The Teachers’ Newsletter from Illinois Classrooms in Action
Grade band lessons, ideas and information
Focus: Mathematics

Volume VII Issue 7
March 2019

Unobtrusive Assessment

Traditional assessment has been of the obtrusive variety, meaning learning stops for the assessment to occur. This is the typical Friday quiz, unit test and yearly assessment type of assessment. It is generally treated as summative in nature, in that it does not usually drive learning forward, but rather is an assessment to determine what the student has learned.

Research shows that unobtrusive assessment, that which fits in with the learning, is a preferred method of assessment. It gives the teacher information to drive their further instruction and informs the student on what still needs to be learned.

Observing students while they work or have a discussion is a type of unobtrusive assessment. In mathematics, asking the student to explain their thinking can be a preferred way to assess their understanding of the mathematics rather than just having them select an answer from a list of choices.

White boards are another method of unobtrusive assessment. Students can solve a problem and hold up their results. The teacher can easily assess who seems comfortable with the task and who needs further learning to occur.

Hands on learning, such as working with manipulatives, or discussing a problem with multiple solutions, can lead to greater learning. All of these can be evaluated through unobtrusive assessment.

You can find more information on unobtrusive assessment in A School Leader’s Guide to Standards-based Grading by Tammy Heflebower.

2019 Illinois Assessment of Readiness Testing Window

ISBE has received inquiries about the possibility of delaying the Illinois Assessment of Readiness testing window due to the significant number of snow days many schools have used this year. We have considered this request carefully and thoroughly.

A detailed analysis has shown that any delay in the end of the testing window would have cascading effects on the timeline for reporting and verifying students’ results. Delaying even one week would impact ISBE’s ability to calculate the growth and proficiency data needed to produce summative designations in time to meet the statutorily mandated deadline for publishing the Illinois Report Card on Oct. 31.

Therefore, we are unable to extend the close of the testing window. The online assessment window is open for seven weeks from March 11 through April 26. The paper assessment window is open for five weeks from March 25 through April 26.

If you have questions or concerns, please contact Jim Palmer of ISBE’s Assessment Division at (866) 317-6034.

Click HERE for the latest information and presentations.
Literacy and Mathematical Practice Connections

The Standards for Mathematical Practice describe ways students engage with mathematical content as they progress from kindergarten through grade twelve. There are many components of literacy that permeate these standards.

Reading comprehension strategies that also connect to the Mathematical Practices (MP) include:

- Predict (MP 1, 3, 5)
- Draw conclusions (MP 3, 4, 7, 8)
- Use of context clues (MP 3, 4)
- Summarize (MP 7)
- Judge text critically (MP 3)
- Use models, charts, graphs, diagrams, and symbols to interpret information (MP 1, 4)
- Gather, evaluate, and synthesize data (MP 1, 2, 3)
- Utilize context clues (MP 1, 3, 6)
- Use content vocabulary (MP 6)
- Decode and encode symbolic meaning (MP 6)

Students can apply writing skills and strategies effectively for different purposes. The application of written communication is embedded within the Standards for Mathematical Practice to develop students’ mathematical proficiency. Some strategies include:

- Compare and contrast (MP 3, 5)
- Create an effective response to answer a problem (MP 1, 3)
- Use appropriate tools to explore and deepen understanding (MP 1, 5)
- Use appropriate symbols to illustrate concepts (MP 1, 4)
- Analyze models, charts, graphs, diagrams, and symbols to enhance communication (MP 1, 2, 3, 4)
- Develop, evaluate, and

An Intersection of Literacy and Mathematics

The Mathical Book Prize aims to inspire a love of mathematics in the everyday world in children of all ages. Each year’s winners and honor books join a selective and ever-growing list of new and previously published fiction and non-fiction titles for youth. These titles are as varied as the intersection between literature and mathematics — that is to say, they encompass picture books, novels, poetry collections, puzzle books, biographies, and more!

The Mathical selection panel is drawn from librarians, teachers, mathematicians, early childhood experts, and others. The jury selects winners in five grade-level categories: PreK, K-2, 3-5, 6-8, and 9-12. Click here for a list of award winners.

ELA Grades 6-8
Shifting the Culture of Mathematics

The culture of mathematics in American classrooms needs to experience a dramatic shift. Here are four important things to remember as we integrate mathematics across subject areas. If we work together to change how mathematics is perceived, our students will grow into life-long learners and problem solvers.

1. **Celebrate mathematics as a useful tool in making sense of the world.**
   Provide opportunities for students to make measurements, understand patterns, analyze data, and quantify relationships in all subjects—making mathematics relevant to students outside of the math classroom.

2. **Facilitate productive struggle.**
   In America, we equate completing something quickly and easily with being smart. Often when students struggle with a skill, they write it off as something they just aren’t good at. Encourage students by recognizing learning happens through hard work and perseverance.

3. **Recognize that there are many different ways to arrive at the solution.**
   The journey to the answer and the mathematical reasoning students employ along the way is often as valuable as the answer itself. Validate students unique strategies for arriving at the answer.

4. **Create a space where it is safe to make mistakes.**

More Than Just the Answer

This article, by Adam Sarli, discusses the cultural shift mentioned above—Recognize that there are many different ways to arrive at the solution. Sarli describes that when he began his journey as an educator he “judged a lesson to be successful after seeing how many students got the right answer.” He slowly realized that correct answers did not correlate to deep understanding. The article goes on to describe how he has shifted to focusing on the strategies and mathematical reasoning used by students. He illustrates this shift through the example used with his 7th graders, 4 - 8, sharing many of the different strategies offered up by his students and the mathematical discourse he facilitated around the problem. He concludes the article by saying, “To help our students really “get it,” I’d choose methods over answers any day.” Math Is a Subject with a Right Answer; the Goal Is to Get It - National Council of Teachers of Mathematics. (2019). Nctm.org. Retrieved 26 February 2019, from https://www.nctm.org/Publications/Mathematics-Teaching-in-Middle-School/Blog/Math-Is-a-Subject-with-a-Right-Answer;the-Goal-Is-to-Get-It/
The National Research Council’s *A Framework for K-12 Science Education* states that, “Increasing students’ familiarity with the role of mathematics in science is central to developing a deeper understanding of how science works.” The Framework goes on to describe the eight Science and Engineering Practices in which students should use and develop in quality science instructional materials. Two of these practices, Analyzing and Interpreting data and Using Mathematical and Computational Thinking, explicitly describe mathematics practices that students should use to figure and explain phenomenon. In fact, the NGSS is designed to mirror the mathematics content outlined by the Common Core Standards at each grade level. Because of this, science lessons can be an effective and engaging way to apply and reinforce the concepts.

### What Mathematics Skills Should Students in Middle School Use?

The NSTA has organized a progression of specific elements for each Science and Engineering Practice in the document found here: [http://nstahosted.org/pdfs/ngss/resources/MatrixForK-12ProgressionOfScienceAndEngineeringPracticesIn][1] (NGSS.8.14.14.pdf). Within this matrix you can find the specific ways that 6-8 students should be Analyzing and Interpreting Data and Using Mathematical and Computational Thinking in science.

### Resources for Science and Mathematics Integration

A resource for classroom activities that provide chances for students to Analyze and Interpret Data and Use Mathematical and Computational Thinking can be found at [datanuggets.org][2]. Data Nuggets provides free classroom activities that are co-designed by scientists and teachers in which students use authentic data to identify hypotheses and predictions, visualize and interpret data, make evidence based claims, and ask their own questions for future research. Activities can be found for all grade levels. Each activity includes a description of the research and of the contributing scientist, the data from their research, and graphing and analyzing activities. Each lesson is leveled based on students prior experience.

---

1. [http://nstahosted.org/pdfs/ngss/resources/MatrixForK-12ProgressionOfScienceAndEngineeringPracticesIn][1]
2. [datanuggets.org][2]
Bridging Social Science and Mathematics

At first glance, there seems to be little connection between the math and social science standards. However, one could argue that there is an increased connection with the addition of the financial literacy component in the new Illinois Learning Standards for Social Science. The previous standards did include an economics strand but did not include or place an emphasis on the financial literacy skills that will become important to students as they become adults.

The financial literacy standards place an emphasis on skills and concepts students need to understand to successfully manage their finances and navigate topics like credit, loans, and interest in adulthood. While these topics may not include all of the complex upper-level math students are engaging in at the middle and high school levels, students will still have the opportunity to explore the real-world applications of math through financial literacy.

It is important that social science courses incorporate the disciplinary concept of economics and financial literacy into their curriculum where applicable. Providing students the opportunity to increase their financial literacy skills will have a long-lasting impact on their future.

Economics and Financial Literacy Resources

The prospect of teaching economics and financial literacy concepts in the classroom is sometimes quite overwhelming and unfamiliar to educators. Many social science educators may have very little background in these topics. However, no matter one’s comfort level, educators should strive to include a variety of disciplinary concepts from the standards in social science courses.

There are many FREE resources that can support educators with professional learning, lesson ideas, and even games and activities to incorporate into the classroom. The following websites provide resources to support educators in the areas of economics and financial literacy:

- **EconEd at the St. Louis Fed**—This site provides lesson and unit ideas that can be sorted by grade band and/or topic. The site also provides access to EconLowdown which provides award-winning FREE online courses and videos for use in K-12 and college classrooms. Check out the Teacher Ed button for professional development opportunities!

- **Econ Illinois**—Econ Illinois offers many programs and workshops for Illinois teachers to integrate the teaching of economics and personal finance across the curriculum in grades K-12. They also include access to their four key signature programs: The Stock Market Game, Economics Concepts Poster Contest, Illinois Econ Challenge, and the Illinois Personal Finance Challenge. Their Professional Development tab provides information about conferences and workshops across Illinois.

- **WE THE ECONOMY**—WE THE ECONOMY: 20 Short Films You Can’t Afford to Miss aims to drive awareness and establish a better understanding of the U.S. economy through a series of 5-8 minute films. As a companion to the series they have a Program and Discussion Guide designed to assist educators discuss the films and the economy both in and out of the classroom. Use the Guide to facilitate discussions around the films, spark social media conversations, and engage students with the topics on a deeper level. The Guide is appropriate for use as a classroom tool across multiple grade levels 9th and up.
Multiple student communication skills listed in the Illinois Math Practice 3 standard are able to be aligned to (developmentally appropriate) Illinois Social Emotional Learning standards. Two classroom in action designed tools are highlighted below to assist classroom teaching and learning for these skills.

<table>
<thead>
<tr>
<th>Illinois Math Practice 3</th>
<th>Illinois SEL standards/benchmarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construct viable arguments and critique the reasoning of others.</td>
<td>Predict others’ feelings and perspectives in a variety of situations. (2A.3a)</td>
</tr>
<tr>
<td>Justify conclusions, communicate them to others, and respond to the arguments of others.</td>
<td>Demonstrate cooperation and teamwork to promote group effectiveness. (2C.3b)</td>
</tr>
<tr>
<td>Listen/read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.</td>
<td>Analyze how decision-making skills improve study habits and academic performance. (3B.2a)</td>
</tr>
</tbody>
</table>

**Tools to support both MP3 and SEL skills**

**Collegial Discussion Guide**

**Conversation Cubes**