The objective of SUNRISE project is to build a unique model of collaboration among elementary and middle schools, school division administration, and GMU to foster systems efforts in implementing Information Technology (IT) rich STEM content-knowledge into G4-6 education by graduate Fellows, with the potential to fundamentally change the delivery of science instruction and long term professional development of science teachers.

The most exciting aspect of the SUNRISE project is that it provides an opportunity to all its participants to discover, widen and deepen knowledge within their own field, as well as a very important mechanism to deliver that knowledge through the graduate Fellows into the K-12 environment.

The end goal of SUNRISE project is to become institutionalized as a university wide program that is sustained through internal and external support. As a continuing project beyond NSF support years the goal of the project will be to reach out to more schools and continue to provide the transformative experience to all its participants.

Fellow Disciplines

- Physics and Astronomy
- Catheline Sauville - Mathematics
- David Barr - Physics and Astronomy
- Joe Cremaldi - Systems Engineering and Operations Research
- Jon Malachowski - Electrical and Computer Engineering
- Manisha Shrestha - Biochemistry
- Melanie Larson - Systems Engineering and Operations Research
- Matthew Dale - Systems Engineering and Operations Research

Infrared Properties and Imaging

Students were shown how infrared is related to heat, how it can be used, and how it goes through some thinner materials that we cannot see through (certain plastics) and is reflected by others that we can (glass).

Observing, Recording, and Analyzing Weather Data

Each student has the opportunity to read weather instruments - Weather data recorded daily on school’s main bulletin board - Students analyze patterns and compare with almanac data

The Electromagnetic Spectrum through Solar Image Analysis and Predicting Solar Cycle 24

- Students obtain and study solar images to learn more about the electromagnetic spectrum - from radio waves to X-rays
- Using images from the MDI instrument on the SOHO satellite, students predict the start of a new solar cycle by observing the reversed polarity of a sunspot

Protein Stabilization

In this lesson, students were introduced to protein and forces that stabilize protein structure by using hemoglobin as an example. Proteins have diverse biological functions ranging from catalysis, storage of iron, transport of oxygen to immune defenses. The solid-ribbon model of hemoglobin was shown, and the function of hemoglobin was discussed. Oxygen binds to the ferrous-heme complex in the lungs and is transported to various parts of the body. The function of the protein depends on its proper fold. Proper protein folding and protein stabilization occur due to the presence of different forces such as charge-charge, van der waals, hydrogen bonding.

Decision Theory Lesson Incorporating Basic Decision Trees

In this lesson students are introduced to the basics of quantified decision making. Students are polled on factors such as cost, play control, and game availability for popular gaming systems and shown how mathematics can be used to aid in decision making. Follow-up discussions include real-world applications and wide ranging utility of such methods.

Radio Detection and Ranging (RADAR) for Air Navigation

A particularly effective method for supplementing the sound unit was by combining it with band, one of the new activities the kids were participating in. In the lab designed for class, the kids explore the relationship between frequency, wavelength, and pitch. In order to more clearly explain these concepts, the band director and Fellow co-taught a lesson to demonstrate several principles they had learned about in science class.

How Ocean Salinity Affects Density and Turn Over

This lab was to show the students how different concentrations of salt in the oceans affect the density of the water and in turn how the ocean's turn over. Each salt solution has a different color to help distinguish it. Different parts of the body. The function of the protein depends on its proper fold. Proper protein folding and protein stabilization occur due to the presence of different forces such as charge-charge, van der waals, hydrogen bonding.

Acoustics

Vibration, pitch, standing waves, directional sound, echoes

Music

In this lesson students are introduced to the concepts of RADAR and its application in navigation of flights, and tracking weather. Students obtain and study RADAR images to learn about this technology, and are introduced to other forms of imaging using satellites. The are introduced to fundamentals of air transportation systems.