

In July of 2001 we (D. Cook, K. Catley and E. Etkina) were awarded \$500,000 grant from the NJ Commission of Higher Education to improve the level of preparation of pre-service and in-service science teachers in NJ. A part of this funding goes into the construction of model science classroom in Lincoln elementary school – one of New Brunswick elementary schools, which is at the same time one of Rutgers GSE Professional Development Schools. The room will be used during day time by NB elementary students (grades 6-8, and their wonderful teacher Keith Thomas), and at night by prospective science teachers who are learning how to teach science. The room is under construction now but in the mean time we started working with NB science teachers. Here is what is happening in NBSD right now.

Science Study Group

Instructors:

Prof. Eugenia Etkina, Prof. Kefyn Catley, Julie, Monet.

Participants:

NBSD 3rd and 4th grade teachers

Location: Lincoln PDS

To sign up contact professor Eugenia Etkina at etkina@rci.rutgers.edu

11.15 Physical Science session 1 Internal Structure of Matter, Water Cycle

Content knowledge: existence of a particle structure of matter, motion of particles, motion and temperature, evaporation and condensation.

Skills: observation, models building and testing, controlling variables, graphing, multiple representations.

Equipment: plastic cups, food coloring, tea bags, rubbing alcohol, beakers.

11.29 Physical Science session 2 Density, Floating and Sinking

Content knowledge: physical quantities of mass and volume, concepts of density, micro differences in the state of matter, formation of clouds, rain, snow and slit.

Skills: observation, data collection, pattern recognition, data interpretation, graphing, model building and testing, application of scientific knowledge, problem solving, devising mathematical relationships, constructing multiple representations.

Equipment: graduated cylinders, water, oil, scales, equal mass and equal volume sets, rocks.

12.13 Physical Science session 3 Sound Waves

Content knowledge: vibrational motion, period of motion, sound wave as a wave of density, loudness and pitch, resonance, producing and recoding sound.

Skills: observation, pattern recognition, recording, comparing.

Equipment: FOSS module, slinkies, objects attached to strings, tuning forks of different sizes, water containers.

01.31 Physical Science session 4 Static electricity

Content knowledge: charging by rubbing, two types of charges, conductors and insulators.

Skills: observation, pattern recognition, problem solving, model building and testing, practical application of knowledge, multiple representations.

Equipment: Styrofoam insulation tubing, felt, plastic bags, scotch tape, coke cans, plastic bottles.

02.14 Physical science session 5 Electric circuits

Content knowledge: simple circuits, energy transformations in a circuit, series and parallel connections.

Skills: problem solving, pattern recognition, model building and testing, devising analogies and multiple representations, practical applications of knowledge, and experiment design.

Equipment: FOSS module

02.28 Physical Science session 6 Magnetic Interactions

Content knowledge: difference between magnetic poles and electric charges, Earth's magnetism, relationship between static electricity, electric current and magnetism.

Skills: observations, pattern recognition, real life application, experiment design, analogical thinking, comparison, analysis and synthesis, and problem solving.

Equipment: FOSS module

03.14 Earth Science Session 1 Mock Rocks

Science Content:

- a. Physical properties of rocks, including shape, size, color and texture
- b. Minerals and their crystalline shapes and patterns
- c. Rock composition
- d. Evaporation

Science Skills: Observation, measuring, recording data

03.28 Earth Science Session 2 Scratch Test

Content knowledge: mineral identification based upon hardness

Skills: observation, communications, comparison and organization

Earth Science Session 3 Calcite Quest

Content knowledge: a. Evaporation, and how it can be used as a tool to separate the liquid from solid parts of a mixture or solution.

- b. How to use the effervescent property of Calcite as a tool to test for its presence in a rock

Skills: investigation, observation, conducting tests, drawing conclusions based upon evidence

04.11 Earth Science Session 4 Take it for Granite

Content knowledge: rocks are composed of minerals, the properties of minerals are used to discover which ones make up a rock

Skills: observation, communications, comparison, organizing, analysis of data

04.18 Life Science session 1 Comparing ecosystems

Content knowledge: systems thinking, physical attributes of forest ecosystems, soil characteristics physical components and chemical structure, pH etc.

Skills: Observation, measurement, data collection, visualization and analysis.

Equipment: pH paper, sieves, soil samples, graduated cylinders, hand lenses, stereo microscopes.

05.9 Life Science session 2 **Comparing ecosystems**

Content knowledge: role of species in a forest community, case study of forest leaf litter community, decomposition and nutrient recycling, biodiversity as provider of ecological services, ecosystem stability.

Skills: using dichotomous keys, applying taxonomy, reconstructing ecological interactions, calculating a biodiversity index, forming and testing hypotheses, modeling.

Equipment: stereo microscopes, petri dishes, dichotomous keys, forceps, hand lenses, artists paint brushes, dissecting needles, ETOH, Berlese samples, Post-its

These sessions will be accompanied by a field trip to Rutgers ecological preserve.