Grade Seven
History-Social Science Content Standards

California State Standards	Journey School Alignment	Remarks
World History and Geography: Medieval and Early Modern Times Students in grade seven study the social, cultural, and technological changes that occurred in Europe, Africa, and Asia in the years A. D. 500Ð 1789. After reviewing the ancient world and the ways in which archaeologists and historians uncover the past, students study the history and geography of great civilizations that were developing concurrently throughout the world during medieval and early modern times. They examine the growing economic interaction among civilizations as well as the exchange of ideas, beliefs, technologies, and commodities. They learn about the resulting growth of Enlightenment philosophy and the new examination of the concepts of reason and authority, the natural rights of human beings and the divine right of kings, experimentalism in science, and the dogma of belief. Finally, students assess the political forces let loose by the Enlightenment, particularly the rise of democratic ideas, and they learn about the continuing influence of these ideas in the world today.	**Overview** The seventh grade history/social science curriculum consists of 4 main lesson blocks. A main lesson block consists of 2 hours every morning 5 days per week for either 3 or 4 weeks in duration. Thus a 4 week main lesson block is 40 instruction hours. For later reference, the Seventh Grade History, Geography and Social Studies Blocks are designated with Roman Numerals as follows: I 4 weeks Geography of Africa and China II 3 weeks Late Medieval History, Renaissance & Reformation Europe III 3 weeks The Explorers: From the Silk Route to the New World IV 4 weeks Medieval History in Africa, the Near East and the Far East During these blocks, students are presented with numerous biographies from which they construct and illustrate essays concerning Age of Discovery, Renaissance and Reformation. and Shakespearean England. Biographies include, but are not limited to, Marco Polo, Vasco da Gama, Columbus, Magellan, Cortez, Sir Walter Raleigh, Galileo, Tycho Brahe, Kepler, Michelangelo, Leonardo da Vinci, Raphael, Catherine de Medici, Vittoria Colonna, Lorenzo de Medici, William Shakespeare, Martin Luther and Queen Elizabeth. Also presented are biographies of Chinese explorers and reformists. In context of the great discoverers, students *review* the landscape, weather, and resources of the world continents; they draw color-coded maps of the continents' topography and land use; and they write research papers comparing and contrasting landscapes, resources and cultural differences. Additionally, students study Spanish language, culture, and geography, in an appreciation of South and Central America and Mexico. 2 classes weekly South American culture, geography and language. Studies in history and social science are also addressed within the context of other main lesson blocks. For example, the *Study of Astronomy* presents the history of the *Scientific Revolution* through the lives of Copernicus, Kepler, Brahe, etc. The *Study of Perspective Drawing* incorporates themes from the Renaissance such as the worldview behind the new architecture; how perspective drawing furthered exploration through better map projections; a new aesthetic attitude towards mountains, etc.	

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7.1 Students analyze the causes and effects of the vast expansion and ultimate disintegration of the Roman Empire. 1. Study the early strengths and lasting contributions of Rome (e.g., significance of Roman citizenship; rights under Roman law; Roman art, architecture, engineering, and philosophy; preservation and transmission of Christianity) and its ultimate internal weaknesses (e.g., rise of autonomous military powers within the empire, undermining of citizenship by the growth of corruption and slavery, lack of education, and distribution of news). 2. Discuss the geographic borders of the empire at its height and the factors that threatened its territorial cohesion. 3. Describe the establishment by Constantine of the new capital in Constantinople and the development of the Byzantine Empire, with an emphasis on the consequences of the development of two distinct European civilizations, Eastern Orthodox and Roman Catholic, and their two distinct views on church-state relations.	**7.1 Was taught in 6th grade extensively and will be reviewed in 7th for grade level understanding.** The history of the Roman Empire was studied for 3 to 4 week in the 6th grade. Students surveyed Roman life, architecture, engineering, the Latin language, law and government, the virtues expressed of the Republic, and the eventual decline during the time of Empire. That study also covered critical periods of Roman History such as the transition from monarchy to the founding of a Republic; the Samnite Wars where the whole of the Italian peninsula was acquired; the Wars with Pyrrus when the last of the Hellenistic world was cast off; and the Wars with Carthage—especially the 2nd Punic war with Hannibal. The reign of the Caesars followed and the expansion of the Empire as far westward as Britain was studied. The students also learned of Christian persecutions during the time of Nero, the reign of Constantine, and the eventual fall of Rome to Vandals in the 5th century. Much of this course was taught from primary sources such as the accounts of Livy and Seutonius.	
7.2 Students analyze the geographic, political, economic, religious, and social structures of the civilizations of Islam in the Middle Ages. 1. Identify the physical features and describe the climate of the Arabian peninsula, its relationship to surrounding bodies of land and water, and nomadic and sedentary ways of life. 2. Trace the origins of Islam and the life and teachings of Muhammad, including Islamic teachings on the connection with Judaism and Christianity. 3. Explain the significance of the Qur'an and the Sunnah as the primary sources of Islamic beliefs, practice, and law, and their influence in Muslims' daily life. 4. Discuss the expansion of Muslim rule through military conquests and treaties, emphasizing the cultural blending within Muslim civilization and the spread and acceptance of Islam and the Arabic language. 5. Describe the growth of cities and the establishment of trade routes among Asia, Africa, and Europe, the products and inventions that traveled along these routes (e.g., spices, textiles, paper, steel, new crops), and the role of merchants in Arab society. 6. Understand the intellectual exchanges among Muslim scholars of Eurasia and Africa and the contributions Muslim scholars made to later civilizations in the areas of science, geography, mathematics, philosophy, medicine, art, and literature.	**7.2 In Part:** In sixth grade history, students learned of: Byzantium, the Eastern Slavic and Western European cultures evolving at that time, the Court of Haroun al-Rashid (Persia), Mohammed and the rise of Islamic culture, the Arab expansion across northern Africa and into Spain, and the Crusades. The teacher emphasized important Arabian contributions to the development of European culture. 7.2.1 Covered in the 7th grade Block IV. 7.2.2 Covered in the 6th grade Block on the Medieval World; reviewed and expanded upon in 7th grade Block IV. 7.2.3 Studied in the 7th grade Block IV. 7.2.4 Introduced in the 6th grade block on the medieval world; reviewed and expanded upon in the 7th grade Block IV. 7.2.5 Introduced in the 6th grade study of the Court of Haroun al-Rashid; expanded upon in the 7th grade Block III. 7.2.6 Emphasized during Seventh grade block II; and also mentioned in the *Perspective Geometry* block (e.g. Optics studies by Arabian scholars led to the development of perspective drawing.)	

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7.3 Students analyze the geographic, political, economic, religious, and social structures of the civilizations of China in the Middle Ages. 1. Describe the reunification of China under the Tang Dynasty and reasons for the spread of Buddhism in Tang China, Korea, and Japan. 2. Describe agricultural, technological, and commercial developments during the Tang and Sung periods. 3. Analyze the influences of Confucianism and changes in Confucian thought during the Sung and Mongol periods. 4. Understand the importance of both overland trade and maritime expeditions between China and other civilizations in the Mongol Ascendancy and Ming Dynasty. 5. Trace the historic influence of such discoveries as tea, the manufacture of paper, wood-block printing, the compass, and gunpowder. 6. Describe the development of the imperial state and the scholar-official class.	**7.3 As Stated:** 7.3.1 through 7.3.6 are covered in Block I and Block IV. Attention is given to the Tang and Sung Dynasties; the rise of Taoism, Confucianism and Buddhism; The Chinese Renaissance of the Ming Dynasty, Observations by Marco Polo, The Silk route and the influence of the Far East on the West; The Mongol invasions and rise to power; social structures in China; the current influence of China on world politics and world economy.	
7.4 Students analyze the geographic, political, economic, religious, and social structures of the sub-Saharan civilizations of Ghana and Mali in Medieval Africa. 1. Study the Niger River and the relationship of vegetation zones of forest, savannah, and desert to trade in gold, salt, food, and slaves; and the growth of the Ghana and Mali empires. 2. Analyze the importance of family, labor specialization, and regional commerce in the development of states and cities in West Africa. 3. Describe the role of the trans-Saharan caravan trade in the changing religious and cultural characteristics of West Africa and the influence of Islamic beliefs, ethics, and law. 4. Trace the growth of the Arabic language in government, trade, and Islamic scholarship in West Africa. 5. Describe the importance of written and oral traditions in the transmission of African history and culture.	**7.4 In Part:** 7.4.1 through 7.4.5 are studied in Block I and Block IV	

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7.5 Students analyze the geographic, political, economic, religious, and social structures of the civilizations of Medieval Japan. 1. Describe the significance of Japan's proximity to China and Korea and the intellectual, linguistic, religious, and philosophical influence of those countries on Japan. 2. Discuss the reign of Prince Shotoku of Japan and the characteristics of Japanese society and family life during his reign. 3. Describe the values, social customs, and traditions prescribed by the lord-vassal system consisting of shogun, daimyo, and samurai and the lasting influence of the warrior code in the twentieth century. 4. Trace the development of distinctive forms of Japanese Buddhism. 5. Study the ninth and tenth centuries' golden age of literature, art, and drama and its lasting effects on culture today, including Murasaki Shikibu's Tale of Genji. 6. Analyze the rise of a military society in the late twelfth century and the role of the samurai in that society.	**7.5 In Part:** 7.5.1 through 7.5.6 are studied in Block IV	

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7.6 Students analyze the geographic, political, economic, religious, and social structures of the civilizations of Medieval Europe. 1. Study the geography of the Europe and the Eurasian land mass, including its location, topography, waterways, vegetation, and climate and their relationship to ways of life in Medieval Europe. 2. Describe the spread of Christianity north of the Alps and the roles played by the early church and by monasteries in its diffusion after the fall of the western half of the Roman Empire. 3. Understand the development of feudalism, its role in the medieval European economy, the way in which it was influenced by physical geography (the role of the manor and the growth of towns), and how feudal relationships provided the foundation of political order. 4. Demonstrate an understanding of the conflict and cooperation between the Papacy and European monarchs (e.g., Charlemagne, Gregory VII, Emperor Henry IV). 5. Know the significance of developments in medieval English legal and constitutional practices and their importance in the rise of modern democratic thought and representative institutions (e.g., Magna Carta, parliament, development of habeas corpus, an independent judiciary in England). 6. Discuss the causes and course of the religious Crusades and their effects on the Christian, Muslim, and Jewish populations in Europe, with emphasis on the increasing contact by Europeans with cultures of the Eastern Mediterranean world. 7. Map the spread of the bubonic plague from Central Asia to China, the Middle East, and Europe and describe its impact on global population. 8. Understand the importance of the Catholic church as a political, intellectual, and aesthetic institution (e.g., founding of universities, political and spiritual roles of the clergy, creation of monastic and mendicant religious orders, preservation of the Latin language and religious texts, St. Thomas Aquinas's synthesis of classical philosophy with Christian theology, and the concept of "natural law"). 9. Know the history of the decline of Muslim rule in the Iberian Peninsula that culminated in the Reconquista and the rise of Spanish and Portuguese kingdoms.	**7.6 Was taught in 6th grade extensively and will be reviewed in 7th for grade level understanding.** In sixth grade history, students were presented with a 3 to 4 week history block on the European Middle Ages. Continuing from the reign of Constantine, they learned of Byzantium, of the Eastern Slavic and Western European cultures evolving at that time, of Medieval Europe including feudalism and the everyday life in the castle (First Estate), monastery (Second Estate), village (peasantry, merchants, and guilds), and the raising of the great cathedrals. Studies continued with the Courts of Charlemagne, Alfred the Great (England), and Haroun al-Rashid (Persia). In the Arab world, students learned of the rise of Islamic culture following Mohammed, the Arab expansion across northern Africa and into Spain, and the eventual conflict of the Crusades. The teacher emphasized important Arabian contributions to the development of European culture. Also covered in the 6th in the *History of the Middle Ages* block were the Medieval Industrial Revolution employing water power, the Magna Carta, Arthurian Legends, the great plagues resulting in the beginnings of a merchant class; and selection(s) from the Canterbury Tales. 7.6.1 is studied in the 6th grade *Survey of European Geography* (4 weeks) 7.6.2-.9 are studied in the 6th grade *History of the Middle Ages*	

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7.7 Students compare and contrast the geographic, political, economic, religious, and social structures of the Meso-American and Andean civilizations. 1. Study the locations, landforms, and climates of Mexico, Central America, and South America and their effects on Mayan, Aztec, and Incan economies, trade, and development of urban societies. 2. Study the roles of people in each society, including class structures, family life, war-fare, religious beliefs and practices, and slavery. 3. Explain how and where each empire arose and how the Aztec and Incan empires were defeated by the Spanish. 4. Describe the artistic and oral traditions and architecture in the three civilizations. 5. Describe the Meso-American achievements in astronomy and mathematics, including the development of the calendar and the Meso-American knowledge of seasonal changes to the civilizations' agricultural systems.	**7.7 As Stated, in addition:** The civilizations of the Mayans, Aztecs, and Incas are studied in the 7th grade in context of the Block III on the Explorers--especially the Spanish conquest--also in twice weekly classes on South American language, geography, and culture. Students study 7.7.1 through 7.7.5 in seventh grade Block III.	
7.8 Students analyze the origins, accomplishments, and geographic diffusion of the Renaissance. 1. Describe the way in which the revival of classical learning and the arts fostered a new interest in humanism (i.e., a balance between intellect and religious faith). 2. Explain the importance of Florence in the early stages of the Renaissance and the growth of independent trading cities (e.g., Venice), with emphasis on the cities' importance in the spread of Renaissance ideas. 3. Understand the effects of the reopening of the ancient "Silk Road" between Europe and China, including Marco Polo's travels and the location of his routes. 4. Describe the growth and effects of new ways of disseminating information (e.g., the ability to manufacture paper, translation of the Bible into the vernacular, printing). 5. Detail advances made in literature, the arts, science, mathematics, cartography, engineering, and the understanding of human anatomy and astronomy (e.g., by Dante Alighieri, Leonardo da Vinci, Michelangelo di Buonarroti Simoni, Johann Gutenberg, William Shakespeare).	**7.8 As Stated, in addition:** The principal study of seventh grade history is its Block II and Block III studies of the European Renaissance and Explorations. Students analyze its origins, biographies, voyages and discoveries (Marco Polo, Vasco da Gama, Columbus, Magellan, etc.), arts, architecture, culture and diffusion. They learn of the rebirth of knowledge of the Classic world in myth, sonnet, fresco, and schools of learning (e.g. Marsilio Ficino). Students learn from biographies, letters, art, and architecture of the rise of Humanism and the ideal of the "Renaissance Man (or Woman) as master of many disciplines, also of the rise of banking with the Medici, and the promotion of art by secular patronage, etc. Students survey paintings by Leonardo, Raphael and Michelangelo. The beginnings of empirical science are found in curiosity and fascination with the natural world, Students have a first-hand experience of perspective drawing in the Geometry Block where related themes are covered, e.g. the scriptorium, and projective map-making for explorations. 7.8.4 See 7.9 on the Reformation	

7.7 Students compare and contrast the geographic, political, economic, religious, and social structures of the Meso-American and Andean civilizations. 1. Study the locations, landforms, and climates of Mexico, Central America, and South America and their effects on Mayan, Aztec, and Incan economies, trade, and development of urban societies. 2. Study the roles of people in each society, including class structures, family life, war-fare, religious beliefs and practices, and slavery. 3. Explain how and where each empire arose and how the Aztec and Incan empires were defeated by the Spanish. 4. Describe the artistic and oral traditions and architecture in the three civilizations. 5. Describe the Meso-American achievements in astronomy and mathematics, including the development of the calendar and the Meso-American knowledge of seasonal changes to the civilizations' agricultural systems.	**7.7 As Stated, in addition:** The civilizations of the Mayans, Aztecs, and Incas are studied in the 7th grade in context of the Block III on the Explorers--especially the Spanish conquest--also in twice weekly classes on South American language, geography, and culture. Students study 7.7.1 through 7.7.5 in seventh grade Block III.	
7.8 Students analyze the origins, accomplishments, and geographic diffusion of the Renaissance. 1. Describe the way in which the revival of classical learning and the arts fostered a new interest in humanism (i.e., a balance between intellect and religious faith). 2. Explain the importance of Florence in the early stages of the Renaissance and the growth of independent trading cities (e.g., Venice), with emphasis on the cities' importance in the spread of Renaissance ideas. 3. Understand the effects of the reopening of the ancient "Silk Road" between Europe and China, including Marco Polo's travels and the location of his routes. 4. Describe the growth and effects of new ways of disseminating information (e.g., the ability to manufacture paper, translation of the Bible into the vernacular, printing). 5. Detail advances made in literature, the arts, science, mathematics, cartography, engineering, and the understanding of human anatomy and astronomy (e.g., by Dante Alighieri, Leonardo da Vinci, Michelangelo di Buonarroti Simoni, Johann Gutenberg, William Shakespeare).	**7.8 As Stated, in addition:** The principal study of seventh grade history is its Block II and Block III studies of the European Renaissance and Explorations. Students analyze its origins, biographies, voyages and discoveries (Marco Polo, Vasco da Gama, Columbus, Magellan, etc.), arts, architecture, culture and diffusion. They learn of the rebirth of knowledge of the Classic world in myth, sonnet, fresco, and schools of learning (e.g. Marsilio Ficino). Students learn from biographies, letters, art, and architecture of the rise of Humanism and the ideal of the "Renaissance Man (or Woman) as master of many disciplines, also of the rise of banking with the Medici, and the promotion of art by secular patronage, etc. Students survey paintings by Leonardo, Raphael and Michelangelo. The beginnings of empirical science are found in curiosity and fascination with the natural world, Students have a first-hand experience of perspective drawing in the Geometry Block where related themes are covered, e.g. the scriptorium, and projective map-making for explorations. 7.8.4 See 7.9 on the Reformation	

7.9 Students analyze the historical developments of the Reformation. 1. List the causes for the internal turmoil in and weakening of the Catholic church (e.g., tax policies, selling of indulgences). 2. Describe the theological, political, and economic ideas of the major figures during the Reformation (e.g., Desiderius Erasmus, Martin Luther, John Calvin, William Tyndale). 3. Explain Protestants' new practices of church self-government and the influence of those practices on the development of democratic practices and ideas of federalism. 4. Identify and locate the European regions that remained Catholic and those that became Protestant and explain how the division affected the distribution of religions in the New World. 5. Analyze how the Counter-Reformation revitalized the Catholic church and the forces that fostered the movement (e.g., St. Ignatius of Loyola and the Jesuits, the Council of Trent). 6. Understand the institution and impact of missionaries on Christianity and the diffusion of Christianity from Europe to other parts of the world in the medieval and early modern periods; locate missions on a world map. 7. Describe the Golden Age of cooperation between Jews and Muslims in medieval Spain that promoted creativity in art, literature, and science, including how that cooperation was terminated by the religious persecution of individuals and groups (e.g., the Spanish Inquisition and the expulsion of Jews and Muslims from Spain in 1492).	**7.9 In Part:** 7.9.1 through 7.9.7 is studied primarily in Block II. Study of the Renaissance is followed by study of its diffusion as the European Reformation. They learn of the religious power structure of the Holy Roman Empire, then of the reformers Luther and Erasmus, their debate concerning freewill/pre-destination, and the eventual religious factionalism of the Thirty Years War. The Catholic Counter-Reformation and Baroque art are studied, the rise of nationhood is surveyed--especially the consolidation of France following the Hundred Years War. The printing press, the translation of the Bible into vernacular, and the woodcut picture book are surveyed for their contribution both to the dissemination of knowledge and the religious fervor of reform. 7.9.6 is studied in seventh grade Block III.	
7.10 Students analyze the historical developments of the Scientific Revolution and its lasting effect on religious, political, and cultural institutions. 1. Discuss the roots of the Scientific Revolution (e.g., Greek rationalism; Jewish, Christian, and Muslim science; Renaissance humanism; new knowledge from global exploration). \ 2. Understand the significance of the new scientific theories (e.g., those of Copernicus, Galileo, Kepler, Newton) and the significance of new inventions (e.g., the telescope, microscope, thermometer, barometer). 3. Understand the scientific method advanced by Bacon and Descartes, the influence of new scientific rationalism on the growth of democratic ideas, and the coexistence of science with traditional religious beliefs.	**7.10 In Part:** 7.10.1 is introduced in seventh grade history Block II and is extended in both the *Perspective Drawing* and *Physics and Astronomy Blocks*. 7.10.2 Copernicus, Tycho Brahe, Kepler and Galileo are studied in the Astronomy Block and the Physics Block. Newton will be studied in depth in 8th grade history and science where Physical Science is emphasized. 7.10.3 The Scientific Experimental Method and the process of inductive reasoning are applied in Physics block experiments. However, the history of the Scientific Revolution will be treated in the study of the Modern and Post-Modern world in 8th grade. The 8th grade studies of European History will usually begin with a survey of Baroque Absolutism (such as the court of Louis XIV in Versailles), then the Age of Reason and the Enlightenment, leading to the French Revolution. The Scientific Revolution and the rise of the mathematical and molecular paradigm will be studied in that context.	

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7.11 Students analyze political and economic change in the sixteenth, seventeenth, and eighteenth centuries (the Age of Exploration, the Enlightenment, and the Age of Reason). 1. Know the great voyages of discovery, the locations of the routes, and the influence of cartography in the development of a new European worldview. 2. Discuss the exchanges of plants, animals, technology, culture, and ideas among Europe, Africa, Asia, and the Americas in the fifteenth and sixteenth centuries and the major economic and social effects on each continent. 3. Examine the origins of modern capitalism; the influence of mercantilism and cottage industry; the elements and importance of a market economy in seventeenth-century Europe; the changing international trading and marketing patterns, including their locations on a world map; and the influence of explorers and map makers. 4. Explain how the main ideas of the Enlightenment can be traced back to such movements as the Renaissance, the Reformation, and the Scientific Revolution and to the Greeks, Romans, and Christianity. 5. Describe how democratic thought and institutions were influenced by Enlightenment thinkers (e.g., John Locke, Charles-Louis Montesquieu, American founders). 6. Discuss how the principles in the Magna Carta were embodied in such documents as the English Bill of Rights and the American Declaration of Independence.	**7.11 In Part:** 7.11.1 is studied in seventh grade Block III 7.11.2 is studied in seventh grade Blocks I and III 7.11.3 is studied in seventh grade Block III 7.11.4 The European Enlightenment will be studied at the beginning of 8th grade historical studies. 7.11.5 This will be presented in the 8th grade block known as *Revolutionaries and Romantics.* 7.11.6 This was presented in 6th grade Medieval History, but will be reintroduced in the 8th grade block *Revolutionaries and Romantics.*	

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Grade Seven
Science Content Standards

California State Standards	Journey School Alignment	Remarks
Focus on Life Science	**Overview** The Science Curriculum for the 7th Grade Year is comprised of several main areas of study taught in main lesson blocks. A main lesson block is usually a 4-week study for 2 hours every morning, 5 days a week. A 4-week study is 40 instructions hours. **Summary:** 5-weeks Life Science: Nutrition, Chemistry, Anatomy, Physiology 4-weeks Physics: Acoustics, Electromagnetism, Optics, Mechanics and Simple Machines 3/4-weeks Other Science not listed in CA standards for 7th Grade • Combustion • Formation of crystals –Inorganic Chemistry • Properties of acids, bases and salts - Inorganic Chemistry • Electricity • Solar system and galaxy - Astronomy: Additionally, students have 3 science classes per week to continue studies from main lesson blocks. One of the classes (usually taught on Fri.) focuses on mathematical applications in science.	
Cell Biology		
1. All living organisms are composed of cells, from just one to many trillions, whose details usually are visible only through a microscope. As a basis for understanding this concept: a. Students know cells function similarly in all living organisms. b. Students know the characteristics that distinguish plant cells from animal cells, including chloroplasts and cell walls. c. Students know the nucleus is the repository for genetic information in plant and animal cells. d. Students know that mitochondria liberate energy for the work that cells do and that chloroplasts capture sunlight energy for photosynthesis. e. Students know cells divide to increase their numbers through a process of mitosis, which results in two daughter cells with identical sets of chromosomes. f. Students know that as multicellular organisms develop, their cells differentiate.	**1a-f As stated, in addition:** An introduction to cellular biology is covered in the 5-week block known as *Nutrition, Chemistry, and Intro to Human Anatomy/ Physiology.* Students learn basic cell components and functions which they illustrate in their main lesson book. This study covers standards 1a - f.	

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Genetics		
2. A typical cell of any organism contains genetic instructions that specify its traits. Those traits may be modified by environmental influences. As a basis for under-standing this concept: a. Students know the differences between the life cycles and reproduction methods of sexual and asexual organisms. b. Students know sexual reproduction produces offspring that inherit half their genes from each parent. c. Students know an inherited trait can be determined by one or more genes. d. Students know plant and animal cells contain many thousands of different genes and typically have two copies of every gene. The two copies (or alleles) of the gene may or may not be identical, and one may be dominant in determining the phenotype while the other is recessive. e. Students know DNA (deoxyribonucleic acid) is the genetic material of living organisms and is located in the chromosomes of each cell.	**2a-e As stated, in addition:** In the Introduction to *Human Anatomy and Physiology* portion of the Life Science Block, students are introduced to the cellular division, reproduction, and growth of the embryo. Students learn of genetic transmission of inherited traits. A more detailed study of the physiology of the Reproductive System will follow in 8th grade *Physiology* Studies.	
Evolution		
3. Biological evolution accounts for the diversity of species developed through gradual processes over many generations. As a basis for understanding this concept: a. Students know both genetic variation and environmental factors are causes of evolution and diversity of organisms. b. Students know the reasoning used by Charles Darwin in reaching his conclusion that natural selection is the mechanism of evolution. c. Students know how independent lines of evidence from geology, fossils, and comparative anatomy provide the bases for the theory of evolution. d. Students know how to construct a simple branching diagram to classify living groups of organisms by shared derived characteristics and how to expand the diagram to include fossil organisms. e. Students know that extinction of a species occurs when the environment changes and that the adaptive characteristics of a species are insufficient for its survival.	**3a-e As stated, in addition:** As part of their study of *Intro to Human Anatomy/ Physiology*, students engage in studies of comparative anatomy. For example, the teeth of a predator, rodent, and bovine are compared to the teeth of an omnivore (human), noting the development of incisors, molars, and canine teeth. The skeleton of the hand is compared to skeletons of limbs of various animals: fins, talons, hooves, claws, etc. Students note the evolution of the three-toed hoof in the horse from its five-toed ancestor, then trace its development to the single hoof of a contemporary horse—an evolved middle digit. Species' environmental adaptations are studied, e.g. the shovel-like claws of the mole, the bovine digestive system, the nerve/sense development in raptor birds (eagles and hawks.) Students are introduced Darwin's Theory of Evolution. In context of geographic study and continental mapping, they contrast climatic zones, seasonal changes, landscapes, weather and resources. They understand the adaptive struggle for survival in context of both time and place. This investigation continues during the 3 science classes per week	

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Earth and Life History (Earth Science)		
4. Evidence from rocks allows us to understand the evolution of life on Earth. As a basis for understanding this concept: a. Students know Earth processes today are similar to those that occurred in the past and slow geologic processes have large cumulative effects over long periods of time. b. Students know the history of life on Earth has been disrupted by major catastrophic events, such as major volcanic eruptions or the impacts of asteroids. c. Students know that the rock cycle includes the formation of new sediment and rocks and that rocks are often found in layers, with the oldest generally on the bottom. d. Students know that evidence from geologic layers and radioactive dating indicates Earth is approximately 4.6 billion years old and that life on this planet has existed for more than 3 billion years. e. Students know fossils provide evidence of how life and environmental conditions have changed. f. Students know how movements of Earth's continental and oceanic plates through time, with associated changes in climate and geographic connections, have affected the past and present distribution of organisms. g. Students know how to explain significant developments and extinctions of plant and animal life on the geologic time scale.	**4a-g Was taught in 6th grade extensively and will be reviewed in 7th for grade level understanding.** Students were introduced to *Mineralogy and Geology* in a 3 to 4 week Earth Science block taught in the 6th grade. Topics included the study of volcanoes in contrast to sedimentary formations of the earth; the Limestone cycle and fossils; the Ring of Fire of the Pacific; the three basic kinds of geological formations and their derivatives; industrial uses of metals; gemstones; plate tectonics; geological time; the earth as a whole; mountain formation, the layers of the Grand Canyon, Coal and petroleum deposits, etc. They learned how mountains are formed; how caves are formed (the limestone cycle); geological time shown in sedimentary layers; land formations once covered by the sea; coal deposits showing proliferate growth; fossil finds of giant horsetails; sea-creature fossils at high altitudes, etc. 7th grade students continue those topics in context of their current study of Evolution. (See standard 3.0)	

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Structure and Function in Living Systems		
5. The anatomy and physiology of plants and animals illustrate the complementary nature of structure and function. As a basis for understanding this concept: a. Students know plants and animals have levels of organization for structure and function, including cells, tissues, organs, organ systems, and the whole organism. b. Students know organ systems function because of the contributions of individual organs, tissues, and cells. The failure of any part can affect the entire system. c. Students know how bones and muscles work together to provide a structural framework for movement. d. Students know how the reproductive organs of the human female and male generate eggs and sperm and how sexual activity may lead to fertilization and pregnancy. e. Students know the function of the umbilicus and placenta during pregnancy. f. Students know the structures and processes by which flowering plants generate pollen, ovules, seeds, and fruit. g. Students know how to relate the structures of the eye and ear to their functions.	**5a-g as Stated, in addition:** a-b The form, organization, and function of organs and tissues are studied in *Intro to Human Anatomy/Physiology* c While studying *Mechanics and Simple Machines,* students learn how the law of the lever applies to the human skeleton, (e.g. arms and legs), and how load-bearing forces are distributed across the arch of the foot, etc. d-e. Cellular reproduction, genetics, and the growth of the embryo are studied in the *Intro to Human Anatomy/Physiology*. A more detailed study of the physiology of the Reproductive System will follow in 8th grade *Physiology* Studies. f. This was introduced in the fifth grade block on *Botanical Studies*; it is reviewed in context of genetics and cell reproduction. g. A detailed examination of the physiology of eye and ear is intrinsic to the Physics block on *Acoustics* and *Optics*. The students learn and illustrate principles of physics applied to these organs. For example, students find optical application of both *camera obscura* and *double lens refraction*.	

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Physical Principles in Living Systems (Physical Science)	•	
6. Physical principles underlie biological structures and functions. As a basis for understanding this concept: a. Students know visible light is a small band within a very broad electromagnetic spectrum. b. Students know that for an object to be seen, light emitted by or scattered from it must be detected by the eye. c. Students know light travels in straight lines if the medium it travels through does not change. d. Students know how simple lenses are used in a magnifying glass, the eye, a camera, a telescope, and a microscope. e. Students know that white light is a mixture of many wavelengths (colors) and that retinal cells react differently to different wavelengths. f. Students know light can be reflected, refracted, transmitted, and absorbed by matter. g. Students know the angle of reflection of a light beam is equal to the angle of incidence. h. Students know how to compare joints in the body (wrist, shoulder, thigh) with structures used in machines and simple devices (hinge, ball-and-socket, and sliding joints). i. Students know how levers confer mechanical advantage and how the application of this principle applies to the musculoskeletal system. j. Students know that contractions of the heart generate blood pressure and that heart valves prevent backflow of blood in the circulatory system.	**6a-j As stated, in addition:** The intent and content of this standard are met in both *Physics* and *Intro to Human Anatomy/Physiology*. Studies of visible light and the eye (6a-e) and of musculoskeletal forces (6h, 6i) are interconnected by both main lesson blocks. The contraction of the heart and blood pressures (6j) is discussed with the physiology of the circulatory system in *Intro to Human Anatomy/Physiology*. Light transmission and reflection (6f, 6g) is studied in the *Physics* of light and optics. Additionally, the ear is discussed in both *Physics* acoustics and the *Intro to Human Anatomy/Physiology*. The *Physics* main lesson block concerns: • Acoustics – natural sounds, vibration and pitch, overtone and harmonics, timbre and qualitative differences of sound, chladni sound figures, sound conductivity in various media • Light and Optics – color phenomenon in nature, color perspective, complementary colors, projecting shadows, visible light EM spectrum, ray optics, lens refraction; the Newtonian and Goethean theories of color are compared. • Magnetism and electricity – the simple motor • Six basic machines – lever, gear, pulley, inclined plane, wedge and screw.	

Physical Principles in Living Systems (Physical Science)	•	
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Investigation and Experimentation		
7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will: a. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data. b. Use a variety of print and electronic resources (including the World Wide Web) to collect information and evidence as part of a research project. c. Communicate the logical connection among hypotheses, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence. d. Construct scale models, maps, and appropriately labeled diagrams to communicate scientific knowledge (e. g., motion of Earth's plates and cell structure). e. Communicate the steps and results from an investigation in written reports and oral presentations.	**7a-e As stated, in addition:** The study of Physics involves students with scientific observation and experimental procedure. They are involved in the set up and use of apparatus (e.g. volt meters, balances, lens systems, etc) for experiment with data collection. Students write reports which record materials used, procedures, hypotheses, observations, and conclusions. Students build models, draw schematics, and illustrate their observations with charts and diagrams.	

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Grade Seven

Mathematics Content Standards

California State Standards	Journey School Alignment	Remarks
By the end of grade seven, students are adept at manipulating numbers and equations and understand the general principles at work. Students understand and use factoring of numerators and denominators and properties of exponents. They know the Pythagorean theorem and solve problems in which they compute the length of an unknown side. Students know how to compute the surface area and volume of basic three-dimensional objects and understand how area and volume change with a change in scale. Students make conversions between different units of measurement. They know and use different representations of fractional numbers (fractions, decimals, and percents) and are proficient at changing from one to another. They increase their facility with ratio and proportion, compute percents of increase and decrease, and compute simple and compound interest. They graph linear functions and understand the idea of slope and its relation to ratio.	**Overview** Initially, students are introduced to the fundamental concepts and operations of algebra in a 3-week main lesson block *Introduction to Algebra*. From this time forward, students will complete the first five books of a 10 book *Key to Algebra* series published by **Key Curriculum Press.** (Books 6 through 8 will be used for practice in the 8th grade, and books 9 and 10 will be used for advanced students. Completion of all 10 books constitutes completion of a first year High School Freshman Algebra.) [The **Key Curriculum Press Key** *Algebra Books 1 to 4* are here abbreviated as KA 1 (Operations on Integers), KA 2 (Variables, Terms, and Expressions), KA 3 (Equations), KA 4 (Polynomials), KA 5 (Rational Numbers) Also, the teacher uses a State approved 7th grade math text as a source of practice problems.] Thereafter, students continue math studies during 3 periods per week. It is at this time that many details from the standards are considered. Particular emphasis is put to: • reviewing and strengthening skills with arithmetic operations (**Number Sense,** standards 1.2-1.3) • developing algebra skills (**Algebra and Functions,** standards 1.0-4.0) • applying business math formulas to described business and banking situations (**Number Sense,** standards 1.6-1.7) • learning strategies of *problem* solving. (**Mathematical Reasoning,** standards 1.1-1.3) • learning systems of measure, conversion , and practice simple formulas (**Measurement and Geometry**, standards 1.0-1.3) • building a deeper understanding of Geometry and the Pythagorean Theorem (**Measurement and Geometry**, standards 2.0-3.6) Also, during their Science Blocks studies (Astronomy, Physics, Nutrition, Chemistry and Human Anatomy), students encounter problems and data which requiring mathematical treatment. These include application of, statistical analysis, scientific notation, analysis of graphs and charts, and strategies of problem-solving.	

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Number Sense		
1.0 Students know the properties of, and compute with, rational numbers expressed in a variety of forms: 1.1 Read, write, and compare rational numbers in scientific notation (positive and negative powers of 10) with approximate numbers using scientific notation. 1.2 Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers. 1.3 Convert fractions to decimals and percents and use these representations in estimations, computations, and applications. 1.4 Differentiate between rational and irrational numbers. 1.5 Know that every rational number is either a terminating or repeating decimal and be able to convert terminating decimals into reduced fractions. 1.6 Calculate the percentage of increases and decreases of a quantity. 1.7 Solve problems that involve discounts, markups, commissions, and profit and compute simple and compound interest.	**1.0 - 1.7 As Stated, in addition:** 1.1 Scientific notation is learned and applied in studies of Physics and Astronomy, Nutrition, Chemistry and Physiology. 1.2-1.3 Students evidence understanding and mastery of the following: number line, real numbers, signed numbers, rational numbers, the magnitude of zero; set theory, methods of the four processes applied to signed, rational, and multiple digit numbers; inverse operations; factoring and operations with mixed numbers, estimation; and rounding. Students understand and recognize more complex number patterns and are able to work with prime numbers. 1.4 In context of their study of proportions in nature, students are introduced to the numerical concepts of pi and phi and learn to distinguish these from rational numbers. They understand pi pictorially and arithmetically. 1.5 Students evidence understanding and mastery of decimals, including: place value of decimal numbers; conversion of fractions to decimal numbers; conversion of decimals to percentages and percentages to decimals; use of decimals in the four basic processes; ordering of decimals, fractions, and mixed numbers by value (greater and lesser); and use of decimals in word problems; ratio and proportion. 1.6-1.7 Students can apply business math formulas to described business and banking situations (Bookkeeping terminology, reading bills calculations of percentages in overall expenses, discount, commission, salaries, selling price, margin and markup, profit, loss, mortgages, principal, simple and compound interest, interest income on checking and savings accounts, dividends, business loans, etc.)	

Number Sense		
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2.0 Students use exponents, powers, and roots and use exponents in working with fractions: 2.1 Understand negative whole-number exponents. Multiply and divide expressions involving exponents with a common base. 2.2 Add and subtract fractions by using factoring to find common denominators. 2.3 Multiply, divide, and simplify rational numbers by using exponent rules. 2.4 Use the inverse relationship between raising to a power and extracting the root of a perfect square integer; for an integer that is not square, determine without a calculator the two integers between which its square root lies and explain why. 2.5 Understand the meaning of the absolute value of a number; interpret the absolute value as the distance of the number from zero on a number line; and determine the absolute value of real numbers.	**2.0 - 2.5 As Stated, in addition:** 2.1 The rules of exponents are covered in KA 2. They are applied in the context of examining macroscopic and microscopic magnitudes in Science. 2.2-.4 Students demonstrate working understanding of the four mathematical processes with fractions and mixed numbers. Students are capable of reducing and expanding fractions by use of "lowest common denominator". These methods are presented in books 1-4 of the **Key to Algebra** series, and find application in the Science studies of Physics and Astronomy. 2.4 These concepts and operations are introduced and applied with the Pythagorean Theorem. Square numbers have been introduced in the sixth grade. 2.5 The concept of absolute value is covered in depth in KA 5. Facility with equations using absolute value is also developed in KA 5.	

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Algebra and Functions		
1.0 Students express quantitative relationships by using algebraic terminology, expressions, equations, inequalities, and graphs: 1.1 Use variables and appropriate operations to write an expression, an equation, an inequality, or a system of equations or inequalities that represents a verbal description (e.g., three less than a number, half as large as area A). 1.2 Use the correct order of operations to evaluate algebraic expressions such as 3(2x + 5)2. 1.3 Simplify numerical expressions by applying properties of rational numbers (e.g., identity, inverse, distributive, associative, commutative) and justify the process used. 1.4 Use algebraic terminology (e.g., variable, equation, term, coefficient, inequality, expression, constant) correctly. 1.5 Represent quantitative relationships graphically and interpret the meaning of a specific part of a graph in the situation represented by the graph.	**1.0 - 1.5 As Stated, in addition:** 1.1 Verbal descriptions as math operations occur throughout KA 1-5 1.2 Order of operations is studied in context of solving equations in KA 3 1.3 Simplifying Expressions is taught in KA 1, KA 2, KA 3, and is emphasized in work with polynomials KA 4. 1.4 Terminology is covered in the introductory block on Algebra; reinforced throughout the workbooks KA 1-5 1.5 Graphing of linear equations is introduced in the 3 -week Algebra block and studied further throughout the year. In-depth study of graphing is covered in KA 8 studied in the 8th grade.	
2.0 Students interpret and evaluate expressions involving integer powers and simple roots: 2.1 Interpret positive whole-number powers as repeated multiplication and negative whole-number powers as repeated division or multiplication by the multiplicative inverse. Simplify and evaluate expressions that include exponents 2.2 Multiply and divide monomials; extend the process of taking powers and extracting roots to monomials when the latter results in a monomial with an integer exponent.	**2.0 - 2.2 As Stated** 2.1 Covered in KA 2 as chapters on *Exponents* and *Equivalent Expressions* 2.2 Introduced in KA 2; reviewed and practiced in subsequent studies, e.g KA 4 on *Polynomials*.	
3.0 Students graph and interpret linear and some nonlinear functions: 3.1 Graph functions of the form y = nx2 and y = nx3 and use in solving problems. 3.2 Plot the values from the volumes of three-dimensional shapes for various values of the edge lengths (e.g., cubes with varying edge lengths or a triangle prism with a fixed height and an equilateral triangle base of varying lengths). 3.3 Graph linear functions, noting that the vertical change (change in y- value) per unit of horizontal change (change in x- value) is always the same and know that the ratio ("rise over run") is called the slope of a graph. 3.4 Plot the values of quantities whose ratios are always the same (e.g., cost to the number of an item, feet to inches, circumference to diameter of a circle). Fit a line to the plot and understand that the slope of the line equals the quantities.	**3.0 - 3.4 As Stated, in addition:** 3.1 Cartesian graphing of functions is introduced in the Algebra Block. Students plot parabolic, circular, and linear shapes and see the relationship of equation to form. 3.2 The seventh grade geometry curriculum focuses on plane geometry, perspective geometry construction, and study of proportions in nature. Solid geometry will be studied in the eighth grade where students apply formulas for calculating volumes of cylinders, prisms, spheres, etc. 3.3 Linear equations are introduced in the 3-week Algebra block. Students construct graphs on graph paper showing how slope of the line and its y-intercept are affected by values of the corresponding equation. 3.4 Students discover slope by plotting sequential terms of geometric series. More generally, *Analytic Geometry* is introduced as students plot a simple table which describes a geometric form.	

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4.0 Students solve simple linear equations and inequalities over the rational numbers: 4.1 Solve two-step linear equations and inequalities in one variable over the rational numbers, interpret the solution or solutions in the context from which they arose, and verify the reasonableness of the results. 4.2 Solve multistep problems involving rate, average speed, distance, and time or a direct variation.	**4.0 - 4.2 As Stated**	
Measurement and Geometry		
1.0 Students choose appropriate units of measure and use ratios to convert within and between measurement systems to solve problems: 1.1 Compare weights, capacities, geometric measures, times, and temperatures within and between measurement systems (e.g., miles per hour and feet per second, cubic inches to cubic centimeters). 1.2 Construct and read drawings and models made to scale. 1.3 Use measures expressed as rates (e.g., speed, density) and measures expressed as products (e.g., person-days) to solve problems; check the units of the solutions; and use dimensional analysis to check the reasonableness of the answer.	**1.0 - 1.3 As Stated, in addition:** 1.1 Measurement scales and conversions are introduced in the context of Physics. Students solve distance and rate problems, convert energy equivalents to joules, measure amperage, voltage, and resistance; and calculate cps (Hz), decibels, etc. Students participate in group activities involving measurement of length, volume, time, weight, mass and capacity. 1.2 There are many opportunities for architectural scaling are studied in Perspective Geometry—a 3-week main lesson study. Students draw exact reproductions of castles, skyscrapers, etc. 1.3 *Manipulation of units* occurs when *units* are treated as variables in math studies.	
2.0 Students compute the perimeter, area, and volume of common geometric objects and use the results to find measures of less common objects. They know how perimeter, area, and volume are affected by changes of scale: 2.1 Use formulas routinely for finding the perimeter and area of basic two-dimensional figures and the surface area and volume of basic three-dimensional figures, including rectangles, parallelograms, trapezoids, squares, triangles, circles, prisms, and cylinders. 2.2 Estimate and compute the area of more complex or irregular two-and three-dimensional figures by breaking the figures down into more basic geometric objects. 2.3 Compute the length of the perimeter, the surface area of the faces, and the volume of a three-dimensional object built from rectangular solids. Understand that when the lengths of all dimensions are multiplied by a scale factor, the surface area is multiplied by the square of the scale factor and the volume is multiplied by the cube of the scale factor. 2.4 Relate the changes in measurement with a change of scale to the units used (e.g., square inches, cubic feet) and to conversions between units (1 square foot = 144 square inches or [1 ft2] = [144 in2], 1 cubic inch is approximately 16.38 cubic centimeters or [1 in3] = [16.38 cm3])	**2.0 - 2.4 As Stated, with the exception of:** 2.1 - 2.3 Formulas of area and perimeter, introduced in 6th grade, are now extended to perimeter and surface area of more complex objects. Scaling of 2-dimensional objects is introduced in Perspective Geometry. (Also see KA 2 and KA 4) *However, objects in 3-Dimensions including volumes and 3D-scaling will be introduced in the 8th grade.* 2.4 Square measure conversions are studied in the 7th grade geometry; Manipulation of units occurs as units are treated as variables in math studies. *Solid geometry conversions are studied in the 8th grade math/ geometry curriculum.*	

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1.0 Students choose appropriate units of measure and use ratios to convert within and between measurement systems to solve problems: 1.1 Compare weights, capacities, geometric measures, times, and temperatures within and between measurement systems (e.g., miles per hour and feet per second, cubic inches to cubic centimeters). 1.2 Construct and read drawings and models made to scale. 1.3 Use measures expressed as rates (e.g., speed, density) and measures expressed as products (e.g., person-days) to solve problems; check the units of the solutions; and use dimensional analysis to check the reasonableness of the answer.	**1.0 - 1.3 As Stated, in addition:** 1.1 Measurement scales and conversions are introduced in the context of Physics. Students solve distance and rate problems, convert energy equivalents to joules, measure amperage, voltage, and resistance; and calculate cps (Hz), decibels, etc. Students participate in group activities involving measurement of length, volume, time, weight, mass and capacity. 1.2 There are many opportunities for architectural scaling are studied in Perspective Geometry—a 3-week main lesson study. Students draw exact reproductions of castles, skyscrapers, etc. 1.3 *Manipulation of units* occurs when *units* are treated as variables in math studies.	
2.0 Students compute the perimeter, area, and volume of common geometric objects and use the results to find measures of less common objects. They know how perimeter, area, and volume are affected by changes of scale: 2.1 Use formulas routinely for finding the perimeter and area of basic two-dimensional figures and the surface area and volume of basic three-dimensional figures, including rectangles, parallelograms, trapezoids, squares, triangles, circles, prisms, and cylinders. 2.2 Estimate and compute the area of more complex or irregular two-and three-dimensional figures by breaking the figures down into more basic geometric objects. 2.3 Compute the length of the perimeter, the surface area of the faces, and the volume of a three-dimensional object built from rectangular solids. Understand that when the lengths of all dimensions are multiplied by a scale factor, the surface area is multiplied by the square of the scale factor and the volume is multiplied by the cube of the scale factor. 2.4 Relate the changes in measurement with a change of scale to the units used (e.g., square inches, cubic feet) and to conversions between units (1 square foot = 144 square inches or [1 ft2] = [144 in2], 1 cubic inch is approximately 16.38 cubic centimeters or [1 in3] = [16.38 cm3])	**2.0 - 2.4 As Stated, with the exception of:** 2.1 - 2.3 Formulas of area and perimeter, introduced in 6th grade, are now extended to perimeter and surface area of more complex objects. Scaling of 2-dimensional objects is introduced in Perspective Geometry. (Also see KA 2 and KA 4) *However, objects in 3-Dimensions including volumes and 3D-scaling will be introduced in the 8th grade.* 2.4 Square measure conversions are studied in the 7th grade geometry; Manipulation of units occurs as units are treated as variables in math studies. *Solid geometry conversions are studied in the 8th grade math/ geometry curriculum.*	

3.0 Students know the Pythagorean theorem and deepen their understanding of plane and solid geometric shapes by constructing figures that meet given conditions and by identifying attributes of figures: 3.1 Identify and construct basic elements of geometric figures (e.g., altitudes, mid-points, diagonals, angle bisectors, and perpendicular bisectors; central angles, radii, diameters, and chords of circles) by using a compass and straightedge. 3.2 Understand and use coordinate graphs to plot simple figures, determine lengths and areas related to them, and determine their image under translations and reflections. 3.3 Know and understand the Pythagorean theorem and its converse and use it to find the length of the missing side of a right triangle and the lengths of other line segments and, in some situations, empirically verify the Pythagorean theorem by direct measurement. 3.4 Demonstrate an understanding of conditions that indicate two geometrical figures are congruent and what congruence means about the relationships between the sides and angles of the two figures. 3.5 Construct two-dimensional patterns for three-dimensional models, such as cylinders, prisms, and cones. 3.6 Identify elements of three-dimensional geometric objects (e.g., diagonals of rectangular solids) and describe how two or more objects are related in space (e.g., skew lines, the possible ways three planes might intersect).	**3.0 - 3.6 As Stated, in addition:** 3.1 - 3.2 Basic geometrical concepts were introduced in fifth grade in freehand geometry, and were extended in sixth grade with artistic constructions based on compass divisions of the circle. This is furthered in seventh grade, applying terminology from Euclidian geometry (circumference, radius, diameter, angles, arcs and chords of a circle, interior angles, quadrilaterals) and the calculation of perimeters and surface areas of more complex objects (regular polygons, platonic solids). Additionally, students learn to construct with compass, straight edge and protractor. They participate in construction of angles, bisection of angles, bisection of line segments, construction of perpendiculars, perpendicular bi-sectors, parallel lines, and regular polygons. 3.2 Students plot simple geometric figures on a Cartesian graph in the *Introduction to Algebra* Block. They create symmetrical forms mirrored across axes and through points. 3.3 Practical proof of the Pythagorean Theorem is usually demonstrated on the tile of the classroom floor, which students then transfer to graph paper. In the following weeks, they are given problems involving practical application in finding the unknown side of a right triangle. 3.4 This study begins in 5th grade freehand geometry, (e.g. similar triangles) and is developed into the Euclidian concept of congruence in the 7th grade. 3.5 The students create many planar figures 7th grade geometry. Three dimensional representations are studied and constructed in 7th grade Perspective Geometry. In the study of 8th grade Solid Geometry, students create the Platonic solids (e.g. tetrahedron, cube, etc.) from planar templates constructed with compass and straight edge. 3.6 Three Dimensionality is studied in the seventh grade Perspective Drawing Block and is developed in eighth grade studies of Solid Geometry.	

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Statistics, Data Analysis, and Probability		
1.0 Students collect, organize, and represent data sets that have one or more variables and identify relationships among variables within a data set by hand and through the use of an electronic spreadsheet software program: 1.1 Know various forms of display for data sets, including a stem-and-leaf plot or box-and-whisker plot; use the forms to display a single set of data or to compare two sets of data. 1.2 Represent two numerical variables on a scatterplot and informally describe how the data points are distributed and any apparent relationship that exists between the two variables (e.g., between time spent on homework and grade level). 1.3 Understand the meaning of, and be able to compute, the minimum, the lower quartile, the median, the upper quartile, and the maximum of a data set.	**1.0 - 1.3 As Stated** Students are introduced to several ways of representing data sets, both during their study of Geography and weekly math classes. By use of box and whisker plots, scatter plots, and stem-and-leaf plot, histogram, etc. the students analyze data such as population distribution, economy, manufacture, education, etc. In constructing box and whisker plot, they learn to compute the median, upper and lower quartile, etc. Students find averages when working with data.	
Mathematical Reasoning		
1.0 Students make decisions about how to approach problems: 1.1 Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns. 1.2 Formulate and justify mathematical conjectures based on a general description of the mathematical question or problem posed. 1.3 Determine when and how to break a problem into simpler parts.	**1.0 - 1.3 As Stated** Strategies for solving word problems are studied during the weekly math practice periods--see **Overview**. Students learn problem-solving strategies in context of solving equations and formulas in Physics. This includes discrimination of relevant from irrelevant information, extraction of data, breaking a problem into necessary steps, etc.	
2.0 Students use strategies, skills, and concepts in finding solutions: 2.1 Use estimation to verify the reasonableness of calculated results. 2.2 Apply strategies and results from simpler problems to more complex problems. 2.3 Estimate unknown quantities graphically and solve for them by using logical reasoning and arithmetic and algebraic techniques. 2.4 Make and test conjectures by using both inductive and deductive reasoning. 2.5 Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning. 2.6 Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work. 2.7 Indicate the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy. 2.8 Make precise calculations and check the validity of the results from the context of the problem.	**2.0 - 2.8 As Stated** 2.1 This includes the ability to estimate long division. 2.6 Students independently use pencil and paper to complete calculations with accuracy of format and answer (on a daily basis). Students listen to complex (grade appropriate) word problems and mentally calculate the response to the question posed. Students extract pertinent data from word problems and calculate an answer (correct answer is not so important as correct process).	

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