An Introduction to Heredity

Heredity:

The passing of physical characteristics from parents to offspring.

Genetics:

The study of heredity

Trait:

Each different form of a characteristic.

- **Examples of Traits:**
  - HAIR COLOR
  - STEM HEIGHT OF PLANTS
  - EYE COLOR
  - FUR COLOR
  - FLOWER PETAL COLOR

Trait: Fur Color

What color fur do you think the parents of this kitten litter have?

Mother Cat

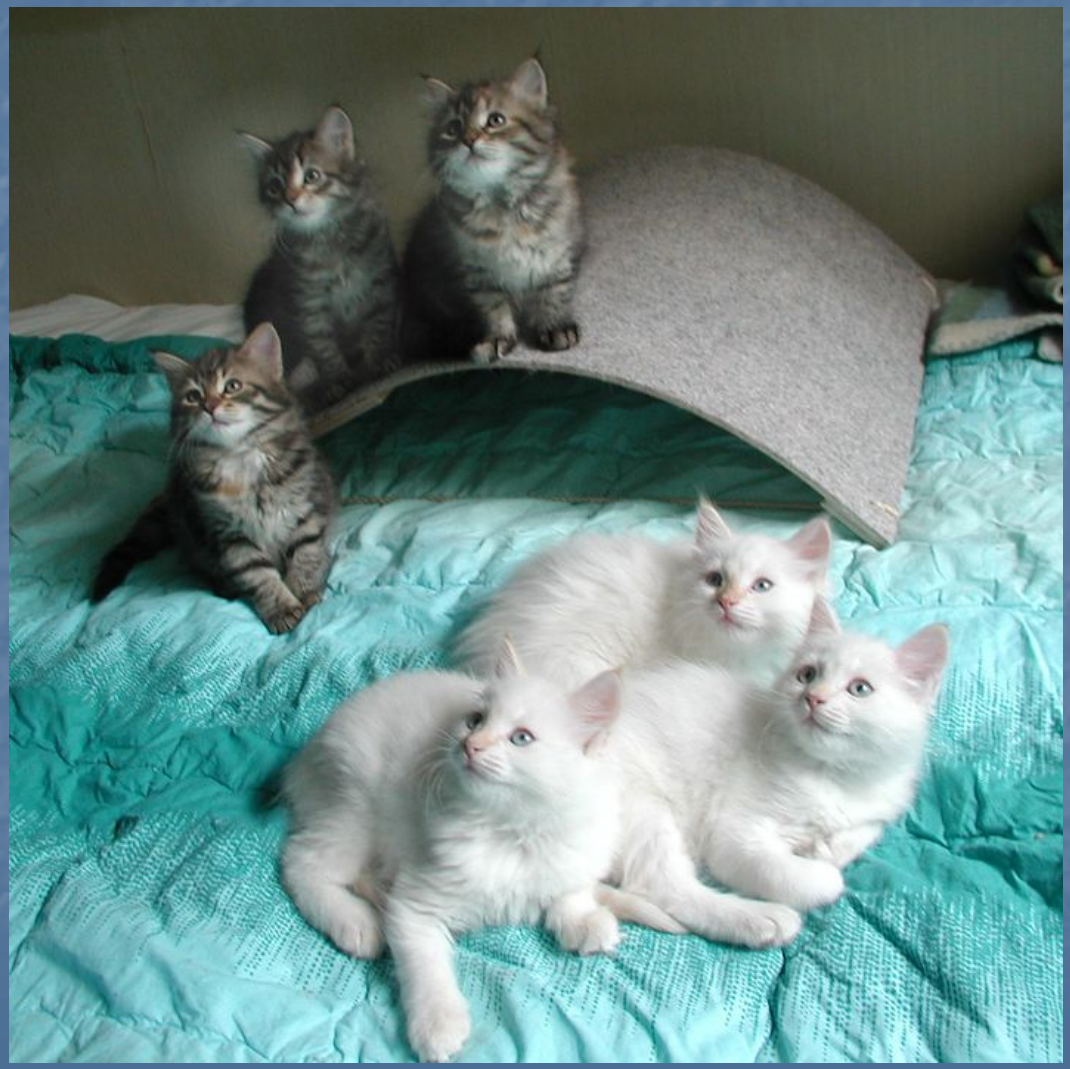
Father Cat

What do their parents have for fur color?

MOTHER CAT

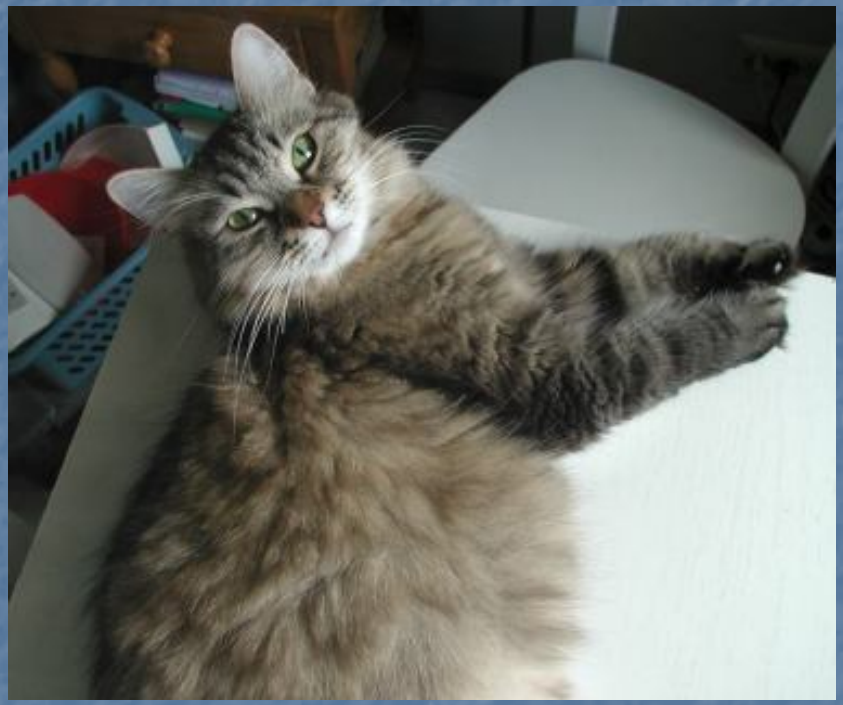
FATHER CAT

ONE MORE...



MOTHER CAT

FATHER CAT



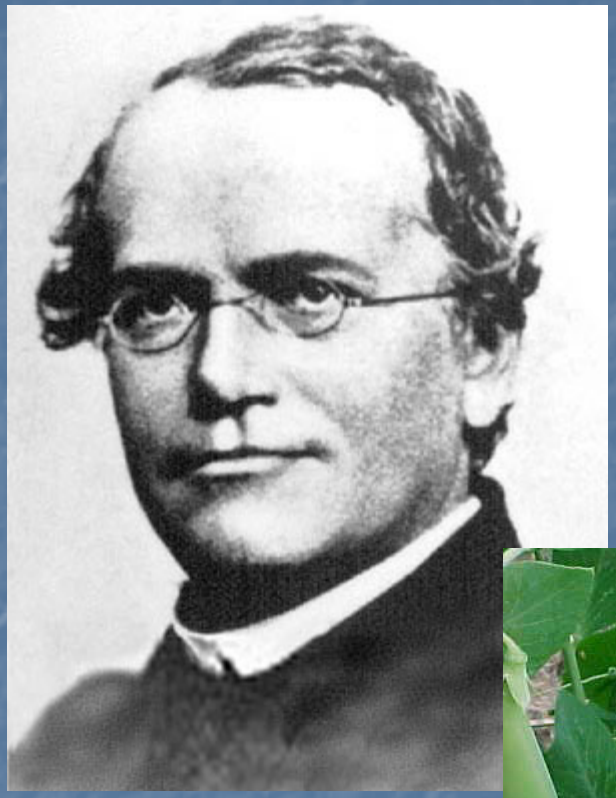
MOM CAT

DAD CAT

What are we going to learn about in the heredity unit?

- How Gregor Mendel first experimented with testing the concept of heredity.
- The difference between “purebred” and “hybrid” organisms.
- How chromosomes contain genes, which control our traits.
- The difference between dominant and recessive traits.
- Predicting the probability of traits in offspring.
- Causes of genetic disorders
- **Project: Probability of the traits your offspring would have.**

A Little Bit of History...

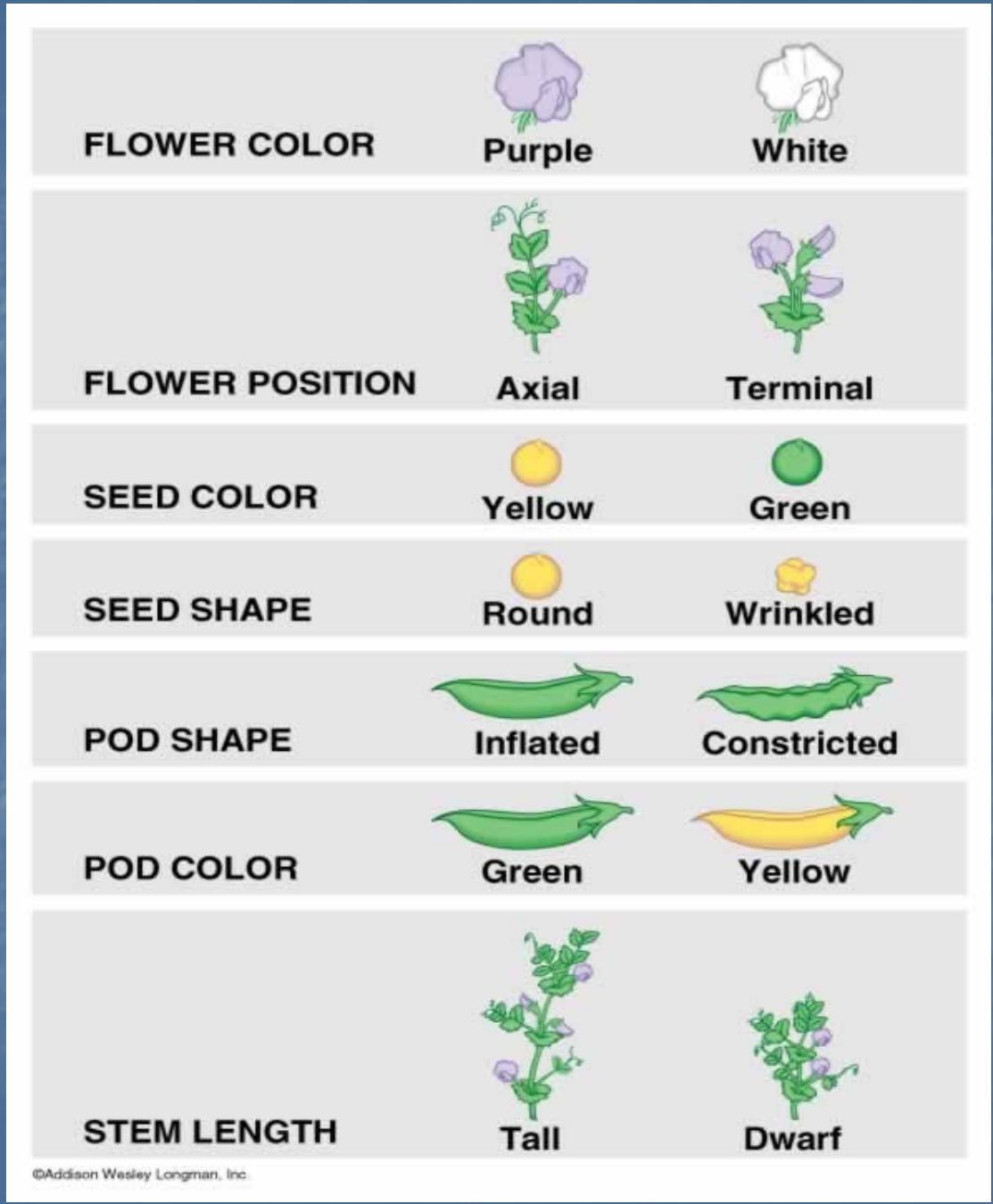


- Gregor Mendel was an Austrian priest and scientist – often called the “father of genetics”
- Spent time observing plants - Mendel wondered why different pea plants had different characteristics

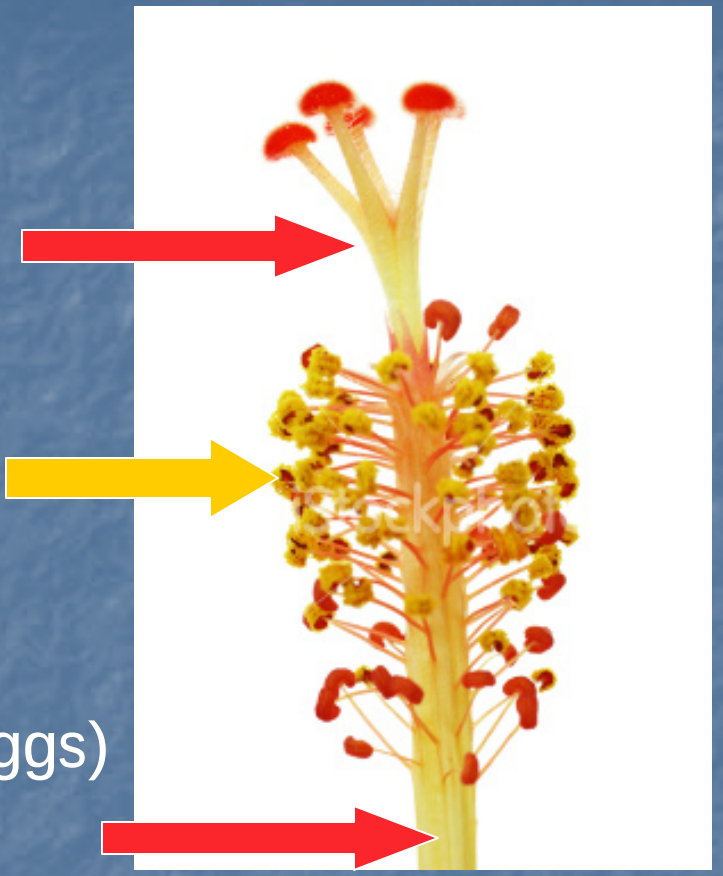
Mendel noticed:

- **Differences in:**
  - Flower color
  - Flower position
  - Seed color
  - Seed shape
  - Pea pod shape
  - Pod color
  - Stem height

Lead him to experiments on the plants



Sex cells in flowers



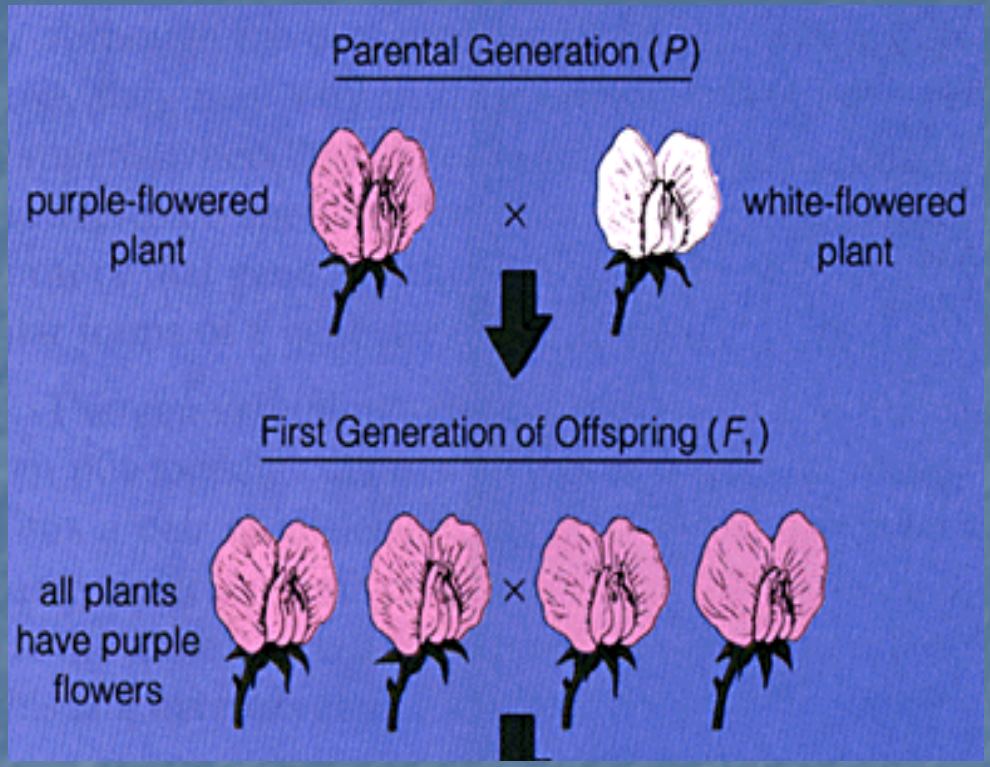
Pistil: produces female sex cells (eggs)

Stamens: produce pollen, which contains the male sex cells (sperm)

When pollen reaches the pistil, **pollination** occurs, and when the sex cells join, **fertilization** occurs.

Mendel's experiments:

- **Purebred: offspring where all previous generations have the same trait. Example: a purebred short plant came from both short parent plants.**
- **First, he crossed purebred purple with a purebred white**
- **Result of F1 Generation: all plants had purple flowers**

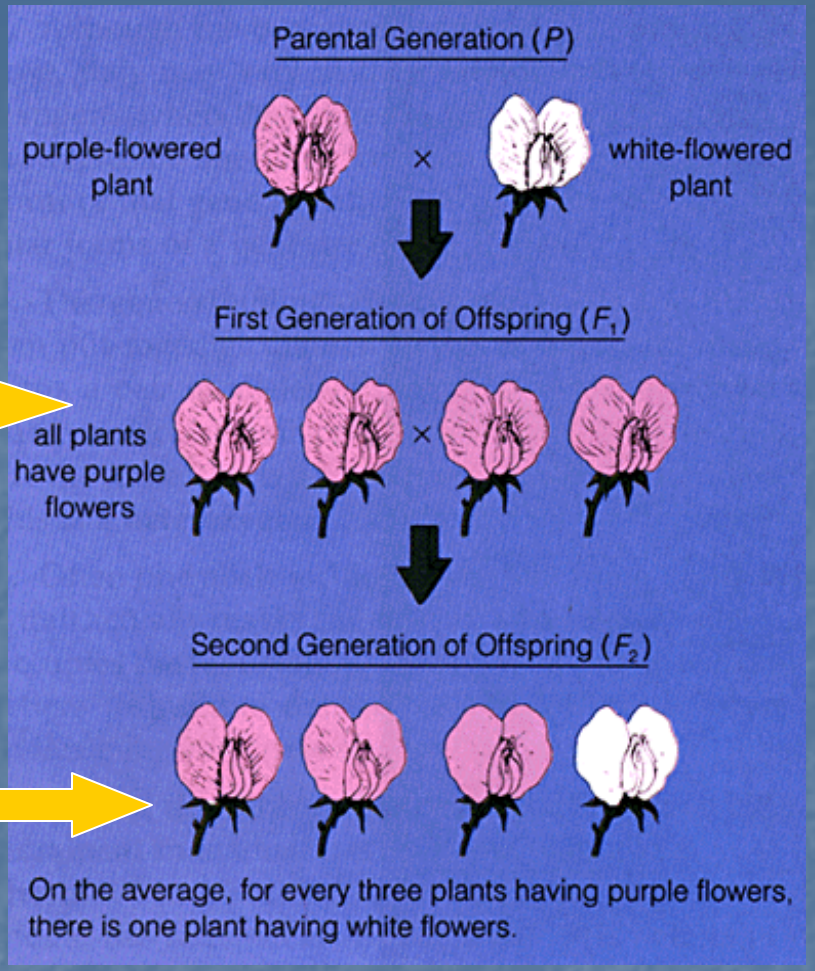


Vocabulary Words:

P Generation = parental generation

First Filial Generation (F1) = first generation of offspring – "filial" means daughter and son

- **Second experiment:**
  - Crossed two of the purple offspring in the F1 generation.
  - The F2 generation resulted in some offspring having purple flowers and others having white flowers
  - See other experiments on height (page 78)



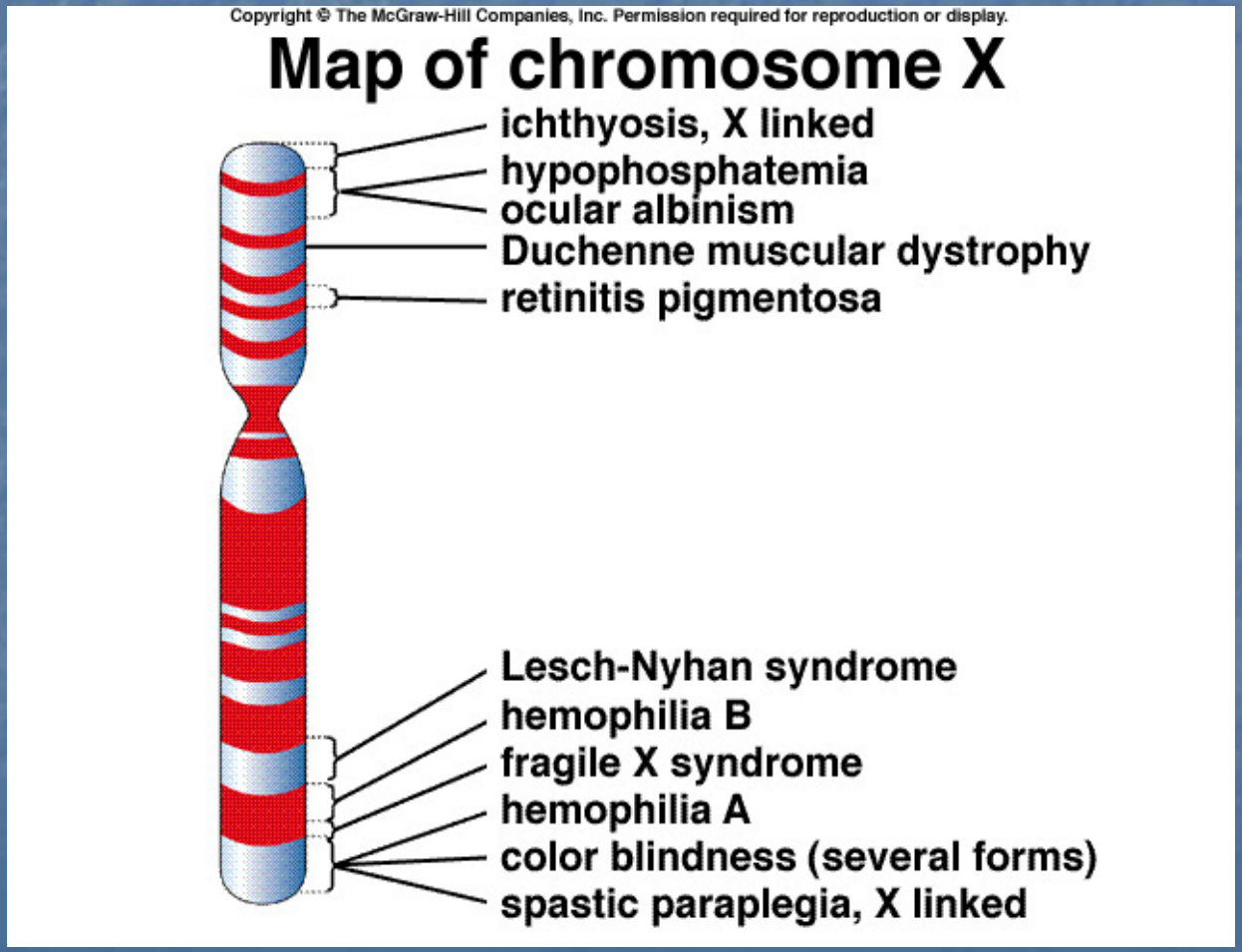
- **His experiments lead him to wonder: Why did this occur? So he continued experimenting.**
- **Later Mendel concluded:**
  1) **Something in an organism controls a trait**
  2) **Both parents contribute to the trait**
  3) **The trait occurs by getting something from the female parent and something from the male parent, so the factor that makes a trait occurs in a pair.**

What did Mendel originally discover, but didn't know – it was discovered later by scientists who continued is work?

Chromosomes and genes

Human chromosome pairs

~ Each chromosome contains **genes**.
~ The genes are responsible for giving us our traits.



DOMINANT AND RECESSIVE ALLELES FOR EYE COLOR