Name _____ Date_____ Class _____

Part 1: Natural Fluorescence Explained Worksheet

- Worksheet:
    - Section A: Define & Describe

        1. Define biofluorescence in your own words.

        2. What are fluorescent proteins, and what is their role in biofluorescence?

        3. How does light absorption and re-emission occur in biofluorescence? Use terms like "excitation" and "emission."

        4. Explain the relationship between DNA, genes, and fluorescent proteins.

    - Section B: Diagram Analysis
        - Provide a simplified diagram of a cell with a nucleus, ribosomes, and a fluorescent protein being synthesized. Ask students to label: DNA, gene, mRNA, ribosome, fluorescent protein. Explain the process shown in the diagram.
    - Section C: Short Answer

        5. Describe two potential ecological advantages for a fish that can be biofluorescent.

        6. Give an example of an animal (other than a fish) that exhibits biofluorescence and describe how it might use this ability.

Part 2: Biofluorescence Comparison & Scenario Assessment (In-class, 30 minutes)

- Scenario A: The Deep-Sea Dragonfish

    - Scientists discover a new species of deep-sea dragonfish that glows red when exposed to certain blue light. They find that this glow is consistent across generations. Genetic analysis reveals that the fish naturally produces a unique red fluorescent protein.
    - Questions:

        7. Is this phenomenon biofluorescence or bioluminescence? Justify your answer.

        8. Explain the likely mechanism by which this fish produces its red glow, including the role of the fluorescent protein.

9.Why is the glowing trait passed on to the offspring? Connect your answer to DNA.

- Scenario B: The "Sparkle" Aquarium Fish
    - A new type of "Sparkle" fish is sold in pet stores. It glows bright blue under normal aquarium lights. Upon investigation, it's revealed that the fish were created by injecting a gene from a jellyfish into the eggs of a common guppy.
    - Questions:

10. Is this an example of natural biofluorescence? Explain why or why not. (4 points)

11. Compare and contrast the "Sparkle" fish's glow with the deep-sea dragonfish's glow. Focus on the *origin* of the glowing ability and its *heritability*.

12. If someone simply injected a blue dye into a guppy, how would its glow differ from the "Sparkle" fish's glow?