

January 4th: I can make a pedigree

Bell ringer: Think of something you did over break and relate it back to science (be ready to discuss)

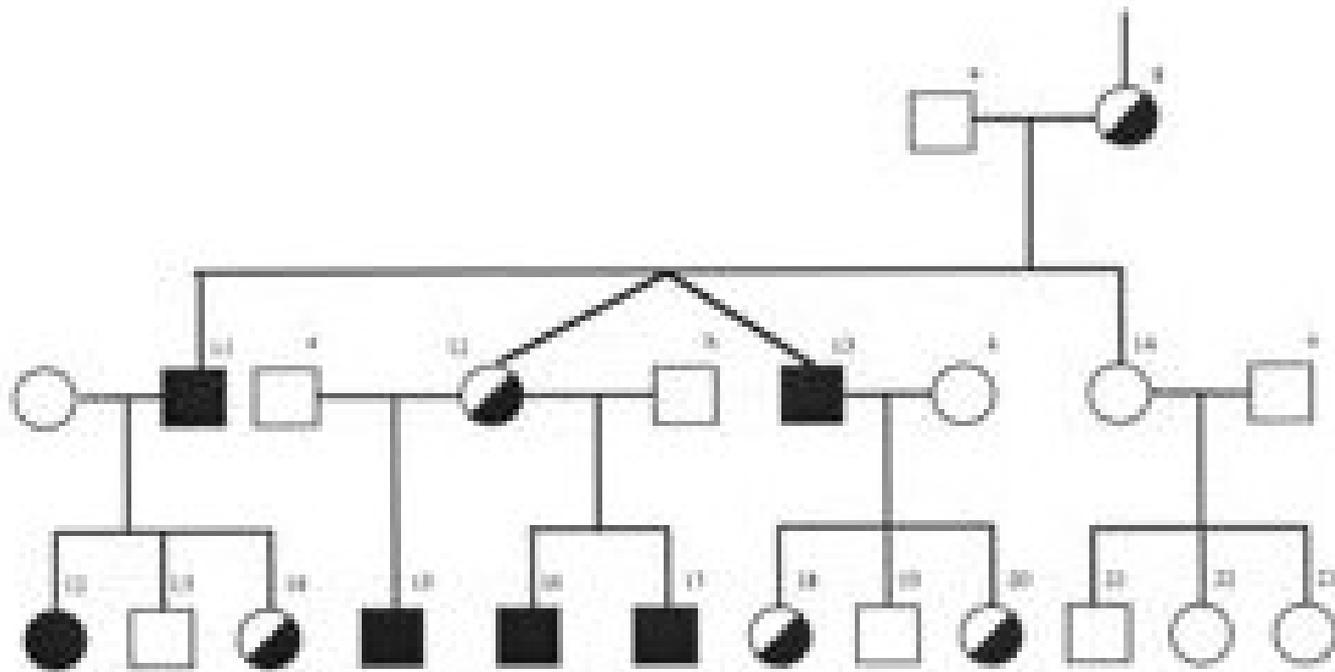
- Take out Chapter 12 review and guided notes
- Chapter 12 PowerPoint

Chapter 12

Patterns of Heredity and Human Genetics

Making a Pedigree

- Pedigree: A graphic representation of genetic inheritance
- It looks very similar to a family tree
- Circle= Female
- Square= Male
- Carrier: Half-shaded circle or square , a heterozygous individual



Analyzing A Pedigree

- Disorders are often passed down from generation to generation
- Disorders often become scarcer and scarcer with each generation.

CREATE YOUR OWN PEDIGREE

- Think of a trait that some (but not all) of your family members carry.
- Some examples may be:
- Left-Handedness
- Curly Hair
- Tongue Rolling
- Widow's Peak
- Attached Earlobes
- Freckles
- Allegies
- Cleft Chin

Dominant Gene		Recessive Gene	
Cleft Chin		No Cleft	
Widow's Peak		No Widow's Peak	
Dimples		No Dimples	
Brown/Black Hair		Blonde Hair	
Freckles		No Freckles	
Brown Eyes		Gray/Blue Eyes	
Free Earlobe		Attached Earlobe	

Simple Recessive Heredity

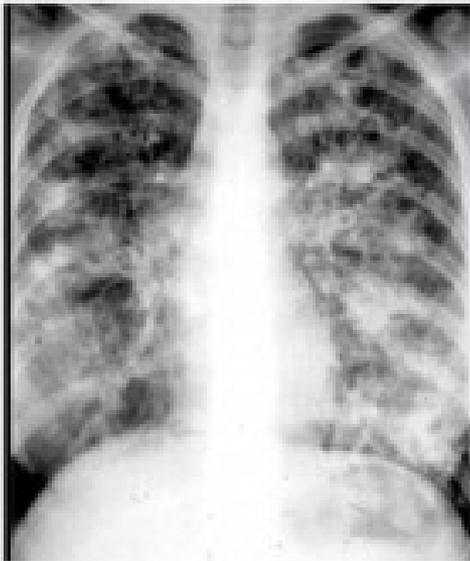
- Many disorders are caused by recessive alleles **
 - Cystic fibrosis
 - Tay-Sachs disease
 - PKU

January 5th: I can state what incomplete dominance is

- Take out Chapter 12 review
- Finish Chapter 12 PowerPoint
- Work on Chapter 12 packet

Cystic Fibrosis

- A fairly common genetic disorder among white Americans.
- Every 1 in 28 white American carries this allele
- This is due to a to a defective protein in the plasma membrane and leads to thick mucus in the lungs and digestive track

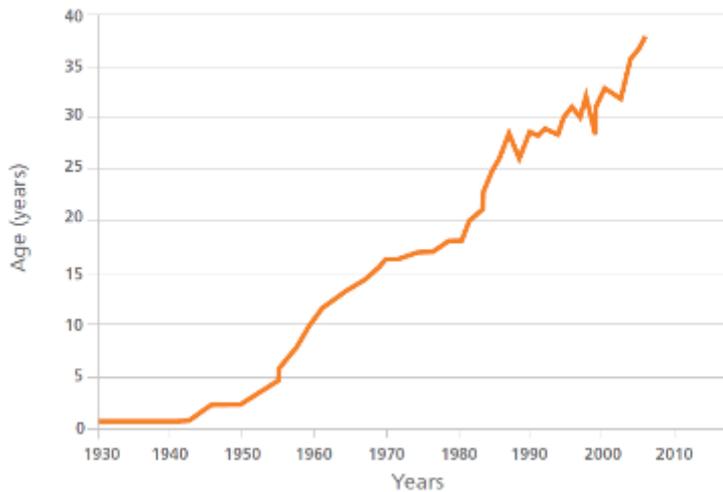


Cystic Fibrosis Lung



Healthy Lung

Cystic Fibrosis Life Expectancy



- Cystic Fibrosis has no cure ☹️
- Treatments have improved over recent years
 - Prevent/control lung infections
 - Loosen and remove thick, sticky mucus from lungs
- Average lifespan about 30-35 years

Tay-Sachs Disease

- A recessive disorder of the central nervous system
- Progressively destroys nerve cells in brain and spinal cord



Tay-Sachs continued

- Baby with disease seems to be developing normally until he/she is 6 months
- Disease gets progressively worse
- Muscle and coordination problems → blind, deaf, paralyzed, etc.
- Tay-Sachs children usually die by age 4-5
- No Cure!
- This is common amongst Ashkenazi Jews
- Testing is not included in routine health care.

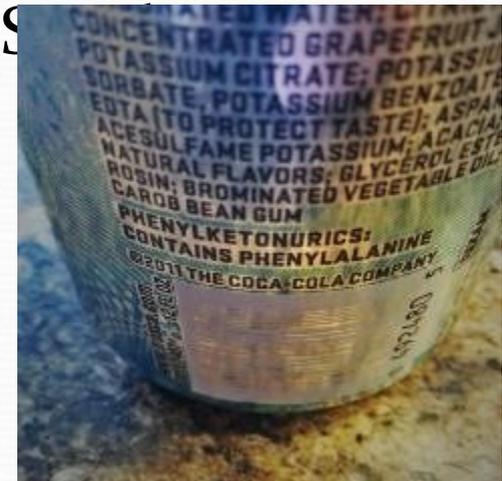
Phenylketonuria

- This is also called PKU
- Leads to nerve and brain damage
- May cause mental retardation
- Babies are tested for PKU right when they are born



- When an infant is diagnosed with PKU, their diet can be adjusted in order to prevent mental retardation. **
- Treatment with correct diet!
- Common from ancestors from Norway, S Ireland.

High Phenylalanine Foods:	Low Phenylalanine Foods:
<p>High-Protein Foods</p> <p>Fish</p> <p>Meat</p> <p>Beans</p> <p>Dairy</p> <p>Wheat</p> <p>Eggs</p> <p>Nuts & Legumes</p> <p>Diet Soda</p> <p>ASPARTAME</p>	<p>Low-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>

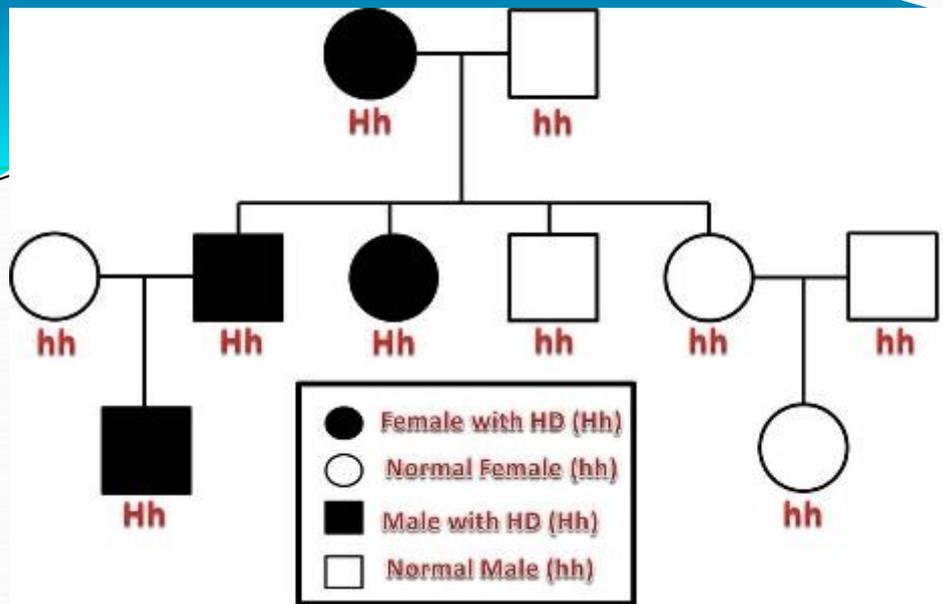


Simple Dominant Traits

- A cleft chin is an example of a simple dominant trait.
- You can inherit simple dominant trait from at least one parent.

Huntington's Disease

- This is a lethal disorder caused by a rare dominant allele
 - Breaks down areas of the brain
 - No treatment
- Huntington's Disease often results in death
- Symptoms usually start between the ages of 30 and 50
 - Death occurs usually 20 years after diagnosis

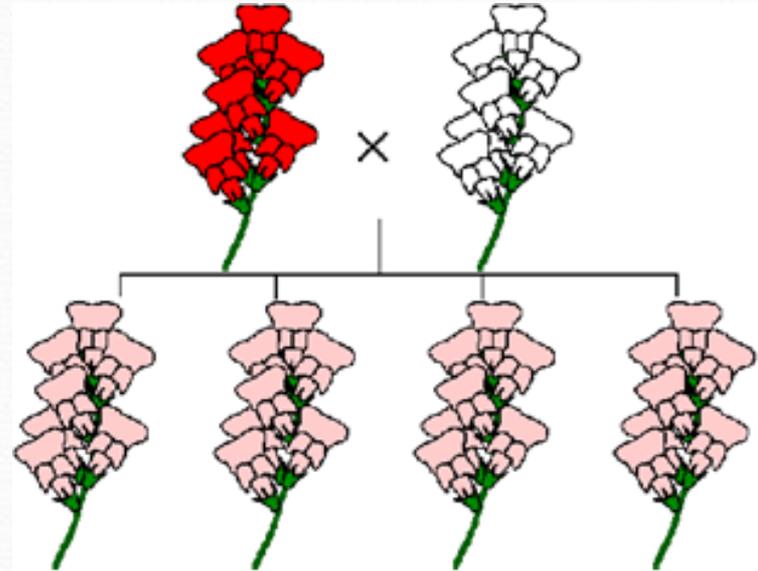


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- Complex Patterns of Inheritance –
 - **Simple Mendelian inheritance** – controlled by dominant and recessive
 - It is not always that simple!!!

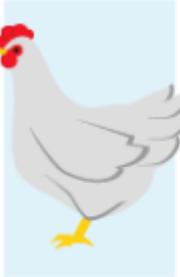
Incomplete dominance**

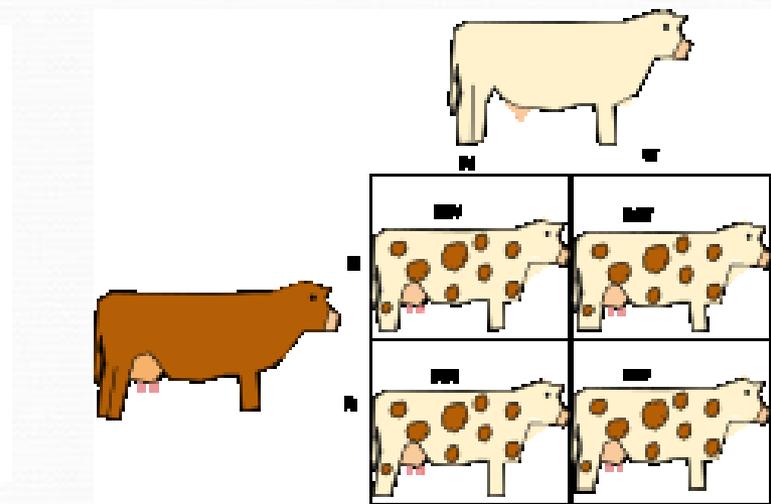
- Third phenotype
 - Incomplete dominance
 - Red snapdragon mixed with a white snapdragon = a pink snapdragon**
 - Curly, straight, wavy hair



Codominance

- Both alleles are expressed
- Example in book – Black Chicken with White chicken = a checkered type chicken color.

			
Phenotype	WHITE	BLACK	SPECKLED
Genotype	WW	BB	BW

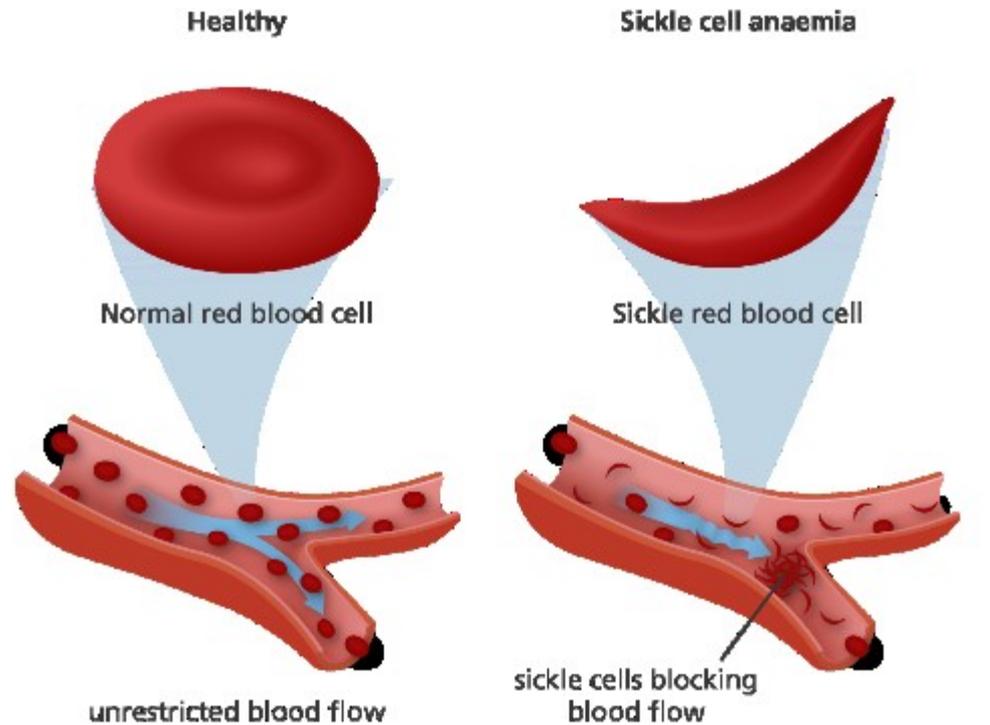






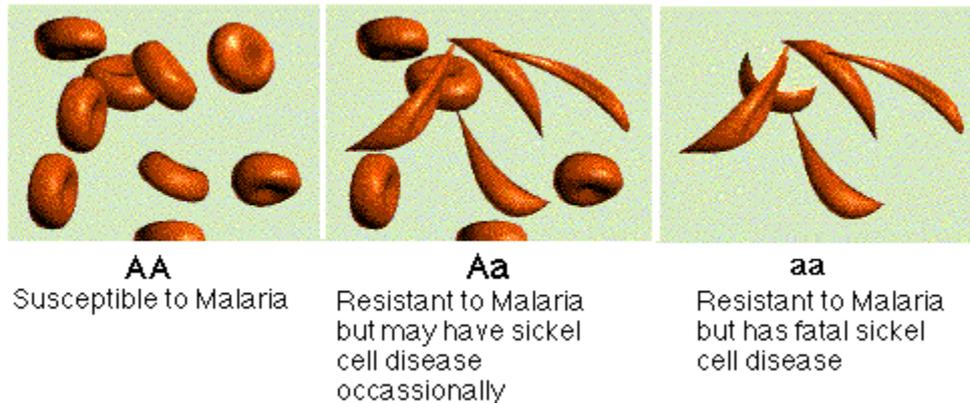
Sickle Cell Anemia - codominance

- Leads to tissue damage and pain
- Shorter life span
- Reduces the ability of



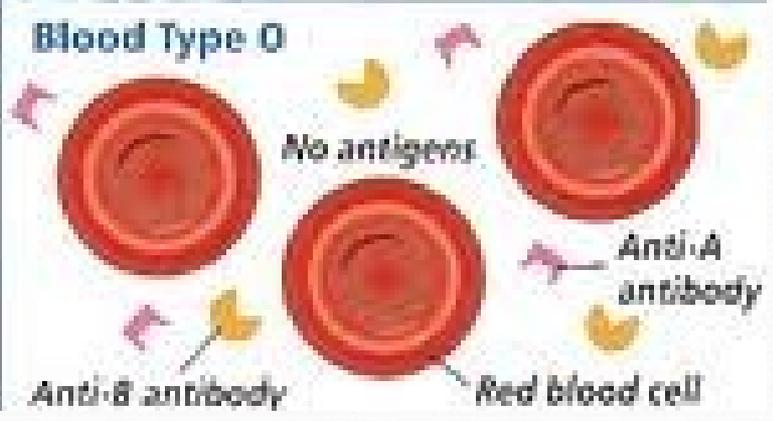
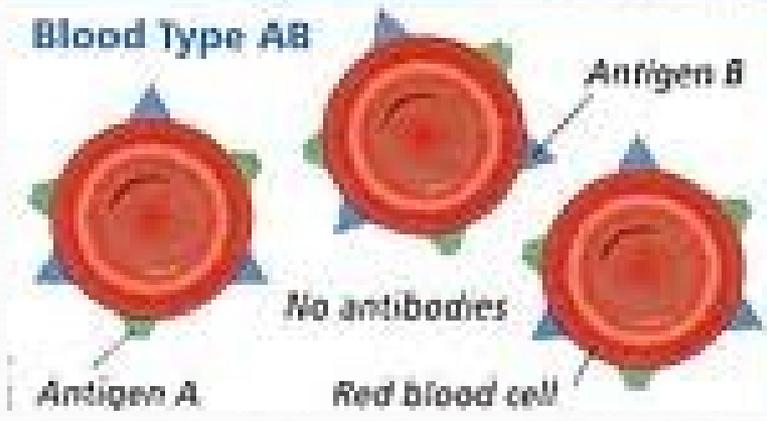
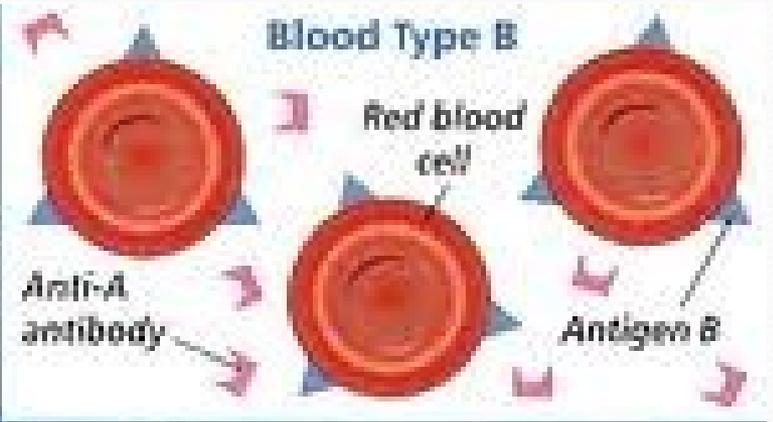
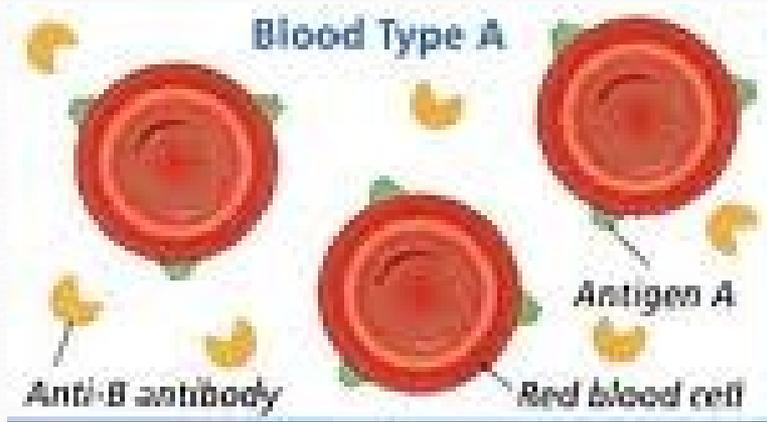
Heterozygous for sickle cell**

- Healthy!
- Example of Co-dominance
- They have some normal hemoglobin and some abnormal hemoglobin. **
- In Africa, “Heterozygous advantage”



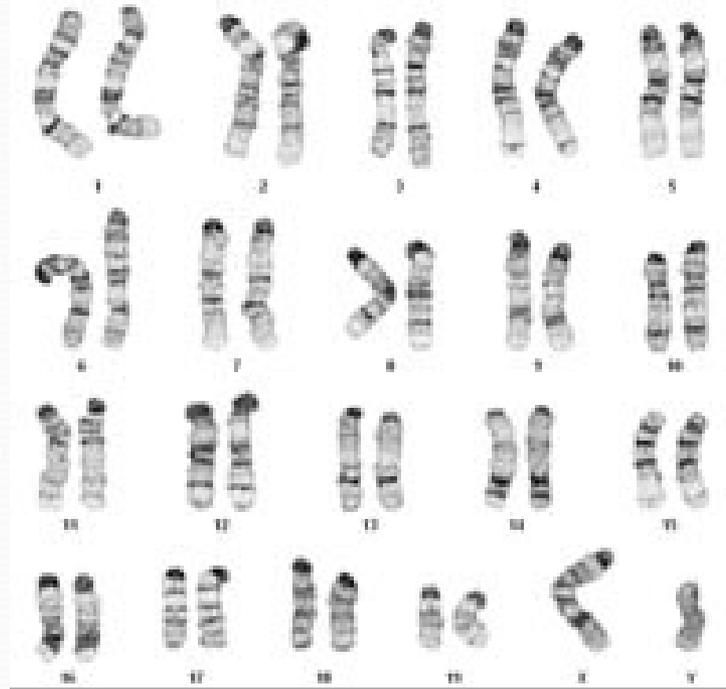
Multiple Alleles

- When a trait is controlled by more than two alleles**
 - Blood type
- Type A, B, AB, O
- Go through genotypes



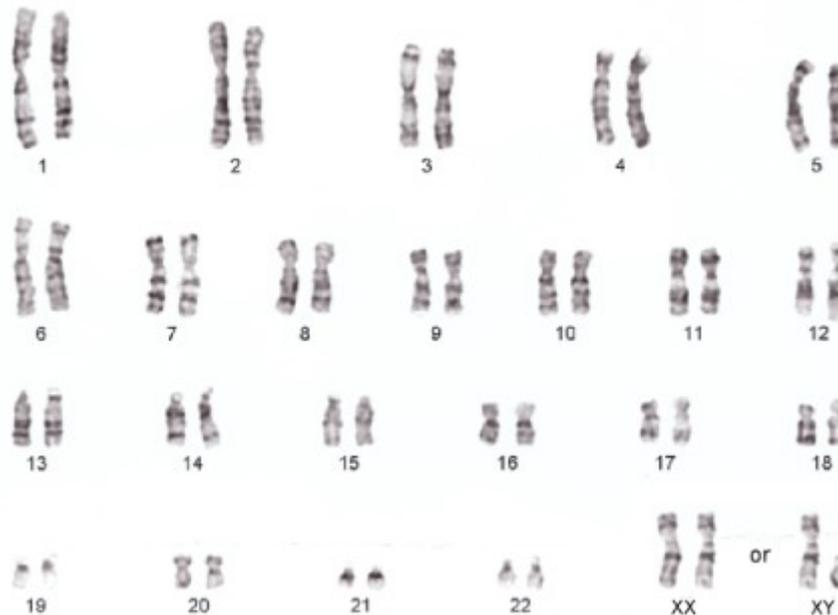
Karyotypes

- Visual diagram of the chromosomes in the cell of an organism
- Mostly used to identify an unusual number of chromosomes**



Sex determination

- 23 rd pairs of chromosomes differs in males and females. The X and Y
- Sex-linked inheritance – traits located on the sex genes.



Sex-linked inheritance

- A female fruit fly heterozygous for red eyes ($X^R X^r$) is crossed with a white eyed male ($X^r Y$), what percent of their offspring would have white eyes? **



Red-Green Color blindness

- X-linked allele
- Females (XX) Males (XY)
- Males can pass the allele to all of their daughters but not their sons** (p.327)

Hemophilia

- Sex-linked inheritance**
- A condition in which your blood cannot clot!
 - Severe bleeding



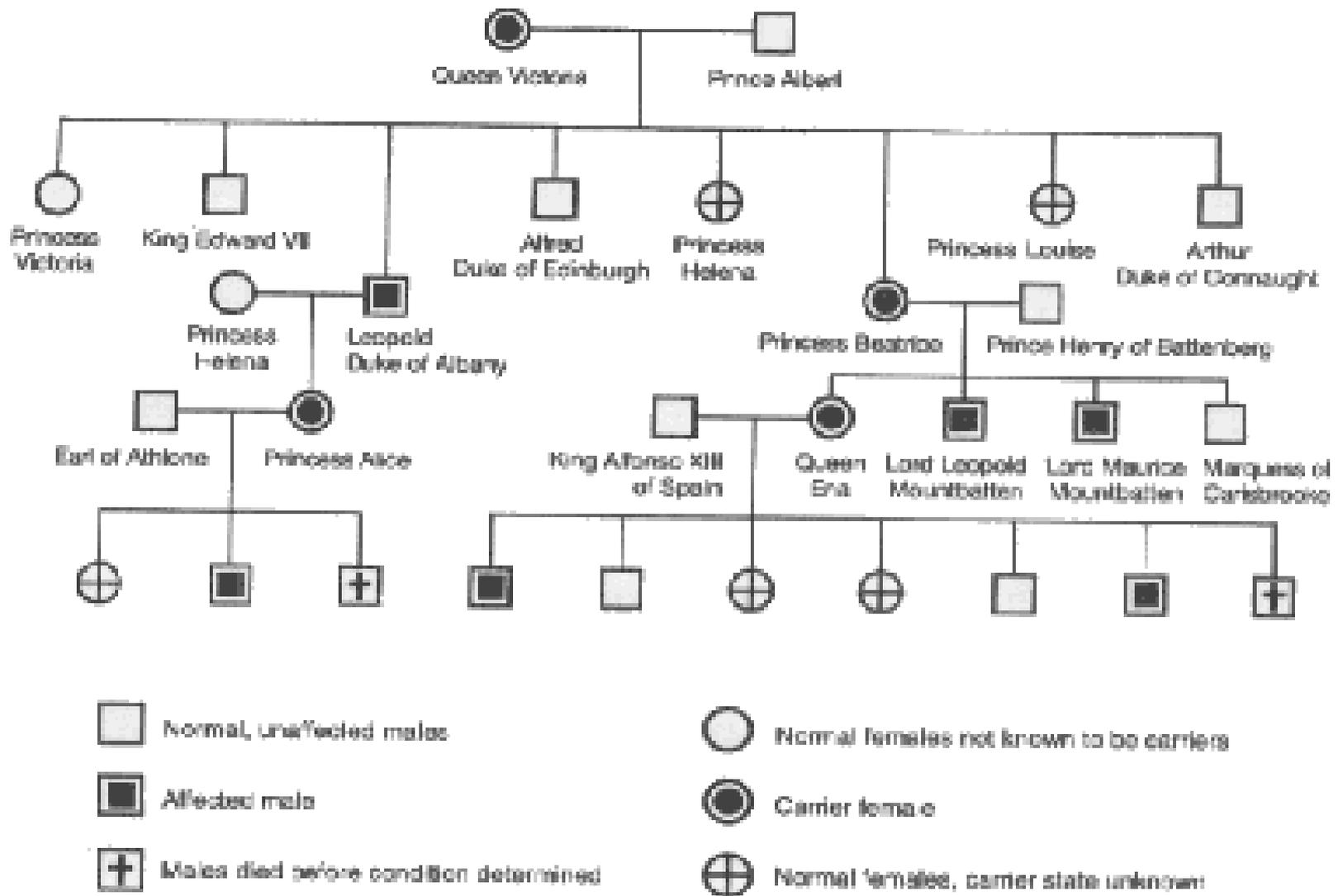


BIO

Hemophilia

		Father's Genes	
		X	y
Mother's Genes	X	1 XX	2 Xy
	X	3 XX	4 Xy

The red **X** is the chromosome carrying hemophilia.



Queen Victoria and part of the royal haemophilia pedigree.

Polygenic inheritance

- Traits that are controlled by more than 1 gene
- Skin color, eye color and height are this
- The phenotype is a range.



