

SCHOOL DISTRICT OF BELOIT BLOG

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January 2021 – **The Importance of STEM in the 21st Century**

STEM refers to the disciplines of Science, Technology, Engineering, and Math. You do not have to look far to see the value of STEM today. In the 21st century, science and technology innovations are all around us, and have become increasingly important as more and more industries rely on data, technology, science, engineering and math to compete in a globalized economy. To succeed in this highly technological world, students need to graduate with a more developed set of STEM skills than what has been required in the past. STEM learning is no longer only important for students who want to become researchers, doctors, and engineers; it is also now equally important for students wanting careers in safety, utilities, food production, and manufacturing. With Beloit's industries in manufacturing, health care, technology, food productions, and distribution STEM learning is important to the future of our community.

Not Your Parent's STEM Education

As parents, we know that the science and math learning that students are being asked to do is not the math and science we did in school. Old STEM learning is sometimes referred to as the "basket of facts" approach. Without the ability to access the internet to get new information, we had to memorize a lot more information than students do today. Data companies measure how quickly new information reaches online or print resources. Twenty-five years ago, the information available to the public doubled every 1-2 years. Today, it doubles every 11-12 hours! In addition, information stayed relevant to our lives a lot longer in the past than it does now. One measure of information usefulness is called "information half-life." In 2010, the half-life of information was around 12 months, while today the half-life is only 6 months. There is no reasonable way for students to learn at the pace that information changes, but they can learn to find the most reliable and long-lasting information, so education is undergoing shifts to help students adapt to this new knowledge age.

Online Information is Readily Available

Since much of the information we need to learn can be found online, more emphasis is placed on students learning to find and evaluate the value of that information. Students still need to memorize key foundational facts so that they can build speed and fluency with some information, but they also must learn how to navigate all the new information available to them.

In education, both the math and science standards have made shifts to help account for these changes in the world. The Common Core State Standards, which help guide math learning, ask students to spend an equal amount of time learning new concepts, practicing math procedures, and applying their learning to real-world situations. In addition, the standards ask students to develop a set of behaviors (Math Practices) that support math learning.



The Next Generation Science Standards are similar; they require students to learn new science concepts in the context of practicing science and engineering skills and learn to connect themes that cut across all types and levels of science learning (these are called Cross Cutting Concepts in the standards).

New STEM education in both math and science promotes skills such as critical thinking, problem solving, higher-order thinking, and design and redesign skills, as well as develop behaviors such as perseverance, adaptability, cooperation, organization, and responsibility that will help them become life-long learners and engaged future citizens.

STEM in the School District of Beloit

In the School District of Beloit (SDB), we are also adapting our curriculum to help students meet the needs of the changing world. This year we developed a vision and core values for the SDB STEM education.

Vision: *Engaging all students in using STEM to solve rigorous, relevant, real-life problems*

Core Values:

- Support access and equity for all learners
- Use standard-aligned curriculum
- Connect to problems in the real-world
- Develop and use authentic assessment structures
- Be accountable for student success
- Maintain a growth mindset for teachers, learners, and administrators
- Create the conditions for joy in both teaching and learning

Implementing and Using the Vision and Values in our Teaching

Our teachers have been using the vision and values to consider how best to guide instruction through distance learning. As we move forward, we will use these statements to guide revisions to the math and science curriculum to help prepare students for their future.

One example of how we are updating the SDB science curriculum is the test of new curricular resources our teachers and young scientists are trying out at the Intermediate Schools. These new resources ask students to take on the role of a scientist or engineer and engage in deep learning toward solving a real-life problem. These new resources ask students to read, write, do experiments, use math, make predictions, and design/redesign models as they move toward solving science problems.

Continuing to update our resources and instruction to align with the changes in how we access and use information helps put all our students on the path to becoming successful 21st century citizens and lifelong learners. At the School District of Beloit, we are preparing and inspiring every student to succeed in life and contribute to an ever-changing world.