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ISBE
Content Specialists

Ninth through Twelfth Grade

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The Teachers' Newsletter

from Illinois Classrooms in Action

Grade band lessons, ideas and information

Focus: Science Integration

Volume 7 Issue V

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Resources for Implementing 3 Dimensional Science Assessment

The Next Generation Science Standards website provides many quality resources to support the current Illinois science standards.

Listed below are some of those resources. For a full list, visit the website:

[https://
www.nextgenscience.org/
assessment-resources](https://www.nextgenscience.org/assessment-resources)

Science Assessment Criteria: This document describes the most important features of statewide summative assessments designed for three-dimensional standards based on *A Framework for K-*

12 Science Education, such as the NGSS.

Science Assessment Task Screening Tools: These two tools are intended to assist educators in evaluating science assessment tasks to determine whether they are designed for three-dimensional science standards based on

the *Framework for K-12 Science Education*, such as the Next Generation Science Standards.

Transforming Science Assessment: Challenges and Recommendations for States: This brief describes some key challenges associated with developing assessments for

new three-dimensional science standards and recommendations for states to consider.



Illinois Science Assessment (ISA) Information

In compliance with federal testing requirements, Illinois will administer a science assessment to students enrolled in a public school district in grades 5, 8 and once at the high school level.

The high school assessment utilizes a course-based model with content aligned to Biology I. The assessment will be administered in an

online format and is aligned to the Illinois Learning Standards for Science incorporating the Next Generation Science Standards (NGSS), which were adopted in 2014.

The Illinois Science Assessment (ISA) page will be updated as information becomes available. The ISA is **not** an alternate

assessment. Students who participate in the DLM-AA alternate assessment will be assessed in science in grades 5, 8, and 11.

To learn about the most recent updated Science Assessment information, click [here](#) to access the ISBE Science page



The hallmark of any focus on literacy — disciplinary or otherwise — is instilling the need and the desire to want to read.

Literacy Standards: They Are Not Just for English Teachers

With the adoption of the ELA standards in 2010, not only ELA teachers, but science teachers were provided literacy standards to work in tandem with the content they teach. These cross-disciplinary literacy expectations were designed so that students can be prepared to enter college and workforce training programs ready to succeed.

The Literacy Standards for Science and Technical Subjects reflects the unique, time-honored place of ELA teachers in developing students' literacy skills while at the same time recognizing that teachers in other areas must have a role in this development as well.

If students are to be college and career ready, they must also be proficient in reading complex informational text

independently in a variety of content areas. Most of the required reading in college and workforce training programs is informational in nature and challenging in content.

The literacy standards for science are meant to support *not* supplant the science standards.

The Literacy for Science Standards work well with the NGSS, which address science core ideas, crosscutting concepts, and practices. The literacy in science standards are consistent with the “norms and conventions” of science. For example, the standards call for students to:

- attend to evidence with precision and detail;
- gather, synthesize, and

corroborate complex information;

- make and assess arguments orally and in writing;
- make accounts of events and ideas; and
- integrate, translate, and evaluate prose, graphs, charts, and formulas.

Language and literacy skills are critical for communicating in science, and practicing scientists read and write for a number of authentic reasons.

The literacy standards for science will assist science teachers with the opportunities to teach students to read and write like scientists.

ELA and Science: A Natural Connection



Reading in science requires an appreciation of the norms and conventions of the discipline of science, including understanding the nature of evidence used, an attention to precision and detail, and the capacity to make and assess intricate arguments, synthesize complex information, and follow detailed procedures and

accounts of events and concepts. Students also need to be able to gain knowledge from elaborate diagrams and data that convey information and illustrate scientific concepts. Likewise, writing and presenting information orally are key means for students to assert and defend claims in science, demonstrate what they know

about a concept, and convey what they have experienced, imagined, thought, and learned.

Click [here](#) to view the Standards for Literacy in Science and Technical Subjects connections to NGSS.

Integrating Math and Science

Mathematics and Science are natural partners.

Mathematics is the language used to understand and explain scientific observations.

Science provides opportunities for students to apply the math skills they are developing.

Consider this quote from

an Edutopia article by Ben Johnson: “In math class one of the biggest needs is relevance. Students want to know how they are going to benefit from being able to do calculations. Why not use science to teach math? Since one of the biggest uses of mathematics in science is data gathering

and analysis, that is the best place to start. When a teacher gives students a real science problem to solve—one that requires math tools—the teacher is giving the students a reason to use math. Math then becomes something useful, not something to be dreaded.” Access the complete article [here](#).

Shrinking Candle, Running Water, Folding Boxes

This activity, from The National Council of Teachers of Mathematics, allows students to look for functions within a given set of data. After performing experiments and collecting data, the students analyze their data, the student determine a type of function that represents the data.



**Mathematics
is the gate
and key to
all the
sciences.**

~ Roger Bacon

Join us at one
of our
upcoming free,
virtual
#ILMathCom
events!

Thursday, December 6, 3:30-4:30

Fluency without Fear

A popular request by #ILMathCom participants is a discussion about fluency in mathematics. Join us as we explore what works and what doesn't as we all work towards helping our students achieve fluency in mathematics. Check out

www.mathteachersinaction.org/ilmathcom.html to access the complete listing of upcoming events, register for #ILMathCom events, or to watch the recordings of past events.

Integrating Science Across the Curriculum

Science is the perfect opportunity for students to apply the skills they are mastering in their Math and ELA classes. Science provides them with a context in which those skills become necessary and relevant. Providing opportunities for scientific thinking or a scientific context across the curriculum benefits students in many ways. Students are

going to need to make decisions about technology for their personal use, vote on issues that affect themselves and the planet, and make health care choices for themselves and their family. Equipping students with scientific thinking skills will make them better citizens in the future.

Selecting scientific passages for students to read can

inspire student questions. Encourage question asking and provide students with opportunities to investigate the answers to their questions.

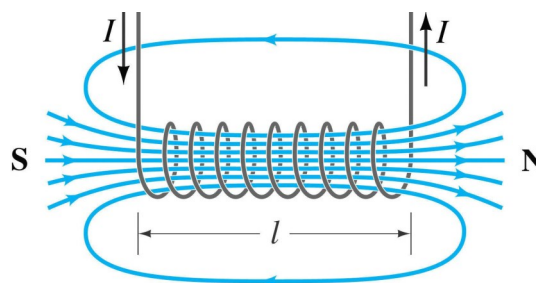
Being cognizant of the [Science and Engineering Practices](#) and [Cross Cutting Concepts](#) and engaging students in these in all subjects is a great way to connect science and other subjects.

The art and science of asking questions is the source of all knowledge.
~ Thomas Berger

The Magnetic Field in a Coil

In this high school science lesson shared on the National Science Teacher's Association vetted [classroom resources page](#)*, students examine how the magnetic field is related to both the number of turns in a coil and the current through the coil.

*These classroom resources are vetted by [NSTA curators](#) who recommend ways to adapt them to be more in line with the vision of the NGSS.



Tuesday, December 18 3:30-4:30 pm

Lacey Wieser, a science content specialist from EdReports. EdReports is currently reviewing science curricular materials and examining their alignment to the Next Generation Science Standards and these reports are scheduled to be released in January. Lacey will share information with us about the review process and why this is so important to the implementation of the NGSS and there will be time for questions and discussion. To stay informed of all upcoming #ILSciCom events and to register go to www.scienceteachersinaction.org/ilscicom.html.

Join us at one of our upcoming free, virtual #ILSciCom events!

A Resource to Support the Use of Sources in the Classroom

Learning to analyze sources should be a part of every K-12 classroom but is also an important part of college and/or career life. Of course, to meet the Illinois Social Science Standards for all grades K-12, students must engage with a wide variety of sources. However, what does engaging with sources mean? Rather than students glancing through sources while having someone telling them what sources reveal, students should be challenged to become better equipped to analyze sources on their own (or with peers) and come to their own conclusions. A new resource titled *Analyzing Social Science Sources* has been developed to support teachers in this effort to equip students with the skills necessary to analyze a variety of sources.

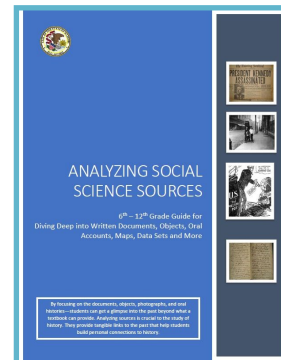
Why are sources so important? By focusing on the documents, objects, photographs, and oral histories—students can get a glimpse into the past beyond what a textbook can provide. Analyzing sources is crucial to the study of history. They provide tangible links to the past that help students build personal connections to history. Additionally, the Illinois Learning Standards reference sources in a variety of standards. The full list of 6-12 standards that address sources can

be found in the *Analyzing Sources* document for grades 6-12. Additional *Analyzing Source* documents exist for grades [K-2](#) and [3-5](#).

The [6-12 Analyzing Sources](#) document contains resources on a variety of source types including written documents, objects/artistic works, oral histories/accounts, maps, data sets (tables, charts and graphs), political cartoons, and photographs. For each source type a brief overview of how students can analyze the source is provided including tips, questions to ask, and benefits and shortfalls of that type of source. Additionally, each source type includes one or two sample graphic organizers that can be used as is or modified for use in the classroom.

At the back each of grade band packet there also are several sample lesson plans (many adapted from the Library of Congress). The 6-12 lessons include *The Bill of Rights: Debating the Amendments*, *The Titanic: Shifting Responses to Its Sinking*, and *Billy the Kid: Perspectives on an Outlaw*.

Be sure to check out these new, valuable resources on [IL Social Science in Action!](#)



***The closer you
can get to your
setting and to
primary sources,
the more
authentic your
history is going
to be.***

David B. Coe

Connecting Science and Social Science

While many 6-12 classrooms are subject-specific, that doesn't mean there aren't opportunities for cross-curricular instruction to occur in some format. The social sciences and science fit together seamlessly. For example, scientific innovation has been a driving force in societal change. This can be put in perspective for students by having them consider what life would be like without the internet, phones or electricity. Or what it would be like to look up at the stars and not know what they are.

Despite what at first appears to be differences in content, science and social science standards address similar skills that students should be building within the classroom. In the social sciences students are working on inquiry skills while in science they are working to conduct investigations. Both involve the skills of questioning, gathering information, and developing solutions or drawing conclusions.

While still emphasizing your primary content, other subjects such as science can be addressed in your course. For example, if you're teaching a

specific historical time period, you can spend time addressing scientific discoveries and technological advances during that time. Perhaps incorporate those areas into a presentation that highlights one or more scientific innovations and how they effected society (both then and now). Depending on the structure of your school, there may also be the opportunity to collaborate with teachers from other subject areas to provide students with more of an interdisciplinary approach to various topics. Developing interdisciplinary lessons and units can be challenging. There are a number of resources that are attempting to fuse the various disciplines into an integrated approach. Some of these resources include, but are not limited to:

- ◆ [Louisiana Department of Education](#) has resources for all content areas
- ◆ [Core Knowledge](#) has curricular materials infusing science and social science, up to 6th grade.
- ◆ [Massachusetts Department of Education](#) has a variety of sample units in various subjects.



Teaching and Learning Supports

High School



Check us out on the web under Climate and Culture:
[Illinois Classrooms in Action](#)



Social Emotional Learning Supporting Science

A common learning strategy that supports most of the Illinois Learning Standards is facilitation of student discussions. Two specific social emotional learning goals and related standards require specific student skills to support these student learning conversations.

SEL Goal 2: Use social-awareness and interpersonal skills to establish and maintain positive relationships.

2A- Recognize the feelings and perspectives of others.

2C - Use communication and social skills to interact effectively with others.

SEL Goal 3: Demonstrate decision making skills and responsible behaviors in personal, school, and community contexts

3B - Apply decision-making skills to deal responsibly with daily academic and social situations.

An increase in student science performance will include not just understanding of content, but also the ability to communicate about their science reasoning. 9th - 10th grade SEL benchmark language (developmentally specific for the goals/standards above) help identify student Social Emotional Learning competencies that support science classroom strategies such as ambitious science teaching and talk moves (highlighted by the inquiry project).

9th - 10th Grade SEL Student Benchmarks

2A	Analyze similarities and differences between one's own and others' perspectives.
	Use conversation skills to understand others' feelings and perspectives.
2C	Evaluate the effects of requesting support from and providing support to others.
	Evaluate one's contribution in groups as a member and leader.
3B	Evaluate personal abilities to gather information, generate alternatives, and anticipate the consequences of decisions.
	Apply decision-making skills to establish responsible social and work relationships.

Full High School standards/benchmarks available at <http://bit.ly/ILSELFULL>

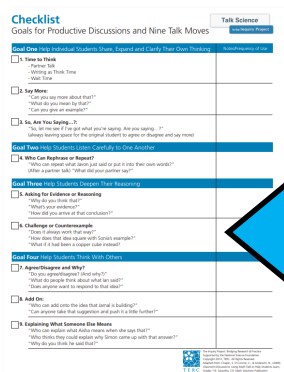
Watch for these benchmarks in the following videos of science instruction strategies...



<https://vimeo.com/106398654>

HOW LEARNING HAPPENS
Encouraging Academic Conversations With Talk Moves

<https://youtu.be/8jMjTJm2d-s>



Science Talk Moves .pdf download
https://inquiryproject.terc.edu/shared/pd/Goals_and_Moves.pdf