For your Quiz Corrections.
For every question you missed…

- Write 1 sentence: Why is the right answer right?
- Write 1 sentence: What was wrong about your answer?
- Staple to your quiz. Turn in.

- HW - Finish your Study Guide – due thursday.

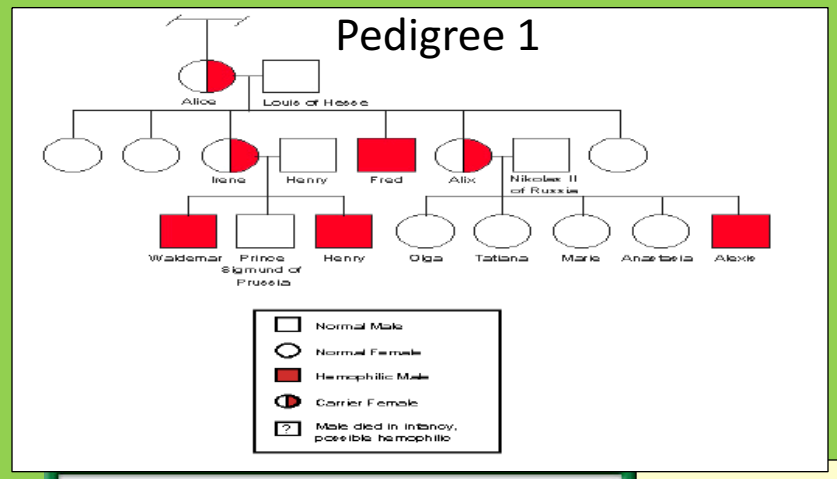
Genetic Inheritance Pedigrees, Modes of Inheritance, Probability and Punnett Squares

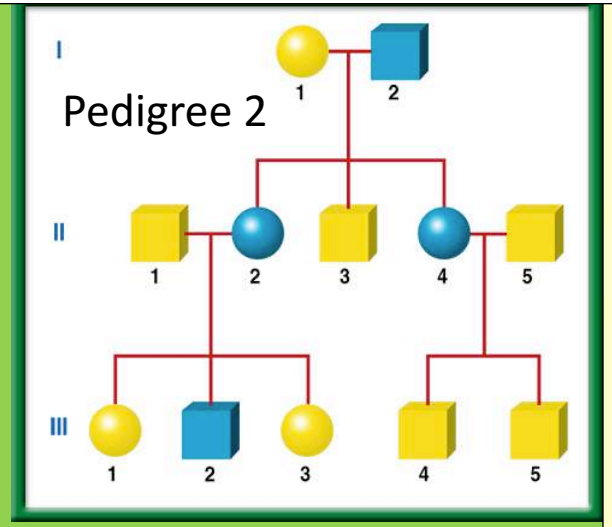
Week 11

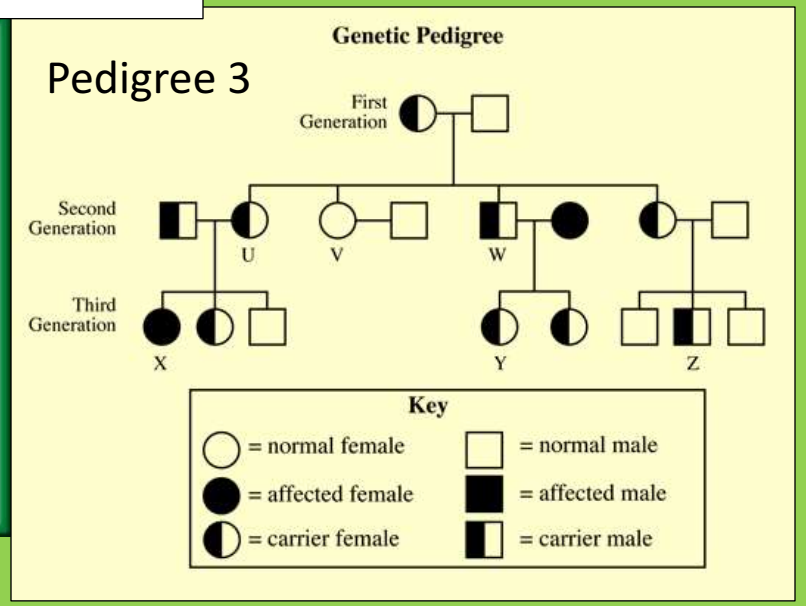
UNIT TEST Friday October 30th

10/26 Pedigrees 12.1

Obj. TSW determine the mode of inheritance of a trait by examining a pedigree in a group pedigree project. P.16 NB







1. Identify and explain the Mode of inheritance for each of these three pedigrees.
   - Dominant or Recessive
   - Autosomal or Sex - Linked

HW – 1 page Notes CH 12

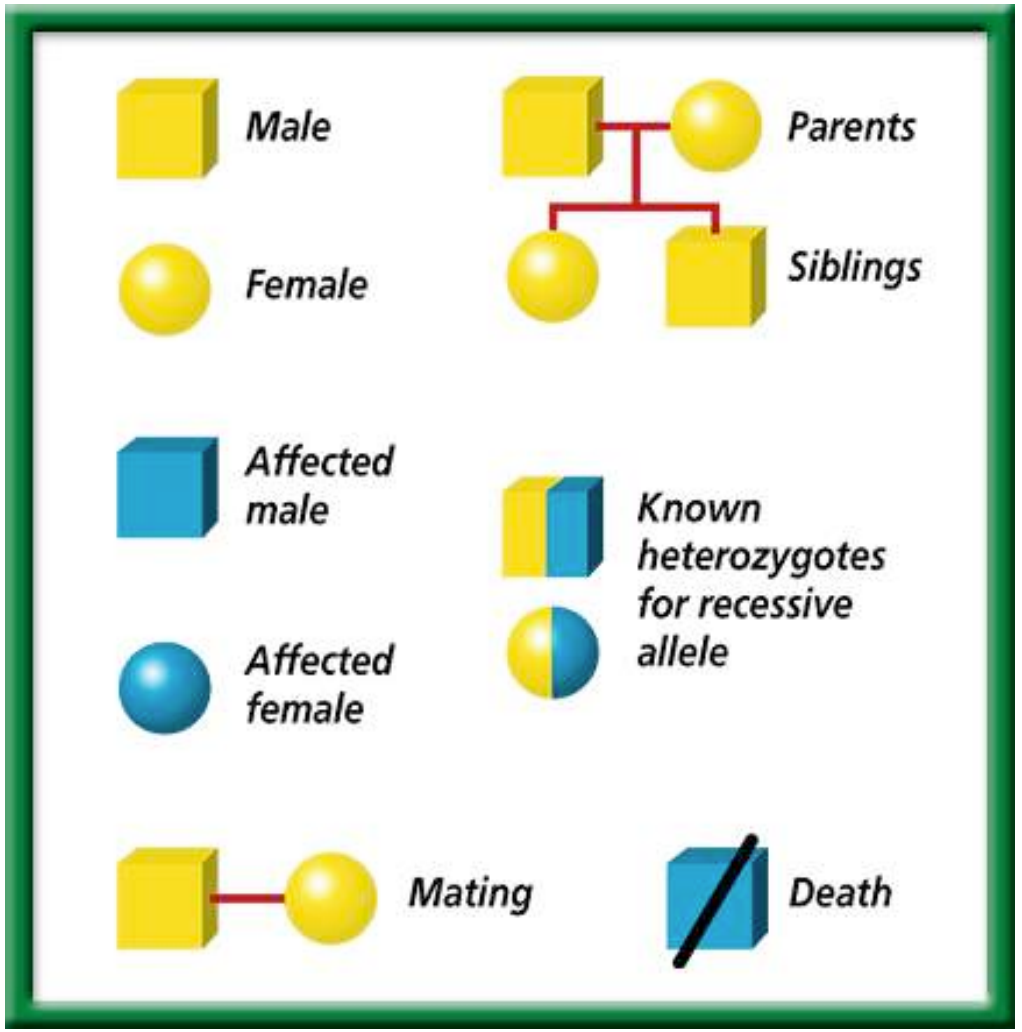
Page 21 NB

Activity: How to construct a Pedigree

- Make a make believe pedigree
- 3 generations
- Complete Dominance Trait – one of the traits on the Human Traits Checklist

Pedigree P. 309

Symbols Used by Geneticists



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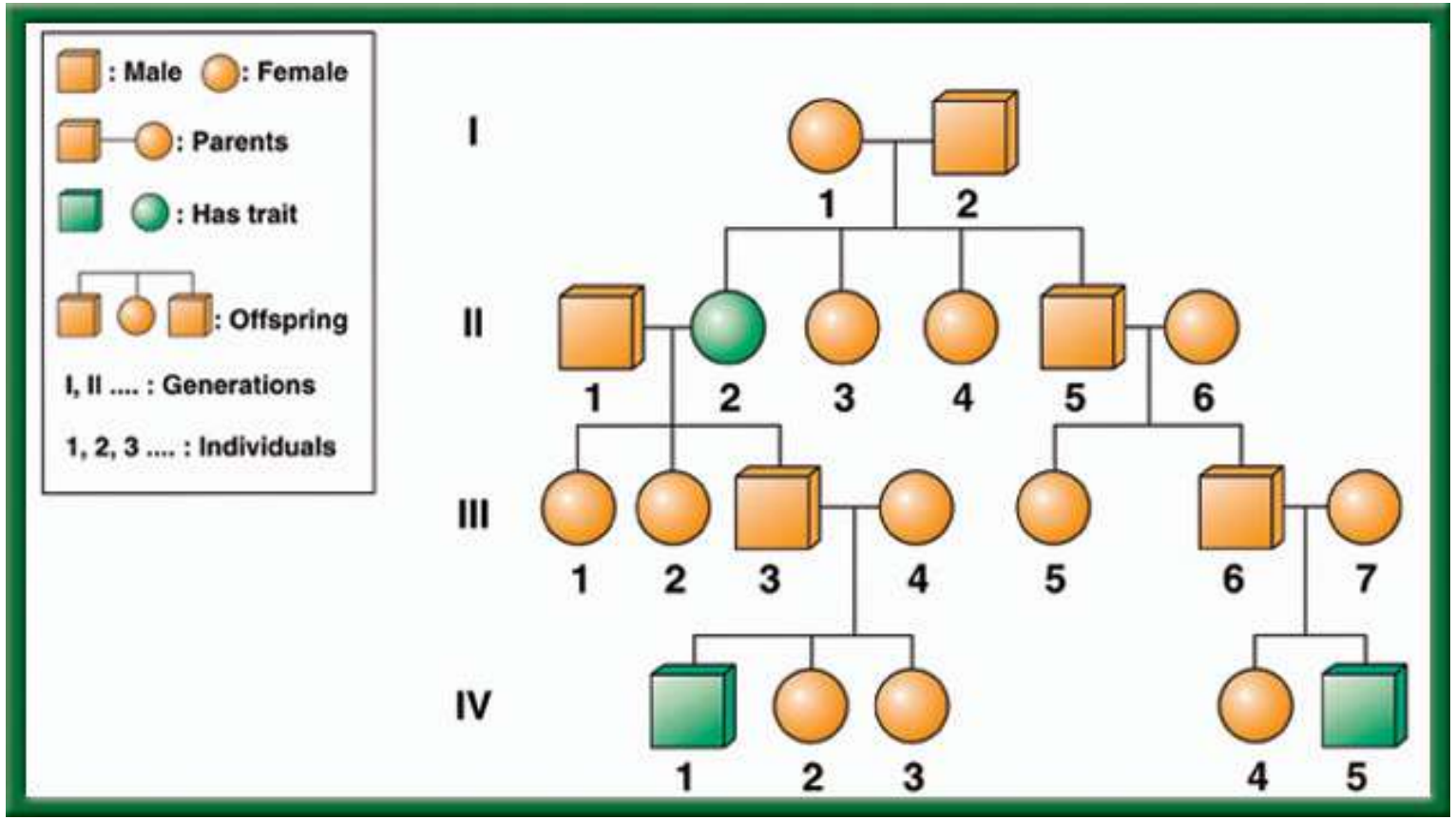
Transparencies



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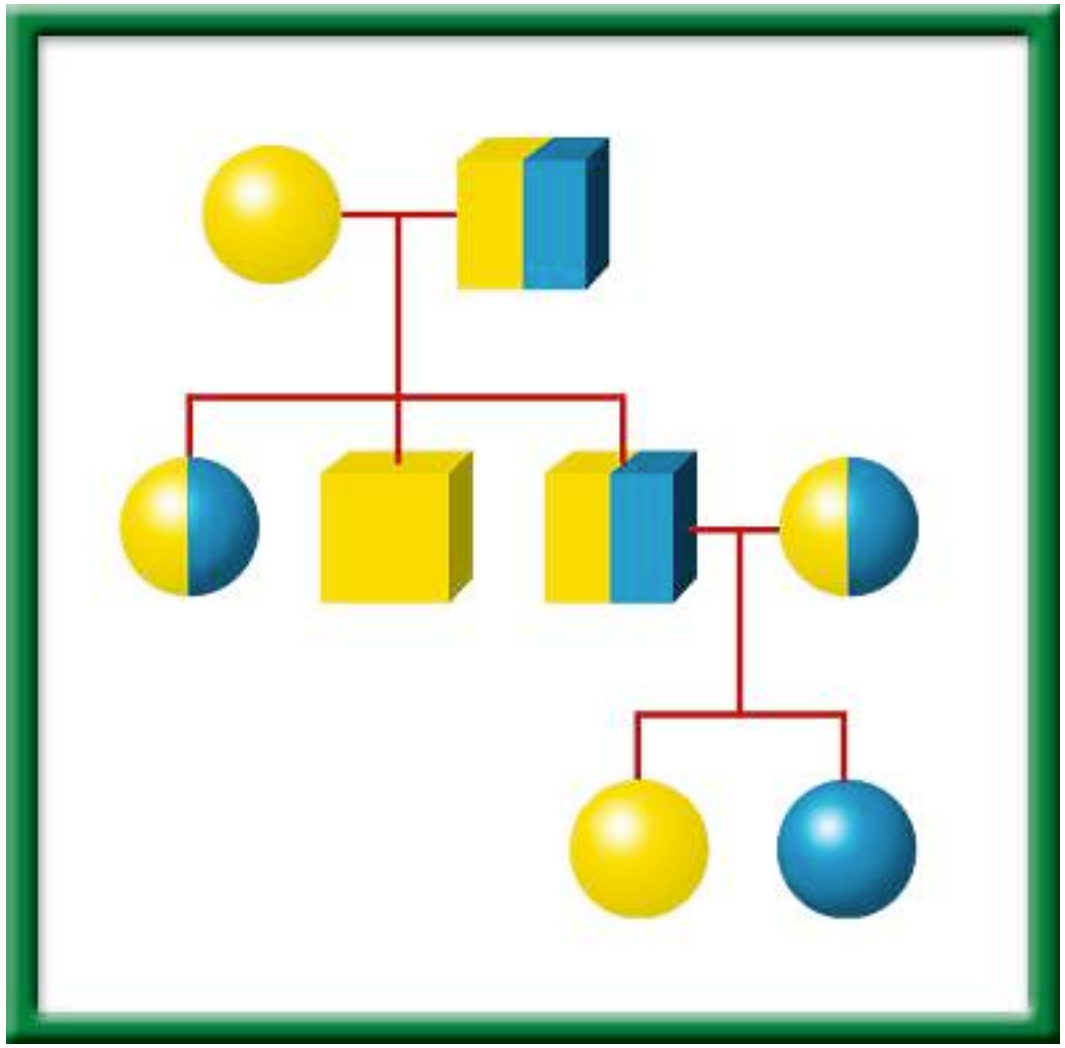
Simple Pedigree



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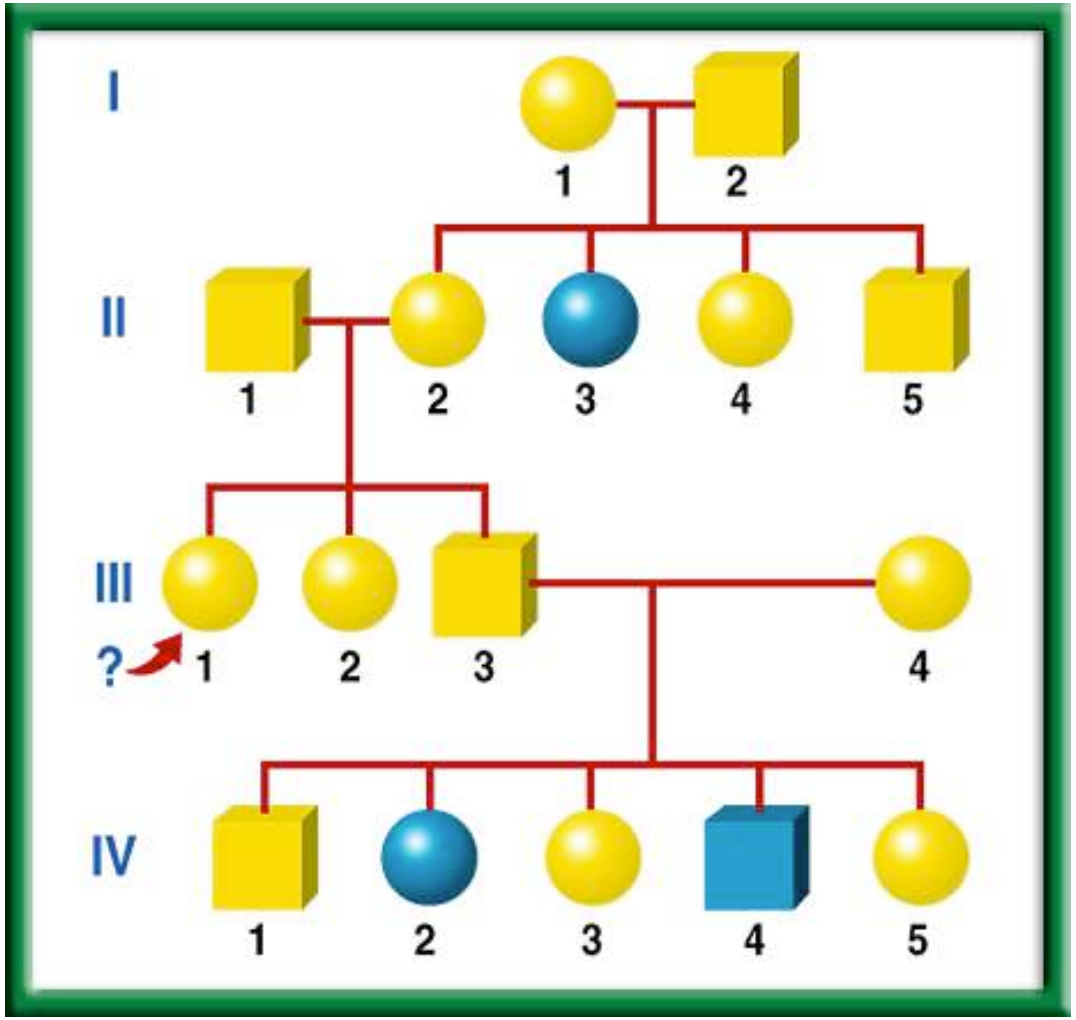
Fictional Pedigree



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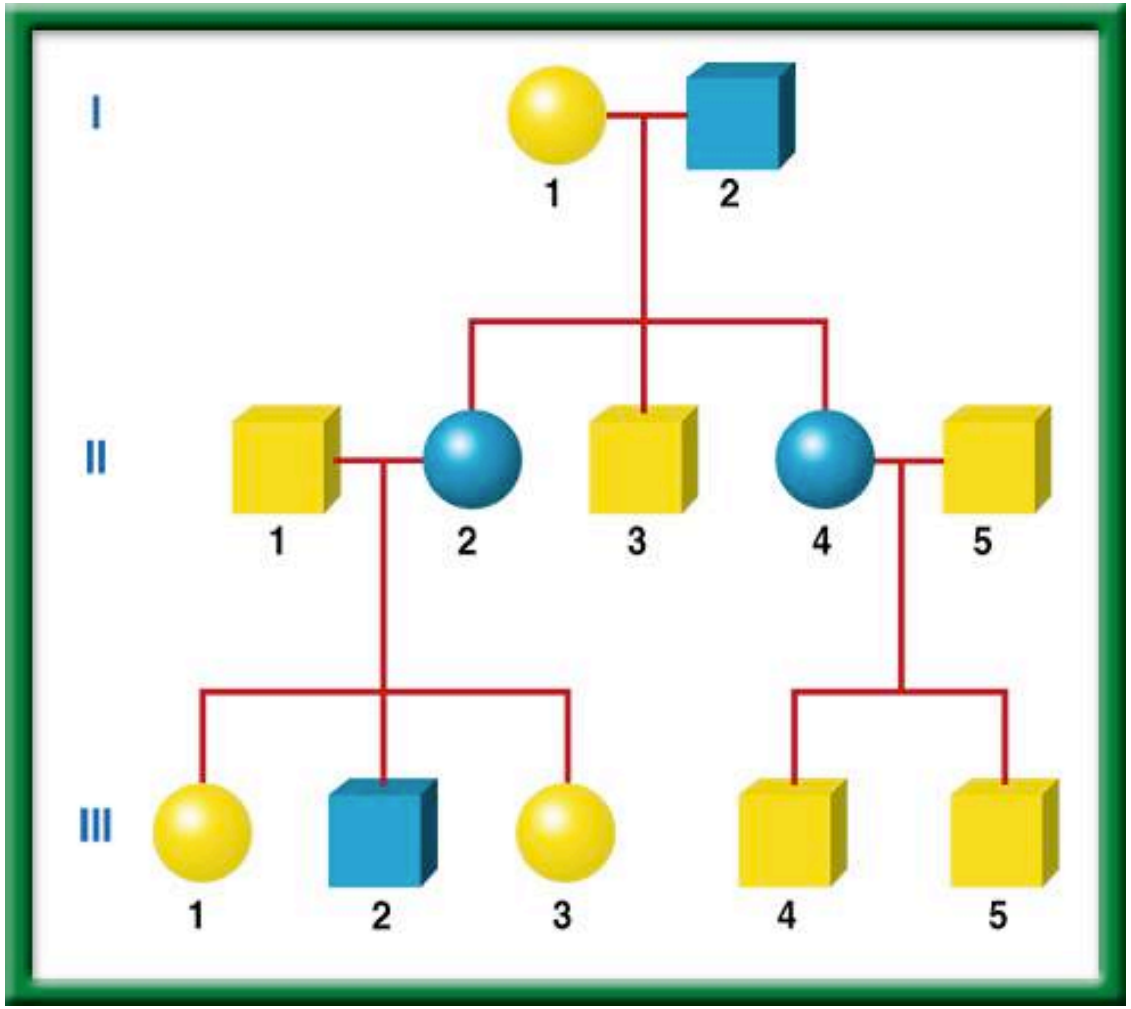
Pedigree-Huntington Disease



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Huntington's disease

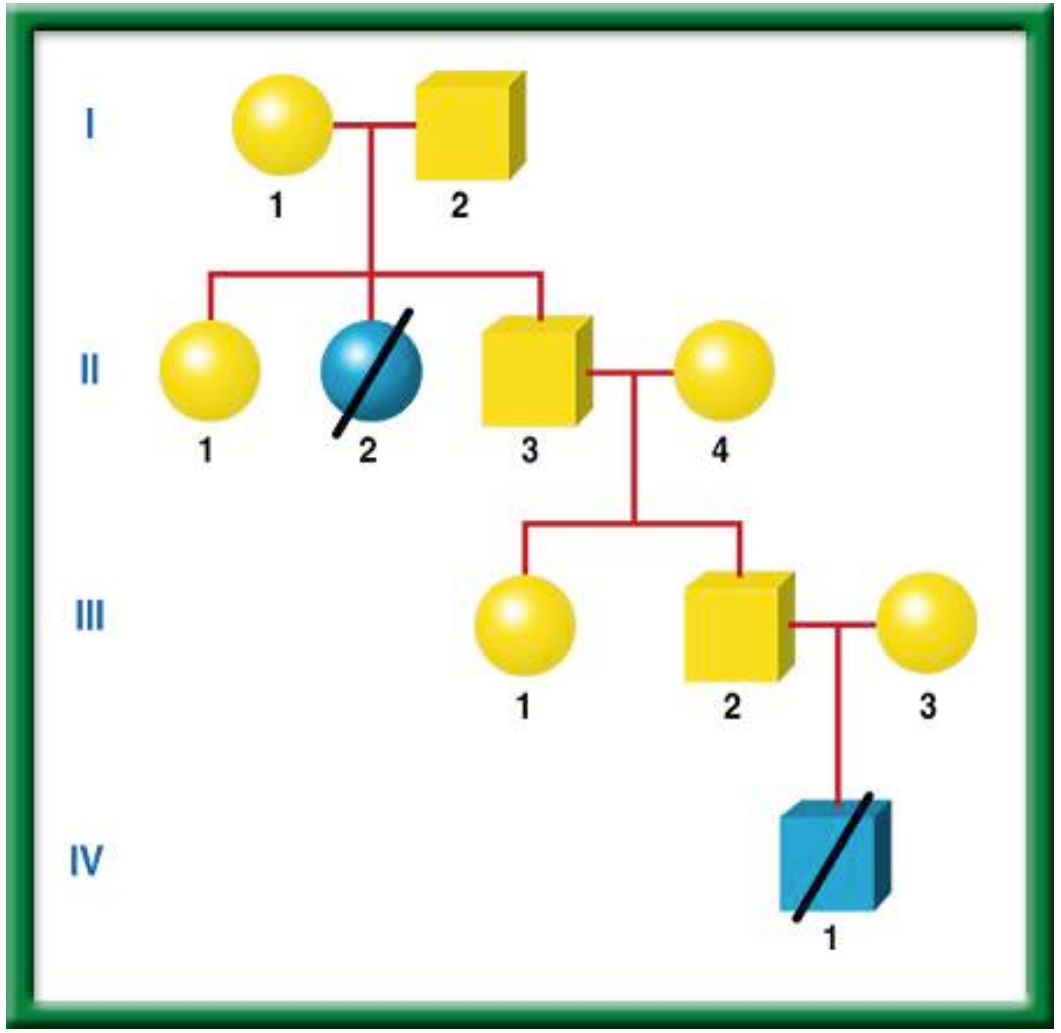
- Huntington's disease is a lethal genetic disorder caused by a rare dominant allele.

- It results in a breakdown of certain areas of the brain.

Huntington's disease

- Ordinarily, a dominant allele with such severe effects would result in death before the affected individual could have children and pass the allele on to the next generation.
- But because the onset of Huntington's disease usually occurs between the ages of 30 and 50, an individual may already have had children before knowing whether he or she is affected.

Pedigree-Tay Sachs Disease



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HW - Family Pedigree Project Due Tuesday November 5th. 25 Points

- Show 3 Generations
- One side of the family
- Include at least 12 individuals
- Show only 1 trait, must be a Complete Dominance Inheritance
- Show the key of what the traits are
- Show affected individuals with the trait (color)
- Label Autosomal or sex-linked
- Label Dominant or recessive
- Write Genotypes for each individual

Activity: Blood Typing Game p. 19 NB

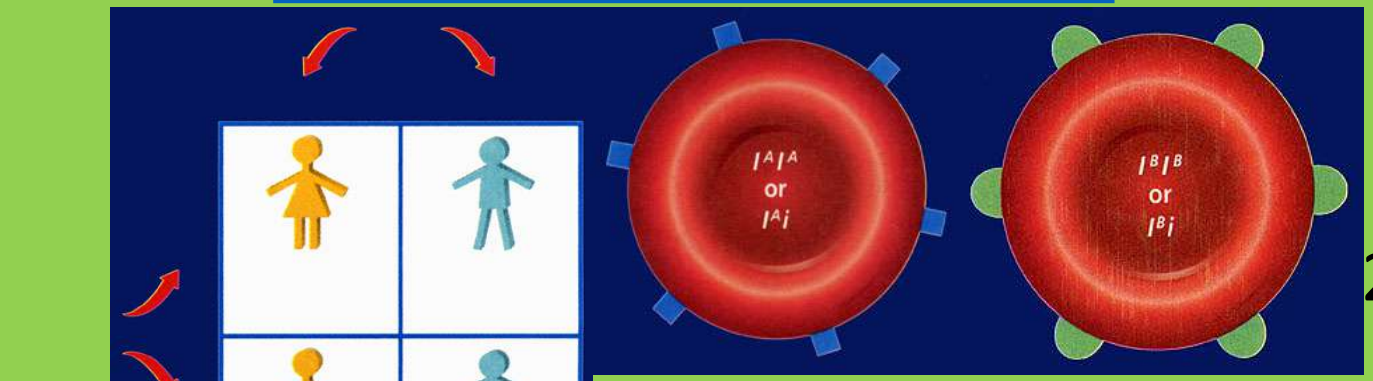
- http://www.nobelprize.org/educational/medicine/bloodtypinggame/gamev2/index.html

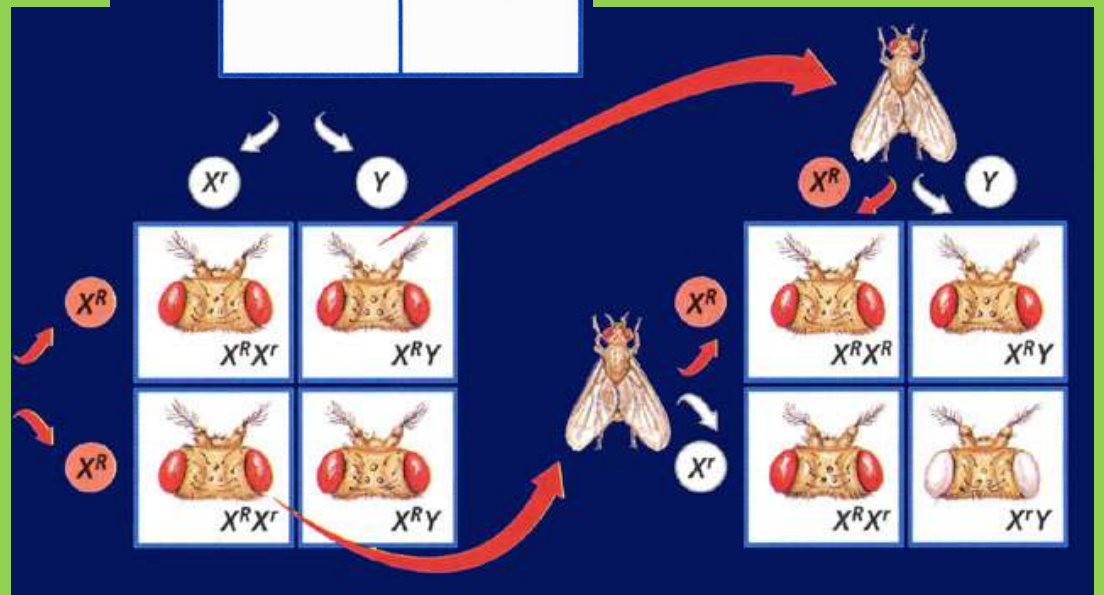
- Go through each of the three patients and correctly identify the blood they need for the transfusion to save their life before they die.
- Why is the correct blood necessary?
- What happens to a person who receives the wrong blood? Why?

10/27 Inheritance 12.2 & 12.3

Obj. TSW demonstrate understanding of Blood Types (multiple allelic), by performing punnett square crosses with probabilities. P.18 NB

http://learn.genetics.utah.edu/





1. How is the sex of an offspring determined? Show the Punnett Square. What % will be male, what % will be female?
2. In sex-linked inheritance, which chromosome will the trait be expressed? How is it different from an autosome?
3. Perform a multiple allelic cross Punnett Square of the blood types: $I^Ai \times I^Bi$.

HW – 1 page Notes CH 12 Page 21 NB

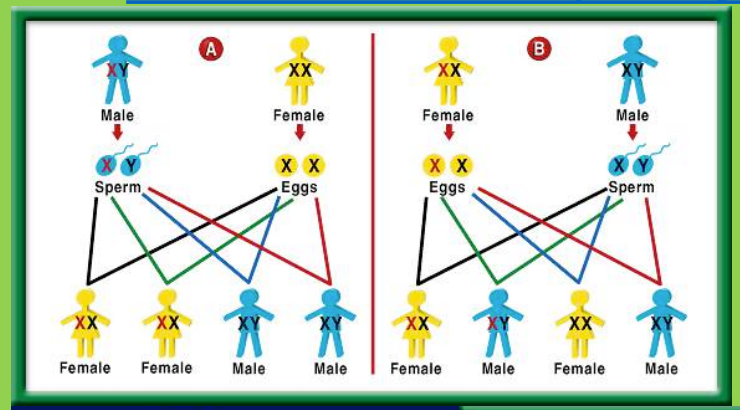
Activity: Classroom Family Pedigree

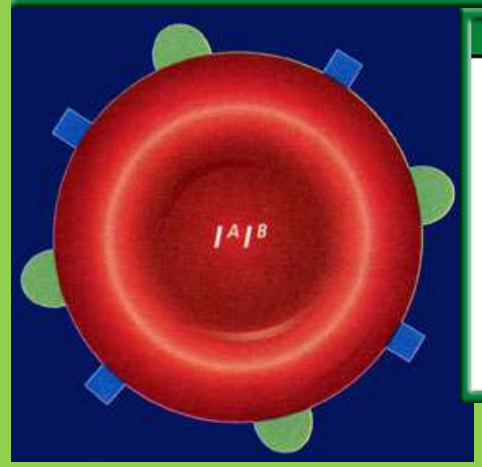
- Work by yourself, with a partner or two other people.
- Come up and get a Family Scenario of an Inherited Trait
- Draw a Rough Family Pedigree on Binder paper, with affected people shaded, carriers half shaded, and unaffected not shaded. Include all names.
- Include a Key showing all the possible combinations of the trait for each sex.
- What is the Disease/ Trait? Give a definition.
- Is the Disease/ Trait Dominant or Recessive?
- Is the trait Autosomal or Sex – Linked?
- Show all Genotypes

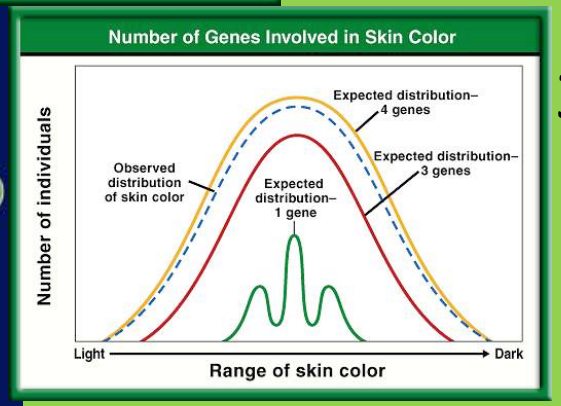
10/28 Complex & Polygenic Inheritance 12.3

Obj. TSW predict possible combinations of alleles in a zygote from the genetic makeup of the parents during classroom activities. P.20 NB

http://www.cde.ca.gov/ta/tg/sr/documents/cstrtqbiology.pdf



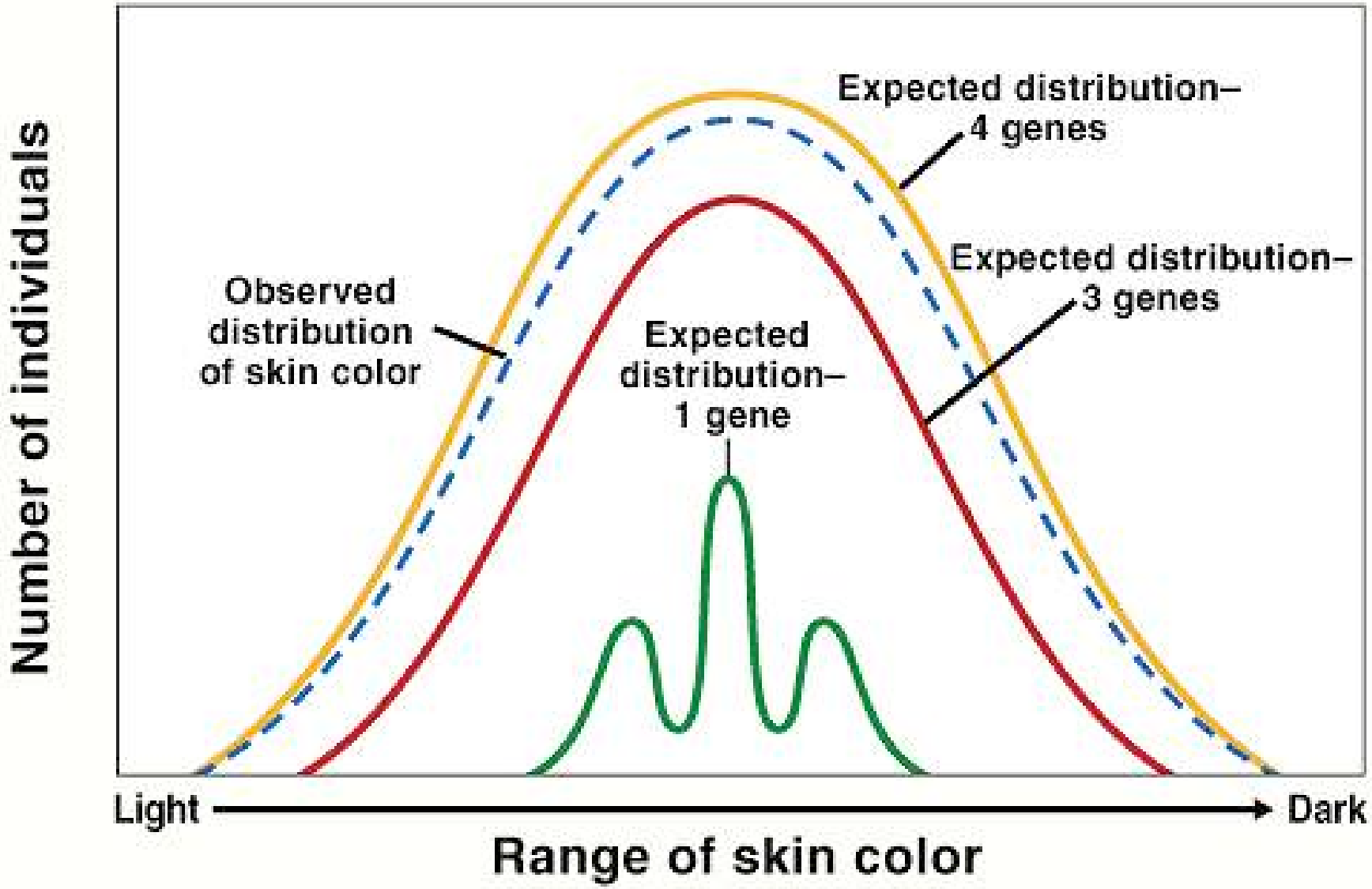




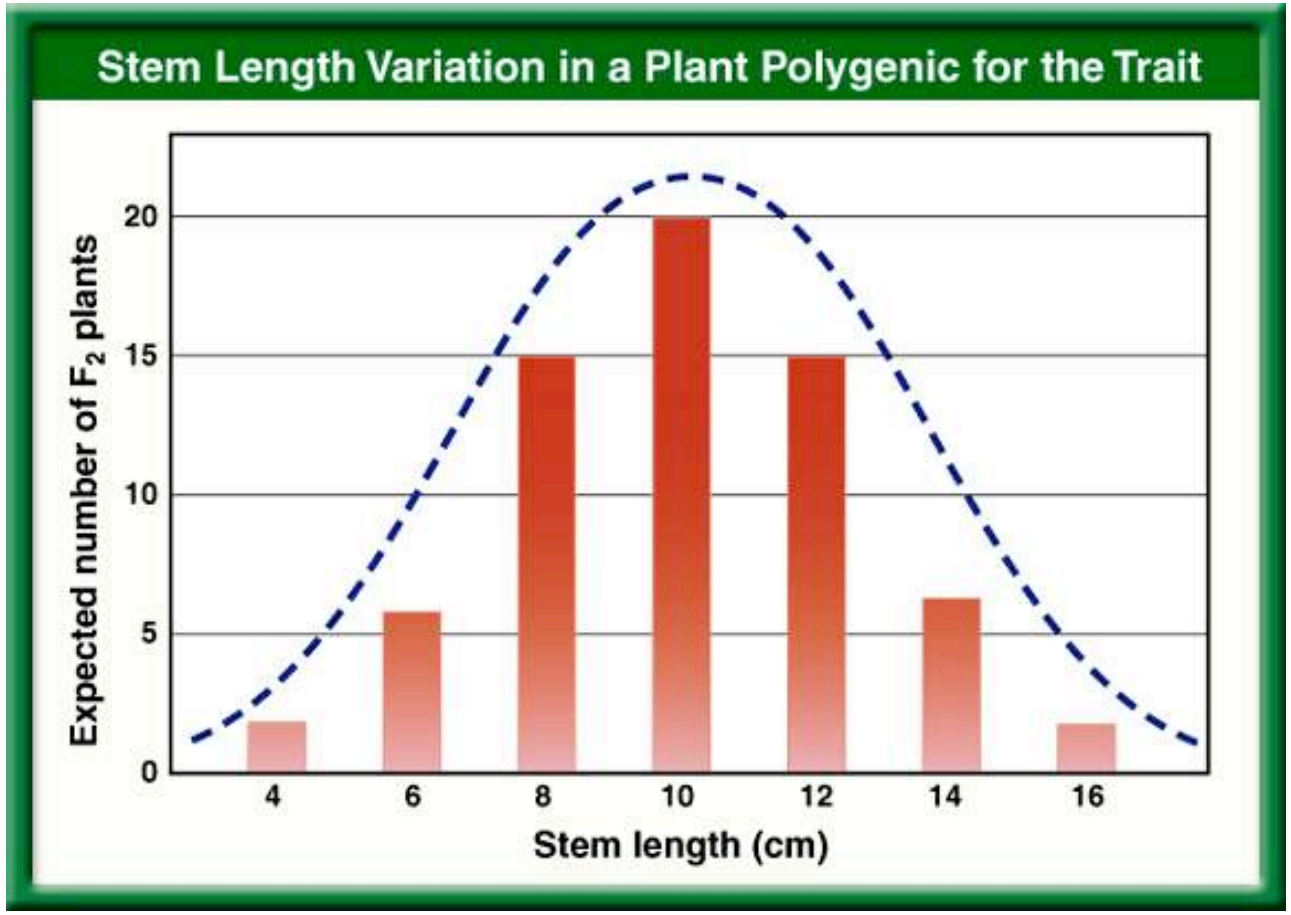
1. Determine the possible blood types of the children of parents that both have type AB.
2. Explain why a male with a recessive X – linked trait usually produces no female offspring with the trait.
3. Explain polygenic inheritance. Give an example. Draw the graph.

HW – 1 page Notes CH 12 Page 21 NB

Number of Genes Involved in Skin Color



Stem Length Variation in Plants



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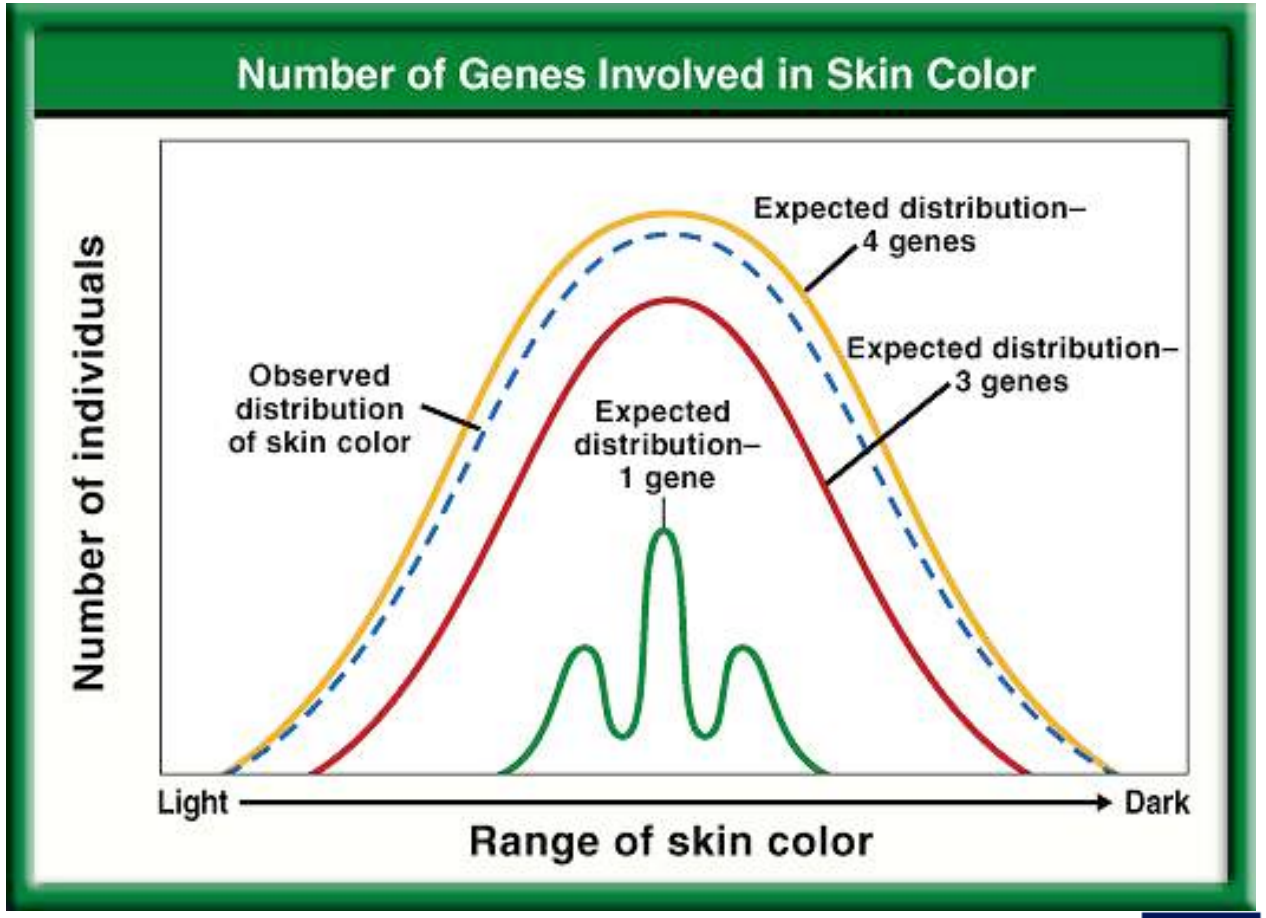
RESOURCES

Number of Genes Involved in Skin Color



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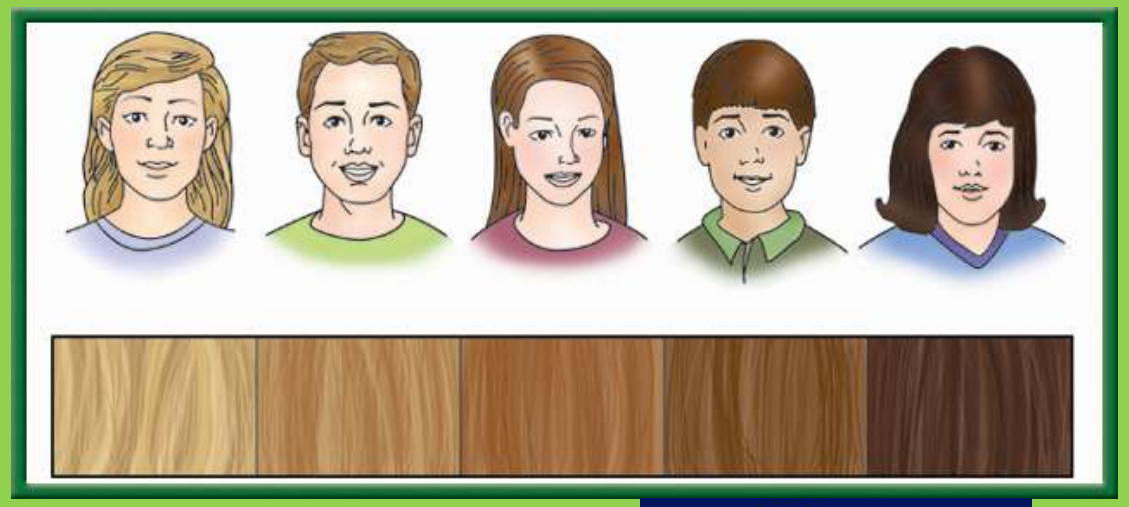
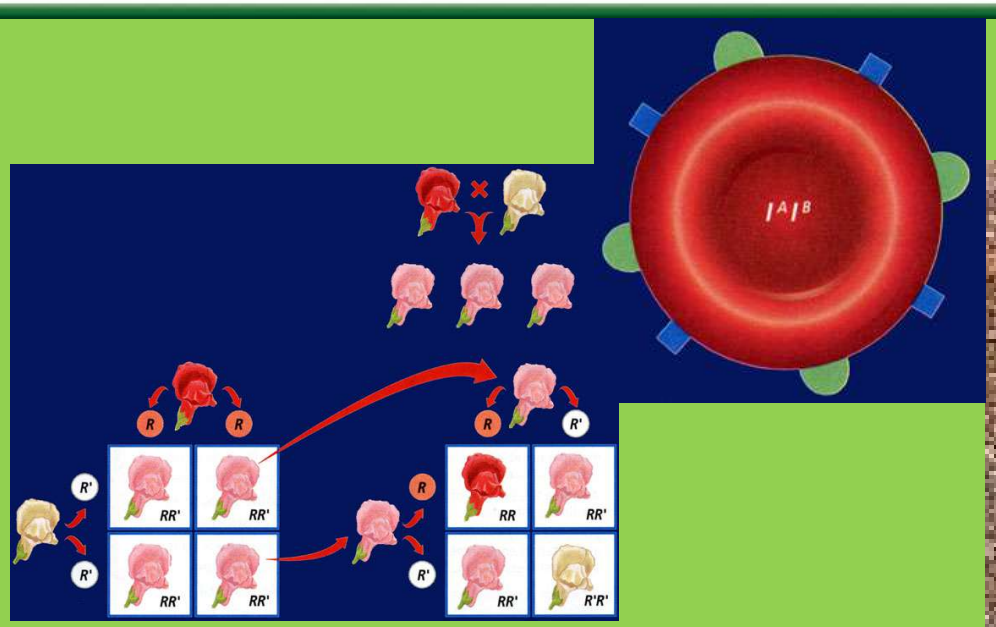
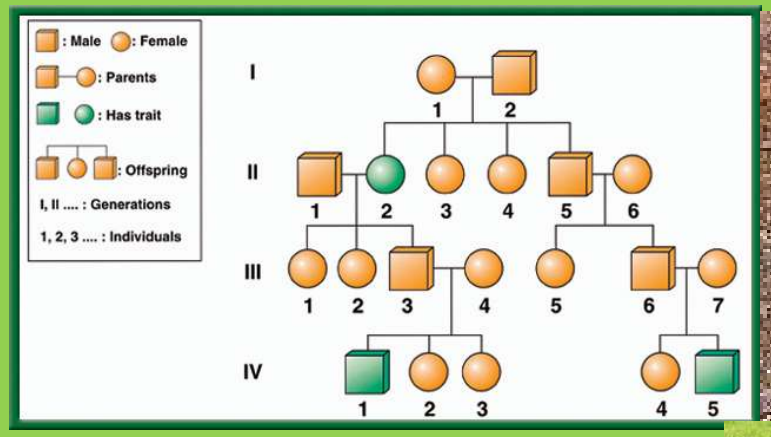
10/29 Incomplete Dominance & Codominance 12.2
Obj. TSW demonstrate understanding of Pedigrees by finishing the study guide. P.22 NB



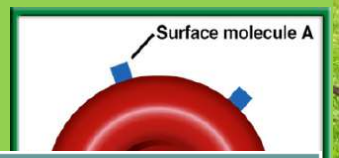
1. Draw a Punnett square and explain how incomplete dominance is inherited in Snap Dragon flowers.
2. Draw a Punnett square and explain how Codominance is inherited in Checkered chickens.
3. What color would the chicken be if feather color were inherited by incomplete dominance?

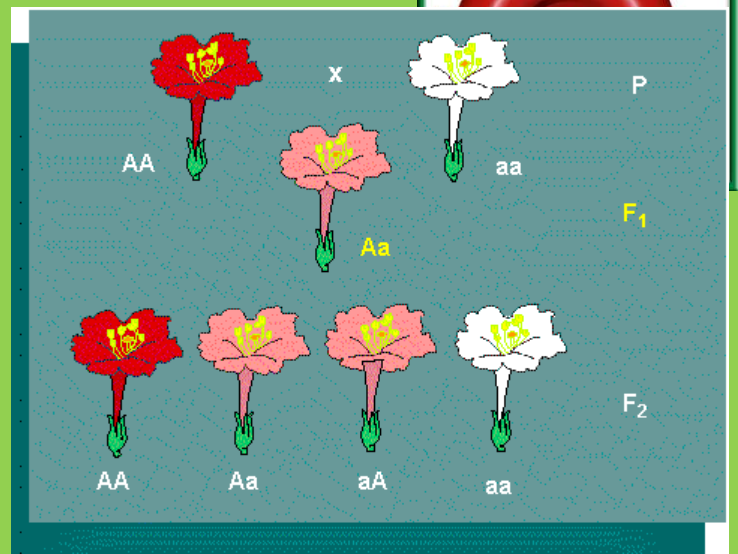


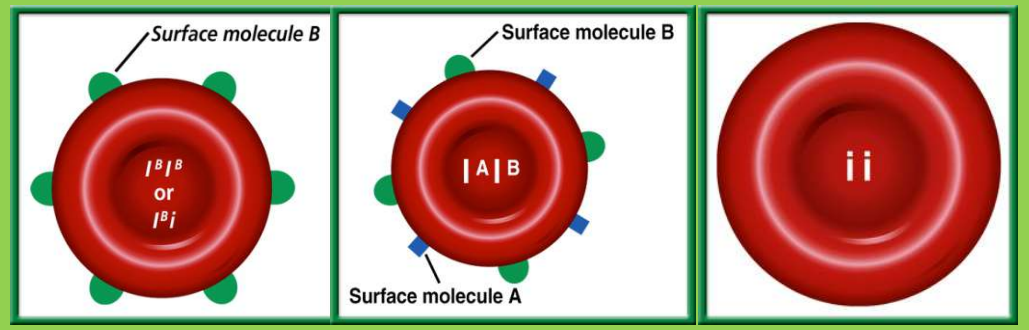
10/30 Patterns of Heredity & Human Genetics 12.1 – 12.3
Obj. TSW discover how multiple alleles are inherited by doing their warm up and competing a Foldable. P. 24 NB



1. Write all the symbols used for a pedigree. Draw a pedigree of just your mom & dad and any siblings. (Youngest to the left)
2. Compare & contrast Incomplete Dominance and Codominance.
3. Write the 6 genotypes for the 4 phenotypes for blood. Make a Punnett square with two crosses.







TABOO

- Dominant
- Allele
- Heterozygous
- Phenotype
- Karoytype
- Pure – Breeding

TABOO

- Recessive
- Genotype
- Homozygous
- Zygote
- Chromosome
- Hybrid

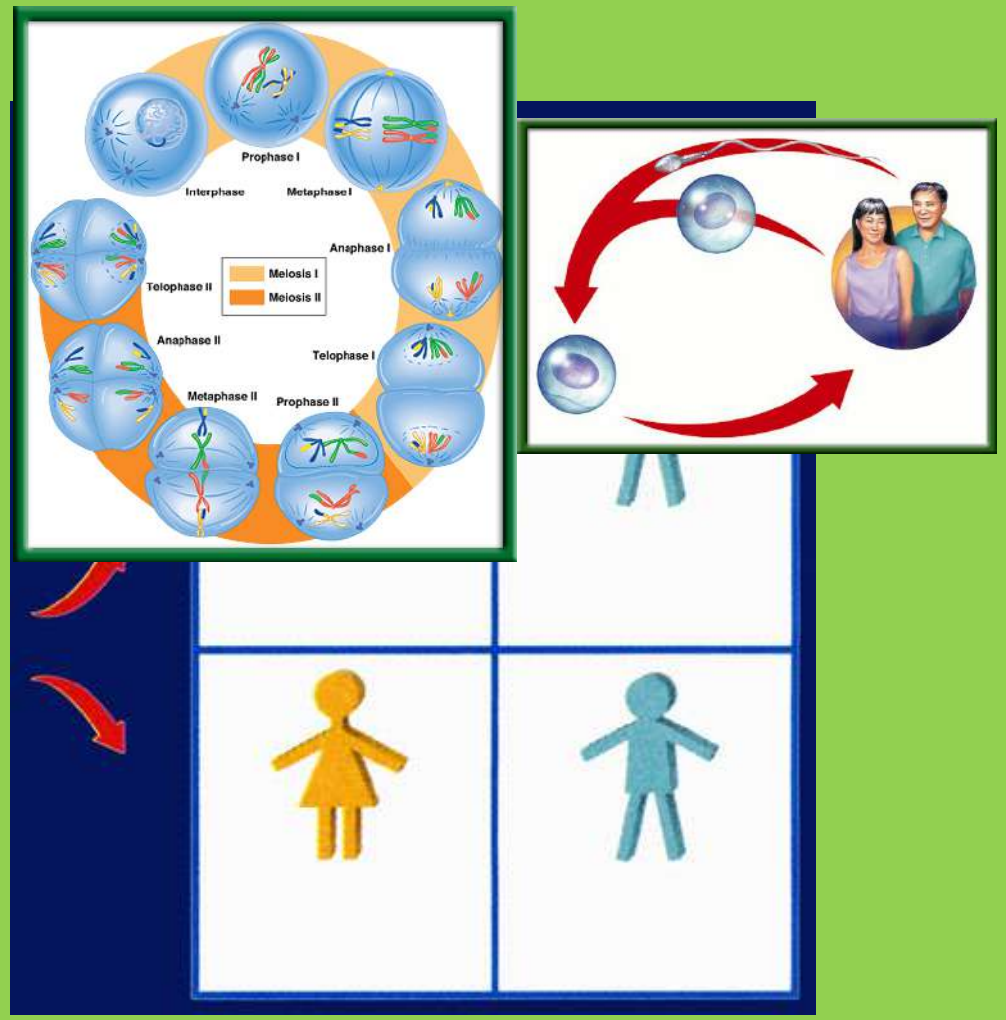
TABOO

- Probability
- Haploid
- Offspring
- Ratio
- DNA
- Meiosis

TABOO

- Diploid
- Punnett Square
- Mitosis
- Protein
- Gametes
- Homologous Chromosomes

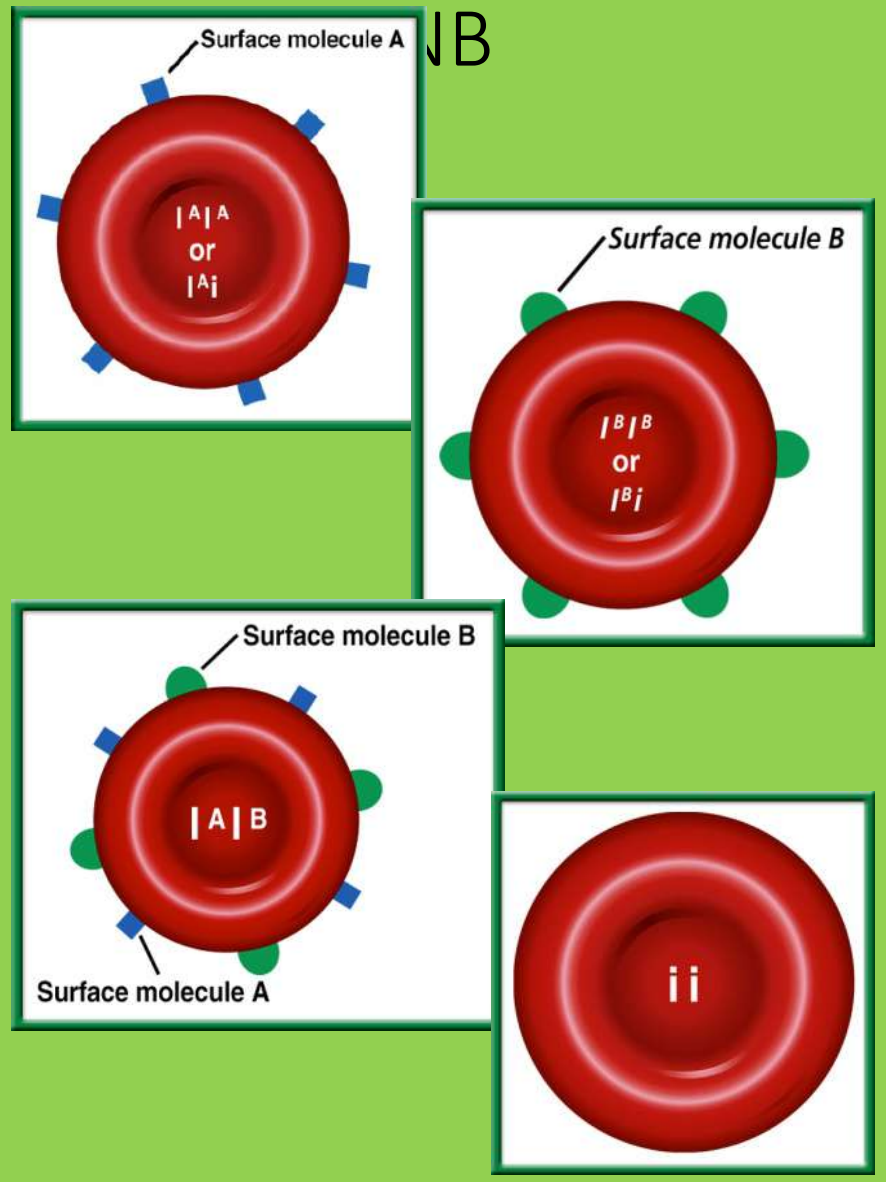
3/21 Genetic Inheritance 10.1 & 10.2
Obj. TSW demonstrate understanding of genetic inheritance by doing well on the mendelian genetics quiz. P. 84NB



1. Draw the process of Meiosis (P.267BB) and explain it's purpose.
2. Explain and draw fertilization using an egg (n) & sperm (n).
3. Using a Punnett Square, show how sex determination is 50%.

3/24 Modes of Inheritance: Multiple Allelic CH 12

Obj. TSW learn how different traits are inherited in the



1. What are the 6 genotypes for blood?
2. What are the 4 phenotypes for blood?
3. Do a punnett square cross between two heterozygotes for A Blood and B blood.

Blood Typing Game

Multiple Alleles Govern Blood Type Answers #1 & 2

Human Blood Types

Genotypes	Surface Molecules	Phenotypes
$I^A I^A$ or $I^A i$	A	A
$I^B I^B$ or $I^B i$	B	B
$I^A I^B$	A and B	AB
ii	None	O

Question #3.

	I^A	i
I^B	I^AI^B	I^Bi
i	I^Ai	ii

Genotypes:

Phenotypes:

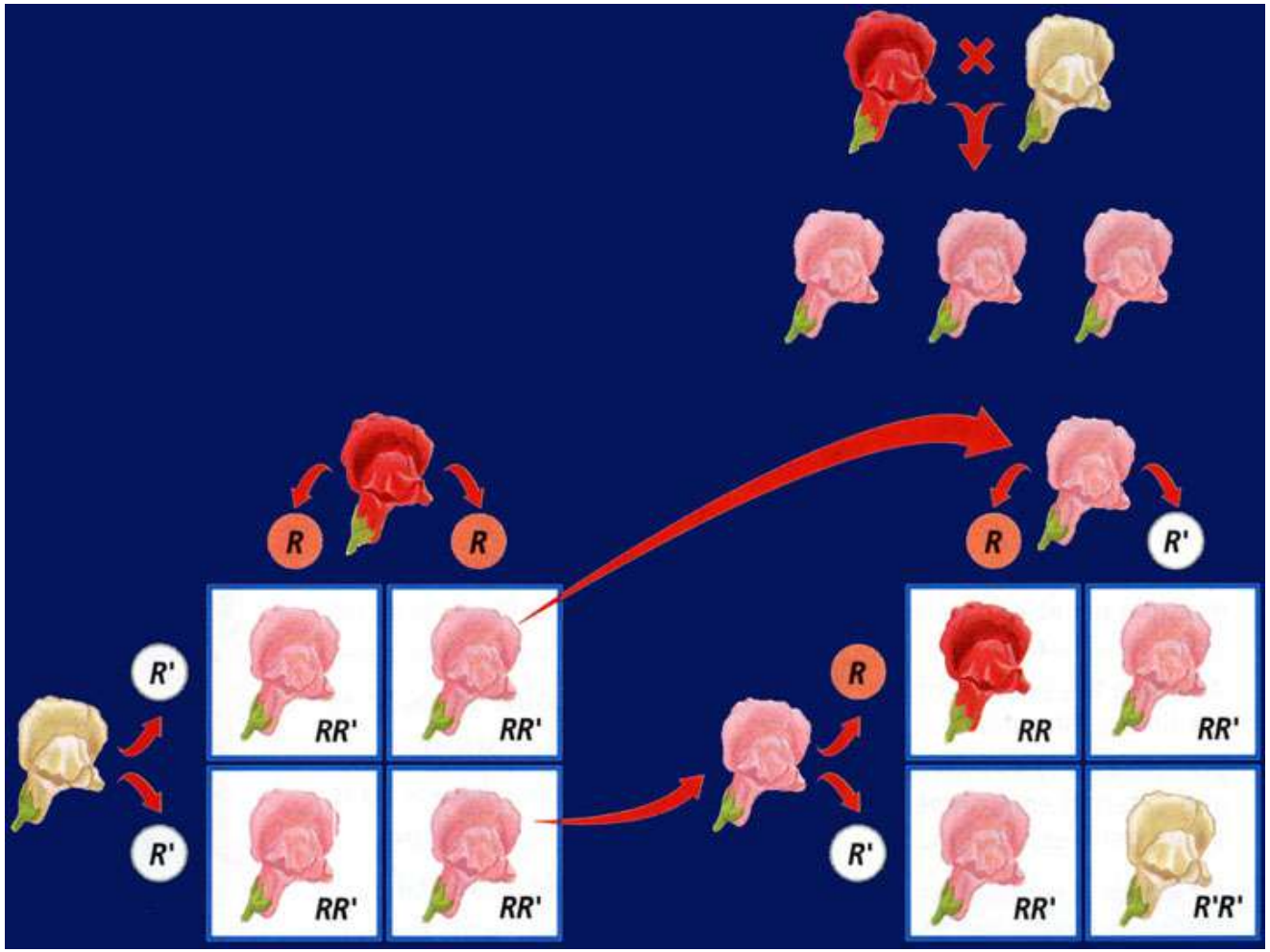
Probability of
A Blood?
B Blood?
AB Blood?
O Blood?

Incomplete dominance: Appearance of a third phenotype p. 77NB

- When inheritance follows a pattern of dominance, heterozygous and homozygous dominant individuals both have the same phenotype.
- When traits are inherited in an incomplete dominance pattern, however, the phenotype of heterozygous individuals is intermediate between those of the two homozygotes.

Incomplete dominance: Appearance of a third phenotype

- For example, if a homozygous red-flowered snapdragon plant *(RR)* is crossed with a homozygous white-flowered snapdragon plant (R′ R′), all of the F_1 offspring will have pink flowers.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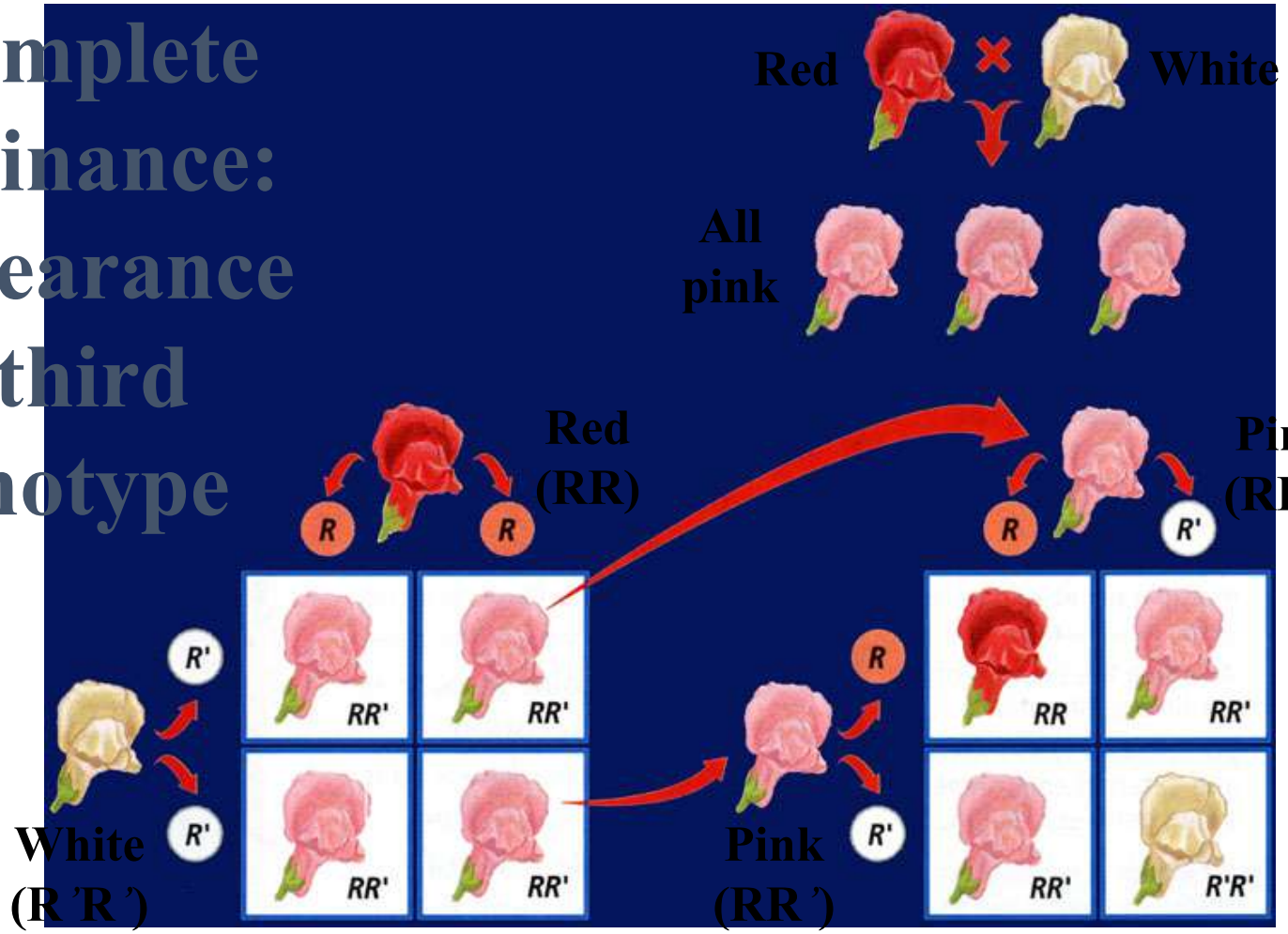
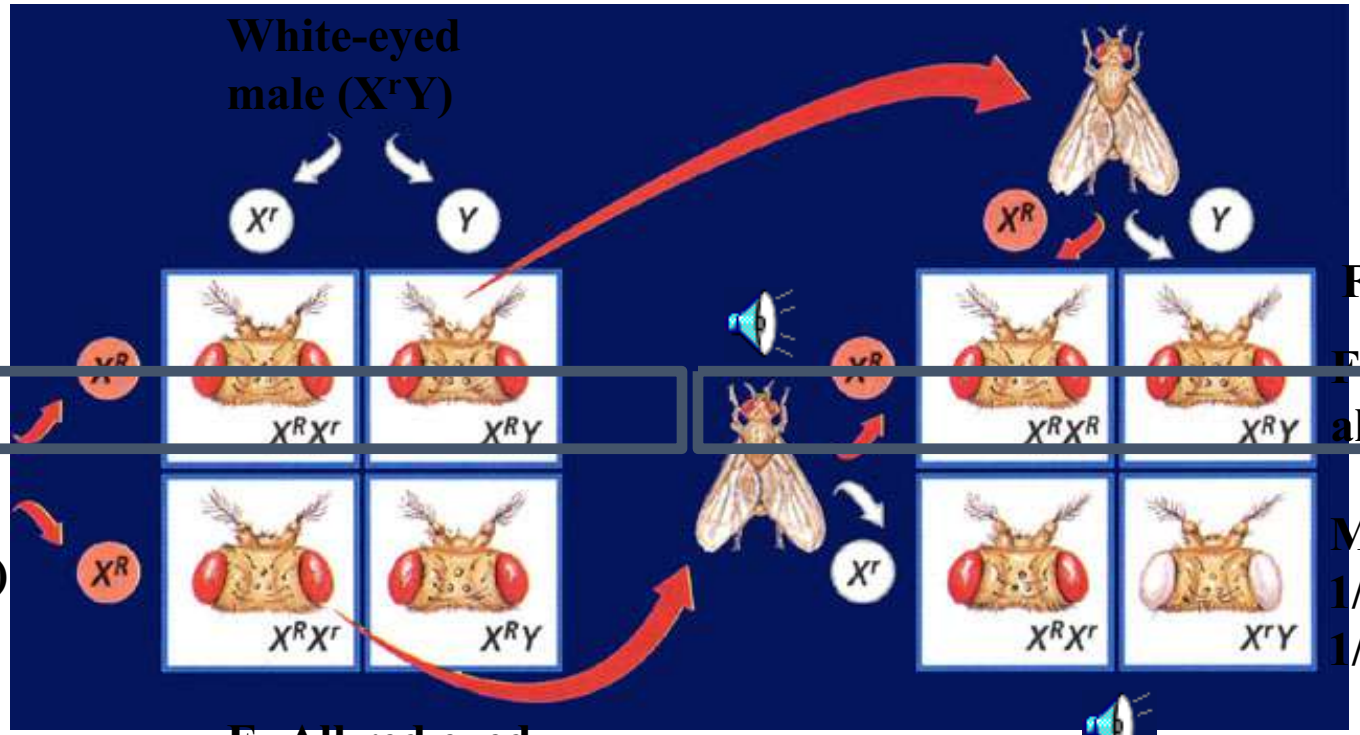
Incomplete dominance: Appearance of a third phenotype



Sex-linked inheritance



Red-eyed female (X^RX^R)

F_1 All red eyed

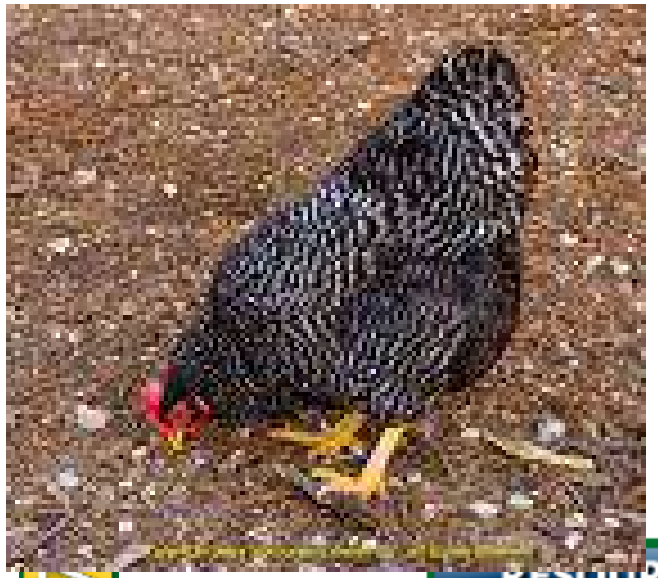
F_2

Females: all red eyed

Males: 1/2 red eyed 1/2 white eyed

Codominance: Expression of both alleles

- Codominant alleles cause the phenotypes of both homozygotes to be produced in heterozygous individuals. In codominance, both alleles are expressed equally.



Karyotyping Chromosomes P. 81NB P.329 BB

1. How many chromosomes are present in Spread #1? 46
   Spread#2 46 Spread #3 46 Set A 47 Set B 47
2. Sperm 23 Chromosomes/egg 23 chromosomes

3 &4 Spread #1 Girl (XX) Spread #2 Boy(XY) Spread #3 Girl (XX) Spread A Boy (XY) Spread B Boy (XXY)

5 & 6. Yes, Spread A is Trisomy 21, Spread B is XXY Chr 23.

7. Possible Problems for Trisomy 21- Down's Syndrome, XXY is Kleinfelter's Syndrome

8. In today's medicine Karyotyping is used to determine the sex of the child and to see is there are abnormalities in the chromosomes.

Mitosis vs Meiosis

Somatic Cell (Body Cell)

- 2N (Diploid)
- 46 Chromosomes
- 1 Division
- Produces 2 identical cells, same as the parent cell

- **Gametes (Sex Cell)**
- 2N -> 1N (Haploid)
- 23 Chromosomes
- 2 Divisions
- Produces 4 Haploid cells, all different from each other and the parent cells. (Crossing Over)
- Increases Genetic Variation

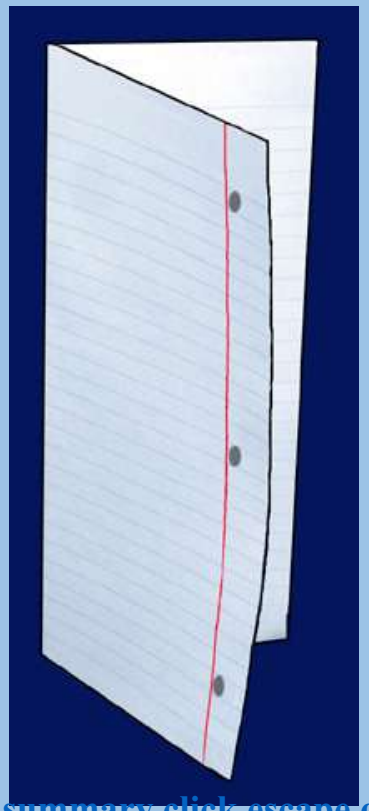
Chapter 12

Foldables Study Organizers

STEP 1

Fold a vertical sheet of notebook paper from side to side.

FOLDABLES™ Study Organizer



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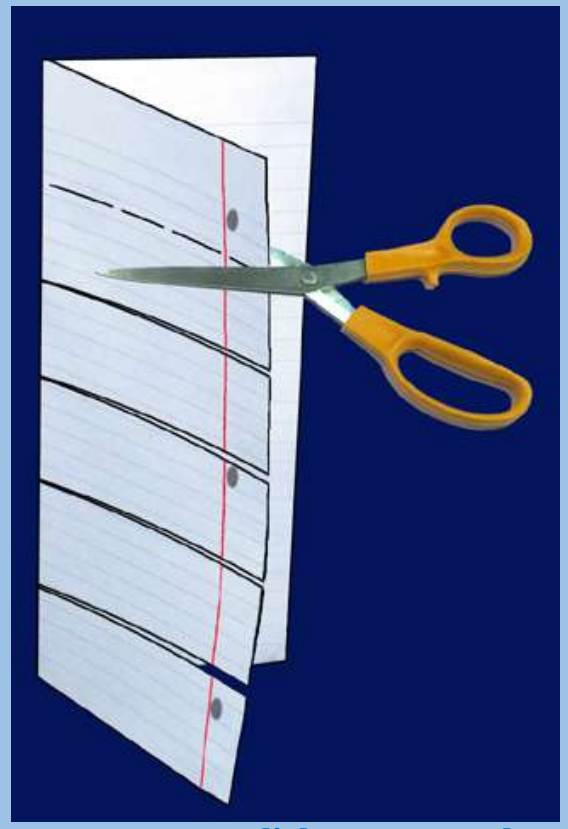
STEP 2

Cut along every fifth line of only the top layer to form tabs.



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Chapter 12

Foldables Study Organizers

STEP 3

Label each tab.

Explain how the traits are inherited by giving an example of a punnett square for each. Make sure you write the key for the genotypes.

P. 83 NB

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http://learn.genetics.utah.edu/
http://www.cde.ca.gov/ta/tg/sr/documents/cstrtqbiology.pdf
Karyotyping Activity
http://www.biology.arizona.edu/human_bio/activities/karyotyping/karyotyping.html

1. Heredity & Traits
    1. Make a Karyotype
    2. Using Karyotypes to predict genetic disorders

2. Genetic Disorders Library
    1. Cystic Fibrosis
    2. Down's Syndrome
    3. Huntington's disease
    4. Sickle Cell Anemia
    5. PKU
    6. Duchenne's Muscular Dystrophy
    7. Osteogenesis Imperfecta
    8. Leukemia
    9. Achondroplasia

CDE Website –2008 Biology Released Test Questions

Multiple Alleles Govern Blood Type

Human Blood Types

Genotypes	Surface Molecules	Phenotypes
$I^A I^A$ or $I^A i$	A	A
$I^B I^B$ or $I^B i$	B	B
$I^A I^B$	A and B	AB
ii	None	O

Multiple phenotypes from multiple alleles

- Although each trait has only two alleles in the patterns of heredity you have studied thus far, it is common for more than two alleles to control a trait in a population.
- Traits controlled by more than two alleles have multiple alleles. 

The importance of blood typing

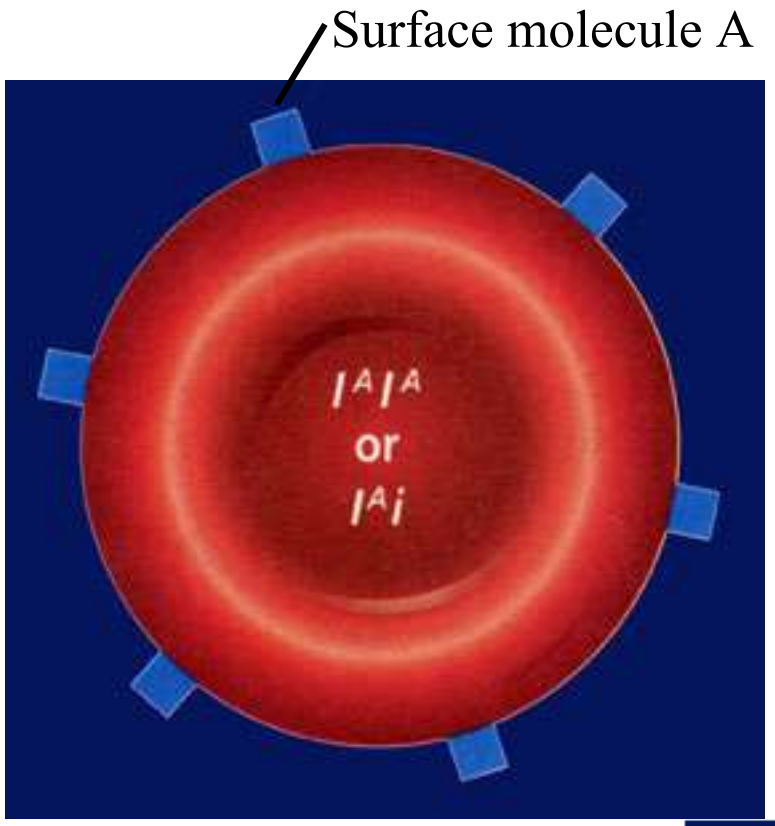
- Determining blood type is necessary before a person can receive a blood transfusion because the red blood cells of incompatible blood types could clump together, causing death.

The ABO Blood Group

- The gene for blood type, gene *I*, codes for a molecule that attaches to a **membrane protein** found on the surface of red blood cells.
- The I^A and I^B alleles each code for a different molecule.
- Your immune system recognizes the red blood cells as belonging to you. If cells with a different surface molecule enter your body, your immune system will attack them.

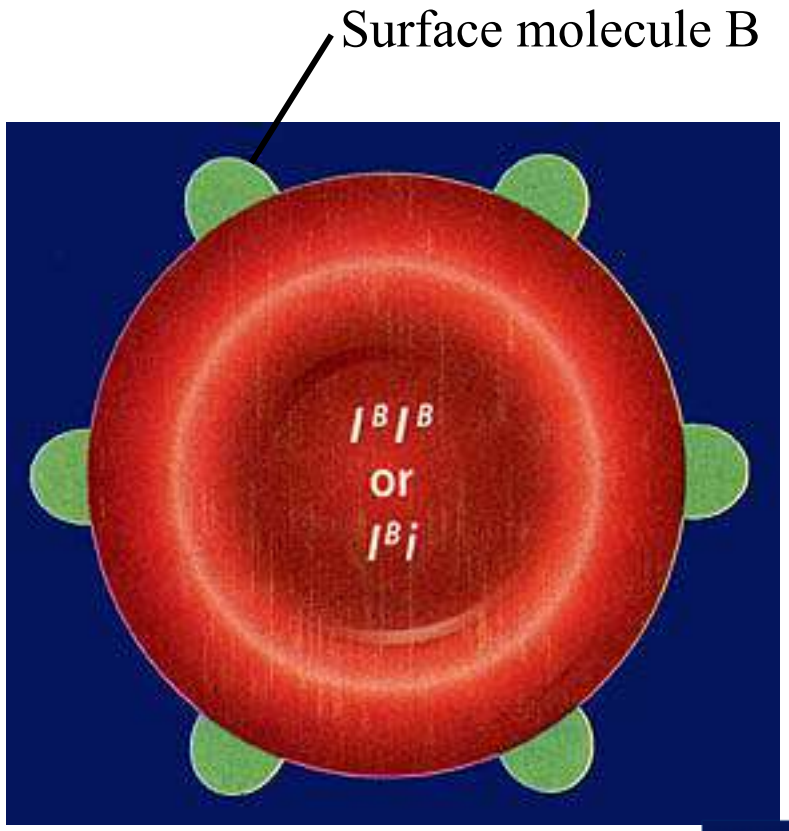
Phenotype A

- The I^A allele is dominant to *i*, so inheriting either the $I^A i$ alleles or the $I^A I^A$ alleles from both parents will give you type A blood.
- Surface molecule *A* is produced.



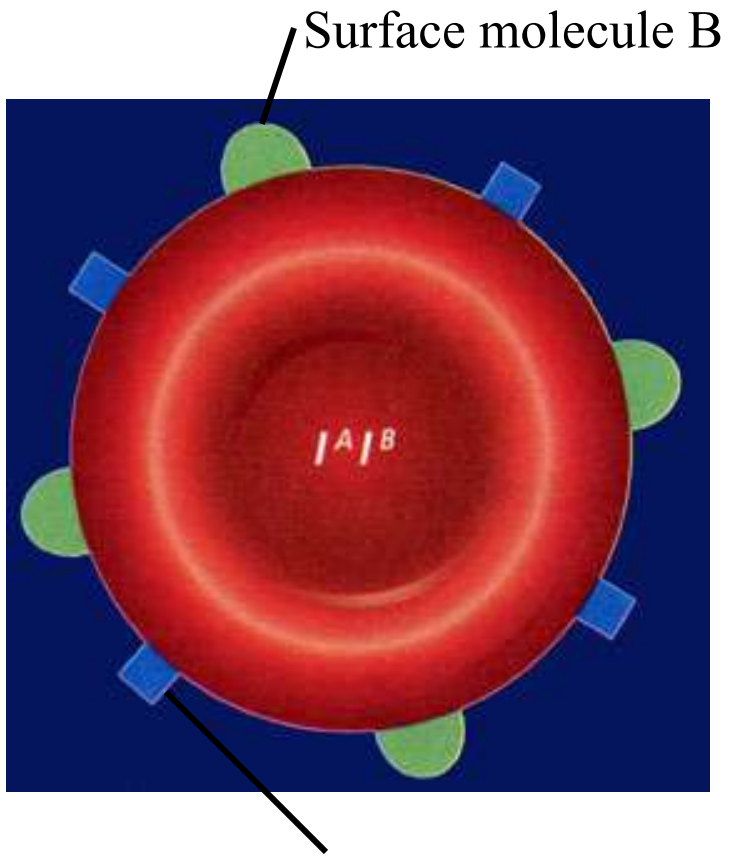
Phenotype B

- The I^B allele is also dominant to *i*.
- To have type B blood, you must inherit the I^B allele from one parent and either another I^B allele or the *i* allele from the other.
- Surface molecule B is produced.

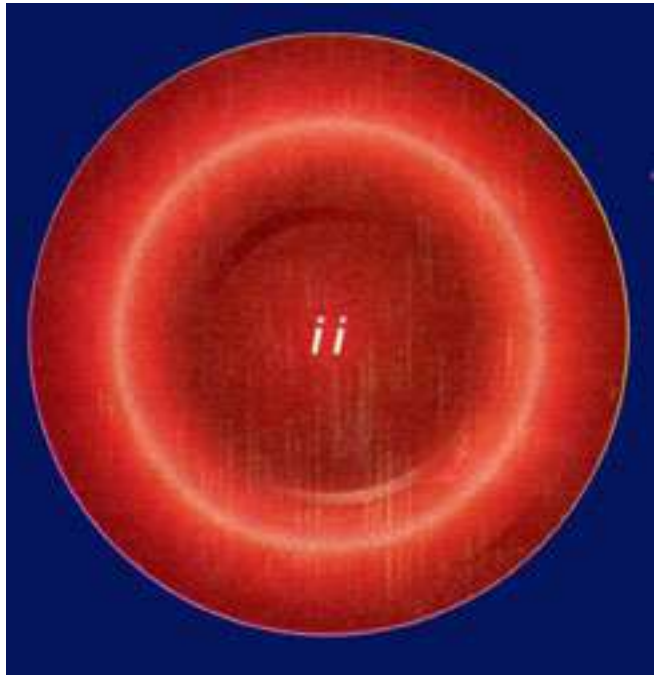


Phenotype AB

- The I^A and I^B alleles are codominant.
- This means that if you inherit the I^A allele from one parent and the I^B allele from the other, your red blood cells will produce both surface molecules and you will have type AB blood.



Phenotype O



- The *i* allele is recessive and produces no surface molecules.
- Therefore, if you are homozygous *ii*, your blood cells have no surface molecules and you have blood type O.

Question 2

According to the table, if you inherit the I^A allele from one parent and the I^B allele from the other parent, you will have type _____ blood.

Human Blood Types

Genotypes	Surface Molecules	Phenotypes
$I^A I^A$ or $I^A i$	A	A
$I^B I^B$ or $I^B i$	B	B
$I^A I^B$	A and B	AB
	None	O

A. A

C. AB

B. B

D. O

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CA: Biology/Life Sciences 3a

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The answer is C. The I^A and I^B alleles are codominant. Your red blood cells would produce both surface molecules and you would have type AB blood.

Human Blood Types

Genotypes	Surface Molecules	Phenotypes
$I^A I^A$ or $I^A i$	A	A
$I^B I^B$ or $I^B i$	B	B
$I^A I^B$	A and B	AB
ii	None	O

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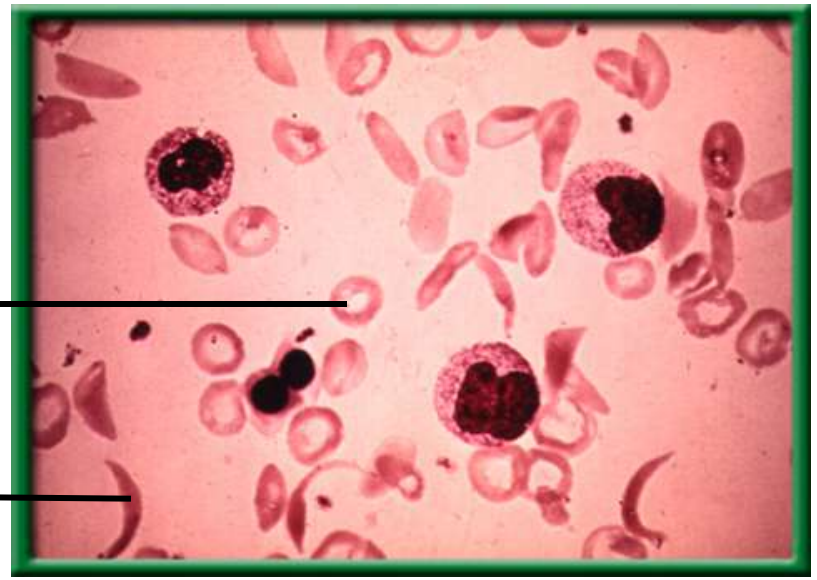
Question 1

What is the difference between simple Mendelian inheritance and codominant inheritance?

In Mendelian inheritance, heterozygous individuals will display the inherited dominant trait of the homozygotes. When traits are inherited in a codominant pattern the phenotypes of both homozygotes are displayed equally in the heterozygotes.

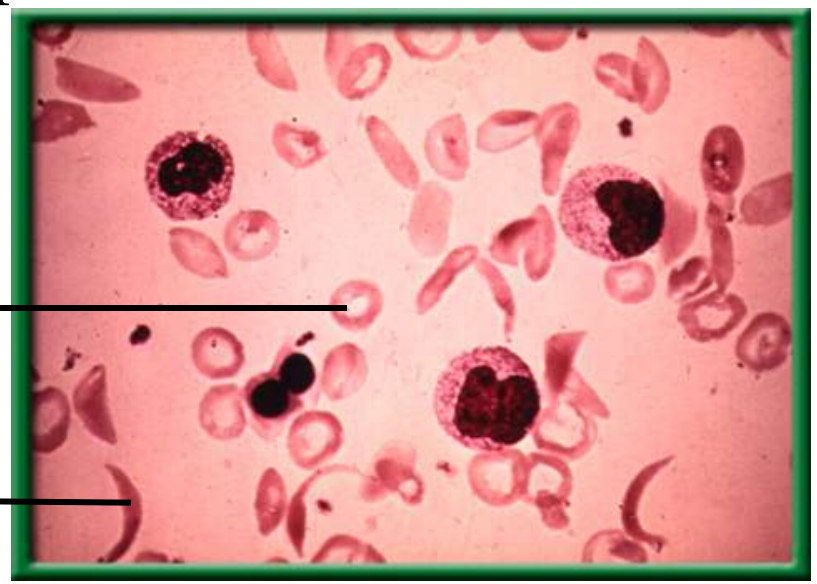
Sickle-cell disease

- The change in shape occurs in the body's narrow capillaries after the hemoglobin delivers oxygen to the cells.

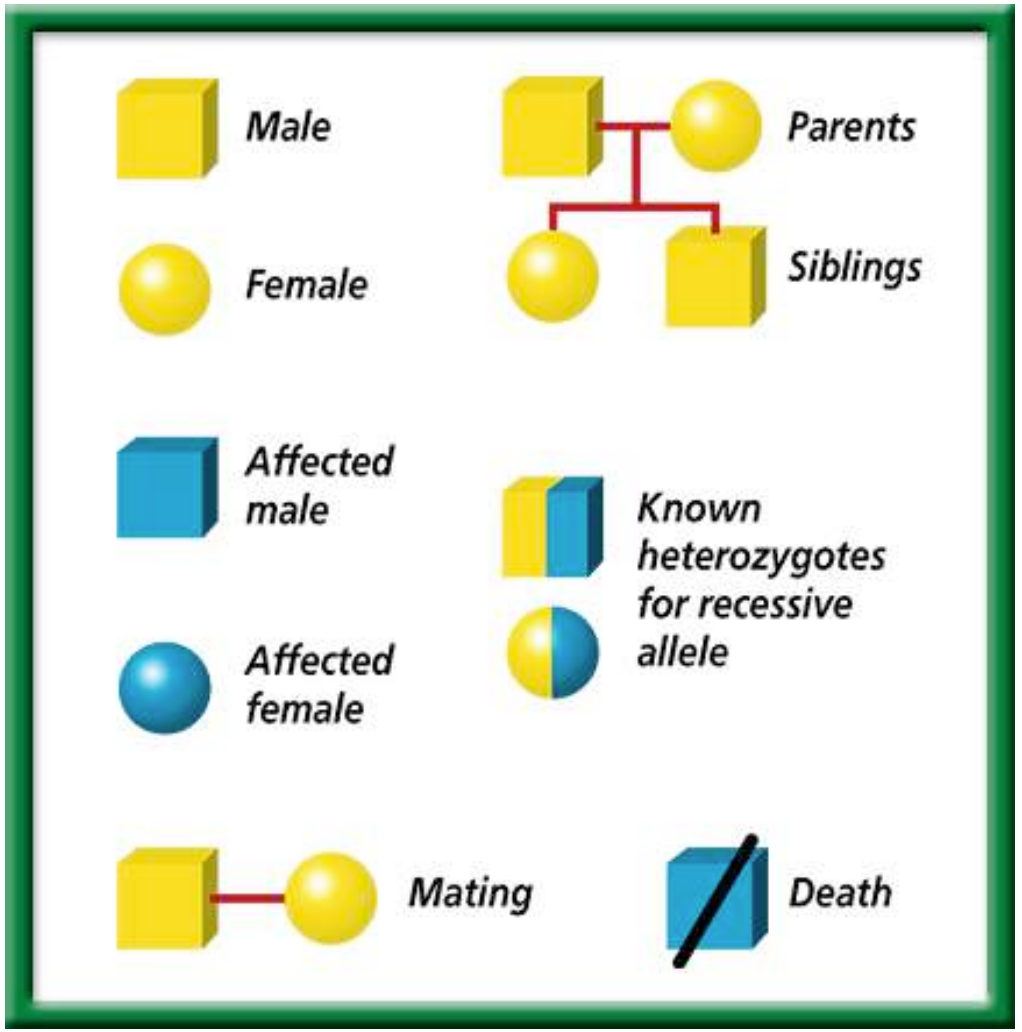


Sickle-cell disease

- Abnormally shaped blood cells, slow blood flow, block small vessels, and result in tissue damage and pain.



Symbols Used by Geneticists



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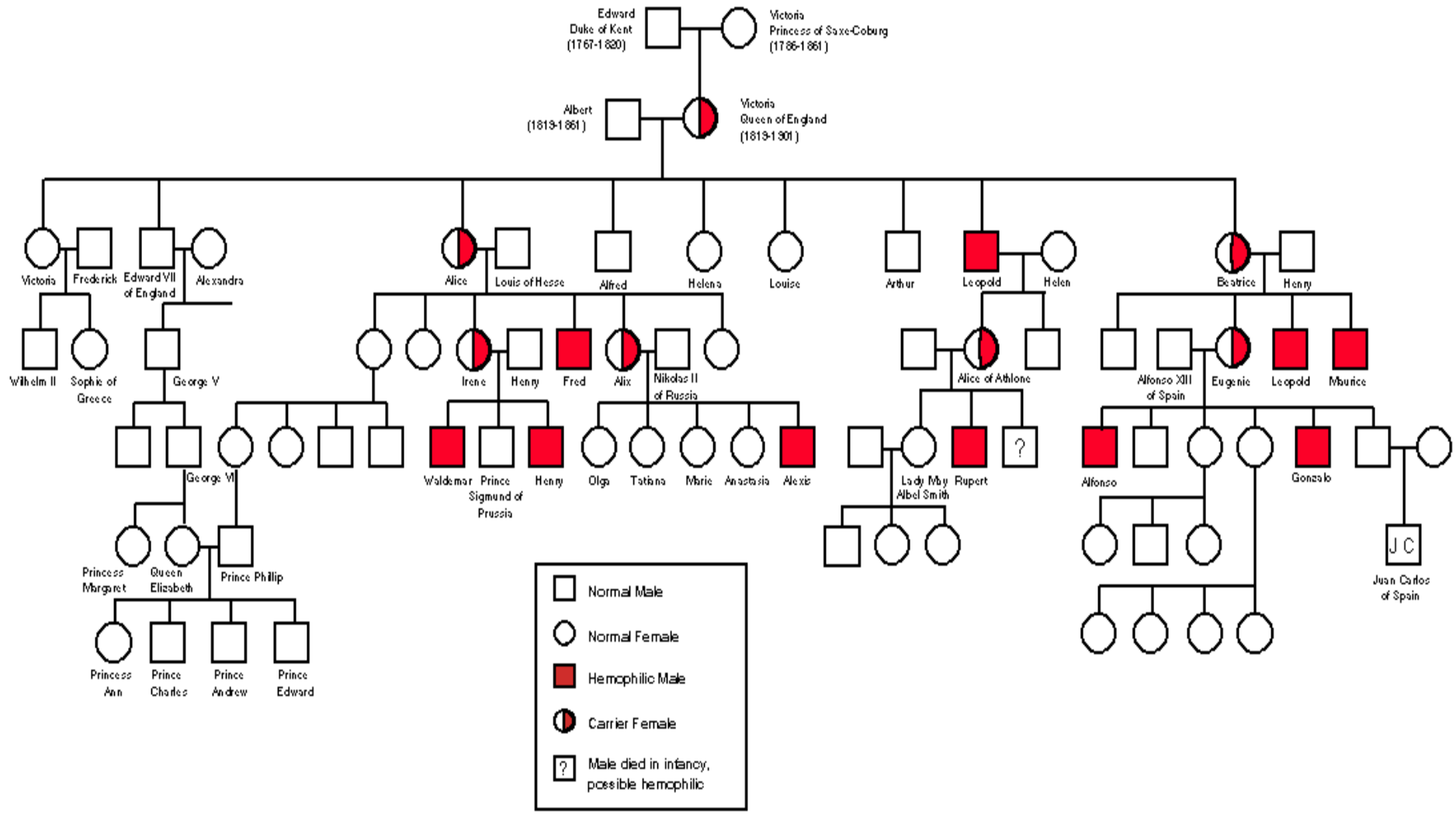
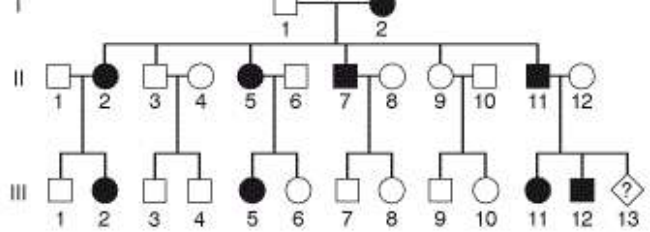
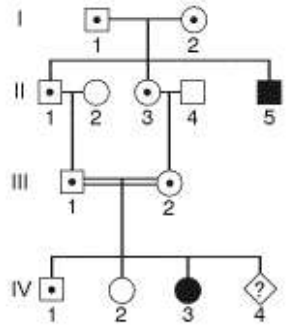

Edward
Duke of Kent
(1767-1820)
Victoria
Princess of Saxe-Coburg
(1786-1861)
Albert
(1819-1861)
Victoria
Queen of England
(1819-1901)
Victoria
Frederick
Edward VII
of England
Alexandra
Alice
Louis of Hesse
Alfred
Helena
Louise
Arthur
Leopold
Helen
Beatrice
Henry
Wilhelm II
Sophie of
Greece
George V
Irene
Henry
Fred
Alix
Nikolas II
of Russia
Alice of Athlone
Alfonso XIII
of Spain
Eugenie
Leopold
Maurice
George VI
Waldemar
Prince
Sigmund of
Prussia
Henry
Olga
Tatiana
Marie
Anastasia
Alexis
Lady May
Abel Smith
Rupert
?
Alfonso
Gonzalo
Princess
Margaret
Queen
Elizabeth
Prince Phillip
J C
Juan Carlos
of Spain
Princess
Ann
Prince
Charles
Prince
Andrew
Prince
Edward
Normal Male
Normal Female
Hemophilic Male
Carrier Female
?
Male died in infancy,
possible hemophilic

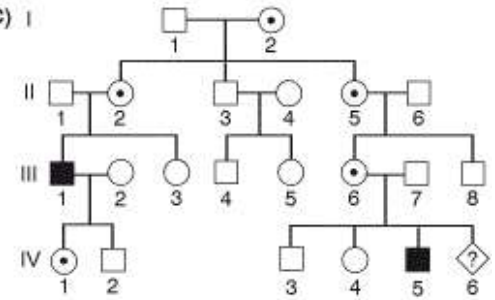
(A)


I
1 2
II
1 2 3 4 5 6 7 8 9 10 11 12
III
1 2 3 4 5 6 7 8 9 10 11 12 ?13

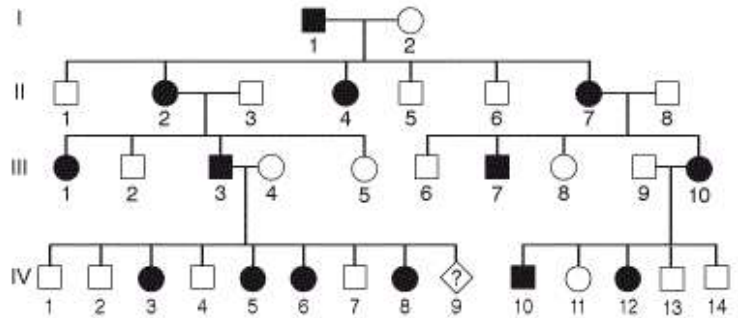
(B)


I
1 2
II
1 2 3 4 5
III
1 2
IV
1 2 3 ?4

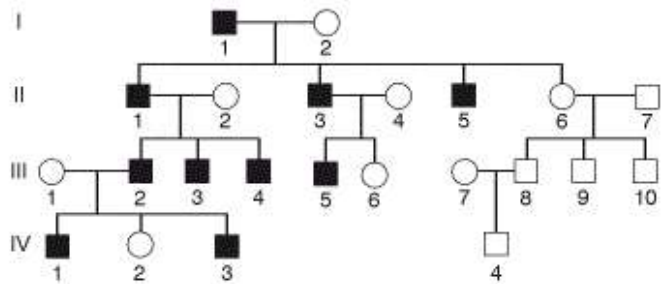
(C)


I
1 2
II
1 2 3 4 5 6
III
1 2 3 4 5 6 7 8
IV
1 2 3 4 5 ?6

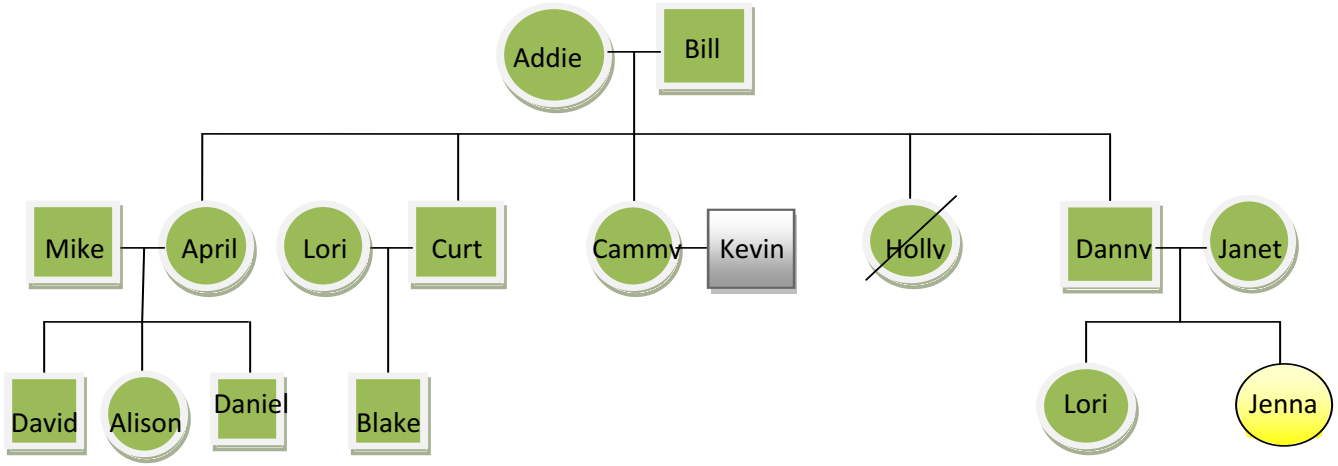
(D)

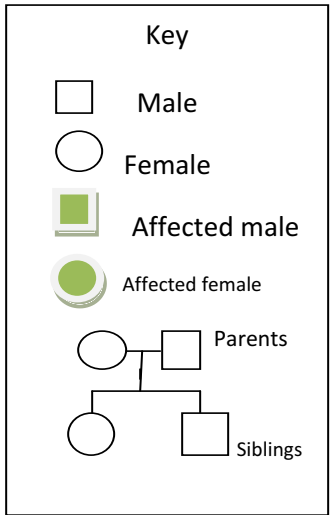

I
1 2
II
1 2 3 4 5 6 7 8
III
1 2 3 4 5 6 7 8 9 10
IV
1 2 3 4 5 6 7 8 ?9 10 11 12 13 14

(E)


I
1 2
II
1 2 3 4 5 6 7
III
1 2 3 4 5 6 7 8 9 10
IV
1 2 3 4

Daniel Ponzi's pedigree

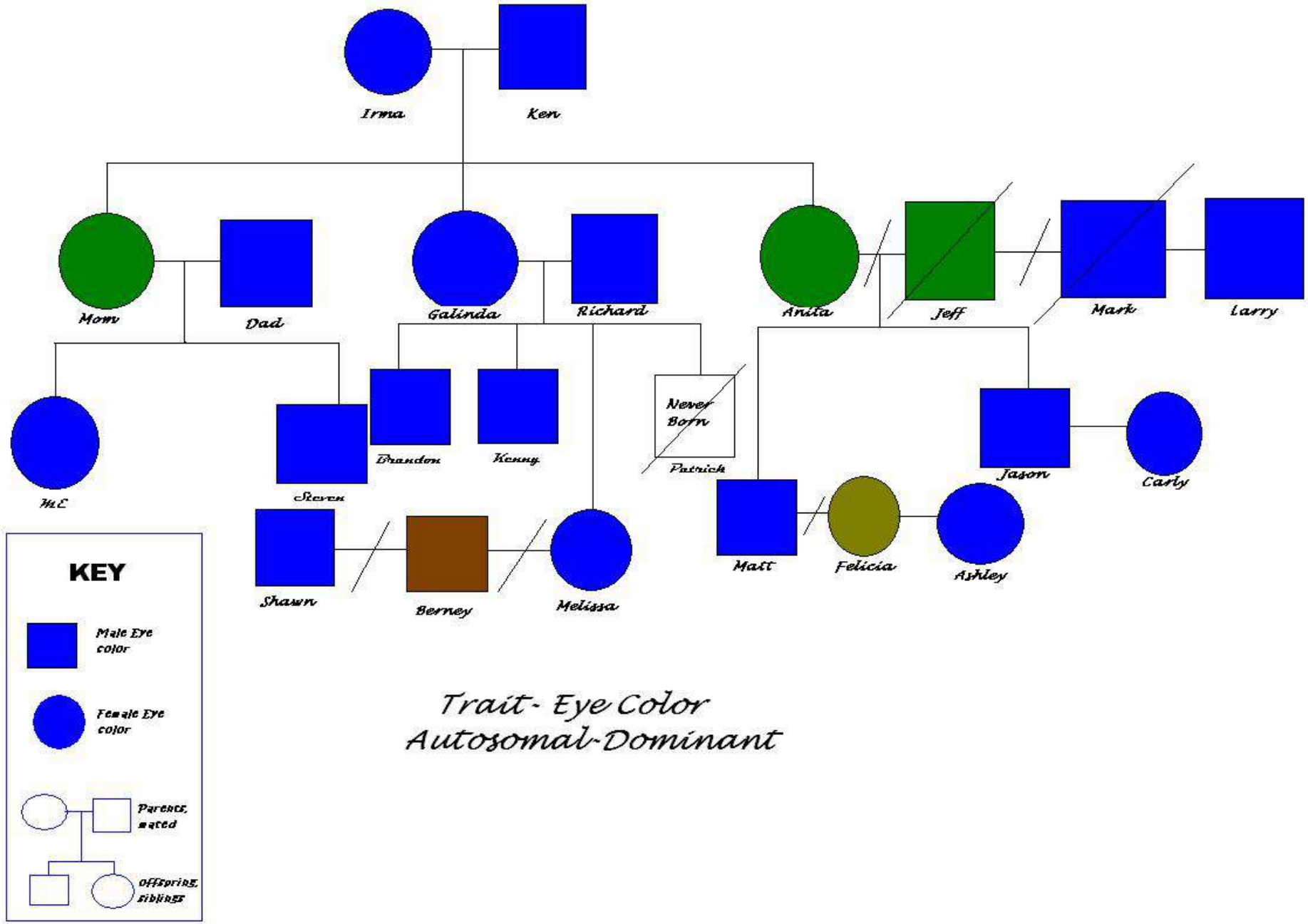




Dominant-Autosomal

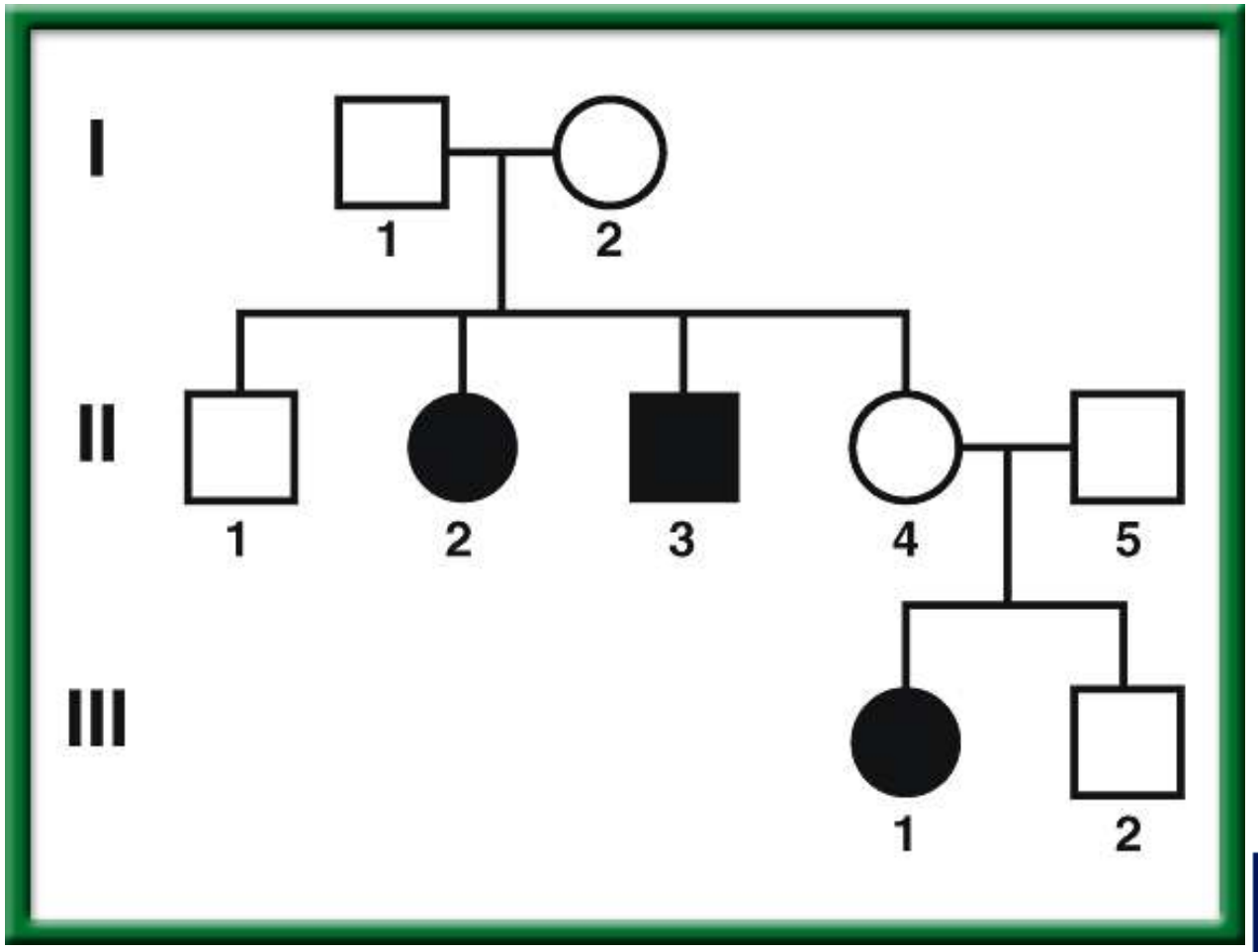
Trait-brown hair

Kristen Mcadoo's Family Pedigree



Trait- Eye Color
Autosomal-Dominant

Pedigree Chart



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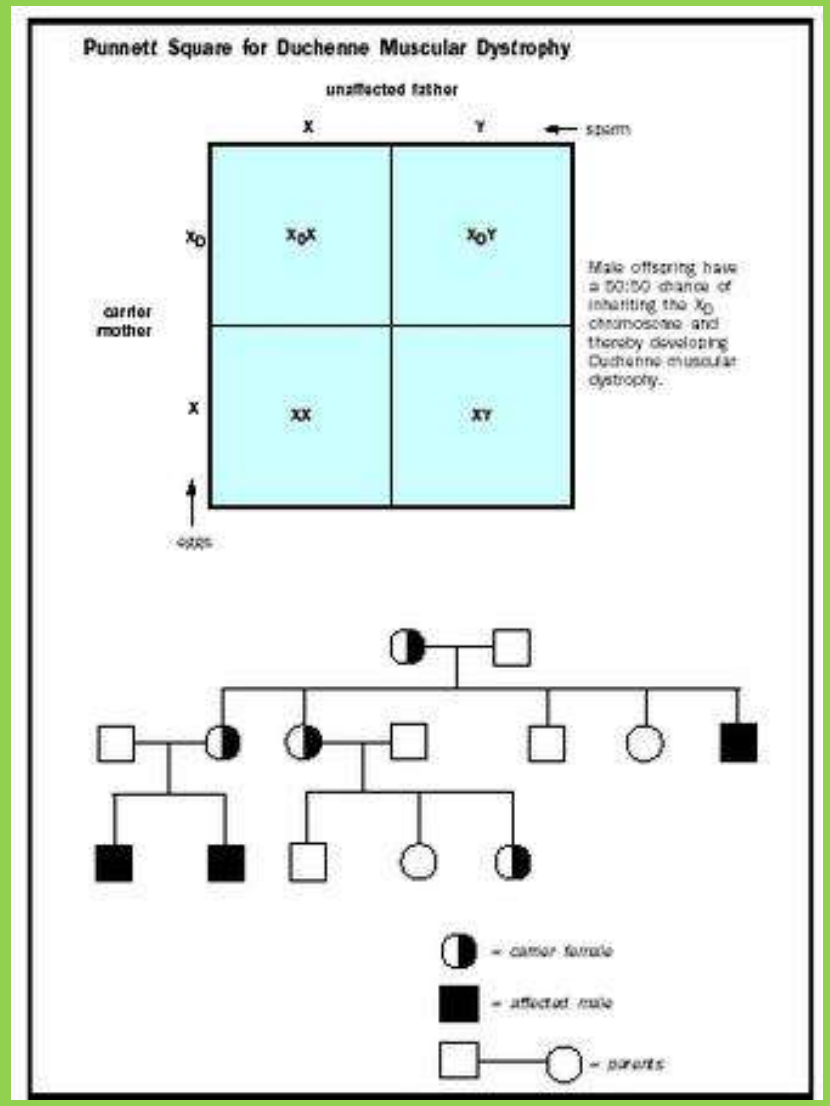
3/26 Complex Inheritance of Human Traits 12.3

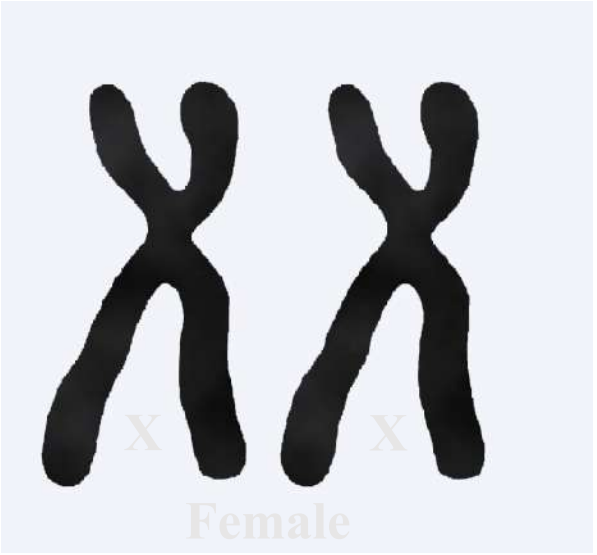
Obj. TSW predict possible combinations of alleles in a zygote from the genetic make up of the parents by working on a pedigree. P.86 NB



1. Reading the Pedigree from the Problem Solving Lab 12.3 p. 326, Is this an autosomal or sex-linked disorder? How do you know?
2. Using the same pedigree as above, What would be the probability of the individual IV-1 having a daughter that is a carrier, and a son inheriting the disorder?
3. Compare & Contrast Autosomes and Sex Chromosomes.

Sex determination

- If you are female, your 23rd pair of chromosomes are homologous, XX.



- If you are male, your 23rd pair of chromosomes XY, look different.

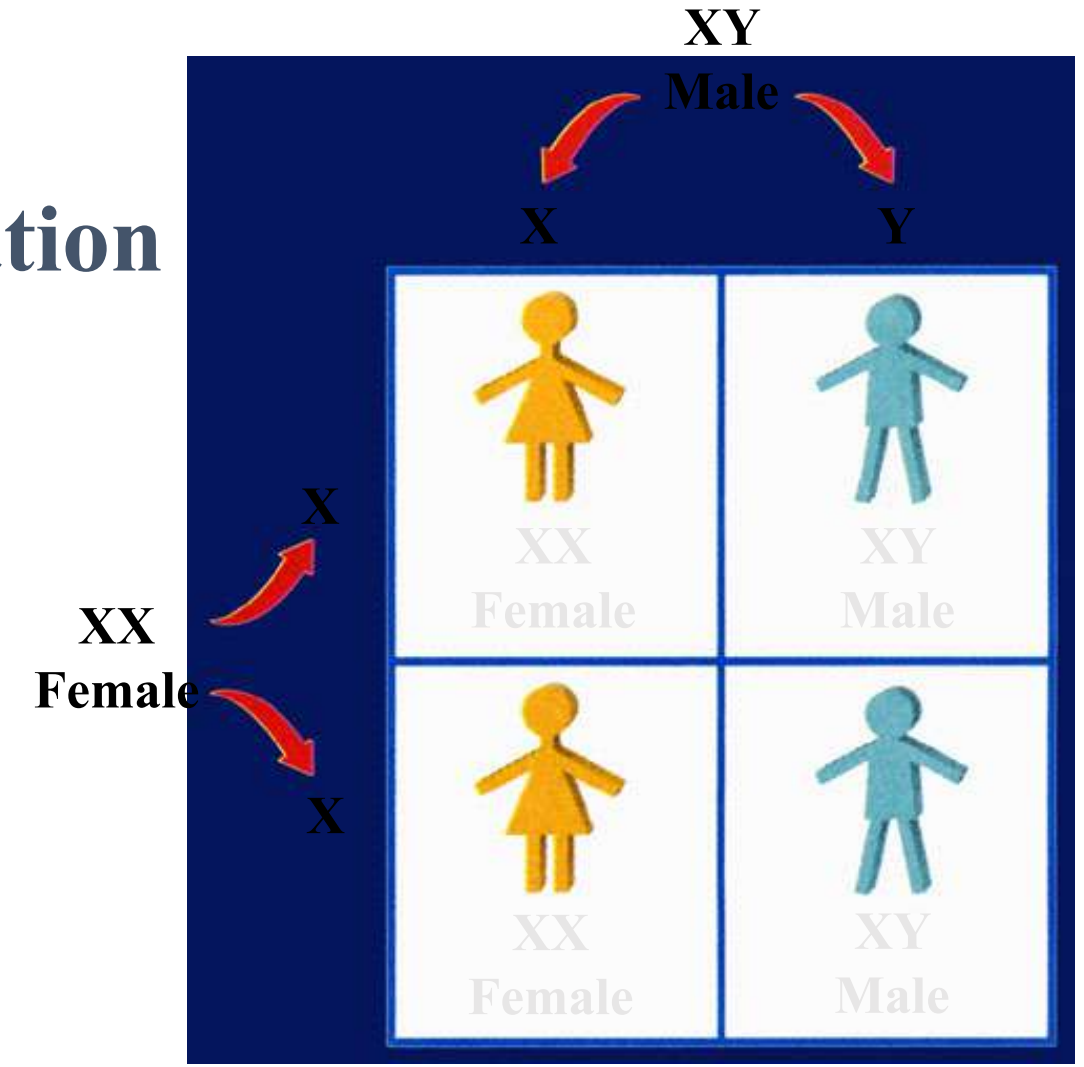
Sex determination

- In humans the diploid number of chromosomes is 46, or 23 pairs.
- There are 22 pairs of homologous chromosomes called autosomes. Homologous autosomes look alike.
- The 23rd pair of chromosomes differs in males and females.

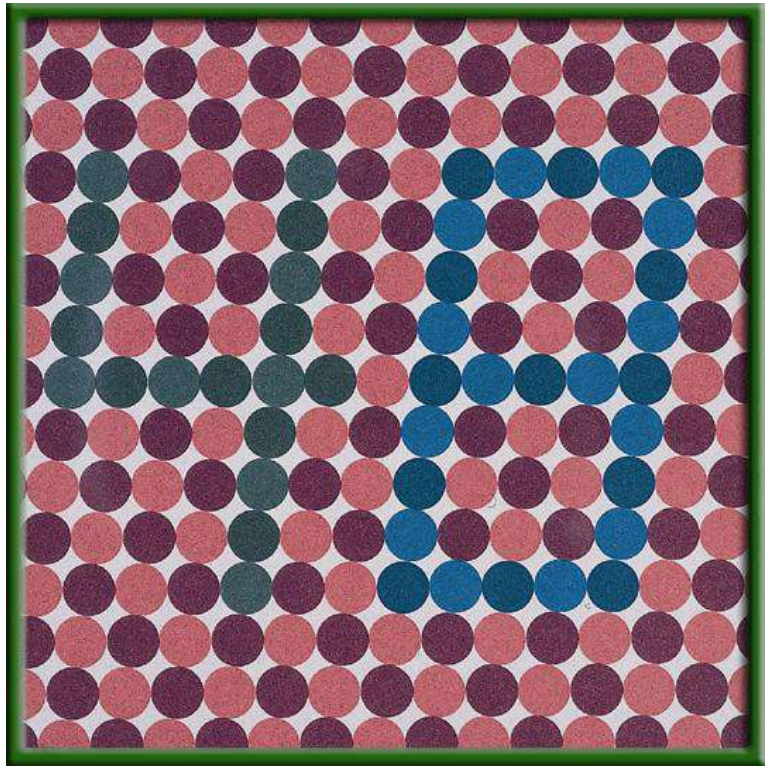
Sex determination

- These two chromosomes, which determine the sex of an individual, are called sex chromosomes and are indicated by the letters X and Y.

Sex determination



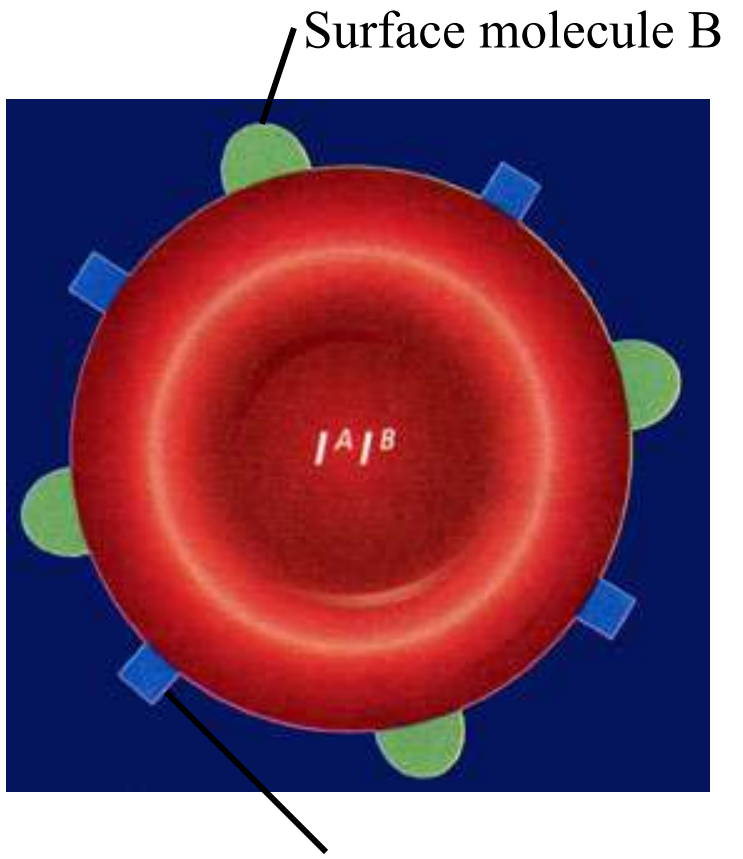
Red-green color blindness



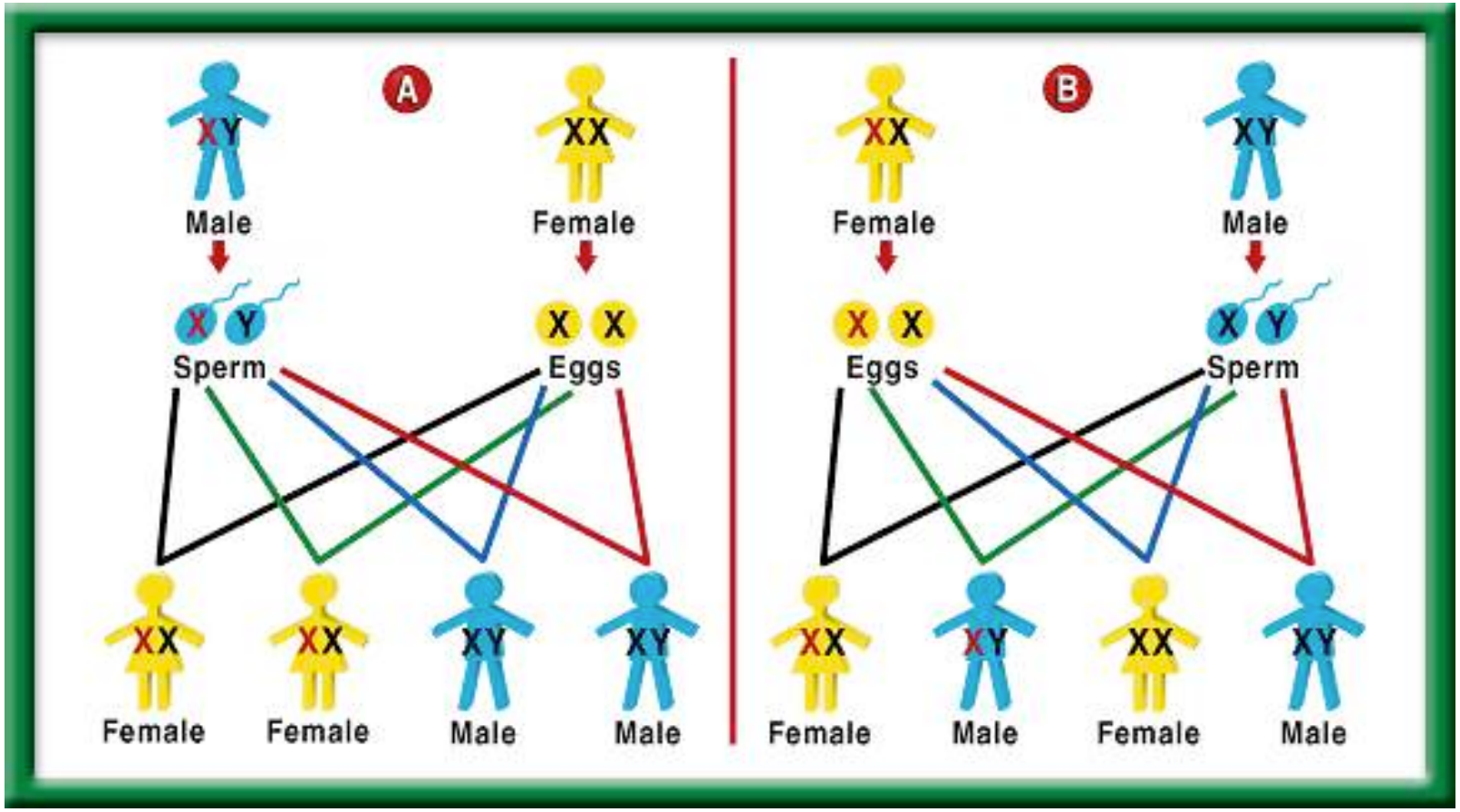
- People who have red-green color blindness can't differentiate these two colors. Color blindness is caused by the inheritance of a recessive allele at either of two gene sites on the X chromosome.

Phenotype AB

- The I^A and I^B alleles are codominant.
- This means that if you inherit the I^A allele from one parent and the I^B allele from the other, your red blood cells will produce both surface molecules and you will have type AB blood.



Inheritance of X Chromosome



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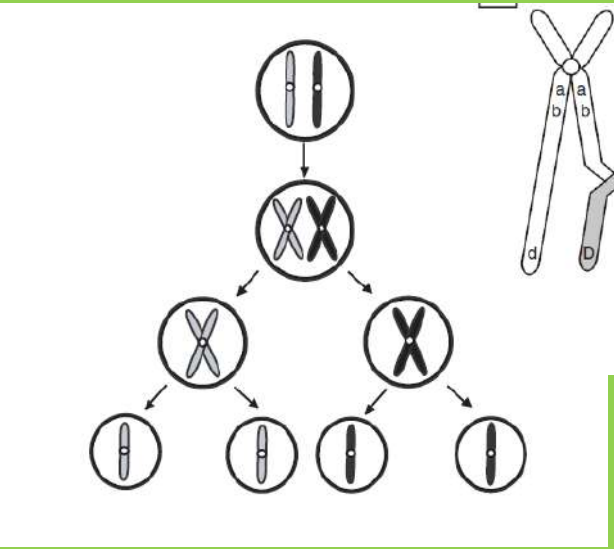
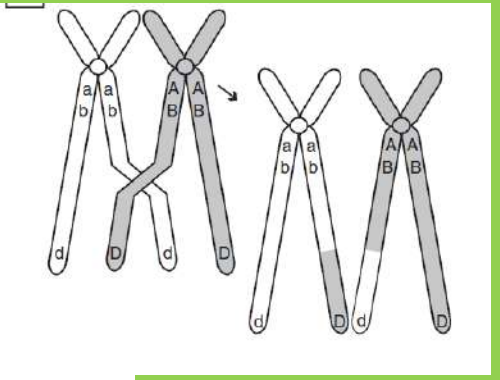
3/27 Genetic Inheritance Review Chapter 10, 12
Obj. TSW demonstrate knowledge and understanding of Modes of Genetic Inheritance. P. 88 NB



Picture 1



Picture 2

http://www.cde.ca.gov/ta/tg/sr/documents/cstrtqbiology.pdf

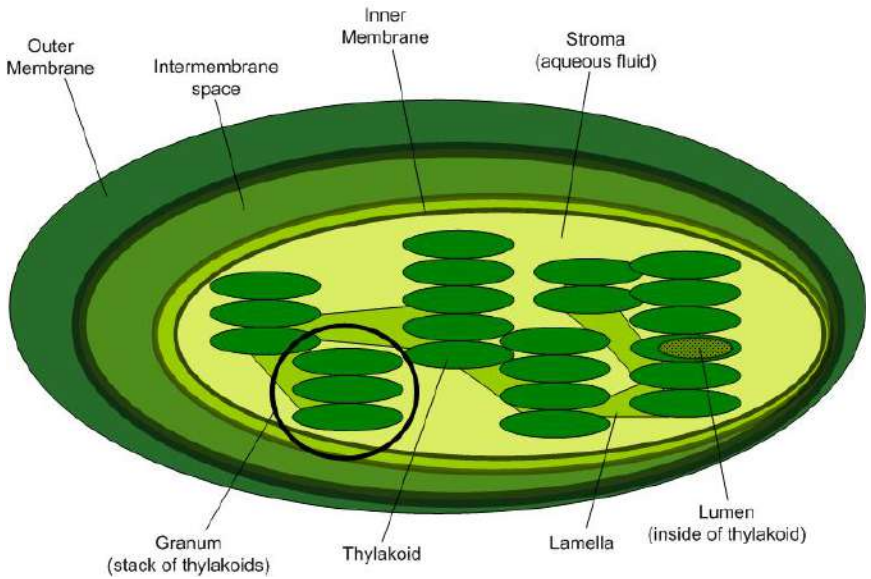
1. What are both processes to the left called?
2. If a pea plant has the Genotype PPTt, what are the possible genetic combinations (gametes) it would pass on to it's offspring?
3. Why is crossing over important?

Cell Biology

1. Semi-permeable or Selectively permeable means that some molecules to pass through while others do not. The Plasma membrane maintains homeostatis in the cell. P.175 BB
2. The “fluid mosaic” Model of the phospholipid bilayer is called fluid because the phospholipids move just like water, at the same time protein in the membrane create a “mosaic” pattern on the surface. P.178
3. Cholesterols in the plasma membrane help stablize the phospholipids by preventing the fatty acid tails from sticking together. They look like little chains with an OH molecule on the end. P.178
4. Water is least likely to be found in the lipid bilayer, in the non-polar tails.
5. The biomolecule, or macromolecule or polymer that is an enzyme is a protein.
6. Enzymes lower the activation energy of a chemical reaction there by speeding it up, without be used up in the process.
7. Prokaryotic cell (Bacteria) has no organized organelles, no nucleus, it is smaller and more simple than an Eukaryotic cell. Eukaryotic cells have a membrane bound nucleus, and organelles.
8. Plant cells have chloroplasts, cell walls and large central vacuoles. Animal cells have small vacuoles, centrioles, and lysosomes.

9. Eukaryotic Cells have a Nucleus.
10. The three main ideas of the cell theory are*: All cells are composed of one or more cells. The cell is the basic unit of structure and organization of an organism. All cells come from preexisting cells. P. 172*
11. The DNA is located in the nucleus of the cell.
12. The process from DNA to RNA is Transcription and it takes place in the nucleus.
13. The process from RNA to Proteins is Translation and it takes place in the Cytoplasm on the Ribosome possibly on the ER.
14. The three kinds of RNA are: mRNA-messenger RNA, copies the DNA, leaves the nucleus to the cytoplasm to the ribosome with the codons that code for amino acids. rRNA-ribosomal RNA, makes the ribosome with the help of proteins. tRNA – transfer RNA, transfers the anticodon with the Amino Acid to the ribosome.
15. Folded Membranes are an advantage to the cell because it increases surface area, cell processes can be more efficient, the membranes form interconnected compartments.

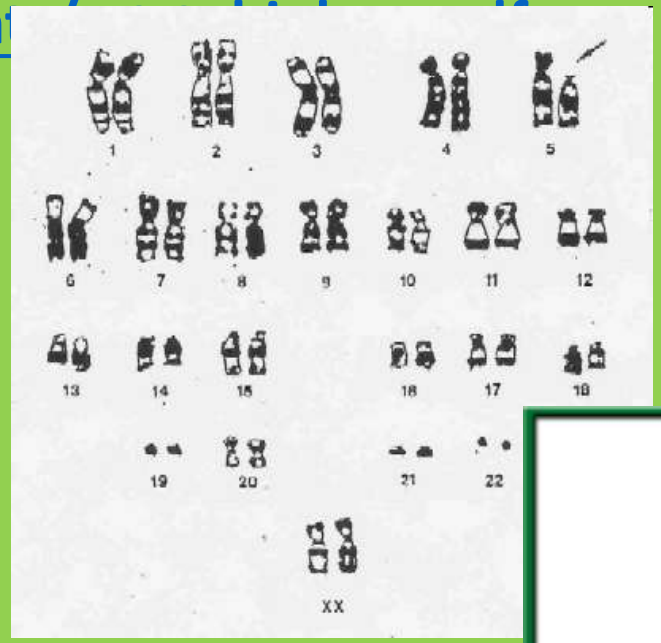
16.The two types of ER are the Rough Endoplasmic Reticulum and the Smooth Endoplasmic Reticulum. The RER has ribosomes that proteins are make on. The SER in involved in the production and storage of lipids.
17. The Golgi Apparatus is a flattened stack of tubular membranes that sorts proteins into packages and packs them into membrane- bound structures called vessicles.
18. The equation for Photosynthesis is:
$6\ CO_2 + 6\ H_20 \text{ ->sunlight-> } C_6H_{12}O_6 + 6\ O_2$
19. Chlorophyll is the name of pigment that reflects green light and traps energy from the sun.
20.



21. Plant and animal cells both have mitochondria.
22. Mitochondria are the energy producers for the cell, they produce ATP.
23. The Glucose that is used in Cellular Respiration comes from plants.
24. ATP is Adenosine Tri Phosphate, and energy molecule that when a phosphate is broken off energy is released.
25. A polymer is a biomolecule, or a macromolecule and the 4 Polymers are: Carbohydrates, Lipids, Nucleic Acids, & Proteins.
26. The Four main elements that make up living things are: Carbon, Hydrogen, Oxygen, and Nitrogen.
27. The proteins contain Nitrogen where as Carbohydrates and Lipids do not.
28. Water is polar, which means it has a charge and therefore is able to dissolve many ionic (Na+, Cl-) and molecular compounds.
29. The basic building blocks or subunits or precursers of Proteins are amino acids.

10/17 Semester 1 Review (Notebook)
Obj. TSW demonstrate understanding of Cell Biology and Genetics by kicking butt on the midterm final. p. 86 NB

http://www.cde.ca.gov/ta/tg/sr/document



Glencoe.com

1. What is the name for the 23rd pair of chromosomes that differ in males and females?
2. What information can a karyotype provide?
3. What does semi-permeable or selectively permeable mean?