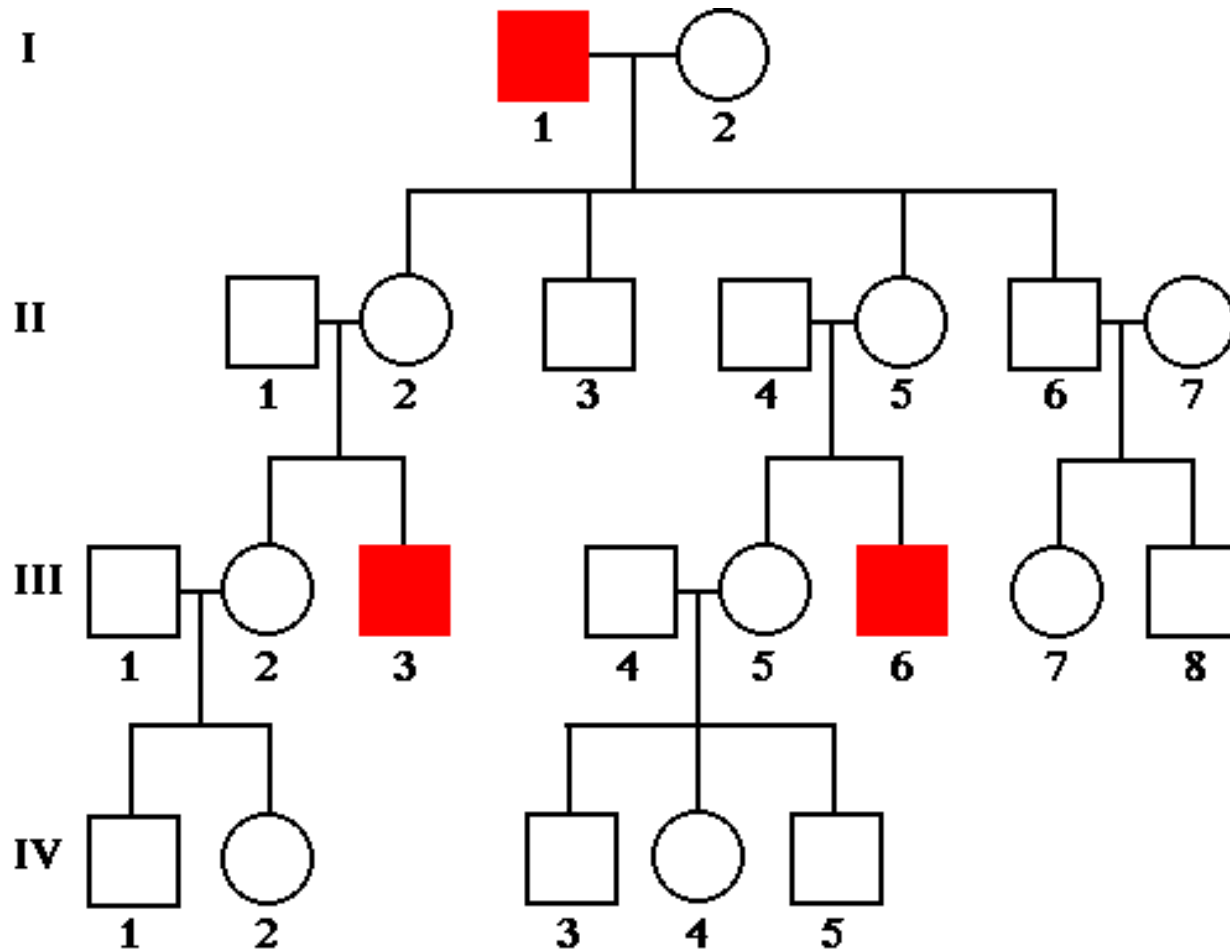


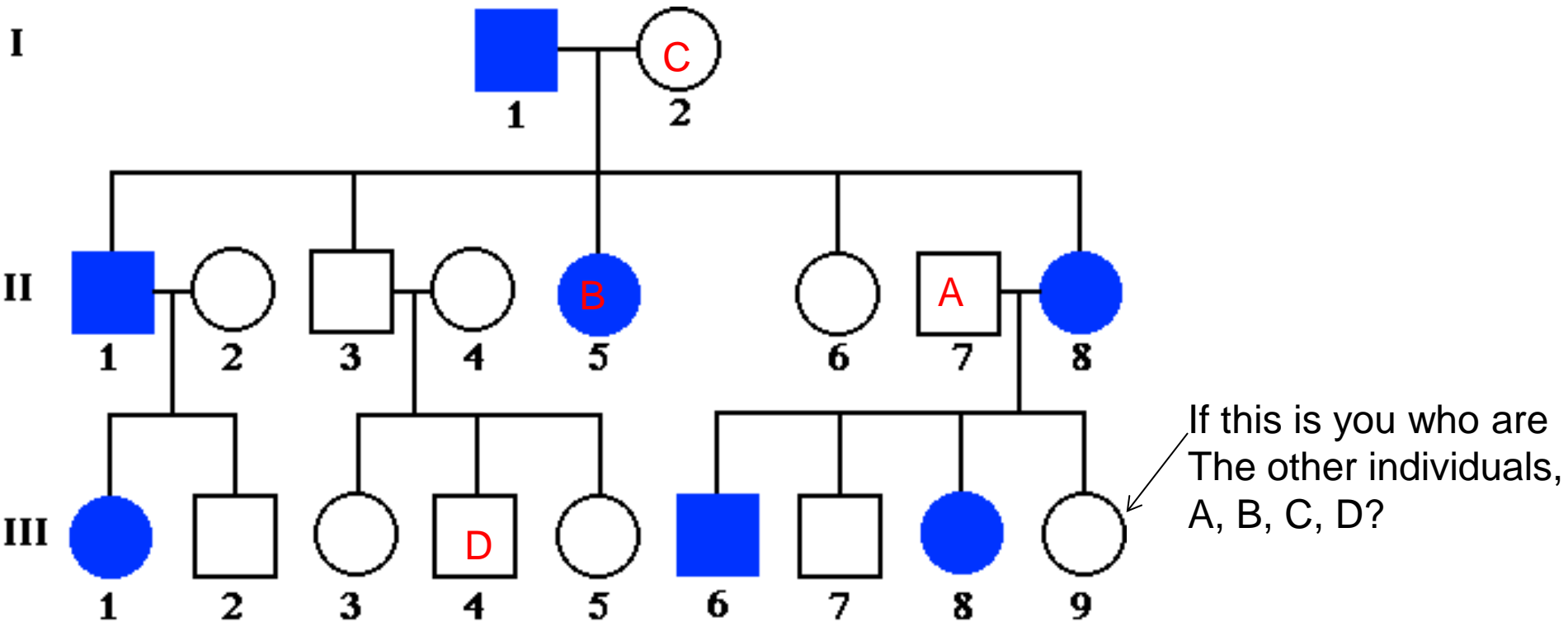
Pedigrees:

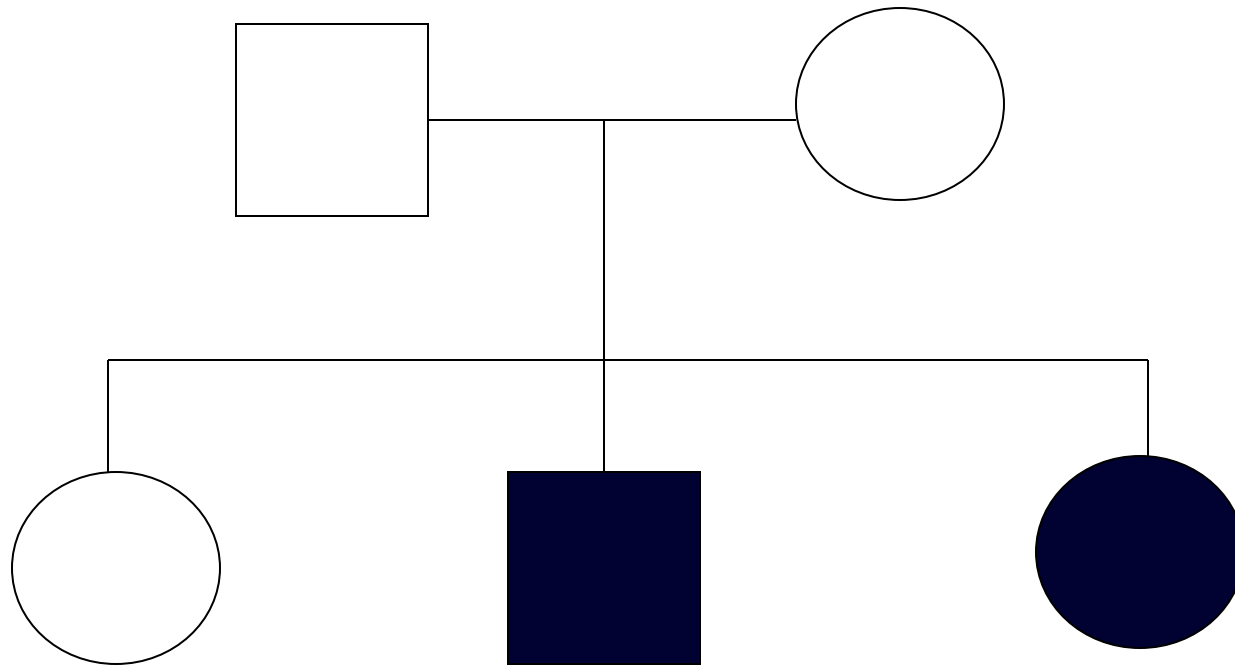
Genetic Family History



Pedigree 8. X-linked recessive inheritance.

- Women are represented with a _____.
- Men are represented with a _____.
- Affected individuals are _____
(individuals who express the trait).

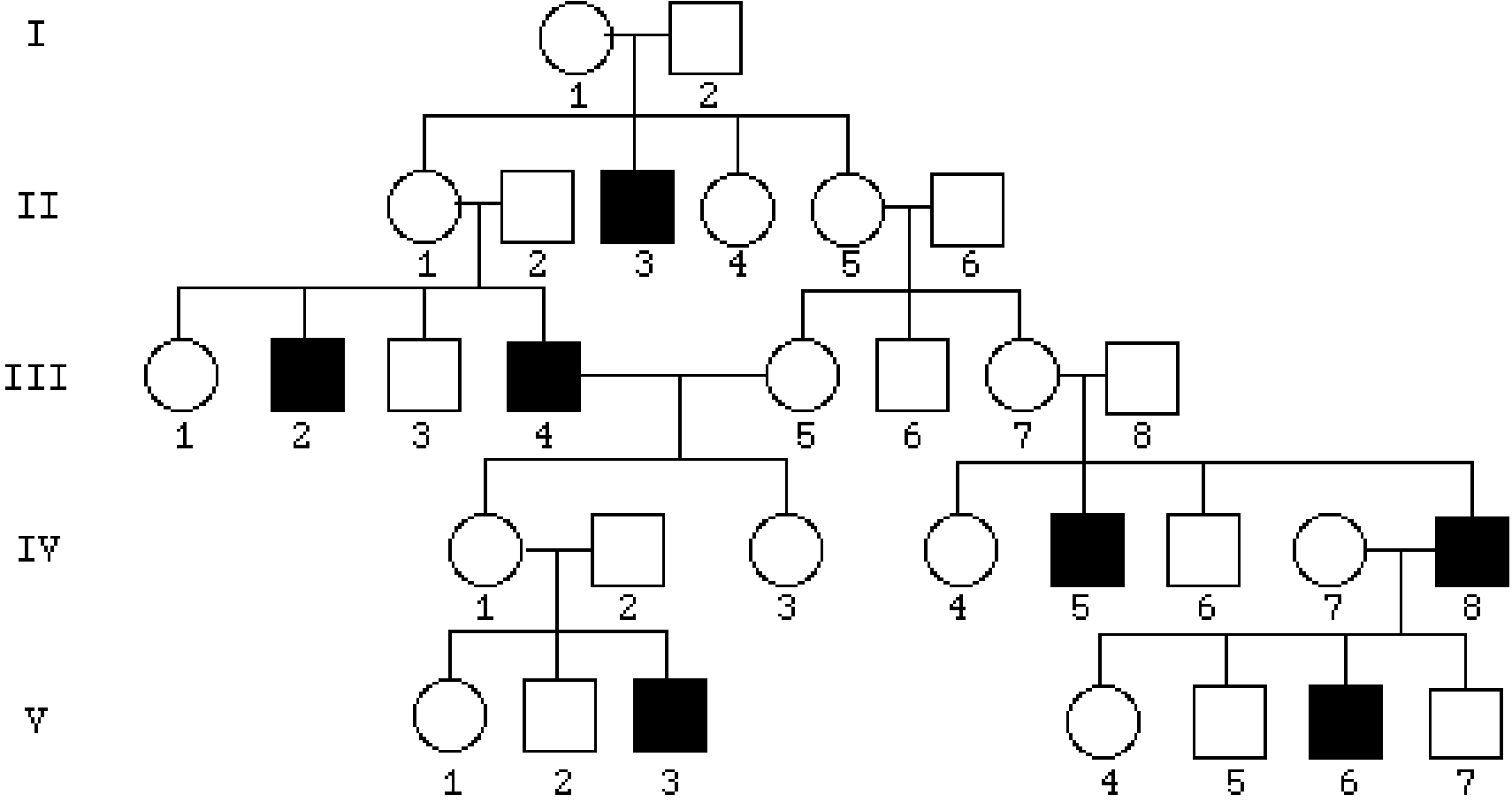




Pedigree for attached ear lobes (shaded in).

- From the pedigree, can you tell if attached lobes is dominant or recessive? Explain.
- If so, label the genotypes for all individuals. For unknown genotypes, write the allele you do know and a question mark for the other allele.

Pedigree for tongue rolling. Rollers are dominant (R). Non-rollers are recessive (r).



- What is the genotype of II-3?
- What is the genotype of II-5?
- What is the genotype of III-7?

Can't always determine the genotype of an individual with the _____ trait.

(In many cases could be homozygous dominant or heterozygous)

Must be heterozygous if:

Has a child with the _____ trait.

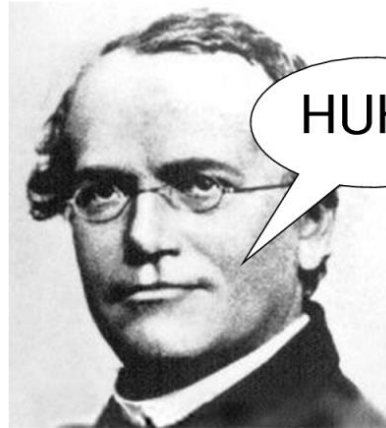
Has a parent with the _____ trait.

Genetics:

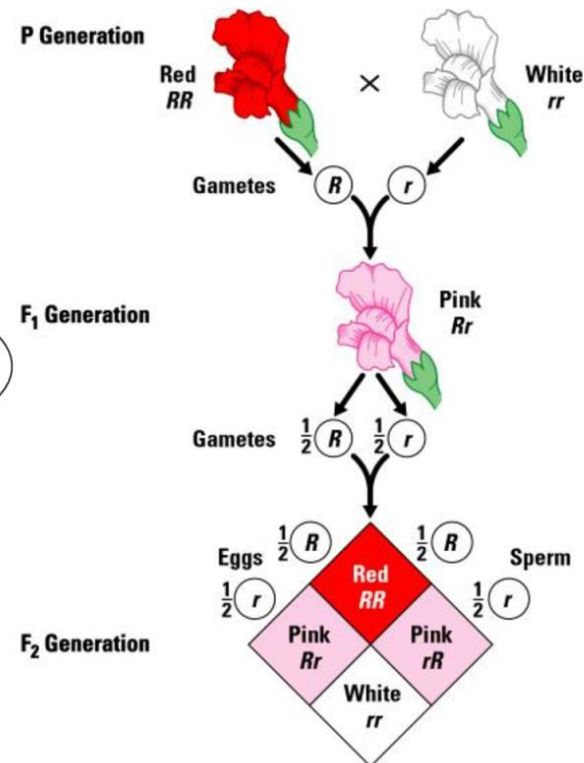
Beyond Mendel:

Non-Mendelian Genetics

- Snapdragons



http://www.dobermann-review.com/mb/genetics/mendels_genetic_laws/Gregor%20Mendel.jpg



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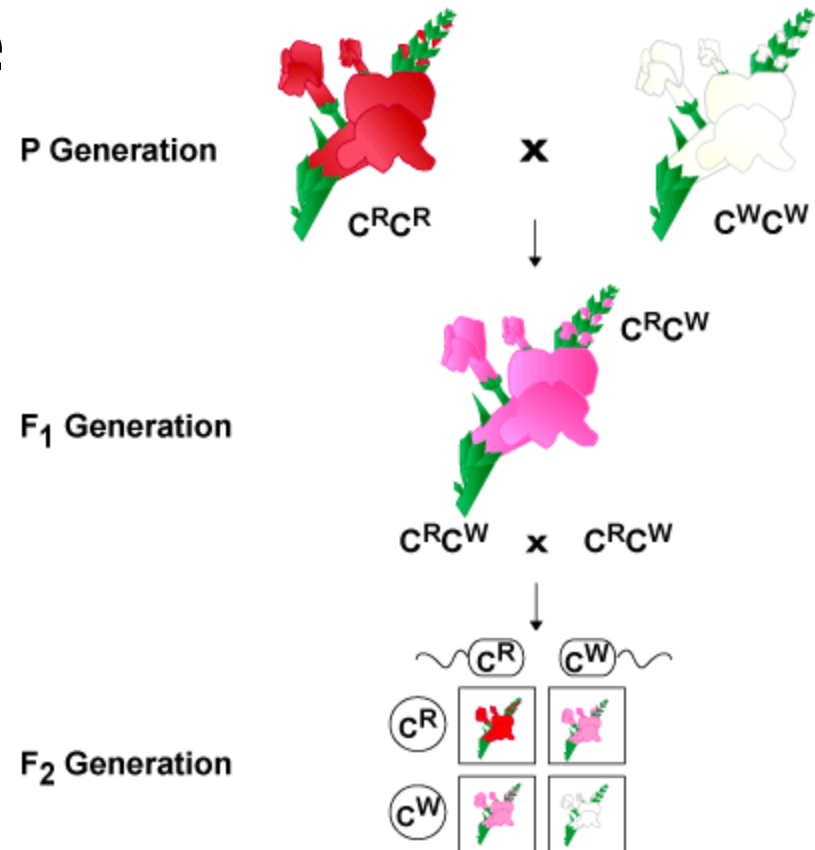
<http://faculty.pnc.edu/pwilkin/incompdominance.jpg>

Incomplete Dominance:

- Neither _____ is dominant.
- “_____” of both alleles occurs to create a new _____ for the heterozygous genotype.

Incomplete = In-between

Example: If snapdragons have a red flower allele and a white allele, flowers are _____.



Representing Incomplete Dominance

- Since neither allele is dominant, alleles with incomplete dominance are often represented as a _____ above a letter representing the _____.

- Example: Red color – _____
White color – _____



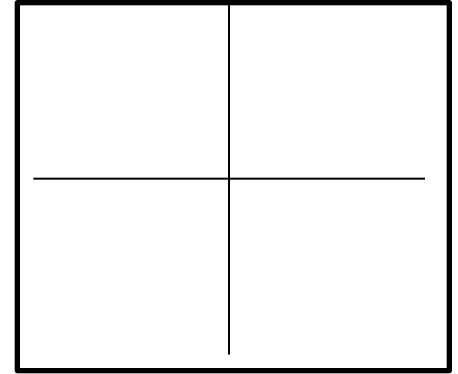
- Each Phenotype has a unique Genotype:
 - Red-_____, White-_____, Pink-_____

Incomplete Dominance Practice

Determine the phenotypic frequencies by completing a Punnett square for the following crosses in snapdragons:

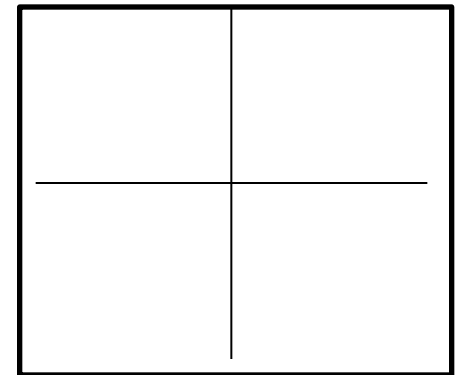
1) Red X White

1.



2) Red X Pink

2.



Codominance

Both alleles are _____ in a _____, _____ “blended”.

Example: Roan cattle with mixed _____ and _____ hairs are heterozygotes for red and white hair color alleles.



Representing Codominance

As with incomplete dominance, codominance is represented with a _____.

Example: red _____, white _____

Difference between incomplete dominance and codominance:

Incomplete dominance = _____

(red + white = _____)

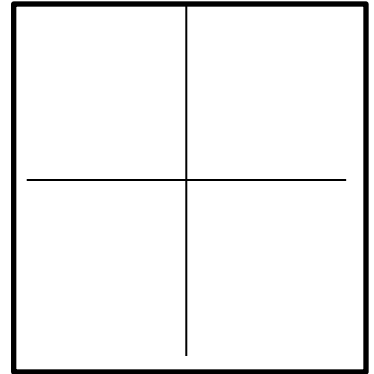
Codominance = both alleles are _____

(red cow + white cow = cow with _____)

Applying the Concepts

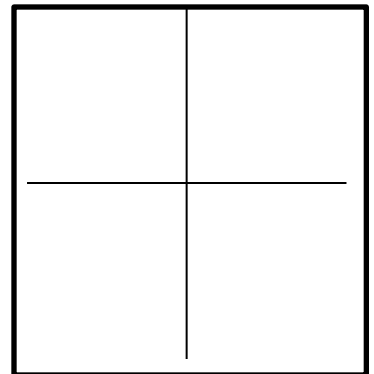
Which produces the greatest number of roan ($C^R C^W$) offspring?

Roan x Roan (_____ X _____)



OR

Red x White (_____ X _____)



Codominant Practice

In some chickens, feather color is codominant.

Black crossed with White = _____

Alleles: _____, _____

Determine the phenotypic frequencies for:

Checkered X Black

_____ X _____

Phenotypic frequency:



Multiple Alleles

For some traits, more than two possible _____ exist for a _____ gene. Although more than two alleles exist in the population, each individual still only has _____ alleles to determine the trait.

Example: 3 Blood Type Alleles

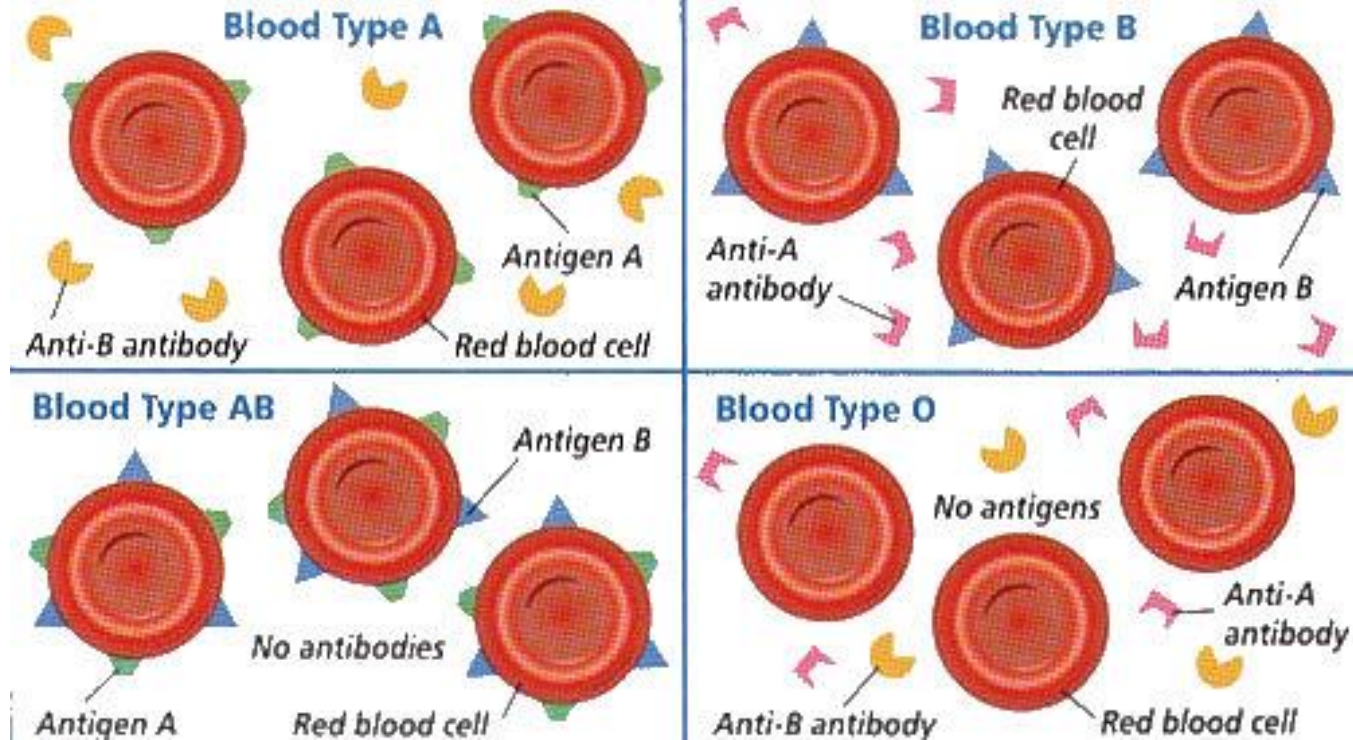
_____, _____, _____

•

• “_____” and “_____” are codominant

“_____” acts _____

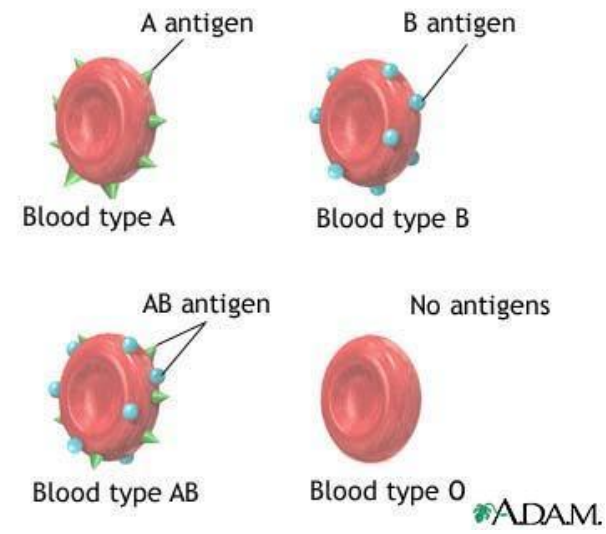
• The “I” stands for “isoagglutinogen”- an antigen on red blood cells. Blood being “+” or “-” is determined by a different antigen, an Rh factor, being present or not.



_____ are specifically shaped _____ on the outside of cells used by your white blood cells to determine your cells from _____.

The ABO blood type gene codes for two different types of antigens- _____ and _____ antigens.

Blood Type (Phenotype)	What antigens are present on the outside of the cells	Possible Genotype(s)
A		
B		
AB		
O		

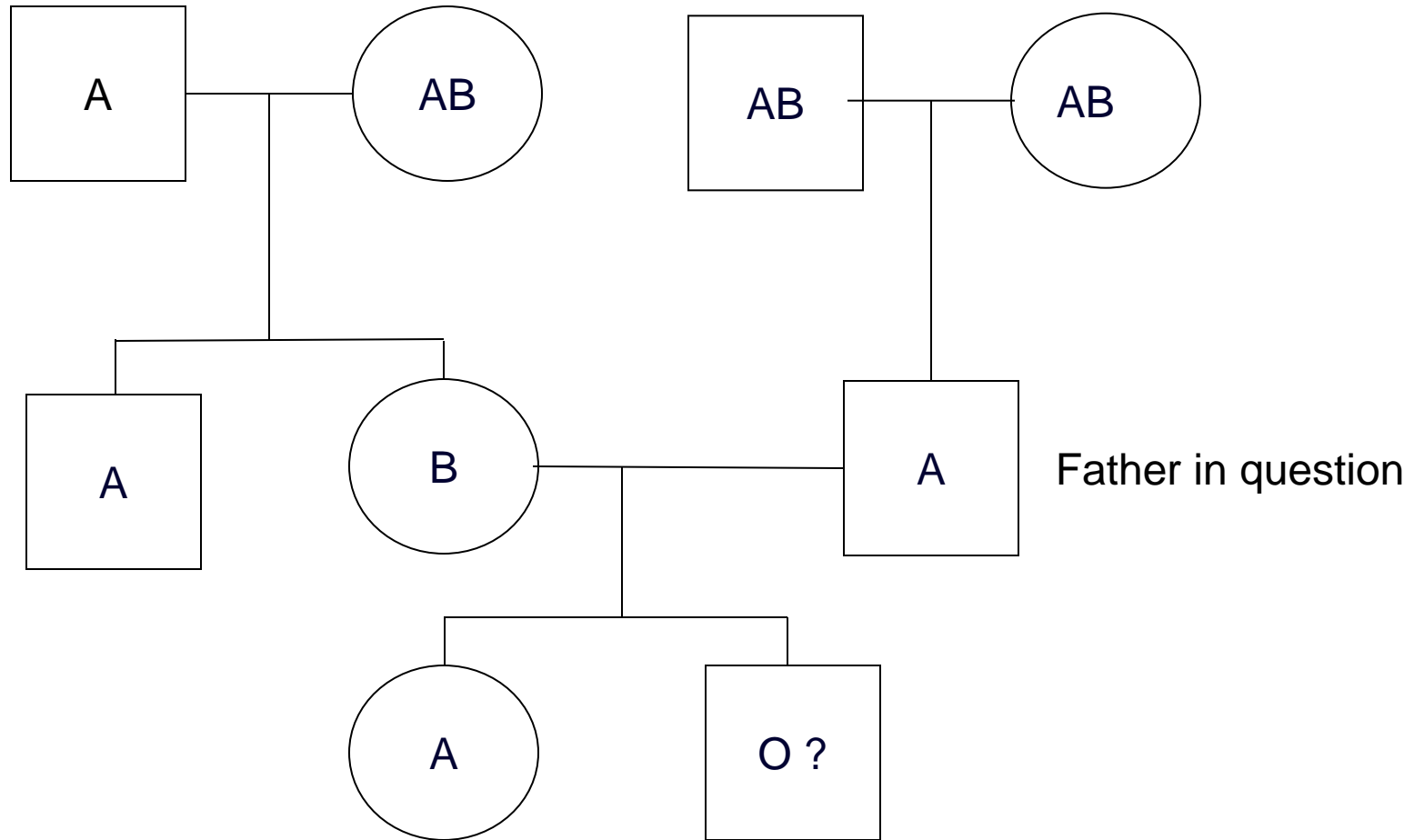


Paternity Tests

A mother has blood type A, and her child has blood type O. Can a man with blood type B be the father?

A mother has blood type B and her child has blood type O. Can a man with blood type AB be the father?

Practice Problem



Write genotypes. Could the last child be from the father?

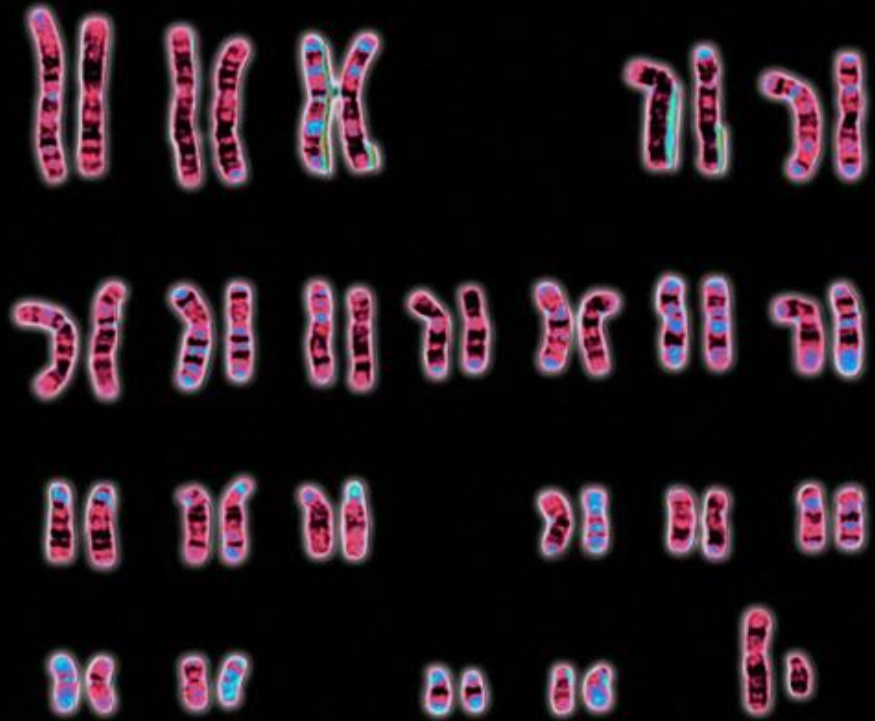
Gender Determination

- In humans, the 23rd pair of chromosomes (_____) are the sex chromosomes which determine the gender.

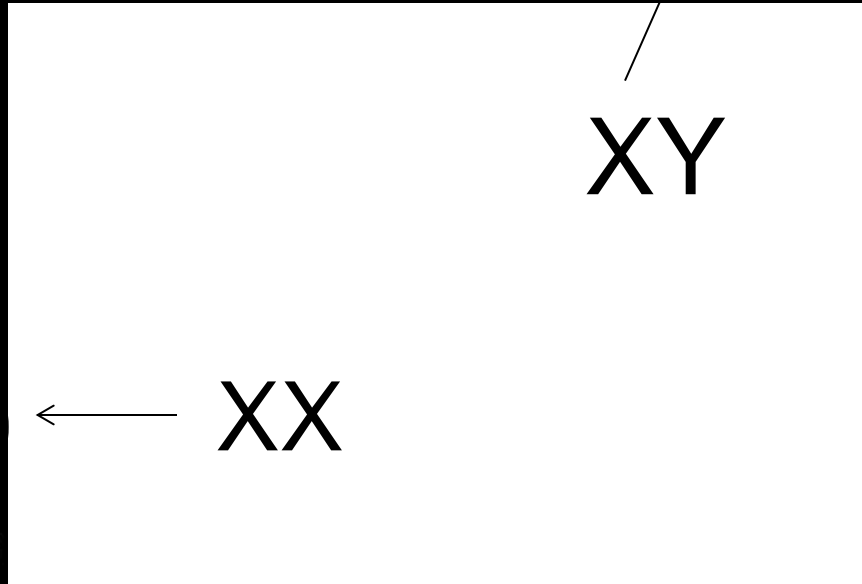
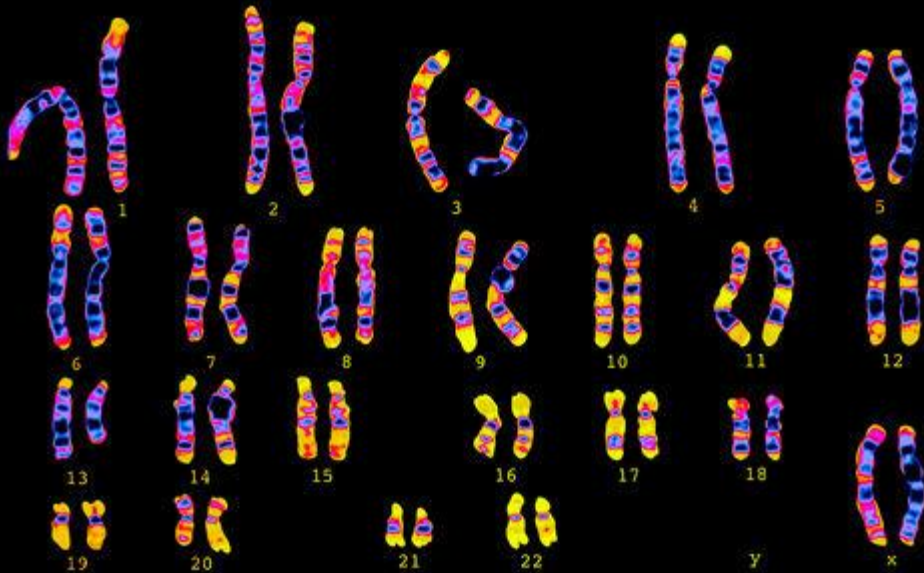
Men are _____

- (X and Y are the only nonhomologous pair- which means that the pair does not contain the same type of _____.)
- Woman are _____
- The other 22 pairs of chromosomes are called _____ chromosomes.

MALE : XY



FEMALE : XX



Sex Linked Traits

- Traits for which the gene is found on the _____ chromosome or the _____ chromosome.
- Very little information is on the Y chromosome so most sex-linked traits are carried on the _____.
- Since men are XY, they have only _____ of sex-linked genes, either on the _____ or _____.

Examples:

-Red-Green Colorblindness (_____)

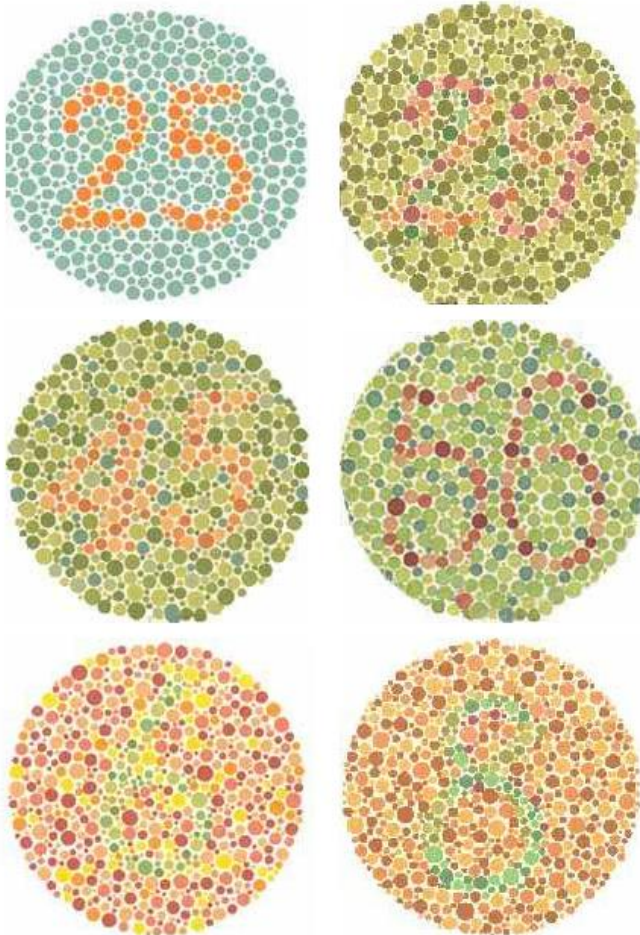
-Hemophilia (_____)

Colorblind Test

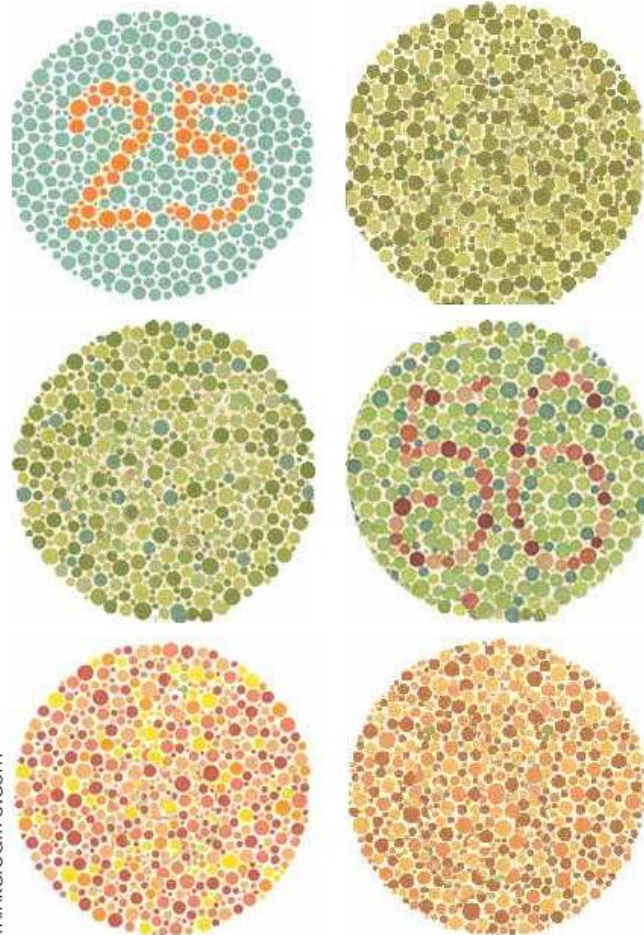
<http://colorvisiontesting.com/online%20test.htm>

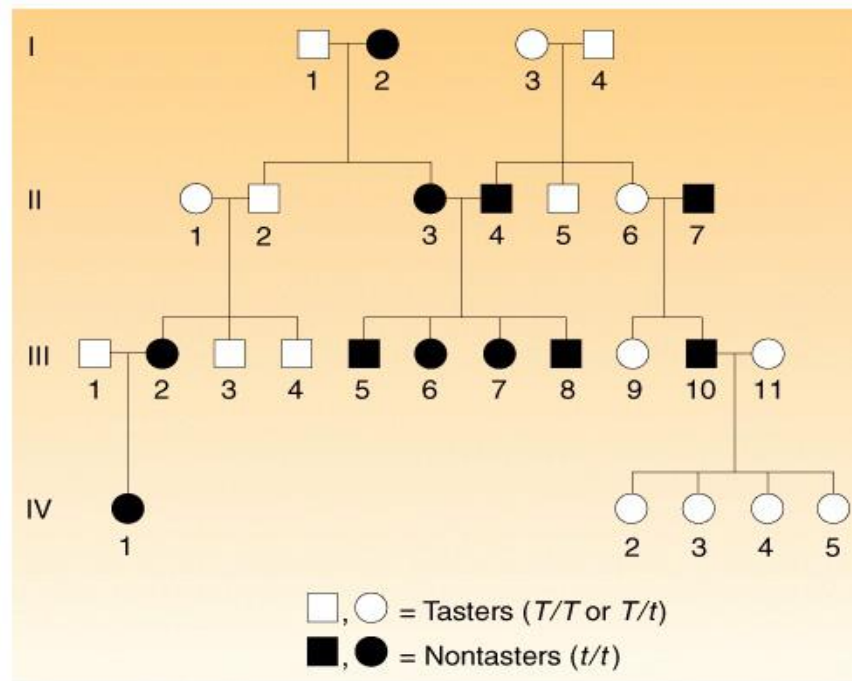
Ishihara Test For Color Blindness

What People With Regular Vision See



What Red-Green Color Blind People See





Can it be determined from this pedigree if the non tasters for PTC tasting gene is recessive sex-linked or autosomal?

For a recessive sex-linked trait, females can only inherit _____ trait if father exhibits _____.

For a sex-linked trait, if female has _____ trait, all _____ must exhibit trait.

Applying the Concepts

Colorblindness is caused by a recessive allele on the X chromosome (X^b).

For males, they have only 1 allele (X^b or X^B)

If a colorblind woman (X^bX^b) marries a man with normal vision (X^BY), what is the probability of a daughter being colorblind? A son being colorblind?

Inheritance of Sex-Linked Traits

- A male can inherit colorblindness if his _____ is a carrier of colorblindness.

(Doesn't matter father's color vision, because males inherits _____ from dad).

- A female must inherit the colorblindness allele from both parents.
 - Mother must be at least a _____.
 - Father must be _____.

Polygenic Traits

Traits that are controlled by _____ genes.

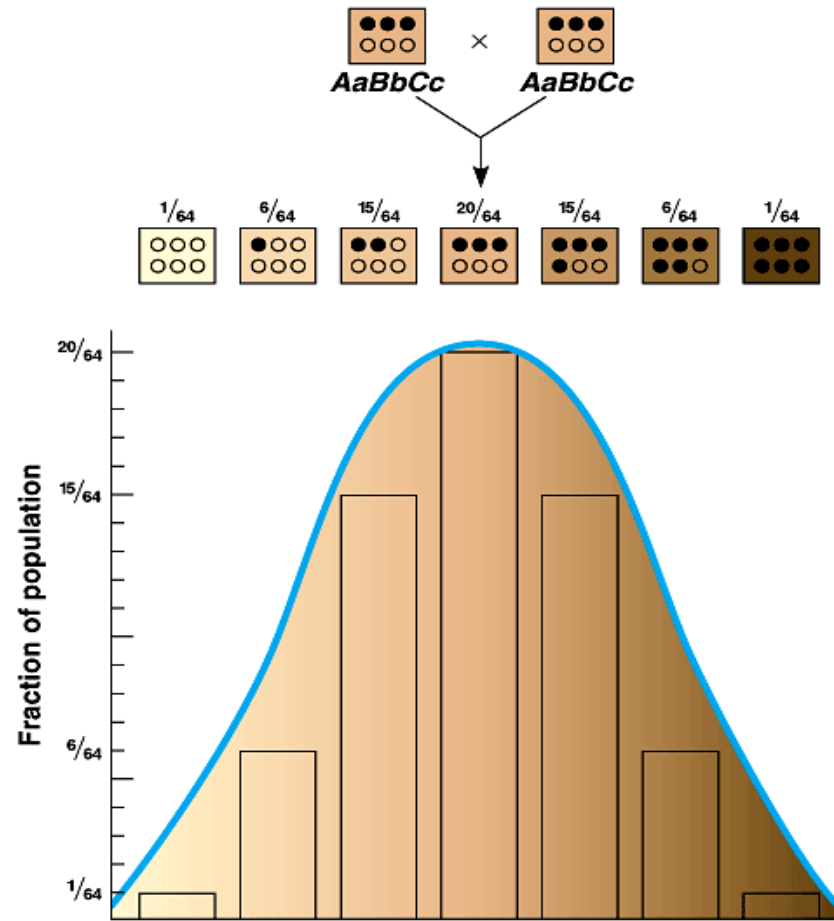
Examples:

Human Height

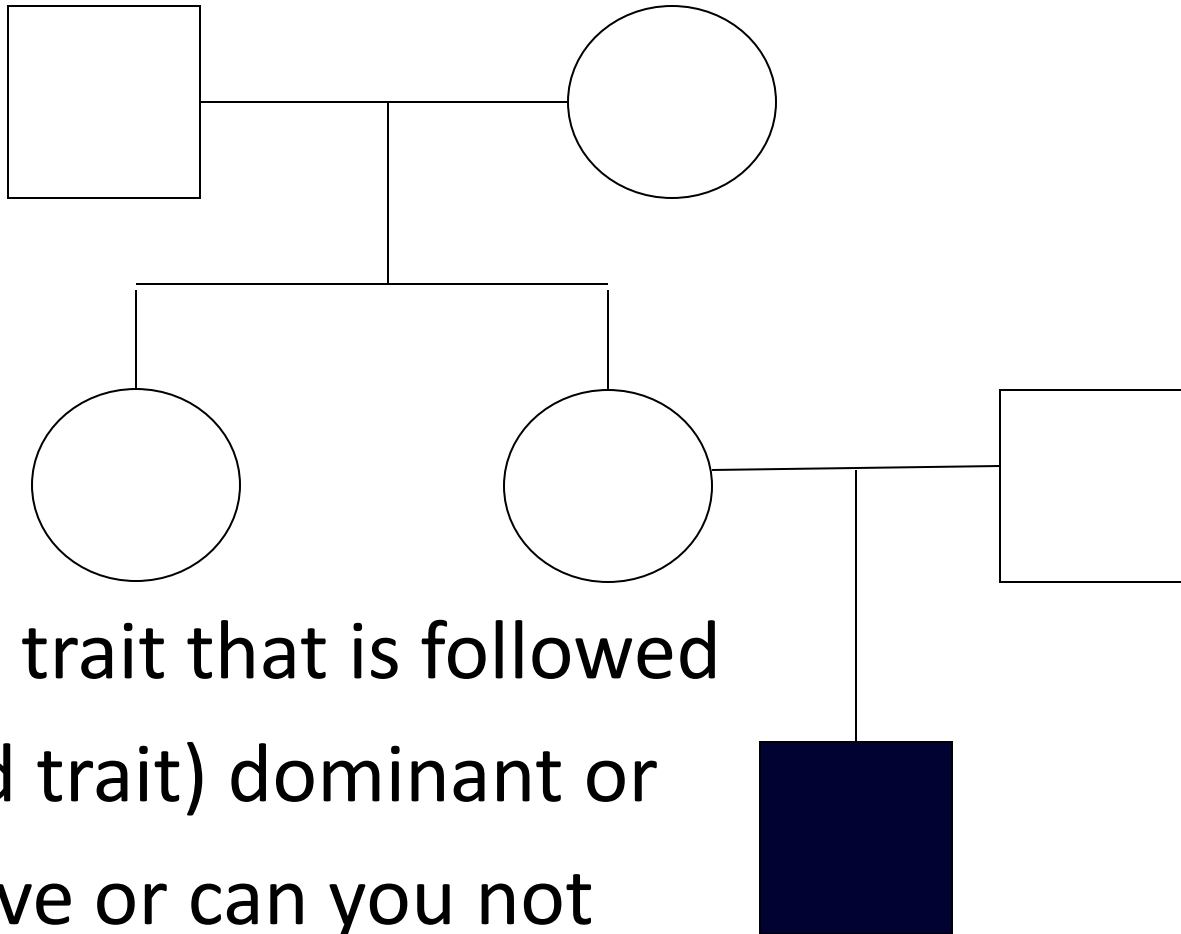
Skin Color

Traits exhibit a
greater range of
_____ due
to having many

_____ determine the
trait

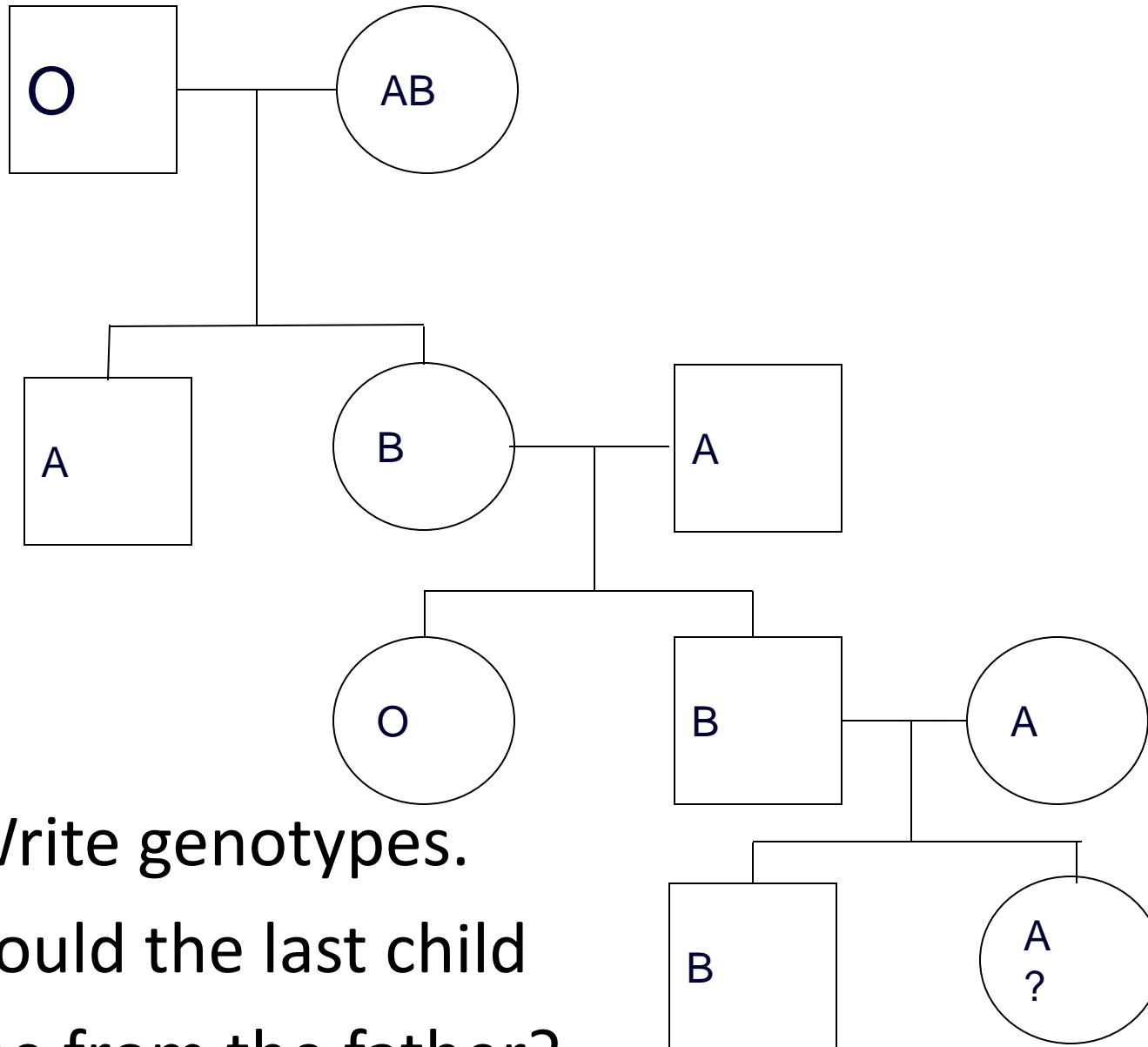


Practice Problems



- Is the trait that is followed (shaded trait) dominant or recessive or can you not tell from the pedigree? Use the letter “T” to write the genotypes if you can.

Practice Problem



Write genotypes.

Could the last child
be from the father?