Chapter 14
Liriodendron tulipifera: A Look at Tennessee and Carbon Dioxide

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ABSTRACT

This chapter will include information on how to integrate instruction across English language arts (ELA), math, and science curriculums or seventh grade. The chapter will illustrate how to integrate standards from these three areas and formulate a culminating unit project. This is the core identifying characteristic for Innovation Academy, a STEM school located in Blountville, Tennessee. This chapter will elaborate on how the teachers at Innovation Academy collaborate, communicate, and plan in order to integrate curriculum and execute the culminating unit project. In addition, this chapter will illustrate designing a plan for formative lessons in the individual ELA, math, and science classrooms to prepare students for the culminating unit project.

INTRODUCTION

John Dewey (2018) says "Education is not an affair of telling and being told, but an active and constructive process." This chapter demonstrates how to integrate instruction across English language arts (ELA), math, and science curriculums in a seventh grade classroom. The chapter illustrates how to integrate standards from these three content areas and formulate a culminating unit project. The core identifying characteristic for Innovation Academy, a Science, Technology, Engineering and Mathematics (STEM)

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school in Blountville, Tennessee, is integrated curriculum taught through project-based peer learning. This chapter elaborates on how the teachers at Innovation Academy collaborate, communicate, and plan in order to integrate curriculum and execute the culminating unit project. In addition, this chapter demonstrates how to design a plan for formative lessons in the individual ELA, math, and science classrooms and, in turn, to prepare students for the culminating unit project, which, in this sample unit, is about carbon-dioxide absorption.

THEORY AND RESEARCH TO SUPPORT INTEGRATION

In *The Seven Laws of Teaching*, John Milton Gregory (2004) argues that learning should begin where the student is competent and confident. This is beneficial in that it allows the student's ownership and value in his/her knowledge and work. As a result, the instructor should build up, or scaffold, from a clear starting point and lead with the immediate next real knowledge that the student needs to investigate the concept further. As the instructor connects past lessons with the current learning, the learning continues in a measured and intentional manner. The instructor paces content appropriately and checks for learning. Ultimately, this culminates in an illustration or explanation by the student in regards to the clear application and use of this knowledge.

This method is a great practice to engage in within the individual classroom. However, it excels in usefulness in an integrated unit. This practice lends itself to discovery, teamwork, and practical application of, possibly, an otherwise *seemingly* useless concept. Integrated units empower students to apply the knowledge and concepts that they will acquire in individual classrooms to a broader experience and understanding. Culminating projects or assessments can then be focused on creating, applying, and using the knowledge, rather than simply recalling it.

In the authors' experience, integration is hard, but beneficial. Many problems that will inhibit integration-from scheduling to time spent covering standards. Nonetheless, the authors have found the benefits to greatly outweigh the issues that arise. For example, the students at Innovation Academy have increased achievement and become better leaders, thus their desire to learn through integration across the curriculums has been heightened. As such, the seventh grade teacher team takes ownership of the problems and works together to find solutions to plan, collaborate, team-teach, and implement integration.

CLASSROOM LEVEL INTEGRATION

How Do I Do It?

This unit is developed on a project-based approach for seventh grade, in which smaller lessons will be taught in individual classes and integrated together in a two to three day culminating assessment. This process allows individual standards and emphases to be taught, while still maintaining a strong and integrated unity to the main focus. The culminating project can be completed via combined classes through creative scheduling or planned out among individual classes. With either option, a common meeting space or workspace is beneficial. If a common space is not an option, student work can be packaged for easier transport to different classrooms.