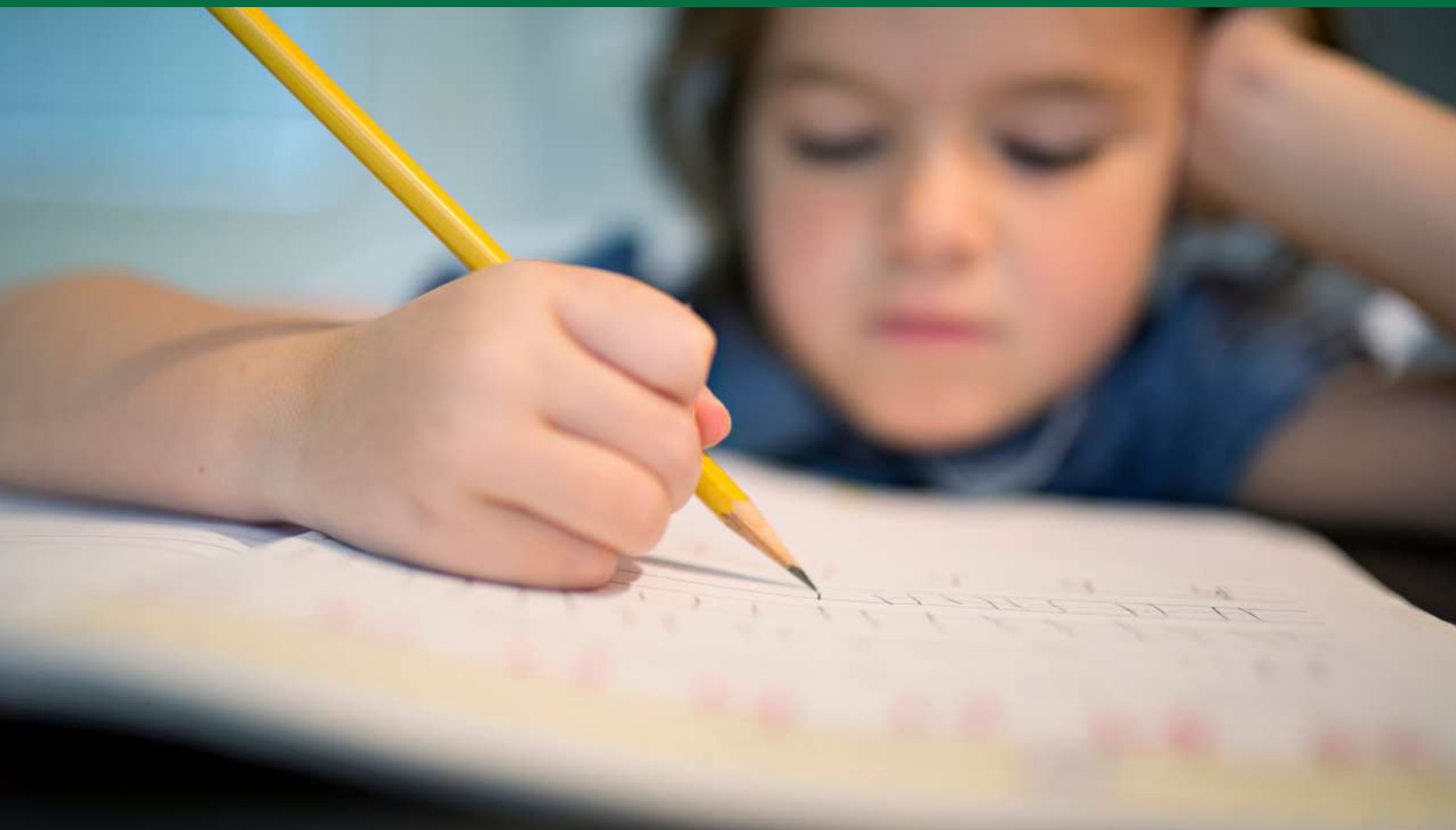
TeachME PROFESSIONAL DEVELOPMENT
CEUs for Teachers and Educators

# Writing Across the Curriculum



# Section 1: Writing Across the Curriculum Movement

## What is Writing Across the Curriculum?

Writing Across the Curriculum (WAC) is a pedagogical initiative that concerns itself with writing in all academic content areas, rather than just in English and communication courses. With increasing demands for writing skills in higher education, as well as in the job force, there has been a push in K-12 schools to prepare students for success in interdisciplinary writing. WAC programs consider writing to be a method of learning, and they "acknowledge the differences in writing conventions across the disciplines, and believe that students can best learn to write in their areas by practicing those discipline-specific writing conventions" (Purdue University, 2021).

## History of the Writing Across the Curriculum Movement

The WAC movement began in America in the 1970s but Russell (1991) traces the origins back to the 1870s, with the need for college-level writing instruction and the emergence of disciplines that required writing skills. In the 1870s, college enrollment increased and students displayed deficient writing skills. This first "literary crisis" occurred due to "the new discipline-specific writing requirements and the entry of students from previously excluded groups into the nascent mass education system" (Russell). Even after this discovery, though initiatives were attempted, writing in the disciplines remained scarce. Though educators and policymakers alike agreed on the importance of writing across the curriculum, "since the turn of the century, the American education system has placed the responsibility for teaching writing outside the disciplines, including, to a large extent, the discipline of 'English' or literary study" (Russell).

The foundation for the movement to begin in the 1970s took place in America in the 1960s through "far-reaching changes in the structure and social role of mass education" (Russell, 1991). During this time, the number of higher education institutions increased by one-fourth and the number of students almost doubled, from 3.6 million in 1960 to 8 million in 1970 (Russell). This increase in students brought in many groups that had previously been excluded from attending college and had not received prior writing instruction. "Racial desegregation forced secondary and higher education to address the problem of teaching long-excluded social groups who did not write the dominant form of English" (Russell). Therefore, initiatives were set forth to try to remedy the disparity over equity and access to a quality education.

In 1971 the University of California at Berkeley began another push to improve the writing skills of college students, only this time they focused on improving writing instruction in secondary schools (Russell, 1991). “Berkeley adopted a collegial, interdisciplinary, ‘bottom-up’ approach . . . organized around workshops in which secondary teachers shared experiences, presented successful methods, and together investigated the roles writing could play in their classrooms, all the while writing a good deal themselves” (Russell). After the first writing workshop was successful in 1974, this approach became a nationwide endeavor to improve writing instruction. Still, writing instruction remained largely in the English classrooms, rather than across the curriculum.

Throughout the 1980s, experimental instruction in WAC was full throttle. By this time, “the WAC movement drew strength from research, in several disciplines, into the social and rhetorical nature of disciplinary inquiry . . . research carried on in such diverse fields as history, anthropology, and the sociology of science, as well as in linguistics, cognitive psychology, and literary theory” (Russell, 1991). Russell explains that the WAC movement, “like the tradition of progressive education it is ultimately a part of, was born out of a desire to make the mass education system more equitable and inclusive but, at the same time, more rational in its pursuit of disciplinary excellence.”

Ultimately, the WAC movement began in higher education institutions and eventually gained some traction in secondary schools as well. Today, the need for proficient writing and critical thinking skills at all academic levels has pushed for WAC starting in elementary school.

## Writing Across the Curriculum Approaches

WAC approaches can vary depending on the discipline, teacher pedagogy, and goals of the assignment. Writing to Learn (WTL) and Writing to Demonstrate Knowledge (WDK) are the two broad WAC approaches that encompass a wide range of opportunities to build skills in writing, critical thinking, analysis, synthesis, and content area knowledge.

### Writing to Learn

Kiefer et al. (2021) explain that Writing to Learn (WTL) activities are “short, impromptu or otherwise informal and low-stakes writing tasks that help students think through key concepts or ideas presented in a course.” WTL activities are meant to encourage and further develop students’ critical thinking skills and understanding of the material. They are typically short assignments in class, or short homework assignments; these tasks are

not meant to be graded but rather briefly read over by the instructor or peers to gauge understanding of the content (Kiefer et al.). In addition, teachers should use WTL tasks as formative assessments to inform their instruction.

The main goal of a WTL activity is to help students become better learners, but there are also a number of additional benefits including increased comprehension and retention of material, development of problem solving skills, and improved writing skills (Purdue University, 2021). Rather than writing to inform or persuade someone else, WTL is used as a tool "for discovering, for shaping meaning, and for reaching understanding" for the writer (Kiefer et al., 2021). Palmquist (2020) cites that the purpose of WTL activities "is to use writing as a tool for learning rather than a test of that learning, to have writers explain concepts or ideas to themselves, to ask questions, to make connections, to speculate, to engage in critical thinking." When students are allowed to write down information, without having to worry about formality, it allows them to really synthesize the information that they are writing about.

Common WTL classroom activities include in-class discussion responses, journal entries, brainstorming, exit slips, reflections, summaries, or online discussion posts. Teachers can choose to use free-writing for journal entries, or they can pose specific questions.

**Writing to Demonstrate Knowledge**

When writing to demonstrate knowledge (WDK), students show their understanding of course concepts by explaining or applying ideas in their writing. WDK is different from WTL in that there is an intended outside audience, writing demonstrates deeper understanding of the content, and writing shows a level of proficiency that allows for analysis, synthesis, and evaluation.

**Writing to Engage**

Writing to engage (WTE) is an example of WDK and is used "to help students assess and work with course concepts, conceptual frameworks, skills, and processes," and to take part in a "deeper engagement with the information, ideas, and arguments central to a discipline" (Palmquist, 2020). Essentially, this form of writing is meant to lead students in actively engaging with the content of their course and it is commonly used across disciplines in K-12 schools. If WTL and Writing in the Disciplines [WID] - discussed below - are on opposite ends of a spectrum of writing, Palmquist puts WTE in the middle, as it "offers a promising means of extending the critical thinking involved in WTL, engaging students in critical thinking about disciplinary knowledge and processes, and laying additional groundwork for writing to communicate within a discipline or profession."

WTE activities can build on WTL activities but should require a higher level of engagement for learners (Palmquist, 2020). Likewise, teachers can grade WTE activities based on custom rubrics that measure the engagement and understanding of the content. Some common WTE activities might include "topic proposals, progress reports, and other brief reports," reflections and critiques, and "application of frameworks to texts, media, and cases" (Palmquist).

**Writing in the Disciplines**

Also referred to as writing to communicate, WID is "designed to introduce or give students practice with the writing conventions of a discipline and to help them game familiarity and fluency with specific genres and formats typical of a given discipline" (Kiefer et al., 2021). WID assignments are technical in nature - rather than reflective - and meant to communicate information to a specific audience. WID activities are practical and should prepare students for writing for a specific discipline, such as engineering, business, education, psychology, etc.

WID activities are used more in high schools where students are taking courses that pertain to their future career interests, but they can be implemented at the middle school level in elective courses, or for specific units in other content areas. The main purpose of WID tasks in disciplinary courses "is to introduce students to the thinking and writing of that discipline," including vocabulary (jargon), format, and style guidelines (Kiefer et al., 2021). While teachers should assess WID activities mostly for substance, it is also necessary to check for proper formatting and professionalism within the respective field.

WID tasks are beneficial because they "provide field-wide context to course material," practice professional communication, "analyze course content," "practice thinking skills relevant to analyses in the discipline," and prepare for various careers within a specific discipline (Kiefer et al., 2021). WID also exposes students to technical forms of writing when the majority of their academic careers are most likely spent writing in humanities courses.

Some common WID activities might include lab reports, presentations, articles, discipline-specific reports (police reports, psychological evaluation, mechanical report, etc.).

## Fitting into Bloom's Taxonomy

Palmquist (2020) examined WAC approaches in regards to Bloom's Taxonomy as revised by Anderson and Krathwohl in 2001, and further modified by himself to include reflecting, in between understanding and applying. Palmquist developed the WTE concept because he felt that WTL and WID tasks presented "bimodal distribution," with WTL covering mostly lower-order thinking skills like remembering and understanding, WID covering mostly higher-order thinking skills like evaluating and creating, and no WAC approaches covering the middle grounds of reflecting, analyzing, and applying. While Palmquist states that WTL can go beyond remembering and understanding and WID can go the opposite way, he felt that the vast majority stayed within those confines.

Because WTL activities are typically low stakes, with little instructor feedback, and are more "writer-based," it makes sense that they typically stay within the knowledge and comprehension categories of Bloom's Taxonomy, sometimes reaching into application as well (Palmquist, 2020). Some examples of WTL activities that have "little or no attention to an audience beyond the writer" include "freewriting and brainstorming, summarizing and responding to readings, reflecting on class sessions, defining concepts, describing processes, listing important ideas and questions about a subject, mapping and clustering, and developing outlines" (as cited in Palmquist).

Writing to demonstrate knowledge activities require higher-order thinking skills. Palmquist (2020) says that WTE activities are meant for students to "move beyond their initial understanding of disciplinary content and processes," moving past remembering and understanding toward reflecting, applying, analyzing, and evaluating. WTE activities can be high or low stakes, and can have a variety of intended audiences. Teachers will interact with WTE activities more than they do WTL activities, as there should be some level of feedback given to students based on student engagement with the content.

WID tasks are more complex, advanced, and time consuming. Palmquist (2020) suggests that WID tasks focus more on analyzing, evaluating, and creating on the spectrum of critical thinking skills. Kiefer et al. (2021) explain that WID tasks can resemble "real writing tasks for audiences students will write to as professionals in the field." Teachers will assess WID activities based on the discipline related content. Since these tasks are often done in multiple drafts and completed over a longer period of time, they are typically high stakes assignments.

## Section 1 Key Terms

Bloom's Taxonomy - A classification system used for categorizing educational goals; the original framework included 1) knowledge, 2) comprehension, 3) application, 4) analysis, 5) synthesis, 6) evaluation; the revised framework uses action words to describe the cognitive processes: 1) remember, 2) understand, 3) apply, 4) analyze, 5) evaluate, 6) create

High-Stakes Assignments - High-stages assignments typically involve a graded evaluation of a student's final product, or some kind of final score (e.g. standardized tests)

Low-Stakes Assignments - A form of evaluation that does not heavily impact a student's grades or outcomes

Pedagogy/Pedagogical - Approach to teaching; the method and practice of teaching

Writing Across the Curriculum (WAC) - A pedagogical initiative that concerns itself with writing in all academic content areas, rather than just in English and communication courses

Writing in the Disciplines (WID) - "Designed to introduce or give students practice with the writing conventions of a discipline and to help them game familiarity and fluency with specific genres and formats typical of a given discipline" (Kiefer et al., 2021)

Writing to Demonstrate Knowledge - Writing to show understanding of course concepts by explaining or applying ideas in student writing

Writing to Engage (WTE) - Writing tasks assigned to engage with course concepts and skills

Writing to Learn (WTL) - Short, informal writing tasks that help students think through key concepts or ideas presented in a course

## Section 1 Reflection Questions

1. Which WAC approach do you use the most in your practice? Why do you think you gravitate toward that approach?
2. What do you think are the main benefits of WTL activities? What about WDK activities?

### Section 1 Activities

1. Using the table below, create a Writing to Learn, Writing to Engage, or Writing in the Disciplines activity. Then explain which critical thinking skills it covers in Bloom's Taxonomy (original or revised).

| Course Subject | Approach | Activity |
|---|---|---|
| | | |

2. Choose a writing activity that you have assigned in the past. Classify it as a WTL or WDK activity. Discuss where it landed on Bloom's Taxonomy and how you could revise it to engage higher order thinking skills.

## Section 2: Benefits of Writing

"Extensive and diverse research has suggested links between writing and mental capacities in such domains as memory, critical thinking, creativity, verbal skills, and overall health" (Metropolitan State University of Denver [MSU Denver], 2019). The benefits of writing are robust and impact learning, content knowledge, communication, career readiness, and mental health.

### Writing Improves Learning

In school, we talk about writing as a means to assess content area knowledge and learning, as a subject to learn grammar and mechanics, or as a vital life skill that students must learn; while all of the above descriptions are accurate, teachers -- and as a result, students -- often neglect to see writing as a learning process, or a means to facilitate learning (Buckley, 2017). The idea that writing elicits and improves learning is not a new concept, as cognitive and social-cultural theories have supported the idea for decades. Back in the 1980s, Britton claimed, "Writers do not know exactly what they will say when they begin to convert an idea into written text, and that the semantics and syntax of language shape this process, resulting in new learning about an idea at the 'point of utterance,'" (as cited in Graham, 2020). In other words, just the process of

putting thoughts into written text further enhances student learning, and creates new connections as thoughts are further organized and synthesized on paper.

**Memory**

Graham (2020) explains, "Writing about content material facilitates learning by consolidating information in long-term memory," which he describes as the retrieval effect. Information is forgotten if it is not reinforced, and writing is a strategy used to reinforce memories of the material. Graham further explains that the reinforcement and consolidation is achieved through "rehearsal of information, elaboration of it, or both." Teachers can use writing as a rehearsal strategy by using the last 5-minutes of class for students to write down the most important concepts that they learned that day; students can further elaborate by explaining why their chosen concepts were most critical to the material.

Writing also helps with retention of information because it forces students to slow down, think about their learning, organize their thoughts, and then determine how they want to express it in their writing. Writing also provides students with a reference that they can continuously look back on, and even add to as new ideas emerge. When students write down what they learned and continuously review or add to it, it is a consistent reinforcement for the memory, which assists in long-term retention "When you have the writing saved, you can also trace how your thinking has evolved and avoid lost time in forgetting what you considered. A likely by-product is that thinking becomes more efficient" (Douma, 2021).

**Critical Thinking Skills**

"Writing is thinking; the whole process of academic writing requires the writer to make a variety of decisions at different levels in writing" (Rahmat, 2020). Writing requires planning, drafting, researching information, evaluating information, deciding which information to use, organizing the information in a logical manner, and then expressing it in a way that is appropriate for the given audience. Rahmat further explains, "Writers use critical thinking and problem-solving skills in the writing process throughout the process . . . Technically, the writing process demands that the writer analyzes and solves problems as they write."

"In studies wherein experimental groups that were subjected to written treatments on tests were compared with control groups that were not, indications of critical thinking skills measured more highly in the former than the latter" (MSU Denver, 2019).

### Metacognitive Skills

When students are asked to show their understanding of a topic by writing about it, areas of confusion and gaps in understanding are often revealed. This type of writing forces students to think about their understanding of the material and measure the depth of their knowledge. Graham found that one of the most effective writing strategies was "metacognitive prompting, in which students are asked not only to recall information but also to apply what they've learned to different contexts by thinking about multiple sides of a position or making predictions based on what they currently know" (Terada, 2021). Metacognitive prompting takes students from just understanding and digesting information to more complex skills like applying it to real life.

## Content Area Improvement

### Reading

Writing has a positive impact on both reading comprehension and reading fluency. Writing can elicit comprehension of a text in the following ways: "fostering explicitness, promoting integration of information, creating a personal involvement with a text, encouraging thinking about ideas," and "facilitating new understanding" (International Literacy Association, 2020). Thus, writing about reading increases comprehension and retention of the material. When students write about what they have read, regardless of the content area, it "dramatically improves" comprehension of the reading (Ferlazzo, 2020). Writing about reading typically requires students to go back and reread the text, gaining a deeper understanding of the material. Literacy Coach Tony Zani explains, "When students have to consider a controversial question and use texts they've read to defend their points of view, reading comprehension is off the charts" (As cited in Ferlazzo). Answering text-dependent questions that require a thorough explanation and analysis forces students to gain expertise about what they are reading. "Comparative research shows that students who wrote about text outperformed those who read, read and reread, read and studied, or read and discussed without writing" (Woodard, 2021).

Writing has additional benefits for reading fluency. "When students have to stop and think about what spelling patterns to use when they write, they are making a deeper connection in their brains about sound and spelling patterns" (Ferlazzo, 2020). These connections make it "faster and easier" for students to recognize and recall the same patterns while reading (Ferlazzo). This is even true for the youngest of readers, who are still learning the rules of both reading and writing. For early readers, "writing is a natural way to ingest and experiment with a growing knowledge of letters and their function in

symbolizing the sounds we speak," and encouraging them to write even before they know the rules "builds a deeper understanding of how reading works" (Ferlazzo). Research also shows that students who are given the freedom to experiment with inventive spelling become better readers (As cited in Ferlazzo).

When students write they are also becoming aware of sentence structure, syntax, and powerful word choices. Because they are paying attention to this in their own writing, they are building a framework to identify it when they are reading. Writing also helps students learn about purpose and genres in their reading. Ferlazzo (2020) cites a story of 1st graders who were writing informational texts on a topic of their choice, and one chose a nursing home because her grandfather was in one. Later, this student was "scouring a book with a glossary in it" and told the teacher that she wanted to "add a glossary" to her writing so that people could look up the big words if they needed to (Ferlazzo). At 6-years old, this student was able to make the connection between genres (her own informational writing and a nonfiction book she was reading), identify a nonfiction text feature, and apply it to her own work.

**Science, Social Studies, & Math**

Graham's (2020) conducted a meta-analysis on 56-studies to determine if writing about content in science, social studies, and math courses improved student learning in these areas. Studies in his review included students in grades 1-12 who engaged in WTL activities in their content area classrooms. Graham reports that not only was the learning enhanced, but "it was equally effective at improving learning in science, social studies, and mathematics as well as the learning of elementary, middle, and high school students." While writing is often used in these subjects to assess student understanding, writing also helps students to recall information, make connections between different concepts, and synthesize new information in these content areas (Terada, 2021).

Writing promotes engagement with the content, which is beneficial in more technical subjects like math. Terada (2021) discusses writing as a learning strategy in her 10th grade math class, "that gives her a window into her students' thinking." She uses low-stakes writing activities when the class is working on definitions; for example, rather than providing the definition of a polygon, she will show examples and non-examples, and have students write down what they notice, what is the same, what is different, et cetera (Terada). Students then form groups to compare responses, which also promotes collaboration around writing. "Students often feel intimidated by math, and transforming the activity into a writing exercise eases some of the anxiety of introducing difficult concepts" (Terada).

## Communication Skills

Communicating effectively is vital for a students' academic endeavors, and even more vital in their personal and professional lives. Whether going to college or a trade school, entering the workforce, or joining the military, adequate verbal and written communication skills are necessary. Students further develop both their verbal and written communication skills with writing practice. "When we are challenged to express ideas more clearly or creatively, we push beyond the boundaries of our habitual jargon and explore novel ways of communicating" (MSU Denver, 2019). When students practice these expressive skills in their writing, it also transfers into their verbal communication skills. Students begin to pay more attention to the words that they use and how those words are communicated to others. "Another study supports the idea that when learners are forced to explore and present complex topics, their vocabulary and manner of expression improves in concert with their growing knowledge" (MSU Denver). Practicing increased articulation in writing can transfer to speaking: "When you can put words on paper cleanly and clearly, it will become easier to do so in your speech" (Rampton, 2019).

"Writing provides students with the avenue to learn all the rules of their language and how they can better organize their ideas more coherently using the language" (Special Contributor, 2020). As students work on expressing themselves through their writing, "grammar, spelling, and punctuation, gestures, paralinguistics'' will also be improved upon (Special Contributor). The ability to write a professional email, for example, using proper grammar, spelling, and punctuation, is an essential life skill that can only be obtained through consistent writing practice. Writing practice across disciplines is important because it helps students with positive transfer of their writing skills.

## Preparing for the Future

"From business leaders to engineers, industry professionals consistently rate written communication skills as among the most important for new workers" (Sparks, 2018). Likewise, colleges and trade schools require proficient writing skills as well. It is not just the writing itself that colleges and employers are interested in, but the analytical and critical thinking skills that come with it. Being a proficient writer means being able to organize one's thoughts in a meaningful way, and that is desirable for colleges and industry professionals alike.

## It's Good for You!

In addition to its cognitive benefits, writing is also just good for the soul. "Writing has been shown to decrease stress, help people cope with trauma, and even correlate with fewer experiences of adverse physiological symptoms" (MSU Denver, 2019). Writing can help individuals deal with anxiety and even improve mood. Researchers "prescribe methods of 'expressive writing' or journaling whereby one can work through complicated thoughts and thereby obtain some relief" (MSU Denver). Writing is reflective and allows students to express themselves, whether that is through journaling, expressive writing, or responding to prompts in different subject areas. Students gain more insight into their own thinking when they are able to write down their thoughts.

Writing can also be used to relieve stress related to test-anxiety. Research led by Stanford University psychologist Christopher Rozek found that "low-income students who expressed their anxiety or reinterpreted it as positive through pre-test writing assignments significantly improved their performance on two end-of-semester biology tests," and "half as likely to fail the critical 9th grade gateway course as similar students who had not participated in the writing exercises" (Sparks, 2019). The results were equally optimistic for students who wrote about their anxiety and how they were feeling, and students that read about reinterpreting anxiety and wrote a written response to it. Writing is a quick and extremely easy way to help students regulate their bodies and emotions when they are feeling unease, or even as a preventative measure to avoid getting to the point of panic. "Writing exercises like we used in this study could be used with students to help support emotional well-being and help them do better on these kinds of high-stakes tests" (as cited in Sparks).

## Section 2 Key Terms

Inventive Spelling - Refers to the practice of children using their best judgment to spell out words

Meta-Analysis - a statistical analysis that combines the results of multiple scientific studies

Retrieval Effect - The act of bringing information out of long-term memory

### Section 2 Reflection Questions

1. Which benefit of writing do you think your students would consider to be most relevant? Why?

2. What is one benefit that you were unaware of before taking this course?

### Section 2 Activities

1. Students love to learn how their brain works and how something - in this case, writing - is relevant to their lives. Design a short Google Slides presentation "selling" them on some of the benefits of writing. This should be student-facing.

## Section 3: Challenges of Writing Across the Curriculum

### Writing Proficiency

The results of the 2017 U.S. National Assessment of Educational Progress (NAEP) for Writing, assessing fourth and eighth-grade students, indicated that 75% of those students could not write at a basic level for their respective age groups, and the results for students from diverse backgrounds were even more troubling (Dunn, 2021). Further, 40% of students who took the writing portion of the ACT in the high school class of 2016 "lacked the reading and writing skills necessary to complete successfully a college-level English composition class" (Goldstein, 2017).

Lack of writing proficiency is not a new issue or concern. The Common Core State Standards [CCSS] were introduced in 2009, describing the skills that students should have by the end of each grade for ELA and math. "The standards were created to ensure that all students graduate from high school with the skills and knowledge necessary to succeed in college, career, and life, regardless of where they live" (Common Core State Standards Initiative, 2022). Writing, of course, is covered under the ELA standards, requiring students to learn grammar, spelling, and mechanics, and three types of essay writing: narrative, argumentative, and informational. Despite these efforts, the "core hasn't led to much measurable improvement on the page. Students continue to arrive on college campuses needing remediation in basic writing skills" (Goldstein, 2017). So what is the root of the problem? Why is writing such a difficult subject to master?

Writing is a complex task that requires numerous interdependent skills: working memory, problem-solving, critical thinking, and knowledge of the English language, to name a few. Being such a varied process to master, many children find writing to be extremely challenging. "A student's potential to improve and master the writing process can be attributed to the family and literacy practices at home, a willingness to improve, and the learning environment at school" (Dunn, 2021). Dunn further explains that family literacy practices that can promote success with writing include being read to frequently in childhood, as well as discussing books. In addition socioeconomic status also plays a part in literacy mastery, which supports the importance of reading and writing for all students.

## Students with Special Needs

Writing is challenging, even without taking into account learning disabilities (LD) or other neurodiversity issues. Students with LD experience even greater difficulty with writing than their non-disabled peers. While there are learning disabilities specific to writing, students with learning disabilities in reading often experience difficulty with writing as well. For example, writing difficulties for "students with dyslexia can be partially attributed to their reading difficulties and can manifest in many ways in their writing, such as poor spelling, poor legibility, lack of diverse vocabulary, poor idea development, and/or lack of organization" (Herbert et al., 2018). It makes sense that students with dyslexia have difficulty with writing, as it requires many of the same skills and processes as reading. Dyslexia "involves difficulties related to processing phonological information needed for decoding words, whereas writing requires encoding phonological information when writing words," so these similar processes are both very difficult for a student with dyslexia (Herbert et al.). Likewise, reading is usually part of the writing process for students, whether it is reading reference materials or going back and rereading their own writing. As such, difficulty with reading is going to create more difficulty with writing.

Students with other disabilities, including Attention Deficit Hyperactivity Disorder (ADHD), often struggle with writing because of their executive functioning skills. As writing tasks increase in complexity, "challenges may originate from an inefficient executive functioning system," which is the ability of learners to focus and make sense of incoming information, make connections with the new knowledge and what they already know, and apply "their working memory to use that new information to expand their knowledge and long-term memory" (Dunn, 2021). Writing is a multistep process, which includes determining the main idea, deciding how to start and how to end,

determining proper word choice, and so on; this means that students must shift their focus several times, while remaining on task. Working memory is key when it comes to writing, so the limitations caused by ADHD make writing a burdensome task. Herbert et al. (2018) explain, "When more working memory resources are needed for any individual component of the process, fewer resources are available to manage other components of writing tasks," making writing a frustrating and overwhelming task.

## English as a Second Language (ESL) Students

Writing is challenging for ESL students due to "lack of vocabulary, poor grammar, poor spelling, students' readiness and lack of exposure to books and reading materials" (Moses & Mohamad, 2019). Like reading comprehension, so much of writing depends on a students' background knowledge about a given topic. Essay topics in K-12 schools are typically based on American culture or written in response to readings from American textbooks; as a result, ESL students have very little background knowledge or previous experience with these topics. This puts them at a disadvantage before the actual writing even begins.

With limited knowledge of the rules of grammar, ESL students often feel anxious about writing sentences that are grammatically correct. Moses and Mohamad (2019) explain that it is common for ESL students to "make mistakes in subject-verb agreement, pronouns, tenses, articles, prepositions and basic sentence structures," as well as proper spelling. Academic writing has a formality to it that is intimidating for all students, but increasingly so for students that are still learning vocabulary, grammar, and other rules of the English language.

## Student Buy-In

Student buy-in is one of the main challenges teachers face when it comes to writing instruction. Across grade levels and content areas, students are "reluctant writers," find writing to be "boring," or "struggle" with writing because tasks and prompts feel irrelevant to them (Mathew, 2018). Students often do not see writing as a real-world skill and they don't understand its importance. Likewise, writing is challenging; it is a complex process that takes a great deal of time and effort to master, and even with the utmost effort, it is still not easy. As a result, writing can be frustrating for a lot of students.

## Teacher Supports

Whether it is in the ELA, science, social studies, math or physical education classroom, teaching writing is a complex task. Many people assume that teachers are naturally good writers but that is not always the case; even teachers who are strong writers do not necessarily have the skills or resources to effectively teach writing. Teaching writing requires a common vision for writing instruction, professional development for teachers, and technological resource allocation for classrooms.

### Common Vision

Graham (2019) poses the scenario: "Imagine asking teachers, principals, district superintendents, or policy makers involved in crafting educational goals for writing to describe their vision for teaching writing, and they were unable to answer this question or each had different answers!" Unfortunately, this hypothetical scenario is not so unrealistic for writing instruction across K-12 schools. Schools often leave it to the classroom teacher to determine how and what to teach in the writing classroom, as long as standards are covered. However, this is overwhelming and an unreasonable position in which to place teachers. Graham insists that in order to give students the writing instruction that they deserve, "There must be a coherent vision for how writing is taught in the classroom, across classrooms and grades in a school, within the district and across districts within a state, across states, and within the nation." While achieving a coherent vision on such a wide spectrum might be unrealistic, it should not be so difficult to do so on a district or school level. Teachers cannot be expected to teach writing effectively if they are not given a framework for what "effective" looks like.

Developing a common vision for teaching writing does not mean that every single teacher has to use the same materials, lessons, and teaching strategies. It means that teachers across disciplines and grade levels are given a framework to follow, with goals and allocations of responsibilities. Implementation of this vision must be completed through a systems approach, meaning "those who teach writing and reading, or use writing to support learning need to be knowledgeable about writing, its development, and writing instruction" (Graham, 2019). Ideally, Graham suggests that state and district "academic standards assign clear, coherent, and realistic responsibilities for writing instruction in all subject areas," but again, this is more realistic at the school level.

### Professional Development

Although writing is one of the most important skills to learn in school, most teachers actually have very little formal training in writing curriculum and pedagogy. Goldstein

(2017) further emphasizes the issue, “A scan of course syllabuses from 2,400 teacher preparation programs turned up little evidence that the teaching of writing was being covered in a widespread or systematic way.” Further, a study of 500 teachers, in grades three through eight, discovered that less than half of the group had taken courses devoted to teaching writing, and less than a third had taken courses about how kids learn to write (Goldstein). With those numbers, it is no wonder that teachers feel unprepared and enthusiastic about teaching writing.

If teachers in the area of ELA feel unprepared to teach writing, it seems even less promising for teachers of other content areas. Founding director of the Reading and Writing Project at Columbia University’s Teacher College, Lucy M. Calkins, acknowledges that the CCSS gave a necessary “wake-up call” on the importance of “rigorous” writing instruction, but policymakers failed in the implementation stage, resulting in the need for “massive teacher education” (Goldstein, 2017). In a given school year, teachers usually have multiple professional development sessions on reading and math instruction, and none on writing instruction. “Most teachers aren’t receiving the support and tools they need to lead strong writing lessons,” so “providing teachers with direct training is critical” for both teacher and student growth (Mathew, 2018).

Mathew (2018) discusses “cold writes,” which a Pennsylvania school district uses to build writing skills in both teachers and students. Each quarter teachers give students a writing prompt about a topic that has already been taught; teachers then bring this writing to a professional development session, where they work with grade level teams to discuss strengths and areas of need. “This helps teachers understand how to evaluate student work, while providing feedback that nurtures growth and motivation” (Mathew). At the school level, Graham (2019) describes research-based principles that can “change teacher’s writing practices” and “improve students’ writing performance,” some of which include the following:

- Redesign the school schedule to allow for ample time for PD and ongoing learning for faculty
- Ensure that PD aligns with the school’s vision for writing instruction
- “Design PD to improve writing instruction within and across grades as well as to support reading and learning”
- Conduct needs assessments and design PD around results

- “Collect data on whether the instructional practices presented in PD achieve the intended effects; readjust and modify as needed.”

PD for writing instruction should be relevant and sustainable; likewise, teachers should be able to implement what they have learned right away. It is helpful if materials used in the PD are materials that are actually available for classroom use.

**Learning Communities**

Personal efforts to engage in ongoing learning should also be encouraged and “rewarded” (Graham, 2019). One way to promote this is “to provide school time for principals and teachers to share new ideas and skills learned through personal activities like reading professional material, attending conferences, observing colleagues, and so forth,” and meeting with learning communities to share and collaborate (Graham). School leaders can select groups of teachers to attend writing conferences or training sessions and then have those teachers lead PD for other teachers in the building; this creates sustainability for new writing practices and increases collaboration amongst colleagues.

**Technology**

Access to efficient technology means access to more writing tools, which improves writing instruction for students and better supports teachers with instruction. In addition to providing students with assistive technology like voice to text, text-to-speech, word prediction, and spell check, technology makes it significantly quicker and easier for teachers to assess and provide feedback on student writing. Mathew (2018) explains that she consistently hears educators talk about the “challenge of giving students feedback and monitoring writing growth,” and about how long it takes to grade papers. There are numerous programs that schools can purchase to streamline the writing assessment process, as well as free classroom platforms that teachers can utilize. Further, there are even browser extensions that allow teachers to use pre-made rubrics, or create their own, and then grade papers right in the platform it is posted in (e.g. Google Classroom).

## Section 3 Key Terms

Attention Deficit Hyperactivity Disorder (ADHD) - Neurodevelopmental disorder that can cause attention difficulties, hyperactivity, and impulsiveness

Common Core State Standards - K-12 initiative that details what students should know in English Language Arts (ELA) and Math at the end of each grade

Dyslexia - Learning disorder characterized by difficulty reading

English as a Second Language (ESL) Student - Student whose first language is not English, and who requires additional English language support to develop reading, writing, and speaking skills

Students with Special Needs - Students that qualify for Special Education services under the Individuals with Disabilities Education Improvement Act (IDEIA) or for 504 plans under Section 504 of the Rehabilitation Act

Working Memory - Cognitive system with limited storage that can hold information temporarily

## Section 3 Reflection Questions

1. What have you found to be the most challenging about teaching writing in your own practice?
2. What barriers have you experienced in teaching writing in a class other than English?
3. What type of support do you need in your practice to successfully implement writing instruction?

## Section 3 Activities

1. Develop a "common vision" statement for effective writing instruction at your school. If your school already has one, upgrade it! Include goals of instruction, what should be taught, who should teach it, and any other details that you feel are important for developing a coherent framework.
2. Design a professional development activity like "cold writes," that you think would help to prepare you and your colleagues to teach writing across the curriculum.

# Section 4: Successful Implementation of Writing Across the Curriculum

Ideally, WAC is implemented at the school level, but it must be done by grade level at the least. In an elementary school, where students spend the majority of their day with one core teacher, it is important that all of the teachers within a grade-level team implement WAC, so that there is consistency as students move from grade to grade. Likewise, it is beneficial for all grade levels when it is reinforced in elective courses, such as art, music, technology, and so on. Successful WAC doesn't mean that students enter the classroom and just write a journal entry; it must be done purposefully in order for it to have a positive impact on students.

## Writing Instruction

### Problems with Writing Instruction

Graham (2019) presents results from 28 surveys, observations, and mixed method studies about how writing is actually taught by over 7,000 teachers. While Graham found that many teachers are providing efficient writing instruction, he also identified several challenges that consistently arose. Some of the issues that Graham discovered include lack of focus on teaching planning and revising, an overemphasis on grammar and mechanics and a lack thereof on critical thinking processes, and little emphasis placed on expository and persuasive writing. Further, Graham found that in many middle and high school classrooms students were practicing "writing without composing," meaning rather than completing thoughtful writing assignments, they were completing fill-in-the-blank worksheets or short-answer responses. Finally, Graham explained five indicators of insufficient writing instruction that he found: not enough time devoted, infrequent practice, inconsistent use of research-based instruction and adaptations, lack of use of digital tools, and limiting classroom writing practices, such as little student collaboration and excessive time spent reviewing for high-stakes tests.

### Successful Writing Instruction for Elementary School

Graham et al. (2018) authors a guide for the U.S. Department of Education (DOE) of evidence-based practices to address the challenges of teaching writing at the elementary level. Graham et al. prescribes four recommendations for quality writing instruction:

1. Provide daily time for writing

2. Teach students to use the writing process for multiple purposes
3. Teach students to become fluent in handwriting, spelling, sentence construction, typing, and word processing (basic writing skills)
4. Create an engaged writing community

**Provide Daily Time for Writing.** Providing ample opportunities throughout the school day for students to write is a critical component of a successful writing program. Starting in first grade, Graham et al. (2018) recommend that students spend at least 60-minutes per day writing. The hour "should include at least 30 minutes dedicated to teaching a variety of writing strategies, techniques, and skills appropriate to students' levels," and the remaining 30-minutes should be spent practicing and applying the skills learned during instruction." Teachers often feel pressured by time constraints when it comes to writing, but time constraints are all the more reason to implement WAC. "Teachers should integrate writing and content-area instruction wherever possible in order to maximize instructional time and give students more writing practice" (Graham et al., 2018). In addition, students will learn skills for writing in different contexts. Writing lessons in ELA will teach different skills than writing lessons in science, which might focus more on detailed lab reports, procedural writing, and descriptions of observations (Graham et al.). Integrating writing tasks in content area lessons not only gives students more writing practice, but it also allows them to think critically and engage more with the content.

**Teach the Writing Process.** When we are discussing WAC and writing instruction in general, we are not just talking about students jotting down ideas that come to their mind. Graham et al. (2018) explain that the writing process "requires that the writer think carefully about the purpose for writing, plan what to say, plan how to say it, and understand what the reader needs to know." The writing process includes the following components: planning, drafting, sharing, evaluating, revising, editing, and publishing (Graham et al.). These steps are not linear, as students will go back and forth between processes as they revise and make changes to their writing. Teachers should guide students throughout the writing process, teaching them various strategies to carry out each step. Teachers should explain and model "the fluid nature in which the components of the writing process work together" so that students can independently apply the strategies when used together or separately (Graham et al.).

**Teach About Writing for Different Purposes.** Students should be exposed to the different purposes for writing, including to inform, persuade, narrate, show knowledge

about a topic, reflect, explore a topic further, and entertain. "Teachers should begin by teaching students the different purposes for writing and how specific genres, or forms of writing defined by specific features, can help students achieve their writing goals" (Graham et al., 2018). In learning about different writing purposes and genres, students will learn about different writing structures, and how to gear their writing toward an intended audience. To help students understand the connection between purpose and audience, it is " important to design writing activities that naturally lend themselves to different audiences" (Graham et al.). For example, teachers and students can create a list of potential audiences, and then students can choose the appropriate audience for the topic that they are writing about. It's important for students to learn how to vary tone, word choice, and sentence structure for different audiences. One activity that works well to develop this skill is to have students write about the same topic for different audiences. For example, students can write about their favorite amphibian for a child that knows nothing about it; then they can write about it for a veterinarian or other zoologist; then they can write about it for their friend that shares interest in the animal; the options are endless. Another important part of teaching writing for different purposes is providing students with appropriate mentor texts. Teachers can assign activities that have students mimic mentor texts for various purposes and audiences. For example, if students in a social studies class are to write a journal entry of someone during the Civil War, it would make sense to share examples of real writing from that time period, so they can emulate the language and structure.

**Teach and Support Students with Basic Writing Skills.** Handwriting or typing, spelling, and sentence construction are basic writing skills. Before students are able to focus on developing thoughtful compositions, they need to be confident in their basic writing skills. Becoming experts in these skills takes a lot of time and practice but they are extremely important in developing proficient writers. When students struggle with basic writing skills, it not only affects the quality of the writing but it is very discouraging as well. When students struggle with spelling it "can affect the words students choose because they may be less likely to use words they cannot spell" (Graham et al., 2018). Further, students should develop the skills to write "strong, interesting sentences that vary in length and complexity in order to convey their intended meaning and engage readers" (Graham et al.).

**Teaching with mentor texts is a great way to introduce students to different sentence structures.** When using mentor texts for this purpose, directly tell the students what elements you're looking at in the text. Next, students should discuss the techniques, point of view, word choice, narrative structure, etc., of the mentor text. Finally, students

should have time to emulate the mentor techniques and approaches of the mentor text in their own writing. This activity gives students practice with varying sentence structure and complexity, and it also allows them to practice with proper grammar, spelling, and punctuation. Practicing basic writing skills should continue throughout a student's school career; students' writing skills should get progressively more advanced, allowing them to write more complex compositions.

**Create an Engaged Writing Community.** Developing students' motivation to write is equally as important as developing their skills. One of the biggest hurdles of teaching writing is when students are so frustrated by the subject that they immediately shut down when it's time to practice. "In a supportive writing environment, teachers participate as writers, not simply instructors . . . By taking part in writing lessons and activities, teachers convey the message that writing is important, valued, and rewarding" (Graham et al., 2018). Giving students opportunities to choose their own topics related to the subject material will also increase engagement. Graham et al. explain, "Such engagement and motivation could potentially lead students to write more frequently and become more involved in the writing process and the writing community."

Providing regular structured time for students to give and receive feedback, as well as participate in collaborative writing activities also creates a stronger sense of community. Graham et al. (2018) explain, "When students feel connected to one another and to the teacher, they may feel safe participating in the writing process and sharing their writing with peers." Publishing student writing for an audience beyond the classroom creates engagement and excitement for students. Teachers can display student writing on bulletin boards, in the school library, school newspaper or newsletters, or on a classroom website or blog. Teachers can create an interactive bulletin board in the classroom or hallway with post-its available, allowing other students to leave positive comments on student writing. "Publishing student work in this manner celebrates writing and helps create a physical environment that is conducive to learning" (Graham et al.).

**Successful Writing Instruction for Middle & High School**

Graham et al. (2017) also authored a guide for the DOE Office of Elementary & Secondary Education to help students in grades 6-12 develop effective writing skills. The recommendations provided by the panel emphasize two important themes: "writing encourages critical thinking" and "writing occurs in every discipline" (Graham et al.). "Critical thinking occurs in every discipline and writing leads students to think critically about content and ideas presented in all classes," so practicing these skills in various disciplines allows for deeper understanding, evaluating, and synthesizing information.

Graham et al. prescribe three recommendations for teaching secondary students to be effective writers:

1. “Explicitly teach appropriate writing strategies using a Model-Practice-Reflect instructional cycle”
2. “Integrate writing and reading to emphasize key writing features”
3. “Use assessments of student writing to inform instruction and feedback.”

**Explicitly Teach Writing Strategies Using Model-Practice-Reflect.** The first recommendation suggests that teachers use both direct instruction and a model-practice-reflect cycle of instruction to teach different strategies for each component of the writing process. When using direct instruction, “students learn how to select a strategy, how to execute each step of the strategy, and how to apply the strategy when writing for different audiences and purposes,” and when using model-practice-reflect, “students observe a strategy in use, practice the strategy on their own, and evaluate their writing and use of the strategy” (Graham et al., 2017). Teachers should teach multiple writing strategies for each component of the writing process so that students can use the option that works best for them for a given task. The goal is not for students to memorize every single strategy, but rather to “understand the purpose of writing strategies and know how to select an appropriate strategy” (Graham et al.).

Secondary students should also be learning how to choose and apply strategies for their specific audience and purpose. “After students learn different strategies, teach them to evaluate the available strategies and choose the most appropriate one for each situation” (Graham et al., 2017). This may include having students provide a short paragraph describing what strategy they chose and how that strategy will help them write for their specific audience or purpose; some teachers may want to provide students with a questionnaire to consider when trying to choose their strategies. “To promote the critical selection of strategies instead of the rote use of strategies, identify opportunities for students to use writing strategies in new ways and in different contexts” (Graham et al.). To do this, teachers might have students use a writing strategy that they have mastered in a different discipline to promote transfer of the skills across content areas. Students should also learn how to adapt their writing strategies for different disciplines, audiences, and purposes. Graham et al. explains, “When students use a planning strategy to write a persuasive essay, they should keep in mind that the appropriate supporting evidence will depend upon the audience and thus, they should carry out the planning strategy differently based on the audience.” For example,

for a writing assignment in a social studies class, the best evidence might be from " historical figures and events," while the best evidence in a science class might come from "results and statistics from a science experiment," rather than from quotes from a scientist (Graham et al.).

Model-Practice-Reflect is synonymous with I Do-We Do-You Do, or the gradual release of responsibility (GRR) model. This teaching strategy allows "students to observe the thinking and actions of a strong writer, attempt to emulate the features of effective writing, and then evaluate their writing accordingly" (Graham et al., 2017). When students learn from their teachers, peers, mentor texts, and their own compositions, they begin to "internalize the features of effective writing and develop effective writing strategies, skills, and knowledge" (Graham et al.). Watching the teacher model without having the opportunity for meaningful practice will not make the strategies stick or lend itself to positive transfer. Creating opportunities for students to practice writing strategies across the curriculum allows students to "practice their writing for different topics, audiences, purposes, and tasks" (Graham et al.). As part of the reflective process, students should analyze whether or not their chosen strategies worked, if a different strategy would have been better, and how their writing turned out as a result; using self-assessment rubrics for writing gives students a sense of ownership as well. This is also a great opportunity for students to analyze growth in their writing over time.

**Integrate Writing and Reading for Key Writing Features.** Using reading to teach writing helps students learn about different text features. In general, students spend a lot more time reading than writing, so they are usually more familiar with reading skills and strategies. "Showing them the connection between reading and writing can help them transfer their reading skills to writing and vice versa" (Graham et al., 2017). For example, when asking students to identify the main idea and supporting details of a paragraph, they will see that good writing typically has these components, that when they read they should identify these components, and when they write a paragraph they should also include a main idea and details. Likewise, reading and writing have four cognitive processes in common in which combining reading and writing help to develop:

- Meta-knowledge
- Domain knowledge
- Text features
- Procedural knowledge

Meta-knowledge involves making the connection between the specific reading and writing processes in relation to the purpose and audience of the writing (Graham et al.). Domain knowledge refers to knowledge on the topic being written or read about. Important text features include "text format, organization, and genre, as well as spelling and syntactical combinations that are accepted in a particular language or culture" (Graham et al.). Procedural knowledge refers to the complex processes and strategies that students need to know to complete a writing task or understand a text. "Combining writing and reading together in all disciplines enables students to develop their writing in diverse contexts," and gives students more opportunities to practice different types of writing (Graham et al.).

**Use Writing Assessments to Inform Instruction and Feedback.** Monitoring student writing and providing feedback throughout the process, rather than just at the end, provides teachers with information on learning gaps, challenges, and elements that need to be retaught. Assessing writing throughout lets teachers learn about student progress on key learning objectives so they will be able to tailor their writing instruction accordingly (Graham et al., 2017). This knowledge is key for planning instructional activities that are differentiated for various levels of mastery. Teachers can plan whole-group, small-group, or one-on-one activities based on the data from the assessments. For example, if half of the class misuses coordinating conjunctions on their exit slip, then dividing the class into two groups and providing station activities might make sense. Further, using writing as formative assessments in other disciplines can inform instruction as well.

Consider a math teacher who realizes that five of her students are consistently arriving at the wrong answer in the Pythagorean Theorem unit. The teacher "rereads their written proofs and deduces that all five students are making the same misstep in their mathematical reasoning," and she can then plan an activity where part of the class works on additional problems, while she solves the original problem with the small group and explains the misstep (Graham, et al.). Formative assessment allows teachers to gauge student understanding, ensuring that they have the foundational skills necessary before teaching new skills or strategies; likewise, formative assessments will allow areas of struggles to be identified and remedied more quickly. Formative assessments can be done using regular classwork, projects, longer written assignments, and WTL prompts, such as exit slips.

## Section 4 Key Terms

Assistive Technology - Any device, software program, or piece of equipment that helps students with disabilities to communicate, learn, or function better

Direct Instruction - Explicit teaching of a specific skill using lectures and demonstrations

Gradual Release of Responsibility Model - Model of instruction that shifts the work from the teacher modeling, to practicing together, to independent practice and application by the student

Mentor Text - Written pieces that serve as examples of good writing for students

Needs Assessment - Systematic process of determining and assessing the needs of a group

Professional Development - The process of identifying goals and learning new skills to grow and succeed in one's career

Writing Process - A sequence of mental and physical steps to produce a piece of writing

## Section 4 Reflection Questions

1. Which parts of successful implementation of writing instruction do you do well? Which parts can you improve on?
2. What differences do you notice between writing instruction for elementary school and writing instruction for middle and high school? Why do you think these differences exist?
3. What part of teaching writing are you most comfortable with? What part are you most uncomfortable with?

## Section 4 Activities

1. Choose a specific writing skill that you would like to teach in your classroom. Identify a mentor text that exemplifies this skill that you can share with students. Discuss why you chose that skill and mentor text.
2. Create a writer's workshop procedure for your classroom. Include components that will help build a positive writing community specific to your discipline.

# Section 5: Ways to Bring Writing into the Classroom

Consider this: “The expectation is that students in every content area will write routinely over time for a variety of tasks, purposes and audiences. Therefore, just as every teacher is a reading teacher, every teacher is a writing teacher” (Ferlazzo, 2018). Still, in reality, teachers do not have “extra” time to add in a writing activity; therefore, it is crucial that teachers across content areas are prepared with writing activities that are flexible, fit into their curriculum, advance instruction, and benefit student learning. While the activities and suggestions below are divided up by content area, many of the activities can be modified and used in other respective disciplines as well, including the ELA classroom.

## Writing Across Disciplines

While many teachers find it counterintuitive to teach writing in a class other than ELA, it is actually best practice to do so. Science and Social Studies standards start in grade 6 for Common Core, with K-5 standards being embedded in the reading standards; these standards are titled “Literacy in History/Social Studies, Science, & Technical Subjects,” so there is a significant focus on reading and writing skills within the disciplines. The standards focus on key ideas and details, craft and structure, integration of knowledge and ideas, and text complexity (Common Core State Standards [CCSS] Initiative, 2022).

### Social Studies

“Social studies without writing would be like math without equations or science without experiments. Writing is simply what we do, as social scientists” (Ferlazzo, 2019). The ultimate goal of the social studies discipline is to build civic competence. The National Council for Social Studies [NCSSS] (2022) defines civic competence as, “the knowledge, intellectual processes, and democratic dispositions required of students to be active and engaged participants in public life,” and is displayed through the ability to “acquire knowledge about one’s community, nation, and world; apply inquiry processes; and employ skills of data collection and analysis, collaboration, decision-making, and problem-solving.” It is not enough to know about historical events and individuals, but students need to understand why the events happened, through analysis and synthesis of primary texts and other sources. So where does writing fit into all of this?

Associate Professor and leading expert on argumentation in social studies, Cauncey Monte-Sano, explains, “Learning to write supports the preparation of citizens who are capable of disciplined inquiry. In particular, written argument allows the chance to

examine the nexus between claim and evidence, which can often be elusive in speech" (as cited in ThinkCERCA, 2022). Further, in such an "interconnected world, with many policy decisions rooted in historical context, students need practice building evidence-based arguments to make informed civic decisions" (ThinkCERCA). Writing about history and how the world came to be aids students in learning from the past, which builds analytical, critical thinking, and problem-solving skills to make informed decisions for the future. However, K-12 social studies courses cover such a broad range of topics that writing as a separate entity does not usually make the cut. "That's why finding ways to integrate writing—and to train students in appropriate writing styles for the social sciences—is key" (Ferlazzo). Below are writing activities that can be implemented within various units of social studies.

**Journaling.** Social studies courses often cover some aspect of current events, whether it is watching CNN10 at the beginning of class or reading important headlines on a digital news source, this is a great opportunity to have students respond to thought-provoking questions in a journal. Journaling does not have to be a standalone activity, particularly in a social studies class. Having students journal their answers to questions is a helpful pre-discussion activity, as it gives students the opportunity to articulate their thoughts before sharing them aloud.

- In addition to current event sources, there are a ton of valuable (and free) resources available online to use for social studies journal prompts. The New York Times has an entire writing curriculum inclusive of journal prompts that pertain to social studies. Likewise, the Library of Congress website has resources to create writing prompts.

**Interviews.** "In modern-history classes, students can learn a tremendous amount from adults in their communities who experienced events like the Vietnam War, the Civil Rights movement, 9/11, and the Iraq War" (Ferlazzo, 2019). Being able to talk to someone who actually experienced an event provides a unique perspective that students cannot get from a textbook. "Preparing interview questions, conducting interviews, and writing up results gives students excellent practice at being historians" (Ferlazzo).

- Students can take their interview data a step further by comparing it to what they have read in textbooks, learned in class, or seen on TV/videos about the event. Chances are the interviewee's personal account of the event will differ from what students read in books or see in the media, which provides the opportunity for them to compare multiple perspectives.

**Inquiry Design Model.** "Students are given authentic inquiry questions connected to content and given a written task that requires them to answer that question while also directing them to cite primary sources—writing as a historian" (Ferlazzo). Questions should be compelling enough to get student buy-in, but should still pertain to the classroom content. Ferlazzo shares an example from the NCSS' framework:

- Students are given the question, "Should safety outweigh freedom?" and are to read primary sources on topics such as "Japanese internment, civil liberties in wartime, communism, and 9/11" → Students complete "formative tasks" to "demonstrate knowledge and understanding to supporting questions" → students compose a written response to answer the main question, citing the historical documents as support

This activity is engaging for students because the question is interesting and they are able to have a voice in the assignment. At the same time, the activity promotes critical thinking, analysis, and is directly related to social studies content.

**Annotating Primary Documents.** Students can gain a lot of insight into an event, time period, or historical figure by annotating primary documents. Annotating is basically engaging with a text, but it looks different when that text is hundreds of years old. Annotating a primary text begins with noting the basics, such as the author, context, location, and other origin information, and then expands to a "close examination and conversation with the text itself. What information, perspectives, ideas, and questions are communicated and raised" (Ferlazzo, 2019).

- Annotating can be used as preparation for bigger writing projects, such as an inquiry design model project, or a standard essay. Students can annotate the text specifically for their inquiry question, or details that will support their answer to the question.

- Annotating does not have to be limited to texts. Students can also annotate primary photos, political cartoons, or propaganda from a given time period. Students can annotate for what they notice about the visual, what they wonder, questions they have, or important details they notice. Using a photograph or cartoon at the beginning of a new unit is a great way to get student engagement.

**Circle of Viewpoints.** Circle of Viewpoints is an activity created by Project Zero (2019) at the Harvard Graduate School of Education that encourages students to look at a situation from multiple perspectives. This can be used as a writing assignment in a social studies class because considering multiple perspectives is crucial when learning about

historical events. Students must learn that all textbooks and resources have some type of bias, so examining multiple viewpoints provides insight into the events. Using whatever content you're covering in class, brainstorm the potential perspectives students can take. Then have students explore the given viewpoint with the following prompts:

- "I am thinking of … the topic … from the viewpoint of … chosen viewpoint.
- I think … describe the topic from your viewpoint. Be an actor—take on the character of your viewpoint
- A question I have from this viewpoint is … ask a question from this viewpoint" (Project Zero).

Students should use the given prompts but elaborate on their answers into a longer composition using details from the texts and other resources.

**Science**

In addition to the CCSS literacy standards for science, the Next Generation Science Standards [NGSS] (2022) suggest that students are able to analyze data, construct explanations and solutions, engage in arguments from evidence, and communicate information; thus, writing and the writing process is an integral part of science instruction. "There is a common misconception that science is all about hands-on activities with writing embedded at the end to form a conclusion…. This could not be farther from the truth, as writing is part of every step in scientific inquiry" (Flynn, 2021). Flynn believes that by providing students with authentic opportunities to write in science class, it not only helps students develop a deeper conceptual understanding of the material, but it also provides them with an "authentic context" to develop writing skills. Like any content area, time is of the essence, so it is important that writing fits into the curriculum and lesson plans because there is no extra time to "add" additional activities.

**Science Notebooks.** Teachers can utilize science notebooks to emulate what real scientists do in a laboratory. Science notebooks are "a chronological repository not just for experimental data, but for the scientist's learning and thinking about scientific evidence," and they provide a means for young scientists to go back and recheck their work (Ferlazzo, 2018b). When students revisit data and analyses in their notebooks to make connections with current readings, they are "seeking answers to real questions rather than just following a procedure" (Ferlazzo). Flynn (2021) explains, "When we

encourage students to write about their science experiences, they are able to emulate real scientists by recording their ideas, observations, predictions, data, and findings." Science notebooks are a WTL tool, allowing students to synthesize their ideas about science in written format. In addition:

- Science notebooks provide a snapshot of the data and learning but they can also be used as a springboard for more formal writing. Students can use data from their notebooks to "synthesize their findings into journal articles, models, infographics, white papers, and advocacy-driven arguments" (Ferlazzo)
- To help students in formal scientific writing, provide them with several examples of proficient scientific writing; this writing can be from magazines, journals, previous classes, or your own.

**Translations.** Instruct students to translate a scientific concept in writing, using discipline specific vocabulary. For example, students can explain a scientific equation, symbol, or idea. Ferlazzo (2018b) uses the example of students explaining what pi is, as "having students explain such concepts beyond their mathematical representations helps to confirm understandings." When a student can explain a concept, it demonstrates understanding; likewise, students practice utilizing correct science vocabulary to complete the activity.

**Today's Specials.** Today's Specials is an activity with a focus on academic vocabulary. You share an academic word list with students; these words can be generic academic words, but it would probably lend more to the lesson if they are related to the current unit of study. Students then work by themselves or with a partner to use the words in sentences describing what they are currently learning in class. Then students share their sentences out loud, which serves as a review of concepts for the whole class. Using this strategy a couple of times a week causes students not only to "internalize their science learning, but also have the added benefit of becoming more proficient in their reading comprehension because they've engaged regularly in blending the generic academic words with the glossary words" (Ferlazzo, 2018b).

**Inquiry-Based Lab Reports.** Lab reports are important and a very real part of a scientist's work but they don't have to be generic. Inquiry-based lab reports create their own investigations by, "generating the questions to explore, defining and running through a procedure, collecting and analyzing data, and using evidence to support their conclusions, as well as by identifying what next steps could be pursued" (Ferlazzo, 2018b). Students are still exposed to typical lab reports and scientific writing but there

is an element of choice added to it, which creates engagement. Showing students samples of inquiry-based lab reports and modeling the process for them is important as well.

**Math**

Teachers have limited guidance and direction on writing in the mathematics classroom; it is not a common activity to implement in K-12 math classes. However, the CCSS states that proficient math students should be able to "communicate their mathematical thinking coherently and clearly to peers, teachers, and others," as well as "construct viable arguments and critique the reasoning of others" (as cited in ThinkCERCA, 2022). Likewise, the National Council of Teachers of Mathematics [NCTM] states that math instruction should teach students to "communicate their mathematical thinking coherently and clearly to peers, teachers, and others," and "use the language of mathematics to express mathematical ideas precisely" (as cited in ThinkCERCA). With these standards in place for both students and math instruction, it is clear that writing has a place in the mathematics classroom.

ASCD (2017) discusses a report by the Elementary Mathematical Writing Task Force, which explains why students should be writing in a mathematics classroom and provides recommendations as to how it advances students' learning in math. The task force identified two types of writing activities that take place in math classrooms: writing about mathematics and mathematical writing (ASCD). Examples of mathematical writing assignments include having students write about math topics, such as math use in medieval times, how we use math in our daily lives, or the important contributions of a famous mathematician. While these assignments touch on math topics, they are still more literacy-based, requiring research and carrying out the writing process. Mathematical writing, on the other hand, is less concerned with literacy skills and aims to engage "students in mathematical reasoning and communication" (ASCD). Mathematical writing includes text but it also includes "symbols (like the equal sign), numerals, operations, and such visual representations as pictures, charts, or tables unique to the discipline of mathematics" (ASCD). ASCD (2017) describes four types of mathematical writing:

- Exploratory
- Informative/Explanatory
- Argumentative

- Mathematically Creative

These four categories prioritize mathematical reasoning first and foremost, and the ability to communicate that reasoning to others. However, they have different components and purposes.

**Exploratory.** Exploratory writing "helps students make sense of a problem or situation and sort through their own thoughts about mathematical concepts" (ASCD, 2017). Exploratory writing is a strategy that students can use to brainstorm ways to solve the problem, ask questions, or test out different theories for solutions. Exploratory writing is an example of WTL, where the student is the intended audience, and the writing is meant to lend itself to deeper learning and analysis. Exploratory writing is a math strategy in and of itself, as sometimes just "writing it out" lends itself to making sense of a math problem.

Exploratory writing should not be graded on its correctness but rather used by teachers to "gain key insights into the depth of student understanding . . . to deliver specific, actionable feedback and additional instruction as necessary" (ThinkCERCA, 2022). Exploratory writing also gives teachers an insight into student thinking processes and rationale.

**Mathematics Journal.** Having students keep a math journal or log is an excellent way to implement exploratory writing in math class. "By reflecting on math work in writing and drawings, students see what they've learned and find areas where they need to improve" (McAnelly, 2021). Journal pages might include written explanations, reflections on learning, questions, and visuals. Journals can be literal spiral notebooks or they can be digital, using programs like Google Slides or Docs. For digital classrooms, students can still work out the problems on paper and then put pictures of their work in their journal; likewise, if students use digital tools to solve problems, they can paste screenshots in their journals. Math journals present student thinking in a visual form. Entries should include "record of personal experience showing what a student tried, what worked and what didn't, what practices should be continued, and what improvements a student should focus on going forward" (McAnelly).

Math journals can benefit both students and the teacher. Writing in a journal gives students the opportunity to try different ideas and strategies, and express their thoughts as they discover new solutions. "Each entry helps organize and clarify thinking processes for deciphering mathematical situations. Students begin to make connections across mathematical ideas, see and use a variety of strategies, monitor and reflect on

processes, and understand and use multiple representations" (McAnelly, 2021). Journals also provide a running record for students to reference earlier work and similar tasks. Math journals can also be used as a tool for collaboration by having students first write in their journals, and then share with a partner or group. Journal-based discussions give students the opportunity to practice with "try[ing] to communicate mathematical ideas effectively and use[ing] mathematical language correctly and precisely" (McAnelly).

McAnelly (2021) suggests using the following types of journal entries:

- **Reflective prompts:** These prompts help students think critically about their own learning by "providing opportunities to synthesize learning and address unanswered questions." Prompts "can lead a student to analyze successes and challenges, draw parallels or find differences, and make recommendations for modifications" (McAnelly).
- **Problem-solving prompts:** Students work out a problem or mathematical situation and write about the strategy used. In the writing portion, students can discuss what worked and what did not, other possible approaches, and what they might do differently for a similar problem in the future (McAnelly).
- **Topic development prompts:** "If there is a specific content focus . . . a journal might be a record of how students developed their understanding" (McAnelly). Keeping these records and allowing students to look back allows for new discoveries to be made.

McAnelly also suggests that journals have a table of contents, titles and dates of entries, and open margins. Table of contents should be created as students add topics so that they can easily find entries later. Including titles and dates not only makes it easier to find entries but also creates "a timeline of learning and thinking evolution" (McAnelly). Keeping one side of the page blank or at least open margins allows for the teacher to write notes, ask questions, make suggestions, et cetera. Most importantly, students should keep all of the pages of their journals, even the ones with a ton of mistakes! This allows students to go back and see that errors (especially in math class) contribute to rich learning experiences.

**Informative/Explanatory.** Informative/Explanatory writing "positions students to describe and explain mathematical ideas" (ASCD, 2017). Explanatory writing is more formal than exploratory, as this is a form of writing to demonstrate knowledge, more specifically WTE. Teachers should instruct students to be clear and mathematically accurate in their writing, as the intended audience is the teacher or classmates.

Informative/explanatory writing tasks might ask the students to "write descriptions of mathematical concepts, representations, and definitions . . . provide mathematical explanations . . . mathematical connections and make comparisons" (ASCD).

**Informative/Explanatory Prompts & Activities.** Informative/explanatory prompts can be created and modified to use with any math topic, as the goal is simply for students to explain math concepts in their own words. Below are example prompts and activities to utilize in a math classroom:

- Explain a method or approach used
    - Compare two methods: Provide students with examples of two methods used to solve the same problem. This can be real student work, textbook samples, or teacher created. Have students explain in writing how the two approaches differ, which is correct (or if both are right), which is better and why.
    - Explain an answer: Provide students example problems and solutions. Have students explain if an answer makes sense. Students can also focus on different elements of the answer, such as units of measurement.
- Analyze and explain relationships
    - Alike and Different: Provide students with two examples of a concept and have them analyze how they are alike and how they are different. This can be done with graphs, charts, tables, equations, shapes, measurements, or operations.
    - Compare Quantities: This can be done with fractions, decimals, a fraction and a decimal, different units of measurement, and so on. Provide students with two quantities that align with class content and have them compare the two using visuals and writing.
    - Representations: Have students represent a percent, fraction, decimal, mixed number, equation, scientific notation, et cetera, in multiple ways. Encourage the use of pictures, diagrams, graphs, examples, et cetera.
        - Another variation of representation entries is to provide students with an answer and have them create the problem. For example, if the class is working on multiplication, you might say

that the answer is 225. Students can then decide how to get to 225.

- Error analysis
    - Provide students with an incorrect solution and have them explain the student's thinking process, what they did wrong, and how to correct it.
    - Error analysis is a helpful writing activity to use for reteaching challenging concepts. Without showing student names, teachers can display actual worksheets or test questions from class, and students can analyze the steps and errors in writing.
- Climb & Dive: Students take 10-minutes to write everything that they learned about a concept. They read through their writing and choose one element to focus on and explore for another 10-minutes. The second 10-minutes is meant for students to justify their answers and to "reflect and organize their thoughts on the concept" (ThinkCERCA, 2022).

**Argumentative.** Argumentative mathematical writing has students "construct viable arguments and critique the arguments of others," including a clearly stated position and evidence to back it up (ASCD, 2017). In addition to "justifying their own positions, students read, analyze, and evaluate the mathematical arguments of others, taking the opportunity to either strengthen a peer's argument or disagree with it while providing their own evidence or counterexamples" (ASCD). Argumentative writing should be like a math investigation, where students need to find and explain their evidence to prove that their answer is correct. Many explanatory topics can be turned into argumentative writing by spending some extra time on it, so that students can obtain more evidence, but argumentative writing can look different as well. Examples include:

- <u>Finding patterns:</u> Show students sets of whatever content you're working on in class; this can be equations, shapes, graphs, functions, et cetera. Ask students to find patterns and make generalizations about the sets. Encourage students to not only find patterns but see if they can discover rules that would apply to all similar sets.
- <u>"The Strategy is best/worst because" stem:</u> Using concepts from your class, provide students with a problem to solve and this sentence stem. Have students fill in the blanks with strategies that you have worked on in class

and explain their answers with evidence. Students should solve the problem using their strategy and use elements of the strategy as their evidence.

- Which One Doesn't Belong: Using content from class, provide students with 3-4 samples, one of which should not be similar to the rest. For example, for early elementary, teachers can show a triangle, square, rectangle, and circle. In that example, students might explain that the circle does not belong because it has no edges or corners like the other shapes. This concept can be illustrated with very simple concepts or more advanced concepts using numbers, expressions, graphs, shapes, and so on. This activity "supports students to begin making specific claims about shared properties among specific objects by noticing and comparing those properties, and supporting their claims with reasoning" (Kazemi et al., 2017).

**Mathematically Creative.** Mathematically creative writing challenges "students to think creatively and document mathematical ideas that extend beyond the intended outcome or process of solving a problem," including "generating original ideas, posing novel problems or questions, and displaying flexibility and fluency in ideas" (ASCD, 2017). Creative writing in math does not necessarily mean creating poetry or prose - though that might be an exciting activity to try - it just means that students are thinking outside of the box and creating their own ideas and meaning from the content.

- Create Your Own ____ : This activity can vary greatly depending on what you're working on in class. Students are given examples of what they are learning and asked to create their own related concepts. For example, in an activity where students were asked to "find similarities between the Egyptian numeration system and the one we use today, one student instead invented her own numeration system" (ASCD). Another variation is to provide students with certain properties and ask that they create their own _____ based on the required properties.

- Three Truths and a Lie: Have students come up with three facts and one lie about a mathematical concept. Students should prove that their facts are true and explain why their lie is not in their writing. For instance, you might have students develop three truths and a lie about fractions; discussing what they know (facts) about fractions and constructing a lie (specific non-examples) will help deepen their learning.

    - This is a fun one to have students share in groups or as a whole class after they complete their writing. Students can present their truths and lie to groups, and members can try to find the lie.

- Explain to a Famous Character: For this activity, students will explain a math concept or strategy to a famous character from pop culture or a novel. The point of this activity is that the students will have to take the concept and adjust their language and explanation - while using accurate math vocabulary - in a way that makes sense to the character that they have chosen.

    - Students will love sharing this writing in front of the class. Imagine explaining the concept of lowest common denominator to Shrek.

## Section 5 Key Terms

Annotation - An explanation or note added to a text or diagram

Argumentative Writing - Writing that takes a stance on an issue and aims to convince the audience of that stance

Informative/Explanatory Writing - Writing that communicates facts and information on a specific topic

## Section 5 Reflection Questions

1. In which content area do you find writing to be the most unnatural? Why do you think this is?
2. Think of your class structures and routines. Where do you think you might be able to integrate a writing activity, without having additional time?
3. Have you used any of the suggested writing activities in your practice previously? Was the activity successful? Why or why not?

## Section 5 Activities

1. Pick one of the content areas - preferably the one that you teach - and design a writing assignment to accompany a lesson that you have taught. Provide a brief explanation of the lesson and then describe the activity. You can modify one of the ones discussed above or develop one on your own.

2. Choose two of your past lesson plans and revise them to include one of the writing activities discussed above. Discuss why you chose that activity and how it fits into your instruction.

## Conclusion

Throughout their academic, personal, and professional lives, students will be tasked to solve problems, form opinions, analyze information, apply concepts, think critically, and articulate their thoughts and viewpoints. In order to develop these real-life skills, students need to practice writing across the curriculum in school. Writing across the curriculum exposes students to the cognitive and physical processes of writing that they will need to be productive in the future.

### Ideas in Action

The principal of Northbrook Middle School (NBMS) announced that the school would be implementing a Writing Across the Curriculum (WAC) initiative next school year. NBMS is a suburban school for students in grades 6-8. There are 40 teachers and approximately 500 students. The principal has not disclosed whether or not there will be WAC training offered to teachers.

Mrs. Strong is an 8th grade math and science teacher. She has worked at NBMS in this position for 10-years. Her grade level team consists of Mr. Nickels and Miss Paul, who teach ELA and social studies, Mrs. Jem, who also teaches math and science, and Mrs. Dolly, a push-in special education teacher.

In addition to core classes, 8th graders take physical education, art and a choice of one of the following electives per semester: music, digital design, cooking, coding, performing arts, forensics, STEM, or foreign language.

Mrs. Strong and Mrs. Jem co-plan the math and science curriculum and they cover the same content in their respective courses. They both utilize writing activities occasionally, as well as short exit slips to gauge understanding, but they want to add more substantive writing to their courses.

Mrs. Strong already knows the units of study for next year's science class: 1) The Scientific Process, 2) Introduction to Matter, 3) Atoms & the Periodic Table, 4) Chemical Reactions, and 5) Health Education. The units for math include 1) The Number System,

2) Expressions & Equations, 3) Functions, 4) Geometry, and 5) Statistics and Probability. Mrs. Strong hopes to collaborate with her team as well as elective teachers on implementing writing activities that will align with the units of study. For example, Mrs. Strong may be able to coordinate health education writing activities into physical education, particularly around fitness goals and nutrition. Additionally, she may also suggest that students in math write about the geometrical concepts involved in basketball, softball, or whatever activity the physical education class is participating in, and then they can share their findings.

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