

PK – 12 Science Framework

Part I: PK-12
February 19, 2018

Addendum June 2018



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District Mission and Beliefs

Science Philosophy

District Mission:

The mission of the Millard Public Schools is to guarantee each student demonstrates the character, knowledge and skills necessary for personal excellence and responsible citizenship through an innovative, world-class educational community that engage and challenges all students.

District Beliefs:

We believe:

- Each individual has worth.
- Individuals are responsible for their actions.
- Our greatest resource is people.
- Diversity enriches life.
- All people can learn.
- High expectations promote higher achievement.
- Achievement builds self-esteem; self-esteem promotes achievement.
- Shaping and developing character is the shared responsibility of the individual, family, school and community.
- All people are entitled to a safe, caring, and respectful environment.
- Responsible risk-taking is essential for growth.
- Educated and engaged citizens are necessary to sustain our democratic society.
- All schools are accountable to the community.
- Public education benefits the entire community and is the shared responsibility of all.
- Excellence is worth the investment.

PK-12 Science Philosophy Statement:

Science education is a systematic process that engages and empowers students to be critical thinkers and problem solvers by gathering, analyzing, and communicating evidence of the natural and engineered world. By incorporating scientific investigations and diverse learning opportunities, students will blend their innate curiosity, skills, and knowledge to meet the challenges of a dynamic world.

Curriculum, Instruction, and Assessment

Written Curriculum - Content Standards

6110.1

The Essential Learner Outcomes of the Millard Public Schools are the following:

MILLARD ESSENTIAL LEARNER OUTCOMES

- LANGUAGE ARTS · MATHEMATICS · SCIENCE · SOCIAL STUDIES ·
 · FINANCIAL WELL-BEING · HUMAN RELATIONS · TECHNOLOGY · FINE AND PERFORMING ARTS · PERSONAL DEVELOPMENT AND WELL-BEING ·
 · CRITICAL THINKING AND PROBLEM-SOLVING SKILLS · CREATIVITY AND INNOVATION ·
 · COLLABORATION AND TEAMWORK · CITIZENSHIP AND PERSONAL RESPONSIBILITY ·

ACADEMIC SKILLS AND APPLICATIONS

Students will demonstrate proficiency by meeting established standards through course requirements and for assessments identified by the District for specific purposes. This proficiency, along with the successful completion of 230 credits and a Personal Learning Plan (PLP) is used for diploma granting or denial.

LANGUAGE ARTS

- Students will learn and apply reading skills and strategies to comprehend text.
- Students will learn and apply writing skills and strategies to communicate.
- Students will develop and apply appropriate speaking and listening skills and strategies to communicate for a variety of purposes.
- Students will apply information fluency and practice digital citizenship.

MATHEMATICS

- Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.
- Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.
- Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.
- Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines.

SCIENCE

- Students will combine scientific processes and knowledge with scientific reasoning and critical thinking to ask questions about phenomena and propose explanations based on gathered evidence.
- Students will integrate and communicate the information, concepts, principles, processes, theories, and models of the Physical Sciences to make connections with the natural and engineered world.
- Students will integrate and communicate the information, concepts, principles, processes, theories, and models of the Life Sciences to make connections with the natural and engineered world.
- Students will integrate and communicate the information, concepts, principles, processes, theories, and models of the Earth and Space Sciences to make connections with the natural and engineered world.

SOCIAL STUDIES

- Students will develop and apply the skills of civic responsibility to make informed decisions based upon knowledge of government at local, state, national and international levels.
- Students will utilize economic reasoning skills to make informed judgments and become effective participants in the economy at the local, state, national and international levels.
- Students will develop and apply spatial perspective and geographic skills to make informed decisions regarding issues and current events at local, state, national and international levels.
- Students will develop and apply historical knowledge and skills to research, analyze, and understand key concepts of past, current, and potential issues and events at the local, state, national, and international levels.

FINANCIAL WELL-BEING

- Demonstrate skills to manage financial resources for short and long term priorities.
- Analyze and make sound financial choices by using appropriate resources.

HUMAN RELATIONS

- Interact positively with all people.
- Understand ethnic and cultural differences.
- Apply awareness of current local, national and global news and world cultures and languages to communicate effectively.

TECHNOLOGY

- Obtain, organize, and communicate information electronically.
- Use a variety of technological resources to solve problems.
- Understands the ethical uses of information and technology related to privacy, intellectual property and cyber security issues.

FINE AND PERFORMING ARTS

- Experience and evaluate a variety of music, art, or drama.

- Recognize the value of a wide range of knowledge and experiences from the arts, culture and humanities.

PERSONAL DEVELOPMENT AND WELL-BEING

- Understand human growth and development.
- Identify the values of good nutrition and physical activity.
- Evaluate the impact of addictive substances and behaviors.
- Build positive social relationships with supportive friends and family in the community.
- Use resources to develop a personal education and career plan to meet goals and objectives.
- Communicate experiences, knowledge and skills identified in a résumé or portfolio and present a professional image when interviewing.

COLLEGE AND CAREER READINESS SKILLS

The following standards and indicators are not measured by district-wide assessments for diploma-granting or denial. Within the school setting, students in the Millard Public Schools will:

CRITICAL THINKING AND PROBLEM-SOLVING SKILLS

- Demonstrate the ability to reason critically, systematically, and logically to evaluate situations from multiple perspectives.
- Conduct research, gather input and analyze information necessary for decision-making.
- Develop and prioritize possible solutions with supporting rationale using valid research, historical context and balanced judgment.
- Demonstrate a willingness to learn new knowledge and skills.
- Exhibit the ability to focus, prioritize, organize and handle ambiguity.
- Recognize factors, constraints, goals and relationships in a problem situation.
- Evaluate solutions and determine the potential value toward solving the problem.

CREATIVITY AND INNOVATION

- Search for new ways to improve the efficiency of existing processes.
- Appreciate new and creative ideas of others.
- Use information, knowledge and experience to generate original ideas and challenge assumptions.
- Know when to curb the creative process and begin implementation.
- Determine the feasibility of improvements for ideas and concepts.
- Accept and incorporate constructive criticism into proposals for innovation.

COLLABORATION AND TEAMWORK

- Contribute to team-oriented projects, problem-solving activities and assignments.
- Engage team members, build consensus and utilize individual talents and skills.
- Anticipate potential sources of conflict to facilitate solutions.
- Demonstrate the ability to disagree with a team member without causing personal offense.
- Take responsibility for individual and shared group tasks.

CITIZENSHIP AND PERSONAL RESPONSIBILITY

- Respect the rights of others.
- Treat others in a considerate and non-demeaning manner.
- Respect diversity.
- Demonstrate the ability to manage time.
- Demonstrate the ability to follow directions.
- Develop the attributes of integrity, self-discipline, and positive attitude.
- Take personal responsibility for actions.
- Establish and execute plans to completion and persevere when faced with setbacks.
- Model behaviors that demonstrate reliability, dependability and commitment.
- Arrive on time to school, work, appointments or meetings adequately prepared and appropriately dressed.
- Comply with policies and regulations.
- Participate in school and/or community organizations.
- Engage in local government through attendance, participation and service.
- Demonstrate a respect for laws and regulations and those who enforce them.
- Consider the ethical implications and long-term consequences of decisions and actions on personal reputation and credibility.

Revised: Strategic Planning, December 5, 1996

T-Chart Approved: Millard Board of Education, January 13, 1997

Related Policy: 6110

Rule Adopted: May 3, 1999

Revised: June 18, 2001; July 21, 2003; December 4, 2006,

March 2, 2009; March 1, 2010; April 18, 2011; August 19, 2013; November 3, 2014

Millard Public Schools
Omaha, Nebraska

Science Curriculum Planning Committee Members

Elementary

Lisa Bartels - 5th grade, Montclair
 Bethany Case - Administrator, Cather
 Dayna Derichs - Teacher Librarian, Wheeler
 Savannah Dinslage - 1st grade, Ezra Millard
 Jeremy Fleming - 3rd grade, Wheeler
 Nikki Frenche - 1st grade, Abbott
 Erin Gonzalez - Administrator, Harvey Oaks
 Carrie Grove - Kindergarten, Norris
 Kelli Hasenjager - 5th grade Primary Years Program, Aldrich
 Briana Holthaus - 4th grade, Wheeler
 Alicia Judernatz - 3rd grade, Rohwer
 Alicia Kotlarz - Administrator, Montclair
 Stephanie Kurz - 4th grade, Holling Heights
 Tracy Logan - Administrator, Wheeler
 Erin Maguire - Kindergarten, Harvey Oaks
 Molly Ritchie - 2nd grade, Ezra
 Charlene Schuchardt - 4th grade, Rohwer
 Robyn Smith - Intermediate Montessori, Norris
 Kate Solberg - 3rd grade Core, Cather
 Jacob Svacina - 2nd grade, Neihardt

Secondary

Dr. Jennifer Allen - Administrator, West HS
 Tyler Berzina - Physics, West HS
 Jason Boatwright - 8th grade, Anderson MS
 Sharon Eblen - Physics, North HS
 Lisa Groth - Life Science, South HS
 Dr. David Hemphill - Administrator, Kiewit MS
 Kristin Holzer - Life Science Electives, West HS
 Daryl Jahn - Chemistry, North HS
 Estefania Larsen - Physics, South HS
 David McEnaney - Life Science, North HS
 Sarah Morrison - Academy, Horizon HS
 Kelsey Nodgaard - Life Science, West HS
 Tyler Renken - Special Education, South HS
 Nichole Schwab - 8th grade, Russell MS
 Kelley Staber - 6th grade, Beadle MS
 Dr. Jennifer Wilson - Chemistry, South HS

District

Lori Bartels – Coordinator of K-5 Special Education
 Dr. Angela Daigle - Library Services Department Head
 Andrew DeFreece - Director, Elementary Education and Early Childhood Education
 Pam Erixon - English Language Learners District Support Specialist
 Ted Esser - Secondary Coordinator of Special Education
 Kara Hutton - Elementary Coordinator of Special Programs
 Cheri Kite - Early Childhood & Literacy Intervention Curriculum & Instruction MEP Facilitator
 Ellen Kramer - K-5 Science Curriculum & Instruction MEP Facilitator
 Jacen Lefholtz - Instructional Technology MEP Facilitator
 Melanie Olson - 6-12 Science Curriculum & Instruction MEP Facilitator
 Anthony Weers - Director of Secondary Education

Science Community Focus Group Members

Dr. Kelly Gomez Johnson, University of Nebraska - Omaha, Teacher Education
 Nancy Thornblad - College of Saint Mary
 Dr. Stacey Ocander - Metro Community College, Dean of Health and MPS Parent
 Andy Szatko - City of Omaha and MPS Parent
 Kent Holm - Douglas County Environmental Services
 Dr. James Persson - Physician and MPS Parent
 Dr. Steve Sindelar - Physician and MPS Parent
 Dr. Clara Hoover - Community Member
 Dr. Abby Burke - Parent
 Sara Cooper - Nebraska Department of Education
 Monica Storm - Iowa Western Community College and MPS Parent

Phase 1 PK-12 Research Subcommittees 2017

Members of the Curriculum Planning Committee engaged in analysis and discussions about concerns, opportunities, weaknesses, and strengths of Science education in Millard Public Schools. From this analysis and discussion seven research topics were determined:

- **Instructional Practices** that support achievement in science education
- **STEM/STEAM Integration**
- **Professional Development** methods that lead to effective instructional practices
- **Alignment and Transitions** within and across grade levels
- **Standards and Assessments** that measure student mastery of science standards
- **Courses** that ensure students of all abilities and interests are college and career ready
- **Resources** that are designed for instructional shifts in science education and facilitate effective teaching and learning

Timeline of Science Curriculum Cycle Meetings

Phase I (2017-2018) Elementary & Secondary

Date	Group -- Purpose
October 24, 2017	Science Curriculum Planning Committee (CPC) Kick Off Orientation to the Phase I process, roles of committee members, introduction to three-dimensional learning
October 30, 2017	CPC Meeting #1 Professional Learning on pedagogical shifts (three-dimensional teaching) in Science, review of data book, identification of critical issues, development of research subcommittees and research questions
October 31, 2017 - November 12, 2017	Science Research Subcommittees conduct research on seven critical issues and research questions
November 13, 2017	CPC Meeting #2 research subcommittee members collaborate, research presentations from subcommittees, exploration of state standards content and format
December 4, 2017	CPC Meeting #3 Professional learning on interdisciplinary connections, three-dimensional using natural phenomena as a teaching tool, and deconstructing state standards; begin development of philosophy statement; discuss possible course offerings at middle school and high school
December 4, 2018 - December 22, 2018	Collect input from CPC members about state standards structure and possible course offerings and sequence for secondary level
January 9, 2018	Community Focus Group Explained state and district policies, curriculum adoption process, shifts in Science teaching and learning Discussed critical issues, and vision for Science education in order for students to be successful beyond high school
January 18, 2018	CPC Meeting #4 Reviewed Community Focus Group input Completed framework writing, philosophy statement Secondary Members of Curriculum Planning Committee—Developed individual course frameworks for all high school courses Elementary Members of Curriculum Planning Committee -- Professional learning on implementation of three-dimensional teaching and learning
February 19, 2018	PK-12 Science Framework proposal submitted to Board of Education for approval

Introduction to PK-12 Science Matrix

The new Nebraska College and Career Ready Standards for Science (CCR-Science) were approved by the Nebraska State Board of Education on September 8, 2017. The following matrix represents the recommendations for Millard Public Schools PK-12 Science Standards made by the PK-12 Science Curriculum Planning Committee. Development of this framework is based on findings from research subcommittees and critical analysis of the new state standards, existing standards in consortia school districts, and existing standards from other states.

The standards are organized by grade level preschool through 12th grade. Preschool standards are based on Nebraska Early Learning Guidelines to meet the diverse and unique learning needs of young children. Standards for our youngest learners establish the foundation for successful scientific understanding as students prepare for kindergarten. Kindergarten through fifth grade standards reflect developmentally appropriate learning progressions that build on the foundation for understanding science in the later grades. Middle school and high school standards help students develop deeper and more sophisticated understanding of science concepts that were introduced in elementary grades.

As is common in all state frameworks, the science standards have two levels of specificity: standards and indicators. A common stem begins each standard regardless of grade: “Gather, analyze, and communicate...” These verbs underscore long-term learning goals that are associated with the rigor of the standards and provide guidance for exemplary classroom instruction throughout all grades. Indicators more specifically describe what students must know and be able to do to meet the standard. *A Framework for K-12 Science Education* (National Research Council, 2012) makes the case for science teaching and learning through three dimensions: Disciplinary Core Ideas, Crosscutting Concepts, and Science and Engineering Practices.

Table 1 below provides details about each of the three dimensions. **Disciplinary Core Ideas** are a focused set of science ideas recommended by *A Framework for K-12 Science Education* and identified as necessary for all students to achieve scientific literacy that will serve them well beyond their K-12 education. **Crosscutting concepts** are tools that help students make sense of disciplinary core ideas and deepen understanding. They facilitate synthesis of knowledge that helps students construct a scientific, evidence-based view of the world. The **science and engineering practices** are behaviors that are utilized to investigate natural phenomena and develop solutions to real-world problems. Each indicator in the framework is an intentional combination of all three dimensions that guide assessment.

Table 1 - The Three Dimensions of Science Teaching and Learning

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<ul style="list-style-type: none"> ● Ask Questions and Define Problems ● Develop and Use Models ● Plan and Carry Out Investigations ● Analyze and Interpret Data ● Use Mathematics and Computational Thinking ● Construct Explanations and Design Solutions ● Engage in Argument from Evidence ● Obtain, Evaluate, and Communicate Information 	<p>Life Science</p> <ul style="list-style-type: none"> ● LS1 - From Molecules to Organisms: Structures and Processes ● LS2 - Ecosystems: Interactions, Energy, and Dynamics ● LS3 - Heredity: Inheritance and Variation of Traits ● LS4 - Biological Evolution: Unity and Diversity <p>Physical Science</p> <ul style="list-style-type: none"> ● PS1 - Matter and Its Interactions ● PS2 - Motion and Stability: Forces and Interactions ● PS3 - Energy ● PS4 - Waves and Their Applications in Technologies for Information Transfer <p>Earth and Space Science</p> <ul style="list-style-type: none"> ● ESS1 - Earth’s Place in the Universe ● ESS2 - Earth’s Systems ● ESS3 - Earth and Human Activity ● ETS1 - Engineering Design 	<ul style="list-style-type: none"> ● Patterns ● Cause and Effect ● Scale, Proportion, and Quantity ● Systems and System Models ● Energy and Matter ● Structure and Function ● Stability and Change

Adapted from: Nebraska Department of Education (2017). [K-12 College and Career Ready Standards for Science](#), and Nebraska Early Learning Guidelines draft (2017)

Legend

Cell without text: No State or Millard indicator exists.

Nomenclature

The nomenclature for the standards and indicators is as follows:

SC	Science State Standard
M	Millard Standard
P3-12	Grade Level
1-15	Topic (Disciplinary Core Idea) <ol style="list-style-type: none"> 1. Forces and Interactions 2. Waves & Electromagnetic Radiation 3. Structure & Properties of Matter 4. Energy 5. Chemical Reactions 6. Structure & Function 7. Interdependent Relationships in Ecosystems 8. Matter & Energy in Organisms & Ecosystems 9. Heredity: Inheritance & Variation of Traits 10. Biological Evolution 11. Space Systems 12. Weather & Climate 13. Earth's Systems 14. History of Earth 15. Sustainability
2.	Standard
A	Indicator
<u>underline</u>	Crosscutting Concept
bold	Science and Engineering Practice

Example

SC.5.3.1 ←(Standard) Gather, analyze, and communicate evidence of structure and properties of matter.				
SC.5.3.1.B ←(Indicator) Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, <u>the total weight of matter is conserved</u>				
SC. content area	5. grade level	3. topic (Disciplinary Core Idea)	1. standard	B indicator
Science	Grade 5	Structures & Properties of Matter	Structure & Properties of Matter	weight of matter is conserved regardless of change that occurs when heating, cooling, or mixing substances

The [Topic Progression](#) provides a quick view of the PK-12 instructional progression.

Science Matrix Contents

<u>Summary of Topic Progression PK-12</u>		
Preschool	Physical Science K-5	Physical Science 6-12
1. Scientific Knowledge	1. Forces and Interactions	1. Forces and Interactions
2. Scientific Skills and Methods	2. Waves and Electromagnetic Radiation	2. Waves and Electromagnetic Radiation
	3. Structure and Properties of Matter	3. Structure and Properties of Matter
	4. Energy	4. Energy
	5. Chemical Reactions	5. Chemical Reactions
	Life Science K-5	Life Science 6-12
	6. Structure & Function	6. Structure & Function
	7. Interdependent Relationships in Ecosystems	7. Interdependent Relationships in Ecosystems
	8. Matter & Energy in Organisms & Ecosystems	8. Matter & Energy in Organisms & Ecosystems
	9. Heredity: Inheritance & Variation of Traits	9. Heredity: Inheritance & Variation of Traits
	10. Biological Evolution	10. Biological Evolution
	Earth & Space K-5	Earth & Space 6-12
	11. Space Systems	11. Space Systems
	12. Weather and Climate	12. Weather and Climate
	13. Earth's Systems	13. Earth's Systems
	14. History of Earth	14. History of Earth
	15. Sustainability	15. Sustainability

Summary of PK-12 Topic Progression

Topic Progression PK-8

Topic\Grade	PK	K	1	2	3	4	5	6	7	8
P4.1 Scientific Knowledge	SC.M.P4.1									
P4.2 Scientific Skills and Methods	SC.M.P4.2									
1 Forces & Interactions		SC.K.1			SC.3.1					SC.8.1
2 Waves & Electromagnetic Radiation			SC.1.2			SC.4.2				SC.8.2
3 Structure & Properties of Matter				SC.2.3			SC.5.3		SC.7.3	
4 Energy						SC.4.4		SC.6.4		SC.8.4
5 Chemical Reactions									SC.7.5	
6 Structure & Function			SC.1.6			SC.4.6		SC.6.6		
7 Interdependent Relationships in Ecosystems		SC.K.7		SC.2.7	SC.3.7				SC.7.7	
8 Matter & Energy in Organisms & Ecosystems							SC.5.8		SC.7.8	
9 Heredity: Inheritance & Variation of Traits					SC.3.9			SC.6.9		SC.8.9
10 Biological Evolution										SC.8.10
11 Space Systems			SC.1.11				SC.5.11			SC.8.11
12 Weather & Climate		SC.K.12			SC.3.12			SC.6.12		
13 Earth's Systems				SC.2.13		SC.4.13	SC.5.13	SC.6.13	SC.7.13	
14 History of Earth									SC.7.14	SC.8.14
15 Sustainability										

Topic Progression High School

Topic\Grade	9	10	11
1 Forces & Interactions			SC.HS.1
2 Waves & Electromagnetic Radiation			SC.HS.2
3 Structure & Properties of Matter		SC.HS.3	
4 Energy			SC.HS.4
5 Chemical Reactions		SC.HS.5	
6 Structure & Function	SC.HS.6		
7 Interdependent Relationships in Ecosystems	SC.HS.7		
8 Matter & Energy in Organisms & Ecosystems	SC.HS.8		
9 Heredity: Inheritance & Variation of Traits	SC.HS.9		
10 Biological Evolution	SC.HS.10		
11 Space Systems		SC.HS.11	SC.HS.11
12 Weather & Climate	SC.HS.12		
13 Earth's Systems	SC.HS.13	SC.HS.13	SC.HS.13
14 History of Earth	SC.HS.14		SC.HS.14
15 Sustainability	SC.HS.15	SC.HS.15	SC.HS.15

PK Science Standards Matrix

Scientific Knowledge	
3-4 years	4-5 years
SC.M.P3.1 Demonstrates a basic awareness and use of scientific concepts SC.M.P4.1 Demonstrates a basic awareness and use of scientific concepts	
SC.M.P3.1.A Compares and contrasts properties of objects (e.g. sink or float)	SC.M.P4.1.A Shows interest in measurement of time, length, distance, weight
SC.M.P3.1.B Provides simple verbal or signed descriptions of observed phenomenon.	SC.M.P4.1.B Describes observable phenomena using adjectives and labels
SC.M.P3.1.C Differentiates between living and nonliving organisms.	SC.M.P4.1.C Uses science and engineering practice words (e.g. observe, experiment, compare)
SC.M.P3.1.D Describes or represents a series of events in the correct sequence	SC.M.P4.1.D Uses scientific content words (e.g. some plants are comprised of stems, roots, leaves).
SC.M.P3.1.E Begins to use scientific vocabulary	SC.M.P4.1.E Uses measurement tools (e.g. scale, ruler, unit blocks) to quantify similarities and difference between objects
	SC.M.P4.1.F Uses non-adult sources to gather information (e.g. reference books)
	SC.M.P4.1.G Develops beginning understanding of caring for the environment

Scientific Skills and Methods	
3-4 years	4-5 years
SC.M.P3.2 Develop foundational skills in learning and understanding about the world through exploration and investigation. SC.M.P4.2 Develop foundational skills in learning and understanding about the world through exploration and investigation.	
SC.M.P3.2.A Explores various materials to learn about characteristics of objects, plants, animals, and various phenomena (e.g. weight, shape, size, color, temperature)	SC.M.P4.2.A Makes observations, asks questions, predicts, draws conclusions, explains, and tries things out to see what will happen

SC.M.P3.2.B Begins to look for answers to questions through active investigation	SC. M.P4.2.B Independently uses simple tools to conduct an investigation to increase understanding
SC.M.P3.2.C Uses a variety of tools and objects to explore the world and how things work in the world (uses magnets, microscope, or magnifying glasses)	SC.M.P4.2.C Collects, describes and records information through discussions, drawings, maps, and charts
SC.M.P3.2.D Asks questions about the relationship between two things (e.g. why do you think some animals sleep in the day?)	SC.M.P.4.2.D Communicates results of an investigation
	SC.M.P.4.2.E Begins to distinguish evidence from opinion

K-5 Science Standards Matrix

Physical Science PK-5 Topic 1: Forces and Interactions					
Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Forces and Interactions: Pushes and Pulls (SC.K.1) Forces and Interactions: Motion and Stability (SC.3.1)					
SC.K.1.1 Gather, analyze, and communicate evidence of forces and their interactions. SC.3.1.1 Gather, analyze, and communicate evidence of forces and their interactions.					
SC.K.1.1.A Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.			SC.3.1.1.A Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.		
SC.K.1.1.B Analyze data to determine if a design			SC.3.1.1.B Make observations		

<p>solution works as intended to <u>change</u> the speed or direction of an object with a push or a pull.</p>			<p>and/or measurements of an object's motion to provide evidence that a <u>pattern</u> can be used to predict future motion.</p>		
			<p>SC.3.1.1.C Ask questions to <u>determine cause and effect</u> relationships of electrical or magnetic interactions between two objects not in contact with each other.</p>		
			<p>SC.3.1.1.D Define a simple design problem that can be <u>solved by applying scientific ideas</u> about magnets.</p>		
<p>Physical Science Topic 2: Waves and Electromagnetic Radiation</p>					
Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
<p>Waves: Light and Sound (SC.1.2) Waves: Waves and Information (SC.4.2)</p>					
<p>SC.1.2.1 Gather, analyze, and communicate evidence of light and sound waves. SC.4.2.1 Gather, analyze, and communicate evidence of waves and the information they transfer.</p>					
	<p>SC.1.2.1.A Plan and conduct investigations to provide evidence that vibrating materials <u>can make</u> sound and that sound <u>can make</u> materials vibrate.</p>			<p>SC.4.2.1.A Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.</p>	

	SC.1.2.1.B Make observations to construct an evidence-based account that objects can be seen only when illuminated.			SC.4.2.1.B Generate and compare multiple solutions that use <u>patterns</u> to transfer information.	
	SC.1.2.1.C Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.				
	SC.1.2.1.D Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.				
Physical Science					
Topic 3: Structure and Properties of Matter					
Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Structure and Properties of Matter (SC.2.3 and SC.5.3)					
SC.2.3.1 Gather, analyze, and communicate evidence of the structure, properties, and interactions of matter. SC.5.3.1 Gather, analyze, and communicate evidence of structure and properties of matter.					
		SC.2.3.1.A Plan and conduct an investigation to describe and classify different kinds of materials <u>by their observable properties</u> .			SC.5.3.1.A Develop a model to describe that matter is made of particles <u>too small to be seen</u> .

		SC.2.3.1.B Analyze data obtained from testing different materials to determine which materials <u>have the properties that are best suited</u> for an intended purpose.			SC.5.3.1.B Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, <u>the total weight of matter is conserved</u> .
		SC.2.3.1.C Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.			SC.5.3.1.C Make observations and measurements to identify materials <u>based on their properties</u> .
		SC.2.3.1.D Make observations to construct an evidence-based account of how an object made of a small set of pieces <u>can be disassembled and made into a new object</u> .			SC.5.3.1.D Conduct an investigation to determine whether the mixing of two or more substances <u>results</u> in new substances.
Physical Science Topic 4: Energy					
Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Energy: Conservation and Transfer (SC.4.4)					
SC.4.4.2 Gather, analyze and communicate evidence of energy conservation and transfer.					
				SC.4.4.2.A Use evidence to construct an explanation relating the speed of an object to the	

				<u>energy of that object.</u>	
				SC.4.4.2.B Make observations to provide evidence that <u>energy can be transferred</u> from place to place by sound, light, heat, and electrical currents.	
				SC.4.4.2.C Ask questions and predict outcomes about the <u>changes in energy</u> that occur when objects collide.	
				SC.4.4.2.D Apply scientific ideas to design, test, and refine a device that converts <u>energy from one form to another.</u>	
				SC.4.4.2.E Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	
				SC.4.4.2.F Obtain and combine information to describe that energy and fuels are derived from natural resources and that <u>their uses affect the environment.</u>	

Physical Science

Topic 5: Chemical Reactions

Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5

**Life Science
Topic 6: Structure and Function**

Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
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Structure, Function, and Information Processing (SC.1.6 and SC.4.6)

SC.1.6.2 Gather, analyze, and communicate evidence to show the relationship between structure and function in living things.
SC.4.6.3 Gather and analyze data to communicate an understanding of structure, function and information processing of living things.

	SC.1.6.2.A Use materials to design a solution to a human problem by <u>mimicking how plants and/or animals</u> use their external parts to help them survive, grow, and meet their needs.			SC.4.6.3.A Develop a model to describe that light reflecting from objects and entering the eyes <u>allows objects to be seen</u> .	
	SC.1.6.2.B Develop a simple sketch, drawing, or physical model to illustrate how the <u>shape of an object helps it function</u> as needed to solve a given problem.			SC.4.6.3.B Construct an argument that <u>plants and animals have internal and external structures that function to support</u> survival, growth, behavior, and reproduction.	
	SC.1.6.2.C Read texts and use media to determine patterns in a			SC.4.6.3.C Use a model to describe that animals <u>receive</u>	

	behavior of parents and offspring that help offspring survive.			<u>different types of information through their senses, process the information in their brain, and respond to the information.</u>	
	SC.1.6.2.D Make observations to construct an evidence-based account that young plants and animals <u>are like, but not exactly like,</u> their parents.				
Life Science					
Topic 7: Interdependent Relationships in Ecosystems					
Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment (SC.K.7.2) Interdependent Relationships in Ecosystems (SC.2.7) Interdependent Relationships in Ecosystems (SC.3.7)					
SC.K.7.2 Gather, analyze, and communicate evidence of interdependent relationships in ecosystems. SC.3.7.2 Gather and analyze data to communicate an understanding of the interdependent relations in ecosystems.					
SC.K.7.2.A Use observations to describe patterns of what plants and animals (including humans) need to survive.		SC.2.7.2.A Plan and conduct an investigation to determine if plants need sunlight and water to grow.	SC.3.7.2.A Construct an argument <u>that some animals form groups that help members survive.</u>		
SC.K.7.2.B Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.		SC.2.7.2.B Develop a simple model that <u>mimics the function</u> of an animal in dispersing seeds or pollinating plants.	SC.3.7.2.B Analyze and interpret data from fossils to provide evidence of the organisms and environments in which they lived <u>long ago.</u>		

SC.K.7.2.C Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.		SC.2.7.2.C Make observations of plants and animals to compare the diversity of life in different habitats.	SC.3.7.2.C Construct an argument with evidence that in a particular habitat some organisms <u>can survive well, some survive less well, and some cannot survive at all.</u>		
SC.K.7.2.D Communicate solutions that will increase the positive <u>impact of</u> humans on the land, water, air, and/or other living things in the local environment.			SC.3.7.2.D Make a claim about the merit of a solution to a problem caused when <u>the environment changes and the types of plants and animals that live there</u> may change.		
			SC.3.7.2.E Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.		
Life Science					
Topic 8: Matter and Energy in Organisms and Ecosystems					
Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Matter and Energy in Organisms and Ecosystems (SC.5.8)					
SC.5.8.2 Gather and analyze data to communicate understanding of matter and energy in organisms and ecosystems.					
					SC.5.8.2.A Use models to describe that energy in animals' food (used for body repair, growth, and motion and to maintain body warmth)

					was once <u>energy from the sun</u> .
					SC.5.8.2.B Support an argument that plants get the <u>materials they need</u> for growth chiefly <u>from air and water</u> .
					SC.5.8.2.C Develop a model to describe the <u>movement of matter among plants, animals, decomposers, and the environment</u> .

Life Science
Topic 9: Heredity: Inheritance and Variation of Traits

Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
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Inheritance and Variation: Life Cycles and Traits (SC.3.9)

SC.3.9.3 Gather and analyze data to communicate an understanding of inheritance and variation of traits though life cycles and environmental influences.

			SC.3.9.3.A Develop models to describe that organisms have unique and diverse life cycles but all <u>have in common</u> birth, growth, reproduction, and death.		
			SC.3.9.3.B Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that <u>variation of these traits exists</u> in a group of similar		

			organisms.		
			SC.3.9.3.C Use evidence to support the explanation that traits <u>can be influenced by</u> the environment.		
			SC.3.9.3.D Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species <u>may provide advantages</u> in surviving, finding mates, and reproducing.		
Life Science Topic 10: Biological Evolution					
Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5

Earth & Space Science Topic 11: Space Systems					
Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Space Systems: Patterns and Cycles (SC.1.11) Space Systems: Stars and Solar System (SC.5.11)					
SC.1.11.3 Gather, analyze, and communicate evidence of patterns and cycles of space systems. SC.5.11.3 Gather and analyze data to communicate understanding of space systems: Earth’s stars and solar system.					

	SC.1.11.3.A Use observations of the sun, moon, and stars <u>to describe patterns</u> that can be predicted.				SC.5.11.3.A Support an argument that the gravitational force <u>exerted by Earth on objects</u> is directed down
	SC.1.11.3.B Make observations at different times of the year <u>to relate the amount of daylight to the time of year.</u>				SC.5.11.3.B Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their <u>relative distances</u> from Earth.
					SC.5.11.3.C Represent data in graphical displays to reveal <u>patterns</u> of daily changes in the length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.
Earth & Space Science Topic 12: Weather and Climate					
Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Weather and Climate (SC.K.12 and SC.3.12)					
SC.K.12.3 Gather, analyze, and communicate evidence of weather and climate. SC.3.12.4 Gather and analyze data to communicate an understanding of weather and climate.					
SC.K.12.3.A Use and share observations of local weather conditions <u>to describe patterns</u> over time.			SC.3.12.4.A Represent data in table, pictograph, and bar graph displays to describe typical weather conditions <u>expected during a particular season.</u>		

<p>SC.K.12.3.B Ask questions to obtain information about the purpose of <u>weather forecasting</u> to prepare for, and respond to, severe weather.</p>			<p>SC.3.12.4.B Obtain and combine information to describe <u>climates in different regions</u> of the world.</p>		
<p>SC.K.12.3.C Make observations to determine <u>the effect of</u> sunlight on Earth's surface.</p>			<p>SC.3.12.4.C Make a claim about the merit of a design solution that <u>reduces the impacts</u> of a weather-related hazard.</p>		
<p>SC.K.12.3.D Use tools and materials to design and build a structure that will reduce the warming <u>effect</u> of sunlight on an area.</p>					
<p>SC.K.12.3.E Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.</p>					

**Earth & Space Science
Topic 13: Earth's Systems**

Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
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**Earth's Systems: Processes That Shape the Earth (SC.2.13 and SC.4.13)
Earth's Systems (SC.5.13)**

<p>SC.2.13.3 Gather, analyze, and communicate evidence of the processes that shape the earth. SC.4.13.4 Gather and analyze data to communicate an understanding of Earth's systems and processes that shape the Earth. SC.5.13.4 Gather and analyze data to communicate understanding of Earth's systems.</p>					
		<p>SC.2.13.3.A Use information from several sources to provide evidence that Earth <u>events can occur quickly or slowly</u>.</p>		<p>SC.4.13.4.A Identify evidence from <u>patterns</u> in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.</p>	<p>SC.5.13.4.A Develop a model using an example to describe ways <u>the geosphere, biosphere, hydrosphere, and/or atmosphere interact</u>.</p>
		<p>SC.2.13.3.B Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.</p>		<p>SC.4.13.4.B Make observations and/or measurements to provide evidence of the <u>effects of</u> weathering or the rate of erosion by water, ice, wind, or vegetation.</p>	<p>SC.5.13.4.B Describe and graph <u>the amounts</u> of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.</p>
		<p>SC.2.13.3.C Develop a model to represent the <u>shapes and kinds</u> of land and bodies of water <u>in an area</u>.</p>		<p>SC.4.13.4.C Analyze and interpret data from maps to describe <u>patterns</u> of Earth's features.</p>	<p>SC.5.13.4.C Obtain and combine information about ways individual communities use science ideas to protect the <u>Earth's resources and environment</u>.</p>
		<p>SC.2.13.3.D Obtain information to identify <u>where water is found on Earth</u> and that it can be solid or liquid.</p>		<p>SC.4.13.4.D Generate and compare multiple solutions to <u>reduce the impacts</u> of natural Earth processes on humans.</p>	<p>SC.5.13.4.D Define a simple design problem that can be solved by applying scientific ideas about the conservation of fresh water <u>on Earth</u>.</p>
					<p>SC.5.13.4.E Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials,</p>

					time, or cost.
Earth & Space Science Topic 14: History of Earth					
Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Earth & Space Science Topic 15: Sustainability					
Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5

6-12 Science Standards Matrix

Physical Science 6-12 Topic 1: Forces and Interactions						
Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
Forces and Interactions (SC.8.1 and SC.HS.1)						
SC.8.1.1 Gather, analyze, and communicate evidence of forces and interactions. SC.HS.1.1 Gather, analyze, and communicate evidence of forces and interactions.						
		SC.8.1.1.A Apply Newton's Third Law to design a solution to a <u>problem involving</u> the motion of <u>two colliding objects</u> .			SC.HS.1.1.A Analyze data to support the claim that Newton's Second Law of Motion describes <u>the mathematical relationship among</u> the net force on a macroscopic object, its mass, and its acceleration.	
		SC.8.1.1.B Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.			SC.HS.1.1.B Use mathematical representations to support the claim that <u>the total momentum of a system of objects</u> is conserved when there is no net force on the system.	
		SC.8.1.1.C Plan an investigation to provide evidence that the <u>change</u> in an			SC.HS.1.1.C Apply science and engineering ideas to design, evaluate,	

		object's motion depends on the sum of the forces on the object and the mass of the object.			and refine a device that <u>minimizes the force</u> on a macroscopic object during a collision.	
		SC.8.1.1.D Ask questions about data to determine the <u>factors that affect</u> the strength of electrical and magnetic forces.			SC.HS.1.1.D Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to <u>describe and predict</u> the gravitational and electrostatic forces between objects.	
		SC.8.1.1.E Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of <u>interacting objects</u> .			SC.HS.1.1.E Plan and conduct an investigation to provide evidence that an electrical current <u>can produce</u> a magnetic field and that a changing magnetic field <u>can produce</u> an electrical current.	
		SC.8.1.1.F Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects <u>exerting forces on each other</u> even though the objects are				

		not in contact.				
Physical Science						
Topic 2: Waves and Electromagnetic Radiation						
Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
Waves and Electromagnetic Radiation (SC.8.2 and SC.HS.2)						
SC.8.2.2 Gather, analyze, and communicate evidence of waves and electromagnetic radiation. SC.HS.2.2 Gather, analyze, and communicate evidence of the interactions of waves.						
		SC.8.2.2.A Use mathematical representations to <u>describe</u> a simple model for waves that includes how the amplitude of a wave <u>is related</u> to the energy in a wave.			SC.HS.2.2.A Use mathematical representations to support a claim <u>regarding relationships among</u> the frequency, wavelength, and speed of waves traveling in various media.	
		SC.8.2.2.B Develop and use a model to describe that waves are reflected, absorbed, or transmitted <u>through various materials</u> .			SC.HS.2.2.B Evaluate questions about the <u>advantages of using</u> digital transmission and storage of information.	
		SC.8.2.2.C Integrate qualitative scientific and technical information to support the claim that digitized signals are a <u>more reliable way</u> to encode and transmit			SC.HS.2.2.C Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either <u>by a</u>	

		information than analog signals.			<u>wave model</u> or a <u>particle model</u> , and that for some situations one model is more useful than the other.	
					SC.HS.2.2.D Evaluate the validity and reliability of claims in published materials of <u>the effects</u> that different frequencies of electromagnetic radiation have when absorbed by matter.	
					SC.HS.2.2.E Communicate technical information about how some technological devices <u>use the principles of wave behavior and wave interactions</u> with matter to transmit and capture information and energy.	
Physical Science Topic 3: Structure and Properties of Matter						
Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
Structure and Properties of Matter (SC.7.3 and SC.HS.3)						
SC.7.3.1 Gather, analyze, and communicate evidence of the structure, properties, and interactions of matter. SC.HS.3.3 Gather, analyze, and communicate evidence of the structure, properties, and interactions of matter.						

	SC.7.3.1.A Develop models to describe <u>the atomic composition</u> of simple molecules.			SC.HS.3.3.A Use the periodic table as a model to predict the relative <u>properties of elements based on the patterns of electrons</u> in the outermost energy level of atoms.		
	SC.7.3.1.B Gather and make sense of information to describe that <u>synthetic materials come from natural resources</u> and impact society.			SC.HS.3.3.B Plan and conduct an investigation to gather evidence to <u>compare the structure</u> of substances at the macro scale to infer the strength of electrical forces between particles.		
	SC.7.3.1.C Develop a model that <u>predicts and describes changes</u> in particle motion, temperature, and state of a pure substance <u>when thermal energy is added or removed</u> .			SC.HS.3.3.C Develop models to illustrate the <u>changes in the composition of the nucleus of the atom</u> and the energy released <u>during the processes of fission, fusion, and radioactive decay</u> .		
				SC.HS.3.3.D Communicate scientific and technical information about why the molecular level structure is <u>important in the</u>		

				<u>functioning of designed materials.</u>		
Physical Science Topic 4: Energy						
Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
Energy (SC.6.4 and SC.8.4 and SC.HS.4)						
SC.6.4.1 Gather, analyze, and communicate evidence of energy. SC.8.4.3 Gather, analyze, and communicate evidence of energy. SC.HS.4.4 Gather, analyze, and communicate evidence of the interactions of energy.						
SC.6.4.1.A Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal <u>energy transfer</u> .		SC.8.4.3.A Construct and interpret graphical displays of data to describe the <u>relationships of</u> kinetic energy to the mass of an object and to the speed of an object.			SC.HS.4.4.A Create a computational model to <u>calculate the change</u> in the energy of one component in a system when the change in energy of the other component(s) and energy flows <u>in and out of the system</u> are known.	
SC.6.4.1.B Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principle and potential impacts on people and the natural environment that may limit		SC.8.4.3.B Develop a model to describe that <u>when the arrangement of objects interacting</u> at a distance changes, then different amounts of potential energy are stored <u>in the system</u> .			SC.HS.4.4.B Develop and use models to illustrate that energy at the macroscopic scale can <u>be accounted for as a combination of energy</u> associated with the motion of particles (objects) and energy associated with the relative positions of particles (objects).	

possible solutions.						
SC.6.4.1.C Plan an investigation to determine the <u>relationships</u> among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.					SC.HS.4.4.C Design, build, and refine a device that works within given constraints to convert <u>one form of energy into another form of energy</u> .	
SC.6.4.1.D Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, <u>energy</u> is transferred to or from the object.					SC.HS.4.4.D Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for <u>societal needs and wants</u>	
					SC.HS.4.4.E Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined <u>within a closed system results in a more uniform energy distribution among the components in the system</u> (second law of	

						thermodynamics).	
						SC.HS.4.4.F Develop and use a model of two objects interacting through electrical or magnetic fields to illustrate the forces between objects and the changes in energy of the objects <u>due to the interaction</u> .	
Physical Science Topic 5: Chemical Reactions							
Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12	
Chemical Reactions (SC.7.5 and SC.HS.5)							
SC.7.5.2 Gather, analyze, and communicate evidence of chemical reactions. SC.HS.5.5 Gather, analyze, and communicate evidence of chemical reactions.							
	SC.7.5.2.A Analyze and interpret data on the <u>properties of substances</u> before and after the substances interact to determine if a chemical reaction has occurred.			SC.HS.5.5.A Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, <u>trends in the periodic table</u> , and <u>knowledge of the patterns of chemical properties</u> .			
	SC.7.5.2.B Develop and use a model to describe how the total			SC.HS.5.5.B Develop a model to illustrate that the <u>release or</u>			

	number of atoms does not change in a chemical reaction and <u>thus mass is conserved.</u>			<u>absorption of energy from a chemical reaction system</u> depends on the changes in total bond energy.		
	SC.7.5.2.C Undertake a design project to construct, <u>test, and modify a device that either releases or absorbs thermal energy</u> by chemical processes.			SC.HS.5.5.C Apply scientific principles and evidence to provide an explanation about the <u>effects of changing the temperature or concentration</u> of the reacting particles on the rate at which a reaction occurs.		
	SC.7.5.2.D Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.			SC.HS.5.5.D Refine the design of a chemical system by <u>specifying a change in conditions</u> that would produce increased amounts of products <u>at equilibrium.</u>		
				SC.HS.5.5.E Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through		

				engineering.		
				SC.HS.5.5.F Use mathematical representations to support the claim that <u>atoms, and therefore mass, are conserved</u> during a chemical reaction.		

Life Science 6-12 Topic 6: Structure and Function						
Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
Structure and Function and Information Processing (SC.6.6) Structure and Function (SC.HS.6)						
SC.6.6.2 Gather, analyze, and communicate evidence of the relationship between structure and function in living things. SC.HS.6.1 Gather, analyze, and communicate evidence of the relationship between structure and function in living things.						
SC.6.6.2.A Conduct an investigation to <u>provide evidence that living things are made of cells</u> ; either one cell or many different numbers and types of cells.			SC.HS.6.1.A Construct an explanation based on evidence for how the structure of DNA determines the <u>structure of proteins which carry out the essential functions</u> of life through systems of specialized cells.			
SC.6.6.2.B Develop and use a model to			SC.HS.6.1.B Develop and use a model to			

describe the function of a cell as a whole and <u>ways parts of cells contribute to the function.</u>			illustrate the hierarchical organization of <u>interacting systems</u> that provide specific functions within multicellular organisms.			
SC.6.6.2.C Use argument supported by evidence for how the body is a <u>system</u> of interacting subsystems composed of groups of cells.			SC.HS.6.1.C Plan and conduct an investigation to provide evidence that <u>feedback mechanisms maintain homeostasis.</u>			
SC.6.6.2.D Gather and synthesize information that sensory receptors <u>respond to stimuli</u> by sending messages to the brain for immediate behavior or storage as memories.			SC.HS.6.1.D Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.			

Life Science
Topic 7: Interdependent Relationships in Ecosystems

Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
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Interdependent Relationships in Ecosystems (SC.7.7 and SC.HS.7)

SC.7.7.3 Gather, analyze, and communicate evidence of interdependent relationships in ecosystems.
SC.HS.7.2 Gather, analyze, and communicate evidence of interdependent relationships in ecosystems.

	<p>SC.7.7.3.A Construct an explanation that predicts <u>patterns of interactions</u> among organisms across multiple ecosystems.</p>		<p>SC.HS.7.2.A Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at <u>different scales</u>.</p>			
	<p>SC.7.7.3.B Evaluate competing design solutions for <u>maintaining</u> biodiversity and ecosystem services.</p>		<p>SC.HS.7.2.B Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of <u>different scales</u>.</p>			
	<p>SC.7.7.3.C Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.</p>		<p>SC.HS.7.2.C Evaluate the claims, evidence, and reasoning that the <u>interactions in ecosystems maintain relatively consistent</u> numbers and types of organisms in <u>stable conditions, but changing conditions</u> may result in a new ecosystem.</p>			
	<p>SC.7.7.3.D Apply scientific principles to design a method for monitoring and</p>		<p>SC.HS.7.2.D Evaluate the evidence for <u>the role of</u> group behavior on</p>			

	<u>increasing positive human impact</u> on the environment.		individual and species' chances to survive and reproduce.			
			SC.HS.7.2.E Design, evaluate, and refine a solution for increasing the positive <u>impacts of human activities</u> on the environment and biodiversity.			
			SC.HS.7.2.F Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on <u>interactions within and between systems</u> relevant to the problem.			
Life Science Topic 8: Matter and Energy in Organisms and Ecosystems						
Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
Matter and Energy in Organisms and Ecosystems (SC.7.8 and SC.HS.8)						
SC.7.8.4 Gather, analyze, and communicate evidence of the flow of energy and cycling of matter in organisms and ecosystems. SC.HS.8.3 Gather, analyze, and communicate evidence of the flow of energy and cycling of matter in organisms and ecosystems.						
	SC.7.8.4.A Construct a scientific explanation based on evidence for the		SC.HS.8.3.A Use a model to illustrate how photosynthesis			

	role of photosynthesis in the <u>cycling of matter and flow of energy</u> into and out of organisms.		transforms light energy into stored chemical energy.			
	SC.7.8.4.B Develop a model to describe how <u>food is rearranged through chemical reactions forming new molecules</u> that support growth and/or release energy as <u>matter moves</u> through an organism.		SC.HS.8.3.B Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may <u>combine with other molecules to form</u> the four basic macromolecules.			
	SC.7.8.4.C Analyze and interpret data to provide evidence for the <u>effects of</u> resource availability on organisms and populations of organisms in an ecosystem.		SC.HS.8.3.C Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules are broken and bonds in new compounds are formed resulting in a net <u>transfer of energy</u> .			
	SC.7.8.4.D Develop a model to describe the <u>cycling of matter and flow of energy</u> among living and nonliving parts of an ecosystem.		SC.HS.8.3.D Construct and revise an explanation based on evidence for the <u>cycling of matter and flow of energy</u> in aerobic and anaerobic conditions.			
	SC.7.8.4.E Construct		SC.HS.8.3.E			

	an argument supported by evidence that <u>changes to physical or biological components</u> of an ecosystem <u>affect populations</u> .		Use mathematical representations to support claims for the <u>cycling of matter and flow of energy</u> among organisms in an ecosystem.			
			SC.HS.8.3.F Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.			
Life Science Topic 9: Heredity: Inheritance and Variation of Traits						
Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
Growth, Development, and Reproduction of Organisms (SC.6.9) Heredity: Inheritance and Variation of Traits (SC.8.9 and SC.HS.9.4)						
SC.6.9.3 Gather, analyze, and communicate evidence of the inheritance and variation of traits. SC.8.9.4 Gather, analyze, and communicate evidence of the inheritance and variation of traits. SC.HS.9.4 Gather, analyze, and communicate evidence of the inheritance and variation of traits.						
SC.6.9.3.A Construct an argument based on evidence for how plant and animal adaptations <u>affect the probability</u> of successful reproduction.		SC.8.9.4.A Develop and use a model to describe why structural changes to genes (mutations) may result in harmful, beneficial, or neutral effects to	SC.HS.9.4.A. Develop and use a model to explain the relationships between the <u>role of DNA and chromosomes in coding the instructions</u> for characteristic traits			

		<u>structure and function</u> of organisms.	passed from parents to offspring.			
SC.6.9.3.B Construct a scientific explanation based on evidence for how environmental and genetic factors <u>influence</u> the growth of organisms.		SC.8.9.4.B Gather and synthesize information about <u>technologies that have changed the way humans influence</u> inheritance of desired traits in organisms.	SC.HS.9.4.B Make and defend a claim based on evidence that inheritable genetic variations may <u>result from</u> : (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.			
SC.6.9.3.C Develop and use a model to describe why asexual reproduction <u>results in</u> offspring with identical genetic information and sexual reproduction <u>results in</u> offspring with genetic variation.			SC.HS.9.4.C Apply concepts of statistics and probability to explain the <u>variation and distribution</u> of expressed traits in a population.			
Life Science Topic 10: Biological Evolution						
Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
Natural Selection and Adaptations (SC.8.10) Biological Evolution (SC.HS.10)						
SC.8.10.5 Gather, analyze, and communicate evidence of natural selection and adaptations. SC.HS.10.5 Gather, analyze, and communicate evidence of biological evolution.						

		<p>SC.8.10.5.A Analyze and interpret data for <u>patterns</u> in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.</p>	<p>SC.HS.10.5.A Communicate scientific information that common ancestry and biological evolution are supported by <u>multiple lines of empirical evidence</u>.</p>			
		<p>SC.8.10.5.B Apply scientific ideas to construct an explanation for the <u>anatomical similarities and differences</u> among and between modern and fossil organisms <u>to infer evolutionary relationships</u>.</p>	<p>SC.HS.10.5.B Construct an explanation based on evidence that natural selection <u>primarily results from</u> four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.</p>			
		<p>SC.8.10.5.C Construct an</p>	<p>SC.HS.10.5.C Apply concepts of statistics</p>			

		<p>explanation based on evidence that <u>describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.</u></p>	<p>and probability to support explanations that organisms with an advantageous heritable trait <u>tend to increase in proportion to organisms lacking this trait.</u></p>			
		<p>SC.8.10.5.D Use mathematical representations to support explanations of how natural selection <u>may lead to increases and decreases</u> of specific traits in populations over time.</p>	<p>SC.HS.10.5.D Construct an explanation based on evidence for how natural selection <u>leads to</u> adaptation of populations.</p>			
			<p>SC.HS.10.5.E Evaluate the evidence supporting claims that <u>changes in</u> environmental conditions <u>may result in</u>: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.</p>			

Earth & Space Science 6-12
Topic 11: Space Systems

Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
Space Systems (SC.8.11 and SC.HS.11)						
SC.8.11.6 Gather, analyze, and communicate evidence of the interactions among bodies in space. SC.HS.11.1. Gather, analyze, and communicate evidence to defend that the universe changes over time.						
		SC.8.11.6.A Develop and use a model of the Earth-sun-moon system to describe the cyclic <u>patterns</u> of lunar phases, eclipses of the sun and moon, and seasons.		SC.HS.11.1.A Develop a model based on evidence to illustrate the <u>stages</u> of stars, like the sun, and the role of nuclear fusion in the sun's core to <u>release energy</u> that eventually reaches Earth in the form of radiation.		
		SC.8.11.6.B Develop and use a model to describe the role of gravity in the motions within the galaxy and <u>the solar system</u> .		SC.HS.11.1.B Construct an explanation of the Big Bang theory based on <u>astronomical evidence</u> of light spectra, motion of distant galaxies, and <u>composition of matter</u> in the universe.		
		SC.8.11.6.C Analyze and interpret data to determine <u>scale properties</u> of objects in the solar		SC.HS.11.1.C Communicate scientific ideas about the way stars, throughout their		

		system.		stellar <u>stages, produce elements.</u>		
					SC.HS.11.1.D Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.	
Earth & Space Science Topic 12: Weather and Climate						
Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
Weather and Climate (SC.6.12 and SC.HS.12)						
SC.6.12.4 Gather, analyze, and communicate evidence of factors and interactions that affect weather and climate. SC.HS.12.2 Gather, analyze, and communicate evidence to support that Earth's climate and weather are influenced by energy flow through Earth systems.						
SC.6.12.4.A Collect data to provide evidence for how the motions and complex interactions of air masses <u>result in changes</u> in weather conditions.			SC.HS.12.2.A Construct an explanation based on evidence for how the <u>sun's energy moves among Earth's systems.</u>			
SC.6.12.4.B Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of <u>atmospheric and oceanic circulation</u> that determine regional climates.			SC.HS.12.2.B Use a model to describe how variations in the flow of energy into and out of Earth's systems <u>result in</u> changes in climate.			

SC.6.12.4.C Ask questions to clarify evidence of the factors that have <u>caused the change</u> in global temperatures over thousands of years.			SC.HS.12.2.C Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the <u>current rate and scale</u> of global or regional climate changes.			
SC.6.12.4.D Analyze and interpret data on weather and climate to forecast future catastrophic events and <u>inform the development of technologies</u> to mitigate their effect.			SC.HS.12.2.D Evaluate the validity and reliability of past and present models of Earth conditions to <u>make projections</u> of future climate trends and their impacts.			
Earth & Space Science Topic 13: Earth's Systems						
Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
Earth's Systems (SC.6.13 and SC.7.13 and SC.HS.13)						
<p>SC.6.13.5 Gather, analyze, and communicate evidence of the flow of energy and cycling of matter associated with Earth's materials and processes.</p> <p>SC.7.13.5 Gather, analyze, and communicated evidence of the flow of energy and cycling of matter associated with Earth's materials and processes.</p> <p>SC.HS.13.3 Gather, analyze, and communicate evidence to defend the position that Earth's systems are interconnected and impact one another.</p>						
SC.6.13.5.A Develop a model to describe the cycling of water through Earth's systems <u>driven by energy</u> from the sun and the force of	SC.7.13.5.A Develop a model to describe the <u>cycling</u> of Earth's materials and the flow of energy that drives this process.		.		SC.HS.13.3.A Analyze geoscience data to make the claim that one change to Earth's surface can <u>create feedbacks</u> that cause	

gravity.					changes to other Earth systems	
	<p>SC.7.13.5.B Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources <u>are the result of</u> past and current geoscience processes.</p>				<p>SC.HS.13.3.B Develop a model based on evidence of Earth's interior to describe the <u>cycling of matter</u></p>	
	<p>SC.7.13.5.C Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources <u>impact Earth's systems</u>.</p>				<p>SC.HS.13.3.C Construct an argument based on evidence to explain the multiple <u>processes that cause</u> Earth's plates to move.</p>	
				<p>SC.HS.13.3.D Plan and conduct an investigation of the properties of water and their effects on Earth materials, surface processes, and groundwater systems.</p>		
			<p>SC.HS.13.3.E Develop a quantitative model to</p>			

			describe the <u>cycling of</u> carbon and other nutrients among the hydrosphere, atmosphere, geosphere, and biosphere, today and in the geological past			
Earth & Space Science Topic 14: History of Earth						
Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
History of Earth (SC.7.14 and SC.8.14 and SC.HS.14)						
SC.7.14.6 Gather, analyze, and communicate evidence to explain Earth's history. SC.8.14.7 Gather, analyze, and communicate evidence to explain Earth's history. SC.HS.14.4 Gather, analyze, and communicate evidence to interpret Earth's history.						
	SC.7.14.6.A Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at <u>varying time and spatial scales</u> .	SC.8.14.7.A Construct a scientific explanation based on evidence from rock strata for how the geologic <u>time scale</u> is used to organize Earth's 4.6-billion-year-old history.			SC.HS.14.4.A Evaluate evidence of the <u>past and current movements</u> of continental and oceanic crust and the theory of plate tectonics to explain the <u>differences in</u> age, structure, and composition of crustal and sedimentary rocks.	
	SC.7.14.6.B Analyze and interpret data on the <u>distribution</u> of fossils and rocks, continental shapes,				SC.HS.14.4.B Apply scientific reasoning and evidence from ancient Earth materials, meteorites,	

	and seafloor structures to provide evidence of past plate motions.				and other planetary surfaces to <u>reconstruct Earth's formation</u> and early history.	
	SC.7.14.6.C Analyze and interpret data on natural hazards to forecast future catastrophic events and <u>inform the development of technologies to mitigate their effects.</u>				SC.HS.14.4.C Develop a model to illustrate how Earth's internal and surface processes operate <u>over time</u> to form, modify, and recycle continental and ocean floor features.	
			SC.HS.14.4.D Construct an argument based on evidence to validate <u>coevolution</u> of Earth's systems and life on Earth.			
Earth & Space Science Topic 15: Sustainability						
Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12
Sustainability (SC.HS.15)						
SC.HS.15.5 Gather, analyze, and communicate evidence to describe the interactions between society, environment, and economy.						
			SC.HS.15.5.A Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards,			

			and <u>changes in climate</u> have influenced human activity.			
			SC.HS.15.5.B Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.			
			SC.HS.15.5.C Create a computational simulation to illustrate the relationships among management of natural resources, the <u>sustainability</u> of human populations, and biodiversity.			
			SC.HS.15.5.D Evaluate or refine a technological solution that increases positive impacts of human activities on <u>natural systems</u> .			
					SC.HS.15.5.E Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs	

					that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible <u>social, cultural, and environmental impacts</u> .	
				SC.HS.15.5.F Use a computational representation to illustrate the <u>relationships among</u> Earth systems and <u>the degree to which</u> those relationships are being modified due to human activity.		
Science 6	Science 7	Science 8	Biology	- Physical Science: Chemistry - Chemistry	- Physical Science: Physics - Physics - AP Physics 1: Algebra-Based	

Appendix

PK-12 Science Courses and Electives

Introduction

The PK-12 Science courses on the following page provides a listing of all required and elective courses offered to Millard Public School students. It provides an overall course sequence.

In addition to maintaining the current Science course offerings the Curriculum Planning Committee (CPC) has proposed one additional Middle School elective.

PK-12 Science Courses and Electives

Elementary

Preschool (PK) Science
 Kindergarten Science
 1st Grade Science
 2nd Grade Science
 3rd Grade Science
 4th Grade Science
 5th Grade Science

Middle School

Science 6
 Science 7
 Science 8

High School

Biology
 Advanced Placement ® Biology
 Physical Science: Chemistry
 Chemistry
 Advanced Placement ® Chemistry
 Physical Science: Physics
 Physics
 Advanced Placement ® Physics 1: Algebra-Based

Advanced Placement ® Physics 2: Algebra-Based

Environmental Science

Advanced Placement ® Environmental Science

Zoology

Astronomy

Human Physiology, proposed name change to Human Anatomy and Physiology

Introduction to IB Chemistry and IB Physics

International Baccalaureate ® Programme Courses:

IB Chemistry HL I

IB Chemistry HL II

IB Biology SL

IB Biology HL I

IB Biology HL II

IB Physics SL

IB Physics HL I

IB Physics HL II

Proposed course additions:

Middle School:

STEM Elective

Proposed Course Changes or Additions

Middle School: STEM Elective	
Summary of Course Content	<p>A middle school STEM elective course would engage students in an opportunity to expand upon and compliment what they are learning in their science and math courses. This course would offer an opportunity to integrate problem based learning and promote systems thinking.</p> <p>Units in the course could include:</p> <ul style="list-style-type: none"> ● Forensics - Crime Scene Investigation ● Robotics ● Meteorology ● Computer Animation and Modeling ● Astronomy ● Archaeology ● Zoology ● Video game design
Benefits	<ul style="list-style-type: none"> ● Student Choice ● Expansion of General Course Content ● Opportunity for Integrated Course Content (multi-disciplinary) ● Opportunity to Integrate Engineering into Diverse Course Content ● Increase Student Opportunities in STEM ● Increase Exposure to STEM Career Fields
Concerns	<ul style="list-style-type: none"> ● Scheduling ● Classroom space
Proposed course to be eliminated	None

High School: Changing the name of the current <i>Human Physiology</i> course to <i>Human Anatomy and Physiology</i>	
Benefits	A change in name from <i>Human Physiology</i> to <i>Human Anatomy and Physiology</i> parallels the course title used at MCC and UNMC. It emphasizes the relationship between body structure and function.
Concerns	None
Proposed course to be eliminated	None, Name change only

AGENDA ITEM: PK-12 English Language Arts Field Study Results, Instructional Materials Proposal, and Framework Part II

MEETING DATE: February 19, 2018

DEPARTMENT: Educational Services

TITLE: PK-12 English Language Arts Field Study Results, Instructional Materials Proposal, and Framework Part II

BRIEF DESCRIPTION: The PK-12 English Language Arts (ELA) Framework was approved by the Board of Education on May 15, 2017. Highlights of this section include:

- The Elementary Field Study included 50 teachers and specialists across the district. The two programs in the field study included Wonders (McGraw-Hill) and Ready Gen (Pearson). The field study committee proposed Wonders.
- The Secondary Field Study included 50 teachers across the district. The three programs in the field study included My Perspectives (Pearson), Mirrors and Windows (EMC School), and Collections (HMH). The field study committee proposed My Perspectives for Middle School English Language Arts, Mirrors and Windows for English 9, 10, & 11, and Collections for Honors English 9 and Honors English 10.
- The PK-12 English Language Arts Curriculum Planning Committee reconvened to review the results forwarded by the field study committees to finalize recommendations which were shared with Educational Services.
- Two English Language Arts Materials Community Preview Meetings were held simultaneously with 9-12 Family and Consumer Sciences on January 18 and 23, 2018. In addition to nine staff members, four community members attended the evening meetings.

The attached recommendation is being brought to the Board of Education from the Office of Educational Services:

- Assists in helping students meet and exceed the standards and indicators within the PK-12 English Language Arts Framework because of connections to College & Career Readiness Skills, critical thinking, engaging reading material, complex texts, close reading, opportunities for discourse, and many opportunities to write about reading.
- Provides updated materials including textbooks for elementary, middle, and high school classrooms, and online licenses for English Language Arts courses.
- Costs an estimated total of \$3,295,825.

ACTION DESIRED: Approval

RECOMMENDATIONS: Recommend approval of the PK-12 ELA resources, associated instructional materials, and Framework as presented herein and that the requested budgets be presented and subject to the District’s program budgeting process.

STRATEGIC PLAN REFERENCE: N/A

TIMELINE: Implementation August, 2018

RESPONSIBLE PERSON(S): Dr. Heather Phipps, Mr. Andrew DeFreece, Dr. Anthony Weers

SUPERINTENDENT’S APPROVAL: _____  _____

PK-5 Language Arts Field Study Results

PK-12 Language Arts Field Study Results

Preschool:

- *Creative Curriculum for Preschool* by Teaching Strategies

Elementary:

- *Wonders* by McGraw-Hill
- *ReadyGen* by Pearson

Middle School (English Language Arts, Reading, and the future Honors English 8) and High School (English 9, 10, 11, Honors English 9, and Honors English 10)

- *My Perspectives* by Pearson
- *Mirrors and Windows* by EMC School
- *Collections* by HMH (in Honors 9 and Honors 10 classes)

At the preschool level, six classroom teachers were involved in the field study of Language Arts instructional materials. Schools included were Bryan, Hitchcock, and Neihardt.

At the elementary level, approximately 50 classroom teachers and specialists were involved in the field study of Language Arts textbooks/instructional materials. Select grade levels at these schools included were: Aldrich, Black Elk, Cody, Cottonwood, Disney, Ezra Millard, Harvey Oaks, Hitchcock, Holling Heights, Neihardt, Norris, Rohwer, Upchurch, Wheeler, Willowdale.

At the middle school level, approximately 30 classroom teachers and special education teachers were involved in the field study of Language Arts instructional materials. At the high school level, approximately 20 classroom teachers and special education teachers were involved in the field study of Language Arts textbooks/instructional materials.

These selected schools represented all areas of the district, all student populations, and all grade levels. Teachers met three times from July to October for trainings. In addition, optional after-school sessions were scheduled throughout the field study for teachers to get support from each company.

PK-12 Language Arts Instructional Materials Selection and Proposal

On December 19, 2017 and December 20, 2017 PK-5 and 6-11, respectively, field study participants met to review teacher reflections and data. Discussions focused on determining which program best met the research results criteria from the Curriculum Planning Committee and the standards and indicators outlined in the PK-12 Language Arts Framework. Based on review of the data and discussions, the Curriculum Planning Committee is recommending the following programs because of connections to College & Career Readiness Skills, critical thinking, engaging reading material, complex texts, close reading, opportunities for discourse, and many opportunities to write about reading.

Preschool: *Creative Curriculum for Preschool* by Teaching Strategies

Elementary: *Wonders* by McGraw-Hill

Middle School Language Arts: *My Perspectives* by Pearson and continued use of *Literature* by McDougal-Littell from the 2009 adoption

English 9, 10, 11: *Mirrors and Windows* by EMC School

Honors English 9 and Honors English 10: *Collections* by HMH

Language Arts Instructional Materials Community Preview

In addition to the instructional materials process noted above, two opportunities were provided to community members inviting them to preview the proposed materials and resources. The two preview sessions were held on Thursday, January 18, 2018, and Tuesday, January 23, 2018. A total of four community members attended. Conversations centered around the structure of the program(s), available reading selections, and the scope and sequence of phonemic awareness. No objections or concerns were noted.

Members of the PK-12 Language Arts Curriculum Planning Committee discussed the results and approved to move them forward as a proposal. Based on the proposal from the PK-12 Language Arts Curriculum Planning Committee, the Educational Services Division is recommending the following instructional materials adoption beginning with the 2018-2019 school year.

Language Arts Instructional Materials Selections		
Preschool Teacher Resources	\$69,278	Primary Resource: <i>Creative Curriculum for Preschool</i>
Elementary School Textbook/Teacher Resources	\$1,720,278	Primary Textbook: K-5 <i>Wonders</i> by McGraw-Hill
	\$70,000	Montessori Materials & Resources
	\$ 140,251	Core Knowledge: K-5 (Disney & Cather) <i>Open Court</i> ; <i>Shurley</i>
Middle School Textbook/Teacher Resources	\$691,194	Primary Textbook: <i>My Perspectives</i> by Pearson
	\$0	Continued use of <i>Literature</i> by McDougal-Littell from the 2009 adoption
High School Textbook/Teacher Resources	\$455,126	<i>Mirrors & Windows</i> by EMC
High School - Honors Courses Textbook/Teacher Resources	\$149,698	<i>Collections</i> by HMH

Digital Resources

K-11 students will have home and school access to the assigned program's online platforms where they will be able to read and annotate the student text, practice skills and strategies, and view media related to the content. In addition, teachers will be able to plan and assign tasks to students, create/modify/administer assessments, and view reports of student achievement.

- *Wonders ConnectEd*
- *Pearson Realize*
- *EMC School Passport*
- *HMH Player*

Supplemental Resources

In addition to the primary resources and digital resources listed above, teacher teams will work this spring and summer to develop writing units and grammar units. These units will be shared digitally with teachers across the district.

Revisions to Approved Frameworks to Support the Middle Level Schedule Change for 2018-2019 and Beyond

This an addendum to each of the related frameworks.

Previous	Revised
Art	
Art 6, 7; required	elective
Business and Information Technology	
Computer Applications 6, 7; required Computational Thinking	Elective Computational Thinking and Coding
Family and Consumer Science	
Childcare, Foods & Nutrition, 6 or 7; required	elective
Integrated Learning Lab 6 or 7; required	elective
Industrial Technology	
Industrial Technology 6, 7; required	elective
Music	
General Music 6, 7; required	elective
Language Arts	
Reading 6, 7, 8; required	Young Adult Literature 6, 7, 8; elective
New	Creative Writing 6, 7, 8; elective
Social Studies	
New	Law and Public Service 6, 7, 8; elective
World Language	
Spanish 6	Spanish A; elective
Spanish 7	Spanish B; elective
Language 8	Spanish C; elective
Spanish I	Spanish II-A; elective
	Spanish II-B; elective

New or revised course descriptions

2652/2752/2852 Young Adult Literature (6, 7, 8)

1 Year

This course is designed with the avid reader in mind! Students will read and familiarize themselves with a wide variety of genres from full novels to short stories, articles, poems, blogs, etc. Each hexter will focus on a new and engaging theme. Similar to a book club, students will share responsibility for facilitating discussion of whole class texts and within smaller literature circles. Emphasis will be placed on independent, active reading and responding to both fiction and nonfiction text.

2656/2756/2856 Creative Writing (6, 7, 8)

1 Hexter

This course is an introduction to creative writing for middle school students who enjoy writing and who want to improve their writing techniques. Students will read mentor texts and write daily. Within different units, writers will experiment with a variety of genre and will share their writing in small groups and potentially with the class.

4602/4702/4802 Law and Public Service (6, 7, 8)

1 Hexter

Students will learn about law and public service. This six week course explores the importance of Civic Responsibility, Legal Services, Law Enforcement Services, Correction Services, Security and Protective Services and Emergency and Fire Management Services within our government.

1618 Spanish A**1 Year**

Students will acquire the vocabulary and structures needed for listening, speaking, reading and writing at an introductory level. Students will learn about and experience cultural practices relating to the Spanish culture. Spanish A is the first year of a three year course to be completed in 8th grade. The course meets on alternate days. Spanish A, Spanish B and Spanish C make up a three year course sequence equivalent to the Spanish I course at the high school.

1718 Spanish B**1 Year**

Students will acquire the vocabulary and structures needed for listening, speaking, reading and writing at an introductory level. Students will learn about and experience cultural practices relating to the Spanish culture. Spanish B is the second year of a three year course to be completed in 8th grade. The course meets on alternate days. Spanish A, Spanish B and Spanish C make up a three year course sequence equivalent to the Spanish I course at the high school.

1818 Spanish C**1 Year**

Students will further develop the vocabulary and structures needed for listening, speaking, reading and writing at an introductory level. Students will learn about and experience cultural practices relating to the Spanish culture. Spanish C is the third year of a three year course sequence. The course meets on alternate days. Spanish A, Spanish B and Spanish C make up a three year course sequence equivalent to the Spanish I course at the high school.

1620 Spanish I-A (KMS/NMS for Aldrich students only)**1 Year**

This course is intended for students who have completed the Spanish sequence at Aldrich Elementary School or an equivalent elementary school Spanish program. The course is offered at KMS and NMS only. Students will acquire the vocabulary and structures needed for listening, speaking, reading and writing at an introductory level. Students will learn about and experience cultural practices relating to the target culture(s). This course begins in sixth grade, meets on alternate days, and will continue with Spanish II-A in seventh grade. Spanish I-A, Spanish II-A, and Spanish II-B constitute a three-year course sequence equivalent to Spanish I and Spanish II taught at the high school.

1722 Spanish II-A**1 Year**

This course is intended for students who have completed the Spanish sequence at Aldrich Elementary School or an equivalent elementary school Spanish program. The course is offered at KMS and NMS only. Students will continue learning vocabulary and developing skills to express themselves. Students will explore culture through a variety of topics. Using listening, speaking, reading and writing skills, students will communicate in the target language. This course meets on alternate days, and will continue with Spanish II-B in eighth grade. Spanish I-A, Spanish II-A, and Spanish II-B constitute a three-year course sequence equivalent to Spanish I and Spanish II taught at the high school.

1826 Spanish II-B**1 Year**

This course is intended for students who have completed the Spanish sequence at Aldrich Elementary School or an equivalent elementary school Spanish program. The course is offered at KMS and NMS only. Students will continue learning vocabulary and developing skills to express themselves. Students will explore culture through a variety of topics. Using listening, speaking, reading and writing skills, students will communicate in the target language. This course meets on alternate days. Spanish I-A, Spanish II-A, and Spanish II-B constitute a three-year course sequence equivalent to Spanish I and Spanish II taught at the high school.