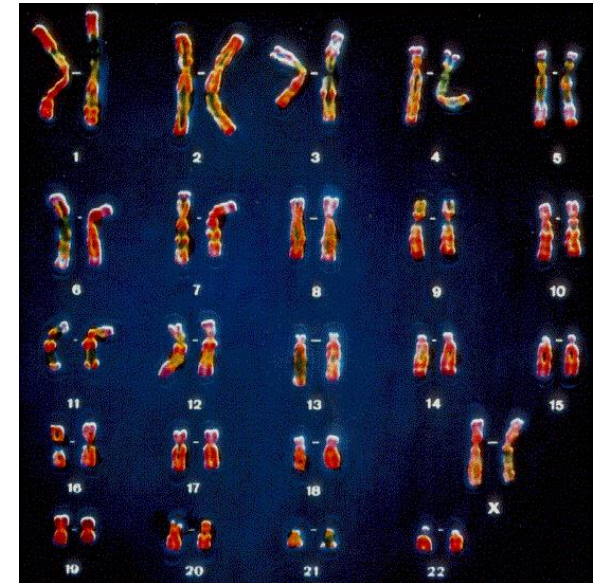
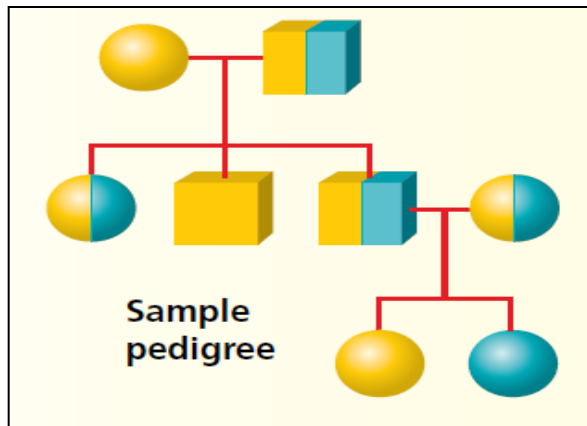


# Agenda

- Warm up- verbal
- Chapter 12 Presentation Projects: Patterns of Heredity and Human Genetics
- Chapter 12 Kahoot
- Chapter 12 Quick Quiz

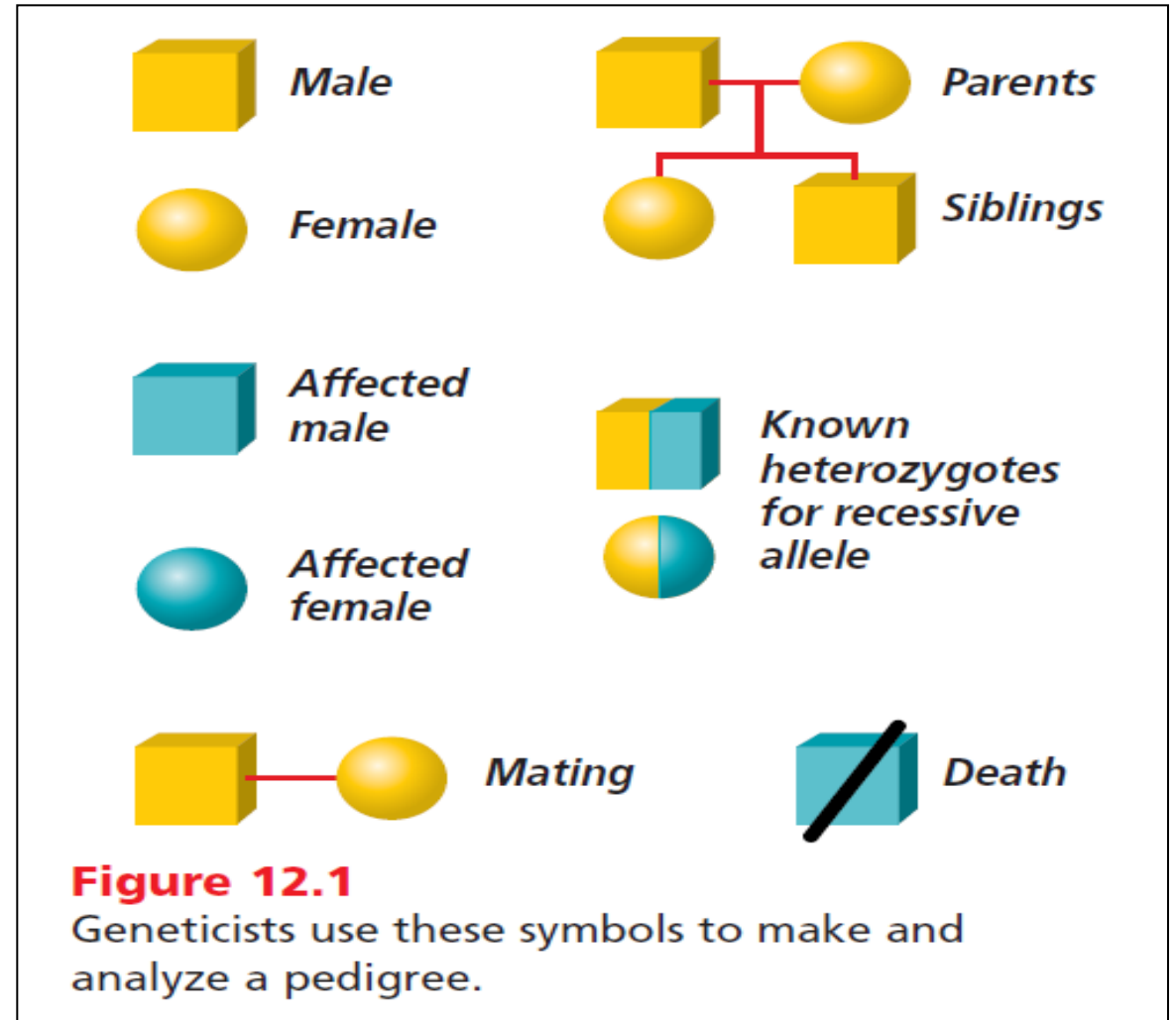
**Homework: 12.2 Section Assessment (pg 322 #1-5)**

# Chapter 12: Patterns of Heredity and Human Genetics

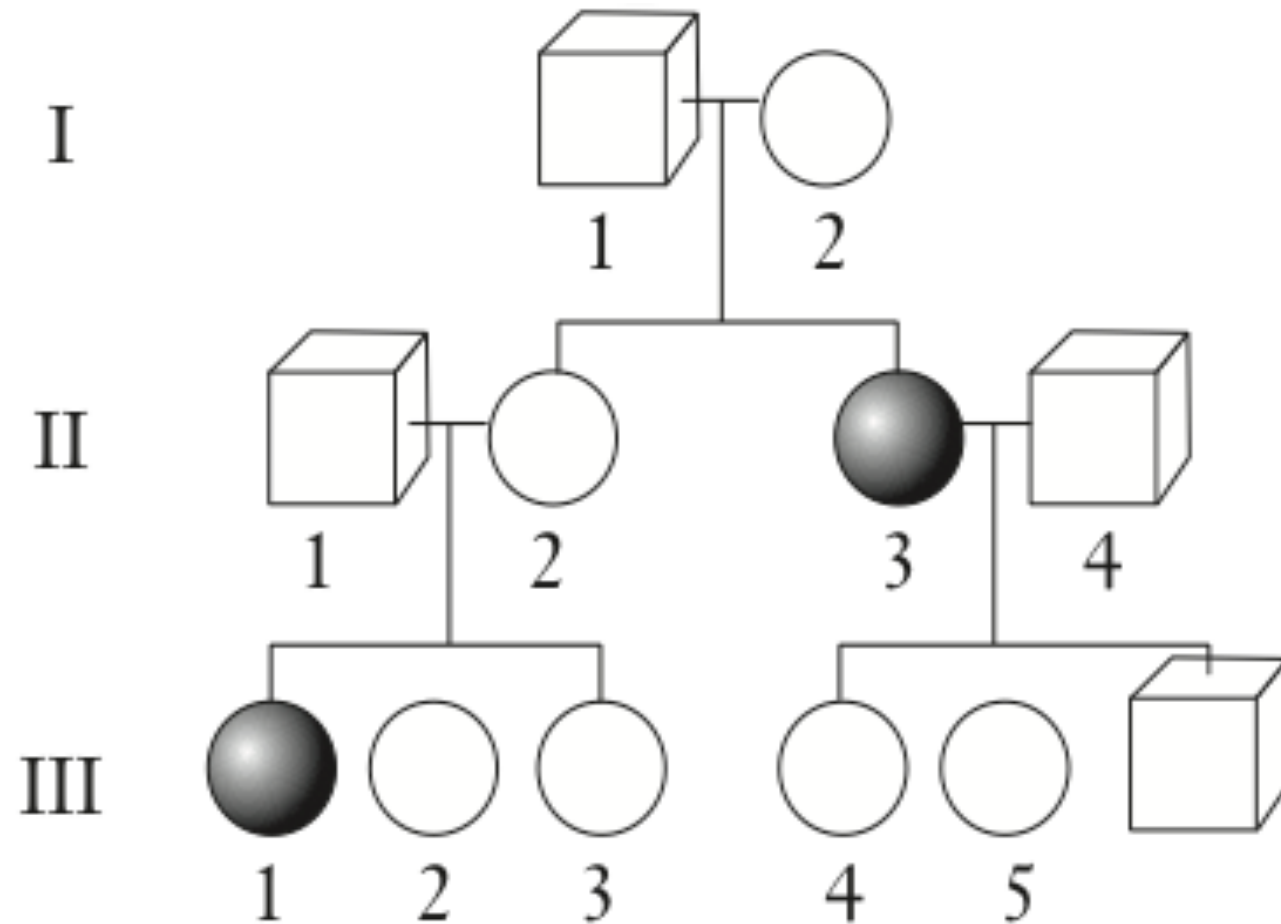


# Pedigree

- Graphic representations of genetic inheritance
- Often used to trace how a genetic disorder is passed along.



# Table Talk Warm Up



1. Is the trait being studied **dominant** or **recessive**?  
**How do you know?**
2. Are II-1 and II-2 **carriers** of the trait? **How do you know?**
3. What is the probability that **II-1 and II-2** will produce an individual with the trait being studied?
4. What is the likely **genotype of II-4** for the trait being studied?

# Genetic Disorders: Cystic Fibrosis

- Recessive genetic disorder
- Mutation in CFTR gene → mutates protein that regulates the flow of salt and fluids in/out of cells
- Causes thick mucus in lungs
- Patients need physical therapy, special diets and medication



Cystic Fibrosis Lung

Healthy Lung



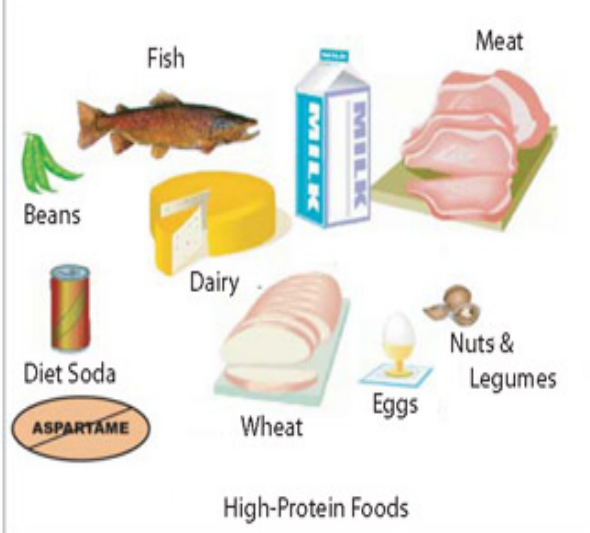

# Tay-Sach's Disease

- Recessive genetic disorder
- Missing an enzyme that breaks down lipids (fats) in central nervous system (brain and spine) → Fats accumulate
- Muscle weakness and slowed development
- Causes death within 4-5 years



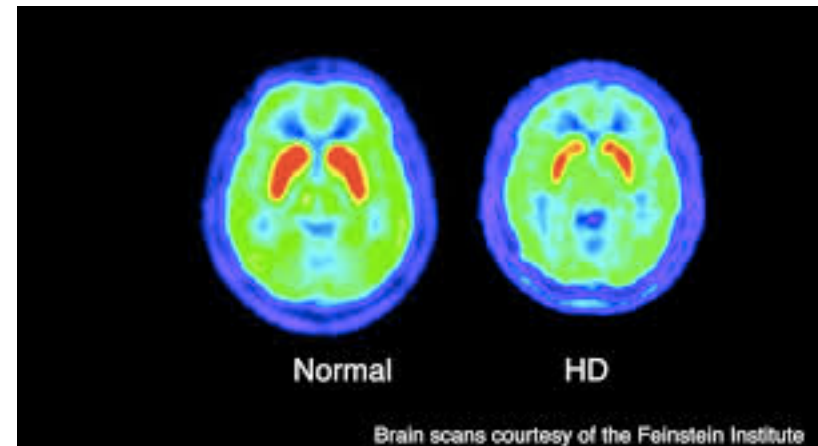
# Phenylketonuria (PKU)

- Recessive genetic disorder
- Missing an enzyme that converts 1 amino acid (Phe) to another amino acid (Tyr)
- Phenylalanine builds up and leads to mental impairment
- Patients must eat a low- protein diet (foods low in Phe)

High Phenylalanine Foods:	Low Phenylalanine Foods:
 <p>Fish</p> <p>Meat</p> <p>Beans</p> <p>Dairy</p> <p>Wheat</p> <p>Eggs</p> <p>Nuts &amp; Legumes</p> <p>Diet Soda</p> <p>ASPARTAME</p> <p>High-Protein Foods</p>	 <p>Most Vegetables</p> <p>Most Fruit</p> <p>Sugars</p> <p>Special Formula</p> <p>Special Breads</p> <p>Cookies</p> <p>Crackers</p> <p>Low-Protein Foods</p>

# Huntington's Disease

- Dominant genetic disorder- caused by rare dominant allele
- Nerve cells in the brain break down over time
- Causes uncontrolled movements, emotional problems, and loss of cognition





# Complex Patterns of Inheritance: Incomplete Dominance vs Codominance

- Incomplete dominance:  
Dominant alleles mix/ blend
- Ex: Red flower x white flower = pink flower

Codominance: Dominant alleles expressed equally, but there is no blending

Ex: Red flower x white flower = red and white flower

Ex: Heterozygous for sickle cell anemia

Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.

R=red r=white



RR



Rr



rr



## Incomplete Dominance or Codominance?



X



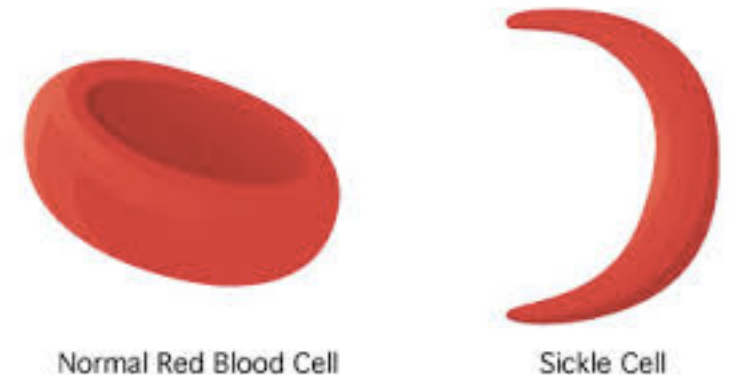
Incomplete Dominance



Codominance

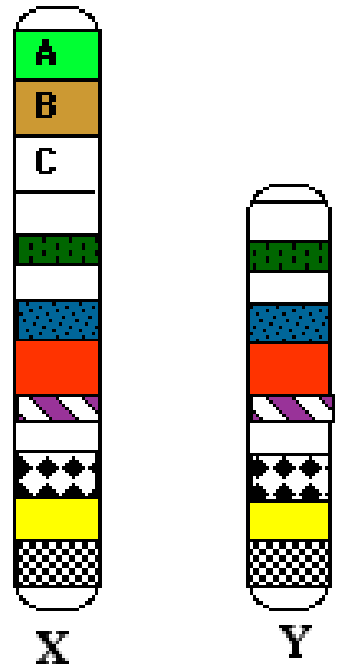
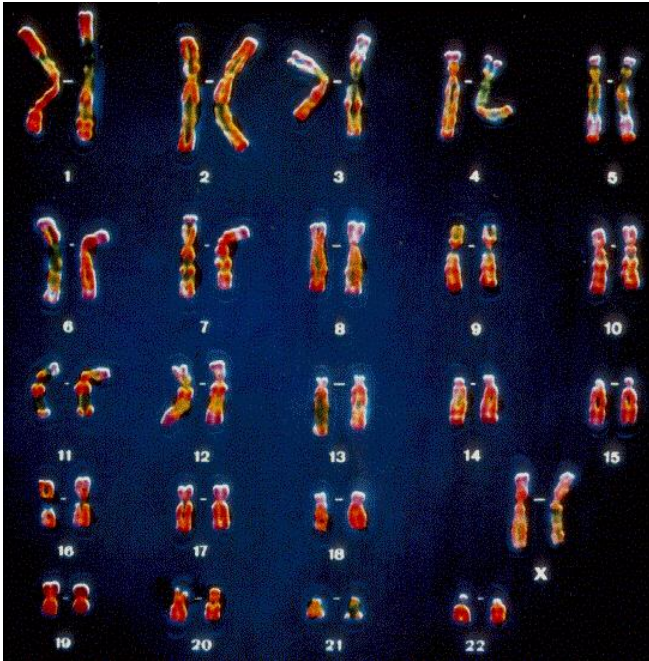
# Sickle- Cell Anemia

- Example of codominance- If person has one copy of the sickle cell allele, half of their red blood cells will be misshapen
- Result of substitution mutation that changes 1 amino acid during translation
- Slowed blood flow, blockage, tissue damage



- Sex Chromosomes: 23<sup>rd</sup> pair of chromosomes that determine the sex (male or female) of a person.

Sex-Linked Gene: A gene found only on a sex chromosome

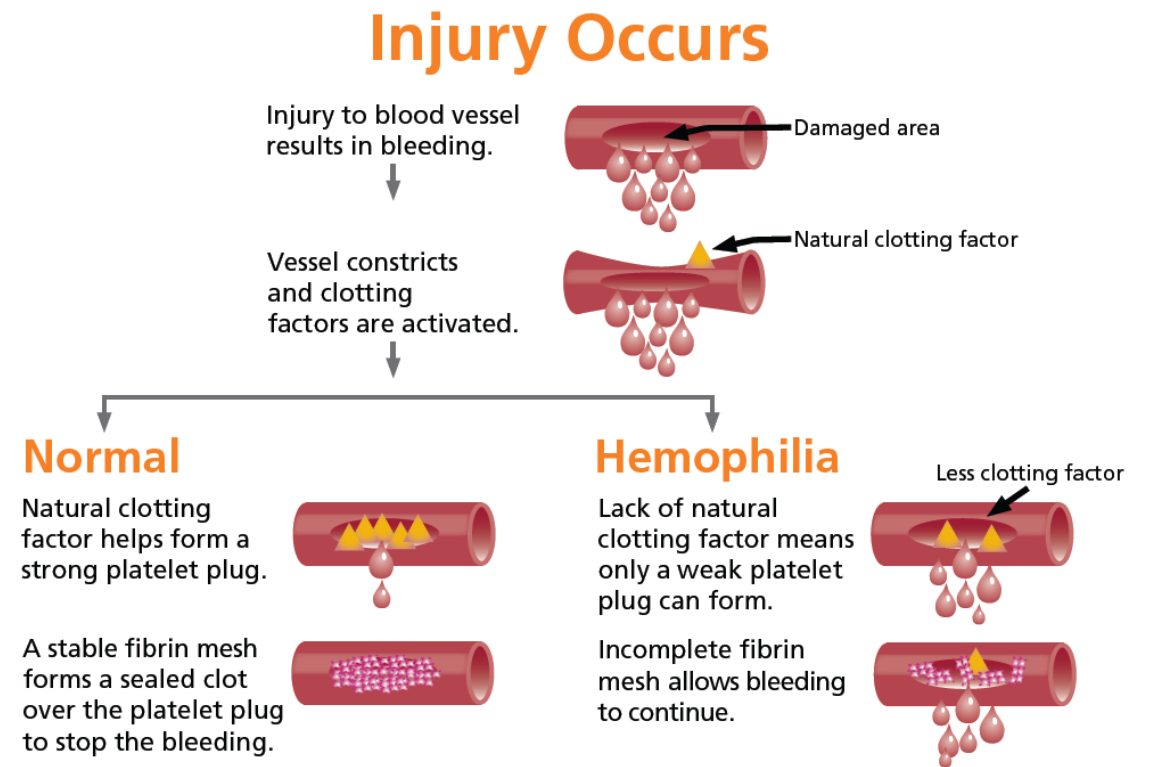


The Y chromosome is missing this section of the X chromosome. The lower sections of both chromosomes contain the genes for the same traits.

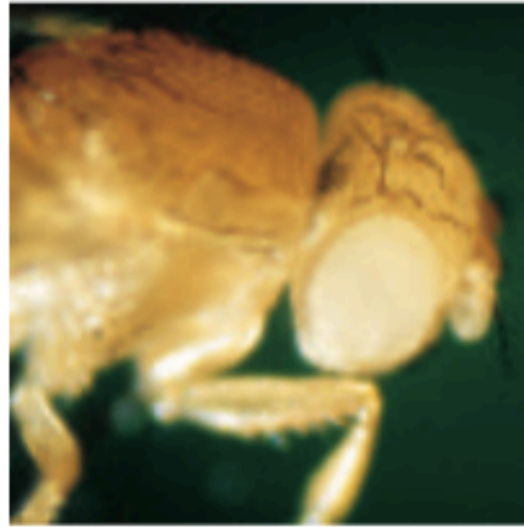
Males: XY  
Female: XX

# Examples (X-Linked)

- Hemophilia: Blood does not clot normally
- Color blindness



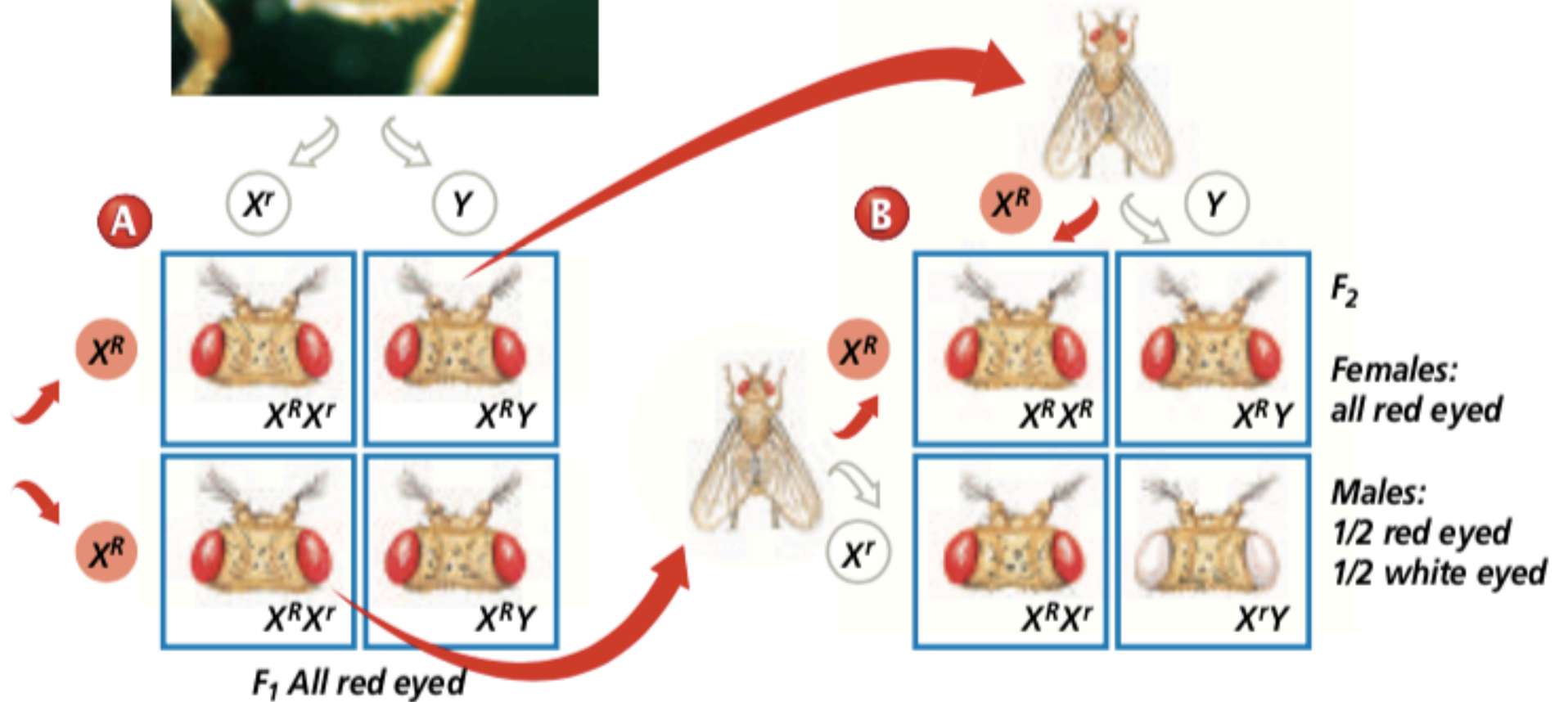
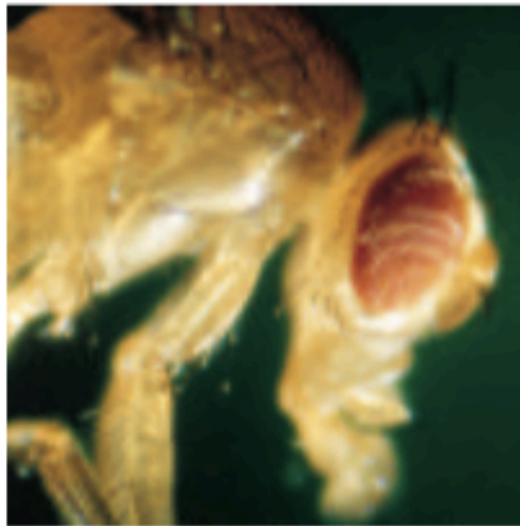
White-eyed male ( $X^rY$ )



### Figure 12.11

Morgan crossed a white-eyed male fruit fly with a normal homozygous red-eyed female (A). He then allowed the  $F_1$  flies to mate (B). The superscripts  $R$  and  $r$  are the dominant and recessive alleles for eye color in fruit flies.

Red-eyed female ( $X^RX^R$ )



# Group Discussion Time!



## Why are X-linked disorders more common in men than in women?



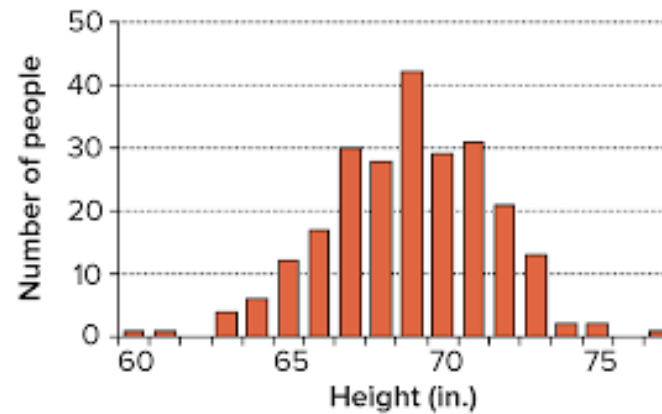
- 
- 2.** If a white-eyed male fruit fly were crossed with a heterozygous red-eyed female fruit fly, what ratio of genotypes would be expected in the offspring?



# Polygenic Inheritance

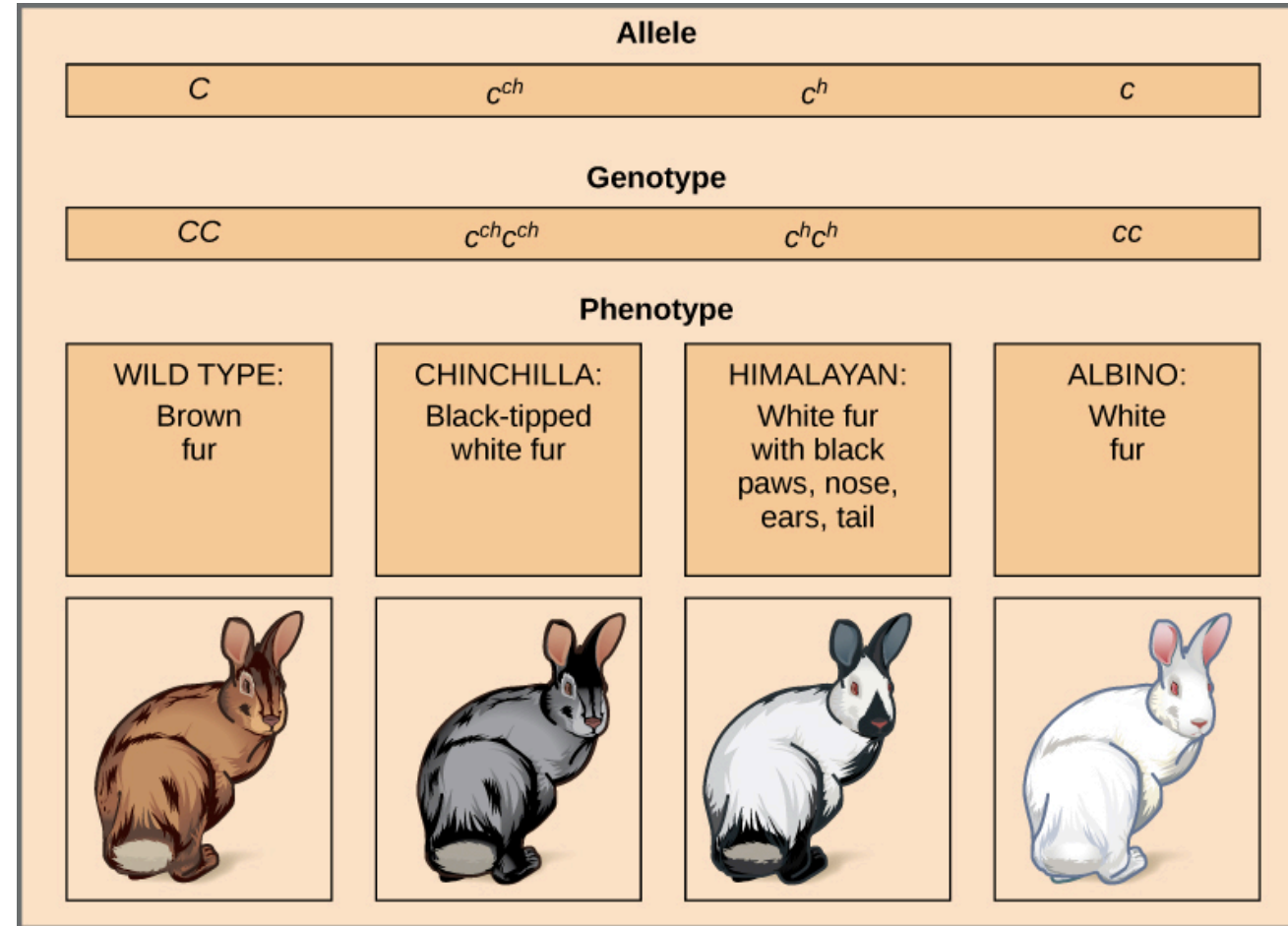
- Inheritance pattern of a trait that is controlled by two or more genes.
- Each gene still has two alleles, but there are multiple genes that determine a trait.

Ex: eye color, height, skin color



# Multiple Alleles

- Instead of having two forms of an allele, there are more than two for one gene
- Again, each gene still only has 2 alleles, there is just more than 2 different alleles the gene can have
- Ex: hair color, eye color, rabbit coat color, blood type (A, B, O)



# Blood Typing Chart

Blood Type	Antigen	Antibody	Receive from	Donate to
A	A	Anti – B	A, O	A, AB
B	B	Anti – A	B, O	B, AB
AB	A, B	None	A, B, AB, O	AB
O	None	Anti –A Anti – B	O	A, B, AB, O

- Antibodies- released by the immune system to fight antigens (foreign substances)

# Abnormal Chromosome Number- Down Syndrome

Trisomy: 3 copies of a chromosome instead of two

Can be seen on a karyotype:

