

Standard I **Element B**

LEVEL 3 PRACTICES

THE TEACHER:

6 *Makes interdisciplinary connections explicit to students.*

The teacher who articulates **interdisciplinary** connections provides clear and concise explanations for how concepts and skills in one discipline impact those in another. Strategies may include summarizing in social studies and science or applying measurement skills in art. In language arts, students may learn how to use maps and graphs when reading informational text and then apply writing skills to describe the meaning and importance of the concepts presented by these visuals. By implementing these strategies, the teacher can help students connect what they are learning across disciplines.

Interdisciplinary connections help students explore overarching themes or concepts. In real life, we are not able to isolate math, writing, science, or history into 45 minutes of our day. Instead, we use all of our knowledge to help us solve everyday problems in the workplace and at home.

Early childhood students spend the majority of their time exploring and trying to make sense of their world. They engage in sorting, describing, building, and experimenting with objects. These activities are preparing them for more formal mathematics and science activities in school. The teacher of early childhood students should guide these activities so that writing, speaking, and listening skills, along with concept development, grow and expand beyond incidental or isolated learning.

The majority of middle and high school students learn content taught by different teachers in isolated settings. Therefore, the importance of articulating interdisciplinary connections for secondary students is critical. This requires teachers to be aware of topics being taught in multiple content areas for which they may not be the primary teacher. There must be opportunities for team collaboration during which time teachers can support one another in making connections to their content area. The teacher who clarifies and elaborates on interdisciplinary connections is able to challenge students' thinking so they are equipped to independently make connections that accelerate their learning.

The teacher who makes explicit connections across content areas:

- Identifies the specific demands from other content areas that exist within a given lesson.
- Provides learning experiences and opportunities that support the application of students' general knowledge and skills from other content areas.
- Uses the language of other content areas while teaching, as appropriate.
- Is aware of content being taught in other disciplines in order to make the explicit connection for students.

Refer to these external resources for additional information:

- Article: "The Art and Craft of Science" by Robert Root-Bernstein and Michele Root-Bernstein
<http://www.ascd.org/publications/educational-leadership/feb13/vol70/num05/The-Art-and-Craft-of-Science.aspx>
Article explains the importance of enhancing the teaching of science through teaching of the arts.
- Article: "The Art of Science Teaching" by Pam Galus
<http://www.ascd.org/publications/classroom-leadership/oct2001/The-Art-of-Science-Teaching.aspx>
Article provides strategies for the integration of art and science.

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- Website: teachinghistory.org
<http://teachinghistory.org/>
Website provides strategies and resources for K–12 teachers to teach US history through interdisciplinary connections.
- Article: “Ten Ways to Integrate Curriculum” by Robin Fogarty
http://www.ascd.org/ASCD/pdf/journals/ed_lead/el_199110_fogarty.pdf
Article describes different models teachers may use for making interdisciplinary connections for students.
- Article: “Integrating Curriculum Planning Wheels Turn Curriculum Around” published by ASCD
http://www.ascd.org/ASCD/pdf/journals/ed_lead/el_199110_palmer.pdf
Article describes how a group of teachers in Maryland uses a planning wheel to make interdisciplinary connections for students.

7 ***Strategically integrates literacy skills (reading, writing, listening, speaking) across content areas.***

Authentic literacy is integral to both what and how we teach. It is the “spine” that “holds everything together” in all subject areas (Phillips & Wong, 2010).

Content is what we teach, but there is also the how, and this is where literacy instruction comes in. There are an endless number of engaging, effective strategies to get students to think about, write about, read about, and talk about the content you teach. The ultimate goal of literacy instruction is to build a student's comprehension, writing skills, and overall skills in communication. (Alber, 2010, para. 8)

Once a literacy skill has been taught, students must have opportunities to apply the skills to a variety of texts and types of communication in order to transfer these skills to new or unfamiliar material. By continually providing opportunities for students to apply skills both recently and previously taught, students can gain a deeper understanding of the mind of a reader and writer and how the skills learned support their literacy development. They can also begin to develop an awareness of those skills that best support their understanding of complex materials and communication skills so they can independently use them.

Refer to these external resources for additional information:

- Article: “The Six Ts of Effective Elementary Literacy Instruction” by Richard Allington
Retrievable at <http://www.readingrockets.org/article/96/>
Article describes Allington’s research on what matters most in teaching kids to read based on observations of effective and expert teachers. **(ELEMENTARY TEACHERS)**
- Website: Achieve the Core
<http://achievethecore.org/>
Website provides a variety of resources for teaching the Common Core Literacy Standards.

Suggested books on literacy instruction:

- *7 Keys to Comprehension How to Help Your Kids Read It and Get It!* by Susan Zimmerman and Chryse Hutchins
- *Comprehension Shouldn’t be Silent From Strategy Instruction to Student Independence* by Michelle J. Kelley and Nicki Clausen-Grace
- *Improving Comprehension with Think-Aloud Strategies* by Jeffrey D. Wilhelm
- *What Really Matters in Vocabulary Research-Based Practices across the Curriculum* by Patricia M. Cunningham

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8 *Strategically integrates mathematical practices across content areas.*

The teacher should build on the professional practices of encouraging students to make math connections across content and the use of instructional strategies that require students to transfer mathematical knowledge by emphasizing these connections in his demonstrations and models. When students have opportunities to witness the content “expert,” or teacher, apply math to other content areas, the importance of these connections becomes stronger and more clear. Students are also more likely to independently make these connections, which can support them in understanding how mathematical information is relevant to their learning.

Examples of transferring math knowledge to different content areas:

- Dance
 - Creating dance patterns and forms based on musical counts and rhythms
 - Subdividing movement phrases and sequences
 - Analyzing the physics of a pirouette turn
- Drama and Theatre Arts
 - Applying mathematical thinking, problem solving and logic through blocking, spatial relationships and aspects of technical theatre
- Science
 - Creating graphs to present data collected from experiments or observations
 - Measuring weight, distance, size, and/or temperature of objects
- Social studies
 - Reading maps by using scales to calculate distance between locations
 - Calculating unemployment percentages and determining who is not counted in the reported figures and the impact this has on communities
 - Applying proportional reasoning to analyze a problem in the community (e.g., unemployment)
- Art
 - Applying measurement skills
 - Applying math to photography or set design
- Physical education
 - Counting by ones, twos, etc., as students do warm-up exercises
 - Measuring distances on a basketball court, baseball diamond, or obstacle course
 - Using formulas to calculate winning percentages, batting averages, or runners’ distances and speeds
- Music
 - Applying math to rhythmic concepts
 - Applying mathematical thinking, problem solving, and logic through tempo

Refer to these external resources for additional information:

- Website: AIMS Education Foundation
<https://www.aimsedu.org/2017/04/27/episode-33-what-role-can-literature-play-in-math-science-teaching/?highlight=integrating%20math%20into%20science>
Website provides sample lessons for integrating math strategies into the teaching of science.
- Website: PE Central
<http://www.pecentral.org/lessonideas/searchresults.asp?category=55>
Website provides lesson ideas for integration of other content areas, including math, into physical education classes.
- Website: Math Songs, Teaching Math Facts & Concepts maintained by Songs for Teaching
<http://www.songsforteaching.com/mathsongs.htm>
Website provides a list of songs that can be used to integrate math concepts and skills.

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- Website: Mathematics in Music sponsored by Pearson Education, Inc.
<https://www.teachervision.com/math/resource/10340.html>
Website provides sample lesson plans that incorporate math strategies into the teaching of music.
- Article: “You’re Not In Math Class Anymore: Integrating Math Across the Curriculum” by Linda Starr Education World
http://www.educationworld.com/a_curr/curr146.shtml
Article provides ways math can be connected to students’ everyday lives and to other disciplines.
- Article: “Bringing Mathematics to Life” by Scott Willis and Kathy Checkley
<http://www.ascd.org/publications/curriculum-update/summer1996/Bringing-Mathematics-to-Life.aspx>
Article explains the importance of real-world applications and includes ideas for classroom instruction.
- Article: “Making Math Relevant”
<https://www.maneuveringthemiddle.com/201522making-math-relevant/Article> describes strategies for making math relevant to students’ lives.
- Website: Content Connections Samples (Kindergarten through 5th Grade)
<http://www.cde.state.co.us/ContentAreas/ContentConnections/index.asp>
Website provides examples of cross-content (multi-disciplinary) connections within the Colorado Academic Standards at grades kindergarten through 5.
- [Strategies for Employing Numeracy across Content Areas](#)
Document lists strategies for employing numeracy in all content areas.

Planning/Coaching Questions

- What connections were made between the content being taught and other content areas?
- How did you make explicit and elaborate interdisciplinary connections?
- How did you emphasize literacy connections to other subject areas?
- How did you emphasize interdisciplinary connections to math?
- How will you provide opportunities for students to apply literacy skills? How will you integrate literacy skills into lessons?
- How did you require students to apply mathematical knowledge to the content I am teaching? Which mathematical practices will be incorporated into the lesson?
- Which literacy skill(s) will need to be integrated into the lesson for students to master the learning objective?
- What instructional strategies will I use to support students in applying mathematical knowledge to the content I am teaching?
- How did you support students with language development related to the content being taught?
- How did you provide instruction that is intensive and of sufficient duration to accelerate learning?
- How did you incorporate real-world examples connected to the learning objective?

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