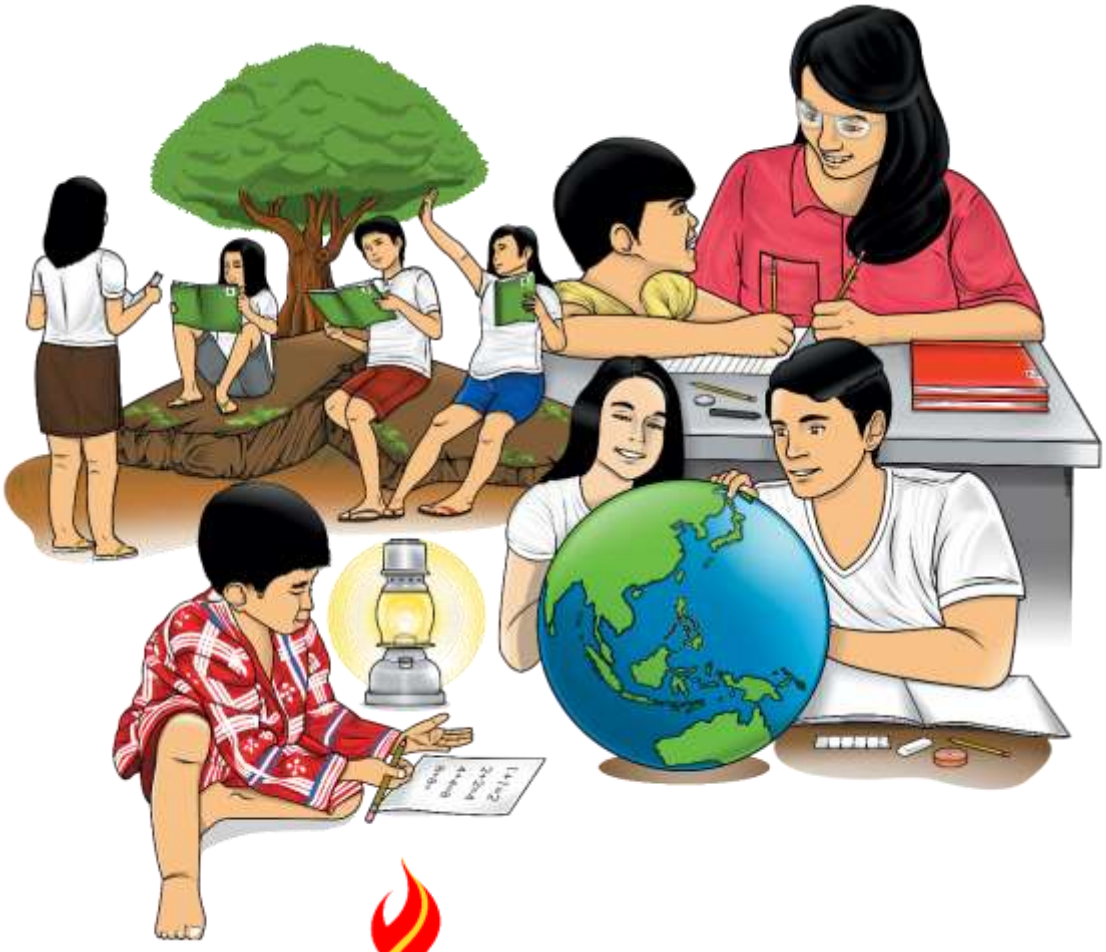
8

DepED
DEPARTMENT OF EDUCATION

Science

Quarter 4 – Module 4:
Mendelian Genetics



ALTERNATIVE DELIVERY MODE
ADM

Science – Grade 8
Alternative Delivery Mode
Quarter 4 – Module 4: Mendelian Genetics
First Edition, 2020

Published by the Department of Education
Secretary: Leonor Magtolis Briones
Undersecretary: Diosdado M. San Antonio

Development Team of the Module

Writer: Dahlia M. De Castro

Editor: Daisy Ruby S. Sinday

Reviewers: Bernabe L. Linog, Corazon P. Roa, Arlene L. Abala, Juvy B. Luna, Kathyleen S. Torculas

Illustrators: Dahlia M. De Castro, Amor M. De Castro II and Amor M. De Castro III

Layout Evaluators: Celeste Faith R. Almanon, Jay S. Ayap and Antionette D. Sacyang

Management Team: Francis Cesar B. Bringas
Isidro M. Biol, Jr.
Maripaz F. Magno
Josephine Chonie M. Obseñares
Gregoria T. Su
Marvilyn C. Francia
Jay S. Ayap
Nonita C. Patalinghug

Printed in the Philippines by _____

Department of Education – Caraga Region

Office Address: Teacher Development Center
J. P. Rosales Avenue, Butuan City, Philippines 8600
Telefax: (085) 342-8207/(085) 342-5969
E-mail Address: caraga@deped.gov.ph

8

Science

Quarter 4 – Module 4:
Mendelian Genetics

DepED
DEPARTMENT OF EDUCATION

Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

This module was designed and written with you in mind. It is here to help you master the Mendelian Genetics. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the learners' material you are now using.

The module contains:

- **Lesson 1** - Mendelian Genetics

After going through this module, you are expected to:

1. discuss Mendelian Genetics;
2. solve and predict Mendelian phenotypic and genotypic expression of traits in a monohybrid cross;
3. solve and predict Mendelian phenotypic and genotypic expression of traits in a dihybrid cross; and
4. predict phenotypic expressions of traits following simple patterns of inheritance. (MELC Week 3 S8LT-IVf-18)

What I Know

Directions: Choose the letter of the correct answer. Write your answers on a separate sheet of paper.

1. An allele is a variant form of a gene. Some genes have a variety of different forms, which are located at the same position, or genetic locus, on a chromosome. Humans are called diploid organisms because they have two alleles at each genetic locus, with one allele inherited from each parent. Which of the examples below is an allele for a diploid organism?
   A. G C. GH
   B. GG D. HHH
2. Homozygous dominant allele is represented by the letters _____.
   A. RR C. Rr
   B. Sr D. rr
3. Who pioneered ~~on~~ the study of Genetics?
   A. Carolus Linnaeus C. Gregor Mendel
   B. Charles Darwin D. Robert Brown

4. A pair of dissimilar alleles for a certain trait is called _____.
   A. Allele
   B. Chromosome
   C. Heterozygous genes
   D. Homozygous genes
5. It is the study of genes to determine traits inherited by the offspring from the parents?
   A. Botany
   B. Genetics
   C. Histology
   D. Zoology
6. Which genotype of an organism is with the same alleles for a trait?
   A. Genes
   B. Heterozygous genotype
   C. Homozygous genotype
   D. Polygenes
7. Which pair of alleles are not identical?
   A. Allele
   B. Chromosome
   C. Heterozygous
   D. Homozygous
8. The genetic makeup of an organism is called _____.
   A. Genotype
   B. Heredity
   C. Offsprings
   D. Phenotype
9. Which of the following is a heterozygous dominant genotype?
   A. HH
   B. HHH
   C. Hh
   D. hh
10. A monohybrid cross is a cross using _____.
   A. two factors or characters
   B. a single trait or character
   C. several factors or characters
   D. a combination of characters

II - Directions: Write the genotypes and phenotypes of the given cross:

1. Yellow color in peas (Y) is dominant over green peas (y). A homozygous yellow pea plant is crossed with a homozygous green pea plant. What will be the genotypes and phenotypes of all the possible offspring?

Genotypes:_____

_____

Phenotypes:_____

_____

2. In fruit flies, long wing (L) is dominant to short wing (l). Two heterozygous long-winged fruit flies both (Ll) are crossed. What are the possible genotypes and phenotypes of their offspring?

Genotypes:_____

_____

Phenotypes:_____

_____

Lesson 1 Mendelian Genetics

Many of us wonder why we look similar to our parents, why plants and animals produce their own kind. Some of your friends would say that your ears and lips are the same as your mother but your skin color and your height are the same as your father. Well, traits really are inherited from our parents. How did this happen?

In this module, you will understand how traits are passed from one generation to the next. So, enjoy learning.

What's In

Activity 1: True or False

Directions: Write True if the statement is correct and False if wrong. Write your answers on a separate sheet of paper.

_____1. The different types of reproduction are sexual, binary, and asexual reproduction.

_____2. Sexual reproduction occurs in organisms that produce reproductive cells that undergo meiosis.

_____3. Asexual reproduction involves two parents.

_____4. Meiosis is a cell division that happens in our sex cells or gametes.

_____5. "Crossing over" can occur in meiosis I but not in meiosis II.

_____6. Prokaryotes go through meiosis I and eukaryotes go through meiosis II.

_____7. A zygote is formed through the union of two gametes.

_____8. Meiosis I is the same as mitosis.

_____9. A human gamete has 23 chromosomes.

_____10. In binary fission, parent and offspring are identical.

_____11. Parents and offspring are dissimilar in sexual reproduction.

_____12. Gametes are diploid; a zygote is haploid.

_____13. Egg and sperm are diploid gametes.

_____14. Meiosis is involved in the production of gametes.

_____15. Asexual reproduction in Meiosis II involves somatic cells.

What's New

As you can see, there are different forms of living things around us. Do you know why is this so? This is one of the questions that will be answered as you go on reading the module.

Figure 1 below shows different forms of living things. What do you think are the differences and similarities among them? Diverse forms exist among living things of similar species or among different species.

Begin your study by comparing the different forms of living things in the pictures below.

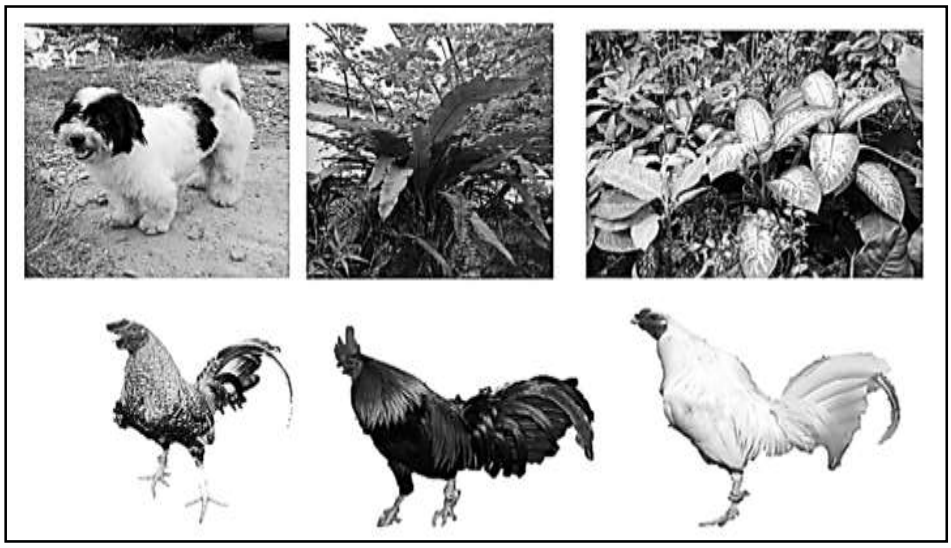


Figure 1. Variation among living organisms

Photographs taken by the author

Have you noticed how siblings look alike or look differently? Even in your family, you shared many traits such as the color of your eyes, the types of your lips, your height and a lot of other traits.

In the next activity, you will find out the differences and similarities of your traits by observing yourself, your siblings, your mother and your father.

Activity 2. Observing Your Traits and Your Family's Traits

Directions: Read the procedure carefully and answer the given questions. Write your answers on a separate sheet of paper.

Procedure:

1. Study the table below.
2. Identify the traits that you, your brother, sister, mother, and your father have by checking (✓) the appropriate box.

Character	**Character Variants**	**Family Members**				
		Me	Father	Mother	Brother	Sister
Earlobes	Unattached					
	Attached					
Eye color	Brown					
	Black					
Hairline	Straight frontal hairline					
	With widow's peak					
Handedness	Left handedness					
	Right handedness					
Height	Short					
	Tall					
Nose	Low-bridged					
	High-bridged					
Skin color	Dark					
	Light or fair					

Questions:

Based from your observations on the different traits of your family members,

a. who looks most similar to you?

Answer: _____

b. who looks most different from you?

Answer: _____

What is It

Gregor Mendel and His Experiment on Garden Peas

Gregor Mendel is an Austrian monk. In a monastery, he spent his time in investigating how individual traits were inherited. Gregor Mendel used the garden peas (*Pisum sativum*) in his experiments because it has several traits to be studied, easy to grow, reproduce through self-pollination. Through his research on garden peas, a new branch of science was formed, it is called Genetics. Gregor Mendel then paved the way for the study of Genetics.

Genetics is the study of heredity and the factors that affect the transmission of genes to determine inherited characters from one generation to the next. Heredity refers to the transfer of traits genes from parents to offspring.

The different traits of Garden Peas that Gregor Mendel studied are shown below (Figure 2):

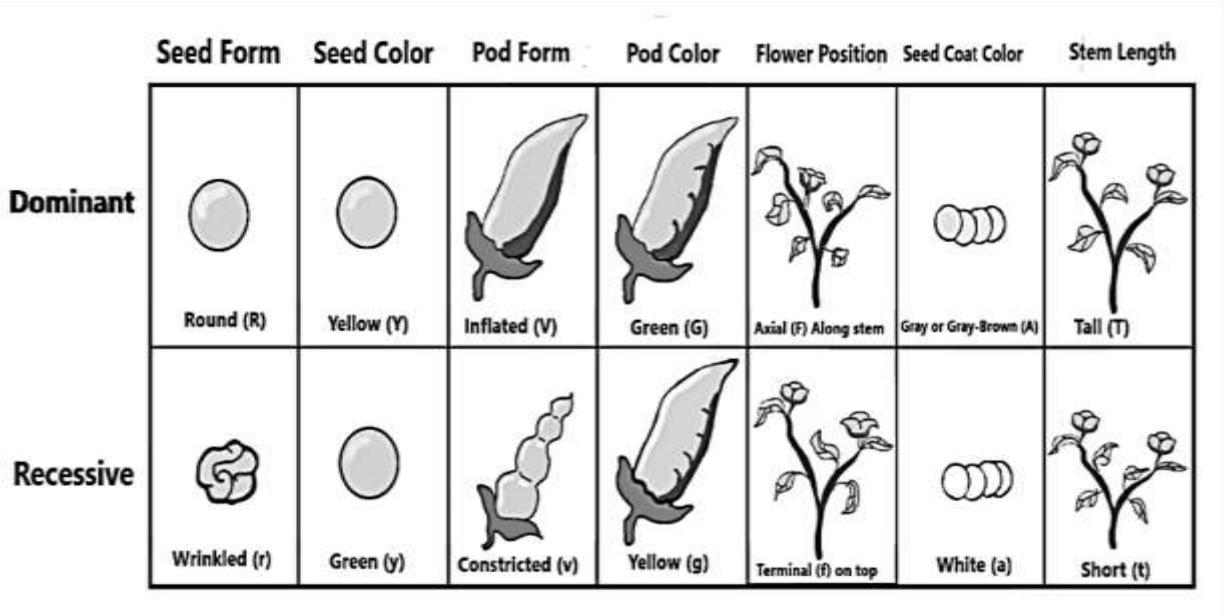


Figure 2. Seven (7) Different contrasting traits of Garden Peas that Gregor Mendel used in his Study.

Illustrated by: Amor M. De Castro III

Gregor Mendel's Experiment

Gregor Mendel first produced pure-breeding plants through self-pollination for many generations until all the offspring had the same features as the parents. For example, when green seed peas were self-pollinated, all the offspring produced were all green seed peas. Using his pure-breeding plants, Gregor Mendel started cross-pollinating the peas with contrasting traits. The pure-breeding peas were called parental or P1 generation and when cross-pollinated, the resulting offspring were called first filial (F1) generation. The F1 generation was also called hybrids because it resulted from a cross between two pure-bred plants with different traits. For example, when the pure-breed round seed was crossed-pollinated with pure-breed wrinkled seed, all the offspring produced were all round seeds. A cross using one trait is referred as **monohybrid cross**. (See Figure 3 & Table 1)

Example of a **Monohybrid Cross**:

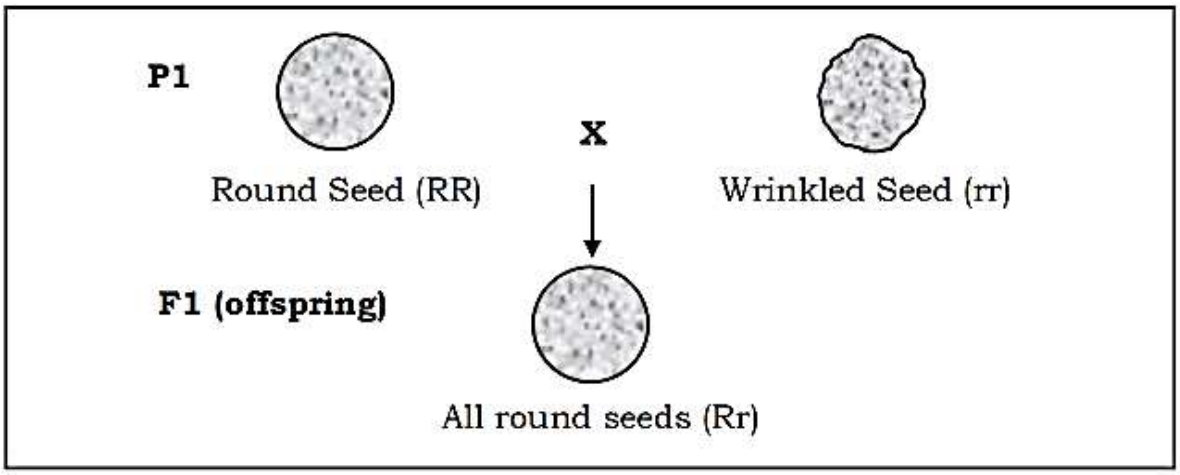


Figure 3. Gregor Mendel's cross using pure-breed round seed and pure-breed wrinkled seed peas producing all round seeds

Illustrated by: Amor M. De Castro II

Table1. *Results of Gregor Mendel's Crosses Between Pure-breed Peas*

TRAITS	PARENTS (P1)			FIRST FILIAL GENERATION (F1)
Flower position	Axial	**X**	Terminal	All axial
Pod color	Yellow	**X**	Green	All green
Pod shape	Inflated	**X**	Constricted	All inflated
Seed coat color	Colored	**X**	White	All colored
Seed color	Yellow	**X**	Green	All yellow
Seed shape	Round	**X**	Wrinkled	All round
Stem length	Long	**X**	Short	All long

Crossing the Hybrid Plants

After cross-breeding the pure-breed peas, Gregor Mendel was determined to know what happened with the other lost traits. Gregor Mendel crossed the peas from **F1** generation (**hybrid)** with each other and produced another type of offspring called the second filial generation **F2** (Table 2). There were two types of offspring produced in the F2 generation, ¾ were round seeds and ¼ were wrinkled seeds (Figure4).

Example: Cross of hybrids

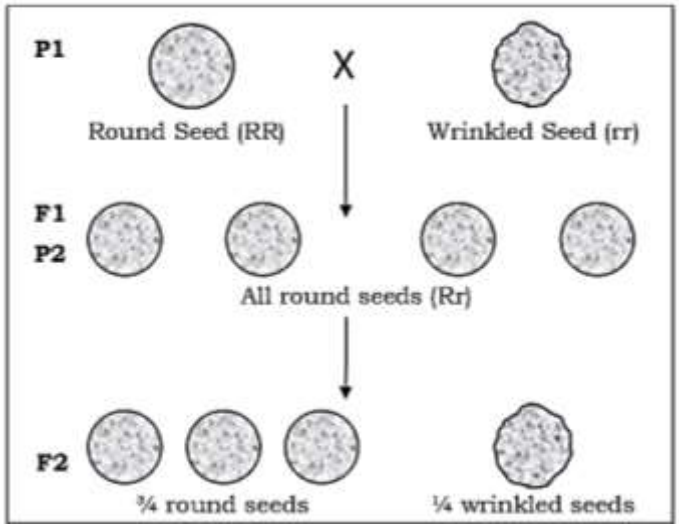


Figure 4. The Result obtained from the self-pollination of F1 peas.
Illustrated by: Amor M. De Castro II

In the F2 generation, Mendel counted 5,474 round seeds and 1,850 wrinkled seeds. The round seeds were about three times as many as the wrinkled seeds. The ratio of round seeds to wrinkled seeds was 2.96:1 or nearly 3:1. Moreover, in the F1 generation the wrinkled seed type did not appear but reappeared in the one-fourth of the F2 generation. He then concluded that the F1 generation received the capabilities to produce both phenotypes from their parents which are retained and passed on to their future offspring. The produced ratios suggest the probability of occurrence of the genotype and phenotype in a generation rather than the ability to generate few offspring. Table 2 summarizes the results on Mendel's second set of experiments.

Table 2. Results of Gregor Mendel's Crosses Between Hybrid Peas

Traits	F1/Hybrid	F2 Generation Produced by Self-Pollinating F1 Hybrids		Observed Ration
Flower position	Axial	Axial (651)	Terminal (207)	3.14:1
Pod color	Green	Green (428)	Yellow (152)	2.82:1
Pod shape	Inflated	Inflated (882)	Constricted (299)	2.95:1
Seed coat color	Colored	Colored (705)	White (224)	3.15:1
Seed color	Yellow	Yellow (6022)	Green (8023)	3.01:1
Seed shape	Round	Round (5474)	Wrinkled (1850)	2.96:1
Stem length	Long	Long (787)	Short (277)	2.84:1

Mendelian Principles of Heredity

Gregor Mendel's results of his experiment made him hypothesize that there was a factor in the plants which controlled the appearance of a trait which he called hereditary "factors". He also hypothesized that traits were regulated by a pair of "factors" now called **alleles**. With these findings, Gregor Mendel was able to formulate the three principles of heredity.

Gregor Mendel conceived the idea of heredity units, which he called hereditary "factors". Mendel found that there are alternative forms of factors currently called genes that account for variations in inherited characteristics.

1. The Law of Dominance

The **Law of Dominance** states that in every organism, there is a pair of factors or genes which control the appearance of a particular trait. One of the pair of genes/alleles may hide or prevent the appearance of the other. One allele is a dominant trait, while the other is a recessive trait. The dominant traits hide or mask the appearance of the recessive trait. The dominant trait is represented by a big letter and a small letter for the recessive trait.

Example:
R for round seed (dominant trait), **r** for wrinkled seed (recessive trait)
G for the green pod (dominant trait), **g** for the yellow pod (recessive trait)**.**

Note that in a particular trait, the same letter will be used for both the dominant and recessive traits. Since **genes are in pairs**, the pure breeding green seed peas will be represented with letters **GG** and the pure breeding yellow seed peas **gg**. There are pairs of alleles which are identical and are called **homozygous** or **homozygote** while the pair of alleles which are not identical are called **heterozygous** or **heterozygote**.

Each one of us has genes or alleles that are either homozygous or heterozygous.
Example: **RR** – homozygous genes for round seed
Rr - heterozygous genes round seed

The pair of genes or alleles is the genetic makeup for a particular trait of an organism called **genotype** while the **phenotype** is the observable trait or the visible trait of an organism based on the genotype (Table 3).

Table 3. Genotype and Phenotype Round Seed Pea Plant

Genotype	Description of the Alleles or genes	Phenotype
RR	Homozygous genes for round seed	Round seed
Rr	Heterozygous genes for round seed	Round seed

2. The Law of Segregation

The **Law of Segregation** states that all pairs of genes for all the traits of an organism segregate or separate from each other during meiosis or gametes (sex cells) formation. Gregor Mendel argued that for any trait, an organism must inherit one factor from the sperm and one factor from the egg. Thus, a new organism receives one factor for each trait from each parent.
(See Figures 5, 6, 7).

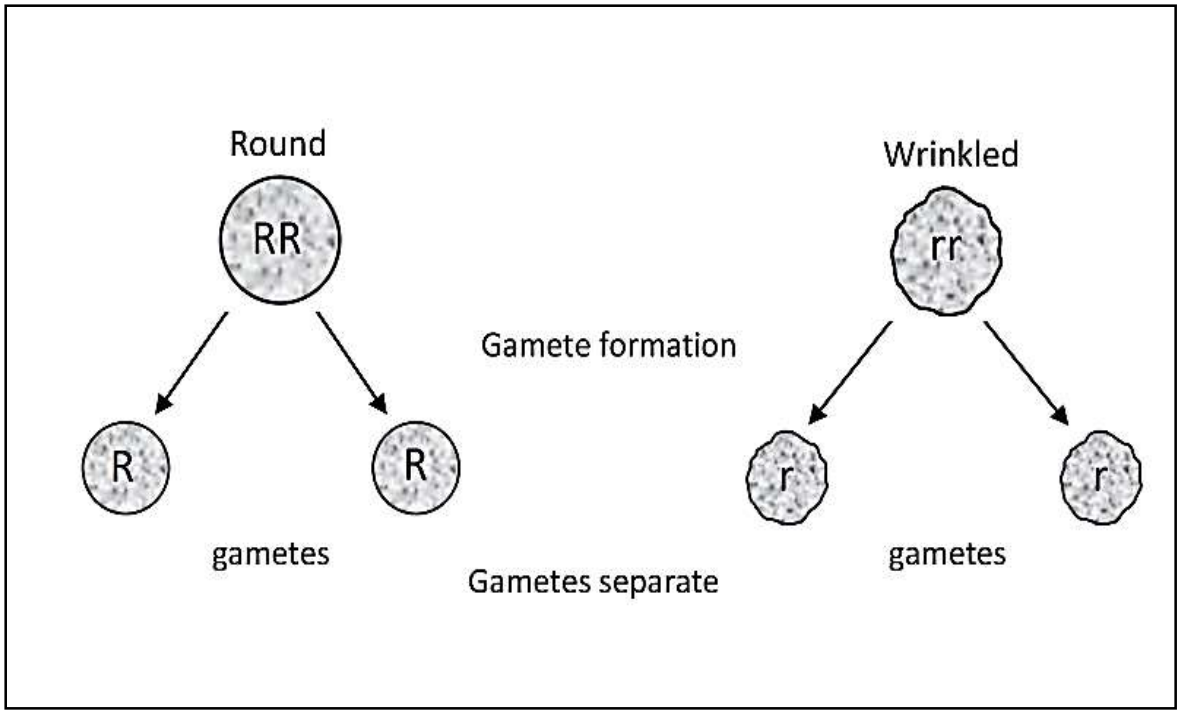


Figure 5. Round and wrinkled seeds during gamete formation

Illustrated by: Amor M. De Castro II

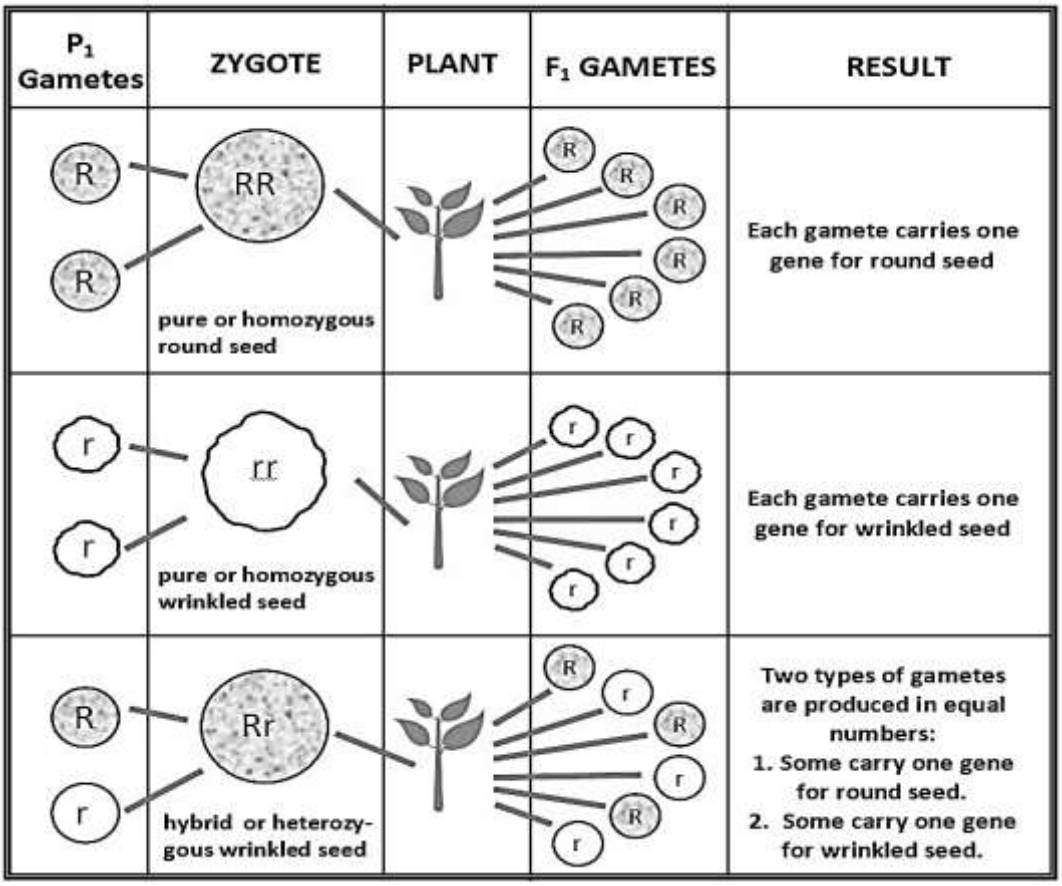


Figure 6. The gametes produced by a pure round seed, pure wrinkled seed and hybrid round seed pea plants

Illustrated by: Amor M. De Castro II

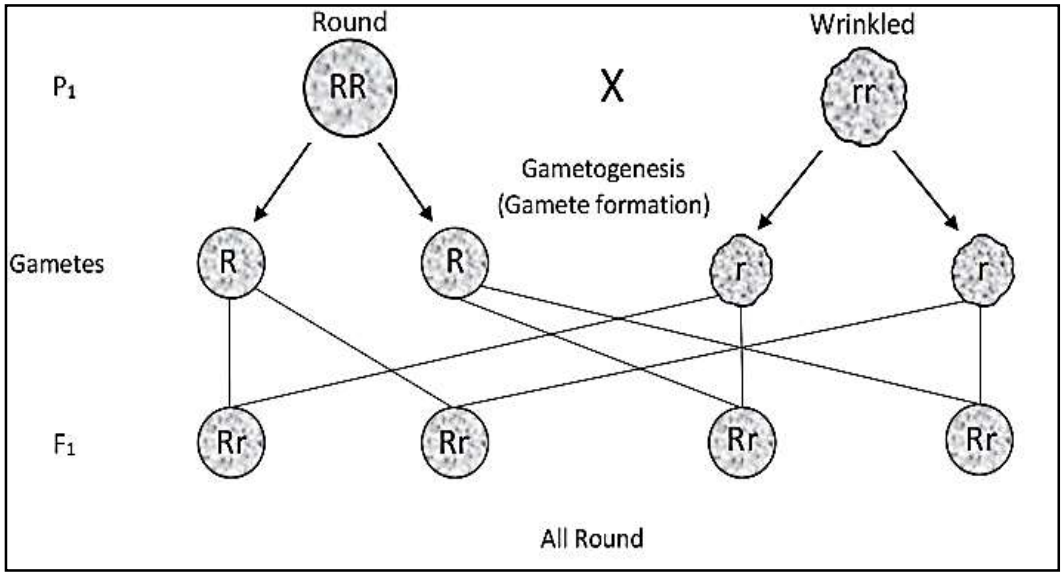


Figure 7. The result of crossing pure-breeding round and wrinkled seed

Illustrated by: Amor M. De Castro II

3. The Law of Independent Assortment

The **Law of Independent Assortment** states that the distribution or assortment of one pair of genes is independent of the distribution of the other pair. Traits are inherited independent of each other. The law applies to genes that are found on separate chromosomes. Thus, one pair of genes is not affected by the other pair.

Dihybrid Cross

Aside from Gregor Mendel's study on inheritance of one pair of genes or alleles, he also studied the inheritance of two pairs of genes or alleles. A cross that involves two pairs of genes or alleles is called **dihybrid cross**. An easy way to do the dihybrid cross is through the use of Punnett square.

Example: **RRYY** X **rryy**

(Round, Yellow Seed) (Wrinkled, Green Seed)

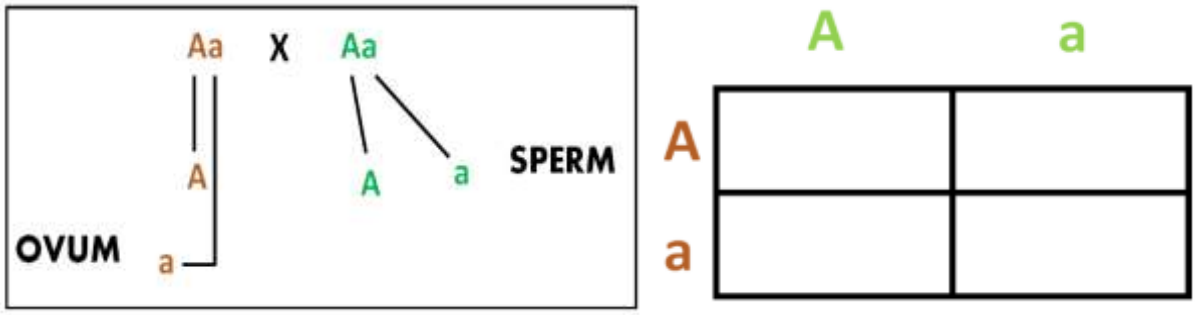
Punnett Square

Reginald C. Punnett is the one who devised the Punnett square. This is a simple way to determine the possible combinations of genes in a given cross. It can help you predict easily the outcome of a given cross.

How to make a Punnett Square

1. Make a square and divide into 4 boxes for monohybrid cross and 16 boxes for dihybrid cross.
2. The letters of the possible genes for a trait from the female (♀) are written down on the left side.
3. The letters of the possible genes for the same trait from the male (♂) are written across the top of the square.

Example illustration:



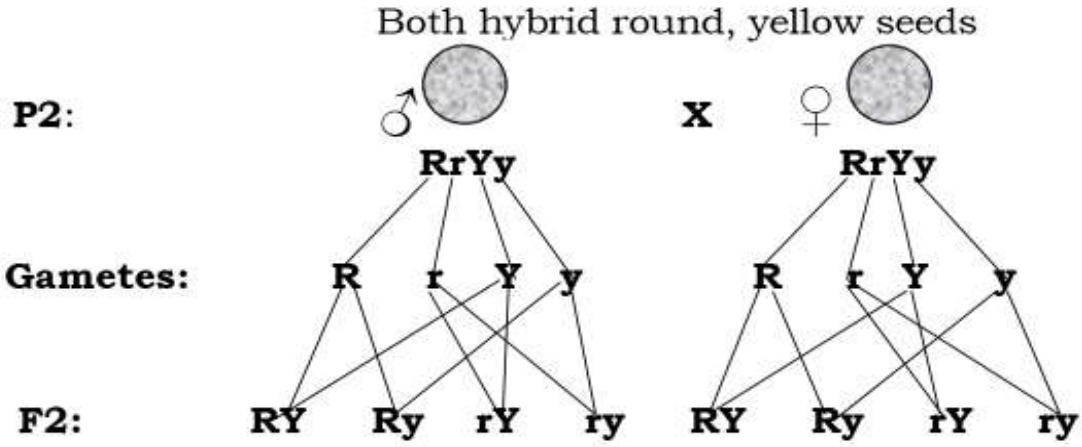
4. Start crossing the male gametes with the female gametes in each box until all the four boxes are filled in. Place the phenotype below each genotype

Axial / axial	A	a
A	AA Axial	Aa Axial
a	Aa Axial	aa terminal

A complete Punnett square will always show the resulting genotypes and phenotypes of the resulting progeny or offspring.

5. Lastly, interpret the result.
   Result of the sample illustration:
   - There are 4 offspring produced from crossing both hybrid axial flowers: Aa X Aa.
   - Their genotypes are:
     1 AA - homozygous axial flower
     2 Aa - heterozygous axial flowers
     1 aa - homozygous terminal flower
   - The genotypic ratio: 1:2:1
   - Their phenotypes are:
     3 - axial flowers
     1 - terminal flower
   - The phenotypic ratio: 3:1

Example 1: Dihybrid Cross using the Punnett Square:



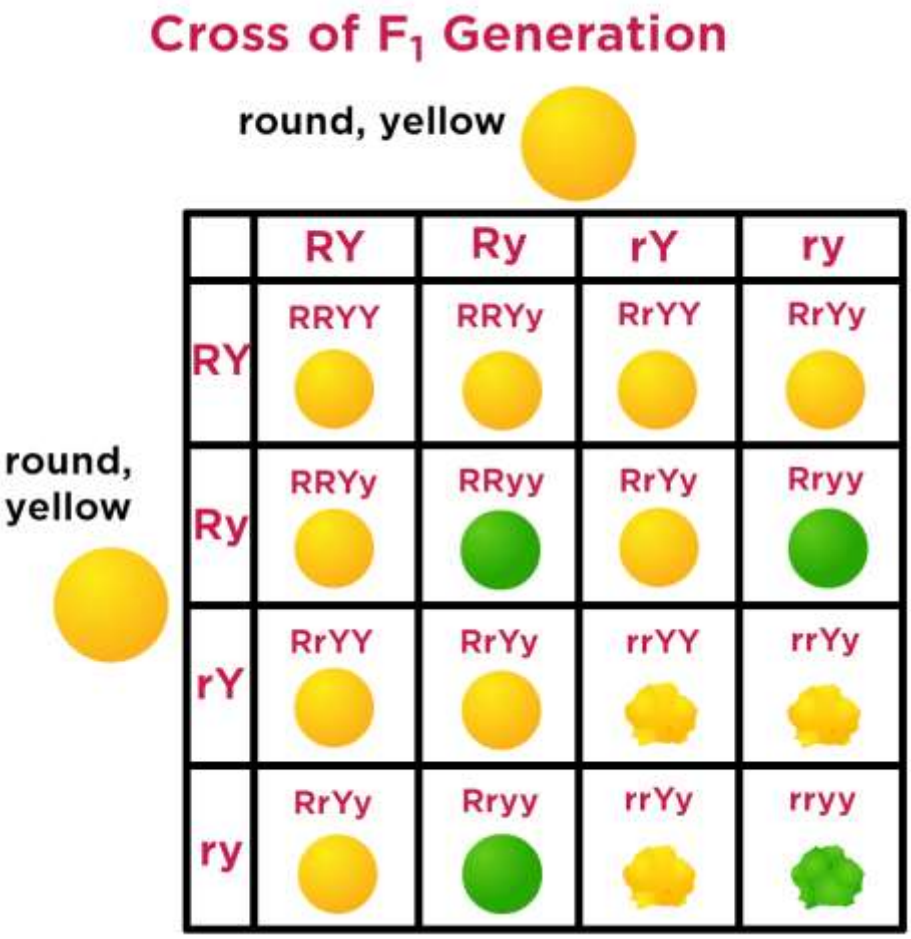


Figure 8. Dihybrid cross of hybrid/heterozygous round, yellow seeds pea plants

Result:

- There are 16 offspring from the cross of both hybrid/heterozygous round, yellow seed pea plants.

- The **genotypes** are:

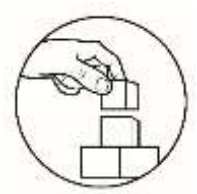
  1 RRYY - homozygous round, yellow seed
  2 RRYy - homozygous round, heterozygous yellow seed
  1 RRyy - homozygous round, green seed
  2 RrYY - heterozygous round, homozygous yellow seed
  4 RrYy - heterozygous round, yellow seed
  2 Rryy - heterozygous round, homozygous green seed
  1 rrYY - homozygous wrinkled, homozygous yellow seed
  2 rrYy - homozygous wrinkled, heterozygous yellow seed
  1 rryy - homozygous wrinkled, green seed

- The genotypic ratio: **1:2:1:2:4:2:1:2:1**

- The **phenotypes** are:

  9 - round, yellow seed
  3 - round, green seed
  3 - wrinkled, yellow seed
  1 - wrinkled, green seed

- The phenotypic ratio: **9:3:3:1**



What's More

Activity 3: What are My Dominant and Recessive Traits?

Directions: Represent the traits with a letter of your choice on the appropriate space in the table below. Write your answers on a sheet of paper.

Dominant Trait	Recessive Trait	Dominant	Recessive
Brown eyes	Blue eyes		
Curly hair	Straight hair		
Tall	Short		
Unattached earlobe	Attached earlobe		

Activity 4. Monohybrid Cross Using the Punnett Square

Directions: Read the situation and answer the questions that follow. Write your answers on a separate sheet of paper.

Situation:

A homozygous red Santan flower (RR) is crossed with a homozygous pink Santan flower (rr).

Tasks:

1. Show the given cross using the Punnett square.
2. Write the genotypes and phenotypes of the resulting offspring.

Activity 5. Dihybrid Cross Using the Punnett Square

Directions: Show the dihybrid cross of both hybrid/heterozygous tall, green mango (TtGg) by filling up the blank boxes in the Punnett square and answer the questions that follow. Write your answers on a sheet of paper.

♂ (pollen) / ♀ (ova)	T G	T g	t G	t g
T G				
T g				
t G				
t g				

Questions:

1. Count the number of:

Tall green Mango: _____
Short yellow Mango: _____

Tall yellow Mango: _____
Short green Mango: _____

2. Write the phenotypic ratio.

Phenotypic ratio: _____

What I Have Learned

Directions: Fill in the blanks with the correct answer from the terms given inside the box below. Write your answers on a separate sheet of paper.

Alleles	Dihybrid	Dominance	Genes	Genetics
Heredity	Homozygous	Monohybrid	Genotype	Segregation
Phenotype	Punnett Square	Recessive	Traits	Independent Assortment

1. The _____ is the study of heredity and variation of organisms.
2. The study of the transfer of traits from the parents to offspring is _____.
3. Inheritance of _____ is controlled by genes.
4. The _____ are always in pair which determine the maternal and paternal trait.
5. The _____ cross involves a cross using a single factor or character trait.
6. The _____ cross involves a cross using two character traits.
7. In Genetics, the two factors mentioned by Mendel are called alleles. These alleles could be dominant or _____.
8. The Law of _____ states that one member of the pair of factors or genes may mask or hide the appearance of the other genes.
9. The _____ can be represented by a pair of letters called genotype.
10. The _____ refers to the genetic composition for a trait of an organism.
11. The _____ is the observable trait or visible feature of the organism
12. Similar alleles are called _____ while dissimilar alleles are called heterozygous.
13. The Law of _____ states that during gamete formation, the all pairs of genes for all traits of an organism separate from each other.
14. The Law of _____ states that the distribution of one pair of genes is independent of the distribution of the other pair.
15. The _____ is a diagram that allows us to determine the possible combinations of genes in a given cross.

What I Can Do

Activity 6. Know My Traits

Directions: Study the given situation below. Fill in the Punnett square with the possible children's skin color. Identify the phenotypes and the phenotypic ratio of the resulting offspring from the given monohybrid cross. Write your answers on a separate sheet of paper.

Situation: Daniel met Cathy at a dance. They are both heterozygous for white (Ww) skin color. Should they get married, what would be the possible skin color of their children?

Punnett Square

Sperm ♂ / Ovum ♀		

Legend:

W – white skin color
w – brown skin color

Questions:

1. What are the possible skin colors of their children?

   Phenotypes: _____

2. What is the phenotypic ratio? _____

Assessment

I. Directions: Choose the letter of the correct answer. Write your answers on a separate sheet of paper.

1. Which does not describe Gregor Mendel?
   A. An Austrian monk
   B. Author of Punnet Square
   C. Father of Genetics
   D. Proponent of Law of Dominance

2. Which pair of letters represents a pure line dominant trait?
   A. CC
   B. Ee
   C. Gg
   D. tt

3. Which pair of alleles represents a recessive trait?
   A. BB
   B. Dd
   C. hH
   D. ss

4. Which is true about homozygous organism?
   A. has different alleles
   B. has only one of the alleles
   C. has three identical alleles
   D. has two similar alleles

5. Which refers to the offspring resulting from a cross between homozygous parents with two contrasting traits?
   A. Crossbred
   B. Hybrid
   C. Multiple Allele
   D. Purebred

6. Which refers to the genetic composition of a particular trait of an organism?
   A. Genotype
   B. Heterozygote
   C. Homozygote
   D. Phenotype

7. Which is a homozygous recessive genotype?
   A. GG
   B. GGG
   C. gg
   D. Gg

8. Which refers to the physical appearance of an organism?
   A. Allele
   B. Genes
   C. Genotype
   D. Phenotype

9. Which is NOT an example of an allele?
   A. Bb
   B. Dr
   C. DD
   D. tt

10. Which of the following is an example of a homozygous genotype?
    A. Tc
    B. tc
    C. TT
    D. Tt

II. Directions: Illustrate the given cross below:

Situation 1:

Long stem (L) in rose is dominant over short stem (l). A homozygous long stem rose plant is crossed with a homozygous short stem.

11. Give the genotypes of the possible offspring. _____
12. Give the phenotypes of the possible offspring. _____

Situation 2: Oval face (O) in man is dominant over round face (o). If a homozygous oval-faced man marries a homozygous round-faced woman.

13. Give the genotypes of the possible offspring. _____
14. Give the phenotype of the possible offspring. _____
15. What percent of their children will be round faced? _____

Additional Activities

Activity 7. Traits in Dogs

Directions: Read the situation carefully and make a Punnett square to show the cross and predict the offspring (phenotypes and genotypes). Write your answers on a separate sheet of paper.

Situation:

In dogs, **stickup ears (E)** is dominant over **dropped ears (e)**. A homozygous stickup-eared dog is mated with a homozygous dropped-eared dog.

Task/Question:

1. Make a Punnett square for the cross given above.
2. What are the genotypes and phenotypes of the resulting offspring?

Genotypes: _____

Phenotypes: _____

Answer Key

What I Know

1. B
2. A
3. C
4. C
5. B
6. C
7. C
8. A
9. C
10. B

1. Result:
   Genotypes of all possible offspring: All Yy
   Phenotype of offspring: All yellow

2. Result:
   Genotypes of all possible offspring: LL, Ll, and ll
   Phenotypes of all possible offspring: LL and Ll = long wings
   ll = short wings

What's In

Activity 1

1. True
2. True
3. False
4. True
5. True
6. False
7. True
8. False
9. True
10. True
11. True
12. False
13. False
14. True
15. False

What's New

Activity 2

Answers in the table will vary

Questions:

a. Who among your family members look similar to you?

#Answer will vary

b. Who has the most number of differences with you?

#Answer will vary

Note: All answers are correct

What's More

Activity 5

Sperm ♂ / Ovum ♀	T G	T g	t G	t g
T G	TTGG Tall green	TT Gg Tall green	Tt GG Tall green	Tt Gg Tall green
T g	TT gG Tall green	TT gg Tall yellow	Tt gG Tall green	Ttgg Tall yellow
t G	tT GG Tall green	tT Gg Tall green	tt GG short green	ttGg short green
t g	tT gG tall green	tT gg tall yellow	ttgG short green	ttgg short yellow

1.There are: Tall green mango: 9 Short green mango: 3

Activity 3:

Dominant	Recessive	Dominant (letters only)	Recessive (letters only)
Brown eyes	Blue eyes	Regardless of the letter chosen, both should be written in uppercase letter	Should be the same letter as the dominant, but both should be written in lowercase letter
Curly hair	Straight hair		
Tall	Short		
Unattached earlobe	Attached earlobe		

Answers to the questions:

1. Tall yellow mangoes: 9
   Tall green mangoes: 3
   Short Green mangoes: 3
   Short yellow mangoes: 1
2. Phenotypic ratio: 9:3:3:1

Activity 4

Sperm ♂ / Ovum ♀	R	R
r	Rr red	Rr red
r	Rr red	Rr red

1. Punnett Square above
2. The resulting offsprings:
   Genotypes: All Heterozygous red Santan flowers
   Phenotypes: All red Santan flowers

Assessment

I

1. B
2. A
3. D
4. D
5. B
6. A
7. C
8. D
9. B
10. C

II. Given the following cross:

11. LL X ll

Ll (All heterozygous long-stemmed rose plant)

12. All long-stemmed rose plant

13. OO X oo

Oo (all heterozygous oval-faced children)

14. ALL Oval-faced

15. 0%

4. Genes
5. monohybrid
6. Dihybrid
7. recessive
8. Dominance
9. Alleles
10. genotype
11. phenotype
12. homozygous
13. Segregation
14. Independent Assortment
15. Punnett square

Additional Activities

Activity 7

Situation: In dogs, **stickup ears (E)** is dominant over **dropped ears (e)**. A homozygous stickup ears dog is mated with a dropped ears dog.

Questions:

1. Make a Punnet square to show the cross between a homozygous stickup ears dog (EE) and a dropped ears dog (ee).

Punnett Square

Sperm♂ / Ovum♀	E	E
e	Ee Stick up	Ee Stick up
e	Ee Stick up	Ee Stick up

2. What is the genotype and phenotype of the resulting offsprings?

Genotype: Ee (Heterozygous stickup ears dogs)

Phenotype: Stickup ears dogs

What Can I do

Activity 6

Sperm♂ / Ovum♀	W	w
W	WW white	Ww white
w	Ww white	Ww brown

Questions:

1. What are the possible skin colors (phenotypes) of their children?

Phenotypes: White skin color and brown skin color

2. Phenotypic ratio: 3:1 (3 white skin color and 1 brown skin color)

References

Books:

Capco, C.M. and G.C. Yang. *Mendel's Principles,* Quezon: Phoenix Publishing House, Inc.,1990.

Department of Education. *Science – Grade 8 Learner's Module*. Quezon: Vibal Publishing House, Inc., First Edition, 2013.

Department of Education. *Biology Science and Technology Textbook II.* Quezon: Studio Graphics Corp., Revised Edition, 2004.

Department of Education. "EASE Module 11 Energy Producing and Distributing Systems." Last modified October 12, 2010. lrmds.deped.gov.ph/detail/968

Gerona, Zonia M., Rebecca C. Nueva Espaňa, Lolita M. Salmorin, and Aurora C. Villamil. *Science and Technology BIOLOGY*. Quezon: Abiva Publishing House, Inc., 1995

Rabago, Lilia M., Crescentia C. Joaquin, and Catherine B. Lagunzad. *Science and Technology BIOLOGY - Textbook for Second Year.* Quezon: SD Publications, Inc., 1997

For inquiries or feedback, please write or call:

Department of Education - Bureau of Learning Resources (DepEd-BLR)

Ground Floor, Bonifacio Bldg., DepEd Complex
Meralco Avenue, Pasig City, Philippines 1600

Telefax: (632) 8634-1072; 8634-1054; 8631-4985

Email Address: blr.lrqad@deped.gov.ph * blr.lrpd@deped.gov.ph