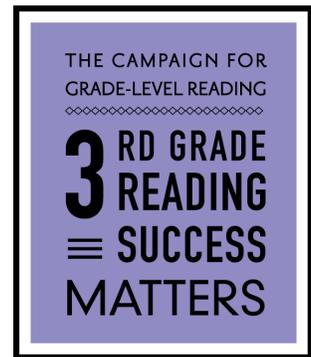


# *Read/STEM:*

## LINKING LITERACY AND STEM EDUCATION



National awareness and ongoing movements promoting literacy and STEM education in the early years and early grades create an opportunity for collaboration to improve educational outcomes for our nation's children, especially those from low-income families. Too often, education systems with scarce resources feel compelled to focus their instruction on one or the other, setting up a competition between teaching literacy and STEM subjects. However, the research on cognition, pedagogy and brain function shows that students gain more knowledge and skills in literacy and STEM subjects when they are taught in tandem.

### What we know:

- **Interest in STEM can help develop reading skills.**

Many beginning readers actually prefer to read information texts—about snakes, spiders and other STEM topics—instead of the fiction books typically provided in the early years and early grades. Offering a more varied selection of books may engage more children in reading.

- **Reading proficiency is key to advancing knowledge and skills in STEM subject areas.**

Students who do not “learn to read” proficiently by the end of third grade will not be able to pivot to “reading to learn” in the years that follow. They will not be able to comprehend STEM texts without sufficient literacy skills.

- **Young children have the cognitive skills to understand STEM concepts.**

Research on attaining higher order thinking skills shows that students can begin to develop essential cognitive skills in the early grades, and schools should reinforce this with science, technology, engineering and math instruction.

### What we plan to do:

The Campaign for Grade-Level Reading is mobilizing a “big tent” of literacy and STEM advocates, policymakers, educators and philanthropy to turn this challenge into an opportunity. Our goal is to increase literacy skills while increasing knowledge and raising interest in STEM subjects and careers, especially among students from underserved and underrepresented populations. In this process, the GLR Campaign seeks to:

- Make the case for aligning, linking and integrating literacy and STEM education throughout the early years and early grades;
- Document “bright spot” examples of K-3 curriculum, teacher preparation programs and professional development opportunities that support integration of literacy and STEM education; and
- Examine emerging research on brain development and content-area literacy acquisition from the early years through the early grades to assess the implications of this research for parents, caregivers and teachers.

Thus far, the GLR Campaign has explored the rationale for integrating literacy and STEM education through the development of three issue papers:

- The Justification for Linking K-3 Literacy and STEM Education
- Current Research-Based Practices Used to Link Literacy and STEM Education in K-3 Classrooms
- Current Practices for Preparing Teachers to Integrate K-3 Literacy and STEM Education

These papers will be used as the basis to further the process of developing policy suggestions and practical strategies for linking literacy and STEM education.

### **Synopses of Three Issue Papers:**

These issue papers focus on broad education elements important to the Campaign for Grade-Level Reading and directly address the GLR Campaign's first assurance of enhancing teacher quality for every child in every setting, every day. The focus on integrating literacy and STEM education is aimed at furthering the goal that all students have the best possible opportunity to achieve reading proficiency by the end of third grade, particularly students from low-income families and underserved, underrepresented populations.

The first paper, "Justification for Linking K-3 Literacy and STEM Education," explores the GLR Campaign's rationale for promoting the integration of literacy and STEM subjects in K-3 classrooms. Integrating the instruction of these subjects proves to be a viable strategy for improving overall reading outcomes for children, especially those from underserved and underrepresented populations. The rationale focuses on this and the following conclusions:

- Formal education is key to the success, safety and advancement of our society and its citizens to maintain economic global competitiveness, especially in science, technology, engineering and math, and to enhance individual achievement and satisfaction.
- Strong commitment from policymakers to the importance of both literacy and STEM education for the well-being and global competitiveness of our nation and quality of life of its citizens demonstrates that we cannot invest in one over the other. Integration is essential in order to do both well.
- Research supports the efficacy of linking the two disciplines and also sheds light on the importance of addressing socioeconomic equity issues in the context of reading and STEM proficiency.

Given this rationale for integrating the two, the GLR Campaign seeks to promote dialogue and develop suggestions for federal, state and local policies and lift up evidence-based strategies for implementation.

The second paper, "Examination of Current Practices Linking K-3 Literacy and STEM Education," summarizes research-based practices that support the connection between literacy and STEM education and provides persuasive evidence suggesting that:

- Linking literacy and STEM instruction increases achievement and long-term proficiency in both subjects, especially when teachers purposefully align curriculum, instruction and assessment for their students.
- Adding meaning-based strategies to teachers' classroom approaches, alongside code-focused programs, is a viable approach.
- Teaching literacy through the use of information texts, in addition to narrative texts, is effective, and situating knowledge building alongside literacy goals has been successful in improving both literacy and content-area knowledge. Contextual literacy programs are a promising approach, especially in improving reading comprehension among low-ability and non-readers.

These findings support the efficacy of using STEM subjects as a primary context for literacy instruction in the early years and early grades in the interest of promoting improved educational outcomes for all children, especially those from underserved and underrepresented populations.

The third paper, "Examination of Current Practices in Preparing Teachers to Link K-3 Literacy and STEM Education," determines that a more purposeful, strategic path for pre-service and in-service teacher education, as well as a well-defined process for scaling and sustaining best practices in all types of learning environments, is needed in order to integrate literacy and STEM education in the early grades. Even the best teacher education programs often treat content areas, such as literacy, language arts, math and science as separate methodological areas and do not appear to prepare teachers for integrating these content areas in K-3 classrooms, even though research suggests that teaching literacy in the context of other content areas is an efficacious approach. Linking literacy instruction and STEM subjects through effective strategies requires not only greater intentionality and investment in teacher preparation programs, but also cooperation from federal, state and local policymakers and local boards of education in creating standards (curriculum) and assessments that also support such integration. The GLR Campaign's goal is to examine and promote effective practices for better equipping our teachers to teach literacy and STEM in an integrated manner.

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