Our thematic fifth-grade unit revolves around Earth & Space Science, much as the nine planets revolve around the sun. In nine curriculum areas (designated below), the students will use various technologies to reach mastery of different curriculum standards, all of which relate back to the subject of Earth & Space.

Our project is designed for use with a group of fifth-grade students. These regular education students are heterogeneously grouped. Some of the students have special needs, some are average in ability and others are designated as above level in ability. These students receive their education in a 5th & 6th grade intermediate school in a socio-economically middle class society. There are two groups of twenty-five students who receive their instruction in their general academic courses from two teachers, a Math/Science teacher and a Language Arts/Social Studies teacher. During their week they attend "Special" classes with Art, Foreign Language, Health, Music and Physical Education teachers. There are two computer carts of 15 computers available to the students, as well as various resources available through the school library including desktop computers, digital cameras and video cameras.

Content Area: Art

Curriculum Standard(s):
Creative Expression and Communication
Students create artworks that demonstrate understanding of materials, processes, tools, media, techniques and available technology. They understand how to use art elements, principles and images to communicate their ideas in a variety of visual forms.
Benchmark A: Apply knowledge of materials, tools, media, techniques and processes to communicate subject matter, themes or ideas in a variety of visual form.
1. Use observational and technical skills to achieve the illusion of depth in two-dimensional space (e.g., value, perspective and placement of objects).
2. Explore different approaches to creating art (e.g., by artist, style or historical period).
Benchmark B: Create two- and three-dimensional original artwork that demonstrates personal visual expression and communication.
3. Identify and communicate sources of ideas (e.g., personal experience, interests, nature or common objects) for their artworks.
Benchmark D: Use current, available technology to refine an idea and create an original, imaginative work of art.
5. Use current, available technology to explore imagery and create visual effects.

Technology: Podcast, Digital Camera, Photo Albums & Frames Craft Projects software

Description: The students will listen to a podcast of clips from Gustav Holst's, "The Planets". Then, choosing one character from the piece of music to

characterize, the students working in collaborative groups, will create a collage with pictures that they have taken.

Supporting Resource: "Although podcasting is not without minor problems, it has many beneficial qualities including students' familiarity with the new technology, and the cost effectiveness in the long run. In other words, the benefits of adopting podcasting outweigh the disadvantages and problems associated with the podcasting…it should supplement class materials, so that students can better understand concepts, theories, and applications that may not have been available during the class."

Shim, J., Shropshire, J., Park, S., Harris, H., & Campbell, N. (2007). Podcasting for e-learning, communication, and delivery. *Industrial Management & Data Systems*, *107*(4), 587-600.

Tried and True (TT) or New and Innovative (NI): NI: The use of these technologies is new and innovative as they are not generally used in conjunction or as part of an elementary art class. The software is also not traditionally used in an art class.

Content Area: Language Arts

Curriculum Standard(s):
Reading Process: Concepts of Print, Comprehension Strategies and Self-Monitoring Strategies
Comprehension Strategies
6. Select, create and use graphic organizers to interpret textual information.
7. Answer literal, inferential and evaluative questions to demonstrate comprehension of grade-appropriate print texts and electronic and visual media.
Self-Monitoring Strategies
9. List questions and search for answers within the text to construct meaning.

Technology: Kidspiration Software

Description: Students will use the Kidspiration software to create a personal KWL chart at the beginning of our unit. They will jot down things they Know, what they Want to know and update it with what they Learn about Earth and Space throughout the unit.

Supporting Resource: A scientifically-based research report summary that demonstrates that visual learning techniques such as those used in Kidspiration improves students' learning and performance is available in PDF form at the Kidspiration website.
The Institute for the Advancement of Research in Education (IARE) at AEL,

(2003). *Graphic Organizers: A Review of Scientifically Based Research*. Charleston, WV. Retrieved November 23, 2007 from http://www.inspiration.com/download/pdf/SBR_summary.pdf.

Tried and True (TT) or New and Innovative (NI): TT: Kidspiration is Tried and True, because students have used it before for different graphic organizers and as a writing tool. However, continually updating the KWL chart with the things they have learned is new to them.

Content Area: Foreign Language

Curriculum Standard(s):
Read, Write, & Speak Spanish: Students will
1. Build foundation of fundamental Spanish vocabulary and essential language structure with emphasis on earth and space science.
2. Navigate Surroundings in context of our topic.
3. Connect with world by building on language fundamentals and conversational skills.

Technology: Rosetta Stone Software

Description: Rosetta Stone software will be used to learn and understand Spanish effectively with the help of the context provided. Students will learn with the help of speech recognition technology, intuitive sequential learning, and real life simulations.

Supporting Resource: Documents outlining how Rosetta Stone units, lessons, and activities correlate to national and state standards are available for download at the Rosetta Stone website.
National TESOLStandards & ACTFL National Standards, (2007). Retrieved November 23, 2007 from http://www.rosettastone.com/schools/standards

Tried and True (TT) or New and Innovative (NI): TT: Rosetta Stone is Tried and True. These programs have been used before as a successful tool in learning and comprehending foreign languages. By advancing in the foreign language, we will be updating with the software.

Content Area: Health

Curriculum Standard(s):
Health Education on Growing Up.
Students will learn various topics such as:
1. Self image/ body image

2. Stages of Development / Puberty
3. Circles of Relationships / Friendship groups / Good Friends
4. Stereotypes / Discrimination / Harassment
5. Problem Solving / Team Work / Coping Skills

Technology: Core Learning: Family Health Series

Description: Core Learning provides health education concerning growing up and becoming an adult and teenage health. Within these lessons there will be a emphasis on how each of these areas of learning can relate to our main topic; problem solving/teamwork/coping skills - scenarios or role playing could be used to associate how people need these skills in everyday life - for example in space and earth science. Each volume contains quizzes and games to test the users knowledge and skills as they learn about growing up and how to deal with their self image, and developing coping skills. Each Family Health software CD-ROM includes a variety of health information and resources that can be used to create projects.

Supporting Resource: A scientifically-based research report summary that looks at active learning that engages students such as Core Learning may be found in the following information.
Journal of Engineering Education, (2004). Does active learning work? A review of the research. Bucknell University. Retrieved November 25, 2007 from http://66.102.1.104/scholar?hl=en&lr=&q=cache:p-hYl7nVxfkJ:www.ncsu.edu/felder-public/Papers/Prince_AL.pdf+author:%22Prince%22+intitle:%22Does+Active+Learning+Work%3F+A+Review+of+the+Research%22

Tried and True (TT) or New and Innovative (NI): NI: Core Learning Software helps to endorse new and innovative software that differs from the tried and true speeches of health related materials. This new and innovative asset allows students to become active in learning and allowing them to apply knowledge.

Content Area: Mathematics

Curriculum Standard(s):
Geometry & Spatial Sense
6. Draw circles, and identify and determine relationships among the radius, diameter, center and circumference.

Technology: Geometer's Sketchpad

Description: The students create representations of the Sun, Earth and Moon using Geometer's Sketchpad. They then use the software to evaluate their radii and diameters and their sizes in relation to each other. After discussing the

relationships between the three in the science portion of this technology rich day, the students will then continue to use Geometer's Sketchpad to show their orbits. They will then use Geometer's Sketchpad to find the approximate distance that Earth travels around the sun, by finding the circumference of a circular motion around the Sun at Earth's distance from the Sun. (Note: Earth's orbit is actually elliptical, so using a circular orbit and its circumference will only approximate the distance of Earth's revolution.) The difference between elliptical and circular orbits will be discussed and diagramed in Geometer's Sketchpad.

Supporting Resource: This article explains the way in which Geometer's Sketchpad can be used to engage students in math while reaching the goals of the NCTM Process and Content Standards.

Sinclair, Nathalie and Crespo, Sandra (2006). Learning Mathematics in Dynamic Computer Environments. Teaching Children Mathematics), 12(9), 436.

Tried and True (TT) or New and Innovative (NI): NI: Although using Geometer's Sketchpad is a Tried & True use of technology in the mathematics classroom, using it to diagram, illustrate and relate the Earth, Sun & Moon and their relationships is New & Innovative.

Content Area: Music

Curriculum Standard(s):

Historical, Cultural and Social Contexts

Students demonstrate knowledge and understanding of a variety of music styles and cultures and the context of musical expression or events, both past and present. Students identify significant contributions of composers and performers to music heritage. Students analyze the historical, social and political forces that have influenced the function and role of music in the lives of people.
Benchmark B: Identify composers and classify them according to chronological historical periods.
4. Identify, listen and respond to music of different composers.

Analyzing and Responding

Students listen to a varied repertoire of music and respond by analyzing and describing music using correct terminology. Students evaluate the creating and performing of music by using appropriate criteria.
Benchmark A: Describe and evaluate a piece of music using developed criteria based on elements of music and music vocabulary.
1. Identify dynamics, tempo, meter and tonality in various pieces of music aurally.
2. Identify terms related to form (e.g., DC al Fine; DC dal segno; DS al Coda; repeat signs, first and second endings).
3. Identify selected electronic and world music instruments.

Technology: Podcast

Description: Utilizing the computer cart or a computer lab, the students will visit and listen to a podcast of Gustav Holst's, "The Planets". They will then each choose three movements to describe using music vocabulary. Finally, they will choose one character and create a picture of that character.

Supporting Resource: "Although podcasting is not without minor problems, it has many beneficial qualities including students' familiarity with the new technology, and the cost effectiveness in the long run. In other words, the benefits of adopting podcasting outweigh the disadvantages and problems associated with the podcasting…it should supplement class materials, so that students can better understand concepts, theories, and applications that may not have been available during the class."

Shim, J., Shropshire, J., Park, S., Harris, H., & Campbell, N. (2007). Podcasting for e-learning, communication, and delivery. *Industrial Management & Data Systems*, *107*(4), 587-600.

Tried and True (TT) or New and Innovative (NI): NI: Podcasting is a relatively new technology. More and more teachers are utilizing podcasting in their teaching, but not universally because it is a newer technology.

Content Area: Physical Education

Curriculum Standard(s):
Physical activity by way of the planets
1. Explain the rotation and revolution of planets in orbit.
2. Explain the speed and time needed for the rotation and revolution that takes place.
3. Have students act out the rotation and revolution of planets in orbit.

Technology: SmartBoard Interactive Whiteboard

Description: Students will learn the basics of the rotation and revolution of planets in orbit and then will try to reenact the rotation and revolution of planets in orbit. Decorated basketballs that symbolize the planets will be what the students carry while taking part in the orbit. Different scenarios of speed will be compared and contrasted to the actual timing of the orbit of planets.

Supporting Resource: A plethora of evaluations and research of the use of Smartboards and the effectiveness of learning that can be demonstrated with them can be found at:
Smarter Kids Foundation, (2000). Higher Education. Retrieved November 25,

2007 from the Smarter Kids Foundation website:
http://smarterkids.org/research/library_subject.asp

Tried and True (TT) or New and Innovative (NI): TT: Although the use of smartboards is still rather new and innovative technology, scenarios and role playing is tried and true when it comes to learning.

Content Area: Science

Curriculum Standard(s):
Earth and Space Sciences
1. Describe how night and day are caused by Earth's rotation.
2. Explain that Earth is one of several planets to orbit the sun, and that the moon orbits the Earth.
3. Describe the characteristics of Earth and its orbit about the sun.

Technology: Digital Camera

Description: All students in the class will report to a set location on the school campus, facing south, every hour during the school day. Once at that location, a student will take a photo using the digital camera of the Southern horizon, being sure to include the sun's position in the photograph. At the end of the day, the students will create a slideshow of the photographs and discuss the apparent movement of the Sun through the sky.

Supporting Resource: An article at Tech4Learning reviews the many uses and applications of digital cameras in an educational setting.

Haddad, Wadi D., Ph.D. (2007). Teaching with Digital Cameras. Retrieved November 25, 2007, from Tech4Learning Web site:
http://www.techknowlogia.org/TKL_active_pages2/CurrentArticles/main.asp?IssueNumber=19&FileType=HTML&ArticleID=473

Tried and True (TT) or New and Innovative (NI): NI: Although the use of digital cameras in the classroom is Tried & True, using them for the purpose of investigating the apparent path of the sun through the sky is New & Innovative.

Content Area: Social Studies

Curriculum Standard(s):
Geography
Places and Regions
4. Explain how climate is influenced by:
a. Earth-sun relationships

Technology: SmartBoard Interactive Whiteboard & Discovery Education Streaming (United Streaming) multimedia website.

Description: Students will view a Discovery Education Streaming (United Streaming) Video on the Smartboard, titled, "The Reasons for the Seasons." They will follow this up by completing 2 worksheets that are included with the video (The Earth's Tilt and The Earth's Orbit Around the Sun) as a class with additional discussion and clarification from the instructor and classmates.

Supporting Resource: An evaluation of Discovery Education Streaming (United Streaming) and its benefits was held in Virginia in 2002 and it showed that students who received the benefit of instruction by Discovery Education Streaming (United Streaming) showed a 12.6% average increase in achievement over those who did not.

Executive Summary: The Effect of the United Streaming Application on Educational Performance. (2002) Retrieved November 23, 2007 from http://www.unitedstreaming.com/home/pdf/evalsumm.pdf.

Tried and True (TT) or New and Innovative (NI): TT: This is new and innovative technology for our school. This is our first subscription to Discovery Education Streaming (United Streaming) and we are hoping that using the tool that ties videos in with curriculum standards by grade and subject will entice teachers to use this subscription service more frequently as part of their classroom instruction.

Summary:
This 5th Grade thematic unit of instruction utilizes many engaging and exciting forms of technology while achieving objectives in nine curriculum areas with a concentration on Earth & Space Science.

- In Art class, the students will listen to a podcast and utilize web images and digital camera photographs to create a collage based on the things they've learned about Earth & Space.
- In Language Arts, the students will use the Kidspiration software to create a "KWL" (Know, Want to know, Learn) Chart about their Earth & Space knowledge.
- In Foreign Languages, the students will use Rosetta Stone software to learn and understand Spanish effectively with the help of the context provided.
- In Health class, the students will be utilizing the Core Learning: Family Health Series. Through this series they will learn life skills to aid them as they mature from teenage years into adulthood.

- In Math class, the students will use Geometer's Sketchpad to diagram and study the characteristics of Earth, our Moon, the Sun, the other planets and the orbits of these celestial bodies.
- In Music class, the students will listen to a podcast of Gustav Holst's "The Planets" and describe the movements of the podcast.
- In Physical Education class, the students will use a SmartBoard presentation to understand the movement of the nine planets and Earth's Moon. They will then use this understanding to reenact these movements physically.
- In Science class, the students will use a digital camera to investigate Earth's rotation. They will do this by periodically taking pictures of the Sun's position in the Southern Horizon and discussing its apparent movement.
- In Social Studies class, the students will use the SmartBoard and Discovery Education Streaming (United Streaming) to watch a video on the creating of Earth's seasons and climates.

Not only will the use of these various technologies support the students' understanding of the curricular standards and objectives, but they will meet many of **The Framework for 21st Century Learning's 21st Century Student Outcomes**, including:

- Core Subjects and 21st Century Themes
    - "Mastery of core subjects and 21st century themes is essential for students in the 21st century."
    - Global Awareness – These Student Outcomes will be reached through the Foreign Languages portion of the unit, in which the students translate key words and phrases from the unit into Spanish.
        - Learning from and working collaboratively with individuals representing diverse cultures, religions and lifestyles in a spirit of mutual respect and open dialogue in personal, work and community contexts.
        - Understanding other nations and cultures, including the use of non-English languages.
- Learning and Innovation Skills
    - Creativity and Innovation – The students will utilize these skills in many of the areas in this unit especially in their collage in Art class, their drawings and Music class and in their openness to the possibly new concept (for them) of the Earth's rotation and revolution around the Sun.
        - Demonstrating originality and inventiveness in work.
        - Developing, implementing and communicating new ideas to others.
        - Being open and responsive to new and diverse perspectives
        - Acting on creative ideas to make a tangible and useful. contribution to the domain in which the innovation occurs.

    - Critical Thinking and Problem Solving – The students will utilize and work towards these skills throughout the unit, especially in interpreting the results of their photograpy experiment in Science class and their diagrams and calculations in Math class.
        - Exercising sound reasoning in understanding.
        - Understanding the interconnections among systems.
        - Framing, analyzing and synthesizing information in order to solve problems and answer questions.
    - Communication and Collaboration – The students will utilize these skills throughout the project as they work with partners and in groups.
        - Articulating thoughts and ideas clearly and effectively through speaking and writing.
        - Demonstrating ability to work effectively with diverse teams.
        - Exercising flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal.
        - Assuming shared responsibility for collaborative work.
- Information, Media and Technology Skills
    - Media Literacy – The students will use these skills in their abilities to analyze how and why they are using certain technologies to reach their learning goals.
        - Understanding how media messages are constructed, for what purposes and using which tools, characteristics and conventions.
    - ICT (Information, Communications & Technology) Literacy -- Throughout this unit, the students will apply the following skills of ICT Literacy.
        - Using digital technology, communication tools and/or networks appropriately to access, manage, integrate, evaluate, and create information in order to function in a knowledge economy.
        - Using technology as a tool to research, organize, evaluate and communicate information, and the possession of a fundamental understanding of the ethical/legal issues surrounding the access and use of information.
- Life and Career Skills – During this unit the students will need to take advantage of many of these Life and Career Skills that are expected of a good, successful student. They are divided into the following sections:
    - Flexibility & Adaptability
    - Initiative & Self-Direction
    - Social & Cross-Cultural Skills
    - Productivity & Accountability
    - Leadership & Responsibility