EXEMPLAR SCIENCE LESSON PLAN

GRADE LEVEL	QUARTER / DOMAIN	WEEK & DAY NO.	PAGE NO.
GRADE 10	3rd QUARTER/LIVING THINGS AND THEIR ENVIRONMENT	WEEK 5 DAY 1	1

I. OBJECTIVES	
A. Content Standards	The learners demonstrate an understanding of: 1. The information stored in DNA as being used to make proteins. 2. How changes in a DNA molecule may cause changes in its product. 3. Mutations that occur in sex cells as being heritable.
B. Performance Standards	The learners shall be able to: Option 1. Demonstrate the process of protein synthesis through role-playing. Option 2. Explain the importance of DNA as the code of life by creating a fictitious organism. Option 3. Compose a letter to the parents of the patients explaining their findings in the Karyotyping activity. Option 4. Interview parents in the community having children with genetic disorder.
C. Learning Competencies/ Objectives Write the LC code for each	Explain how mutations may cause changes in the structure and function of a protein (S10LT-IIIe-38) 1. Compare the different types of mutations 2. Describe the results of chromosomal aberrations
II. CONTENT	Heredity: Inheritance and Variation (Changes in Chromosome Structure)
III. LEARNING RESOURCES	
A. References	
1. Teacher's Guide pages	Teacher's Guide pp. 210 - 212
2. Learner's Materials pages	Leraner's Material pp. 283-293
3. Textbook pages	
4. Additional Materials from Learning Resource (LR) portal	EASE/OHSP Biology Module 14: Genetics - The Study of Inherited Traits
B. Other Learning Resources	https://youtu.be/WrF_luIjvVA http://ib.bioninja.com.au/_Media/translation-analogy_med.jpeg
IV. PROCEDURES	
A. Reviewing previous lesson or presenting the new lesson	1. Jeopardy-style review game on DNA,RNA and Protein Synthesis (Teacher Handout 1) 2. Central Dogma Analogy (Teacher Handout 2)
B. Establishing a purpose for the lesson	1. Have learners read the sentence below as an analogy representing a strand of DNA THE FAT CAT ATE THE WEE RAT QUESTION: Does the sentence make sense? 2. Ask learners to consider the following changes in the sentence:

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	2.1. THE FAT CAT ATE THE WET RAT. 2.2. THE FAT CAT ATT HEW EER AT. 2.3. THE FAB TCA TAT ETH EWE ERA T. QUESTIONS: a. Identify the changes and describe how these changes affect the meaning/thought of the sentence? b. What does each word in the sentence represent? c. What does each letter represent?
C. Presenting examples/instances of the new lesson	1. PICTURE ANALYSIS: Have learners predict on the effects of UV photon in the DNA structure. (Teacher Handout 3) 2. Have learners watch a videoclip " Mutations and the Genetic Code" https://youtu.be/WrF_luIjvVA QUESTIONS: When does Genetic Mutations occur? What are the types of Mutations discussed in the video?
D. Discussing new concepts and practicing new skills #1	Option 1: Have learners perform Activity 6: Chromie Change in Learner's Material pages 284-288 Option 2. Identifying different types of mutations Have learners study the following diagrams. Observe the changes in each diagram and determine the type of mutation. (Answers are shown in the diagram) source: www.shmoop.com  Figure 1
E. Discussing new concepts and practicing new skills #2	A. Group Activity: Round Table-Mutation Worksheet named Mutation Types (Please refer to Activity Sheet 1) Teacher tasks: 1.Divide the class into five groups. 2. Provide the activity sheet assigned for each group.(Student Activity) 3. Give each group 5 minutes to perform the activity and 2 minutes to present their data. B. ANALYSIS 1. What kind of mutation is more likely to result in a nonfunctional protein? 2. Differentiate frameshift mutation from point mutation.

<table>
<tr><td>F. Developing mastery (leads to Formative Assessment 3)</td><td>

A. Differentiate the types of Chromosomal Mutations by filling out the table below.

Chromosomal Mutations			
	Translocation	Deletion	Inversion
1. How many chromosomes are involved?			
2.How will you change the original structure of the of chromosomes?			
3. What condition/s result/s to change/s of chromosome structure?			

B. ANALYSIS
Sickle cell anemia is the result of a type of mutation in the gene that codes for part of the hemoglobin molecule. Recall that hemoglobin carries oxygen in your red bloods cells. The mutation causes the red blood cells to become stiff and sickle-shaped when they release their oxygen. The sickled cells tend to get stuck in blood vessels, causing pain and increased risk of stroke, blindness, damage to the heart and lungs, and other conditions.

Analyze the DNA strands below to determine what amino acid is changed and what type of mutation occurred.

Normal hemoglobin DNA **C A C G T G G A C T G A G G A C T C C T C**

Normal hemoglobin mRNA <u>G U G C A C C U G A C U C C U G A G G A G</u>

Normal hemoglobin A.A. sequence <u>VALINE-HISTIDINE-LEUCINE-THREONINE-PROLINE-GLUTAMIC ACID-GLUTAMIC ACID</u>

Sickle cell hemoglobin DNA **C A C G T G G A C T G A G G A C A C C T C**

Sickle cell hemoglobin mRNA <u>G U G C A C C U G A C U C C U G U G G A G</u>

Sickle cell hemoglobin A.A. sequence <u>VALINE-HISTIDINE-LEUCINE-THREONINE-PROLINE-VALINE-GLUTAMIC ACID</u>

</td></tr>
<tr><td>G. Finding practical applications of concepts and skills in daily living</td><td>QUESTION:
Imagine making a random change in a machine/gadget/appliances, how does it affect the functioning of the said object and your life as well?</td></tr>
<tr><td>H. Making generalizations</td><td>Graphic Organizer: List down 4 types of mutations and briefly describe the occurrence of each.</td></tr>
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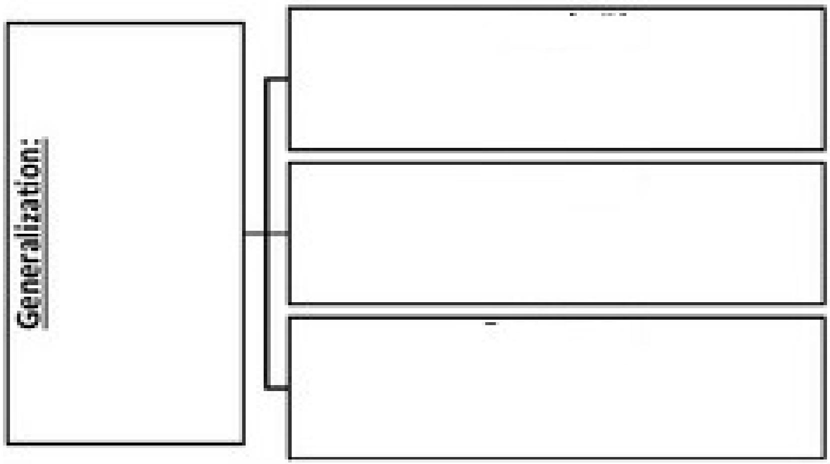
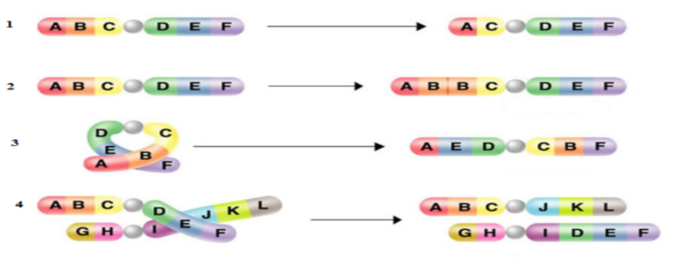
and abstractions about the lesson	
I. Evaluating learning	Describe the type of chromosomal aberration shown in each of the following diagrams. 
J. Additional activities for application or remediation	1. Identify and describe the effects of mutations in the following: 1. Medicine 2. Agriculture 3. Genetic-Make Up of Organisms 2. Have learners research on the type of chromosomal aberration which causes each of the following human genetic disorders: Sickle cell anemia Williams Syndrome Criduchat syndrome Alagille Syndrome
V. REMARKS	
VI. REFLECTION	

A. No. of learners who earned 80% in the evaluation	
B. No. of learners who require additional activities for remediation	
C. Did the remedial lessons work? No. of learners who have caught up with the lesson	
D. No. of learners who continue to require remediation	
E. Which of my teaching strategies worked well? Why did these work?	
F. What difficulties did I encounter which my principal or supervisor can help me solve?	

G. What innovation or localized materials did I use/discover which I wish to share with other teachers?	

Writer/s:	**ODETTE M. FABON** *City of Mandaluyong Science High SChool* *Mandaluyong*