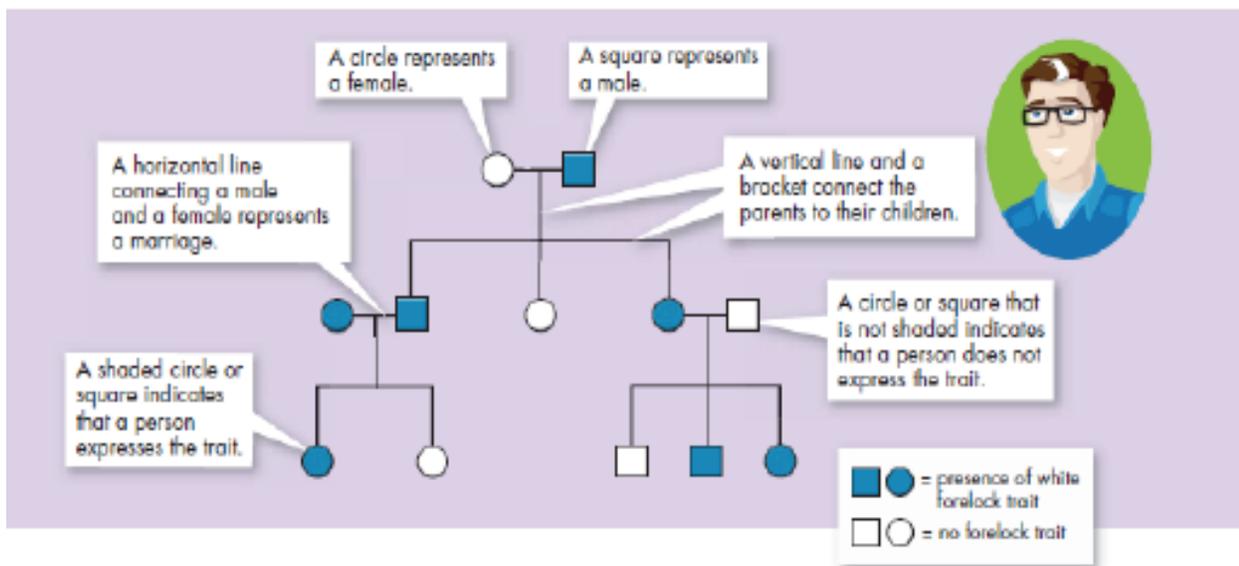




APRIL 27- APRIL 30, 2020

TOPIC: UNDERSTANDING PEDIGREE

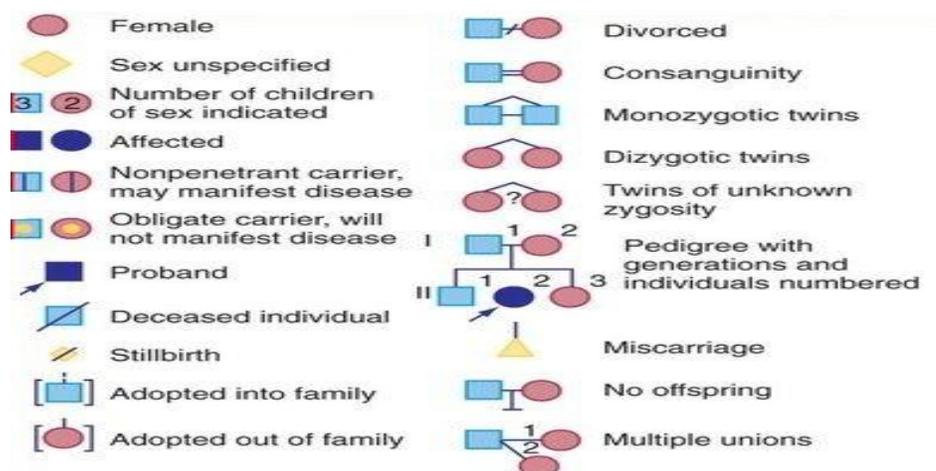
**Pedigree** is similar to a “family tree” which shows a systematic listing of individuals from one generation to another, usually following a trait of interest. It is a graphical chart that illustrates a family history or transmission of a particular trait. They are also used when trying to determine the predisposition of someone to carry a hereditary disease for example, familial breast cancer. The figure below indicates some of the basic symbol used for pedigree.



<https://images.app.goo.gl/kdD7Ajr6FniW6yq8>

**Components of a Pedigree**

- A pedigree involves a large number of individuals represented by figures such as circle for female and square for male.
- A shaded figure represents a female or male individual that is known to be affected by a genetic disease.
- Horizontal and vertical lines are used to connect figures with each other denoting marriage, children, or siblings. Figure below shows standard symbol use for pedigree chart analysis.



## Analysing Simple Pedigree

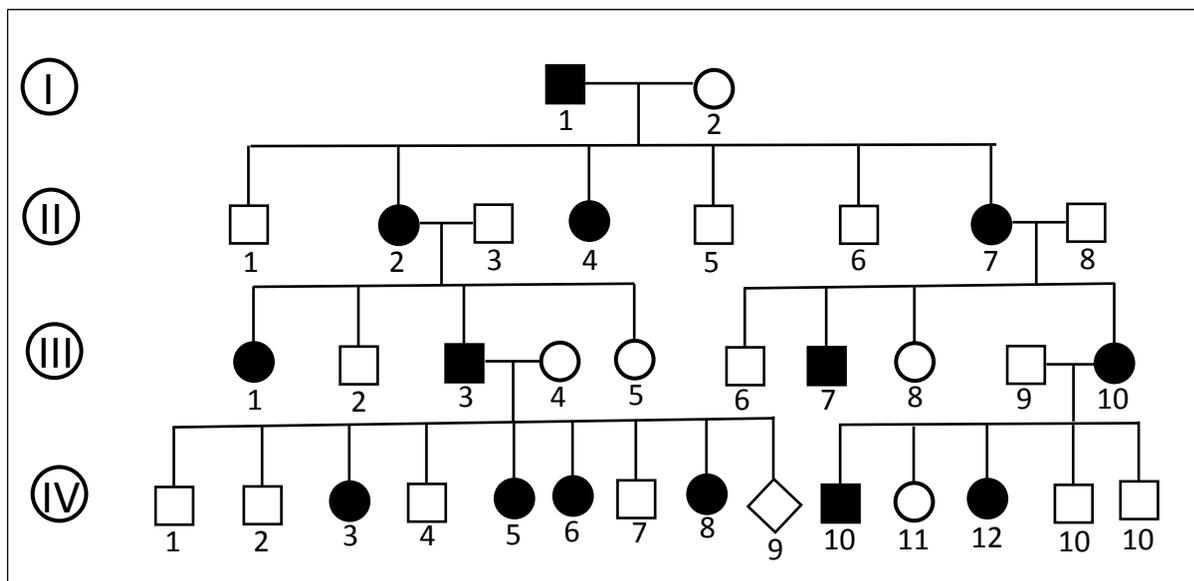
On the left side of the chart, Roman numerals are written, representing generations such as I, II and III for the first, second, and third generations, respectively in each row, Arabic numerals are assigned to refer to individuals during analysis

When referring to the second individual in the third generation, it will be written III-2. Furthermore, a proband in a pedigree is identified by an arrow pointer. A proband is the individual in the pedigree that first exhibited the trait of interest. Below are the symbols used in making a pedigree.

How do we understand a pedigree? Let us take a look at the pedigree presented below. The topmost individual symbolizes the “founding parent” or the head of the clan. The male head of the clan expressed the genetic trait while the female head did not. The couple had six children (II-1, II-2, II-4, II-5, II-6, and II-7) with three of their children (II-2, II-4, and II-7) expressed the same trait as their father II-2 and II-7 both female married II-3 and II-8, respectively.

The marriage of II-2 and II-3 resulted in 4 children with their III-1 female and III-3 male children expressing the trait similar to their mother (II-2). III-3 married and bore 9 children. All their daughters (IV-3, IV-5, IV-6, and IV-8) expressed the trait. Their ninth child has unknown sex and trait expression.

The marriage of II-7 and II-8 resulted in 4 children with their III-7 male and III-10 female children expressing the trait. III-10 married and had 5 children. Child IV-10 who is male and child IV-12 who is female expressed the trait.



### Hints for Analysing Pedigree

Analysing a pedigree and predicting the probability of the next generation of offspring expressing trait is not an easy task. Analysis involves determining the probability of a trait being expressed in succeeding generations of offspring. There are five considerations which can be used in pedigree analysis:

1. An individual that does not express the trait does not carry a dominant allele of the trait.
2. All individuals that married into the family are considered without the trait or disease.
3. It is possible for an individual that does not express the trait can be a carrier of the trait.
4. If the trait is linked to the X chromosome, one copy of this allele is enough for the trait to be expressed in a male individual.
5. If a male individual carries an X-linked trait, the individual will express it. Upon marriage, the allele of the X-linked trait will be passed on to all of his daughters.



LA IMMACULADA CONCEPCION SCHOOL  
SENIOR HIGH SCHOOL  
GRADE 11 – STEM: GENERAL BIOLOGY

ACTIVITY  
AN INVENTORY OF MY TRAIT

Students take an inventory of their own easily observable genetic traits. Working with your siblings, observe how their trait inventories differs from those of others. You will record their observations in a data table and make a bar graph to show the most and least common traits in your family. Using your learning on your research subject gather and tabulate your data from your own design questionnaire.

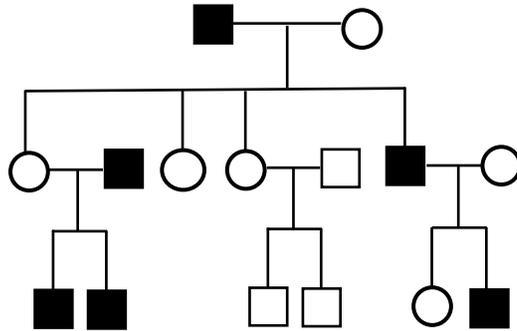


ACTIVITY  
QUICK CHECK

Directions: Answer the following questions separately for each pedigree.

1. What is the mode of inheritance?
2. Write the genotype of the individuals in the pedigree based on the mode of inheritance given.

**Pedigree 1**



**Pedigree 2**

