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Why Science Instruction is Essential to Literacy

by Brandy Archer



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The Michigan State Board of Education’s adoption of new science standards is a great way to leverage science, math, and literacy instruction – especially in the early elementary grades. The state legislature has recently expanded efforts through legislation and funding to focus on early literacy with an end goal of increasing third grade reading proficiency (Michigan Public Act 85, 2015). Meanwhile, less than 30% of Michigan students are scoring proficient in science (MiSchoolData, 2016). These poor scores affect students’ career and college ready outlook (Dorph, Shields, Tiffany-Morales, Harry & McCaffrey, 2011). Research suggests that science is rarely taught in elementary grades, as teachers and administrators focus on the subjects required for high-stakes testing (McMurrer, 2008). Thus, the adoption of new Michigan science standards that endorse key connections across science, math, and literacy offer the opportunity to revisit current curricular, instructional, and assessment practices (Michigan Department of Education, 2015).

The Michigan Department of Education (MDE) supports the implementation of these science standards and encourages attention to the instruction of science content in the lower elementary grades. To this end, MDE has worked with a panel of state and nationally recognized experts in science and literacy to develop a set of beliefs about science and literacy instruction in the early grades. It was important to the panel that these beliefs honor the importance of time devoted to helping students learn to read, as well as building student content knowledge through reading, and offering plenty of science learning opportunities.

The MDE’s message to the state about early literacy, implementing science standards, and intentional instruction, includes seven belief statements. The document is located at <http://tinyurl.com/earlylitandscience>, and the belief statements are:

1. The new science standards are an opportunity.
2. Science instruction needs to happen nearly every day.
3. Literacy instruction should happen throughout the day.
4. Involvement in the investigation of natural phenomena and complex problems is important for ALL students.
5. Science learning is essential.
6. Science education supports literacy development.
7. Intensive professional learning for teachers in science and literacy is needed.

I would like to highlight three essentials linked to these beliefs to clarify the importance of teaching science *and* literacy on a regular basis. While these content areas can, and should be integrated, it is important to embrace the instruction and learning inherent in both.

Students need time in the early grades devoted to both the foundational and literacy

Michigan English Language Arts/Literacy Standards include foundational standards for concepts of print, phonological awareness, phonics and word recognition, and fluency (Michigan State Board of Education, 2010). Classroom instruction must devote time to instruction in these areas. Along with such foundational standards, students are required to engage with both informational and literary text in reading, writing, listening, and speaking. From the earliest years, children should be engaged in opportunities to meet all of these standards.

All Students need to receive science instruction

Science instruction is more than reading a book about plants. Elementary science programs should provide opportunities for reading, reasoning, writing, and communication practices that are authentic to science instruction. In addition, students should be engaged with learning to ask questions and conducting simple investigations while using science equipment to gather data, which can help construct explanations (National Science Teachers Association, 2002). For example, when studying sound and vibration in first grade, students can pose questions about how these concepts are related, leading to opportunities to investigate. By researching the topic through texts and videos, students can purposefully explore with various instruments, collect data, write observations, and communicate their findings. Science instruction on this topic would include reading books about sound and vibrations and thus support engagement in science learning. When science instruction is neglected, with the argument that extra time for reading and math are required for increasing student achievement in high-stakes content areas, student achievement suffers in academic areas beyond science (Blank, 2012).

Students need opportunities in the early grades to engage in literacy practices that are inherent to science

Teaching science includes the investigation of natural phenomena and complex problems. This learning also involves developing language and the capacity for generating and interpreting science text – which includes narrative text *and* graphs, diagrams, physical models, charts, and tables. The practice of science demands that students make sense of data, draw inferences, and construct their own arguments based on evidence. Additional literacy practices that are authentic to science require inference of word meaning and constructing meaning from text (Pearson, Moje, & Greenleaf, 2010). Thus, the benefits of science instruction are twofold, leading to increases in student achievement in both science and in literacy.

The MDE seeks to support strong science and literacy instruction in the elementary grades, and will begin by providing the Supporting Early Literacy Development and Science Instruction document. Plans include the creation of further messaging and compiling resources to support strong science instruction. Please email Brandy Archer (ArcherB2@michigan.gov) for more information.

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