8

Lesson Exemplar in Science

Quarter 1
Lesson

3

Lesson Exemplar for Science Grade 8
Quarter 1: Lesson 3 of 5 (Week 3)
SY 2025-2026

Development Team

Writer:
- Darryl Roy T. Montebon, Ph.D. (PNU Manila)

Reviewed and Revised:
- Genelita S. Garcia, Ph.D. (PNU Manila)

Management Team
Philippine Normal University
Research Institute for Teacher Quality
SiMERR National Research Centre

SCIENCE /QUARTER 1 / GRADE 8

<table>
<tr>
<td colspan="2">I.   CURRICULUM CONTENT, STANDARDS, AND LESSON COMPETENCIES</td>
</tr>
<tr>
<td>A. Content Standards</td>
<td>The learners learn that:
1. Inherited traits passed from parents to offspring are governed by the rules on the patterns of inheritance.</td>
</tr>
<tr>
<td>B. Performance Standards</td>
<td>By the end of the Quarter, learners learn to represent patterns of inheritance and predict simple ratios of offspring.</td>
</tr>
<tr>
<td>C. Learning Competencies and Objectives</td>
<td>Learning Competency
1. Describe simple patterns of inheritance in organisms
2. Represent patterns of inheritance of a simple dominant/ recessive characteristic through generations of a family.

Learning Objectives:
Students should be able to:
1. Describe their family and analyze the common traits present
2. Describe patterns of inheritance through pedigree analysis</td>
</tr>
<tr>
<td>D. Content</td>
<td>Topic: Patterns of Inheritance
Sub-topic: Dominant and Recessive Traits</td>
</tr>
<tr>
<td>E. Integration</td>
<td></td>
</tr>
</table>

<table>
<tr>
<td>II. LEARNING RESOURCES</td>
</tr>
<tr>
<td>Pedigree ppt. (n.d.). [PowerPoint slides]. Retrieved from
    https://www.duplinschools.net/cms/lib/NC01001360/Centricity/Domain/758/PEDIGREE%20ppt..ppt</td>
</tr>
</table>

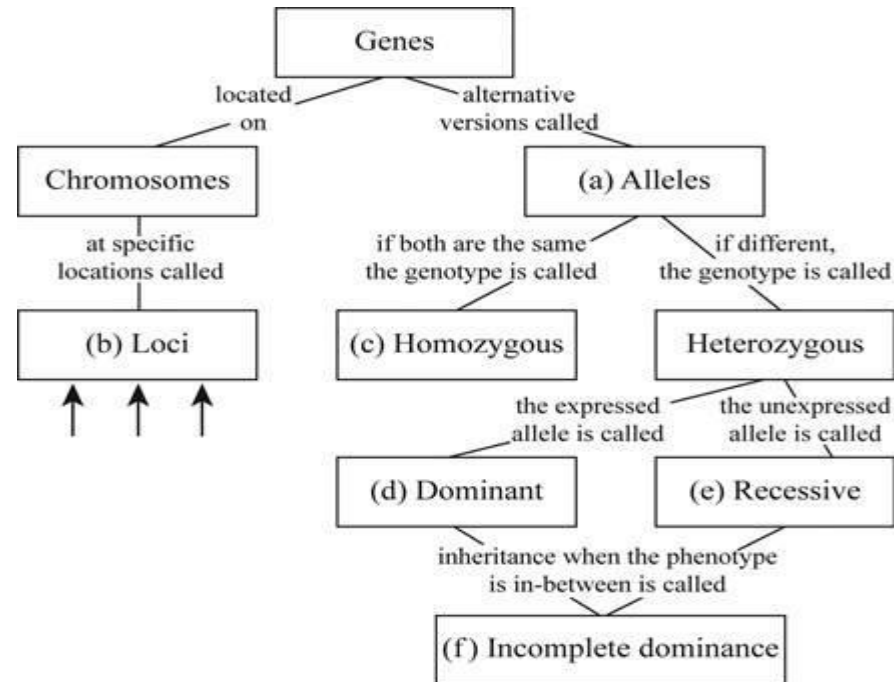| III. TEACHING AND LEARNING PROCEDURE		NOTES TO TEACHERS
A. Activating Prior Knowledge	**Day 1** **1. Short Review** Facilitate a simple review game about the plant transport system. Let students write their own questions and answers on a small piece of paper. Prepare a box or a container where students can place their questions. Pick questions and call students to answer them. **2. Feedback (Optional)**	Some sample questions: ● What tissue in the roots absorbs water and minerals? (Root hairs) ● What process pulls water up the xylem? (Transpiration) ● What sugar does photosynthesis produce? (Glucose) ● What carries food (sugar) throughout the plant? (Phloem) ● What are the tiny tubes in xylem called? (Tracheid) ● Why is xylem like a straw? (It's hollow and allows for efficient transport)
B. Establishing Lesson Purpose	**1. Lesson Purpose** Post the question *"Who do you look like?"* on the board. Let students give their answers and reasons for their responses. **2. Unlocking Content Area Vocabulary** • Facilitate a Scavenger Hunt activity to define words that are associated with heredity. • Hide cards or papers with terms and their definitions around the classroom or school. • Divide students into teams and provide them with a list of terms to find. • The teams must search for the cards, match the terms with their definitions, and return to the starting point within a time limit.	

Here are some words to identify and unlock:
a. **Alleles**: different versions of a gene found at the same location (locus) on homologous chromosomes.
b. **Chromosomes**: thread-like structures made of DNA.
c. **Genes**: the fundamental units of heredity.
d. **Dominant**: A genetic trait that is expressed when present, overriding the expression of its recessive allele.
e. **Recessive**: A genetic trait that is expressed only in the absence of the dominant allele.
f. **Genotype**: The genetic makeup of an organism, consisting of the alleles it inherits from its parents.
g. **Phenotype**: The observable traits or characteristics of an organism, resulting from its genotype and influenced by environmental factors.
h. **Pedigree**: A diagrammatic representation of a family's genetic history, showing the transmission of traits across generations.
i. **Homozygous**: Having two identical alleles for a particular gene (e.g., homozygous dominant or homozygous recessive).
j. **Heterozygous**: Having two different alleles for a particular gene (e.g., one dominant and one recessive allele).
k. **Mendelian Inheritance**: The principles of inheritance discovered by Gregor Mendel, including the law of dominance, law of segregation and the law of independent assortment.
l. **Punnett Square**: A diagram used to predict the possible genotype combinations of offspring from a genetic cross between two parents.
m. **Genotypic Ratio**: The ratio of different genotypes produced by a genetic cross, representing the probability of each genotype occurring among the offspring.
n. **Phenotypic Ratio**: The ratio of different phenotypes produced by a genetic cross, representing the probability of each phenotype occurring among the offspring.
o. **Monohybrid Cross**: A genetic cross involving only one trait.
p. **Dihybrid Cross:** A genetic cross involving two different traits.
q. **Probability**: The likelihood or chance of a particular outcome occurring, often expressed as a fraction or percentage.

	• *Ask the following guide questions:*
	   a. Which word is familiar to you?
	   b. Which word do you think is hard to understand?
	   c. How are the words related to the lesson on heredity?	

C. Developing and Deepening Understanding	**Day 2**
	1. Explicitation
	Activity 1.
	• Let students accomplish *Activity #1: My Family and Their Traits* and facilitate classroom discussion
	
	• Facilitate a classroom discussion about the story.
	  Guide questions:
	   1. How will you describe your family?
	   2. Which trait do you think you have inherited from your father? From your mother?
	   3. Why do you think there is a difference in your inheritance?
	
	Day 3
	2. Worked Example
	Activity 2.
	• Divide students into small groups and provide each group with a pedigree chart representing a family's history of a specific trait (e.g., attached earlobes). See *Activity #2: Pedigree Analysis*
	• Instruct students to analyze the pedigree charts, identify patterns of inheritance, and determine whether the trait is dominant or recessive.
	• Encourage students to discuss within their groups and come up with hypotheses about how the trait is inherited.
	• Circulate among groups to provide guidance and clarification as needed.
	• Let students present their work in class
	
	Day 4
	3. Lesson Activity
	● Facilitate a discussion on the patterns observed in the pedigree charts.
	● Conduct a class discussion to reiterate the concepts related to heredity.
		Teachers are encouraged to be sensitive to the nature of the student's family (e.g. adopted children, separate parents, and orphans). In such cases, teachers may prepare a picture of a family and anchor the discussion on them.
		
		Some concepts for discussion are:
		a.**Genetics**: Genes are segments of DNA that serve as the fundamental units of heredity, containing instructions for the development, functioning, and inheritance of traits in organisms.
		b.**Genes**: Genes are like the tiny instructions passed from parents to children

	Guide questions:
	    1. What are genes? What branch of science studies them?
	    2. How do you think that a trait is dominant? Recessive?
	    3. How will you compare genotype vs phenotype?
	
	● Let students create a concept map on the ideas they have learned from genetics and heredity
		that shape certain traits or features in the children.
		c. **Gregor Mendel**: Considered as the Father of Genetics for his work on heredity
		d. **Dominant**: A genetic trait that is expressed when present, overriding the expression of its recessive allele.
		e. **Recessive**: A genetic trait that is expressed only in the absence of the dominant allele.
		f. **Genotype**: The genetic makeup of an organism, consisting of the alleles it inherits from its parents.
		g. **Phenotype**: The observable traits or characteristics of an organism, resulting from its genotype and influenced by environmental factors.
		h. **Pedigree**: A diagrammatic representation of a family's genetic history, showing the transmission of traits across generations.

D. Making Generalizations	**1. Learners' Takeaways** Let students create a concept-map on how they understand the different concepts and ideas, discussed on heredity. Let the class present their work in class and check for misconceptions and clarify challenging ideas.	The teacher may propose other activities for the learners to describe their understanding of

A sample concept map is shown below:

2. **Reflection on Learning**
   - Conclude the lesson with a reflection period where students can share their thoughts and insights on genetic diversity.

   - Encourage students to consider how they can apply their understanding of diversity to future studies and careers in genetics and healthcare.

   - Reiterate the importance of embracing diversity as a fundamental aspect of human genetics and promoting equity and inclusion in genetic research and practice.

a concept, idea, and skill covered in the previous topic.

When pressed for time, teachers may choose to provide students with a concept map chart that is blank, leaving only the words to be filled in by the students themselves.

Image source:
https://shorturl.at/kJpn2

The teacher should allow the learners to document their ways on how they think about their learning (metacognition).

IV. EVALUATING LEARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION		NOTES TO TEACHERS

A. Evaluating Learning	**1. Formative Assessment**
	Let students answer the following multiple choice test questions:
	
	1. What is a pedigree?
	  A) A type of dog breed
	  B) A diagram showing genetic relationships within a family
	  C) A scientific instrument used in genetic research
	  D) A type of genetic mutation
	
	2. Who is considered the Father of Genetics?
	  A) Charles Darwin
	  B) Gregor Mendel
	  C) Thomas Hunt Morgan
	  D) James Watson
	
	3. What is a genotype?
	  A) The observable traits of an organism
	  B) The genetic makeup of an organism
	  C) The environment in which an organism lives
	  D) The combination of dominant and recessive alleles
	
	4. What is a phenotype?
	  A) The genetic makeup of an organism
	  B) The observable traits of an organism
	  C) The dominant alleles of an organism
	  D) The recessive alleles of an organism
	
	5. What is a dominant trait?
	  A) A trait that is only expressed in the presence of a recessive allele
	  B) A trait that is always expressed, overriding the expression of its recessive allele
	  C) A trait that is expressed when both alleles are recessive
	  D) A trait that is rarely expressed in offspring
		Answer Key:
		1. B) A diagram showing genetic relationships within a family
		2. B) Gregor Mendel
		3. B) The genetic makeup of an organism
		4. A) The observable traits of an organism
		5. B) A trait that is always expressed, overriding the expression of its recessive allele
		6. D) A trait that is expressed only in the absence of the dominant allele
		7. B) Segments of DNA that code for proteins
		8. B) They influence the observable traits of an organism
		9. C) The transmission of traits within a family
		10. D) Through the independent assortment and segregation of alleles

6. What is a recessive trait?
   A) A trait that is always expressed, overriding the expression of its dominant allele
   B) A trait that is expressed only in the presence of a dominant allele
   C) A trait that is expressed when both alleles are dominant
   D) A trait that is expressed only in the absence of the dominant allele

7. How are genes defined?
   A) Segments of RNA that code for proteins
   B) Segments of DNA that code for proteins
   C) Regions of the cell membrane that transport molecules
   D) Units of heredity found only in bacteria

8. What is the role of genes in heredity?
   A) They determine the environment in which an organism lives
   B) They influence the observable traits of an organism
   C) They control the growth and development of an organism
   D) They have no role in heredity

9. What does pedigree analysis show?
   A) The genetic makeup of an individual
   B) The observable traits of an individual
   C) The transmission of traits within a family
   D) The environmental factors affecting an individual

10. How are genes inherited according to Mendelian genetics?
   A) Through blending parental traits
   B) Through the passing of genes from parent to offspring unchanged
   C) Through the mixing of genes from both parents to form a new genetic code
   D) Through the independent assortment and segregation of alleles

2. Homework (Optional)
Let students create a Pedigree chart for their family. Students may choose one trait to be illustrated in their pedigrees.

The teacher may give homework for extended deliberate practice.

A. Teacher's Remarks	*Note observations on any of the following areas:*	**Effective Practices**	**Problems Encountered**	This lesson design component prompts the teacher to record relevant observations and/or critical teaching events that he/she can reflect on to assess the achievement of objectives.
	strategies explored			
	materials used			The documenting of experiences is guided by possible areas for observation including teaching strategies employed, instructional materials used, learners' engagement in the tasks, and other notable instructional areas.
	learner engagement/ interaction			
	Others			Notes here can also be on tasks that will be continued the next day or additional activities needed.

B. Teacher's Reflection	*Reflection guide or prompt can be on:*
	▪ <u>*principles behind the teaching*</u>
	   What principles and beliefs informed my lesson?
	   Why did I teach the lesson the way I did?
	
	▪ <u>*students*</u>
	   What roles did my students play in my lesson?
	   What did my students learn? How did they learn?
	
	▪ <u>*ways forward*</u>
	   What could I have done differently?
	   What can I explore in the next lesson?
				This lesson design component guides the teacher in reflecting on and for practice. Entries on this component will serve as inputs for the LAC sessions, which can center on sharing the best practices discussing problems encountered and actions to be taken; and identifying anticipated challenges and intended solutions. Guide questions or prompts may be provided here.