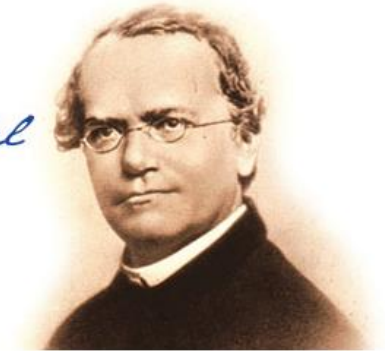# Genetics Notes

Who is Gregor Mendel? "**Father of Genetics**"

Principle of **Independent Assortment** – Inheritance of one trait has **no effect** on the inheritance of another trait

Man of Science

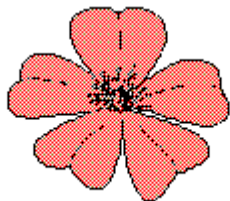Gregor Johann Mendel

Incomplete dominance and Codominance

- When one allele is **NOT** completely **dominant** over another (they **blend**) – **incomplete dominance**

  Example: In carnations the color red (R) is incompletely dominant over white (W). The hybrid color is pink. Give the genotypic and phenotypic ratio from a cross between 2 pink flowers.
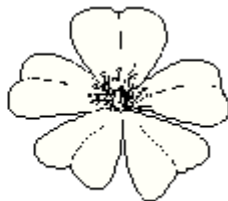
  RW X RW

	R	W
R	RR	RW
W	RW	WW

homozygous dominant   heterozygous   homozygous recessive

Genotypic = **1 RR : 2 RW : 1 WW**
Phenotypic = **1 red : 2 pink : 1 white**

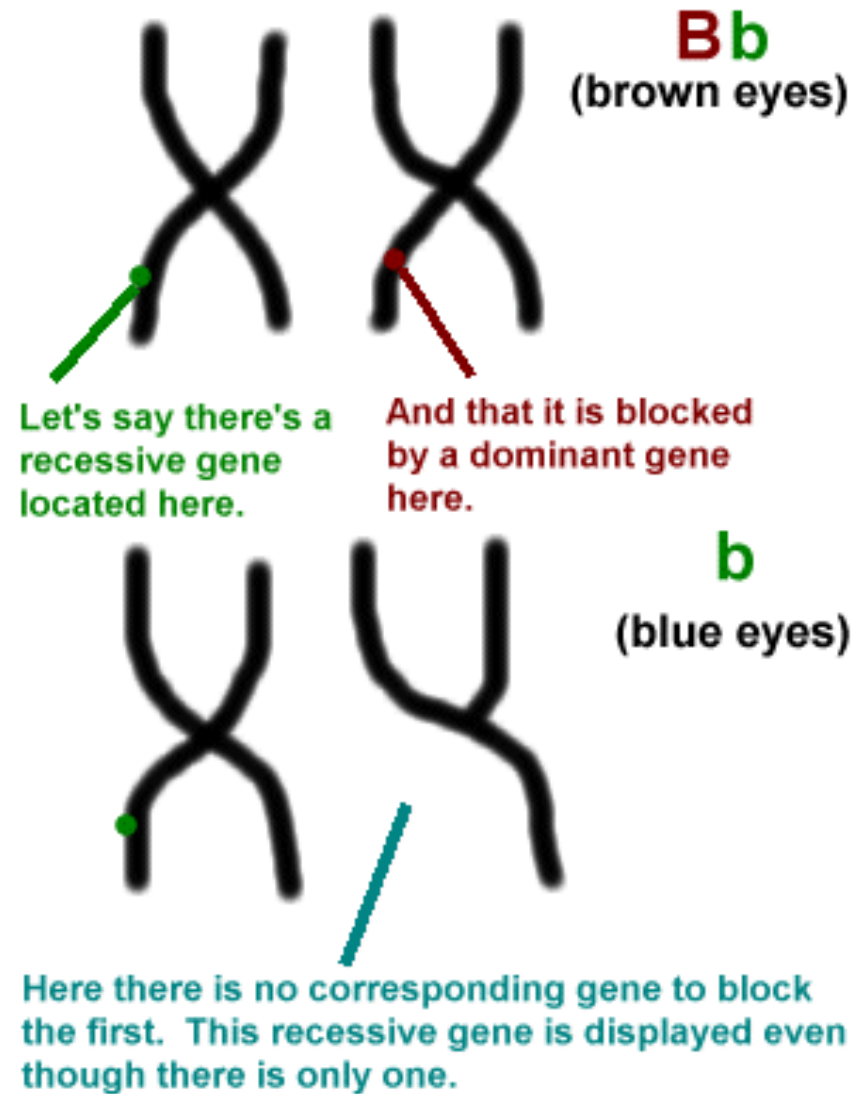- When **both** alleles are **expressed** – **Codominance**

Example: In certain chickens black feathers are codominant with white feathers.

Heterozygous chickens have black and white speckled feathers.

Sex – linked Traits

- **Genes** for these **traits** are located **only** on the **X** chromosome (NOT on the Y chromosome)

- X linked alleles **always** show up in **males** whether **dominant** or **recessive** because males have only **one** X chromosome

Bb
(brown eyes)

Let's say there's a recessive gene located here.

And that it is blocked by a dominant gene here.

b
(blue eyes)

Here there is no corresponding gene to block the first. This recessive gene is displayed even though there is only one.

- Examples of **<u>recessive</u>** sex-linked disorders:

1. **<u>colorblindness</u>** – inability to distinguish between certain colors
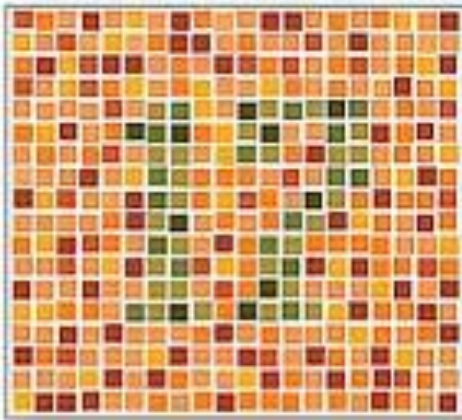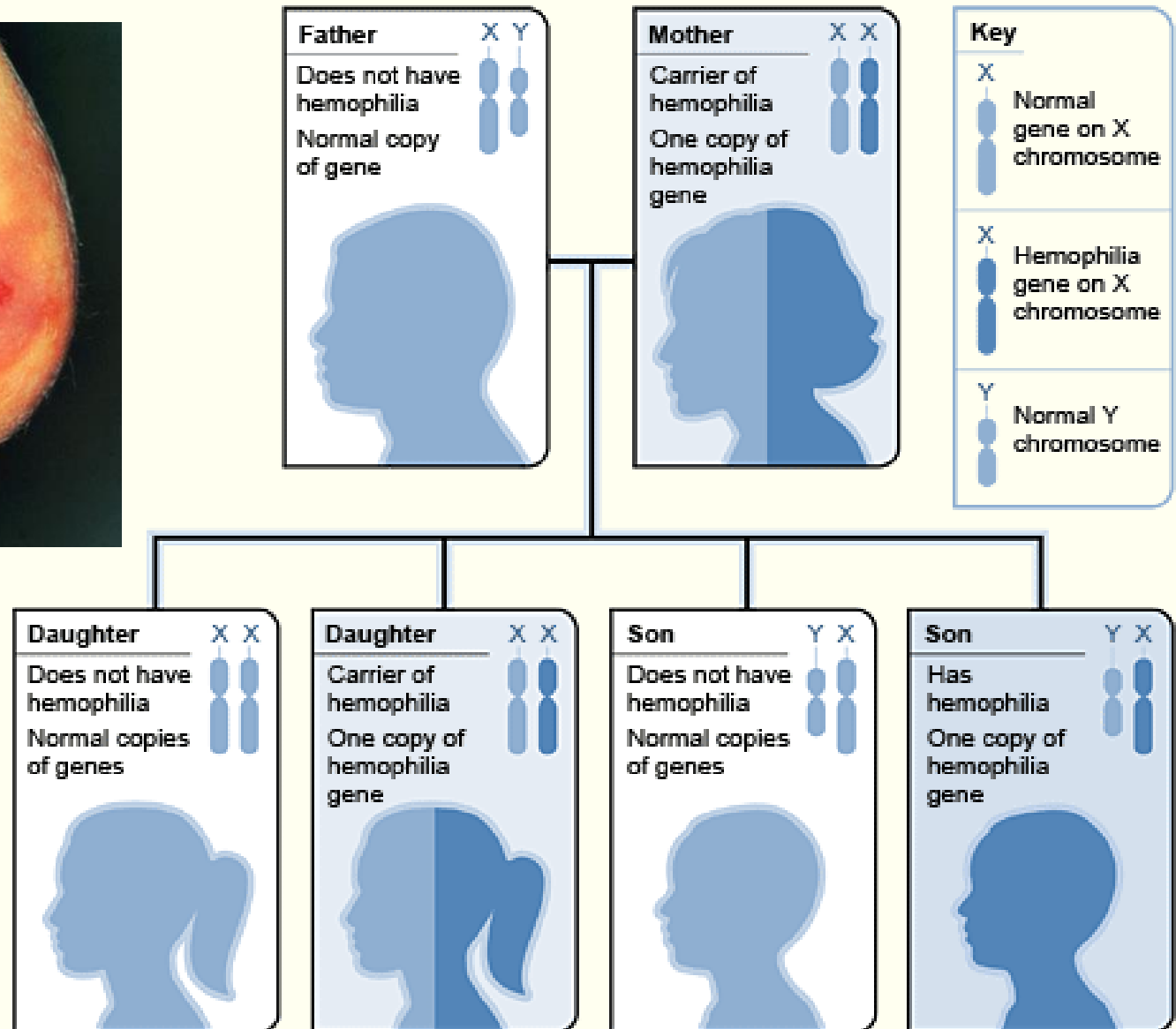

You should see **58** (upper left), **18** (upper right), **E** (lower left) and **17** (lower right).

Various tests for color blindness

Color blindness is the inability to distinguish the differences between certain colors. The most common type is red-green color blindness, where red and green are seen as the same color.

2. **hemophilia** – blood won't clot

Example: What would be the possible blood types of children born to a female with type AB blood and a male with type O blood?

AB X **OO**

	A	B
O	AO	BO
O	AO	BO

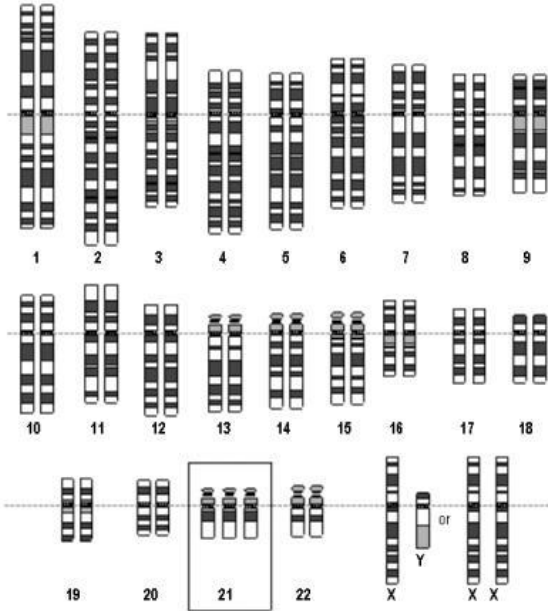Children would be type **A** or **B** only

Mutations

- Mutation – sudden **genetic change** (change in **base** pair sequence of **DNA**)

- Can be :
Harmful mutations – organism **less able** to survive: genetic disorders, cancer, death

  Beneficial mutations – allows organism to **better survive**: provides **genetic variation**

  Neutral mutations – **neither** harmful nor helpful to organism

- Mutations can occur in 2 ways: **chromosomal** mutation or **gene/point** mutation

Genetic Mutations of the Fruit Fly

Wingless

Bar-Eyed

Sepia Eyed

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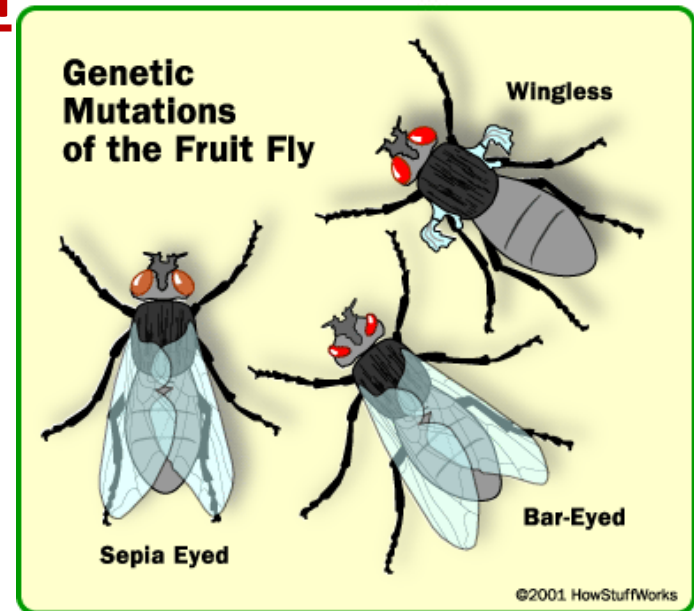
- Examples:

Down's syndrome – (Trisomy 21) **47** chromosomes, extra chromosome at pair **#21**

flattened nose and face, upward slanting eyes,

Normal palm creases

Simian crease

widely separated first and second toes and increased skin creases