Iowa Core Curriculum
Essential Concepts and Skill Sets of the Iowa Core Curriculum

The Iowa Core Curriculum (also known as Model Core Curriculum) provides local school districts a guide to delivering instructional content that is challenging and meaningful to students. The curriculum identifies the essential concepts and skill sets for literacy, mathematics, science and social studies, as well as 21st century learning skills (civic literacy, financial literacy, technology literacy, health literacy, and employability).

Below are the identified skills and concepts of the Iowa Core Curriculum for grades K-12 (please note that the skills and concepts for social studies and 21st century skills for grades K-8 will be developed later in 2008).

The Iowa Department of Education and its partners have and will continue to provide guidance and assistance to Iowa's school districts and teachers in incorporating these skills and concepts in into their local curriculum.

The goal of the Iowa Core Curriculum is to ensure Iowa students are engaged in rigorous curriculum.

Literacy

Literacy — defined by Meltzer, Smith, and Clark as the ability to read, write, speak, listen, and think effectively — enables students to learn and to communicate clearly about what they know. Being literate gives people the ability to become informed, to inform others, and to make informed decisions (2001). Literacy is synonymous with learning. The integration among reading, writing, speaking, listening, and viewing — connecting with the ever-increasing knowledge base for each content area — provide the means for thinking among and between concepts and ideas. It is an active process.

The Reading, Writing, Speaking, Listening, and Viewing Essential Skills and Concepts found in the Iowa Core Curriculum describe what students should know and be able to do in English language arts at the primary (K–2), intermediate (3–5), middle (6–8), and high school (9–12) levels. The essential skills and concepts described in this document should be considered the focal points for instruction and student learning. The language arts: reading, writing, speaking, listening, and viewing — are different from other content areas because they provide the processes that students use to learn and understand the complex world in which they live. Each discipline has a language and vocabulary of its own. Because of the inclusive nature of language arts, it is critical that these essential literacy concepts and skills be integrated throughout the content areas.

The purpose of this document is to guide school districts in the development of effective literacy curricula. Two fundamental concepts have guided its creation. First, literacy learning is recursive. This means students apply similar language arts skills and concepts at every developmental level as they encounter increasingly complex materials. Therefore, the essential skills and concepts for each level (primary, intermediate, middle, and high school) are very similar. Their implementation at each level will vary by instructional strategies, learning materials, and assessment. As a result, students will build upon and refine their knowledge, and gain sophistication and independence in their use and application of the essential skills and concepts.

Second, although listed separately in the Iowa Core Curriculum, the individual strands of Reading, Writing, Speaking, Listening, and Viewing are intertwined. Each strand links to and supports the other strands. At any time, or at the same time, students may read, write, and view, or speak and listen, to convey meaning. To be learned and used effectively, the processes of reading, writing, speaking, listening, and viewing are best taught in an integrated manner and assessed in the same way.

Primary Elementary Grades

Reading

- Demonstrates an understanding of written language and the relationship of letters and words to the sounds of speech
- Uses multiple decoding strategies to accurately read words in text
- Independently reads a significant number of books and text each year. This reading should include both fiction and nonfiction in a variety of genres
- Reads for a variety of purposes and across content areas
- Uses a variety of skills and strategies to comprehend non-fiction and informational text
- Uses a variety of strategies and skills to comprehend and interpret fiction
- Reads with fluency silently and aloud to support comprehension
- Uses a variety of strategies to develop and expand reading vocabulary

Writing

- Uses an effective writing process
- Uses knowledge of purpose, audience, format and medium in developing written communication
- Applies writing skills and strategies to communicate effectively in a variety of genres with various audiences
- Uses writing as a tool for learning
- Engages in the information literacy process: accesses, evaluates, and communicates information and ideas
- Is able to write on demand
- Adheres to conventions generally established in spelling, punctuation, grammar, usage, syntax and style
- Incorporates technology as a tool to enhance writing

Speaking

- Considers audience and variables in the speaking situation
- Produces a coherent message
- Participates in a variety of communication situations
- Uses appropriate content and conventions for purpose, audience, occasion, and context
- Demonstrates use of presentation skills to communicate
- Participates appropriately in one-on-one situations and group settings
- Recognizes the role of evaluation in oral communication
- Recognizes the role of response in oral communication

Listening

- Listens for information and understanding
- Listens for interpretation, analysis, and evaluation
- Listens to establish, maintain and enhance relationships

Viewing
- Demonstrates an awareness of the effects of visual media on society and culture
- Uses a range of strategies to interpret visual media
- Applies a variety of criteria to evaluate informational media
- Understands how literary forms can be represented in visual narratives

Intermediate Elementary Grades

Reading
- Uses multiple decoding strategies to accurately read words in text
- Independently reads a significant number of books and text each year. This reading should include both fiction and nonfiction in a variety of genres
- Reads for a variety of purposes and across content areas
- Uses a variety of skills and strategies to comprehend non-fiction and informational text
- Uses a variety of strategies and skills to comprehend and interpret fiction
- Reads with fluency silently and aloud to support comprehension
- Uses a variety of strategies to develop and expand reading vocabulary

Writing
- Uses an effective writing process
- Uses knowledge of purpose, audience, format, and medium in developing written communication
- Applies writing skills and strategies to communicate effectively in a variety of genres with various audiences
- Uses writing as a tool for learning
- Engages in the information literacy process: accesses, evaluates, and communicates information and ideas
- Is able to write on demand
- Adheres to conventions generally established in spelling, punctuation, grammar, usage, syntax, and style
- Incorporates technology as a tool to enhance writing

Speaking
- Considers audience and variables in the speaking situation
- Produces a coherent message
- Participates in a variety of communication situations
- Uses appropriate content and conventions for purpose, audience, occasion, and context
- Demonstrates use of presentation skills to communicate
- Participates appropriately in one-on-one situations and group settings
- Recognizes the role of evaluation in oral communication
- Recognizes the role of response in oral communication

Listening
- Listens for information and understanding
- Listens for interpretation, analysis, and evaluation
- Listens to establish, maintain and enhance relationships

Viewing
- Analyzes the effects of visual media on society and culture
- Uses a range of strategies to interpret visual media
- Applies a variety of criteria to evaluate informational media
- Understands how literary forms can be represented in visual narratives

Middle School Level

Reading

- Independently reads a significant number of books and text each year. This reading should include both fiction and nonfiction in a variety of genres
- Reads for a variety of purposes and across content areas
- Uses a variety of skills and strategies to comprehend non-fiction and informational text
- Uses a variety of strategies and skills to comprehend and interpret fiction
- Reads with fluency silently and aloud to support comprehension
- Uses a variety of strategies to develop and expand reading vocabulary

Writing

- Uses an effective writing process
- Uses knowledge of purpose, audience, format, and medium in developing written communication
- Applies writing skills and strategies to communicate effectively in a variety of genres with various audiences
- Uses writing as a tool for learning
- Engages in the information literacy process: accesses, evaluates, and communicates information and ideas
- Is able to write on demand
- Adheres to conventions generally established in spelling, punctuation, grammar, usage, syntax, and style
- Incorporates technology as a tool to enhance writing

Speaking

- Considers audience and variables in the speaking situation
- Produces a coherent message
- Participates in a variety of communication situations
- Uses appropriate content and conventions for purpose, audience, occasion, and context
- Demonstrates use of presentation skill to communicate
- Participates appropriately in one-on-one situations and group settings
- Recognizes the role of evaluation in oral communication
- Recognizes the role of response in oral communication

Listening

- Listens for information and understanding
- Listens for interpretation, analysis, and evaluation
- Listens to establish, maintain and enhance relationships

Viewing

- Analyzes the effects of visual media on society and culture
- Uses a range of strategies to interpret visual media
- Applies a variety of criteria to evaluate informational media
- Understands how literary forms can be represented in visual narratives

High School Level

Reading

- Independently reads a significant number of books and texts each year. This reading should include both fiction and nonfiction in a variety of genres.
- Reads for a variety of purposes and across content areas.
- Uses a variety of skills and strategies to comprehend complex non-fiction and informational text.
- Uses a variety of strategies and skills to comprehend and interpret complex literature.
- Reads with fluency silently and aloud to support comprehension.
- Uses a variety of strategies to understand unfamiliar vocabulary found in narrative text, technical reading, and literary text.

Writing

- Uses an effective writing process.
- Uses knowledge of purpose, audience, format, and medium in developing written communication.
- Applies writing skills and strategies to effectively communicate in a variety of genres with various audiences.
- Uses writing as a tool for learning.
- Engages in the information literacy process: accesses, evaluates, and communicates information and ideas.
- Is able to write on demand.
- Adheres to conventions generally established in spelling, punctuation, grammar, usage, syntax, and style.
- Incorporates technology as a tool to enhance writing.

Speaking

- Considers audience and variables in the speaking situation.
- Produces a coherent message.
- Participates in a variety of communication situations.
- Uses appropriate content and conventions for purpose, audience, occasion, and context.
- Demonstrates control of delivery skills.
- Participates appropriately in one-on-one situations and group settings.
- Recognizes the role of evaluation in oral communication.
- Recognizes the role of response in oral communication.

Listening

- Listens for information and understanding.
- Listens for interpretation, analysis, and evaluation.
- Listens to establish, maintain, and enhance relationships.

Viewing

- Analyzes the effects of visual media on society and culture.
- Uses a range of strategies to interpret visual media.
- Applies a variety of criteria to evaluate informational media.
- Understands how literary forms can be represented in visual narratives.

Mathematics

Recent results of national and international tests show that the United States is facing a crisis in mathematics education. American high school students score near the bottom on the international TIMSS and PISA tests. Analysis of this poor performance shows that the U.S. mathematics curriculum is “a mile wide and an inch deep,” trying to cover too many topics in not enough depth. All Iowa high students must be better prepared in mathematics to successfully compete in the technology-rich, information-dense, global society. To achieve this we must redesign our K-12 mathematics curriculum so that it is focused on providing deep understanding of important mathematics.

In this document we identify the essential skills, content, and characteristics of the world-class mathematics curriculum that Iowa needs. This core curriculum for K-12 school mathematics is based on recommendations from the National Council of Teachers of Mathematics (NCTM, 2000), five years of experience with Iowa’s Every Student Counts mathematics initiative (ESC), and best practices identified from reviews of research conducted by the National Research Council (2001), the International Bureau of Education (2000), the National Council of Teachers of Mathematics (2003), the federal What Works Clearinghouse, and Iowa’s Mathematics Content Network project.

In addition, the essential skills and content recommended in this core curriculum document have been informed by a careful review of many background resources, including the Focal Points for K-8 Mathematics from the National Council of Teachers of Mathematics (NCTM, 2006), the Mathematics Framework for the National Assessment of Educational Progress (NAEP, 2007), mathematics standards recommended by Achieve (2007), mathematics standards recommended by the College Board (2007), ACT core curriculum recommendations (2005), the mathematics curricula of Japan and Singapore, the National Center for the Study of Mathematics Curricula, and recommendations from Iowa’s Core Curriculum Lead Team.

In order to provide effective guidance and technical assistance for Iowa’s schools, this document has drawn from the above resources to identify the essential skills, content, and characteristics of a world-class K-12 mathematics curriculum.

Characteristics of a World-Class Core Curriculum in Mathematics

A world-class mathematics curriculum should have the following essential characteristics:

- Teaching for Understanding
- Problem-Based Instructional Tasks
- Distributed Practice that is Meaningful and Purposeful
- Emphasis on Mathematical Representations
- Focus on Deep Conceptual and Procedural Knowledge
- Rigor and Relevance
- Effective Use of Technology
- Coherent and Connected Content

Essential Skills of a World-Class Core Curriculum in Mathematics

Students need powerful skills to be successful in the globally competitive workforce of the 21st century. Business and industry demand workers who can solve problems, work in teams, and are able to apply learning to new and changing situations, especially as workers change jobs and careers many times in their lifetimes. Therefore, students must acquire powerful, flexible, and widely-applicable mathematical skills by the time they graduate from high school. Many such skills have been discussed in surveys of businesses (e.g., the SCANS report) and in the NCTM Process Standards (NCTM, 2000).

Essential Skills in a World-Class Mathematics Curriculum:

- Problem Solving
- Communication
- Reasoning and Proof
- Ability to Recognize, Make, and Apply Connections
- Ability to Construct and Apply Multiple Connected Representations

Essential Content of a World-Class Core Curriculum in Mathematics

All students should acquire a deep and powerful understanding of mathematics. But which areas and topics of mathematics should be included in the K-8 curriculum? The most telling criticism of the U.S. mathematics curriculum is that it is "a mile wide and an inch deep." We cannot continue to teach too many topics in too little depth. Long lists of recommended topics are symptomatic of and serve to exacerbate this problem. In order to provide effective guidance to Iowa's elementary and middle schools, this document identifies essential mathematical strands and essential focal points in each strand. The emphases for these grade strands will vary within and between the grade bands. For instance, Number and Operations will receive greater emphasis in K-2 and less instructional time in 6-8.

Essential Mathematical Strands in a World-Class High School Mathematics Curriculum:

- Number and Operations
- Algebra
- Geometry and Measurement
- Data Analysis and Probability

Primary Elementary Grades

Number and Operations

- Count, represent, read, compare, order and conserve whole numbers
- Develop understandings of addition and subtraction and strategies for basic addition facts and related subtraction facts
- Express numbers as equivalent representations to fluently compose and decompose numbers (putting together and taking apart)
- Develop fluency and quick recall of addition facts and related subtraction facts and fluency with multi-digit addition and subtraction
- Estimate the answer to an addition or subtraction problem before computing, and determine whether the computed answer makes sense
- Develop an understanding of whole number relationships, including grouping in tens and ones and apply place-value concepts
- Understand fractional parts are equal shares or equal portions of a whole unit (a unit can be an object or a collection of things)

Algebra

- Recognize, describe, create and extend repeating and growing patterns such as physical, geometric and numeric patterns and translate from one representation to another
- Sort, classify, and order objects by size, number and other properties
- Demonstrate the use of the commutative and associative properties and mathematical reasoning to solve for the unknown quantity in addition and subtraction problems; justify the solution
- Understand equality as meaning “the same as” and use the = symbol appropriately

Geometry

- Recognize and describe shapes and structures in the physical environment
- Compose and decompose geometric shapes, including plane and solid figures to develop a foundation for understanding area, volume, fractions, and proportions
- Identify, name, sort, and describe two- and three- dimensional geometric figures regardless of size or orientation
- Describe and specify space and location with simple relationships and with coordinate systems
- Experience and recognize slides, flips, turns and symmetry to analyze mathematical situations
- Use attributes of geometric figures to solve spatial problems

Measurement

- Identify attributes that are measurable, such as length, weight, time and capacity, and use these attributes to order objects and make direct comparisons
- Estimate, measure and compute measurable attributes while solving problems
- Estimate and measure length using standard (customary and metric) and non-standard units with comprehension

Data Analysis

- Collect, sort, organize, and represent data to ask and answer questions relevant to the K-2 environment
- Compare different representations of the same data using these types of graphs: bar graphs, frequency tables, line plots, and picture graphs
- Use information displayed on graphs to answer questions and make predictions, inferences and generalizations such as likely or unlikely events

Intermediate Elementary Grades

Number and Operations

- Develop an understanding of multiplication and division concepts and strategies for basic multiplication facts and related division facts
- Develop fluency and quick recall of multiplication facts and related division facts and fluency with multi-digit multiplication and division
- Develop the ability to estimate the results of computation with whole numbers, fractions or decimals and be able to judge reasonableness
- Extend place value concepts to represent and compare both whole numbers and decimals
- Use benchmarks to help develop number sense
- Develop an understanding of commonly used fractions, decimals, and percents, including recognizing and generating equivalent representations
- Develop an understanding of and fluency with addition and subtraction of fractions and decimals

Algebra

- Represent and analyze patterns and relationships involving multiplication and division to introduce multiplicative reasoning
- Identify the commutative, associative, and distributive properties and use them to compute with whole numbers
- Understand and apply the idea of a variable as an unknown quantity and express mathematical relationships using equations
- Represent and analyze patterns and functions, using words, tables, and graphs

Geometry and Measurement

- Describe, analyze and classify two-dimensional and three-dimensional shapes
- Explore congruence and similarity
- Predict and describe the results of sliding (translation), flipping (reflection), and turning (rotation) two-dimensional shapes
- Use ordered pairs on a coordinate grid to describe points or paths (first quadrant)
- Use geometric models to solve problems, such as determining perimeter, area, volume, and surface area
- Select and apply appropriate standard (customary and metric) units and tools to measure length, area, volume, weight, time, temperature, and the size of angles
- Select and use benchmarks (1/2 inch, 2 liters, 5 pounds, etc.) to estimate measurements

Data Analysis and Probability

- Represent and analyze data using tallies, pictographs, tables, line plots, bar graphs, circle graphs and line graphs
- Describe the distribution of the data using mean, median, mode or range
- Propose and justify conclusions and predictions based on data
- Predict the probability of simple experiments and test the predictions
- Describe events as likely or unlikely and discuss the degree of likelihood using words like certain, equally likely and impossible

Middle School

Number and Operation

- Understand, apply, and be computationally fluent with multiplication and division of fractions and decimals
- Understand, apply, and be computationally fluent with rational numbers, including negative numbers
- Understand and apply ratio and rate, including percents, and connect ratio and rate to fractions and decimals
- Understand and apply proportional reasoning
- Understand, estimate, and represent real numbers, including common irrational numbers and use of scientific notation

Algebra

- Write, interpret, and use mathematical expressions, find equivalent forms, and relate such symbolic representations to verbal and tabular representations
- Understand and apply proportionality
- Understand, solve, and apply linear equations and inequalities
- Understand and apply linear functions
- Use tables and graphs to analyze systems of linear equations

Geometry and Measurement

- Understand, determine, and apply area of polygons
- Understand and apply similarity, with connections to proportion
- Understand, determine, and apply surface areas and volume of prisms and cylinders and circumference and area of circles
- Analyze two-dimensional space and figures by using distance, angle, coordinates, and transformations
- Visualize, represent, and describe three-dimensional shapes

Data Analysis and Probability

- Understand, interpret, determine, and apply measures of center and graphical representations of data
- Understand and represent simple probabilistic situations
- Use proportions and percentages to analyze data and chance
- Analyze and summarize data sets, including initial analysis of variability
- Understand, compute, and estimate simple probabilities using counting strategies and simulation

High School

Algebra

- Understands, analyzes, represents, and applies functions.
- Understands, analyzes, solves, and applies equations and inequalities.
- Understands, analyzes, transforms, and applies algebraic expressions.
- Understands, analyzes, approximates, and interprets rate of change.
- Understands and applies recursion and iteration*.

**Recursion* and *iteration* are used to represent and solve problems related to sequential change. Sequential change is step-by-step change, such as population change year-by-year. *Recursion* is the method of describing a given step in a sequence in terms of previous steps. *Iteration* is the process of repeating the same procedure or computation over and over again.

Geometry

- Represents and solves geometric problems by specifying locations using coordinates.
- Understands and applies the basic principles of transformational geometry.
- Understands and applies properties and relationships of geometric figures.
- Uses trigonometry based on triangles and circles to solve problems about length and angle measures.
- Uses diagrams consisting of vertices and edges (vertex-edge graphs) to model and solve problems.

Statistics and Probability

- Understands and interprets descriptive statistics.
- Understands and interprets inferential statistics.
- Understands and applies the basic ideas of probability.

Quantitative Literacy

- Understands and applies number operations and properties.
- Understands and applies the basic mathematics of decision making in a democratic society *(social decision making*).*
- Understands and applies the basic mathematics of information processing and the Internet *(informatics**).*
- Understands and applies the mathematics of systematic counting *(combinatorics**).*

*Social decision-making includes the basic mathematics of voting and elections, apportionment, and fair division.
**Definition will be added.

Problem Solving

- Builds new mathematical knowledge through problem solving.
- Applies and adapts a variety of appropriate strategies to solve problems in mathematics and other contexts.
- Monitors and reflects on the process of mathematical problem solving.

Communication (Reading, Writing, Speaking, Listening, Viewing)

- Organizes and consolidates his/her mathematical thinking through communication.
- Communicates his/her mathematical thinking coherently and clearly to peers, teachers, and others.
- Analyzes and evaluates the mathematical thinking and strategies of others.
- Uses the language of mathematics to express mathematical ideas precisely.

Reasoning and Proof

- Recognizes reasoning and proof as fundamental aspects of mathematics.
- Makes and investigates mathematical conjectures.
- Develops and evaluates mathematical arguments and proofs.
- Selects and uses various types of reasoning and methods of proof.

Representation

- Creates and uses representations to organize, record, and communicate mathematical ideas.
- Selects, applies, and translates among mathematical representations to solve problems.
- Uses representations to model and interpret physical, social, and mathematical phenomena.

Connections

- Recognizes and uses connections among mathematical ideas and how they build on one another to produce a coherent whole.
- Recognizes and applies mathematics in contexts outside of mathematics.

Science

The Iowa Science Core Curriculum is a framework of science concepts and skills. This document provides a scaffold upon which each district will develop grade level expectations. The vision is that all Iowa students will have access to this common core and that individual districts will decide how they will extend this core to meet the needs of their students.

The committee used international, national, and state level documents in this process. The final core concepts and skills are drawn from the respected work of the National Research Council's (NRC) National Science Education Standards (NSES). This document is framed upon the four content categories (Science as Inquiry; Physical Science; Earth and Space Science; and Life Science). The remaining categories (Science and Technology; Science in Personal and Social Perspectives; and The History and Nature of Science) address the application of knowledge and should be integrated throughout the content categories.

For this core to become viable, teachers will need to be aware of and effectively use research-based, best practice instructional strategies. The Iowa Content Network - http://www.iowa.gov/educate/prodev/main.html scrutinizes research in instruction and learning. This research base provided the impetus for the Every Learner Inquires (ELI) initiative. The purpose of ELI is to establish a learning community among Iowa teachers as they utilize best practices (such as learning cycles) to help students become more scientifically literate. ELI is a state-wide teaching and learning initiative that will improve Iowa students' access to this core of science concepts and skills. These two Department of Education programs should work hand-in-hand to help students attain the scientific literacy necessary for success in the 21st century.

Primary Elementary Grades

Science as Inquiry
- Ask questions about objects, organisms, and events in the environment
- Plan and conduct simple investigations
- Use tools to gather data and extend the senses
- Use mathematics in scientific inquiry
- Use data to construct reasonable explanations
- Communicate investigations and explanations orally, in writing or through drawings
- Follow appropriate safety procedures when conducting investigations

Earth and Space Science
- Apply and understand properties of earth materials
- Apply and understand observable information about daily and seasonal weather conditions
- Apply and understand events around us that have repeating patterns including the seasons of the year, day and night

Life Science
- Apply and understand the characteristics of living things and how living things are both similar to and different from each other and from non-living things
- Apply and understand life cycles of plants and animals
- Apply and understand the basic needs of plants and animals and how they interact with each other and their physical environment
- Apply and understand ways to help take care for the environment
- Apply and understand fundamental human body parts and their functions
- Apply and understand good health habits

Physical Science
- Understand and apply observable and measurable properties of objects
- Understand and apply characteristics of liquids and solids
- Understand and apply the positions and motions of objects

Intermediate Elementary Grades

Science as Inquiry
- Generate questions that can be answered through scientific investigations
- Recognize that scientists perform different kinds of investigations
- Plan and conduct scientific investigations
- Use appropriate tools and techniques to gather, process, and analyze data
- Incorporate mathematics in science inquiries
- Use evidence to develop reasonable explanations
- Communicate scientific procedures and explanations
- Follow appropriate safety procedures when conducting investigations

Earth and Space Science
- Understand and demonstrate knowledge of properties and uses of earth materials
- Understand and demonstrate knowledge of processes and changes on or in the earth's land, oceans, and atmosphere
- Understand and demonstrate knowledge of fossils and the evidence they provide of past life on earth
- Understand and demonstrate knowledge of weather and weather patterns

- Understand and demonstrate knowledge of the properties, movements, and locations of objects in our solar system

Life Science
- Understand and demonstrate knowledge of structures, characteristics, and adaptations of organisms that allow them to function and survive within their habitats
- Understand and demonstrate knowledge of how individual organisms are influenced by internal and external factors
- Understand and demonstrate knowledge of the relationships among living and non-living factors in terrestrial and aquatic ecosystems
- Understand and demonstrate knowledge of environmental stewardship
- Understand and demonstrate knowledge of basic human body systems and how they work together
- Understand and demonstrate knowledge of personal health and wellness issues

Physical Science
- Understand and demonstrate knowledge of how to describe and identify substances based on characteristic properties
- Understand and demonstrate knowledge of states of matter and changes in states of matter
- Understand and demonstrate knowledge of the concept of conservation of mass/matter
- Understand and demonstrate knowledge of the characteristic properties of sound, light, electricity, magnetism, and heat

Understand and demonstrate knowledge of how forces are related to an object's motion

Middle School

Science as Inquiry
- Generate questions that can be answered through scientific investigations
- Design and conduct different kinds of scientific investigations
- Understand that different kinds of questions suggest different kinds of scientific investigations
- Select and use appropriate tools and techniques to gather, analyze and interpret data
- Incorporate mathematics in scientific inquiry
- Use evidence to develop descriptions, explanations, predictions, and models
- Think critically and logically to make the relationships between evidence and explanations
- Recognize and analyze alternative explanations and predictions
- Communicate and defend procedures and explanations
- Use appropriate safety procedures when conducting investigations

Earth and Space Science
- Understand and demonstrate knowledge of the structure of the earth system and the processes that change the earth and its surface
- Understand and demonstrate knowledge of the water cycle, including consideration of events that impact groundwater quality
- Understand and demonstrate knowledge of our earth's history based on physical evidence
- Understand and demonstrate knowledge of the earth's atmospheric properties and how they influence weather and climate
- Understand and demonstrate knowledge of the components and predictable patterns of our solar system

Life Science

- Understand and demonstrate knowledge of the basic components and functions of cells, tissues, organs, and organ systems
- Understand and demonstrate knowledge of how different organisms pass on traits
- Understand and demonstrate knowledge of the complementary nature of structure and function and the commonalities among diverse organisms
- Understand and demonstrate knowledge of the interdependency of organisms, changes in environmental conditions, and survival of individuals and species
- Understand and demonstrate knowledge of the cycling of matter and energy through ecosystems
- Understand and demonstrate knowledge of the social and personal implications of environmental issues
- Understand and demonstrate knowledge of the functions and interconnections of the major human body systems including the breakdown in structure or function that disease causes

Physical Science

- Understand and demonstrate knowledge of elements, compounds, mixtures, and solutions based on the nature of their physical and chemical properties
- Understand and demonstrate knowledge of physical and chemical changes and their relationship to the conservation of matter and energy
- Understand and demonstrate knowledge of forms of energy and energy transfer
- Understand and demonstrate knowledge of motions and forces

High School

Science as Inquiry

- Identifies questions and concepts that guide scientific investigations.
- Designs and conducts scientific investigations.
- Uses technology and mathematics to improve investigations and communications.
- Formulates and revises scientific explanations and models using logic and evidence.
- Recognizes and analyzes alternative explanations and models.
- Communicates and defends a scientific argument.
- Understands about scientific inquiry.

Earth and Space

- Understands and applies knowledge of energy in the earth system.
- Understands and applies knowledge of Geochemical cycles.
- Understands and applies knowledge of the origin and evolution of the earth system.
- Understands and applies knowledge of the origin and evolution of the universe.

Life Science

- Understands and applies knowledge of the cell.
- Understands and applies knowledge of the molecular basis of heredity.
- Understands and applies knowledge of biological evolution.
- Understands and applies knowledge of the inter-dependence of organisms.
- Understands and applies knowledge of matter, energy, and organization in living systems.
- Understands and applies knowledge of the behavior of organisms.

Physical Science

- Understands and applies knowledge of the structure of atoms.
- Understands and applies knowledge of the structure and properties of matter.
- Understands and applies knowledge of chemical reactions.
- Understands and applies knowledge of motions and forces.
- Understands and applies knowledge of conservation of energy and increase in disorder.
- Understands and applies knowledge of interactions of energy and matter.

Social Studies

Social studies is the integrated study of the social sciences and humanities to promote civic competence. Within the school program, social studies provides coordinated, systematic study drawing upon such disciplines as anthropology, archaeology, economics, geography, history, law, philosophy, political science, psychology, religion, and sociology, as well as appropriate content from the humanities, mathematics, and natural sciences. The primary purpose of social studies is to help young people develop the ability to make informed and reasoned decisions for the public good as citizens of a culturally diverse, democratic society in an interdependent world.

Definition of Social Studies
National Council for the Social Studies (NCSS)

The founders of our country emphasized that the vitality and security of a democracy depends upon the education and willingness of its citizens to participate actively in society. This level of participation requires civic competence. In other words, it is imperative that our future generations gain an understanding of the core concepts of Social Studies. The United States and its democratic system are continually changing which creates varying social circumstances. As a result, citizens need to adapt to such changes in order to sustain vital democratic traditions. Meeting this need is the mission of the social studies.

In social studies, students develop knowledge, skills and dispositions including but not limited to:

- basic knowledge and ways of thinking drawn from many academic disciplines
- expressing ideas in written form
- reading reflectively and critically
- analyzing their own and others' opinions on social issues
- becoming motivated to participate in civic and community life as active and informed citizens

As we work to carry on the ideals of the founders we are compelled to revisit our fundamental beliefs and institutions and to construct new social contexts and relationships. The Iowa Social Studies Core Curriculum reflects the belief that the informed social studies student comprehends and applies to personal and public experiences the core content perspectives of the many academic fields of the social studies. Our entire social experiences, as well as our republic, are established upon the principles of individual citizenship. Therefore, it is necessary that attention be paid to the education of those future citizens.

For that reason, the Iowa Social Studies Core Curriculum has been structured around five core social studies content areas. They are:

- Behavioral Sciences
- Economics
- Geography
- History
- Political Science/Civic Literacy

For each area, knowledge and skills have been identified and defined in terms of detailed understandings that students should be able to apply. It is of key importance that students possess the knowledge and skills associated with the economic, political, and social forces that make up the human systems in which they live. In addition, they must possess the historical knowledge, which created the spatial, temporal and cultural perspectives present in our world.

This document is premised upon a rigorous and relevant K-12 social studies program. Engaging students in the pursuit of active informed citizenship will require a broad range of understandings and skills. It will also require an articulated curriculum which connects students to the social world through informed instructional experiences led by teachers who are committed to active civic participation. This document represents a bold step toward a vision of social and civic literacy for all of Iowa's students.

Primary Elementary Grades – Being Developed
Intermediate Elementary Grades – Being Developed
Middle School Level – Being Developed

High School

Behavioral Sciences

- Understand the historical development of the behavioral sciences and the changing nature of society
- Understand the influences on individual and group behavior and group decision making
- Understand the appropriate research procedures and skills of the behavioral scientist
- Understand current social issues to determine how the individual is able to formulate opinions and responds to those issues
- Understand how social status, social groups, social change and social institutions influence individual and group behaviors
- Understand the process of how humans develop, learn, adapt to their environment, and internalize their culture
- Understand how personality and agents of socialization impact the individual

Economics

- Understand the function of common financial instruments
- Understand the role of scarcity and economic trade-offs
- Understand the functions of economic institutions
- Understand how governments influence economic behavior
- Understand how universal economic concepts present themselves in various types of economies
- Understand the local, state, regional, national and international factors that create patterns of interdependence in the global economy
- Understand the impact of advancing technologies on the global economy

Geography

- Understand the use of geographic tools to locate and analyze information about people, places, and environments
- Understand how physical and human characteristics create and define regions
- Understand how human factors and the distribution of resources affect the development of society and the movement of populations
- Understand how physical and human processes shape the earth's surface and major ecosystems
- Understand how human actions modify the environment and how the environment affects humans
- Understand how culture affects the interaction of human populations through time and space
- Understand how cultural factors influence the design of human communities

History

- Understand historical patterns, periods of time and the relationships among these elements
- Understand how and why people create, maintain or change systems of power, authority, and governance
- Understand the role of culture and cultural diffusion on the development and maintenance of societies
- Understand the role of individuals and groups within a society as promoters of change or the status quo
- Understand the effect of economic needs and wants on individual and group decisions
- Understand the effects of geographic factors on historical events
- Understand the role of innovation on the development and interaction of societies
- Understand cause and effect relationships and other historical thinking skills in order to interpret events and issues

Political Science/Civic Literacy

- Understand the rights and responsibilities of each citizen and demonstrate the value of lifelong civic action
- Understand how the government established by the Constitution embodies the enduring values and principles of democracy and republicanism
- Understand the purpose and function of each of the three branches of government established by the Constitution
- Understand the differences among the complex levels of local, state and national government and their inherent, expressed and implied powers
- Understand strategies for effective political action that impacts local, state and national governance
- Understand how law and public policy are established at the local, state and national levels
- Understand how various political systems throughout the world define the rights and responsibilities of the individual
- Understand the role of the United States in current world affairs

21st Century Skills

As each Iowa student is provided access to essential concepts and meaningful learning experiences in the core academic content areas, it is imperative that we also look to 21st century skills to build capacity in students so they are prepared to lead productive, satisfying lives. According to Ken Kay, president of the Partnership for 21st Century Skills, the 21st century skills set "is the ticket to economic upward mobility in the new economy" (Gewertz, 2007). Business and industry is providing a very clear message that students need the skills to "work comfortably with people from other cultures, solve problems creatively, write and speak well, think in a multidisciplinary way, and evaluate information critically. And they need to be punctual, dependable, and industrious." (Gewertz, 2007).

The Framework for 21st Century Learning stated, "We believe schools must move beyond a focus on basic competency in core subjects to promoting understanding of academic content at much higher levels by weaving 21st century interdisciplinary themes into core subjects" (2007). 21st century skills bridge the knowledge, skills, and dispositions of students from the core academic areas to real life application.

"The primary aim of education is not to enable students to do well in school, but to help them do well in the lives they lead outside of the school."

-Ray McNulty, ICLE
Iowa High School Summit, December 10, 2007

Descriptions of the new global reality are plentiful, and the need for new, 21st century skills in an increasingly complex environment is well documented. In one form or another, authors cite (1) the globalization of economics; (2) the explosion of scientific and technological knowledge; (3) the increasingly international dimensions of the issues we face, i.e. global warming and pandemic diseases; and (4) changing demographic as the major trends that have resulted in a future world much different from the one that many of us faced when we graduated from high school (Friedman, 2005 and Stewart, 2007). The trends are very clear that each Iowa students will need essential 21st century skills to lead satisfying lives in this current reality.

Descriptions of what constitute essential 21st century skills are plentiful as well. In the 2007 session, the Iowa Legislature established the Iowa 21st century framework as:

1. employability skills
2. financial literacy
3. health literacy
4. technology literacy

Within this 21st century skill framework are the common strands of learning and innovation; communication, information, and technology; and, life and career skills.

The development of the Iowa 21st century essential concepts and skills was a collaborative process engaging the expertise of p – 16 educators, business, and industry representatives. Sources used for this work included the 1991 SCANS report, What Work Requires of Schools, and Framework for 21st Century Learning, from the Partnership for 21st Century Skills. The committee surveyed the literature and endeavored to bring together the common elements of these frameworks. The members have outlined the concepts, dispositions and habits of mind believed essential for success in the 21st century.

The reality of building capacity for the 21st century is that we do not know what the work of the future will be like (Darling-Hammond, 2007) or how technology will influence health and financial

issues. The challenge is to prepare students to think critically, to engage in mental activity, or habits of mind, that "…use facts to plan, order, and work toward an end; seek meaning or explanations; are self-reflective; and use reason to question claims and make judgments…" (Noddings, 2008). It may be that our task is not only to prepare students to "fit into the future" but to shape it. "…If the complex questions of the future are to be determined… by human beings…making one choice rather than another, we should educate youths - all of them - to join in the conversation about those choices and to influence that future…" (Meier, 2008)

Primary Elementary Grades – Being Developed
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High School

Financial Literacy

- Demonstrate financial responsibility and planning skills to achieve financial goals for a lifetime of financial health
- Manage money effectively by developing spending plans and selecting appropriate financial instruments to maintain positive cash flow
- Make informed and responsible decisions about incurring and repaying debt to remain both creditworthy and financially secure
- Evaluate and identify appropriate risk management options, including types of insurance, non-insurance, and identity protection
- Assess the value, features, and planning processes associated with savings, investing, and asset building, and apply this knowledge to achieve long-term financial security with personal and entrepreneurial goals in a global market
- Understand human, cultural, and societal issues related to financial literacy, and practice legal and ethical behavior

Health Literacy

- Demonstrate functional health literacy skills to obtain, interpret, understand and use basic health concepts to enhance personal, family, and community health
- Synthesize interactive literacy and social skills to establish and monitor personal, family and community goals related to all aspects of health
- Apply critical literacy/thinking skills related to personal, family and community wellness
- Use media literacy skills to analyze media and other influences to effectively manage health risk situations and advocate for self and others
- Demonstrate behaviors that foster healthy, active lifestyles for individuals and the benefit of society

Technology Literacy

- Demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology
- Use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others
- Apply digital tools to gather, evaluate, and use information
- Demonstrate critical thinking skills using appropriate tools and resources to plan and conduct research, manage projects, solve problems and make informed decisions
- Understand human, cultural, and societal issues related to technology, and practice legal and ethical behavior
- Demonstrate a sound understanding of technology concepts, systems and operations

Employability

- Communicate and work productively with others, incorporating different perspectives and cross cultural understanding, to increase innovation and the quality of work
- Adapt to various roles and responsibilities and work flexibly in climates of ambiguity and changing priorities
- Demonstrate leadership skills, integrity, ethical behavior, and social responsibility while collaborating to achieve common goals
- Demonstrate initiative and self-direction through high achievement and lifelong learning while exploring the ways individual talents and skills can be used for productive outcomes in personal and professional life
- Demonstrate productivity and accountability by meeting high expectations