Unveiling the Carboniferous: A Biological Inquiry with SCRATCH

Adapted from Biological Inquiry: A workbook of investigative cases (2011)

Target Age Group: 9th grade Earth Science, 10th grade Biology & Honors Biology

Objectives of the Assignment:

    Earth Science: Create an educational Scratch program that will be visually pleasing, entertaining, and most importantly, present information concerning the Carboniferous Period. Earth Science students will focus on changes in landforms of the globe due to continental drift, and limestone and coal deposits.

    Biological Science: Create an educational Scratch program that will be visually pleasing, entertaining, and most importantly, present information concerning the Carboniferous Period. Biology students will focus on organismal life and important adaptations that contributed to the success of life on land.

Description of Problem:

- Create a Scratch program that provides information on the Carboniferous Period. For biology students –

- Use a sprite available from Scratch as a narrator. The sprite does not need to be present during the entire program, but is the only sprite from Scratch that you may use (5 pts.)
- Use a backdrop that represents a realistic (but artistically rendered) scene form the Carboniferous (5 pts.)
- Provide a soundtrack that will play during parts of, or the entire program (5 pts.)
- Utilize sprites or costumes derived from scientific illustrations and/or photographs of organisms (10 pts)
- Present five terrestrial organisms (from at least three kingdoms) that likely lived during the Carboniferous. Provide biological data (by the narrator or the organism itself) about these life forms (25 pts.)
- Present examples of three animal phyla that lived in aquatic environments of the Carboniferous. Provide biological data (by the narrator or the organism itself) about these life forms (15 pts.)
- Display two adaptations that contributed to the success of life on land and why they are significant (20 pts.)
- Define scientific terms and/or translate scientific names where appropriate (15 pts.)
- Have your Scratch narrator perform a dance or draw a picture at the end of the program (10 pts.)

Questions:

- How does creating a Scratch program to organize, interpret, and present information differ from doing the same via a PowerPoint demonstration or research paper? What are the advantages?
- How did creating a Scratch program modify your information transfer, and perhaps your ideas, about the Carboniferous Period and the biology of organisms?
- What was your biggest challenge in fusing biological data and computer programming with Scratch?
- What other ways might you use computer programming design to understand biology?

Standards:

9-10.DA.08:	Analyze data and identify patterns through modeling and simulation.
9-10.IC.05:	Demonstrate how computing enhances traditional forms and enables new forms of experience, expression, communication, and collaboration.
9-10.AP.10	Illustrate the flow of execution and output of a given program (e.g. flow and control diagrams).
9-10.AP.12	Design algorithms using sequence, selection, iteration and recursion.
9-10.AP.13	Explain, represent, and understand natural phenomena using modeling and simulation.

Support Material:

    Waterman, M. and E. Stanley. 2011. Biological Inquiry: A workbook of investigative cases. 9th edition. Benjamin Cummings. San Francisco, CA.