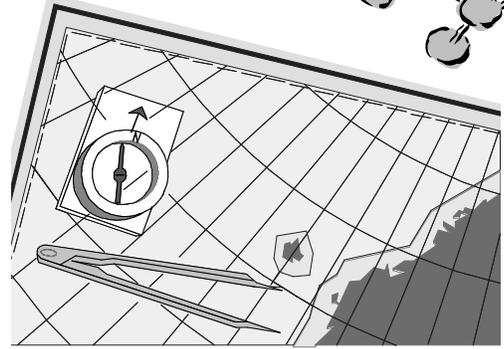
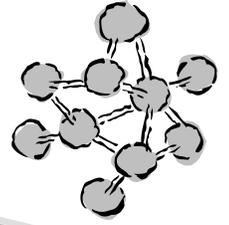


# 7th Grade Curriculum Parent Guide

Raymond School



## Welcome to Seventh Grade

Curriculum performance standards were developed for each grade level that will lead students to specific eighth grade academic goals. By the end of grade eight, students will read and respond to a wide range of writing to build an understanding of written materials, of themselves, and of others.

In the language arts, students will learn to read, interpret, and critically analyze literature; read and discuss literary and nonliterary texts to understand human experiences; read to acquire information; and create or produce writing to communicate with different audiences for a variety of purposes. Students will plan, revise, edit, and publish clear and effective writing; understand the function of various forms, structures, and punctuation marks of standard improving communication in American English and use them appropriately in communications. Students will learn to orally communicate information, opinions, and ideas effectively to different audiences for a variety of purposes. They will participate effectively in discussions and develop their vocabulary and ability to use words, phrases, idioms, and various grammatical structures as a means of improving communication. They will recognize and interpret various uses and adaptations of language in social, cultural, regional, and professional situations, and learn to be flexible and responsive in their use of English.

Students will also use computers to acquire, organize, analyze, and communicate information; make informed judgments about media and products; create media products appropriate to audience and purpose; demonstrate a working knowledge of media production and distribution; and analyze and edit media work as appropriate to audience and purpose. Students will conduct research and inquiry on self-selected or assigned topics, issues, or problems and use an appropriate form to communicate their findings.

In social studies, students gain geographical perspectives on the world by studying the earth and the interactions of people with places where they live, work and play. Knowledge of geography helps students to address the various cultural, economic, social and civic implications of life in earth's many environments. In Wisconsin schools, the content, concepts and skills related to geography may be taught in units and courses that deal with geography, history, global studies, anthropology, sociology, psychology, current events and world religions.

Students will learn about the history of Wisconsin, the United States and the world, examining change and continuity over time in order to develop historical perspective, explain historical relationships and analyze issues that affect the present and the future. Reconstructing and interpreting historical events provides a needed perspective in addressing the past, the present and the future. Students will learn about political science and acquire the knowledge of political systems necessary for developing individual civic responsibility by studying the history and contemporary uses of power, authority and governance. Students will learn about production, distribution, exchange and consumption so that they can make informed economic decisions.

Students in Wisconsin will learn about the behavioral sciences by exploring concepts from the discipline of sociology, the study of the interactions among individuals, groups and institutions; the discipline of psychology, the study of factors that influence individual identity and learning; and the discipline of anthropology, the study of cultures in various times

and settings. Learning about the behavioral sciences helps students to understand people in various times and places. By examining cultures, students are able to compare our ways of life and those of other groups of people in the past and present.

Students in Wisconsin will draw upon a broad body of mathematical knowledge and apply a variety of mathematical skills and strategies, including reasoning, oral and written communication and the use of appropriate technology, when solving mathematical, real-world and non-routine problems. In order to participate fully as a citizen and a worker in our contemporary world, a person should be mathematically powerful. Mathematical power is the ability to explore, to conjecture, to reason logically and to apply a wide repertoire of methods to solve problems. People use numbers to quantify, describe and label things in the world around them. It is important to know the many uses of numbers and various ways of representing them. Number sense is a matter of necessity, not only in one's occupation but also in the conduct of daily life, such as shopping, cooking, planning a budget or analyzing information provided by the media.

Students will be able to use geometric concepts, relationships and procedures to interpret, represent and solve problems. Geometry and its study of shapes and relationships is an effort to understand the nature and beauty of the world. Students will also select and use appropriate tools (including technology) and techniques to measure things to a specified degree of accuracy. They will use measurements in problem-solving situations. Measurement is the foundation upon which much technological, scientific, economic and social inquiry rests. Dramatic advances in technology have launched the world into the Information Age, where data are used to describe past events or predict future events. Whether in the business place or in the home, as producers or consumers of information, citizens need to be well versed in the concepts and procedures of data analysis in order to make informed decisions.

Students discover, describe and generalize simple and complex patterns and relationships. In the context of real-world problem situations, the student will use algebraic techniques to define and describe the problem to determine and justify appropriate solutions.

## Language Arts

### Reading/Literature

- ♦ Determine meaning using context, syllabication, word origins, roots and affixes
- ♦ Use visual images to understand and clarify the meaning of text
- ♦ Develop and explain system for learning vocabulary in other subjects
- ♦ Apply reading strategies in other subjects for purposes such as study, research, review, and enjoyment
- ♦ Write, outline, and summarize complete and accurate notes for specific purposes
- ♦ Skim, scan, and apply organizational pattern, format, and visual keys to aid understanding
- ♦ Use underlining, highlighting, margin notes, and stickies to aid comprehension
- ♦ Use word histories to determine word meaning
- ♦ Use headings, bold print, pictures, graphics, and chronology to increase comprehension
- ♦ Establish reading and writing habits through positive modeling by adults
- ♦ Identify the defining features and structure of literary texts such as conflict, representation of character, and point of view
- ♦ Analyze the effect of character, plot, setting, language, topic style, purpose, and point of view on the overall impact of literature
- ♦ Draw on a broad base of knowledge about the genres of literature, such as the structure and conventions of essays, epics, fables, myths, plays, poems, short stories, and novels, when interpreting the meaning of a literary work
- ♦ Develop criteria to evaluate literary merit and explain critical opinions about a text, informally in conversation or formally in a well-organized speech or essay
- ♦ Evaluate the characteristics of fictional and nonfictional genres such as fables, myths, plays, poems, short stories, and novels
- ♦ Identify conflict, character, and point of view in each genre
- ♦ Analyze the effect of character, plot, setting, language, style, purpose, and point of view on the overall impact of literature
- ♦ Analyze use of flashback, foreshadowing, symbolism, and figurative language
- ♦ Use prior knowledge to interpret fables and folk tales
- ♦ Evaluate literary merit and explain critical opinions about a text, orally and in writing
- ♦ Develop criteria to evaluate literary merit of non-fiction and fiction material

- ♦ Explain opinions about a text in a speech or in writing
- ♦ Provide interpretive responses, orally and in writing, to literary and non-literary texts representing the diversity of American cultural heritage and cultures of the world
- ♦ Identify common historical, social, and cultural themes and issues in literary works and selected passages
- ♦ Draw on a broad base of knowledge about the themes, ideas, and insights found in classical literature while reading, interpreting, and reflecting on contemporary texts
- ♦ Evaluate the themes and main ideas of a world considering its audience and purpose
- ♦ Interpret literary and non-literary texts, orally and in writing
- ♦ Identify, analyze, and evaluate characterization methods in literary and non-literary texts
- ♦ Analyze the plots of essays, epics, myths, plays, poems, short stories, and novels
- ♦ Analyze the effect of character, plot, setting, style, purpose, and point of view on readers
- ♦ Evaluate the geographical, cultural, and historical settings of essays, epics, fables, myths, plays poems, short stories, and novels
- ♦ Analyze the effect of geographical, cultural, and historical setting on characters, plot, setting, language, style, purpose, and point of view
- ♦ Defend interpretive responses to texts representing American and world cultures
- ♦ Synthesize themes, ideas, and insights while interpreting literary and non-literary texts
- ♦ Apply cause and effect to real-life action and consequences
- ♦ Interpret and use charts, tables, timelines, and manuals in paper and electronic form
- ♦ Use technological resources to gather, organize, and present information
- ♦ Compare, contrast, and evaluate the accuracy and usefulness of information from print and audio sources
- ♦ Explain information, main ideas, and organization of various informational sources
- ♦ Identify and compare the facts found in documents, narratives, charts, tables and other sources

## Writing

- ♦ Write a coherent and complete expository piece, with sufficient detail to fulfill its purpose, sufficient evidence to support its assertions, language appropriate for its intended audience, and organization achieved through clear coordination and subordination of ideas
- ♦ Write a well-organized persuasive piece that includes a clear position, a discernible tone, and a coherent argument with reliable evidence
- ♦ Write a well-organized narrative based on experience that uses descriptive language and detail, presents a sequence of events, and reveals a theme
- ♦ Write clear and pertinent responses to verbal or visual material that communicate, explain, and interpret the reading or viewing experience to a specific audience
- ♦ Write creative fiction that includes major and minor characters, a coherent plot, effective imagery, descriptive language, and concrete detail
- ♦ Write in a variety of situations and adapt strategies, such as revision, technology, and the use of reference materials, to the situation
- ♦ Use a variety of writing technologies including pen and paper as well as computers
- ♦ Write for a variety of readers, including peers, teachers, and other adults, adapting content, style, and structure to audience and situation
- ♦ Write a five-paragraph expository piece using statistics and examples as supportive evidence and details
- ♦ Write an expository piece using language with clear coordination and subordination of ideas
- ♦ Write persuasive essays in response to real issues
- ♦ Write a five-paragraph persuasive piece establishing a clear position and three coherent arguments and reliable evidence and a discernible tone
- ♦ Write a personal narrative in correct sequence with a beginning, middle, and end
- ♦ Write narrative pieces following a specific theme with sufficient detail and descriptive language
- ♦ Write creative fiction with major and minor characters, a strong plot, concrete details, descriptive language, and imagery
- ♦ Write responses to verbal or visual material that communicate, explain, and analyze the material
- ♦ Write in timed and untimed situations for different purposes and audiences using technology and reference materials
- ♦ Write using pencil and paper as well as technology
- ♦ Produce multiple drafts, including finished pieces, that demonstrate the capacity to generate, focus, and organize

ideas and to revise the language, organization, content, and tone of successive drafts in order to fulfill a specific purpose for communicating with a specific audience

- ♦ Identify questions and strategies for improving drafts in writing conferences with a teacher
- ♦ Given a writing assignment to be completed in a limited amount of time, produce a well-developed, well organized, and effective response in correct English and an appropriate voice.
- ♦ Produce drafts and finished pieces that generate, focus, and organize ideas and revise language, organization, content, and tone
- ♦ Identify questions and strategies for improving drafts in writing conferences with a teacher
- ♦ Produce a well developed, organized, effective response in appropriate voice in a limited time
- ♦ Understand the use of words, phrases, and clauses in written language
- ♦ Use coordinate and subordinate conjunctions, relative pronouns, and comparative adjectives
- ♦ Use correct tenses to indicate the order of events
- ♦ Use principles of agreement for subject-verb, pronoun-noun, and preposition-pronoun
- ♦ Punctuate compound, complex, and compound-complex sentences
- ♦ Employ the conventions of capitalization
- ♦ Spell words correctly and use effective strategies to spell unfamiliar words

## Oral Language

- ♦ Share impromptu remarks related to the context of the discussion
- ♦ Speaking from notes or an outline, relate an experience in descriptive detail, with appropriate timing and decorum
- ♦ Construct and communicate a position based on opinion, facts, and data
- ♦ Interview a community member to obtain educational information on a given topic
- ♦ Prepare and present an oral reading of prose and poetry
- ♦ Relate a personal experience in descriptive detail with timing and decorum
- ♦ Present and defend a position, paper, evaluating and organizing materials appropriate to the audience
- ♦ Use appropriate vocabulary and etiquette when expressing thanks and receiving praise
- ♦ Research and organize a topic in preparation for a debate
- ♦ Practice giving and receiving criticism in a constructive and sincere manner
- ♦ Summarize and explain the information conveyed in an oral communication, accounting for the key ideas, structure, and relationship of parts to the whole
- ♦ Distinguish among purposes for listening, such as gaining information or being entertained, and take notes as appropriate
- ♦ Recall significant details and sequence accurately
- ♦ Follow a speaker's argument and represent it in notes
- ♦ Evaluate the reliability of information in a communication, using criteria based on prior knowledge of the speaker, the topic, and the context and on analysis of logic, evidence, propaganda devices, and language
- ♦ Identify key ideas and supporting details from a listening experience
- ♦ Sequence key ideas and supporting details in a listening experience
- ♦ Use basic note taking strategies in a listening experience
- ♦ Identify facts and opinions that strengthen or weaken an argument
- ♦ Use prior knowledge of a topic to evaluate the reliability of oral information
- ♦ Participate in discussion by listening attentively, respecting the opinions of others, and responding responsibly and courteously to the remarks of others
- ♦ Explain and advance opinions by citing evidence and referring to sources
- ♦ Evaluate the stated ideas and opinions of others, seeking clarification through questions
- ♦ Invite ideas and opinions of others into the discussion, responding clearly and tactfully to questions and comments
- ♦ Accept and use helpful criticism
- ♦ Establish and maintain an open mind when listening to others' ideas and opinions
- ♦ Summarize the main points of a discussion, orally and in writing, specifying areas of agreement and disagreement and paraphrasing contributions
- ♦ Display and maintain facial expressions, body language, and other response cues that indicate respect for the speaker and attention to the discussion
- ♦ Attend to the content of discussion rather than the speaker

- ♦ Participate in discussion without dominating
- ♦ Distinguish between supported and unsupported statements
- ♦ Practice giving positive feedback to others while in a discussion
- ♦ Defend personal opinions by citing appropriate evidence
- ♦ Use effective questioning to clarify the ideas and opinions of others
- ♦ Respond clearly to questions and comments in a discussion
- ♦ Accept helpful criticism without negative feedback
- ♦ Compare and contrast the opinions of others
- ♦ Summarize the main points of a discussion orally and in writing
- ♦ Demonstrate respect to a speaker by using appropriate response cues
- ♦ Practice attending to the content of a discussion rather than to the speaker

## Language

- ♦ Use dictionaries, thesauruses, handbooks, and grammar texts to choose precise words and phrases to use in oral and written language.
- ♦ Identify and use paper and electronic resources
- ♦ Analyze and create figurative language
- ♦ Apply words to inform, explain, and persuade
- ♦ Describe the difference between literal and figurative language
- ♦ Describe how American English is used in various public and private contexts, such as school, home, and work.
- ♦ Make appropriate choices when speaking and writing, such as formal or informal language, considering the purpose and context of the communication.
- ♦ Evaluate how audience and context affect the selection and use of words and phrases, including technical terms, slang, and jargon.
- ♦ Write to different audiences such as a parent, classmate, and teacher using the same subject matter
- ♦ Analyze the nonverbal communications of others
- ♦ Explain how context and audience affect the use of slang and jargon

## Media and Technology

- ♦ Use word processing functions including copy, cut, paste text; centering; single and double spacing; tab; indent; style functions; page layout, header, footer, pagination; insert graphics from various sources
- ♦ Use a spell checker correctly
- ♦ Write rough draft, revise and finalize (ex. Inspiration)
- ♦ Create data base fields, enter and sort data, produce a report (i.e. written portfolio)
- ♦ Use on-screen help when using various computer programs
- ♦ Identify keywords, use basic search engines & demonstrate efficient Internet navigation
- ♦ Examine selected resources for pertinent information, determine validity and authority
- ♦ Become familiar with e-mail functions
- ♦ Recognize common structural features found in print and broadcast advertising.
- ♦ Identify and explain the use of stereotypes and biases evident in various media.
- ♦ Compare the effect of particular symbols and images seen in various media.
- ♦ Develop criteria for selecting or avoiding specific broadcast programs and periodicals.
- ♦ Use criteria for judging quality of print and non-print resources
- ♦ Interpret and evaluate symbols in various forms of media
- ♦ Use personal criteria for selecting materials and/or broadcast programs
- ♦ Interpret and evaluate stereotypes in various forms of media
- ♦ Evaluate various kinds of images used in media
- ♦ Make use of written and/or oral reviews and evaluations from teachers, peers, critics, reviewers
- ♦ Create media products (including both written and technology-enhanced)
- ♦ Identify audience and purpose of media product
- ♦ Select appropriate format
- ♦ Use presentation software program to create a media product
- ♦ Plan a promotion or campaign that involves broadcast and print media production and distribution.
- ♦ Analyze how messages may be affected by financial factors such as sponsorship.
- ♦ Identify advertising strategies and techniques aimed at teenagers.

- ♦ Design a middle school brochure
- ♦ Revise media productions by adding, deleting, and adjusting the sequence and arrangement of information, images, or other content as necessary to improve focus, clarity, or effect.
- ♦ Develop criteria for comprehensive feedback on the quality of media work and use it during production.
- ♦ Use a graphics program to create or modify images or pictures
- ♦ Identify the criteria to be used, assess the product and determine ways to improve presentation (ex. story board, Inspiration)

## Research & Inquiry

- ♦ Identify problem or question, review prior knowledge, determine focus, and questions
- ♦ Determine audience and purpose of presentation
- ♦ Refine selection and location skills
- ♦ Refine ability to interpret information
- ♦ Refine note-taking strategies
- ♦ Develop note-taking strategies, record information and cite sources
- ♦ Organize and evaluate information to summarize findings
- ♦ Evaluate information and use relevant info to solve problem or answer question
- ♦ Determine need for more information
- ♦ Select presentation format and develop product
- ♦ Cite sources used
- ♦ Evaluate product according to predetermined criteria and determine ways to improve

## Social Studies

- ♦ Use appropriate data sources and geographic tools such as aerial photographs, satellite images and map projections to gather and compare information about locations in the Eastern Hemisphere.
- ♦ Map the major present day sources of key resources such as petroleum, bituminous coal, diamonds and copper and then trace the routes that link them to consuming countries.
- ♦ Use mental maps of place location to list the countries through which a person would travel between two points.
- ♦ Use an atlas, and other tools, to estimate distance, calculate scale and distinguish other geographic relationships such as population density and spatial distribution patterns.
- ♦ Choose the most appropriate maps and graphics in an atlas to answer specific questions about geographic issues.
- ♦ Compare a variety of media such as photographs, maps, aerial photographs and field sketches to draw conclusions about a place including a country's standard of living and accessibility to resources.
- ♦ Identify and speculate about the social and economic impact of environmental changes and crises resulting from phenomena such as floods, tidal waves, storms and drought.
- ♦ Explain past and current patterns of rural-urban migrations in the United States.
- ♦ Describe how the characteristics of different physical environments provide opportunities for, or place constraints on, human activities.
- ♦ Explain how environmental changes made in one place affect other places.
- ♦ Explain the importance of cathedrals in defining the mindset of the Middle Ages.
- ♦ Analyze the causes and consequences of urbanization.
- ♦ Discuss how cooperation and conflict among people contribute to political, economic and social division of the earth's surface.
- ♦ Explain factors of language, religion and ethnicity that contributed to conflict in specific countries or regions.
- ♦ Examine a contemporary issue using geographic knowledge, skills and perspectives.

## History: Time, Continuity and Change

- ♦ Formulate and discuss historical questions from encounters with historical documents, eyewitness accounts, letters, diaries, photos, historical files, art, architecture and other records from the past.
- ♦ Explain trade and evaluate how it influenced patterns of economic activity.
- ♦ Evaluate the importance of the relationship between industrialization and immigration.
- ♦ Explain how and why historical events are viewed and interpreted differently.
- ♦ Explain how various historical interpretations can vary according to prevailing orthodoxies thoughts and ideas at the time of their writing.
- ♦ Formulate a position on the effects of the fall of communism in the Soviet Union.

- ♦ Place important historical events within specific chronological timeframe.
- ♦ Identify major scientific discoveries and technological innovations and describe their social and economic effects on society.
- ♦ Explain the need for laws and policies to regulate science and technology
- ♦ Analyze examples of conflict, cooperation, and interdependence among groups, societies, or nations
- ♦ Summarize major issues associated with the history, culture, tribal sovereignty, and current status of the American Indian tribes and bands in Wisconsin
- ♦ The student is expected to analyze information by sequences, identifying cause and effect relationships, comparing, contrasting, finding the main idea, summarizing, making generalizations and predictions and drawing inferences and conclusions.

### **Political Science and Citizenship: Power, Authority, Governance and Responsibility**

- ♦ Compare and contrast the rights guaranteed to United States citizens with two other nations in other hemispheres.
- ♦ Identify historical and contemporary nations that in reality do not limit power, e.g., the former Soviet Union, Nazi Germany and Iraq under Saddam Hussein.
- ♦ Explain the difference between a country's written government versus the leader's interpretation (e.g. the way communism was written and carried out in Russia or Iran).
- ♦ Describe historical and contemporary examples of how constitutions have been used to promote the interests of a particular group, class, religion or political party with People's Republic of China, South Africa, Germany or the former Soviet Union.
- ♦ Explain the role of political parties and interest groups in American politics
- ♦ Locate, organize, and use relevant information to understand an issue of public concern, take a position, and advocate the position in a debate
- ♦ Identify ways in which advocates participate in public policy debates
- ♦ Explain how citizens can monitor and influence the formation and implementation of public policies in different countries of the world.
- ♦ Describe the role of international organizations such as military alliances and trade associations
- ♦ Describe the purposes and functions of major governmental international organizations such as the UN, NATO, World Court, OPEC.
- ♦ Describe the purpose and functions of major non-government international organizations such as the International Red Cross and Amnesty International.

### **Economics: Production, Distribution, Exchange, Consumption**

- ♦ Describe and explain how money makes it easier to trade, borrow, save, invest, and compare the value of goods and services
- ♦ Identify and explain basic economic concepts: supply, demand, production, exchange, and consumption; labor, wages, and capital; inflation and deflation; market economy and command economy; public and private goods and services
- ♦ Cite and explain examples of how economic systems determine how goods and services are to be produced, distributed and consumed.
- ♦ Describe Wisconsin's role in national and global economies and give examples of local economic activity in national and global markets.
- ♦ Describe how investments in human and physical capital, including new technology, affect standard of living and quality of life
- ♦ Assess why scientific, technological and medical advances have improved living standards for many ... yet hunger, poverty and economic disease have persisted.
- ♦ Examine, within a historical context, attempts made to open trade markets in China and Japan.
- ♦ Explain ways in which the airplane, automobile and information technology affected world commerce, migration and work and leisure habits.
- ♦ Identify the location of concentrations of selected natural resources and describe how their acquisition and distribution generates trade and shapes economic patterns
- ♦ Explain how and why people who start new businesses take risks to provide goods and services, considering profits as an incentive
- ♦ Explain why the earning power of workers depends on their productivity and the market value of what they produce
- ♦ Identify the economic roles of institutions such as corporations and businesses, banks, labor unions, and the Federal

Reserve System.

- ♦ Describe how personal decisions can have a global impact on issues such as trade agreements, recycling, and conserving the environment.

## **The Behavioral Sciences: Individuals, Institutions and Society**

- ♦ Give examples to explain and illustrate how factors such as family, gender, and socioeconomic status contribute to individual identity and development
- ♦ Explain the significance of a country being known as a developed or developing nation.
- ♦ Critique the affect that the influx of Jewish refugees has had on education, housing and everyday life in Europe.
- ♦ Describe and explain the means by which individuals, groups, and institutions may contribute to social continuity and change within a community
- ♦ Explain the presence of ethnic enclaves in cities resulting from voluntary or forced migration such as Philippine workers in Kuwait, Turks in Germany and Southeast Asians in the United States.
- ♦ Describe and explain the means by which groups and institutions meet the needs of individuals and societies
- ♦ Describe and explain the influence of status, ethnic origin, race, gender, and age on the interactions of individuals
- ♦ Identify and explain examples of bias, prejudice, and stereotyping, and how they contribute to conflict in a society
- ♦ Describe how the discrimination of the Jewish population in Europe led to the Holocaust.
- ♦ Develop and support generalizations about the impact of the media in reporting and interpreting information from the Middle East, Africa and Asia.
- ♦ Discuss why specific ethnic groups immigrated to other parts of the world and describe what elements of their culture they brought with them.
- ♦ Explain how language, art, music, beliefs, and other components of culture can further global understanding or cause misunderstanding
- ♦ Explain how beliefs and practices, such as ownership of property or status at birth, may lead to conflict among people of different regions or cultures and give examples of such conflicts that have and have not been resolved
- ♦ Describe conflict resolution and peer mediation strategies used in resolving differences and disputes
- ♦ Discuss the success of peacekeeping efforts in addressing ethnic warfare, for example in Central Europe, Africa or the Middle East.
- ♦ Select examples of artistic expressions from several different cultures for the purpose of comparing and contrasting the beliefs expressed
- ♦ Describe cooperation and interdependence among individuals, groups, and nations, such as helping others in times of crisis
- ♦ Explain major characteristics of the interregional trading system that linked people of Africa, Asia and Europe on the eve of over seas voyages of discovery for example the Silk Road.

## **Science Connections**

Science Themes: Develop their understanding of the science themes by using the themes to frame questions about science-related issues and problems.

- ♦ Define and explain how the following science themes can be applied to the natural world: systems (body systems), order (classification system), organization (structural organization of organisms), and interactions (interaction of body systems); evidence (data), models (Cells and DNA) and explanations (lab conclusions); constancy (mitosis), change (life span), and measurement (temperature, volume, mass, distance); evolution (changes of organisms over time), equilibrium (homeostasis), and energy (photosynthesis) to understand science content. Form and function (body design of animal and how these designs relate to certain functions.)

Science Systems and the Themes: Describe limitations of science systems and give reasons why specific science themes are included in or excluded from those systems.

- ♦ Describe limitations of science systems and give reasons why specific science themes are included in or excluded from those systems (i.e., collecting data about body systems may be limited by cost, time, technology and knowledge.)

Defending and Critiquing Explanations: Defend explanations and models by collecting and organizing evidence that supports them and critique explanations and models by collecting and organizing evidence that conflicts with them.

- ♦ Explain the characteristics of a good explanation (use supporting evidence) and why models are used (i.e., economical and practical, less dangerous).
- ♦ Give examples of when using a model is a disadvantage.

Evidence: Collect evidence to show that models developed as explanations for events were (and are) based on the evidence available to scientists at the time.

- ♦ Collect evidence to show that models developed as explanations for events were (and are) based on the evidence available to scientists at the time (i.e. microscope models, spontaneous generation vs. biogenesis, cell theory.)

New Evidence: Show [include the following themes when showing] how models and explanations, based on systems, were changed as new evidence accumulated (the effects of constancy, evolution, change, and measurement should all be part of these explanations).

- ♦ Understand that models will change over time as new evidence is collected.

Predicting with Models and Explanations: Use models and explanations to predict actions and events in the natural world.

- ♦ Use models and/or explanations to predict actions and events in the natural world (i.e., predict where bacteria will be most prevalent in the school).

Models: Design real or thought investigations to test the usefulness and limitations of a model.

- ♦ Work as a group to identify the usefulness and limitations of a model (i.e., discuss limitations of the cell model, the DNA model).

Predicting with Themes: Use the themes of evolution, equilibrium, and energy to predict future events or changes in the natural world.

- ♦ Use the themes of evolution, equilibrium, and energy to predict future events or changes in the natural world (i.e. how physical and chemical changes in water will affect life in a pond or river).

## **Nature of Science**

Science Knowledge and Concepts: Describe how scientific knowledge and concepts have changed over time in the earth and space, life and environmental and physical sciences.

- ♦ Describe how scientific knowledge and concepts have changed over time in life and environmental science (i.e., changes in cell theory, spontaneous generation to biogenesis).

Change Over Time: Identify and describe major changes that have occurred over time in conceptual models and explanations in the earth and space, life and environmental, and physical sciences and Identify the people, cultures, and conditions that led to these developments.

- ♦ Identify and describe major changes that have occurred over time in conceptual models and explanations in life and environment and identify the people, cultures, and conditions that led to these developments (i.e. discuss the timeline of genetic discovery Mendel cloning).

Rules of Science: Explain how the general rules of science apply to the development and use of evidence in science investigations, model-making, and applications.

- ♦ Understand that the rules of science require us to use data without changing data to meet expected outcomes.

Reasoning: Describe types of reasoning and evidence used outside of science to draw conclusions about the natural world.

- ♦ Provide examples of non-scientific reasoning used to draw conclusions about the natural world (i.e., mythology, astrology).

Application of Science Knowledge: Explain ways in which scientific knowledge is shared, checked, and extended, and show how these processes change over time.

- ♦ Know that much of today's scientific knowledge is based on previous scientific ideas that have changed over time (i.e., cell theory).

Uses and Limitations of Science: Explain the ways in which scientific knowledge is useful and also limited when applied to social issues.

- ♦ Discuss cost factors, moral and ethical issues related to cloning of whole organisms and genetic engineering.

## **Science Inquiry**

Questioning: Identify questions they can investigate using resources and equipment they have available.

- ♦ Be able to use a microscope to answer questions.
- ♦ Understand parts, functions and the proper use of a microscope.
- ♦ Use microscope to examine life forms.
- ♦ Understand the nature of scientific explanations (i.e., use of logically consistent arguments; emphasis on evidence; use of scientific principles, models and theories; acceptance or displacement of explanations based on new scientific evidence).

**Data and Information Sources:** Identify data and locate sources of information including their own records to answer the questions being investigated.

- ♦ Students will use the data collected during investigations to develop conclusions and report findings.
- ♦ Given data from another source, students will make inferences and draw conclusions.

**Conducting Investigations:** Design and safely conduct investigations that provide reliable quantitative or qualitative data, as appropriate, to answer their questions.

- ♦ Know that an experiment must be repeated many times and yield consistent results before the results are accepted as correct.
- ♦ Know that there is no fixed procedure called the scientific method, but that investigations involve systematic observations, carefully collected, relevant evidence, logical reasoning and some imagination in developing hypotheses and explanations.
- ♦ Designs and conducts a scientific investigation (i.e., formulates hypotheses, designs and executes investigations, interprets data, synthesizes evidence into explanations, proposes alternative explanations for observations, critiques explanations and procedures).
- ♦ Uses appropriate tools (including computer hardware and software) and techniques to gather, analyze and interpret scientific data.

**Inferences:** Use inferences to help decide possible results of their investigations, [and] use observations to check their inferences.

- ♦ Hypothesize and then use data to determine the validity of an hypothesis.

**Explaining Results:** Use accepted scientific knowledge, models, and theories to explain their results and to raise further questions about their investigations.

- ♦ Explain the results and identify questions that could still be investigated.

**Relating Inferences from Investigations:** State what they have learned from investigations, relating their inferences to scientific knowledge and to data they have collected.

- ♦ The students will respond back to the purpose statements of the investigation and explain how purposes were met and knowledge gained.

**Explaining Conclusions:** Explain their data and conclusions in ways that allow an audience to understand the questions they selected for investigation and the answers they have developed.

- ♦ Explain data and conclusions in ways that allow others to understand the questions they elected to investigate.

**Using Technology:** Use computer software and other technologies to organize, process, and present their data.

- ♦ Use computer software and other technologies to organize, process, and present their data (Power Point, Inspiration, Excel, internet, etc.).

**Defending Validity:** Evaluate, explain, and defend the validity of questions, hypotheses, and conclusions to their investigations.

- ♦ Evaluate, share, explain, and defend data from an investigation with peers and teacher.

**Realizing the Importance of Implications:** Discuss the importance of their results and implications of their work with peers, teachers, and other adults.

- ♦ Discuss the importance of data collected from investigations and its implications in real life situations.

**Further Questioning:** Raise further questions which still need to be answered.

- ♦ Raise further questions about investigations which still need to be answered.

## **Physical Science**

**Physical and Chemical Properties:** Observe, describe, and measure physical and chemical properties of elements and other substances to identify and group them according to properties such as density, melting points, boiling points, conductivity, magnetic attraction, solubility, and reactions to common physical and chemical tests.

- ♦ Observe, describe, and measure physical and chemical properties of elements and other substances to identify and group them according to properties such as density and solubility.
- ♦ Know that matter is made up of tiny particles called atoms and different arrangements of atoms into groups compose all substances.
- ♦ Know that certain atoms will combine to form a molecule (or crystal), the smallest particle of a substance that retains its properties.
- ♦ Know that substances containing only one kind of atom are elements and do not break down by normal laboratory reactions (i.e., heating, exposure to electric current, reaction with acids) and that over 100 different elements exist.

**Chemical Interactions (Changes):** Use the major ideas of atomic theory and molecular theory to describe physical and chemical interactions among substances, including solids, liquids, and gases.

- ♦ Know that photosynthesis is an example of a chemical change.

**New Substances:** Understand how chemical interactions (change) and behaviors lead to new substances with different properties.

- ♦ Explain photosynthesis and cellular respiration, the compounds necessary, interaction that takes place and the by-products produced.

**Explaining Interactions:** While conducting investigations, use the science themes to develop explanations of physical and chemical interactions and energy exchanges.

- ♦ Carry out investigations with sugar and yeast. Observe and discuss interactions that take place, reactions and the by-products produced.

**Forces of Motion:** While conducting investigations, explain the motion of objects by describing the forces acting on them.

- ♦ Identify how earth forces and effect plant growth (tropisms).

**Explaining Motion:** While conducting investigations, explain the motion of objects using concepts of speed, velocity, acceleration, friction, momentum, and changes over time, among others, and apply these concepts and explanations to real-life situations outside the classroom.

- ♦ Calculate current speed during the Watershed study.

**Using Definitions and Ideas:** While conducting investigations of common physical and chemical interactions occurring in the laboratory and the outside world, Use commonly accepted definitions of energy and the idea of energy conservation.

**Interactions of Objects:** Describe and investigate the properties of light, heat, gravity, radio waves, magnetic fields, electrical fields, and sound waves as they interact with material objects in common situations.

- ♦ This standard is not addressed at this grade level.

**Models of Energy Transmission:** Explain the behaviors of various forms of energy by using the models of energy transmission, both in the laboratory and in real-life situations in the outside world.

- ♦ Give examples of transfer of energy in life science (i.e. food chain, photosynthesis, cellular respiration, cell process, digestion).

**Models of Atomic Structure:** Explain how models of the atomic structure of matter have changed over time, including historical models and modern atomic theory.

## **Earth and Space Science**

**Changes in Earth Features:** Using the science themes, explain and predict changes in major features of land, water, and atmospheric systems.

**Underlying Structures of the Earth:** Describe underlying structures of the earth that cause changes in the earth's surface.

**Forces Acting on the Earth:** Using the science themes during the process of investigation, describe climate, weather, ocean currents, soil movements and changes in the forces acting on the earth.

**Influence of Living Organisms:** Using the science themes, analyze the influence living organisms have had on the earth's systems, including their impact on the composition of the atmosphere and the weathering of rocks.

- ♦ Analyze impact of microorganisms in production of oxygen and carbon dioxide.
- ♦ Discuss and use demonstrations to show impact of microorganisms, plants and worms on the decomposition process and weathering.

**Evidence of Earth History:** Analyze the geologic and life history of the earth, including change over time, using various forms of scientific evidence.

**Use of Resources:** Describe through investigations the use of the earth's resources by humans in both past and current cultures, particularly how changes in the resources used for the past 100 years are the basis for efforts to conserve and recycle renewable and non-renewable resources.

- ♦ Explain how recycle programs may affect renewable and non-renewable resources.

**Celestial Models:** Describe the general structure of the solar system, galaxies, and the universe, explaining the nature of the evidence used to develop current models of the universe.

**Cycles of the Earth:** Using past and current models of the structure of the solar system, explain the daily, monthly, yearly, and long-term cycles of the earth, citing evidence gained from personal observation as well as evidence used by scientists.

## **Life and Environmental Science**

**Structure and Function of Living Things:** Understand the structure and function of cells, organs, tissues, organ systems, and whole organisms.

- ♦ Construct models of cells (plant or animals).
- ♦ Perform experiments relating to cell activities and provide an explanation of the results.
- ♦ Explain relationships between cells, organs, tissues, organ systems, and whole organisms.
- ♦ Identify and describe functions of organelles, tissues, organs, organ systems, and whole organisms through dissection, development of models, and student-centered research.
- ♦ Participate in dissection activities and be able to identify names of organs studied and their function.
- ♦ Use microscopes to investigate life forms.
- ♦ Know ways in which living things can be classified (i.e., taxonomic groups of plants, animals and fungi; groups based on the details of organisms internal and external features; groups based on functions served within an ecosystem such as producers, consumers and decomposers).

**Adaptation Structures:** Show how organisms have adapted structures to match their functions, providing means of encouraging individual and group survival within specific environments.

- ♦ Compare and contrast adaptations in various organisms.
- ♦ Create environments for organisms and hypothesize what the organisms would need to survive.

**Single and Multi Celled Organisms:** Differentiate between single-celled and multiple-celled organisms (humans) through investigation, comparing the cell functions of specialized cells for each type of organism.

- ♦ Compare and contrast cell functions of specialized cells (i.e. study of human systems, red and white blood cells, nerve and muscle cells, study of plant and animal cells, protists and bacteria) and give examples of each.
- ♦ Differentiate between single-celled (bacteria and protist) and multiple-celled (plants and fungi) organisms.

**Characteristic Traits:** Investigate and explain that heredity is comprised of the characteristic traits found in genes within the cell of an organism.

- ♦ Know that hereditary information is contained in genes (located in the chromosomes of each cell), each of which carries a single unit of information; an inherited trait of an individual can be determined by either one or many genes, and a single gene can influence more than one trait.
- ♦ Know that the characteristics of an organism can be described in terms of a combination of traits; some traits are inherited and others result from interactions with the environment.

**Passing on Characteristics:** Show how different structures both reproduce and pass on characteristics of their group.

- ♦ Define different structures for human reproduction (Human reproduction is in the health curriculum).
- ♦ Know that reproduction is a characteristic of all living things and is essential to the continuation of a species.
- ♦ Recognize models of different structures for reproduction.
- ♦ Understand asexual and sexual reproduction (i.e., in asexual reproduction, all the genes come from a single parent; in sexual reproduction, an egg and sperm unite and half of the genes come from each parent, so the offspring is never identical to either of its parents; sexual reproduction allows for greater genetic diversity; asexual reproduction limits the spread of disadvantageous characteristics through a species).
- ♦ Compare and contrast structures and methods of asexual and sexual reproduction.
- ♦ Develop charts, and/or graphs depicting how characteristics of organisms are passed on.

**Internal and External Regulation:** Understand that an organism is regulated both internally and externally.

- ♦ Understand that multicellular organisms have a variety of specialized cells, organs, tissues and organ systems that perform specialized functions (i.e., digestion, respiration, reproduction, circulation, excretion movement, control and coordination and protection from disease).
- ♦ Know that organisms have a great variety of body plans and internal structures that serve specific functions for survival (i.e., digestive structures in vertebrates, invertebrates, unicellular organisms and plants).
- ♦ Know how an organism's ability to regulate its internal environment enables the organism to

obtain and use resources, grow, reproduce and maintain stable internal conditions while living in a constantly changing external environment.

- ♦ Know that organisms can react to internal and environmental stimuli through behavioral response (i.e., plants have tissues and organs that react to light, water and other stimuli; animals have nervous systems that process and store information from the environment), which may be determined by heredity or from past experience.

**Behavior Adaptations:** Understand that an organism's behavior evolves through adaptation to its environment.

- ♦ Determine how an organism's behavioral changes are connected to changes in its environment.
- ♦ Explain the difference between reflexes and learned behavior.
- ♦ Give examples of behavioral responses to stimuli.

**Population Balance:** Show through investigations how organisms both depend on and contribute to the balance or imbalance of populations and/or ecosystems, which in turn contribute to the total system of life on the planet.

- ♦ Know factors that affect the number and types of organisms an ecosystem can support (i.e., available resources; abiotic factors such as quantity of light and water, range of temperatures, and soil composition; disease; competition from other organisms within the ecosystem; predation).
- ♦ Know ways in which organisms interact and depend on one another through food chains and food webs in an ecosystem (i.e., producer/consumer, predator/prey, parasite/host, relationships that are mutually beneficial or competitive).
- ♦ How energy is transferred through food webs in an ecosystem (i.e., energy enters ecosystems as sunlight and green plants transfer this energy into chemical energy through photosynthesis; this chemical energy is passed from organism to organism; animals get energy from oxidizing their food, releasing some of this energy as heat).

**Changes that Impact on the Survival and Growth of Certain Species:** Explain how some of the changes on the earth are contributing to changes in the balance of life and affecting the survival or population growth of certain species.

- ♦ Research and present local and global changes which have affected various species.
- ♦ Analyze problems and develop solutions regarding local and global changes and how they affect various species.

**Human Influence on the Environment:** Project how current trends in human resource use and population growth will influence the natural environment, and show how current policies affect those trends.

- ♦ Identify, illustrate, and project natural resource trends regarding population growth and environment (i.e., Watershed Project).
- ♦ Research policies which affect natural resource use and explain why they were put in place.
- ♦ Suggest changes in policies or develop new policies based on information gathered about current resource trends.

## Science Application

**Careers:** Identify and investigate the skills people need for a career in science or technology and identify the academic courses that a person pursuing such a career would need.

- ♦ Identify course work required for specific careers in science.
- ♦ Research careers in science and technology through specific current and historical scientists.

**Influence of Discoveries:** Explain how current scientific and technological discoveries have an influence on the work people do and how some of these discoveries also lead to new careers.

- ♦ Discuss and analyze ethical issues related to scientific and technological discoveries as they relate to new and evolving careers.
- ♦ Explain how scientific and technological discoveries have influenced careers (i.e., environmental science, space research, forensics, research, computer programming, transplant technology, gene therapy, water treatment, sanitation, bridge construction).

**Impact of Science and Technology:** Illustrate the impact that science and technology have had, both good and bad, on careers, systems, society, environment, and quality of life.

- ♦ Identify and explain positive and negative effects science and technology have had on society (i.e., faster pace, longer life expectancy, accessibility, invasion of privacy, loss/increase of jobs,

organizational, opportunities, internet usage, impact on environment, energy sources, energy consumption and costs).

**Science Models/Machines:** Propose a design (or re-design) of an applied science model or a machine that will have an impact in the community or elsewhere in the world and show how the design (or re-design) might work, including potential side effects.

- ♦ Design applied science models or machines and explain how they could affect society (i.e., egg drop, design temperature control {insulation} containers, structural design, landscape design, living habitat design).

**Science or Technology Solutions:** Investigate a specific local problem to which there has been a scientific or technological solution, including proposals for alternative courses of action, the choices that were made, reasons for the choices, any new problems created, and subsequent community satisfaction.

- ♦ Identify local scientific or technological problems and their solutions and explain processes (methods) by which problems were solved.

**Discoveries Result in New Technology:** Use current texts, encyclopedias, source books, computers, experts, the popular press, or other relevant sources to identify examples of how scientific discoveries have resulted in new technology.

- ♦ Gather information, using a variety of current and reliable resources, to identify scientific discoveries which have resulted in new technologies (Science in the News activity). (i.e., genetics and cloning, Global Positioning System, pacemakers, velcro, genetic engineering, laser eye surgery.)

**Science and Technology Interdependence:** Show evidence of how science and technology are interdependent, using some examples drawn from personally conducted investigations.

- ♦ Describe how science and technology are interdependent by citing examples and explaining the link between technology and science.

- ♦ Through Jason Project, students will interact with scientists and students via the internet to share classroom experiment results.

## **Science in Social and Personal Perspectives**

**Evidence in Media:** Evaluate the scientific evidence used in various media (for example, television, radio, Internet, popular press, and scientific journals) to address a social issue, using criteria of accuracy, logic, bias, relevance of data, and credibility of sources.

- ♦ Analyze, and discuss scientific evidence from various media sources, for accuracy, logic, bias, relevance of data, and credibility of sources.

- ♦ Identify scientific and technological discoveries through discussion of current events.

- ♦ Recognize and understand what makes a source reliable.

**Scientific Solution:** Present a scientific solution to a problem involving the earth and space, life and environmental, or physical sciences and participate in a consensus-building discussion to arrive at a group decision.

- ♦ Identify scientific problems and possible solutions.

- ♦ Participate in group discussions regarding problems and solutions of an environmental issue.

- ♦ Debate or discuss in small groups or as a class the pros and cons of an environmental solution, backing up opinions with research and data, and reaching group consensus.

**Consequences of Decisions on Health and Safety:** Understand the consequences of decisions affecting personal health and safety.

- ♦ Define consequences of decisions affecting personal health and safety.

- ♦ Identify choices and consequences regarding personal health and safety. (i.e., disease transmissions, microbes, contagious diseases).

- ♦ Participate in the Science Safety Unit.

# Math

## Mathematical Processes

- ♦ Use reasoning abilities to:
  - ♦ perceive patterns (congruent, similar, divisibility, L.C.M., G.C.F., prime factorization, comparing and ordering, sequence, Pascal's Triangle, Fibonacci Sequence, probability)
  - ♦ identify relationships (ratio, proportion, congruent, arithmetic, geometric)
- ♦ evaluate information (too much, not enough, what do you need to use)
- ♦ Use reasoning abilities to:
  - ♦ design questions that will help with further research
- ♦ justify a statement using logical reasoning by explaining processes used to arrive at the answer
  - ♦ test reasonableness of results through estimation, sampling and substitution
  - ♦ to defend work by using the four-step process (explore, plan, solve, examine)
- ♦ Apply the following problem-solving strategies:
  - ♦ choose an operation
  - ♦ draw a diagram
  - ♦ use manipulatives
  - ♦ guess and check
  - ♦ make a chart/table/list
  - ♦ use estimation
  - ♦ work backwards
  - ♦ note important information
  - ♦ use a calculator
  - ♦ identify needed/extra information
  - ♦ find a pattern
  - ♦ use a graph
  - ♦ use an equation
  - ♦ use a formula
  - ♦ solve a simpler problem
  - ♦ make a model
  - ♦ classify
  - ♦ eliminate possibilities
  - ♦ Venn diagrams
- ♦ Justify strategies and solutions through oral and written explanations.
- ♦ Communicate logical arguments clearly to show why a result makes sense using words, numbers, pictures, symbols, charts, graphs, tables, diagrams, models.
- ♦ Know when to use the appropriate resource/strategy.
- ♦ Justify logical arguments through oral and written explanation.
- ♦ Analyze non-routine problems by illustrating, guessing, simplifying, relating to everyday life, modeling, acting it out, generalizing, shifting to another point of view.
- ♦ Use mathematics as a way to understand other areas of the curriculum (e.g. measurement in science, geography skills in social studies, and Venn diagrams in language arts).
- ♦ See relationships between various kinds of problems and actual events.
- ♦ Develop effective oral and written presentations that include:
  - ♦ appropriate use of technology
  - ♦ the conventions of mathematical discourse (e.g., symbols, definitions, labeled drawings)
  - ♦ mathematical language
  - ♦ clear organization of ideas and procedures
  - ♦ understanding of purpose and audience
- ♦ Calculators – a learner will apply scientific calculators.
- ♦ Computers – a learner will apply spreadsheet tool; graphing tool; geometry tool; internet access.
- ♦ The learner will determine when technology is appropriate and when other approaches are more appropriate or efficient.
- ♦ Present results of a project, written and oral, to an audience.
- ♦ Communications – The learner will explain and demonstrate mathematical concepts, procedures and ideas to others by reading, talking about it, sharing and assisting others.
- ♦ think/pair/share
- ♦ peer tutoring
- ♦ study buddies
- ♦ cooperative groups
- ♦ Curriculum connections: social studies/history/geography; health/physical education; science; music; language arts; art; and electives.
- ♦ Real-world connections: the learner will use real-world connections as they apply in daily life, careers, as consumers and in multicultural situations.

## Number Operations and Relationships

- ♦ Read, write and demonstrate integers, decimals, fractions, and percents.
- ♦ Express numbers in scientific notation and exponential expanded form (standard form).
- ♦ Use powers and exponents in expressions.
- ♦ Read, write, demonstrate and graph on a number line integers, decimals, fractions and percent.
- ♦ Add, subtract, multiply and divide decimals, fractions, mixed numbers, and integers.
- ♦ Solve for, as well as write, powers and positive and negative exponents in expressions.
- ♦ Understand and find the square root of perfect squares.
- ♦ Evaluate numerical and algebraic expressions using order of operations
- ♦ Reinforce solving algebraic two-step equations.
- ♦ Recall of multiplication and division facts 0-12.
- ♦ Express terminating decimals as fractions and express fractions as decimals.
- ♦ Express fractions as percents and vice versa.
- ♦ Express decimals as percents and vice versa.
- ♦ Formulate algebraic expressions and equations from verbal phrases and sentences.
- ♦ Express equivalent fractions in lowest terms.
- ♦ Compare and order decimals and fractions and integers using  $<$ ,  $>$ ,  $=$ .
- ♦ Determine whether a pair of ratios forms a proportion by using cross products ( $=$  or  $\neq$ ).
- ♦ Solve proportions by using cross products.
- ♦ Apply proportional thinking in a variety of problem situations that include, but are not limited to:
  - ♦ ratios and proportions (e.g., rates, scale drawings, similarity)
  - ♦ percents including those greater than 100 and less than one (e.g., discounts, rate of increase or decrease, sales tax)
- ♦ Express ratios as fractions and determine whether two ratios are equivalent.
- ♦ Determine unit rates (3 apples for \$.30; how much for 1 apple?).
- ♦ Solve proportions.
- ♦ Solve problems involving scale drawings.
- ♦ Illustrate the meaning of percent using models or symbols.
- ♦ Express percents greater than 100 and percents less than 1 as fractions and as decimals and vice versa.
- ♦ Find the percent of a number.
- ♦ Solve problems using the percent proportion.
- ♦ Solve problems involving sales tax and discount.
- ♦ Express similarity statements.
- ♦ Model and solve problems involving number-theory concepts such as:
  - ♦ prime and composite numbers
  - ♦ divisibility and remainders
  - ♦ greatest common factors
  - ♦ least common multiples
- ♦ Find the prime factorization of a composite number.
- ♦ Use divisibility rules of 2, 3, 4, 5, 6, 8, 9, and 10.
- ♦ Find the greatest common factor of two or more numbers.
- ♦ Find the least common multiple of two or more numbers.
- ♦ Reinforce dividing whole numbers and repeating and terminating rational decimals.
- ♦ In problem-solving situations, select and use appropriate computational procedures with rational numbers such as:
  - ♦ calculating mentally
  - ♦ estimating
  - ♦ using technology (e.g., scientific calculators, spreadsheets)
- ♦ Compute sums and differences using compensation.
- ♦ Multiply decimals mentally by powers of 10.
- ♦ Estimate sums and differences using front-end estimation.
- ♦ Estimate quotients using compatible numbers.
- ♦ Problem solving strategies:
- ♦ Classify information, guess and check, use a graph, make a table, determine reasonable answers, use a formula,

solve a simpler problem, choose the method of computation, make a list, eliminate possibilities, find a pattern, use logical reasoning, draw a diagram, make a model, work backward, use an equation and not enough information is present.

- ♦ Estimate with decimals.
- ♦ Estimate the area of irregular figures.
- ♦ Estimate sums and differences, products and quotients of fractions and mixed numbers.
- ♦ Estimate by using fractions, decimals and percents interchangeably.
- ♦ Estimate by rounding.
- ♦ Estimate square roots.
- ♦ Use scientific calculators in problem-solving situations to help explain algorithms.
- ♦ Compute mentally a percent of a number.

## Geometry

- ♦ Describe special and complex two- and three-dimensional figures (e.g., rhombus, polyhedron, cylinder) and their component parts (e.g., base, altitude and slant height) by:
  - ♦ naming, defining and giving examples
  - ♦ comparing, sorting and classifying them
  - ♦ identifying and contrasting their properties (e.g., symmetrical, isosceles, regular)
  - ♦ drawing and constructing physical models to specifications
  - ♦ explaining how these figures are related to objects in the environment
- ♦ Identify and draw points, line segments, line rays, transversal lines, perpendicular lines, parallel lines, and intersecting lines.
- ♦ Draw and construct physical models to specifications by using a compass, protractor, and straight edge.
- ♦ Describe and classify angles (alternate interior, corresponding, vertical, complementary and supplementary, right, obtuse, acute, straight) and triangles (equilateral, isosceles, scalene, acute, obtuse and right).
- ♦ Construct angles and triangles (congruent and bisected).
- ♦ Calculate the sum of the angles of a polygon.
- ♦ Identify, classify, and construct regular and irregular polygons (three-sided through n-sided).
- ♦ Identify and construct congruent, similar and symmetrical figures.
- ♦ Construct and identify the parts of a circle including diameter and radius.
- ♦ Analyze three-dimensional objects by applying the knowledge of faces, edges, vertices, and comparison of line segments within the figure.
- ♦ Analyze, select and present examples of three-dimensional figures in real-life settings.
- ♦ Identify and use relationships among the component parts of special and complex 2- and 3-dimensional figures (e.g., parallel sides, congruent faces).
- ♦ Predict a pattern for the number of diagonals in a polygon.
- ♦ Illustrate perpendicular and parallel lines; congruent and similar figures.
- ♦ Determine and calculate correspondence in similar figures and find missing measures.
- ♦ Analyze three-dimensional objects by applying the knowledge of faces, edges, vertices, and comparison of line segments within the figure.
- ♦ Plan and construct physical models to specifications.
- ♦ Perform transformations on 2-dimensional figures and describe and analyze the effects of the transformations on the figures.
- ♦ Translate, rotate and reflect figures on the coordinate plane.
- ♦ Design tessellations.
- ♦ Compose and diagram dilations.
- ♦ Locate objects using the rectangular coordinate system.
- ♦ Employ technology to demonstrate the rectangular coordinate system when grade appropriate.
- ♦ Identify ordered pairs using the rectangular coordinate system.
- ♦ Identify and graph the transformations or movements of geometric figures shown on a coordinate grid.
- ♦ Translate, rotate, and reflect figures on the coordinate plane.
- ♦ Locate and examine points on earth by using the rectangular coordinate system.

## Measurement

- ♦ Find irregular figures located in the home and estimate area of each.

- ♦ Determine appropriate tools and accurately measure length, mass and volume.
- ♦ Use procedures for basic indirect measurement to find area of irregular figures.
- ♦ Summarize the process and results of steps 2 and 3 to the class using graphics or other technologies.
- ♦ Demonstrate understanding of basic measurement facts, principles and techniques including the following:
  - ♦ approximate comparisons between metric and US customary units (e.g., a liter and a quart are about the same; a kilometer is about six-tenths of a mile.)
  - ♦ knowledge that direct measurement\* produces approximate, not exact, measures.
  - ♦ the use of smaller units to produce more precise measures.
  - ♦ employment of appropriate grade level technology.
- ♦ Compare and contrast metric and customary units of measure.
- ♦ Demonstrate that each unit of measurement is part of another either smaller or larger unit.
- ♦ Distinguish when it is necessary to use smaller units for more precise measurements.
- ♦ Determine measurement directly using standard units (metric and US customary) with these suggested degrees of accuracy:
  - ♦ lengths to the nearest mm or 1/16 of an inch
  - ♦ weight (mass) to the nearest 0.1 g or 0.5 ounce
  - ♦ liquid capacity to the nearest ml
  - ♦ angles to the nearest degree
  - ♦ temperature to the nearest Centigrade and Fahrenheit degree
  - ♦ elapsed time to the nearest second
- ♦ Determine measurements to the following degrees of accuracy:
  - ♦ length to the nearest sixteenth, eighth, quarter, half-inch, foot, yard, millimeter, centimeter, meter
  - ♦ weight to the nearest ounce, pound, gram, and kilogram
  - ♦ temperature to the nearest degree in Celsius and Fahrenheit
  - ♦ time to the nearest second
  - ♦ liquid capacity to the nearest ounce, cup, pint, quart, half-gallon, gallon, milliliter, liter, and fluid ounce
  - ♦ angles to the nearest degree.
- ♦ Determine appropriate units to measure length, mass, temperature, capacity and time.
- ♦ Apply measurement skills to real life problems.
- ♦ Determine measurements indirectly using:
  - ♦ estimation
  - ♦ conversion of units within a system (e.g., quarts to cups, millimeters to centimeters)
  - ♦ ratio and proportion (e.g., similarity, scale drawings)
  - ♦ geometric formulas to derive lengths, areas, volumes of common figures (e.g., perimeter, circumference, surface area)
  - ♦ the Pythagorean relationship
  - ♦ geometric relationships and properties for angle size (e.g., parallel lines and transversals; sum of angles of a triangle, vertical angles)
- ♦ Convert units within metric/customary systems.
- ♦ Estimate measurement indirectly by using non-standard units.
- ♦ Create ratio and proportion/scale drawings.
- ♦ Apply geometric formulas to calculate:
  - ♦ perimeter and circumference.
  - ♦ area of triangles, quadrilaterals, and circles.
  - ♦ surface area and volume of rectangular prisms and cylinders.
- ♦ Distinguish geometric relationships and properties for angle size (parallel lines and transversal; vertical, supplementary, corresponding, and alternate interior; sum of the angles of triangle.)
- ♦ Apply the Pythagorean Theorem ( $a^2 + b^2 = c^2$ ).
- ♦ Solve basic rate problems (unit price, distance per unit of time).
- ♦ Examine the relationship between perimeter and area (using perimeter to find area and area to find perimeter).
- ♦ Apply measurement skills to real life problems.

## Statistics and Probability

- ♦ Collect, organize and record real-world data.

- ♦ Conduct surveys, experiments or simulations and display results.
- ♦ Formulate questions and determine the appropriate data to collect and how to collect data.
- ♦ Draw reasonable conclusions about real-world data.
- ♦ Use technology to produce a simple database and be able to present it.
- ♦ Use technology to produce a simple spreadsheet and present it.
- ♦ Organize and display data from statistical investigations using:
  - ♦ appropriate tables, graphs and/or charts (e.g., circle, bar, or line, for multiple sets of data)
  - ♦ appropriate plots (e.g., line, stem-and-leaf, box, scatter)
- ♦ Gather and organize data into a table.
- ♦ Construct circle graphs.
- ♦ Construct bar graphs and line graphs with multiple sets of data.
- ♦ Construct line plots, stem and leaf plots, and scatter plots.
- ♦ Assess the most effective way of displaying data.
- ♦ Create story problems based on collected data for classmates to solve.
- ♦ Extract, interpret and analyze information from organized and displayed data by using:
  - ♦ frequency and distribution, including mode and range
  - ♦ central tendencies of data (mean and median)
  - ♦ indicators of dispersion (e.g., outliers)
- ♦ Predict and calculate the mean, median, mode and range from a set of data.
- ♦ Analyze information based on frequency and distribution.
- ♦ Assess and select the appropriate scale and interval for graphs or frequency tables.
- ♦ Examine the effect of extreme values on measures of central tendency.
- ♦ Assess and select the best measure of central tendency to represent data.
- ♦ Determine and understand the function of an outlier.
- ♦ Solve data problems by extracting, interpreting, and analyzing data.
- ♦ Use the results of data analysis to:
  - ♦ make predictions
  - ♦ develop convincing arguments
  - ♦ draw conclusions
- ♦ Predict and draw conclusions from data.
- ♦ Analyze data from simple line, bar, circle graphs, and scatter plots.
- ♦ Apply results of the data analysis to solve problems.
- ♦ Determine if the conclusion drawn is valid for the data presented.
- ♦ Construct and present arguments to support analysis and display of data.
- ♦ Formulate a hypothesis from multiple sets of actual data.
- ♦ Analyze the data to determine the criteria that makes the hypothesis true or false.
- ♦ Construct a database on the computer using charts or graphs.
- ♦ Prepare a presentation using technology and present it to the class.
- ♦ Evaluate presentations and statistical analyses from a variety of sources for:
  - ♦ credibility of the source
  - ♦ techniques of collection, organization and presentation of data
  - ♦ missing or incorrect data
  - ♦ inferences
  - ♦ possible sources of bias
- ♦ Determine if a source is credible and why.
- ♦ Evaluate techniques of collection, organization and presentation of data.
- ♦ Determine if any data is missing or incorrect and why.
- ♦ Determine the likelihood of occurrence of simple events by:
  - ♦ using a variety of strategies to identify possible outcomes (e.g., lists, tables, tree diagrams)
  - ♦ conducting an experiment
  - ♦ designing and conducting simulations
  - ♦ applying theoretical notions of probability (e.g., that four equally likely events have a 25% chance of happening)
  - ♦ employing appropriate grade level technology for presentations
- ♦ Use a variety of strategies to identify possible outcomes (lists, tables, tree diagrams.)

- ♦ Design and conduct an experiment.
- ♦ Design and conduct simulations.
- ♦ Apply theoretical notions of probability:
  - ♦ permutations
  - ♦ independent/dependent events

## Algebraic Relationships

- ♦ Use vocabulary symbols and notation of algebra correctly (n, n, =, <, >).
- ♦ Evaluate numerical and simple algebraic expressions using order of operations.
- ♦ Demonstrate the use of exponents in algebraic expressions.
- ♦ Solve real-life problems involving algebraic expressions.
- ♦ Write algebraic expressions from verbal phrases.
- ♦ Work with linear and nonlinear patterns and relationships in a variety of ways, including:
  - ♦ representing them with tables, with graphs and with algebraic expressions, equations and inequalities
  - ♦ describing and interpreting their graphical representations (e.g., slope, rate of change, intercepts)
  - ♦ using them as models of real-world phenomena
  - ♦ describing a real-world phenomenon that a given graph might represent
- ♦ Graph equations by plotting points.
- ♦ Complete function tables.
- ♦ Graph functions.
- ♦ Model algebraic expressions.
- ♦ Solve problems involving discounts and simple interest.
- ♦ Identify inequalities.
- ♦ Recognize, describe, and analyze functional relationships by generalizing a rule that characterizes the pattern of change among variables. These functional relationships include exponential growth and decay (e.g., cell division, depreciation)
- ♦ Use linear equations and inequalities in a variety of ways, including:
  - ♦ writing them to represent problem situations and to express generalizations.
  - ♦ solving them by different methods (e.g., informally, graphically, with formal properties, with technology).
  - ♦ writing and evaluating formulas (including solving for a specified variable).
  - ♦ using them to record and describe solution strategies.
- ♦ Identify, solve and graph linear equations by using mental math, the guess and check strategy (use of a replacement set) and inverse operations.
- ♦ Solve problems by using a formula.
- ♦ Solve equations:
  - ♦ proportions
  - ♦ linear equations using models
  - ♦ two-step equations using models
  - ♦ involving percents
- ♦ Solve and graph equations:
  - ♦ using rational numbers
  - ♦ with two variables
- ♦ Identify, solve and graph inequalities.
- ♦ Use a calculator to solve equations.
- ♦ Write algebraic equations from verbal sentences.
- ♦ Solve for a specified variable.
- ♦ Solve more complex problems by writing and solving an equation.
- ♦ Recognize and use generalized properties and relations, including:
  - ♦ additive and multiplicative property of equations and inequalities
  - ♦ commutativity and associativity of addition and multiplication
  - ♦ distributive property
  - ♦ inverses and identities for addition and multiplication
  - ♦ transitive property
- ♦ Recognize, use, and differentiate between the basic properties of arithmetic:

- ♦ Order/Commutative property for  $+/x$ .
- ♦ Zero property for  $+/x$ .
- ♦ One/Identity Property for  $x/\div$ .
- ♦ Inverse property for  $+/-$  and  $x/\div$  ( $12-3=9/9+3=12$ ).
- ♦ Property of one for  $x$  and  $\div$ .
- ♦ Associative property for  $+$  and  $x$  [ $5x(3x2)=(5x3)x2$ ].
- ♦ Distributive property.
- ♦ Identify and use addition, subtraction, multiplication and division properties of equality.

## **Health**

### **Mental Emotional Health**

Explain the difference between healthy behaviors and risk behaviors. Demonstrate the ability to use goal-setting and decision-making skills to enhance health. Demonstrate communication skills to build and maintain healthy relationships. Predict how decisions regarding health behaviors have consequences for self and others. Demonstrate ways to communicate care, consideration, and respect of self and others. Identify stress management strategies. Identify six suicide prevention skills to use when a person shows signs of suicide.

### **Family Living**

Analyze the possible causes of conflict of youth in schools and communities. Generate way to avoid and get assistance in threatening situations. Describe characteristics needed to be a responsible friend and family member. Describe how the behavior of family and peers contributes to ones physical, mental, emotional, and social health. Discuss ways family members deal with death of a family member, separation and divorce of parents, dating and remarriage, formation of a step-family, and new siblings. Weigh the balance of giving and taking in a healthful relationship. Distinguish between safe, risky, and harmful behaviors in relationships. Identify topics to include when discussing dating with parents.

### **Growth and Development**

List the physical changes that occur during puberty. State the function and care for the endocrine system. Explain what happens during a 28-day menstrual cycle. State the function and care of the reproductive system. Explain the process of conception. Describe the the development of the baby of the 1st, 2nd, and 3rd trimester of pregnancy. Discuss the problems that can occur during pregnancy Explain why abstinence is the best choice for teens.

### **Nutrition**

Identify the functions of each of the six basic classes of nutrients. Illustrate The Food Guide Pyramid showing the 5 basic food groups, examples of foods in each, and the number of servings each day. Comprehend concepts related to health promotion and disease related to health promotion and disease prevention. Explain why teens need to eat a variety of food combined with physical activity. Evaluate the information that is found on a food label. Analyze the validity of health information, products, and services. Recommend suggestions how to choose healthful foods. Recognize the importance of a safe food handling/cooking and kitchen. Identify steps to use to maintain a desirable weight. Recognize the causes, symptoms, and treatment for anorexia nervosa, bulimia, and obesity. Recognize the warning signs that indicate the negative body image.

### **Personal Health**

Recognize the importance of assuming responsibility for personal health behaviors. Demonstrate ways to care for the body. Explain why regular physical activity can help with weight managements and body composition. Identify the importance of why a person needs rest and sleep. Sketch out a physical fitness plan. Illustrate types of exercise to develop physical fitness. Identify the 5 areas of Phy. Fitness Identify the components of a complete workout. Demonstrate the steps of RICE for injuries. Design a physical fitness plan using the activity pyramid. Students role-play

### **Alcohol, Tobacco, and Other Drugs**

Explain why drugs have different effects on different body actions. Analyze the information on the labels of OTC drugs and prescription drugs. Summarize the effects of alcohol on the mind including decision-making, violence, depression, and suicide. Analyze the effects of alcohol on the body. Explain how smoking affects the cardiovascular and respiratory system. Discuss smoking-related conditions and diseases. Analyze how smoking affects appearance, relationships, and spending habits. Identify ways in which tobacco ads try to encourage teens to use tobacco products. Discuss the effects of controlled drugs and illegal drug use. Explain how drug misuse and abuse progresses to drug dependence. List support programs for drug dependent, family members, and friends. Demonstrate the ability to resist drug use and abuse.

## **Communicable and Chronic Diseases**

Understand the difference between communicable and non-communicable diseases. List behaviors that reduce the risk of being infected with a communicable disease. Discuss the cause, symptoms, and treatment for sexually transmitted diseases. Distinguish between safe, risky, and harmful behaviors in relationships. Outline how you can and cannot become infected with HIV/AIDS. Explain how HIV destroys the immune system.

## **Injury Prevention and Safety**

List the protective factors that reduce the risk of violence. Discuss the kinds of violent behavior and why it is important to recognize them. List anger management skills and conflict resolution skills. Explain the first aid procedures for emergency situations. Demonstrate how to perform life saving techniques. Examples are choking, rescue breathing, and CPR.

## **Consumer and Community Health**

Explain how technology/media influences the consumer. Discuss tempting appeals used in advertisements. Explain how to make a budget and why it is important. Explain why it is important to be cautious when purchasing products and services.

## **Environmental Health**

Analyze how environment and personal health are interrelated. Name products that can be sorted and recycled.