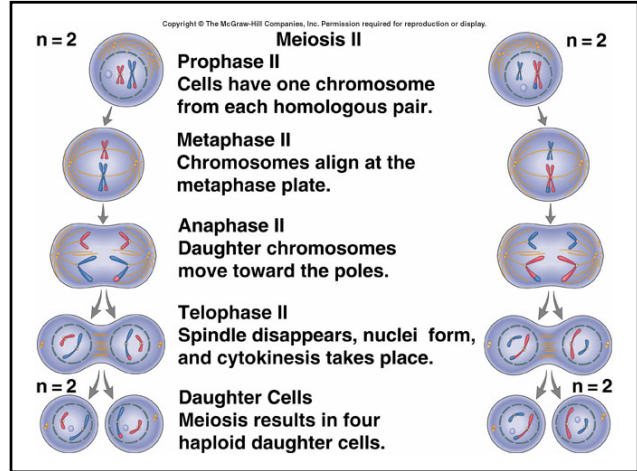
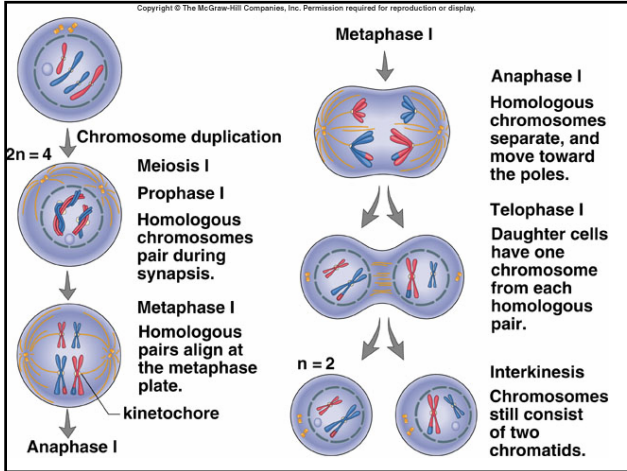
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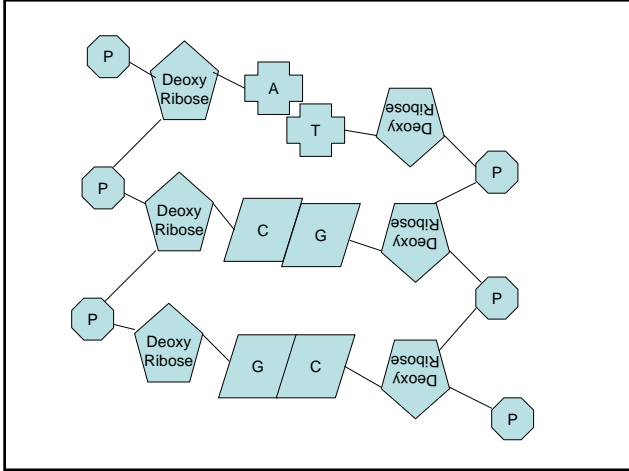


## DNA as Genetic Material

- Genes are composed of sequences of DNA
- Each genes located at a specific location of a chromosome.
- Different sequence of base pairs results in different alleles
- Mutation can change the sequence
- Genes code for proteins

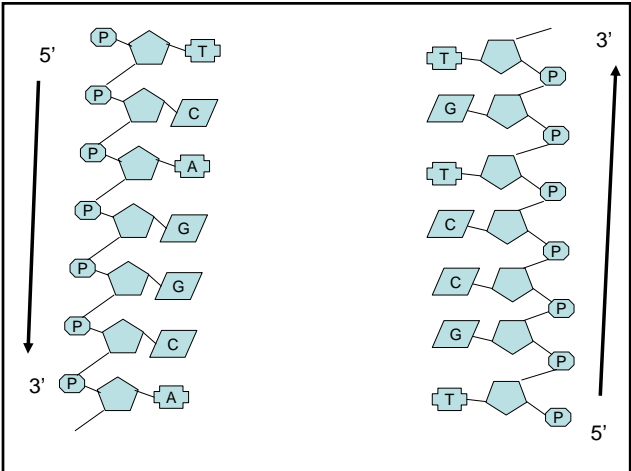
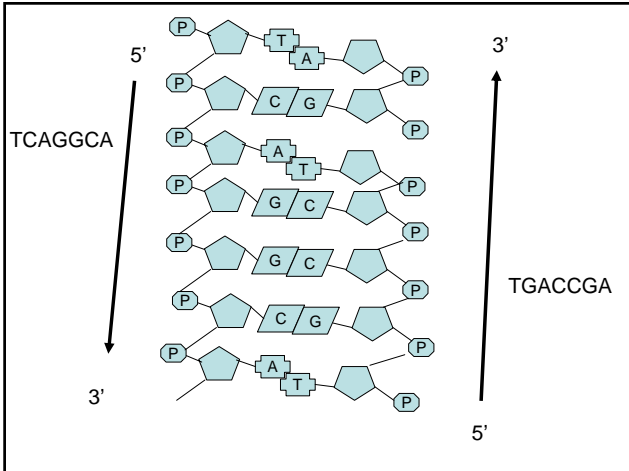
## DNA

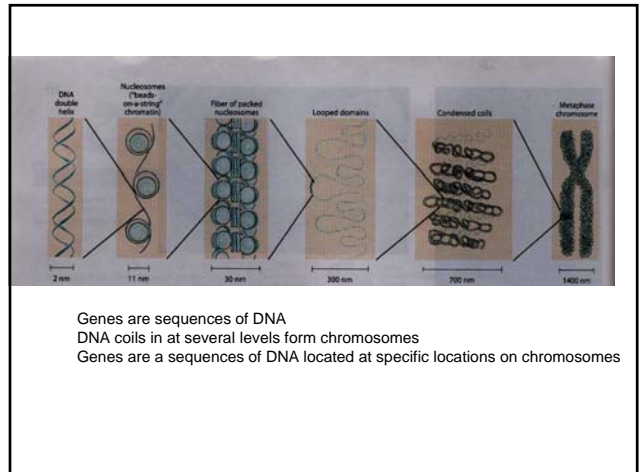
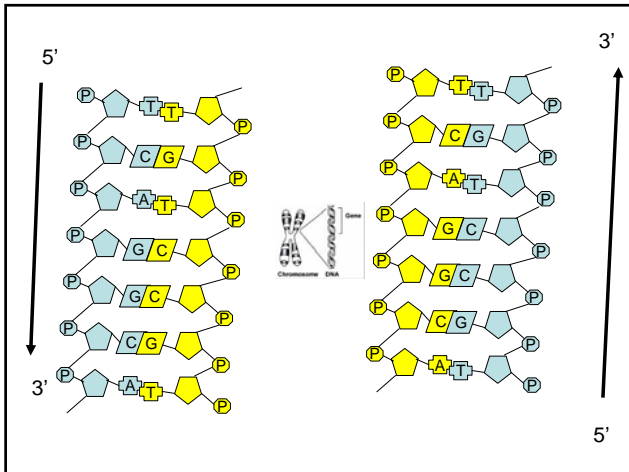
- DNA
  - Phosphate + Ribose sugar forms chain
  - Nitrogenous bases
    - Connect chains
    - Four Forms
      - Adenine – A, Thymine – T,
      - Guanine – G, Cytosine – C
      - A always binds T
      - C always bind G



### Semiconservative Replication

- Replication of DNA such that each new strand consists of  $\frac{1}{2}$  an old strand
- The old strand is used to as a template to derive a new strand
- The new strand will be complimentary to the old .





## DNA as Genetic Material

- Genes are composed of sequences of DNA
- Each genes located at a specific location of a chromosome.
- Different sequence of base pairs results in different alleles
- Mutation can change the sequence
- Genes code for proteins

## Dominance

- Complete (Full) – the dominant allele is always expressed if present
- Incomplete dominance
  - Tall x Short may result in intermediate height

## Polygenic Inheritance

- For many traits more than one gene contributes to the phenotype.
- Multiple genes may result in many possible phenotypes.
- Consider three genes A,B,C each of which can have two alleles.

## Height - Analogy

- Three gene example
- aabbcc, Aabbcc, AaBbcc, AaBbCc, AABbCc, AABBCc, AABBCc, AABBCc
- $1/64 = aabbcc = \text{Very Short}$
- $7/64 = Aabbcc = \text{Short}$
- $14/64 = AaBbcc = \text{Short - Medium}$
- $20/64 = AaBbCc = \text{Medium}$
- $14/64 = AABbCc = \text{Medium-Tall}$
- $7/64 = AABBCc = \text{Tall}$
- $1/64 = AABBCc = \text{Very Tall}$