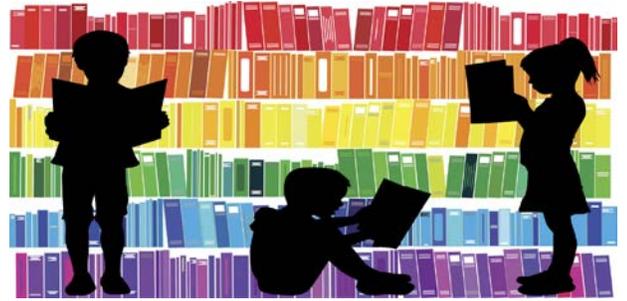


LITERACY AND STEM

What is STEM?

STEM is a *philosophy*. It is a way of acquiring, reflecting, and applying knowledge in daily life. It takes the individual skills and concepts that students learn in Science, Technology, Engineering, and Mathematics and integrates them within these disciplines as well as other disciplines such as Social Studies, Literature, and Art. A STEM environment requires a community of stakeholders who are committed to behaving as critical thinkers by demonstrating a willingness to be introspective as well as perceptive. These critical thinkers must be willing to question ideas, challenge assumptions, explore concepts, examine points of view, and analyze implications. These behaviors lead to deeper understanding and better application of knowledge. Cultivating a STEM culture provides an expectation that our students will be fully equipped to explore, understand, and apply the knowledge and skills learned in the classroom. In turn, students will be well prepared to live, work, and play in our global society.



Interconnectedness of Literacy & STEM

STEM is an approach to teaching and learning that integrates the content and behaviors of Science, Technology, Engineering, and Mathematics with other disciplines. The depth of the interconnected relationship existing between literacy and STEM education, at first glance, is not overt. However, a thorough analysis of all the disciplines, both independently and jointly, reveal that students cannot engage in STEM education without utilizing their literacy skills -- writing, critical thinking, viewing, listening, and speaking. The reverse is true as well. Students must activate STEM behaviors; for example, problem solving, critical analysis, communication, collaboration, design, etc., in order to develop their literacy skills to the degree required by colleges and careers.



An Example of Literacy in STEM

- **READING, WRITING, SPEAKING & LISTENING, & CRITICAL THINKING** After analyzing a number of science texts, students use the knowledge gained to formulate a hypothesis. After carrying out an investigation, students will draft a lab report and present on their findings.

An Example of STEM in Literacy

- **SCIENCE, SOCIAL STUDIES, MATHEMATICS, COLLABORATION, COMMUNICATION, CRITICAL THINKING, AND CREATIVITY** Over the course of a unit of study on “Finding Ourselves in Nature”, students read a range of texts - - essay, novel, documentary and poem -- offering various information and perspectives on humans and nature in order to address the question, “What can nature teach us?”. Throughout the unit, students collaborate to analyze and discuss the texts. Additionally, students conduct research to obtain additional texts that further explain and elaborate on the real-world problem of destroying nature. At the end of the unit, students use Google Suite applications to construct an argumentative essay in which they defend their position on the acceptability of humans destroying nature for economic gain.

THE FOUR C'S English Language Arts Curricula

STEM students are primarily characterized as being *collaborative*, *communicative*, *creative*, and *critical thinkers*. In preparation for their future careers, students must develop the traits required by the industries of the future. The learning experiences that they will have in their English Language Arts courses will equip them with the skills and knowledge necessary for future career success. The sample learning tasks, taken from the English Language Arts curricula, evidence how students are receiving **regular** learning opportunities that will help them to develop as competent communicators, critical readers and thinkers, problem solvers and creators -- the hallmarks of college and career readiness.

English Language Arts Learning Tasks

Kindergarten End of Unit Writing Task

Students will **analyze and synthesize** the provided social studies sources to respond to the writing prompt. Evidence from the provided sources as well as prior knowledge should be reflected in the response.

Martin Luther King Jr. had a dream of equality and Civil Rights for all, despite the color of their skin. In your opinion, how close are we to Martin Luther King, Jr.'s dream for America becoming a reality? **CRITICAL THINKING**

4th Grade End of Unit Writing Task

Your community may be starting a bike sharing program soon. **Write an article** that is several paragraphs long for your community newspaper in which you **give your opinion about** this idea. Your article will be read by the parents and students in your community. Make sure to state your opinion clearly and to **support** your opinion with **reasons** from the sources using your own words. **Develop** your ideas clearly. **CRITICAL THINKING & CREATIVITY**

Grade 7 End of Unit Performance Task

During this unit of study, you have read a variety of texts about the beauty, power and mystery of nature. Despite nature's majesty, many people abuse it, resulting in devastating consequences for ourselves as well as Mother Earth. Such consequences include, but are not limited to, climate change, pollution, and the obliteration of certain plant and animal species. The urgency to stymie human activities that contribute to the destruction of the planet have led to global campaigns asking people to "Reduce, Reuse, Recycle," "Walk or Bike" more, "Plant a Tree," "Conserve Water," and to remember that "Animals Are Not Ours." Regardless of these efforts, human activity continues to negatively impact our planet. Some people believe the only way to mitigate reckless human behaviors that harm the Earth is to mandate, through the judicial system, a course that educates about saving the planet and requires several hours of community service. **Determine your stance** on the topic and **construct an argumentative** essay in which you make and support a claim that addresses the question: Should there be a law that requires all citizens to complete several hours of community service through an approved educational program from the Environmental Protection Agency (EPA) before they can obtain or renew their driver's license? Be sure to use information from the text read during this unit of study, as well as **other print and digital resources that you gather through research**.

CRITICAL THINKING & CREATIVITY

Grade 8 End of Unit Performance Task

The theme, "Approaching Adulthood", permeated the texts explored during this unit of study. After reading multiple texts about characters who transitioned from adolescence to adulthood and exploring how those experiences profoundly affected the main characters, you should have a greater understanding about the challenges, surprises, and rewards of transitioning from innocence to experience. As the characters in the texts are forced into adulthood, they learn life lessons, which show up in the texts as themes such as *Resistance*, *Choice*, *Faith*, *Hope*, *Social Responsibility*, *Identity*, *Relationships*, etc. Demonstrate your understanding of the unit's topic by selecting one theme as a focus and constructing an informational/explanatory essay in which you explain how teenagers-- real or imagined -- have been called upon to behave like adults. Examples should come from Collections texts and **additional research**. Then, use the information explicated in the essay to **design a multimedia presentation** in which you describe the examples. Conclude your presentation with a **motivational charge to your peers to demonstrate responsibility and maturity in an area of your choice that is related to the overarching theme of your project**. **CRITICAL THINKING, CREATIVITY, COMMUNICATION, COLLABORATION**

THE FOUR C'S English Language Arts Literacy Competitions

Hear Our Voices Writing and Speech Competition CRITICAL THINKING, CREATIVITY, COMMUNICATION

K-2 Speech Topic	During a discussion with students, former President Barack Obama stated, “Learning to stand in somebody else’s shoes, to see through their eyes, that’s how peace begins. And it’s up to you to make that happen.” His words help us to understand that getting along with others, interacting respectfully and being good citizens are important to having and maintaining a peaceful community. <u>Consider why it is important to be respectful and welcoming to others; then, write a speech that addresses the question: What are some ways to build community with someone who is different from your mirror image?</u>
3-12 Speech Topic	With the advent of cutting edge technologies that support real-time global interactions, increased world travel, and globally transient people, there has never been a more relevant time for the American people to demonstrate understanding, tolerance, and empathy for the human race. Culture and belonging are paramount to establishing and sustaining a sense of community. Yet, almost daily there is a barrage of media reports that rarely promote empathy by depicting injustices and tragedies stemming from a lack of cultural awareness and fear. As urged by former President Barack Obama, during a roundtable discussion with students, “Learning to stand in somebody else’s shoes, to see through their eyes, that’s how peace begins. And it’s up to you to make that happen.” <u>Consider how to change the narrative in America; then, write a speech that addresses the question: What are some viable solutions for mitigating cultural bias, racism, and hate crimes?</u>

Perfect Pitch Competition CRITICAL THINKING, CREATIVITY, COMMUNICATION, COLLABORATION

At the collegiate level, the *Perfect Pitch Competition* is notable for helping students vie for a career position. At the high school level, competitors are required to provide a brief explanation of how they can benefit a potential employer or college by persuasively explaining their unique traits, experiences, skills, and accomplishments. The benefits of this competition include,

- ❖ exposure to public speaking,
- ❖ development of persuasive communication techniques,
- ❖ building self-confidence,
- ❖ promoting strengths and talents,
- ❖ and cultivating team collaboration.

Examples of STEM in the English Language Arts Georgia Standards of Excellence

Anchor Standards for K-12 English Language Arts

<i>Reading Informational</i>	<ul style="list-style-type: none">● ELAGSER1: Read closely to determine what the text says explicitly and make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.● ELAGSER8: Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence. CRITICAL THINKING
<i>Writing</i>	<ul style="list-style-type: none">● ELAGSEW1: Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.● ELAGSEW6: Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others. CRITICAL THINKING, CREATIVITY, COMMUNICATION, COLLABORATION
<i>Speaking and Listening</i>	<ul style="list-style-type: none">● ELAGSESL2: Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.● ELAGSESL4: Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.● ELAGSESL5: Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations. CRITICAL THINKING, CREATIVITY, COMMUNICATION, COLLABORATION