

## CURRICULUM

STEM Junior High will align its curriculum with benchmarks for each content area based on Colorado Academic Standards and Douglas County School District Essential Learning Standards for grades 6-8.

### **STEM Junior High Educational Plan**

STEM Junior High is dedicated to providing an outstanding liberal arts education, with a focus on science and technology. Our curriculum is designed to ensure 100% student proficiency on state standards in math, science and English and a 90% student acceptance and graduation rate from four-year colleges. By starting in the sixth grade, we feel we can reach this ambitious goal. In order to meet these goals, our academic program is founded on the following principles:

**High Expectations:** All students are required to complete a rigorous college-preparatory curriculum that includes seven years of secondary math through pre-calculus – regardless of their math level when they enter STEM Junior High in the 6th grade (provided they continue the program provided at STEM High School). Students who enter STEM in the 6<sup>th</sup> grade will be required to complete eight years of integrated laboratory science (STEM Junior/Senior High). There is no remedial track at STEM Junior/Senior High School. However, intervention is available for new students enabling them an opportunity to align themselves with the rest of the class they entered. Every student completes the core curriculum or a challenge course in each subject. STEM Junior High requirements will exceed Colorado's higher education entrance requirements. The Colorado Academic Standards for 6<sup>th</sup> through 8<sup>th</sup> grade are provided in Appendix A. The Douglas County Essential Learning Standards for 6<sup>th</sup> through 8<sup>th</sup> grade are provided in Appendix B. There are only two subjects that have Essential Learning Standards provided by Douglas County School District: Science and Social Studies. Other Essential Learning Standards will be added once the district has made them available. Appendix C has the timeline for the first year to meet the Douglas County ends statements.

**High-Accountability School Culture:** STEM Junior High has created a high-accountability culture where doing your best in your classes is expected.

- A homeroom adviser for every student, who will check student readiness in the mornings (check planners, binder organization), monitors student performance and maintains regular communication with parents/guardians. This provides an environment to help students become more responsible for their school performance and organizational skills.

- The homeroom adviser also encourages students to take responsibility for their actions, to familiarize them with good character traits, to introduce them to role models, and to help develop good citizens with high moral values. The family is the most important place for character and moral education, but the public schools are partners with the family. We share, as public school educators, the responsibility to reinforce the shaping of moral behavior that families are trying to encourage.
- College Prep, a required after-school study hall for students who have not completed their homework. Requiring students to stay for study hall when homework is not completed teaches students responsibility for their own academic growth and performance.
- Mandatory teacher tutoring for students who fail a quiz or test or need support. This service helps students who are struggling with certain subjects to get help so they can be successful throughout the school year.
- A learning culture that communicates to students that learning the concepts and skills is more important than grades. STEM type projects that are assigned at the different grade levels will allow the students to demonstrate what they have learned about a particular topic in ways that are different than the traditional paper assessment.
- Monthly recognition of students for academic effort and success and demonstrating core values.

**Balanced Curriculum Approach:** STEM Junior High has a balanced pedagogical approach that includes:

- Combined traditional and inquiry-based instructional practices to ensure that students master both concepts and skills in all of their classes.
- Spiraling of concepts in our teaching, so that students revisit core skills many times throughout the year.
- Real-world application and project-based learning that reinforce important basic skills in a pragmatic, inquiry-based setting.

**Use of Technology:** STEM Junior High employs our technology to transform teaching and learning in the following ways:

- Pedagogy that utilizes technology to enhance and transform outstanding teaching practices.

- The use of technology throughout school-wide assessment practices to efficiently analyze and act on data.

## Core Curriculum

STEM Junior High will use the Core Knowledge Sequence. We plan to supplement Core Knowledge with several carefully selected programs in language arts, mathematics, science, technology, and character development as well as including any elements of Colorado Academic State and District standards not addressed by Core Knowledge. The Core Knowledge Sequence is a research-based program that is utilized in hundreds of schools across the country and is based on the premise that a grade-by-grade core of common learning is necessary to ensure a sound and fair elementary education. The Core Knowledge curriculum was developed by Dr. E. D. Hirsch, Jr. and is based on a large body of research in cognitive psychology, as well as a careful examination of several of the world's fairest and most effective school systems. Dr. Hirsch has argued that, for the sake of academic excellence, greater fairness, and higher literacy, early schooling should provide a solid, specific, shared core curriculum in order to help students establish strong foundations of knowledge. The Core Knowledge Sequence prepares students for a lifetime of learning in a manner that can be described as solid, sequenced, specific, and shared. (Appendix E provides the Core Knowledge sequence for 7<sup>th</sup> through 8<sup>th</sup> grade)

- **Solid**— grade by grade comprehensive outline including history, language arts, science, math, art, music and more for kindergarten through 8th grade
- **Sequenced**— builds upon prior knowledge, preventing repetition and gaps as well as ensuring a deep and broad comprehension of subject matter
- **Specific**— allows teachers to count on prior knowledge and ensures that every student is fully prepared to move on to the next grade
- **Shared**— prepares students to enter the world with a common body of knowledge

The Core Knowledge Sequence maps out a complete program in kindergarten through grade 8 that provides the student with a broad-based education, free of significant gaps. It clearly defines the content knowledge and skills that each student must be taught at each grade level. It also fosters high levels of academic expectations. In addition, the Core Knowledge curriculum not only eliminates some of the gaps and repetition characterized in standard curriculum's, but it also aids in delivering cultural literacy in a systematic manner while leaving room for creativity.

(<http://coreknowledge.org/CK/about/6-8glance.htm>)

## Science

The first aim of the middle school science curriculum is to foster and enhance an interest in science and technology, while at the same time establishing a basic foundation in biology, botany, chemistry, physics, and earth and environmental sciences. The Core Knowledge Sequence covers scientific concepts that build from grade to grade. STEM Junior High will select textbooks and programs that align with the Core Knowledge curriculum, such as Prentice Hall texts. The Core Knowledge curriculum will be augmented to ensure alignment with the Colorado Academic Standards (Appendix A) and the Douglas County Essential Learning Standards (Appendix B) for STEM Junior High School. Students will experience science in a variety of ways: in the classroom, labs, and several STEM based projects to augment the section of science being studied. Through the Math, Science, and Technology (MST) Discovery Week program, students will be given additional exposure to the applications and implications of scientific concepts learned in the Core Knowledge curriculum.

Other STEM related activities include Science Fairs, Lego® Robot Design, Chemistry Olympiad, Craftsman/NSTA Young Inventors Awards, ExploraVision, Intel International Science and Engineering Fair, Science Olympiad, Team America Rocketry Challenge, National Science Bowl Computer and Technology Related, ThinkQuest Internet Challenge, USA Computing Olympiad, FIRST Robotics Competition, and SimCity Future City Design.

The curriculum for each grade in the middle school has been outlined. There are several examples in the curriculum for 6<sup>th</sup> grade that add a STEM emphasis to the course. The 7<sup>th</sup> and 8<sup>th</sup> grade will have a similar STEM emphasis added to augment the Core Knowledge base information. The principal will make the final decision on the STEM emphasis for this subject.

## **Curriculum for 6<sup>th</sup> grade**

### **Earth Science**

- Describe Earth's origins and how the solar system was formed
- Identify the layers of the Earth and their characteristics: Crust, Lithosphere, Mantle, Inner and Outer core
- Examine the evidence for Continental Drift
- Use Continental Drift Theory to evaluate and describe plate tectonics
- Discuss and evaluate sea floor spreading
- Identify and explain causes of trenches and mountains
- Describe and analyze volcanoes and explain the dangers of volcanic eruptions
- Explain earthquakes and examine their cause
- Describe the Richter scale explain how it is used
- Explain what causes waves and tides
- Identify parts of a wave
- Describe ocean circulation and identify the major ocean currents
- Identify the parts of the ocean floor
- List, label and identify certain types of ocean life, how they live and food webs

- An example of a real world application and relevance with the STEM emphasis would be to visit the USGS (United States Geological Survey) in Golden to see how they track and monitor earthquakes. USGS monitors earthquake activity and develops models in order to predict earthquake activity.

### **Astronomy**

- Describe the force of gravity and explain the gravitational equation
- Discuss Isaac Newton and explain the two factors
- Identify and explain what stars are and the life cycle of stars
- Explain what constellations are and identify certain major ones like the big dipper, little dipper and the North star
- Explain what galaxies are and identify parts of the Milky Way galaxy.
- Because of the ties that our community has to the aerospace industry, there are several opportunities for the students to engage in STEM projects geared to enhance their interest in space technology with various industry partners. This will allow the students to make connections with real world problems and ways to solve them.

### **Energy, Heat and Energy Transfer**

- Identify the parts of an atom: electron, proton and neutron and explain their functionality within the atom
- Identify the states of matter and explain the differences between solid, liquid and gases
- Explain temperature and phase changes and how they affect each state of matter
- Discuss expansion and contraction, conduction, convection, radiation
- Explain the different forms of energy, energy resources
- Compare and contrast the different forms of energy and their environmental risks
- Examine the greenhouse effect.
- STEM related projects involving different types of energy resources, such as solar energy, and wind energy will be used to enhance understanding of the energy used today and energy possibilities of tomorrow.

### **Human Body**

- Discuss the circulatory system and explain why it is important to the human body
- Identify the parts of the circulatory system
- Explain the lymphatic system and its purpose to the human body
- Examine both non-communicable and communicable diseases
- Compare and contrast bacterial versus viral diseases
- Explain the immune system and how it protects the human body
- Examine how antibiotics work in the human body
- Discuss vaccines and how they work in the system
- Opportunities for students to study diseases such as diabetes will be made available through connections with various medical establishments.

Understanding just how important diet and exercise are throughout life will also be emphasized.

In addition to these topics, there will be additional study of certain scientists such as Marie Curie and Lewis Howard Latimer to develop an understanding of the contributions of great scientists of the past.

## Curriculum for 7<sup>th</sup> grade

### Atomic Structure

- Review Structure of atoms: protons, neutron, electrons
- Discuss compounds: how they are formed, describe how compound properties are different from the constituent elements.
- Explain early theories of matter: Greek theory of the four elements: earth, air, fire and water
- Describe later theories of Democritus: everything is made of atoms and nothing else (“atom” in Greek means that which can’t be cut or divided); atoms of the same kind form a pure “element”
- Describe Alchemy in middle ages
- Explain the start of modern chemistry
- Discuss Lavoisier and oxygen: the idea that matter is not gained or lost in chemical reactions
- Explain how and why John Dalton revives the theory of the atom.
- Understand how Mendeleev developed the Periodic Table, showing that the properties of atoms of elements come in repeating (periodic) groups.
- Describe Niels Bohr depiction of the atom and its significance in atomic theory: how shells hold a certain number of electrons, plus the discovery of neutrons, how his model helped explain the Periodic Table: atomic number, atomic weight, and isotopes.

### Chemical Bonds and Reactions

- Discuss ways atoms obtain a stable outer shell of electrons, atoms either give away, take on, or share electrons.
- Identify different chemical reactions and discuss how the reactions rearrange the atoms and the electrons in elements and compounds to form chemical bonds.
- Define Molecule: When single atoms combine with themselves or with other atoms, the result is a molecule.
- Identify different types of molecules: e.g. O<sub>2</sub> is a molecule of oxygen. NaCl is a molecule of salt, and because it has more than one element is called a compound.
- Describe Ionic bonding: Atoms like sodium that have just one or two extra electrons are very energetic in giving them away. Elements with the same number of extra or few electrons can join with each other to make an ionic bond. Example: NaCl, table salt.
- Describe Metallic bonding: In the metallic bond, electrons are not given away between elements, but are arranged so that they are shared between atoms. Pure

metals show this sharing, and the atoms can rearrange themselves in different ways, which explains why you can pound metals into different shapes.

- Describe Covalent bonding: Some atoms share electrons in a definite way, making them very stable and do not react. Examples are H<sub>2</sub> and O<sub>2</sub>. Carbon, which can take up or give away 4 electrons in covalent bonds, can help make molecules that can adopt almost any shape. It is the basis of life.
- Compare and contrast ionic, metallic and covalent bonding: how are they different and why
- Identify different kinds of chemical reactions: oxidation, reduction, acid-base
- Describe an oxidation reaction and identify examples: a chemical reaction that commonly involves oxygen. More generally, oxidation is a reaction in which an atom accepts electrons while combining with other elements. The atom that gives away electrons is said to be “oxidized”. Examples: rusting of iron, burning of paper. Heat is given off.
- Describe a reduction reaction and identify examples: the opposite of oxidation. Reduction involves the gaining of electrons. An oxidized material gives them away and heat is gained.
- Describe what acids are and identify some examples: vinegar, HCl, H<sub>2</sub>SO<sub>4</sub>; sour; turn litmus red
- Describe what bases are and identify some examples: baking soda; bitter; turn litmus blue
- Explain what pH is and how the scale is used: ranges from 0-14; neutral = 7, acid = below 7, base = above 7
- Explain how reactions with acids and bases happen
- Describe how a “salt” is formed: In a water solution, an acid compound has an H ion (a proton lacking an electron), and the base compound has an OH ion (with an extra electron). When the two come together, they form HOH (water) plus a stable compound called a “salt.”
- Explain how chemists describe reactions by equations, for example:  $\text{HCl} + \text{NaOH} = \text{NaCl} + \text{H}_2\text{O}$
- Define a catalyst and how it is used: a catalyst helps a reaction, but is not used up.
- STEM related projects for this section could include performing elementary chemical reactions in STEM Academy labs.

### **Cell Division and Genetics**

- Describe Cell division, the basic process for growth and reproduction
- Discuss the two types of cell division: mitosis (growth and asexual reproduction), meiosis (sexual reproduction)
- Describe Asexual reproduction: mitosis; diploid cells (as in amoeba)
- Describe Sexual reproduction: meiosis; haploid cells; combinations of traits
- Discuss how change occurs from one generation to another: either mutation or mixing of traits through sexual reproduction
- Explain why acquired characteristics are not transmitted
- Describe and understand Gregor Mendel’s experiments with purebred and hybrid peas

- Explain the difference between dominant and recessive genes
- Describe Mendel's statistical analysis led to understanding that inherited traits are controlled by genes (now known to be DNA).
- Explain the modern understanding of chromosomes and genes
- Describe the double helix (twisted ladder) of DNA coding; how DNA makes new DNA, how DNA sequence makes proteins; one gene equals one protein
- Explain what Genetic engineering is and what benefits/repercussions surround this issue
- Research Modern researchers in genetics: Francis Crick, James Watson, Severo Ochoa, Barbara McClintock.
- Write a paper on a genetic engineering researcher

### **History of the Earth and Life Forms**

- Define Paleontology
- Discuss fossils as a record of the Earth's history and past life forms
- Describe how fossils are formed, and types of fossils (mold, cast, trace, true-form)
- Illustrate and describe the idea of geologic time
- Discuss the age of the earth (about 4.6 billion years), based on geologic evidence and radioactive dating. Life has existed on earth for more than 3 billion years.
- Describe how movements of the earth's plates have affected the distribution of organisms
- Discuss the organization of geologic time and describe each era's environment and the animals that lived during that time: Scientists have organized the earth's history into four major eras:
  1. Precambrian Era (earliest forms of life, such as bacteria and blue-green algae; later in the period, invertebrates such as jellyfish)
  2. Paleozoic Era (Pangaea; invertebrate life, such as trilobites, early in this era, followed by development of vertebrates later in the era, including fish; development of insects, amphibians, and the beginnings of reptiles; development of simple plants, such as mosses and ferns)
  3. Mesozoic Era (Pangaea separates into continents; "Age of Reptiles"; dinosaurs, flowering plants, small mammals and birds)
  4. Cenozoic (Present) Era (Ice Age; mammoths; gradual development of mammals, birds and other animals recognizable today; humans; flowering plants, forests, grasslands)
- An example of a more in-depth look at geologic time would be a field trip to red rocks to see the Precambrian era rocks or the I-70 road cut would be a good way for the students to see the different era's in the form of layers in the rock.

### **Evolution**

- Define evolution: the change in a population of organisms over time caused by both genetic change and environmental factors.
- Define and discuss adaptation and mutation

- Describe and discuss some works by Charles Darwin: voyages of the *Beagle*; *Origin of Species* (1859)
- Define and describe natural selection as the mechanism of evolution: Darwin's theory that life forms better adapted to their current environment have a better chance of surviving and will pass on their traits to their offspring
- Describe trait variation and how it changes from generation to generation
- Discuss the evidence for the theory of evolution including comparative anatomy, geology, fossils, and DNA research.
- Discuss and define extinction and speciation
- Explain how extinction occurs and what happens afterward: extinction occurs when an environment changes and a species is no longer adapted to it. New species can develop when part of the population becomes separated and evolves in isolation. Life forms have evolved from simple organisms in oceans through amphibians to higher forms such as primates.

### Science Biographies

- Research and write a paper about the contributions to science from one or more of the sections that were discussed during the year.
  1. Charles Darwin (scientist known for theory of natural selection)
  2. Antoine Lavoisier (chemist who discovered the process of oxidation)
  3. Lise Meitner (physicist who helped discover nuclear fission)
  4. Dmitri Mendeleev (scientist who devised the periodic table)

## Curriculum for 8<sup>th</sup> grade

### Physics

#### Velocity and Acceleration

- Define and calculate velocity and speed and explain the differences between the two. The velocity of an object is the rate of change of its position in a particular direction. Speed is the magnitude of velocity expressed in distance covered per unit of time.
- Explain changes in velocity and how they affect speed and direction
- Define Average speed = total distance traveled divided by the total time elapsed and explain how this information is important when solving problems
- Discuss the formula: Speed = Distance/Time ( $S = D/T$ ) and explain how to use this equation
- Identify and name common units for measuring speed: miles or kilometers per hour

#### Force and motion

- Define the concept of force: force as a push or pull on an object. A force has both direction and magnitude (vector)

- Identify examples of common forces (such as gravity, magnetic force)
- Explain how to measure force and define common units of force in different systems of measure: mass, pounds in English system, Newton in metric system
- Explain “unbalanced forces”. What cause changes in velocity?
- If an object is subject to two or more forces at once, the effect is the net effect of all forces.
- Describe and explain Newton’s laws involving force: The motion of an object does not change if all the forces on it are in balance, having net effect of zero. The motion of an object changes in speed or direction if the forces on it are unbalanced, having net effect other than zero. To achieve a given change in the motion of an object, the greater the mass of the object, the greater the force required.
- Several experiments will be done to solidify the simple Newtonian physics ideas in order to create a basis for understanding when the topic is reintroduced in high school.

### **Density and Buoyancy**

- Define what a buoyant force is and when it occurs. When immersed in a fluid (i.e. liquid or gas), all objects experience a buoyant force. The buoyant force on an object is an upward (counter-gravity) force equal to the weight of the fluid displaced by the object.
- Define density and the units associated with the calculation  
Density = mass per unit volume
- Discuss the Relationship between mass and weight (equal masses at same location have equal weights)
- Discuss how to calculate density of regular and irregular solids from measurements of mass and volume
- Explain the experiment used to show the Archimedes principle
- Explain to predict whether an object will float or sink

### **Work**

- Define work and its relationship between force and distance: work is done when a force is exerted over a distance. Equation: Work equals Force x Distance ( $W = F \times D$ )
- Identify and use common units for measuring work: foot-pounds (in English system), joules (in metric system; 1 joule = 1 Newton of force x 1 meter of distance)

### **Energy**

- Define energy as defined in physics as the ability to do work.
  - Compare and contrast Energy from Work

- Explain how and why having energy, does not mean movement
- Explain how Work is the transfer of energy.
  - Identify and explain the difference between two main types of energy: kinetic and potential
  - Identify different types of potential energy: gravitational, chemical, elastic, electromagnetic
  - Identify different types of kinetic energy: moving objects, heat, sound and other waves
- Explain the Conservation of Energy in a system

### **Power**

- Define power and its relationship between work and time: a measure of work done
- (or energy expended) and the time it takes to do it. Equation: Power equals Work divided by Time ( $P = W/T$ ), or Power = Energy/Time
- Identify and use common units of measuring power: foot-pounds per second, horsepower (in English system); watts, kilowatts (in metric system)

## **Electricity and Magnetism**

### **Electricity**

- Identify basic terms and concepts
- Define Electricity: the charge of electrons in a conductor.
- Explain how opposite charges attract, like charges repel.
- Define and describe conductors and insulators
- Identify and describe open and closed circuits
  - Explain a short circuit: sudden surge of amperage due to the reduction of resistance in a circuit; protection from short circuits is achieved by fuses and circuit breakers
- Discuss electrical safety
- Explain electricity as the charge of electrons
  - Explain that electrons carry negative charge; protons carry positive charges
  - Define conductors: materials like metals that easily give up electrons
  - Define insulators: materials like glass do not easily give up electrons

### **Static electricity**

- Define a static charge (excess or deficiency) creates an electric field
- Explain a capacitor

- Explain that electric energy can be stored in capacitors (typically two metal plates, one charged positive and one charged negative, separated by an insulating barrier). Capacitor discharges can release fatal levels of energy.
- Explain how grounding drains excess or makes up a deficiency of electrons, because the earth is a huge reservoir of electrons. Your body is a ground when you get a shock of static electricity.
- Explain lightning is a grounding of static electricity from clouds.

### **Flowing electricity**

- Define electric potential and identify the units
  - Explain electric flow (current) and identify the units: 1 ampere = flow of 1 coulomb of charge per second (1 coulomb = the charge of 6.25 billion electrons). The total power of an electric flow over time is measured in watts. Watts = amps x volts; amps = watts/volts; volts = watts/amps.
- Identify unit of electrical resistance: ohm.

### **Sound Waves**

- Describe sound waves: longitudinal, compression waves, made by vibrating matter Identify examples: strings, wood, air
- Compare light and radio waves with sound waves traveling through a vacuum. Explain the difference between them: Sound waves need a medium through which to travel.

### **Speed**

- Describe how different mediums affect the speed of sound: sound goes faster through denser mediums, that is, faster through solids and liquids than through air (gases).
- At room temperature, sound travels through air at about 340 meters per second (1,130 feet per second).
- Discuss the idea of the speed of sound = Mach number, supersonic booms; breaking the sound barrier

### **Frequency**

- Describe what the frequency of sound waves is and how it are measured in “cycles per second” or Hertz (Hz)
- Identify audible frequencies and their frequencies (roughly between 20 and 20,000 Hz)
- Explain the relationship between higher frequencies and higher subjective “pitches”

### **Amplitude**

- Explain what wave amplitude is and its relationship to loudness. Identify the units of amplitude (decibels (dB)).
- Discuss the dangers of very loud sounds and how they affect hearing
- Describe what resonance is and identify examples: the soundboard of a piano, or plates of a violin

## **Chemistry of Food and Respiration**

- Identify the sun as a major source of energy for life on Earth (from sun, to plants, to animals, back to plants).
- Discuss how living cells get most of their energy through chemical reactions.
- Explain how living cells make and use carbohydrates (carbon and water), the simplest of these being sugars.
- Explain how living cells make and use proteins, often very complex compounds containing carbon, hydrogen, oxygen, and many other elements.
- Describe how to make these compounds and explain how this process involves chemical reactions that need water, and takes place in and between cells, across cell walls.
- Explain that the reactions also need catalysts called “enzymes.”
- Identify other product that cells make: fats, and explain what their use

### **Energy of Plants: Photosynthesis**

- Explain how plants get their energy: photosynthesis, do not need to eat other living things for energy
- Identify the main nutrients of plants: the chemical elements nitrogen, phosphorus, potassium, calcium, carbon, oxygen, hydrogen (some from soil or the sea, others from the air)
- Explain the process of Photosynthesis, using chlorophyll, converts these elements into more plant cells and stored food using energy from sunlight. Leafy plants mainly get their oxygen dissolved in water from their roots, and their carbon mainly from the gas CO<sub>2</sub>.
- Plant photosynthesis uses up CO<sub>2</sub> and releases oxygen.

### **Energy of Animals: Respiration**

- Discuss energy used for respiration in animals
  - Explain how animal chemical reactions do the opposite of plants- they use up oxygen and release CO<sub>2</sub>.
  - Compare and contrast the different processes surrounding energy generation in animals and plants.
  - Explain why animals cannot make carbohydrates, proteins, and fats from elements. They must eat these organic compounds from plants or other animals, and create them through respiration. Explain the balanced interdependence between plant and animal life

### **Human nutrition and respiration**

- Discuss humans eating habits: omnivores and can eat both plant and animal food.
- Explain human respiration, through breathing, gets oxygen to the cells through the lungs and the blood.

- Explain the importance of hemoglobin in the blood

### **Human health**

- Explain how humans get their vitamins
  - Discuss why a balanced diet: the food pyramid for humans (review); identification of the food groups in terms of fats, carbohydrates, proteins, vitamins, and trace elements are important to human health

### **Science Biographies**

Write an informative paper on one or more of the scientists that shaped physics, and chemistry within the human body. Examples are Albert Einstein (physicist whose theories of relativity allowed great advancements in the study of space, matter, energy, time, and gravity); Dorothy Hodgkin (chemist who determined the structure of vitamin B12); James Maxwell (scientist who created mathematical equations that expressed the basic laws of light, electricity, and magnetism) and Charles Steinmetz (scientist who made key advances in electric power)

## **Mathematics**

Saxon Math will be the program implemented for mathematics at STEM Junior High. The reasons for choosing Saxon Math are listed below. Instead of relying on rote memorization, Saxon math is taught incrementally, such that each lesson builds on previous lessons, resulting in a deep and lasting understanding. STEM Junior High plans to implement flexible grouping based on mastery of skills in conjunction with the Saxon Math program. This flexible ability grouping approach allows intervention for remedial course work to be added as needed. Appendix A shows the Colorado Academic Standards for math in grades 6-8. Appendix D outlines the syllabus for the SAXON Math in the middle school. Algebra 1 and Geometry are also shown for completeness.

STEM emphasis for the math department is to make sure that each student understands the relevance and real world applications for the topic they are studying. Math is a tool aiding understanding of the science and engineering behind different types of STEM related disciplines in which the students are exposed.

### **Incremental Instruction Distributed Across the Level**

In Saxon Math, each increment builds on the foundation of earlier increments, leading students to a deeper understanding of mathematical concepts. The instruction of related increments is carefully distributed throughout the grade level, ensuring that students have the opportunity to master each increment before being introduced to the next related one. Foundational research has shown that instruction that presents material to be learned over several intervals (distributed instruction) results in greater student achievement than instruction that is not distributed (English, Wellburn & Killian, 1934). Further studies

have confirmed that distributed instruction is more effective in a variety of subjects including mathematics (Dempster, 1988; Hintzman, 1974; Reynolds & Glasser, 1964).

### **Continual Practice Distributed Across the Level**

Practice of an increment is distributed continually across each grade level. Continual, distributed practice ensures that concepts are committed to students' long-term memory and that students achieve automaticity of basic math skills. Several research studies show that students who are taught with a mathematics curriculum that uses continual practice and review show greater skill acquisition and math achievement (Good & Grouws, 1979; MacDonald, 1984; Hardesty, 1986; Mayfield & Chase, 2002; Usnick, 1991; Ornstein, 1990; Hardesty, 1986; MacDonald, 1984; Good & Grouws, 1979). Additional studies have concluded that spaced (distributed) practice results in higher performance than massed practice (Dhaliwal, 1987; Proctor, 1980).

### **Cumulative Assessment Distributed Across the Level**

The frequent, cumulative assessments in Saxon Math assess both the acquisition and maintenance of concepts. Assessments are built into each fifth lesson to help teachers frequently gauge students' progress. And, since each of the assessments is cumulative, teachers can also monitor students' retention of skills. The Saxon Math assessment strategies are based on foundational research showing that more effective assessment is frequent and cumulative rather than infrequent or related only to content covered since the last test (Dempster, 1991).

In addition to Saxon Math, STEM Junior High will also use a program such as Accelerated Math, a part of Renaissance Learning, which is a computer-based math program that generates individualized practice and exercise assignments, diagnostic tests, and tests for each student. A program such as Accelerated Math will allow STEM Junior High to make sure students are getting individualized testing at their suitable level, and provides a framework to set up our own benchmarks and incentives. All data is stored online with these types of programs. The Math Department interprets the data and adjusts its instruction accordingly.

## **Curriculum for 6<sup>th</sup> through 8<sup>th</sup> grade**

Since each student is at a different level and STEM Junior High will use ability grouping, the curriculum for each 6<sup>th</sup> through 8<sup>th</sup> grade student will vary. Please see appendix D.

## **English-Language Arts**

The purpose of an effective Language Arts program is to cultivate personalized and purposeful literacy that ensures students' proficiency as learners across curricular areas and as skillful communicators and negotiators of information and meaning in authentic, real world contexts. It is also critical to personal and professional success beyond the classroom. Therefore STEM Junior High will integrate CDE Academic Standards (Appendix A) for reading, writing, speaking and listening within all classes ensuring that every student has an opportunity to learn and grow. The Language Arts teachers will

work with staff to promote collaboration among teachers and integration of Language Arts in content classes.

## **Curriculum for 6<sup>th</sup> grade**

This course focuses on reading comprehension, vocabulary development and writing. This is achieved through a variety of venues: poetry, structure in poetry, myths, stories and plays from the Core Knowledge Curriculum. These topics help students improve their abilities to critically analyze texts, write clear, comprehensible essays, as well as narrative and expository texts. Students also learn how to deliver focused, coherent presentations, and well-organized and persuasive speeches.

### **Content**

#### **1. Word Recognition and Vocabulary Development**

- A. Read aloud narrative and expository text fluently, identifying and interpreting figurative language and words with multiple meanings.
- B. Recognize the origins and meanings of frequently used foreign words in English and use these words accurately in speaking and writing.
- C. Monitor expository text for unknown words or words with novel meanings by using word, sentence, and paragraph clues to determine meaning.

#### **2. Reading Comprehension**

- A. Identify the structural features of popular media (e.g., newspapers, magazines, online information) and use the features to obtain information.
- B. Analyze text that uses the compare-and-contrast organizational pattern.
- C. Connect and clarify main ideas by identifying their relationships to other sources and related topics.
- D. Clarify an understanding of texts by creating outlines, logical notes, summaries, or reports.
- E. Determine the adequacy and appropriateness of the evidence for an author's conclusions.
- G. Make reasonable assertions about a text through accurate, supporting citations.
- H. Note instances of unsupported inferences, fallacious reasoning, persuasion, and propaganda in text.

#### **3. Literary Response and Analysis**

- A. Identify the forms of fiction and describe the major characteristics of each form.
- B. Analyze the effect of the qualities of the character (e.g., courage or cowardice, ambition or laziness) on the plot and the resolution of the conflict.
- C. Analyze the influence of setting on the problem and its resolution.
- D. Define how tone or meaning is conveyed in poetry through word choice, figurative language, sentence structure, line length, punctuation, rhythm, repetition, and rhyme.

- E. Identify the speaker and recognize the difference between first-person and third-person narration (e.g., autobiography compared with biography).
- F. Identify and analyze features of themes conveyed through characters, actions, and images.
- G. Explain the effects of common literary devices (e.g., symbolism, imagery, metaphor) in a variety of fictional and non-fictional texts.
- H. Critique the credibility of characterization and the degree to which a plot is contrived or realistic (e.g., compare the use of fact and fantasy in historical fiction).

#### **4. Grammar and Usage**

- A. Identify what constitutes a sentence and understanding the different pieces that construct a sentence.
- B. Identify the different types of sentences (simple, compound, complex and compound-complex)
- C. Explain the differences between active and passive voice in a sentence
- D. Analyze Greek and Latin Roots to help students recognize prefixes, suffixes and roots of words.

#### **5. Writing Strategies**

- A. Choose the form of writing (e.g., personal letter, letter to the editor, review, poem, report, narrative) that best suits the intended purpose.
- B. Create multiple-paragraph expository compositions and engage the interest of the reader and state a clear purpose.
- C. Develop the topic with supporting details and precise verbs, nouns, and adjectives to paint a visual image in the mind of the reader.
- D. Conclude with a detailed summary linked to the purpose of the composition.
- E. Use a variety of effective and coherent organizational patterns, including comparison and contrast; organization by categories; and arrangement by spatial order, order of importance, or climactic order.
- F. Use organizational features of electronic text (e.g., bulletin boards, databases, keyword searches, e-mail addresses) to locate information.
- G. Compose documents with appropriate formatting by using word-processing skills and principles of design (e.g., margins, tabs, spacing, columns, page orientation).
- H. Revise writing to improve the organization and consistency of ideas within and between paragraphs.

#### **6. Writing Applications (Genres and Their Characteristics)**

- A. Write narrative, expository, persuasive, and descriptive texts of at least 500 to 700 words in each genre.
- B. Write narratives:
  - Establish and develop a plot and setting and present a point of view that is appropriate to the stories.
  - Include sensory details and concrete language to develop plot and character.
  - Use a range of narrative devices (e.g., dialogue, suspense)

- C. Write expository compositions (e.g., description, explanation, comparison and contrast, problem and solution):
  - State the thesis or purpose.
  - Explain the situation.
  - Follow an organizational pattern appropriate to the type of composition.
  - Offer persuasive evidence to validate arguments and conclusions as needed.
- D. Write research reports:
  - Pose relevant questions with a scope narrow enough to be thoroughly covered.
  - Support the main idea or ideas with facts, details, examples, and explanations from multiple authoritative sources (e.g., speakers, periodicals, online information searches).
  - Include a bibliography.
- E. Write responses to literature:
  - Develop an interpretation exhibiting careful reading, understanding, and insight.
  - Organize the interpretation around several clear ideas, premises, or images.
  - Develop and justify the interpretation through sustained use of examples and textual evidence.
- F. Write persuasive compositions:
  - State a clear position on a proposition or proposal.
  - Support the position with organized and relevant evidence.
  - Anticipate and address reader concerns and counter arguments.

## 7. Written and Oral English Language Conventions

- A. Write and speak with a command of standard English conventions appropriate to this grade level.
- B. Use simple, compound, and compound-complex sentences; use effective coordination and subordination of ideas to express complete thoughts.
- C. Identify and properly use indefinite pronouns and present perfect, past perfect, and future perfect verb tenses; ensure that verbs agree with compound subjects.
- D. Use colons after the salutation in business letters, semicolons to connect independent clauses, and commas when linking two clauses with a conjunction in compound sentences.
- E. Use correct capitalization.
- F. Spell frequently misspelled words correctly (e.g., their, they're, there).
- G. Deliver focused, coherent presentations that convey ideas clearly and relate to the background and interests of the audience. Evaluate the content of oral communication.

## 8. Comprehension

- A. Relate the speaker's verbal communication (e.g., word choice, pitch, feeling, tone) to the nonverbal message (e.g., posture, gesture).
- B. Identify the tone, mood, and emotion conveyed in the oral communication.

- C. Restate and execute multiple-step oral instructions and directions.
- D. Select a focus, an organizational structure, and a point of view, matching the purpose, message, occasion, and vocal modulation to the audience.
- E. Emphasize salient points to assist the listener in following the main ideas and concepts.
- F. Support opinions with detailed evidence and with visual or media displays that use appropriate technology.
- G. Use effective rate, volume, pitch, and tone and align nonverbal elements to sustain audience interest and attention.
- H. Analyze the use of rhetorical devices (e.g., cadence, repetitive patterns, use of onomatopoeia) for intent and effect.
- I. Identify persuasive and propaganda techniques used in television and identify false and misleading information.

### 9. Speaking Applications (Genres and Their Characteristics)

- A. Deliver narrative presentations:
  - Establish a context, plot, and point of view.
  - Include sensory details and concrete language to develop the plot and character.
  - Use a range of narrative devices (e.g., dialogue, tension, or suspense).
- B. Deliver informative presentations:
  - Pose relevant questions sufficiently limited in scope to be completely and thoroughly answered.
  - Develop the topic with facts, details, examples, and explanations from multiple authoritative sources (e.g., speakers, periodicals, online information).
- C. Deliver oral responses to literature:
  - Develop an interpretation exhibiting careful reading, understanding, and insight.
  - Organize the selected interpretation around several clear ideas, premises, or images.
  - Develop and justify the selected interpretation through sustained use of examples and textual evidence.
- D. Deliver persuasive presentations:
  - Provide a clear statement of the position.
  - Include relevant evidence.
  - Offer a logical sequence of information.
  - Engage the listener and foster acceptance of the proposition or proposal.
- E. Deliver presentations on problems and solutions.
- F. Theorize on the causes and effects of each problem and establish connections between the defined problem and at least one solution.
- G. Offer persuasive evidence to validate the definition of the problem and the proposed solutions.

English at this level increases the student focus on expository writing. Students will also be given opportunities to also write fiction, poetry or drama. Reading strategies focus on comprehending informational materials through the use and analysis of categories of materials and assessment of an author's argument. In addition, student interactions with literary texts become more sophisticated. Students are expected to articulate the purposes and characteristics of different forms of prose, ranging from short stories to essays; identify events that advance the plot in a story and determine how each event explains past or present actions or foreshadows future actions; and analyze themes and characterization.

With regard to writing, this course provides increased instruction in documentation and argumentative support. Students are expected to write research reports that not only summarize existing data but that also analyze and assess these data. Students are expected to write multiple essays of at least 700 words each in the following categories: literary interpretation, argumentation, summaries, and research. Students are expected to demonstrate a command of formal Standard English.

With regard to speaking and listening, students are expected to deliver well-organized presentations using rhetorical strategies appropriate to a variety of situations, including presentations of research and summaries of articles and books. Standards for writing apply across the disciplines.

Please see Appendix E for specific information regarding the Core Knowledge sequence for 7<sup>th</sup> grade. In addition to the Core Knowledge sequence, additional instruction will be extended to the art of technical writing.

### **Curriculum for 8<sup>th</sup> grade**

Language Arts for the 8<sup>th</sup> grade continues to increase student focus on expository and argumentative texts. The skills and strategies mastered in 7<sup>th</sup> grade are further practiced and assessed, but for the purpose of exploring and articulating thematic elements in speech and writing. Traditional, canonical authors are the primary sources of literature, including poetry, drama, short stories, and novels. Essays are expanded to include students' interpretations of thematic elements, and to include articulate judgments about those thematic elements. Literature sources in 8<sup>th</sup> grade form the beginning of a foundation in knowledge of canonical texts, themes, and ideas, to be continued in the high school career.

Please see Appendix E for specific information regarding the Core Knowledge sequence for 8<sup>th</sup> grade. In addition to the Core Knowledge sequence, additional instruction will be extended to the art of technical writing.

### **History, World Civilizations, and Geography**

The Core Knowledge sequence thoroughly covers History, World Civilizations and Geography. We will select textbooks in this area that are in alignment with Core Knowledge as well as the Colorado Academic Standards (Appendix A) and Douglas County Essential Learning (Appendix B) requirements. As the students progress through these subjects, they should understand the shared values of a civilized society, be able to follow the threads throughout world history that provide a context for the founding of America, and trace the emergence of the principles on which our nation was founded. Additionally, these studies should provide a historical basis for the establishment of the modern world. Supplementing the Core Knowledge curriculum with the history of certain critical technologies, such as the computer, will provide students the understanding of how and when the technology we use today originated and the reason for its development.

## **Curriculum for 6<sup>th</sup> grade**

### **World Geography**

- Demonstrate knowledge of Latitude and Longitude on a map and why it is important for geographical studies.
- Predict the astronomical relationship between the Earth and sun. Understand the location of the North and South Pole, equator. Identify the changing of the seasons on all locations of the globe.
- Define what a Desert is and the locations of the important ones. (Sahara, Mojave, etc.) Understand how they are created, climate patterns, plant and animal life and the process of desertification.

### **Judaism and Christianity**

- Identify the Middle East and understand the idea of monotheism
- Summarize Abraham and the Covenant, and Moses and the Law
- Discuss Israel's Triumph, Defeat and Rebirth
- Discuss Christianity, the teachings of Jesus, death of Jesus and the spread of Christianity

### **Ancient Greece**

- Identify the City-States of Ancient Greece and the rivalries between Sparta and Athens.
- Describe the idea of Democracy as started in Athens
- Explain the Persian wars and the Golden Age
- Compare Greek philosophies of Plato, Socrates, and Aristotle
- Demonstrate knowledge of Alexander the Great and his conquering of the Persian Empire

### **Ancient Rome**

- Define the Roman Republic and identify what patricians and plebeians are.
- Discuss the Punic Wars

- Determine what caused the end of the Republic and why it happened (geographical, Julius Caesar, and the 1<sup>st</sup> emperor of Rome Octavian (Augustus))
- Discuss Augustus, and later emperors
- Analyze the rise of Christianity throughout the Roman Empire
- Determine the fall of the Roman Empire

### **The Enlightenment**

- Define the new way of thinking “The Enlightenment”
- Discuss Descartes, Newton and the Laws of Nature, Thomas Hobbes
- Describe John Locke and the natural rights of people, and Montesquieu
- Discuss the Enlightenment in America: idea of the Declaration of Independence where all men are created equal

### **The French Revolution**

- Discuss King Louis XIV, the three estates, Kings Louis XV and Louis XVI and Marie Antoinette.
- Determine what caused the fall of the Bastille
- Discuss the women’s march on Versailles and the document called “The Declaration of the Rights of Man”
- Discuss the Reign of Terror and how France came to using the guillotine on more than 1600 people.
- Analyze the rise of Napoleon, Napoleonic wars, invasion of Russia and the eventual exile of Napoleon

### **Romanticism**

- Define Romanticism and how it differs from classicism and neoclassicism
- Discuss Jean-Jacques Rousseau and his ideas about the state of nature
- Identify Romanticism in Literature and how it influenced different poets, painters, and musicians

### **Industrialism, Capitalism, Socialism**

- Define the Industrial Revolution
- Discuss how Railroads, the textile industry, and the Iron and Steel Industries are important to the Industrial Revolution
- Explain consequences of the Industrial Revolution
- Identify factory and living conditions prevalent during the Industrial Revolution
- Discuss child labor
- Explain the idea of Laissez Faire and how it would affect the economy
- Define Socialism
- Discuss Marxism
- Define Capitalism
- Discuss how a capitalistic society is structured and how it works.

### **Latin American Independence**

- Discuss overview of colonies in Latin America including Haiti and what is known as Colonial Mexico
- Describe Miguel Hidalgo and his role in Mexico's independence
- Discuss how Mexico gained its independence
- Explain Santa Anna's role in the Alamo's defeat, and Texan Independence
- Discuss Benito Juarez and his rise to become president of Mexico
- Discuss the Mexican Revolution, the revolutions in South and Central America and Independence for Brazil

### **Immigration to the United States**

- Describe the immigration from Ireland and Germany, the second wave, Jewish and Asian immigration
- Describe Ellis Island
- Explain the Immigrants in the Cities and their impact on such cities as New York, Boston, Chicago, and San Francisco.
- Analyze the meaning of "the Melting Pot"
- Discuss the Resistance to Immigrants
- Explain the meaning of "the land of opportunity"

### **Industrialization and Urbanization**

- Discuss the Age of Industry and the new types of inventions that were created (telephone)
- Describe the growth of industrial cities such as Pittsburgh, Cleveland and Chicago
- Discuss urban corruption, labor conditions, unions
- Identify the great industrialists of the era and describe what they contributed
- Discuss the attempts to regulate business

### **Reform**

- Discuss the rise of the Populists party and the alignment with the farmers
- Describe the Progressive era
- Discuss Socialism in America
- Discuss Theodore Roosevelt as the 26<sup>th</sup> president of America
- Describe the reform that African Americans faced during the Progressive Era, the campaign against lynching
- Discuss women's rights

## **Curriculum for 7<sup>th</sup> grade**

In earlier grades, the history guidelines in the Core Knowledge Sequence were organized into separate strands on World History and American History. Because the World and American History strands merged chronologically in sixth grade, here in seventh grade the Sequence presents a unified section on History and Geography. Central themes of the history guidelines in grades seven and eight are growth and change in American democracy, and interactions with world forces, particularly nationalism and

totalitarianism. Fundamental principles and structure of American government will be reviewed in a civics unit in eighth grade.

The study of geography aims at understanding the spatial relationship between nature and human culture and processes that change environments. Following the main outline of the history curriculum, seventh grade students study the geography of Europe, the United States, and Japan, while eighth graders will study the Middle East, South Asia, China, Canada, Mexico, and post-Cold War changes. Students should learn locations as well as the relationships between physical and human systems

Please see Appendix E for specific information regarding the Core Knowledge sequence for 7<sup>th</sup> grade.

### **Curriculum for 8<sup>th</sup> grade**

Central themes of the history guidelines in grades seven and eight are growth and change in American democracy, and interactions with world forces, particularly nationalism and totalitarianism. Fundamental principles and structure of American government are reviewed in a civics unit in this grade.

The study of geography aims at understanding the spatial relationship between nature and human culture and processes that change environments. Following the main outline of the history curriculum, eighth graders study the Middle East, South Asia, China, Canada, Mexico, and post-Cold War changes. Students will learn locations as well as the relationships between physical and human systems.

Please see Appendix E for specific information regarding the Core Knowledge sequence for 8<sup>th</sup> grade.

### **Technology**

Technology will be integrated into everyday learning at STEM Junior High and be aligned with the National Educational Technology Standards (NETS) for the present time. STEM Junior High School will align itself with the Colorado Academic Standards and district standards for Technology when made available. Technology will be used as a learning enabling tool, an output tool, an assessment tool, and a subject for study. Research based and proven software programs such as the Microsoft Windows operating system, Mavis Beacon Typing programs, Microsoft Office programs, Internet browsing/research software will be integrated in the regular curriculum. The principal will determine a Technology curriculum that meets the International Society for Technology Education (ISTE) seal of approval to further augment the program. Appendix F identifies the National Educational Technology Standards and Performance Indicators for Students.

## **Music and Art**

Music and art are essential components of a quality curriculum. STEM Junior High will align its music and art program with the Colorado Academic Standards (Appendix A) for 6<sup>th</sup> through 8<sup>th</sup> grade by using the Core Knowledge curriculum and extend the learning to include technological advances in music and visual arts. The Music guidelines for grades 6-8 share a basic vocabulary of the elements of music that can inform the discussion, appreciation, and study of selected musical works. Teachers will tie art and music with other curriculum components in history, language arts, and technology. For example, as different periods are being discussed in history, the great art works and music from that period will also be studied. Science can be tied in through a study on how art is authenticated or how musical instruments are designed. Technology can be tied in through a study of graphic art or modern music.

### **6<sup>th</sup> Grade Curriculum**

#### **Elements of Music**

- Identify musical notation: staves and clefs, notes and rests, sharps and flats
- Identify the beat of different types of music
- Define and recite the different scales and when they are used
- Identify different chords and define triads
- Read simple music pieces while playing a recorder

#### **Classical Music**

- Describe the Baroque period of music
- Discuss the lives of Johann Sebastian Bach and George Frideric Handel
- Explain the differences between Bach and Handel's style of music
- Interpret words like soprano, alto, tenor, etc.
- Describe the Classical period of music
- Discuss the lives of Joseph Haydn, Wolfgang Amadeus Mozart, and Ludwig van Beethoven
- Explain the differences between the music of Haydn, Mozart and Beethoven
- Demonstrate understanding of the sonata form of music
- Describe the Romantic period of music
- Discuss the lives of Franz Schubert, Robert Schumann and Frederic Chopin
- Explain the differences in music style of Schubert, Schumann and Chopin

#### **Science of Music**

- Explain how string, wind and reed and brass instruments work such as a guitar, piano, banjo, flute, recorder, clarinet, etc.
- Describe the differences between string, wind, reed and brass instruments

#### **Classical Art**

- Identify the different types of Greek architecture
- Evaluate and discuss the architecture used to build the Pantheon

- Describe Gothic art and identify the similarities/differences between Gothic art and the architecture of the Greeks
- Explain the difference between Renaissance sculptures such as Michelangelo's David and Gothic art
- Discuss what Renaissance paintings such as "The School of Athens" by Raphael
- Describe Baroque art and evaluate how it is different from both Gothic and Renaissance art
- Identify El Greco as an important painter of the late Renaissance/early Baroque
- Discuss different painters of the Baroque period including that of Rembrandt
- Differentiate between the Baroque period and Rococo period
- Describe the neoclassical era and tell about Jacques-Louis David's contribution to the period
- Describe the differences between neoclassical art and romantic era art
- Compare and contrast the different painters of the Romantic era: Goya, Delacroix, and Friedrich
- Explain the shift away from the Romantic era to that of Realism
- Discuss the differences/similarities between European and American realism
- Create different types of art that are introduced throughout the year by giving students frequent opportunities to draw, paint, cut, paste, mold with clay, and take photographs
- Plan and construct a graphic art project using computer software

### **7<sup>th</sup> and 8<sup>th</sup> Grade Curriculum**

While the Core Knowledge guidelines focus on musical vocabulary, appreciation, and history, musical performance should be encouraged and emphasized as resources allow. The focus here combines music history with appreciation of illustrative works, and continues from grade 6 the idea of classifying Western music by periods, with examples of specific composers and works, as well as some associated musical terms. Timelines will help students situate the periods. The periods and their characteristics are not absolute distinctions but generally helpful categories often used in discussions of music.

Lessons on the visual arts should illustrate important elements of making and appreciating art, and emphasize important artists, works of art, and artistic concepts. When appropriate, topics in the visual arts may be linked to topics in other disciplines. While the following guidelines specify a variety of artworks in different media and from various cultures, they are not intended to be comprehensive. Students will be exposed to a wide range of art and artists. In studying the works of art specified below, and in creating their own art, students should review, develop, and apply concepts introduced in previous grades, such as line, shape, form, space, texture, color, light, design, and symmetry.

Please see Appendix E for specific information regarding the Core Knowledge sequence for 7<sup>th</sup> and 8<sup>th</sup> grade.

## **Physical Education**

Regular physical activity is an essential component of a healthy life. Children will develop this important habit. The physical education program will develop coordination and motor skills, foster teamwork, and expose children to a variety of sports and games. STEM Junior High plans to utilize a textbook like the Glencoe health instruction book.

STEM Junior High standards for pupil performance in Physical Education are those adopted by the state of Colorado. Appendix A has the Health and Physical Education Colorado Academic standards outlined for 6<sup>th</sup> through 8<sup>th</sup> grade. Any additional standards developed by STEM Junior High School will meet or exceed state and national standards. STEM Junior High's athletic program director along with the principal will develop skills standards in detail.

## **World Language**

The Spanish language program to be used at STEM Junior High employs a wide range of learning strategies to enable students to develop competency in all four language skills: listening, speaking, reading and writing. The Pearson Prentice Hall's Realidades series will be used to align the Spanish program for the school with the Colorado Academic Standards for World Language outlined in Appendix A. This program includes a textbook, workbook, related video program, listening tapes and transparencies. Classroom activities are designed to provide students extensive practice in interpreting, expressing and negotiating meaning in communicative tasks that are relevant to their lives. Students also work with readings, photography, and art that are authentic to the Spanish-speaking world. The video programs and Internet links show native speakers engaged in real-life situations and experiences. Assessment of acquired competency is based on daily participation, homework, quizzes and tests, and quarterly projects. Other languages will be added to the curriculum or as after-school clubs upon demand from parents and teachers.

### **Curriculum for 6<sup>th</sup> grade**

In sixth grade, we offer an introductory Spanish class (6I) for students who may need more time with the spoken language and a more advanced class (6A) for students with a solid foundation in Spanish. The advanced sixth-grade class progresses to Spanish 7A, which is completed over the course of the seventh and eighth grade years. Students in the beginning Spanish 6I class are ready to begin Spanish 7I in seventh grade.

### **Curriculum for 7<sup>th</sup> grade**

#### **Spanish 7I**

In seventh grade, students who have completed beginning Spanish 6I are ready to begin Spanish 7I. At this level, students are challenged to produce language with increasing fluency. Upon completion of the course, students are able to carry on basic conversations about themselves and their surroundings. They are capable of writing short compositions

using the present and present progressive verb forms as well as many idiomatic expressions to communicate preferences, obligations and opinions.

### **Spanish 7A**

Students who have completed the equivalent of Spanish 1 by the end of the sixth grade, progress directly to a more advanced Spanish and complete the first half of the course in the seventh grade. The grammar includes the reflexive, direct and indirect object pronouns, imperative verb forms as well as the preterite, imperfect progressive and imperfect verb tenses.

## **Curriculum for 8<sup>th</sup> grade**

### **Spanish 8I**

Students who complete Spanish 7I finish the curriculum equivalent to the **first year** of high school Spanish in Spanish 8I. They have daily opportunities to learn new grammatical and cultural concepts with practice in a variety of formats. They enhance their vocabulary by learning the meaning of prefixes, suffixes, and the role of cognates.

### **Spanish 8A**

Students who have completed Spanish 7A complete the curriculum, equivalent to the **second year** of high school Spanish, in eighth grade. In addition to the continual incorporation of the grammar previously presented, students learn the future and conditional verb forms and participate in activities that give them the opportunity to develop a deeper understanding and appreciation of Hispanic cultures. They do in-depth research in English or Spanish, as appropriate, on certain cultural topics.