Guidelines for the Vicksburg Community Schools Proposal Form

All Forms of Proposals are due by February 26, 2010

Use the Vicksburg Community Schools Proposal Form and the form outline as indicated. This form will be used as your cover sheet. Check each item as you edit or create your final draft.

- Proposal Background & Overview – Write a narrative that includes:
  - ☒ Relevant background/history.
  - ☒ Problem or other basis for the proposal (i.e. student needs, etc.).
  - ☒ Reasons for making the change.
  - ☒ Targeted students and District/Building/Curriculum Area Goals.

- Complete Description of Proposed Change(s):
  - ☒ List all major changes, components and/or strategies of the proposal.
  - ☒ Give rationale for each change (base the rationale on research or best practice information).
  - ☒ Include new course/textbook title, course/textbook replaced, credit, and prerequisite(s).
  - ☒ Attach the current benchmarks/EPS, course outline, and/or general syllabus (models available upon request – contact curriculum office – VAB)

- Implementation Plan
  - ☒ Give a full explanation of the implementation timeline, action items, and responsibilities for implementing.
  - ☒ *Itemize, in detail, all proposal costs. Include 1st year costs and a budget to maintain the proposal after implementation. Include resource needed to support change. (texts, soft/hardware, consumables, substitute cost, training, equipment, personnel). Use resource expenditures worksheet to itemize all costs.

- Anticipated/Expected Impact
  - ☒ Explain the anticipated proposal outcomes. Describe how the proposal will impact students, staff, and the instructional program. Include expected gains in student success. Include how this proposal articulates with other courses/levels in this subject area & across the curriculum (scope and sequence) and, strategies for coordinating with other departments/levels.

- Proposal Evaluation Plan and Student Achievement
  - ☒ Explain the means of assessment & grading (semester project, term paper, objective-based tests, surveys, workshop feedback).
  - ☒ Explain how this proposal will be evaluated, the timeline used, what data is to be collected (survey results, district assessments), and how the evaluation will be reported.

Name: Steven Fryling Department and Curriculum Area: 8th Grade Science

Building: VMS Principal's Signature: [signature]

Title of Proposal: 8th Grade Science Committee Chair: Steven Fryling

Committee Members: Steven Fryling, Lisa Harbour

Dates of Board Review and Action: _____ _____

*Include Attachment

Proposal Background and Overview

Since the major changes made to the scheduling and timing of MEAP test in the Mid 1990's , 8th Grade science is taught in a curriculum area that is not considered "Middle School" , but the students themselves are not considered high school students. Since 2005, 8th grade science has aligned itself with the High School. We have taught high school content expectations (HSCE's). The HSCE's selected are noted as "essential" expectations, that is, those that may not be in a core class, but may be tested on the Michigan Merit Exam (MME). These expectations fall into the areas of basic chemistry and basic physics. This was done so that if students chose not to take physics or chemistry (they must take one of the two), then they would be exposed to basic concepts to be better prepared for the MME.

In the 2009-2010 school year, the high school decided that it wished to reduce the required science courses such that all students must take biology and then either chemistry or physics, as per state law. The third class would be an elective of a particular student's choice. This would open up more semesters for students who wished to take AP classes in the department.

This restructuring of curriculum left earth science HSCE's largely out of the high school required curriculum which could lead to problems with students being successful in that portion of the MME. This proposal plans to address this gap by redesigning the 8th grade science course to have many of its expectations from the Earth Science HSCE's, with some coverage of basic physics. The first six weeks of the class would deal with HCSE's in the area of energy forms and transformations and the First Law of Thermodynamics. The balance of the class would address major HCSE's in Earth Science.

In order to accomplish this in a method of instruction that best addresses student long-term retention and success on the MME, it is felt that an inquiry/problem based approached would be the most effective. After review of several alternatives, the committee decided that the Earth Comm program would offer the most comprehensive approach. This program, known as *Earth Comm* (Earth Science in Our Community) is from the same publisher as the *Active Physics* curriculum used at VHS. It features earth science content presented as problems that must be solved by students, with major emphasis on application knowledge and skills used to solve those problems and present the findings to others. The approach is well rooted in the "5E" method of science inquiry instruction (Engage, Explore, Explain, Elaborate, Evaluate) which research has shown to be effective in science instruction for long term retention. We have reports from the high school that the *Active Physics* program there is holding student interest and producing positive results.

Complete Description of Proposed Changes

The changes at the 8th grade level would involve replacing our current program of physical science (physics and chemistry) with about 30 weeks of earth science, using the earth science HSCSE's after teaching about 6 weeks of physics based on the theme of energy. The program would involve adoption of the Earth Comm book and program, including teacher's materials, interactive media, teacher training and lab supplies. This program works best when it is followed with little deviations, and so we will endeavor to teach as many of the topics that correspond to the relevant HSCE's as possible within the 30 weeks. Instead of purchasing a text for every student, we propose to purchase a classroom set, with a few loaners, that would stay within the classroom. We would then propose purchasing an inexpensive theme notebook, equipped with grid paper, for each student each year. This theme book would go home with the students and be the basis for notes and written

assignments. The other expenses involved would be one-time expenses to buy re-useable lab equipment, rock samples, and DVD media, as well as a continuing budget for consumable lab supplies and presentation supplies, as each student is required to present their findings after each topic has concluded.

In particular, we propose to replace the current text entitled "Science Spectrum- A Physical Approach" (Holt, 2001) with Earth Comm (Herff-Jones, ---). As in the past, the course is not available for high school credit. No pre-requisites are required, nor does this course serve as a pre-requisite to any other course.

Current Syllabus 8th Grade Science 2006-2009

OVERVIEW: This course will be organized very much like a physical science class in 9th or 10 grade. The aim is to prepare the students for classes in physics or chemistry they will be required to take in high school and to prepare for the Michigan Merit Test in Science.

The year will be divided into two semesters. The first semester will review the major topics of middle school science and then focus on chemistry. After a semester exam, the class will focus on conceptual physics with a minimal dependence on mathematics. A semester exam will follow at the end of the school year.

Each semester exam will count for 10% of the semester grade and will only apply to that semester.

Throughout the class, science thinking and analysis skills will be emphasized through the class activities.

CHEMISTRY (1st semester)

Student Expectations:

1. Describe matter in terms of atoms and molecules and how their motion causes changes of phase.
2. Describe how kinds of atoms are put into groups according to their properties and how these groups form the Periodic Table.
3. Name atoms, elements and molecules and reactions though the use of symbols and formulas.
4. Predict and analyze the results of combining (bonding) various atoms and describe the reaction with balanced formulas.
5. Describe acids and bases, how they interact, and how they impact our lives.

UNITS

Unit 1 Atoms, Compounds and Molecules

Topic 1A Properties and Phases of Matter

Topic 1B Atomic Structure

Unit 2 Elements and Bonding

Topic 2A Elements and the Periodic Table

Topic 2B Bonding and Formulas

Unit 3 Chemical Interactions

Topic 3a—Chemcial reactions

Topic 3B Acids and Bases

Topic 3C Nuclear Reactions

PHYSICS (2nd Semester)

Student Expectations:

1. Analyze and describe the motion of an object in terms of speed, velocity and acceleration.
2. Apply Newton's Laws of Motion to the actions of objects
3. Describe and classify the types of energy and how energy can be transferred and changed in form between objects.
4. Describe the similarities and differences between mechanical and electromagnetic waves along with the properties and uses of each.
5. Predict and analyze the behavior of light under various conditions.
6. Explain how the flow of electricity occurs, how it is measured and how it moves through circuits.

Unit 4 Motion, Forces and Energy

Topic 4A—Motion, Topic 4B—Acceleration and Newton's laws, Topic 4C—Energy

Unit 5 Sound Light and Waves

Topic 5A Waves, Topic 5B Electromagnetic Waves, Topic 5C—Behavior of Light

Unit 6 Electricity

Topic 6a—Electric Charges Topic 6B—Electric Devices

Topic 3B Acids and Bases

Topic 3C Nuclear Reactions

Proposed Replacement Course Syllabus and State HSCE's

Course Title: 8th Grade Science

This course is designed to help you to understand the planet we live on as it affects our community. In each chapter, we will be posing problems for you to solve using what you have learned through the activities, experiences and readings in the chapter. At the end of each chapter, you will need to present your solution to the problem that was posed to the rest of the class. This presentation, along with a written test will make up about 65% of your grade. The other 35% will come from labs, class participation exercises, and homework activities. At the end of each semester there will be a comprehensive semester exam worth 10% of your semester grade and will cover all of the objectives for that semester.

Physics Unit (First 6 Weeks)

The Big Ideas

Moving objects and waves transfer energy from one location to another. They also transfer energy to objects (for example: sunlight transfers energy to the ground when it warms the ground; sunlight also transfers energy from the Sun to the Earth).

Energy is often transformed from one form to another. The amount of energy before a transformation is equal to the amount of energy after the transformation. When this happens, some energy is converted to thermal (heat) energy.

Moving objects have kinetic energy. Objects experiencing a force may have potential energy due to their relative positions (for example, lifting an object or stretching a spring, energy stored in chemical bonds).

Key Concepts

1. **(P4.1B)** Explain instances of energy transfer by waves and objects in everyday activities (for example, why the ground gets warm during the day, how you hear a distant sound, why it hurts when you are hit by a baseball).
2. **(P4.3A)** Identify the form of energy in given situations (for example, moving objects, stretched springs, rocks on cliffs, energy in food).
3. **(P4.3B)** Describe the transformation between potential and kinetic energy in simple mechanical systems (for example, pendulums, roller coasters, ski lifts).
4. **(P4.3C)** Explain why all mechanical systems require an external energy source to maintain their motion.
5. **(P4.1A)** Account for and represent energy into and out of systems using energy transfer diagrams.
6. (P4.2A) Account for and represent energy transfer and transformation in complex processes (interactions).
7. (P4.2B) Name devices that transform specific types of energy into other types (for example, a device that transforms electricity into motion).
8. (P4.2C) Explain how energy is conserved in common systems (for example, light on a transparent material, light on a leaf, mechanical energy in a collision).

EARTH COMM (The rest of the year)

Unit I – The Geosphere

Chapter 1 – Volcanoes and Your Community

State HSCE's Addressed:

E3.4 Earthquakes and Volcanoes

Plate motions result in potentially catastrophic events (earthquakes, volcanoes, tsunamis, mass wasting) that affect humanity. The intensity of volcanic eruptions is controlled by the chemistry and properties of the magma. Earthquakes are the result of abrupt movements of the Earth. They generate energy in the form of body and surface waves.

E3.4A Use the distribution of earthquakes and volcanoes to locate and determine the types of plate boundaries.

E3.4B Describe how the sizes of earthquakes and volcanoes are measured or characterized.

E3.4C Describe the effects of earthquakes and volcanic eruptions on humans.

E3.4d Explain how the chemical composition of magmas relates to plate tectonics and affects the geometry, structure, and explosivity of volcanoes.

E3.4e Explain how volcanoes change the atmosphere, hydrosphere, and other Earth systems.

Chapter 2 – Plate Tectonics and Your Community

State HSCE's Addressed:

E3.3 Plate Tectonics Theory

The Earth's crust and upper mantle make up the lithosphere, which is broken into large mobile pieces called tectonic plates. The plates move at velocities in units of centimeters per year as measured using the global positioning system (GPS). Motion histories are determined with calculations that relate rate, time, and distance of offset geologic features. Oceanic plates are created at mid-ocean ridges by magmatic activity and cooled until they sink back into the Earth at subduction zones. At some localities,

plates slide by each other. Mountain belts are formed both by continental collision and as a result of subduction. The outward flow of heat from Earth's interior provides the driving energy for plate tectonics.

E3.3A Explain how plate tectonics accounts for the features and processes (sea floor spreading, mid-ocean ridges, subduction zones, earthquakes and volcanoes, mountain ranges) that occur on or near the Earth's surface.

E3.3B Explain why tectonic plates move using the concept of heat flowing through mantle convection, coupled with the cooling and sinking of aging ocean plates that result from their increased density.

E3.3C Describe the motion history of geologic features (e.g., plates, Hawaii) using equations relating rate, time, and distance.

E3.3d Distinguish plate boundaries by the pattern of depth and magnitude of earthquakes.

E3.r3e Predict the temperature distribution in the lithosphere as a function of distance from the mid-ocean ridge and how it relates to ocean depth. *(recommended)*

E3.r3f Describe how the direction and rate of movement for the North American plate has affected the local climate over the last 600 million years. *(recommended)*

Unit II - Environment

Chapter 1 – Bedrock Geology and Your Community (Rock Cycle)

State HSCE's Addressed:

E3.1 Advanced Rock Cycle

Igneous, metamorphic, and sedimentary rocks are indicators of geologic and environmental conditions and processes that existed in the past. These include cooling and crystallization, weathering and erosion, sedimentation and lithification, and metamorphism. In some way, all of these processes are influenced by plate tectonics, and some are influenced by climate.

E3.1A Discriminate between igneous, metamorphic, and sedimentary rocks and describe the processes that change one kind of rock into another.

E3.1B Explain the relationship between the rock cycle and plate tectonics theory in regard to the origins of igneous, sedimentary, and metamorphic rocks.

E3.1d Explain how the crystal sizes of igneous rocks indicate the rate of cooling and whether the rock is extrusive or intrusive.

E3.1e Explain how the texture (foliated, nonfoliated) of metamorphic rock can indicate whether it has experienced regional or contact metamorphism.

Unit III – Earth's Fluid Spheres

Chapter 2 – Severe Weather and Your Community

State HSCE's Addressed:

E4.3 Severe Weather

Tornadoes, hurricanes, blizzards, and thunderstorms are severe weather phenomena that impact society and ecosystems. Hazards include downbursts (wind shear), strong winds, hail, lightning, heavy rain, and flooding.

The movement of air in the atmosphere is due to differences in air density resulting from variations in temperature. Many weather conditions can be explained by fronts that occur when air masses meet.

E4.3A Describe the various conditions of formation associated with severe weather (thunderstorms, tornadoes, hurricanes, floods, waves, and drought).

E4.3B Describe the damage resulting from, and the social impact of thunderstorms, tornadoes, hurricanes, and floods.

E4.3C Describe severe weather and flood safety and mitigation.

E4.3D Describe the seasonal variations in severe weather.

E4.3E Describe conditions associated with frontal boundaries that result in severe weather (thunderstorms, tornadoes, and hurricanes).

E4.3F Describe how mountains, frontal wedging (including dry lines), convection, and convergence form clouds and precipitation.

E4.3g Explain the process of adiabatic cooling and adiabatic temperature changes to the formation of clouds.

E4.p2 Weather and the Atmosphere ***(prerequisite)***

The atmosphere is divided into layers defined by temperature. Clouds are indicators of weather. *(prerequisite)*

E4.p2A Describe the composition and layers of the atmosphere. *(prerequisite)*

E4.p2C Explain the differences between fog and dew formation and cloud formation. *(prerequisite)*

E4.p2D Describe relative humidity in terms of the moisture content of the air and the moisture capacity of the air and how these depend on the temperature. *(prerequisite)*

E4.p2E Describe conditions associated with frontal boundaries (cold, warm, stationary, and occluded). *(prerequisite)*

E4.p2F Describe the characteristics and movement across North America of the major air masses and the jet stream. *(prerequisite)*

E4.p2G Interpret a weather map and describe present weather conditions and predict changes in weather over 24 hours. *(prerequisite)*

Unit IV – Earth's Natural Resources

Chapter 1 – Energy Resources and Your Community

State HSCE's Addressed:

E2.1A Explain why the Earth is essentially a closed system in terms of matter.

E2.2B Identify differences in the origin and use of renewable (e.g., solar, wind, water, biomass) and nonrenewable (e.g., fossil fuels, nuclear [U-235]) sources of energy.

E2.2e Explain how energy changes form through Earth systems.

E2.2f Explain how elements exist in different compounds and states as they move from one reservoir to another.

E2.3A Explain how carbon exists in different forms such as limestone (rock), carbon dioxide (gas), carbonic acid (water), and animals (life) within Earth systems and how those forms can be beneficial or harmful to humans.

E2.3d Explain how carbon moves through the Earth system (including the geosphere) and how it may benefit (e.g., improve soils for agriculture) or harm (e.g., act as a pollutant) society.

Chapter 3 – Water Resources and Your Community

State HSCE's Addressed:

E4.p1A Describe that the water cycle includes evaporation, transpiration, condensation, precipitation, infiltration, surface runoff, groundwater, and absorption. *(prerequisite)*

E4.p1B Analyze the flow of water between the elements of a watershed, including surface features (lakes, streams, rivers, wetlands) and groundwater. *(prerequisite)*

E4.1 Hydrogeology

Fresh water moves over time between the atmosphere, hydrosphere (surface water, wetlands, rivers, and glaciers), and geosphere (groundwater). Water resources are both critical to and greatly impacted by humans. Changes in water systems will impact quality, quantity, and movement of water. Natural surface water processes shape the landscape everywhere and are affected by human land use decisions.

E4.1A Compare and contrast surface water systems (lakes, rivers, streams, wetlands) and groundwater in regard to their relative sizes as Earth's freshwater reservoirs and the dynamics of water movement (inputs and outputs, residence times, sustainability).

E4.1B Explain the features and processes of groundwater systems and how the sustainability of North American aquifers has changed in recent history (e.g., the past 100 years) qualitatively using the concepts of recharge, residence time, inputs, and outputs.

E4.1C Explain how water quality in both groundwater and surface systems is impacted by land use decisions.

E2.2f Explain how elements exist in different compounds and states as they move from one reservoir to another.

Unit V – Earth Systems Evolution

Chapter 1- Astronomy and Your Community

State HSCE's Addressed:

E5.p1 Sky Observations *(prerequisite)*

Common sky observations (such as lunar phases) can be explained by the motion of solar system objects in regular and predictable patterns. Our galaxy, observable as the Milky Way, is composed of billions of stars, some of which have planetary systems. Seasons are a result of the tilt of the rotation axis of the Earth. The motions of the moon and sun affect the phases of the moon and ocean tides. *(prerequisite)*

E5.p1A Describe the motions of various celestial bodies and some effects of those motions. *(prerequisite)*

E5.p1C Explain how a light year can be used as a distance unit. *(prerequisite)*

E5.p1D Describe the position and motion of our solar system in our galaxy. *(prerequisite)*

E5.1 The Earth in Space

Scientific evidence indicates the universe is orderly in structure, finite, and contains all matter and energy. Information from the entire light spectrum tells us about the composition and motion of objects in the universe. Early in the history of the universe, matter clumped together by gravitational attraction to form stars and galaxies. According to the Big Bang theory, the universe has been continually expanding at an increasing rate since its formation about 13.7 billion years ago.

E5.1A Describe the position and motion of our solar system in our galaxy and the overall scale, structure, and age of the universe.

E5.1b Describe how the Big Bang theory accounts for the formation of the universe.

E5.1c Explain how observations of the cosmic microwave background have helped determine the age of the universe.

E5.1d Differentiate between the cosmological and Doppler red shift.

E5.2 The Sun

Stars, including the Sun, transform matter into energy in nuclear reactions. When hydrogen nuclei fuse to form helium, a small amount of matter is converted to energy. Solar energy is responsible for life processes and weather as well as phenomena on Earth. These and other processes in stars have led to the formation of all the other chemical elements.

E5.2A Identify patterns in solar activities (sunspot cycle, solar flares, solar wind).

E5.2B Relate events on the Sun to phenomena such as auroras, disruption of radio and satellite communications, and power grid disturbances.

E5.2C Describe how nuclear fusion produces energy in the Sun.

E5.2D Describe how nuclear fusion and other processes in stars have led to the formation of all the other chemical elements.

E5.2x Stellar Evolution

Stars, including the Sun, transform matter into energy in nuclear reactions. When hydrogen nuclei fuse to form helium, a small amount of matter is converted to energy. These and other processes in stars have led to the formation of all the other chemical elements. There is a wide range of stellar objects of different sizes and temperatures. Stars have varying life histories based on these parameters.

E5.2e Explain how the Hertzsprung-Russell (H-R) diagram can be used to deduce other parameters (distance).

E5.2f Explain how you can infer the temperature, life span, and mass of a star from its color. Use the H-R diagram to explain the life cycles of stars.

E5.2g Explain how the balance between fusion and gravity controls the evolution of a star (equilibrium).

E5.2h Compare the evolution paths of low-, moderate-, and high-mass stars using the H-R diagram.

E5.3 Earth History and Geologic Time

The solar system formed from a nebular cloud of dust and gas 4.6 Ga (billion years ago). The Earth has changed through time and has been affected by both catastrophic (e.g., earthquakes, meteorite impacts, volcanoes) and gradual geologic events (e.g., plate movements, mountain building) as well as the effects of biological evolution (formation of an oxygen atmosphere). Geologic time can be determined through both relative and absolute dating.

E5.3A Explain how the solar system formed from a nebula of dust and gas in a spiral arm of the Milky Way Galaxy about 4.6 Ga (billion years ago).

E5.3B Describe the process of radioactive decay and explain how radioactive elements are used to date the rocks that contain them.

Chapter 3 – Changing Life and Your Community

State HSCE's Addressed:

E5.3C Relate major events in the history of the Earth to the geologic time scale, including formation of the Earth, formation of an oxygen atmosphere, rise of life, Cretaceous-Tertiary (K-T) and Permian extinctions, and Pleistocene ice age.

E5.3D Describe how index fossils can be used to determine time sequence.

E5.3x Geologic Dating

Early methods of determining geologic time, such as the use of index fossils and stratigraphic principles, allowed for the relative dating of geological events. However, absolute dating was impossible until the discovery that certain radioactive isotopes in rocks have known decay rates, making it possible to determine how many years ago a given mineral or rock formed. Different kinds of radiometric dating techniques exist. Technique selection depends on the composition of the material to be dated, the age of the material, and the type of geologic event that affected the material.

E5.3e Determine the approximate age of a sample, when given the half-life of a radioactive substance (in graph or tabular form) along with the ratio of daughter to parent substances present in the sample.

E5.3f Explain why C-14 can be used to date a 40,000 year old tree, but U-Pb cannot.

E5.3g Identify a sequence of geologic events using relative-age dating principles.

E5.4 Climate Change

Atmospheric gases trap solar energy that has been reradiated from the Earth's surface (the greenhouse effect). The Earth's climate has changed both gradually and catastrophically over geological and historical time frames due to complex interactions between many natural variables and events. The concentration of greenhouse gases (especially carbon dioxide) has increased due to human industrialization, which has contributed to a rise in average global atmospheric temperatures and changes in the biosphere, atmosphere, and hydrosphere. Climates of the past are researched, usually using indirect indicators, to better understand and predict climate change.

E5.4B Describe natural mechanisms that could result in significant changes in climate (e.g., major volcanic eruptions, changes in sunlight received by the earth, and meteorite impacts).

E5.4C Analyze the empirical relationship between the emissions of carbon dioxide, atmospheric carbon dioxide levels, and the average global temperature over the past 150 years.

E5.4D Based on evidence of observable changes in recent history and climate change models, explain the consequences of warmer oceans (including the results of increased evaporation, shoreline and estuarine impacts, oceanic algae growth, and coral bleaching) and changing climatic zones (including the adaptive capacity of the biosphere).

E5.4e Based on evidence from historical climate research (e.g. fossils, varves, ice core data) and climate change models, explain how the current melting of polar ice caps can impact the climatic system .

Implementation Plan and Timeline

Date	Action	Responsible
March 2010	Approval and Purchase of Materials	Board, Administration
March 2010	Finalize Earth Science HSCE for High School Courses	8-12 Science Staff
April-May 2010	Set up a schedule for topics to be taught and begin planning first topic.	Steve Fryling, Lisa Harbour
April-May 2010	Create orders for purchase of consumable theme books, consumable lab supplies and re-useable lab supplies	Steve Fryling, Lisa Harbour
Summer 2010	At least one day of teacher training with a consultant/trainer who uses the program	Steve Fryling, Lisa Harbour
Summer 2010	Purchases of all materials executed	Administration
September – October 2010	Teach the physics and Energy Unit, using current materials	Steve Fryling, Lisa Harbour
October 2010 –June, 2011	Teach the Earth Science Units as Planned and Scheduled	Steve Fryling, Lisa Harbour
Summer 2011	Evaluate the program and adjust units as needed, based on first year's experience	Steve Fryling, Lisa Harbour

Implementation Costs

ONE -TIME COSTS	UNITS	Unit Cost	Total	ISBN/product number
EarthComm Student Edition	70	79.90	5,593.00	978-1-58591-325-1
EarthComm 5-Volume Teacher Set	1	412.00	412.00	978-1-58591-326-8
EarthComm Color Overheads and BLM's CD	1	239.20	239.20	978-1-58591-401-2
EarthComm EXAMVIEW Test Generator CD	1	208.00	208.00	978-1-58591-400-5
Fees for training , summer of 2010	2		500.00	
Lab Equipment and Rock Samples			7,900.00	
Shipping and Handling			1,590.19	
Sub Total			**16,442.37**	
Annual Costs				
Lab Consumables			450.00	
Stipend for summer work/training	2 days	150	300.00	
Sub Total			750.00	
GRAND TOTAL 1st Year			**17,192.39**	

Anticipated/Expected Impact

Anticipated Outcomes

1. Student performance on the Earth Science Expectations tested by the MME will be maintained or increase.
2. Number of high school students enrolling in AP science classes will be maintained or may increase.

The changes in the program will not have an adverse impact on middle school staff or students or the overall instructional program. The course articulates with high school courses in that it relieves the high school of having to address most earth science expectations tested on the MME. It does not serve a as a pre-requisite for any high school course. Some of the required courses in the highs school will be assigned a few of the earth science expectations, as are fitting with their overall curriculum such that all major expectations will be addressed. These expectations have been addressed through meetings with high school staff and will continue to be adjusted as the curriculum is taught.

Proposed Evaluation Plan and Student Achievement

Student performance in the course will be evaluated using formative and summative assessments given during the course of instruction. At the end of each chapter/topic, students will be required to propose a solution to a problem posed in the chapter. This presentation will serve as a significant summative assessment, along with traditional selected response tests created by the teachers. Students will have common assessments and assignments throughout the course. The teachers will also create a comprehensive exam each semester worth 10% of the semester grade. The questions on these exams will emulate the style found on the MME. These exams will also serve as the district assessment of the expectations. After each exam, the teachers will analyze the results to determine if students are learning the desired expectations, with adjustments to be made each summer. As the first cohort of students that have had the course takes the MME in the year 2013, a comparison of results can be made with those who took it previously to see the impact of the course. Student scores on the EXPLORE test, taken later in 8^{th} grade may give more immediate information as to student progress on earth science content in the interim. The results will collected by 8^{th} grade staff and reported to administration each spring, after the EXPLORE test results have been reported.