

10 Content-Area Literacy Strategies for Art, Mathematics, Music, and Physical Education

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Abstract: Content-area literacy involves the use of research-based learning strategies that help students effectively and efficiently gain content knowledge. Its use is fundamental to all content areas, not just to those that rely heavily on printed materials. One of the major goals of content-area instruction is to produce critical thinkers and problem solvers, and content-area literacy is a tool that teachers use to help students achieve this goal. Through this author's teaching experiences, she (Ming) learned about literacy strategies that are useful in art, mathematics, music, and physical education. Thus, in this article, she discusses the importance of using literacy in content-area instruction. Specifically, she talks about how literacy strengthens students' language arts skills, shares 10 content-area literacy strategies that can be integrated into the four content areas, and provides specific examples of what they would look like in each area.

Keywords: literacy, literacy strategies, content area literacy, content area learning

My Journey

When the chair of my department asked me to teach the graduate content-area literacy course I was extremely excited because I believed that I knew all there was to know about content-area literacy. However, when I saw the class roster I was a little puzzled about some of the students who were enrolled in the course. I said to myself, "Why are there physical education, music, art, and mathematics majors signed up for this class? Content area literacy doesn't really have anything to do with them. After all, isn't physical education mainly about movement; music mostly about playing an in-

strument and listening to and singing songs; art predominantly about drawing, sculpting, and interacting with pictures and paintings; and mathematics primarily about calculating problems? Weren't literacy strategies all about being able to read and understand connected text?" I was curious about the kinds of textbooks that students in these four content areas used and did some investigation. I found that arts texts heavily focused on demonstrating elements and principles of artistic design like color, texture, harmony, and rhythm. I learned that mathematics texts heavily relied on the use of visual elements such as graphs, charts, diagrams, maps, and shapes. I discovered that the focus of music texts was on musical notes, bars, instruments, and pictures. I realized that, if physical education texts existed, they were written in the context of health and wellness topics and, again, heavily relied on the use of visual elements like graphs, charts, and pictures. The results of my investigation made me realize that, while textbooks existed in these four content areas, they did not rely heavily on extensive amounts of connected text to relay meaning, and my perception was that content-area literacy was all about reading and interacting with extensive amounts of connected text. Therefore, I began to question myself about just how much I really knew about content-area literacy. I wondered about whether I would be able to make this class relevant to all students.

As I thought about these four content areas, I realized that they were quite different in nature. Art and music are considered fine arts subjects, mathematics is believed to be a core subject, and physical education is thought of as a related academic subject. However, I knew that I needed to include each of them in this discussion because it was not apparent to me how their content focus readily lent themselves to literacy

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integration. Knowing that I needed to arm myself with information about what content-area literacy looked like in these subjects, I set out to find out about literacy strategies that were applicable to each of the four content areas.

What Is Content-Area Literacy, and Why Is it Important in the Content Areas?

Content-area literacy is the ability to use listening, speaking, reading, writing, and viewing to gain information within a specific discipline (Vacca, Vacca, and Mraz 2011). These five modes help students think critically as they receive, process, and produce information. In addition, the integration of content-area literacy has been shown to increase reading comprehension, build conceptual knowledge, and foster problem-solving skills (Holloway 2002). The purpose of content-area instruction is to produce thoughtful, well-informed students; therefore, literacy should be used in all content areas, including art, mathematics, music, and physical education, to ensure that students have opportunities to learn in effective ways.

In art, the integration of content-area literacy is useful because one of the main goals of this subject is to produce students who have reflective and emotional dispositions. Through literacy, students experience visual and graphic development and verbal discourse. They also get the opportunity to express their uniqueness through artistic and written efforts (Feret and Smith 2010). Mathematics uses symbols to represent concepts, vocabulary that has differing meaning from our everyday language, and text structure that makes use of succinct writing. The integration of literacy provides students with opportunities to learn about the uniqueness of the language and practice how to make meaning from its content (Phillips et al. 2009). Musical skills are similar to literacy skills. When students write about music, it expands their understanding of its vocabulary and concepts. When they sing rote songs it develops their speaking and listening skills, and when they read music it promotes their ability to read text and symbols (Feret and Smith 2010). Content-area literacy also improves the ability of students to perform in physical education. Successful performance requires students to plan, reason, strategize, and reflect, and when they listen, speak, read, and write, they perform these activities. In addition, reading and writing ensure that students connect class activities with elements of their lives outside of the school setting (Buell and Whittaker 2001).

Content-Area Literacy Fosters Language Arts Development

As I researched the definition of content-area literacy, I saw its close connection to the *language arts*. (See table 1 for specific examples of the connection.) This term

is used to describe tools that teachers use to impart knowledge and that students use to obtain and document information. The language arts include: listening, speaking, reading, writing, viewing, and visual representation. Students use listening to receive information for aesthetic or efferent purposes. They can listen to teachers, fellow classmates, guest speakers, or audio recordings. Students use speaking to respond to or demonstrate learning by asking questions to clarify information, providing feedback, reporting information, or debating a topic. Students use reading to make meaning of information for aesthetic or efferent purposes. They can read independently, read with a buddy, or read in a small-group setting. Students use writing to express their ideas. Like reading and listening, students write for pleasure or to demonstrate learning. When they write informally, they engage in daily writing opportunities that allow them to creatively express themselves. Students use viewing to observe, think about, and learn through elements of media that include illustrations, photographs, videos, and the Internet. Students use visual representation to demonstrate their learning in genuine ways. They can create charts, maps, and books.

With the exception of visual representation, which was added to the language arts in 1996 by the National Council of Teachers of English (NCTE) and the International Reading Association (IRA), the language arts and content-area literacy mirror each other. Therefore, it is essential that teachers use content-area literacy to teach their content areas, because, in doing so, they are helping students to strengthen their language arts abilities. With strong language arts abilities, students are able to integrate new knowledge into their existing schema (Tompkins 2005).

10 Content-Area Literacy Strategies for Art, Mathematics, Music, and Physical Education

Ensure Authentic Writing

Writing is the process by which students compose text in a coherent fashion; it provides them with opportunities to demonstrate their desire to learn specific content, reinforce newly gained information, or show their acquisition of knowledge. When students write for authentic purposes, they respond in meaningful ways to content. (Refer to table 2 for ways in which students respond through writing.) Writing can take many forms, and students can write *journal and paragraph responses*, *poetry*, and *quick writes* (Behrman 2004; Buell and Whittaker 2001; Pearman and Friedman 2009). Journal and paragraph writing are written responses to content learning. Students write about information they have read, listened to, discussed, and observed. They can write in a response journal to share their thoughts about text along with emotional reactions toward it, and they

TABLE 1. Content-Area Literacy Fosters Language Arts Development

Content-Area Literacy Strategies	Listening	Speaking	Reading	Writing	Viewing	Visually Representing
Ensure authentic writing			✓	✓		
Foster collaboration	✓	✓	✓	✓		
Encourage discussion	✓	✓				
Use graphic organizers			✓	✓	✓	✓
Incorporate relevant text	✓	✓	✓			
Model think alouds	✓	✓	✓			
Allow visual representation		✓			✓	✓
Include visuals					✓	✓
Teach visualization			✓			✓
Integrate engaging vocabulary	✓	✓	✓			

can write in learning logs or use paragraph responses to keep track of their learning.

A concrete poem is a poem that forms a picture of the topic or follows the contours of a shape that is suggested by the topic. Haiku poems are a type of poetry from Japanese culture, and they include topics about nature. The first line usually contains five syllables, the second line contains seven syllables, and the third line contains five syllables. Students can write concrete poems that form the picture of the topic they are learning about, or they can write haiku poems that, while short in nature, provide a concrete image of the topic. Quick writes allow students to respond, in 2–10 minutes to an open-ended question or prompt posed by the teacher.

Students can also engage in quick writes that give them the opportunity to reflect on a topic and freely write about it (Ness 2007; Whitin and Piwko 2008). For example, after learning about the order of operations in arithmetic, a teacher could ask the following question: Do you feel like you have mastered the steps in using the order of operations to solve arithmetic problems? The student’s response could be as follows:

When I first began to learn about solving arithmetic problems using the order of operations I was nervous because there seemed to be too many steps to remember. But now I realize that there are just three main rules: (1) I must solve any calculations inside the parenthesis; (2) I must then perform all multiplications and divisions from left to right; (3) I must finally perform all additions and subtractions from left to right. I am more confident in working on my mathematics problems now that I truly understand how to use the order of operations correctly.

TABLE 2. Examples of How Authentic Writing Can Be Integrated into the Four Content Areas

Ensure Authentic Writing	
Art	<ul style="list-style-type: none"> • Write journal entries to respond to artists who are read about. • Write poetry to respond to images that are viewed.
Mathematics	<ul style="list-style-type: none"> • Write paragraphs to explain procedures or solutions to a problem. • Write poetry to describe a concept.
Music	<ul style="list-style-type: none"> • Write notes, descriptions of strategies, and vocabulary in an academic notebook. • Write poetry about musical instruments that are enjoyed.
Physical education	<ul style="list-style-type: none"> • Write a “quick write” to explain one rule of a game to be played and why it is important to follow the rule. • Write in a journal to record performance and set a goal for the next class session.

Foster Collaboration

Collaboration occurs when students work together to achieve a goal. Teachers must ensure that students are deliberately placed in collaborative groups (see table 3 for two examples). Two collaborative grouping options are *group retellings* and *jigsaw groups*. The procedures for participating in group retellings are as follows: (1) Students of differing abilities work in groups of three or more; (2) each member reads a different text on the same topic; (3) after reading, each member shares what he or she has read while other members listen and at any point share additional information and insights based on their own reading. The procedures for participating in jigsaw groups are as follows: (1) The teacher provides a main topic for students to explore; (2) she places three to six members in a team, giving each member a subtopic of the larger topic; (3) students become experts in their subtopic; (4) jigsaw members temporarily leave their groups to join an “expert group” (all of whom have studied the same subtopic) to discuss and share ideas; (5) experts return to jigsaw teams to teach their subtopic

TABLE 3. Examples of How Collaboration Can Be Integrated into the Four Content Areas

Foster Collaboration	
Art	<ul style="list-style-type: none"> • Use group retellings to read a different text about the same artist, and then form groups to share the perspective of the text.
Mathematics	<ul style="list-style-type: none"> • Use jigsaw groups to learn an assigned step of a procedure needed to solve a problem, and then explain the designated step to group mates.
Music	<ul style="list-style-type: none"> • Use group retellings to read a different text about the same musician, and then form groups to share the perspective of the text.
Physical education	<ul style="list-style-type: none"> • Use jigsaw groups to learn an assigned step involved in playing a game or sport, and then explain the designated step to their group mates.

TABLE 4. Examples of How Discussion Can Be Integrated into the Four Content Areas

Encourage Discussion	
Art	<ul style="list-style-type: none"> • View a photograph or painting, think (T) about what ideas it raises, pair (P) with a partner, and share (S) ideas (think-pair-share).
Mathematics	<ul style="list-style-type: none"> • Respond by stating “yes” or “no” to a knowledge-rating survey about whether there is familiarity with specific concepts and/or terms.
Music	<ul style="list-style-type: none"> • Listen to a genre of music, think (T) about how colorful it sounds as it pertains to the vibrancy, tone, and rhythm of the notes being played; pair (P) with a partner, and share (S) ideas (think-pair-share).
Physical education	<ul style="list-style-type: none"> • Use an anticipation guide to indicate agreement or disagreement to a series of thought-provoking statements. Responses are used as a springboard for classroom discussion.

to the other group members; (6) jigsaw members listen and take notes.

When students are deliberately placed into groups, the teacher accounts for students’ ability levels, their personal characteristics, and the task that is expected of them as they work with group members. Students also need to know what role they will play in these group settings. Roles can include reader, note taker, and discussion leader. Students can participate in group retellings in which they read a different text on the same topic and share with two to five group members, or they can contribute to jigsaw groups that require them to become experts on a subtopic of a larger topic and teach it to two to five group members (Box and Little 2003; Vacca, Vacca, and Mraz 2011).

Encourage Discussion

In classroom discussions, students and teachers exchange ideas on a given topic. This ensures that students are actively engaged in learning, and teachers serve as facilitators instead of dispensers of knowledge. (See table 4 for ways in which teachers can foster effective classroom discussion.) Teachers can use the *think-pair-share* strategy to encourage discussion by asking students to think about a concept, exchange their ideas with tablemates or group mates, and then share with the class at large. They can also have students complete knowledge surveys and anticipation guides prior to the introduction of a new topic. A knowledge survey is an analysis sheet with a list of terms or concepts that students must evaluate to determine their familiarity with the ideas. For example, the teacher could list the following instruments for students to define prior to

teaching a lesson about woodwind instruments: flute, piccolo, oboe, clarinet, saxophone, and bassoon. An anticipation guide is a series of thought-provoking statements to which students must respond prior to reading text. An example of a thought-provoking statement that students could respond to in a physical education class could be: Healthy eating is not necessary if I exercise and play sports every day. When students have had the opportunity to interact with and think about content prior to formal instruction, it helps to stimulate thinking. The teacher subsequently uses the information gathered as a springboard for classroom discussion (Lee and Spratley 2010; Millman 2009; Morse 2008; Spencer and Guillaume 2009; Yell, Scheurman, and Reynolds 2004).

Use Graphic Organizers

A graphic organizer is an instructional device that allows knowledge or ideas to be organized in a visual way. It is used before, during, and after instruction by students and teachers to demonstrate meaningful connections across concepts. Numerous graphic organizers exist, and a few include the t-chart, Venn diagram, timeline, K-W-L chart, and enumeration chart. Table 5 provides specific details for the ways in which these graphic organizers can be used. With the t-chart and Venn diagram, students and teachers examine and represent two aspects of a topic using a t-shaped graphic or interlocking circles. With a timeline and an enumeration chart, students keep track of patterns

TABLE 5. Examples of How Graphic Organizers Can Be Integrated into the Four Content Areas

Use Graphic Organizers	
Art	<ul style="list-style-type: none"> • Use a t-chart to compare and contrast visual elements. • Use a timeline chart to sequence the events in an artist’s life.
Mathematics	<ul style="list-style-type: none"> • Use a K-W-L chart to track knowledge of vocabulary. • Use an enumeration chart to show the steps in solving a problem.
Music	<ul style="list-style-type: none"> • Use a t-chart to compare and contrast a description of the sounds of different instruments. • Use a K-W-L chart to track knowledge of vocabulary.
Physical education	<ul style="list-style-type: none"> • Use a Venn diagram to compare and contrast different sports. • Use an enumeration chart to show the steps or processes in a game.

such as historical sequences, lifecycles, story elements, and steps in a process using a vertical or horizontal list sequence. The three-column K-W-L chart allows students to monitor their learning by having them note what they know (K) about a topic in the first column, what they want (W) to learn in the second column, and what they have learned (L) once instruction takes place in the third column (Gallavan and Kottler 2007; Greenwood 2002; Monroe and Orme 2002).

Incorporate Relevant Text

Relevant text refers to supplemental reading materials that serve to enhance and reinforce students’ content knowledge. These materials help to clarify meaning, provide in-depth information, ensure simpler vocabulary, and offer greater student engagement. While textbooks are the primary medium through which students learn content, there are challenges that they face in using these materials. Students struggle to read textbooks because they are sometimes written above their reading levels with challenging vocabulary, topics are covered at a surface level, and the organizational style of writing is unfamiliar to them (Ballinger and Deeney 2006; Jenkins 2010; Wallace, Clark, and Cherry 2006). Thus, supplemental reading materials can include fiction and nonfiction trade books (i.e., any books that are not textbooks, magazines, comics, and reference books), reference resources (e.g. dictionaries, atlases, maps), and reading materials that are used in one’s everyday life (e.g., newspapers, magazines) (Johnson and Giorgis 2001). Table 6 shows the kinds of reading that can be supported with the use of supplemental text.

TABLE 6. Examples of How Relevant Text Can Be Integrated into the Four Content Areas

Incorporate Relevant Text	
Art	<ul style="list-style-type: none"> • Read biographies about famous artists. • Read picture books that demonstrate the visual arts and nonfiction literature about the history of art education, medieval art, photography, and sculpting.
Mathematics	<ul style="list-style-type: none"> • Read fictional literature in which mathematics concepts are integral to the story development. • Read weekly department store sale flyers, sale coupons, the sports section of the newspaper, and other nonfiction literature about how mathematics is relevant to our daily lives.
Music	<ul style="list-style-type: none"> • Read biographies about famous musicians and nonfiction literature about the history of musical genres. • Read song lyrics.
Physical education	<ul style="list-style-type: none"> • Read the sports section of the newspaper and sports magazine articles. • Read game rules, lists, charts, graphs, and playbook manuals.

Model Think Alouds

Think alouds occur when teachers make their thought processes explicit to students. As teachers read, model, and engage in instructional activities, they verbalize exactly what is going on in their minds. This practice helps students understand what proficient learners should think about as they actively seek information (Block and Israel 2004). (See table 7 for the kinds of information that teachers can use to engage in think aloud activities.) Teachers can engage in several forms of think alouds, some of which include making predictions, observing, and arguing. When teachers make predictions they use contextual information to make decisions about what they believe the text will be about. For example, the teacher could verbalize the following once she has previewed a piece of physical education text: “Based on the title of the reading, the headings and subheadings, and the pictures, I believe that this text will be about how anaerobic activity can strengthen the heart.” When teachers observe, they comment on textual information or environmental situations. For example, as the teacher reads an art text aloud, she could stop and verbalize the following: “Based on this artist’s extensive use of white space, I believe that he wants my focus to be on the image in the center of the page.” When teachers argue, they use textual information to take a stance on

TABLE 7. Examples of How Think Alouds Can Be Integrated into the Four Content Areas

Model Think Alouds	
Art	<ul style="list-style-type: none"> • Verbalize images that come to mind upon seeing an abstract piece. Emphasize how the artist's use of line, color, shape, and/or texture gives the piece its look and feel.
Mathematics	<ul style="list-style-type: none"> • Verbalize each step for solving a word problem. When solving algebraic problems, for example, emphasize the importance of maintaining balance, which means that what is done on one side of the equation must be done on the other side as well.
Music	<ul style="list-style-type: none"> • Verbalize the challenges of playing a specific instrument. Stress the significance of accurately reading the notes on the lines and in the spaces to maintain the appropriate rhythm of the piece.
Physical education	<ul style="list-style-type: none"> • Verbalize each step of a practice drill while performing it. Demonstrate correct body formation or body shape while engaging in the activity.

TABLE 8. Examples of How Visual Representation Can Be Integrated into the Four Content Areas

Allow Visual Representation	
Art	<ul style="list-style-type: none"> • Tell a story by using only pictures or drawings. • Read a text and draw a picture to illustrate perception or interpretation. Use line, color, shape, and/or texture to help illustrate the reaction.
Mathematics	<ul style="list-style-type: none"> • Use manipulatives to represent a problem. Ensure that the manipulatives show the cohesiveness or unity across all parts of the problem. • Draw a picture or make a diagram to show how the problem parts are related.
Music	<ul style="list-style-type: none"> • Interpret music through dance. The dance should have clean lines and should maintain precise rhythm. • Draw a picture to describe the feelings that music brings forth.
Physical education	<ul style="list-style-type: none"> • Create a brochure that highlights the school's athletic programs. Emphasize the variety of games that are played across the student body. • Design a playbook that describes and illustrates strategies to be used during a game.

a specific point. For example, in modeling how to solve a mathematics problem, the teacher could say: "While there are multiple ways to arrive at the answer, the way that I am showing you is absolutely the easiest way to solve the problem."

Allow Visual Representation

Visual representation occurs when students create meaning by using multiple outputs. They create meaning to show the depth of knowledge that they have gained. Outputs can be spoken, kinesthetic, written, or visual. When students create spoken outputs they can participate in a panel discussion, role-play based on text characters, or take part in a reader's theater play. When students create kinesthetic outputs they can be involved in drama, experiments, or artistic endeavors. When students create written outputs they can write poetry, stories, or letters. When students create visual outputs they can construct a website, construct a graphic organizer, or draw a picture (Burke 2000; Bustle 2004; Chapman, Greenfield, and Rinaldi 2010; Kenney 2009; Soundy and Drucker 2010). Table 8 demonstrates the use of visual representation in each of the four content areas.

Include Visuals

Visuals refer to physical aids that teachers use in their instruction to make sure that it is explicit and effective. The majority of students are visual learners (Heynen 2008; Sipe 2001); thus, this method will help them make associations from existing to new concepts. If students are unable to make the appropriate connections, learning will not be meaningful. Visuals provide the missing link because they help students organize, revise, and modify the connections they make as they acquire content (Alsop and Bergart 2007; Mitchell and Hutchinson 2009; Tompkins 2009). Visuals include pictures, diagrams, real-life objects, models, videos, maps, and body language. Table 9 lists examples of the kinds of visuals that are appropriate for each content area.

Teach Visualization

Visualization refers to the ability students have to use their imaginations to create mental images, put themselves in specific situations, or elicit particular feelings based on stimuli. Visualization strengthens students' comprehension skills because it makes learning concrete. These scenarios and pictures also increase student

TABLE 9. Examples of How Visuals Can Be Integrated into the Four Content Areas

Include Visuals	
Art	<ul style="list-style-type: none"> • Show dioramas, photographs, drawings, paintings, or sculptures.
Mathematics	<ul style="list-style-type: none"> • Use counters, currency, pattern blocks, fraction circles, base-10 blocks, geoboards, or a Promethean board.
Music	<ul style="list-style-type: none"> • Show students how to correctly hold an instrument. • Tap the rhythm of a selection before asking students to play it.
Physical education	<ul style="list-style-type: none"> • Watch instructional videos of techniques. • Demonstrate correct versus incorrect formation.

engagement and attention and help them to link past experiences with new ones (Cooper and Kiger 2009; Harvey and Goudvis 2000). To help students create mental images the teacher can ask students to picture what the characters are wearing and what a scene looks like. To help students put themselves in specific situations the teacher can provide a circumstance and ask students to

TABLE 10. Examples of How Visualization Can Be Integrated into the Four Content Areas

Teach Visualization	
Art	<ul style="list-style-type: none"> • Imagine what it would be like to be an artist in a specific cultural context. Picture how the use of line, shape, color, and texture will help with the representation of this cultural context.
Mathematics	<ul style="list-style-type: none"> • Mentally construct an image of each of the steps needed to solve a problem. In thinking about the problem, visualize how the steps work in harmony to produce the correct answer.
Music	<ul style="list-style-type: none"> • Imagine what instruments are being played and what mood the piece brings to mind while listening to a musical selection. Listen to how the rhythm influences the colorfulness of the selection.
Physical education	<ul style="list-style-type: none"> • Imagine what it feels like to engage in a specific motor activity or win a game. Think about how unity among teammates can influence the outcome of the game.

TABLE 11. Examples of How Engaging Vocabulary Can Be Integrated into the Four Content Areas

Integrate Engaging Vocabulary	
Art	<ul style="list-style-type: none"> • Use typographic clues to signal important vocabulary while reading a piece of text.
Mathematics	<ul style="list-style-type: none"> • Use a semantic feature analysis table to determine what key vocabulary terms learned during the lesson have or do not have in common.
Music	<ul style="list-style-type: none"> • Use a word of the day activity where multiple sources are referenced to find out as much as possible about a word prior to the beginning of a lesson.
Physical education	<ul style="list-style-type: none"> • Use a semantic feature analysis table to determine what key vocabulary terms learned during the lesson have or do not have in common.

react to the situation. To help students elicit feelings the teacher can show students a visual and ask them to state how it makes them feel. Table 10 provides specific visualization scenarios that teachers can ask students to perform.

Integrate Engaging Vocabulary

Vocabulary is the knowledge of words and the meaning of words. It has been powerfully linked to reading comprehension and overall academic success because without having a deep knowledge of words, students will be limited in their ability not only to understand connected texts but also to use context appropriately to decipher the meanings of newly encountered words (Lehr, Osborn, and Hiebert 2004). Teachers cannot leave vocabulary development to chance because many students do not read widely, do not learn words incidentally, and are not able to use the dictionary to effectively learn word meanings. Instead, teachers must teach vocabulary explicitly, which includes talking about words while using visual aids to clarify meaning, modeling how to use words in context, and providing students with opportunities to interact with words on repeated tasks. When teachers teach vocabulary, they must teach words that are critical for students to best internalize concepts (Greenwood 2002). (See table 11 for a list of vocabulary strategies.)

Conclusion

Teachers teach in their content areas to produce students who are knowledgeable about subject matter. This kind of instruction can be enhanced through the use of content-area literacy because it allows students to read,

write, listen, speak, and view to obtain information. Because content-area literacy uses research-based learning strategies that help foster critical thinkers and problems solvers, content areas such as art, mathematics, music, and physical education can benefit from its integration into these subjects. Thus, while teachers in such content areas may not rely heavily on printed materials, they must realize that content-area literacy is an important tool for them to use as they impart knowledge. Furthermore, teachers must help students understand the value of using content-area literacy and explicitly teach them how to use it.

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