Writing Across Disciplines:
An Expansion of Composition in the Classroom
Writing to Learn in Science Instruction

Fall 2022
What is Writing Across Disciplines?

What does “Writing Across Disciplines” mean?

Defining “Writing Across Disciplines,” requires clarity around the terms “Writing” and “Across Disciplines.” Most simply, writing is communicating. Student writers communicate with themselves, peers, teachers and others. Writing in the classroom can have many purposes and audiences and may be formal or informal. In the academic setting, writing can serve as a tool to promote student learning, to allow students to demonstrate their thinking and understanding of the content and/or concepts taught, and/or to share with others in a real-world setting. These types of writing are called Writing to Learn, Writing to Demonstrate Learning and Writing for Publication. “Across Disciplines” refers to using the types of writing—as defined here—in English/language arts as well as other disciplines, such as social studies, science, math and visual and performing arts.

What is Writing Across Disciplines, and what is its purpose?

Writing Across Disciplines is an expansion of Composition in the Classroom, a resource developed by reading and writing teachers to help Kentucky educators provide students with opportunities to develop into confident, independent and proficient writers. Composition in the Classroom and its expansions support teachers implementing existing High-Quality Instructional Resources (HQIRs) adopted by school districts as well as educators teaching in districts that have not yet adopted a primary HQIR in reading and writing. The tips, suggestions and tasks in Composition in the Classroom and its expansions should not replace adopted HQIR but should serve to supplement instruction towards the full depth and rigor of the Kentucky Academic Standards. For more information regarding high-quality literacy curricula, districts and school leaders may access The Reading and Writing Instructional Resources Consumer Guide, a tool for evaluating and selecting instructional resources for alignment to the Kentucky Academic Standards (KAS) for Reading and Writing.

Composition in the Classroom is organized around three modes of writing in the Kentucky Academic Standards (KAS) for Reading and Writing, including information regarding standards instruction through Writing to Learn, Writing to Demonstrate Learning and Writing for Publication. Writing Across Disciplines, however, contains sample discipline-specific writing tasks, organized by each of the three types of writing mentioned above. This resource is grounded in the KAS for Reading and Writing, which includes the Interdisciplinary Literacy Practices as well as each discipline’s content specific standards. The ten Interdisciplinary Literacy Practices are part of the KAS for Reading and Writing, appearing on every page of the standards document but should not be confused as additional standards. They should guide teachers in providing intentional opportunities for students to engage in deeper learning by practicing the behaviors of a literate citizen. The student practices serve as the overarching goals for literacy instruction for each student across the state. These practices are further clarified by possible teacher and student actions. These actions do not define curriculum, but rather they demonstrate how teachers can provide opportunities for students to experience the literacy practices and how students will apply these practices, so they may become an innate part of life across the disciplines and beyond school. This resource aims to bring more clarity around what these practices look like in action.
While *Composition in the Classroom* primarily serves English/language arts teachers and their students, *Writing Across Disciplines* attends to the needs of all teachers and their students. Because of its widespread classroom use already, the developers chose to begin the expansion with a focus on Writing to Learn, a professional learning space that will hopefully both affirm and stretch educators' practices. Subsequent releases will focus on Writing to Demonstrate Learning and Writing for Publication.

*Writing Across Disciplines* is created to provide what *Composition in the Classroom*, alone, does not. While *Composition in the Classroom* provides general characteristics of each type of writing (Writing to Learn, Writing to Demonstrate Learning and Writing for Publication) and examples of strategies teachers can implement to engage students in each of the types of writing, this expansion includes a more disciplinary, or specialized, look at writing. *Writing Across Disciplines* intends to show more precisely how to ensure opportunities for students to engage in discipline-specific literacies or learning that uses reading and writing skills specific to each field to teach or demonstrate content knowledge and for publication purposes as well. The sample tasks in *Writing Across Disciplines* represent some of the types of reading and writing experts in each field (e.g., economists, biologists, literary scholars, mathematicians, etc.) might authentically engage in to deepen their own expertise.

**Writing TO LEARN Across Disciplines**

*Writing to Learn*, as previously described, is an instructional strategy used to promote student learning. Teachers utilize this instructional strategy to help deepen students' understanding of the subjects they are studying, to engage students in thinking, to provide opportunities for applying, extending and developing skills, and to help students reflect on their learning. Typically, Writing to Learn is informal writing with the student as the primary audience. Rather than emphasizing formal composition skills, Writing to Learn helps students obtain content knowledge and build capacity to analyze, synthesize, comprehend and express their thinking in writing. Most simply stated, Writing to Learn is any writing students engage in that promotes learning. Therefore, Writing to Learn Across Disciplines refers to using Writing to Learn in English/language arts as well as other disciplines, such as social studies, science, art, math and visual and performing Arts. The first section of this expansion, Writing to Learn Across Disciplines, provides samples of Writing to Learn tasks for each discipline. Explicit reading-writing connections are intentionally present throughout the sample tasks, requiring students to read and think deeply about text, or “anything that communicates a message,” as defined by the *KAS for Reading and Writing*. Throughout the sample tasks, readers engage in passages, videos, graphs, data sets, experiments or other forms of communication while processing and documenting their learning through writing.
How to Read the Writing to Learn Templates

Each content area template begins broadly with a compilation of possible Writing to Learn strategies that experts in the field deem especially applicable to learning that discipline’s content. The remainder of each template provides authentic content-specific Writing to Learn samples, organized into elementary and secondary levels. These samples can help educators recognize the presence or absence of Writing to Learn instructional strategies within their curricula, equipping them with the knowledge to identify when the curriculum does not include adequate opportunities for students to engage in Writing to Learn. Because the types of texts involved in reading and writing vary across disciplines, each sample contains discipline-specific approaches to Writing to Learn.

- About the Writing to Learn Tasks provides background for the sample Writing to Learn tasks. The sequence of the tasks within the larger context is described.
- Content Specific Standards Alignment lists the discipline-specific standards alignment. Because each content area’s standards are organized differently, some templates include more boxes for standards alignment than others. In this example, there are two standards boxes because Social Studies standards include Disciplinary Strand Standards and Inquiry Practices Standards.
- Implementing Writing to Learn is a springboard of ideas intended to launch further knowledge building of Writing to Learn strategies. Disciplinary experts offer several Writing to Learn strategies educators can consider implementing in their content-specific classrooms.
- Reading and Writing Standards Alignment shows how the tasks align with at least one reading and one composition standard in the Kentucky Academic Standards for Reading and Writing.
- Interdisciplinary Practices Connections identifies two to three Interdisciplinary Literacy Practices that are intentionally embedded in the tasks to provide opportunities for students to practice the behaviors of literate citizens across disciplines.
- Teacher Notes is a section for additional information the teacher may need to know regarding the Writing to Learn tasks. This space coaches teachers as they make sense of and think through implementation of the Writing to Learn tasks and/or the writing experiences within their curricula. “Extra” details they may need to know in order to fully understand how the tasks align with standards, how to access and/or utilize accompanying resources as well as explicit explanations for how the tasks utilize Writing to Learn in the sequence of a larger unit are located here.
Writing to Learn in Science Instruction

Implementing Writing to Learn in Science Instruction

Writing to Learn in the science classroom should be a regular occurrence as this type of writing allows students to formulate ideas, organize thoughts and share information with others for feedback and discussion, continuously revising as they gain deeper understanding of the phenomenon and/or problem. While there are many more Writing to Learn strategies that fit well in science classrooms, some examples include, but are not limited to, the following:

- Organizing information into a table
- Representing data on a chart
- Developing models
  - Images
  - Flowcharts
  - Analogies
  - Mathematical Equations
- Designing Solutions
- Critiquing Arguments

Science teachers implement Writing to Learn strategies when their students engage in the science and engineering practice (SEP), a dimension of the Kentucky Academic Standards for Science. These practices define the “doing” of science; that is, how students come to understand the natural and designed world. Writing to Learn supports students as they engage in the “doing” and can help advance their understanding of the disciplinary core ideas. These eight practices are the science literacy skills students use that will lead them to being scientifically literate citizens. To generate more ideas for how to utilize Writing to Learn in a science classroom, review the components of the practices found in the tables at the end of each practice description in Appendix F: Science and Engineering Practices. Through the regular use of these practices, students gain a deeper understanding of the core ideas of science.

The SEPs interact with one another and are not used in a linear way. This provides numerous opportunities for writing to learn to occur in the science classroom. The task descriptions for these samples incorporate writing to learn opportunities that support the sample writing to learn tasks.
About the Writing to Learn in Science Tasks in the Resource

The second-grade unit on plant growth begins with students exploring the mystery of their harvest corn, something they initially saw as decoration, beginning to sprout what appears to be leaves and roots. As students made observations of the dried corn, this led to the question, “Why is our corn changing?” Leading up to this task, the students were actively engaged in collaborative planning and carrying out investigations and making independent observations in order to see patterns. From the previous investigation the students have questioned the needs of plants and noticed that the plant structures are bending toward the window to get light. They design another investigation to answer, “Does corn need light to keep growing?” The students place some of their plants in the dark and some in the light.

The sixth-grade task is part of a unit exploring the phenomenon of a change in height of Mt. Everest after an earthquake has occurred. As students begin to investigate this phenomenon, they relate this change to mountain ranges around the world, leading to the question, “Why do some mountains grow higher while other mountains are losing height?”

<table>
<thead>
<tr>
<th>Disciplinary Core Idea Alignment</th>
<th>Science and Engineering Practices Alignment</th>
<th>Crosscutting Concepts Alignment</th>
<th>Reading and Writing Standards Alignment</th>
<th>Interdisciplinary Literacy Practices Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supports learning towards LS2.A Interdependent Relationships in Ecosystems: Plants depend on light and water to grow.</td>
<td>Planning and Carrying Out Investigations Make observations (firsthand or from media) and/or measurements to collect data that can be used to make comparisons. Engaging in Argument from Evidence Construct an argument with evidence to support a claim.</td>
<td>Patterns: Patterns in the natural world can be observed. Cause and Effect: Events have causes that generate observable patterns.</td>
<td>RI.2.3 Describe the connection between individuals, historical events, scientific ideas or concepts or steps in technical procedures over the course of a text. C.2.6 Collect information from real-world experiences or provided sources to answer or generate questions C.2.2 Compose informative and/or explanatory text, using writing and digital resources, to establish a topic and provide information about the topic. ILP 1: Recognize that text is anything that communicates a message. ILP 8: Engage in specialized, discipline-specific literacy practices.</td>
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## The Task

**Writing to Learn Task:**
Students will use Writing to Learn to guide and synthesize their learning as they investigate the question, “Does corn need light to keep growing?” Students will engage in Writing to Learn experiences throughout the investigation in order to build knowledge and answer the question. During the plant observation period, students will collect data through drawings and descriptions or measurement data such as height of the plants in light and dark environments. They will look for patterns across all the data samples, keeping focused on the purpose of the investigation, to answer, “Does corn need light to keep growing?” Students will write a claim, with evidence, in response to the question, “Does light cause plants to grow and remain healthy?”

Data collection is the first Writing to Learn task within this investigation. Provide students with this language to begin the investigation: **Use your science notebook to collect observational data (drawings or descriptions) or measurement data (height) of the plants in the light and the plants in the dark for two weeks.** During the observation period, facilitate thinking/learning by asking students what they notice about the data they are collecting. Ask how the data for plants in the dark are different from data collected for plants in the light. After two weeks, prompt students to process their thinking/learning through Writing to Learn using language such as: **Now that we have collected data for two weeks, what patterns do you notice across all the samples?** Using Writing to Learn at this stage of the learning process engages students in data analysis and interpretation. Look for patterns that will help you answer the investigation question, “Does light cause plants to grow and remain healthy?” Think: What do these patterns help me discover about what plants need to grow and remain healthy? Students will draft a written response to the investigation question after orally describing the patterns/connections between sunlight and plant growth and health, using their observation data as evidence to support their thinking. Provide students with this language to initiate another opportunity for Writing to Learn: **Does light cause plants to grow and remain healthy? Write a claim supported by evidence from the data you collected. You may use the following sentence starter to begin your claim.**

**Light (does not cause/causes) plants to grow and remain healthy. I know this because...**

## Teacher Notes

Writing to Learn is illustrated in this through the collection of data, a component of carrying out the investigation (SEP: Planning and Carrying Out an Investigation) in order to identify trends (CCC: Patterns) across all the samples that can help answer the question being investigated. As they begin to think about the relationship (CCC: Cause and Effect) between light and plant growth (DCI: LS2.A Interdependent Relationships in Ecosystems), the students use their data as evidence to support their thinking (SEP: Engaging in Argument from Evidence).

For guidance on where this fits into the sequence and specific lesson details, access [Lesson 6b: Does corn need light to keep growing?](#) of the NextGen Storylines 2nd grade unit: “Why is our corn changing?”
Sample Task Featuring Writing to Learn: Sixth Grade Science

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</thead>
<tbody>
<tr>
<td>Supports learning towards MS-ESS2.A Earth’s materials and Systems</td>
<td>Analyzing and Interpreting Data</td>
<td>Patterns</td>
<td>IR.6.1 Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.</td>
<td>ILP 1: Recognize that text is anything that communicates a message.</td>
</tr>
<tr>
<td>The planet’s systems interact over scales that range from microscopic to global in size and they operate over fractions of a second to billions of years. These interactions have shaped Earth’s history and will determine its future.</td>
<td>Use graphical displays (e.g., maps, charts, graphs and/or tables) of large data sets to identify temporal and spatial relationships.</td>
<td>Patterns can be used to identify cause and effect relationships.</td>
<td>C.6.2 Compose informative and/or explanatory texts to examine a topic and convey ideas, concepts and information through the selection, organization, and analysis of relevant content.</td>
<td>ILP 8: Engage in specialized, discipline-specific literacy practices.</td>
</tr>
</tbody>
</table>

The Task

**Writing to Learn Task:**

As a class, students are asked to identify the types of data that would be needed to help determine how mountains change over time. Once the class comes to an agreement on a type of datum, the teacher will write it on the board. Students will use the agreed upon information to develop their data table. Students are then provided a set of six data cards describing the characteristics of six different mountains including maps of their locations.

The teacher will initiate students’ first opportunity to Write to Learn using oral or written directions such as, “**Using your science journal, design a table, individually or collaboratively, to organize the data determined by the class that will help us in answering our question.**” Once the data tables have been designed, the data cards will be distributed, and the teacher will set students up for another Writing to Learn opportunity. The teacher will explain, “The data cards contain information about the various mountains and may include more information than we identified as a class. **Record the appropriate information in your table. You may add the information to your data table if it is relevant to the question being answered. You may also wish to annotate the cards as you read through them.**”
Writing to Learn is illustrated in this through the organization of the information from the data cards (SEP: Analyze and Interpret Data) into a form that will allow them to identify trends (CCC: Patterns) that can help answer the question being investigated, as they begin to think about potential causal (CCC: Cause and Effect) mechanisms for changes in mountain height (DCI: ESS2.A Earth materials and systems).

For guidance in assisting students in determining appropriate data and organization of their table, access Lesson 1: What is causing Mt. Everest and other mountains to move, grow or shrink? of the OpenSciEd 6th grade unit: What causes Earth’s surface to change?