General Biology 2
Grade 12

Name: _____ **Date:** _____
Grade/Section: _____ **Score:** _____

Lesson Title: Genetic Engineering

Learning Competencies

- Outline the processes involved in genetic engineering
- Discuss the applications of recombinant DNA

Learning Content

The learners demonstrate an understanding of the genetic engineering
and recombinant DNA.

Learning Check

Activity: Discovering DNA: Extracting Genetic Material from Fruits

Objectives:

1. To extract and visualize DNA from fruits.
2. To understand the basic structure and role of DNA in living organisms.
3. To explore the significance of DNA extraction in genetic engineering.

Materials:

- Fresh fruit (e.g., banana & strawberry)
- Coffee filter or cheesecloth
- 1 teaspoon of salt Funnel
- Dishwashing liquid (2 tablespoon)
- Test tubes or small clear containers
- 50 mL of water
- Glass rod or toothpick
- Isopropyl alcohol or ethanol (cold)
- Measuring spoons
- 2 Ziploc bag (medium)

Pre-Laboratory Questions:

1. What is DNA, and why is it important?
2. What role does DNA extraction play in genetic engineering?
3. Predict what you might observe when DNA is extracted from fruit.

Procedure:

Note: Prepare 2 set-ups (for banana & strawberry), strictly follow the instruction to achieve the expected output.

Preparation of the Extraction Solution

Mix 1 tablespoon of dishwashing liquid, 1 teaspoon of salt, and 50 mL of water in a beaker or cup. Stir gently until combined.

Fruit Preparation

- Place a small piece of fruit (about 50 grams) into a Ziploc bag.
- Mash the fruit thoroughly for about 2-3 minutes until it becomes a smooth pulp.

Mixing with the Extraction Solution

- Add 10 mL of the prepared extraction solution into the Ziploc bag with the mashed fruit.
- Seal the bag and gently knead the mixture for another 2-3 minutes.

Filtering the Mixture

- Place a funnel lined with a coffee filter or cheesecloth over a test tube or small container.
- Pour the fruit mixture into the funnel and let the liquid filtrate drip into the test tube. This step may take a few minutes.

Precipitating the DNA

- Carefully tilt the test tube and pour an equal volume of cold ethanol or isopropyl alcohol down the side of the tube, forming a distinct layer on top of the filtrate.
- Observe as DNA begins to precipitate and appear as a white, stringy substance at the interface between the alcohol and the filtrate.

Collecting the DNA

Use a glass rod or toothpick to gently spool or collect the DNA by swirling it in the white layer.

Post-Laboratory Questions:

1. Describe the appearance of the extracted DNA.
2. Explain the role of each ingredient used (dish soap, salt, alcohol).
3. How can this technique be applied in real-world scenarios?

Analysis and Conclusion:

Summarize the process and results of the DNA extraction. Discuss the importance of being able to isolate DNA in genetic engineering and other biological studies.

Extension Activity:

Compare the yield and quality of DNA extracted from different types of fruits (e.g., banana vs. strawberry).

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