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Connecting the Curriculum in Science and Language Arts at the Middle School Level

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The need for a connected curriculum is acknowledged by organizations and content experts throughout the educational system. The National Council of Teachers of Mathematics, National Science Teachers Association, American Association for the Advancement of Science, Association for the Education of Teachers of Science, National Association of Language Arts Teachers, Association for Supervision and Curriculum Development, and many others have sponsored publications indicating the need for, and benefits of, connecting the curriculum in language arts and science.

Connecting the curriculum is a phrase used far and wide by educators and researchers alike. It has many meanings and many different levels of implementation. For this work it is intended to mean the linking of conceptual understandings denoted by the content standards and benchmarks described in the Michigan Curriculum Framework (1996).

The connected curriculum leads to more time spent on active student learning, increased retention of conceptual ideas, increased practice time, and greater potential for student application in all content areas. The connections build upon each other and make the process and the learning more powerful to the individual.

Intervention: The Connections Matrix

The process for connecting the curriculum is simple and effective. The Connections Matrix is a strategy that allows the educator to examine content standards and benchmarks of two different content areas, and discover the areas where the two mesh. First, one content standard and then the other is defined, and the connections for learning are identified.

To complete the Connections Matrix, select one of the benchmarks in either language arts or science. For this work science will be examined first. Select a benchmark that has a particular meaning in your classroom and fits within your curriculum. In this work we will be working with Content Standard 2, Middle School Benchmark 4. This benchmark states, "describe how waste products accumulating from natural and technological activity create pollution."

Next, identify three critical components of the benchmark that students must understand in order to be able to demonstrate their attainment of the benchmark. For our purposes we will select the following:

A. Demonstrate how the water cycle is affected by coal burning industries.

B. Demonstrate how waste products of fires affect air quality.

C. Demonstrate the difficulty in cleaning oil and petroleum spills in freshwater.

Chart 1: The Connections Matrix

Science → ↓ **Language Arts**	A. Demonstrate how the water cycle is affected by coal-burning industries.	B. Demonstrate how automotive waste products affect air quality.	C. Demonstrate the difficulty in cleaning oil and petroleum spills in freshwater.
1. Write a narrative of a situation.	A1	B1	C1
2. Develop a persuasive presentation using technology.	A2	B2	C2
3. Write and submit for publication a letter to the editor on a topic.	A3	B3	C3

These components are then recorded on Chart 1: The Connections Matrix.

The same process should be repeated with the language arts benchmark. For this work the Content Standard 7, Middle School Benchmark 4 has been selected. This benchmark states, "document and enhance a developing voice through multiple media."

The three components of this benchmark might include:

1. Write a narrative of a situation.
2. Develop a persuasive presentation using technology.
3. Write and submit for publication a letter to the editor on a topic.

These components are recorded on Chart 1.

Selecting the Learning Events

Once the parameters of the Connections Matrix have been selected, it is time to identify learning experiences that are appropriate to the developmental level of the students involved in the class. To best accomplish this task, I suggest brainstorming a variety of ideas for activities which connect the two content areas and then selecting the activity which fits best with your teaching style and available resources. One suggestion at this point is to spend between three and five minutes brainstorming and then move on to the next cell. Do not try to force connections; rather allow the learning events to flow from your content knowledge and the natural blending of the benchmarks.

First, let's examine Cell A1. Read the two components listed and brainstorm the possible activities through which students could learn about both components. A learning activity for this cell might be writing a short story about the impact coal-burning power plants in Appalachia have on the water systems. Students could research the topic through the media center, public library, and the World Wide Web, and then write a story about the impact of pollution from the perspective of a middle school student, a particular plant or animal, or a cloud. This activity would then address both the science and the language arts benchmarks and help students see the connections between the two content areas.

Now, move on to the next cell, B1. There are many possible learning activities for this combination. However, one effective learning activity that appears to address both science and language arts in this cell could be the development of a student-

made presentation using either Power Point (Windows or Macintosh) or HyperStudio (Macintosh). Students could once again research the topic using a variety of sources and then develop a presentation to be used by a local community group to make individuals aware of the hazards of large scale burning such as in rain forests or large forest fires. This might also include events that affect a local community, such as the burning of brush or out buildings on a farm.

Continue brainstorming activities that fit into each of the specific cells labeled A1 through C3. You may find that there are more possible combinations than you can possibly use in your classroom. This will allow you to be selective and creative in your selection of meaningful learning activities for your students in science and language arts.

Conclusion

When you have finished with all nine cells of the Connections Matrix you will have at least nine activities that will allow you and your students to connect the content areas of science and language arts. This will allow your students a variety of opportunities to learn, and then to demonstrate their learning in both science and language arts. In short, your students will be getting the best of content and demonstrating their achievement of benchmarks in a unique and meaningful manner.

Review of steps

1. Identify a benchmark in a content area.
2. Identify three critical components of the benchmark.
3. List the critical components on the Connections Matrix.
4. Identify a benchmark from a second content area.
5. List three critical components of the second benchmark.
6. List these three critical components on the Connections Matrix.
7. Brainstorm possible learning events.
8. Select the most appropriate learning events.

References

Michigan Department of Education. (1996). *Michigan curriculum framework.* Michigan Center for Career and Technical Education, East Lansing, MI.