

The May 2016 Superintendent Report to the Board of

The May 2016 Superintendent Report to the Board of Education will include information related to the following items:

1. NGSS State Science Testing
2. PARCC Testing Report from Spring 2016
3. K Enrollment Update
4. State Budget Update

You may also find our last three months of sales tax revenues interesting:

April 2016 = \$86,295.03 was actually receipts from December 2015

March 2016 = \$79,131.23 was receipts from November 2015

February 2016 = \$81,088.03 was receipts from October 2015

NGSS Science Test

The Illinois Science Assessment test is new for 2016. Illinois has adopted the Next Generation Science Standards in the form of the Illinois Science Learning Standards. We recently received notification of the testing window opening on May 2nd. This is obviously not the most ideal scenario for us as we are closing out the 2015-16 school year. We are going to offer the test as required, but there may be students who are again exempted from the test by their parents. (We also have information for you in this report about PARCC testing exemptions.) The test is given only online to 5th graders, 8th graders and those in Biology class at the high school. I have provided a number of different informational packets from the Illinois State Board of Education that we may review further at the board meeting if you would like.

PARCC Testing Update

Provided with this report is a summary of the students who were eligible to participate in the PARCC testing at each building, and those who were exempted by their parents. It should be noted that all students were allowed the

opportunity to sit for both the English and the Mathematics assessments.

Please keep in mind that the ISBE expects that 95% of our students participate in the state testing. You may recall that we received a letter that our district is named on a list of those who fail to test at the appropriate level. The Regional Office of Education has been charged with investigating any cases of malfeasance or impropriety as it relates to testing.

Here is the data from this testing sequence:

Building	Eligible	Parents elected for students to not participate	%age	
MIL	214	40	18.69%	
NS	144	18	12.50%	
SW	214	32	14.95%	
GMS	631	192	30.43%	
GHS	203	102	50.25%	English 2
GHS	201	105	52.24%	Geometry

Kindergarten Update

Spring 2016 Kindergarten enrollment for the 2016-17 school year has yielded 159 students to date. We typically have picked up another 10-12 students over the summer and at new student registration.

We will be exploring options of employing an 8th kindergarten teacher to try to keep those class sizes to 20 or below, if possible. We would have a full sized classroom available at Southwest School to accommodate. Research tells us that class size does have some impact at the K-2 grades. Because of this additional staff person (will not change our FTE teacher plans for 2016-17, but is a shift) we canceled the Kindergarten Orientation and will conduct that in the fall again once we know more firm enrollments and have been able to level all the students appropriately.

We are also reviewing a proposal from the kindergarten teachers to modify their curriculum, reducing some of the time spent directly in the Journeys basal curriculum and introducing some items from the “Teachers Pay Teachers”

website. This was information that our kindergarten teachers learned at this year's Kindergarten conference. It will not change our use of the Journeys Unit 5 benchmark assessment and the teachers are willing to commit their time and consumables resources to making this program improve our current kindergarten delivery system.

State Budget Forecast

The 2017 State Budget has yet to be finalized. While there has been any number of news articles and conversations/conflicts arising from Springfield, the tea leaves are not necessarily any less murky to read as to what may be a final resolution creating a PK-12 budget for 2017.

We do know that there is legislation moving forward to approve approximately \$450M for higher education in Illinois. This may or may not be good news for PK-12 education, as we know right now the funding levels are insufficient to sustain adequate levels of funding for PK-16 without some type of increase in revenues.

Senate Bill 231, sponsored by Senator Manar is the most recent iteration of a funding bill designed to pump dollars into Chicago, but at its main premise, it is designed to push more money towards students of poverty and those districts with lower amounts of local property wealth and lower ability to generate income through the property tax. As you can see from the breakdown of the SB 231 chart, our district would stand to lose more than \$1M in state funding, (what they call Primary State Aid or PSA) comparing FY 17 to FY 16, unless there is a Hold Harmless provision. Keep in mind that the Hold Harmless only keeps us at an 89% pro rata amount.

We will review more in depth data at the meeting, but here are a few things that are very concerning in the rhetoric from the Capitol and from those who seem to have some inside information:

1. There will be some type of pension cost-shift, whether it ramps up district or employee obligations, but either way, this will be a bargained issue and one

that has significant impact. Every 1% increase in TRS costs is more than \$100,000 increase in expenses from someone.

2. There will likely be some kind of property tax freeze. Most likely limiting at the 2015 level and with no opportunity to capture new property growth, even at a cost of living allowance. This is where our district again is hamstrung because of the Education Fund tax rate we currently have. If we are going to continue to try to protect the tax rate in this district, then we will be forced to provide a less desirable educational plan. That's the reality of less income with the same or growing expenses.

Depending upon the timing of legislation in Springfield, we may even miss an opportunity to issue any additional Working Cash Fund bonds.

Bottom line is that it's likely that more onerous legislation strangles schools before any kind of lifeline in the form of funding reform comes into play.

Illinois Science Assessment (ISA)

www.isbe.net/assessment/isa.htm

Frequently Asked Questions

Updated 03/23/2016

1. Is ISA required to be administered during the current school year?

Answer: Yes. The federal government requires public schools to assess students in science.

2. Who must test?

Answer: In a public school district, ISA will be administered to students enrolled in grade 5 and grade 8 at their respective grade level. The high school assessment for students enrolled in grades 9-12 will be course-based and correspond to the content of Biology I.

- ~~3. Specifically, which high school students must test?~~

~~**Answer:** As indicated in ISBE's Student Information System (SIS), high school students enrolled in one of the following four science courses must test:~~

- ~~• 03051A000 Biology~~
- ~~• 03052A000 Biology Advanced Studies~~
- ~~• 03056A000 AP Biology~~
- ~~• 03057A000 IB Biology~~

4. Can the ISA high school science courses be adjusted like they can be for PARCC high school tests for English language arts/literacy and mathematics (i.e., may more courses be mapped and may some courses be removed)?

Answer: Not at this time.

5. When will ISA be administered?

Answer: The test window is expected to be open throughout May 2016. That said, we hope to open the window in April 2016 to give schools added flexibility.

6. In what format will ISA be administered?

Answer: ISA will be administered in an online format only.

7. How will the test be administered?

Answer: ISA will use an open-source technology known as TAO.

8. On what standards is ISA based?

Answer: ISA is based on the Illinois Learning Standards in science incorporating the Next Generation Science Standards (NGSS). The State Board adopted these standards in 2014. See <http://www.isbe.net/nils/science/default.htm> for more details.

9. How do the Illinois Learning Standards in science incorporating the NGSS, which were adopted in 2014 by ISBE, relate to the Illinois Learning Standards in science adopted in 1997?

Answer: The Illinois Learning Standards in science incorporating the NGSS replaced the previous science standards that were adopted in 1997. The NGSS are the most comprehensive science standards that Illinois has ever had. They are more rigorous and detailed as they integrate the content of science with the practices of science. However, there are many similarities between the two sets of standards. For example, the Engineering Standard aligns well to the 1997 Illinois Learning Standard 11B, Technological Design. If students are designing and building models, plus testing and retesting those models, they are meeting the Engineering Standard found in the NGSS.

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Frequently Asked Questions

Updated 03/23/2016

10. How was the ISA developed?

Answer: The Illinois State Board of Education entered an item-sharing agreement with the Office of the State Superintendent in the District of Columbia and is working in partnership with D.C. to build the ISA. This partnership allows Illinois to utilize the existing work of D.C., which administered a science exam based on the Next Generation Science Standards in 2015, and leverage both entities' resources to develop a high-quality test.

11. Specifically, which high school students must test?

Answer: As indicated in ISBE's Student Information System (SIS), high school students enrolled in one of the following four science courses must test unless they have received a full year credit from a previous school year for at least one of the following courses:

- 03051A000 Biology
- 03052A000 Biology—Advanced Studies
- 03056A000 AP Biology
- 03057A000 IB Biology

12. How much time is allotted for ISA?

Answer: Students must complete the test in one day. The table below shows the estimated time of testing, but this is not a time limit. Districts have flexibility to allow students to continue testing during the session if they are actively engaged with the assessment.

Test	Number of Items	Before/After Time (in minutes)	Estimated Test Time (in minutes)	Total Time (in minutes)
Grade 5	18	15	38	53
Grade 8	23	15	40	55
High School	21	15	32	47

The times above are estimates based on operational testing in Washington, D.C. ISBE does NOT impose a time limit other than the session cannot span over two days. Districts have the flexibility to continue testing if students are still working during the session.

13. What are the technology requirements?

Answer: iPads are NOT supported. The rest of the technical requirements can be found at <http://www.isbe.net/assessment/pdfs/isa/2016/ADS-specs.pdf>.

14. What types of items will appear on the ISA?

Answer: Each test (5, 8, high school) will begin with reading passages, called scenarios, and will be followed by a series of test items. Some items will be open-ended, some will be multiple-choice and some will be multiple-select (more than one correct response). Other items will involve drop-down selections. Each test will also include stand-alone, multiple-choice items that do not follow a scenario.

15. What NGSS science content is covered in each test?

Answer: Grades 5 and 8 will have items aligned to Physical Science (PS), Life Science (LS),

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Frequently Asked Questions

Updated 03/23/2016

Earth/Space Science (ESS) and Engineering (ETS). The high school test is aligned to Life Science (LS) with a small portion covering Engineering (ETS).

16. Are there sample items available?

Answer: Washington, D.C., has sample items online at <http://osse.dc.gov/node/1111507>. However, these items do not reflect the test construction mentioned above.

17. Are calculators allowed on the ISA?

Answer: Calculators will be allowed, although they will not be needed to complete the ISA.



Illinois State Board of Education

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FACT SHEET

Illinois Learning Standards in Science

February 2016, ISBE Division of Public Information

The Illinois Learning Standards in science emphasize a more engaged, hands-on science education that aims to give students a deeper understanding of the core concepts in science and engineering as well as practice applying those concepts – linking knowledge and real-world skills.

Quality science education is based on standards that are rich in content and practice, with aligned curricula, assessment, and teacher preparation and practice. It has been nearly 20 years since the National Research Council and the American Association for Advancement in Science produced their reports from which most state science standards are based. Illinois' previous science standards were adopted in 1997. Since that time, we have seen major advances in science and expanded our understanding of how students learn the subject. Our K-12, 1997 science standards needed to be updated accordingly.

Illinois' current science standards became effective in February 2014 and are based on the Next Generation Science Standards (NGSS). Forty-one experts, including three Illinois educators, wrote the NGSS. State-level committees in 26 states reviewed the learning benchmarks. These groups confirmed that the design and development of the NGSS were guided by the best available evidence to ensure that students who meet these standards are prepared for postsecondary education and careers in the 21st century.

Illinois' science standards consider what it means to be "literate" in science by including the use of technology, critical thinking, and analytical skills. One of the biggest shifts in the transition to the new standards is how they encourage students to engage with science through integrated and interrelated concepts.

The Illinois State Board of Education believes that a high-quality science education equips students with the knowledge and skills - such as communication, collaboration, inquiry, and flexibility - that are necessary for all careers, not just those within the science, technology, engineering and math (STEM) fields. In today's global marketplace, students will face unprecedented competition in the workforce from their peers across the country and around the world. We must give our kids the right foundation to successfully solve problems and tackle complex issues that face current and future generations.

Illinois' current science standards connect scientific principles to real-world situations, making content and instruction more engaging and relevant to the topics and activities students experience outside the classroom. The standards also introduce science at an earlier age, when children have many questions about the world and how it works. They build on children's inherent curiosity.

The need for high-quality science education – beginning at the earliest grades – is more essential now than ever before. Students need the kind of preparation that not only supports their current learning but also gives them the tools and skills necessary to succeed in a rapidly and continuously changing world. The Illinois Learning Standards in science are a key component toward advancing high-quality teaching and learning in science.

The Illinois Learning Standards in science are not a curricula but a guide for what students need to know and be able to do by the end of each grade level. Schools began implementing the standards in 2014, with full implementation set for the 2016-17 school year. Though the new science standards are more comprehensive and rigorous than the 1997 science standards, there are similarities between the two. Many of the new standards correspond to, and build off of, the previous standards. Starting this spring, students in grades 5, 8 and once at the high school level will also take a new assessment aligned to the new science standards.

To comply with federal testing requirements, Illinois will administer the Illinois Science Assessment (ISA) to students enrolled in grades 5, 8 and once at the high school level. The ISA will be given online, and the high school assessment uses a course-based model with content aligned to Biology I. Illinois has an item-sharing agreement with the Office of the State Superintendent in the District of Columbia and is working in partnership with D.C. to develop the ISA. More details about the assessment are available at www.isbe.net/assessment/isa.htm.

Differences Between 1997 Illinois Learning Standards and 2014 Illinois Learning Standards (NGSS)

1997 Illinois Learning Standards in Science	2014 Illinois Learning Standards (NGSS)
<p>Grouped by grade spans: Early Elementary, Late Elementary, Middle/Junior High School, Early High School, Late High School</p> <p>Each grade span expanded into Benchmark Statements</p> <p>Total number of Benchmark Statements: 169</p>	<p>Grouped by grade levels for grades K, 1, 2, 3, 4, and 5</p> <p>Grade spans for Middle School and High School</p> <p>Each grade level and grade span expanded into Performance Expectations</p> <p>Total number of Performance Expectations: 208</p>
<p>System Architecture Example: 11. A. 1a: Goal 11, Standard A, (Scientific Inquiry), Benchmark 1a refers to Early Elementary</p>	<p>System Architecture Example: K-PS2-1: Grade K, Physical Science, 2 (Motion and Stability), 1 identifies the Disciplinary Core Idea (DCI)</p>
<p>Inquiry (11A) not integrated with other standards</p>	<p>Science and Engineering Practices and Crosscutting Concepts are integrated throughout all of the standards.</p>
<p>Did not have connections to Common Core State Standards</p>	<p>Common Core State Standards Connections appear beneath Foundation Boxes</p>
<p>Benchmarks generalized into concise, grade span statements</p>	<p>Performance Expectations are specific at all grade levels/grade spans.</p>
<p>“Defending conclusions drawn from investigations” appears at the Early High School Level</p>	<p>Defending conclusions and “Constructing arguments” first appears at grade 2, but then every level afterward</p>
<p>Standard 13.A.1a – 13A.5a: Use basic safety practices, avoiding injury, identifying potential hazards, reducing risk, designing policies to reduce risk in science activities</p>	<p>Safety practices are not included in the 2014 ILS (NGSS).</p>
<p>Standard 13.A.2c, 13.A.4d: Keeping accurate records, peer review</p>	<p>Keeping accurate records and statements regarding peer review are not included in the 2014 ILS (NGSS).</p>
<p>“Waves” and their properties introduced at middle school</p>	<p>“Waves” and their properties introduced at grade 4</p>
<p>ILS did not include how animals receive information through their senses and process information in their brains.</p>	<p>4-LS1-2: Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.</p>
<p>ILS did not include developing a model to show how food is rearranged through chemical reactions.</p> <p>Similar: Physical Development and Health 23.A.3: Explain how body systems interact with each other (e.g., blood transporting nutrients from the digestive system and oxygen from the respiratory system).</p>	<p>MS-LS1-7: Develop a model to describe how food is rearranged through chemical reactions, forming new molecules that support growth and/or release energy as this matter moves through an organism.</p>

1997 Illinois Learning Standards in Science	2014 Illinois Learning Standards (NGSS)
<p>ILS did not include sensory receptors responding to stimuli or sending messages to the brain.</p>	<p>MS-LS1-8: Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.</p>
<p>ILS did not address human population and consumption of natural resources, but something similar was found in the Social Science Standards.</p> <p>Similar: Social Science Standard 17.C.2a: Explain how human activity affects the environment. Also Social Science Standard 16.E.5a: Analyze positive and negative aspects of human effects on the environment in the United States, including damming rivers, fencing prairies, and building cities.</p>	<p>MS-ESS3-4: Construct an argument supported by evidence for how increases in human population and per capita consumption of natural resources impact Earth's systems.</p>
<p>ILS did not address feedback mechanisms maintaining homeostasis.</p> <p>Similar: Physical Development and Health 20.B.2a: Monitor individual heart rate before, during, and after physical activity, with and without the use of technology.</p>	<p>HS-LS1-3: Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</p>
<p>ILS did not address food molecules being broken down to form new compounds.</p>	<p>HS-LS1-7: Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed, resulting in a net transfer of energy.</p>
<p>ILS did not address how natural resources, natural hazards, and changes in climate have influences human activity.</p> <p>Similar: Social Science 17.D.2b: Identify different settlement patterns in Illinois and the United States and relate them to physical features and resources. Also Social Science 17.C.3a: Explain how human activity is affected by geographic factors.</p>	<p>HS-ESS3-1: Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.</p>

Differences in Architecture between 1997 ILS and the 2014 ILS (NGSS)

1997 Illinois Learning Standards in Science (only showing 12B):

12B. Know and apply concepts that describe how living things interact with each other and with their environment.

Early Elementary	Late Elementary	Middle/Junior High	Early High School	Late High School
12.B.1a Describe and compare characteristics of living things in relationship to their environments.	12.B.2a Describe relationships among various organisms in their environments (e.g., predator/prey, parasite/host, food chains, and food webs).	12.B.3a Identify and classify biotic and abiotic factors in an environment that affect population density, habitat, and placement of organisms in an energy pyramid.	12.B.4a Compare physical, ecological, and behavioral factors that influence interactions and interdependence of organisms.	12.B.5a Analyze and explain biodiversity issues and the causes and effects of extinction.
12.B.1b Describe how living things depend on one another for survival.	12.B.2b Identify physical features of plants and animals that help them live in different environments (e.g., specialized teeth for eating certain foods, thorns for protection, insulation for cold temperature).	12.B.3b Compare and assess features of organisms for their adaptive, competitive, and survival potential (e.g., appendages, reproductive rates, camouflage, defensive structures).	12.B.4b Simulate and analyze factors that influence the size and stability of populations within ecosystems (e.g., birth rate, death rate, predation, migration patterns).	12.B.5b Compare and predict how life forms can adapt to changes in the environment by applying concepts of change and constancy (e.g., variations within a population increase the likelihood of survival under new conditions).

2014 Illinois Learning Standards in Science (only showing LS2):

LS2 Ecosystems: Interactions, Energy, and Dynamics (Examples from Grades 2, 3, 5, Middle School, and High School).

Students who demonstrate understanding can:

2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

3-LS2-1. Construct an argument that some animals form groups that help members survive.

5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

HS-LS2-1. Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.

The standards, also known as Performance Expectations, are listed at the top of each page (MS-LS2-1 through MS-LS2-5). The Foundation Boxes (also known as Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts) appear beneath the standards. The Connecting Boxes, showing connections to other DCIs and the Common Core State Standards, are below the Foundation Boxes. Please refer to the [How to Read the Next Generation Science Standards](#) document for a complete description.

<http://www.nextgenscience.org/sites/ngss/files/How%20to%20Read%20NGSS%20-%20Final%2008.19.13.pdf>.

MS-LS2 Ecosystems: Interactions, Energy, and Dynamics		
MS-LS2 Ecosystems: Interactions, Energy, and Dynamics		
Students who demonstrate understanding can:		
MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. [Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.]		
MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. [Clarification Statement: Emphasis is on predicting consistent patterns of interactions in different ecosystems in terms of the relationships among and between organisms and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, and mutually beneficial.]		
MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. [Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system.] [Assessment Boundary: Assessment does not include the use of chemical reactions to describe the processes.]		
MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. [Clarification Statement: Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.]		
MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.* [Clarification Statement: Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.]		
The performance expectations above were developed using the following elements from the NRC document <i>A Framework for K-12 Science Education</i> :		
Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Developing and Using Models Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.</p> <ul style="list-style-type: none"> Develop a model to describe phenomena. (MS-LS2-3) <p>Analyzing and Interpreting Data Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.</p> <ul style="list-style-type: none"> Analyze and interpret data to provide evidence for phenomena. (MS-LS2-1) <p>Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.</p> <ul style="list-style-type: none"> Construct an explanation that includes qualitative or quantitative relationships between variables that predict phenomena. (MS-LS2-2) <p>Engaging in Argument from Evidence Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).</p> <ul style="list-style-type: none"> Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (MS-LS2-4) Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. (MS-LS2-5) <p style="text-align: center;"><i>Connections to Nature of Science</i></p>	<p>LS2.A: Interdependent Relationships in Ecosystems</p> <ul style="list-style-type: none"> Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. (MS-LS2-1) In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. (MS-LS2-1) Growth of organisms and population increases are limited by access to resources. (MS-LS2-1) Similarly, predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared. (MS-LS2-2) <p>LS2.B: Cycle of Matter and Energy Transfer in Ecosystems</p> <ul style="list-style-type: none"> Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. (MS-LS2-3) <p>LS2.C: Ecosystem Dynamics, Functioning, and Resilience</p> <ul style="list-style-type: none"> Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. (MS-LS2-4) Biodiversity describes the variety of species found in Earth's terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health. (MS-LS2-5) <p>LS4.D: Biodiversity and Humans</p> <ul style="list-style-type: none"> Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling. 	<p>Patterns</p> <ul style="list-style-type: none"> Patterns can be used to identify cause and effect relationships. (MS-LS2-2) <p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-LS2-1) <p>Energy and Matter</p> <ul style="list-style-type: none"> The transfer of energy can be tracked as energy flows through a natural system. (MS-LS2-3) <p>Stability and Change</p> <ul style="list-style-type: none"> Small changes in one part of a system might cause large changes in another part. (MS-LS2-4), (MS-LS2-5) <p style="text-align: center;"><i>Connections to Engineering, Technology, and Applications of Science</i></p> <p>Influence of Science, Engineering, and Technology on Society and the Natural World</p> <ul style="list-style-type: none"> The use of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time. (MS-LS2-5) <p style="text-align: center;"><i>Connections to Nature of Science</i></p> <p>Scientific Knowledge Assumes an Order and Consistency in Natural Systems</p> <ul style="list-style-type: none"> Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. (MS-LS2-3)

MS-LS2 Ecosystems: Interactions, Energy, and Dynamics

HS.ESS3.B (MS-LS2-4); HS.ESS3.C (MS-LS2-4),(MS-LS2-5); HS.ESS3.D (MS-LS2-5)

Common Core State Standards Connections:

ELA/Literacy –

RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts. (MS-LS2-1),(MS-LS2-2),(MS-LS2-4)
RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-LS2-1)
RST.6-8.8	Distinguish among facts, reasoned judgment based on research findings, and speculation in a text. (MS-LS2-5)
RI.8.8	Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims. (MS-LS-4),(MS-LS2-5)
WHST.6-8.1	Write arguments to support claims with clear reasons and relevant evidence. (MS-LS2-4)
WHST.6-8.2	Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-LS2-2)
WHST.6-8.9	Draw evidence from literary or informational texts to support analysis, reflection, and research. (MS-LS2-2),(MS-LS2-4)
SL.8.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly. (MS-LS2-2)
SL.8.4	Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. (MS-LS2-2)
SL.8.5	Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. (MS-LS2-3)
<i>Mathematics –</i>	
MP.4	Model with mathematics. (MS-LS2-5)
6.RP.A.3	Use ratio and rate reasoning to solve real-world and mathematical problems. (MS-LS2-5)
6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (MS-LS2-3)
6.SP.8.5	Summarize numerical data sets in relation to their context. (MS-LS2-2)

