INQUIRY APPROACHES TO MATH AND SCIENCE : GRADES 3-8
JUNE 26 – 30, 2006
SCHEV-NCLB TITLE IIA IMPROVING TEACHER QUALITY PROGRAM
SWEET BRIAR COLLEGE

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
MORNING SESSION 9:00 – 12:00	**Ecosystems** Room 116 3-8	**The Giant Cell** Room 018 5-7	**Investigations with Light:…** Room 018 5-8	**Investigating Matter…** Room 208 3-8	**Ecosystems** Room 116 3-8
	Investigations for the Whole School Year Room 208 5-6	**Discovering Plants In the Classroom** Room 116 3-5	**Weather Part I** Room 114 3-8	**School Yard Science** Room 116 3-6	**School Yard Science** Room 018 3-6
	Investigations with Magnets and Motors - Part I Room 018 3-4	**Variables in Scientific Investigation** Room 208 5-8	**Discovering Plants in the Classroom** Room 116 3-5	**What causes the Phases of the Moon? …** Room 018 3-6	**Understanding the Periodic Table** Room A201 5-8
AFTERNOON SESSION 1:00 – 4:00	**Investigations with Magnets and Motors - Part II** Room 018 3-4	**Discovering Plants Outside** Room 116 3-6	**PROFESSIONAL DEVELOPMENT MENU**	**Learning about force, motion, energy and graphing …** Room 018 3-4	**Exploring My Watershed** Room 018 4-6
	Geometry – The Bridge between Math and Art Part I Room A201 3-8	**Geometry – The Bridge between Math and Art Part II** Room A201 3-8		**Geometry – The Bridge between Math and Art Part I** Room A201 3-8	**Geometry – The Bridge between Math and Art Part II** Room A201 3-8
	Investigations with Food Room 208 5-8	**It's a Small World: Adventures in Microscopy** Room 114 6-8		**Weather Part II** Room 114 3-8	**Water: Fresh and (Mostly) Salt** Room 114 6-8

Daily Schedule

Monday, June 26
9:00 Opening Convocation and Welcome in Heurer Auditorium, Guion 101
9:40 – 12:00 Session 1 Class
12:00 – 12:50 Lunch, Prothro Cafeteria
1:00 – 4:00 Session 2 Class

Tuesday, June 27
9:00 – 12:00 Session 1 Class
12:00 – 12:45 Lunch, Prothro Cafeteria
1:00 – 4:00 Session 2 Class

Wednesday, June 28
9:00 – 12:00 Session 1 Class
12:00 – 12:45 Lunch, Prothro Cafeteria
1:00 – 2:00 Instructional Support, All meet in Heurer, Guion 101
2:10 – 3:00 Professional Development Menu – Choice 1
3:10 – 4:00 Professional Development Menu – Choice 2

Thursday, June 29
9:00 – 12:00 Session 1 Class
12:00 – 12:45 Lunch, Prothro Cafeteria
12:00 – 12:45 EDUC 656 Informational Lunch meeting – Teachers interested in the Graduate Course, "Inquiry Approaches in Science and Math" – Prothro private dining room A
1:00 – 4:00 Session 2 Class

Friday, June 30
9:00 – 12:00 Session 1 Class
12:00 – 12:45 Lunch, Prothro Cafeteria
1:00 – 3:30 Session 2 Class
3:30 – 4:00 Closing Convocation – Final Announcements and Paperwork to be Filed

Professional Development Menu
(Wednesday afternoon sessions)

Session A: "Inquiry Teaching in a Differentiated Classroom: How does Inquiry support Differentiated Instruction", Dr. Kay Brimijoin and Dr. Jim Alouf, Department of Education, Sweet Briar College

Session B: "Debunking the notion of THE Scientific Method"; Dr. Jill Granger, Dpt of Chemistry, Sweet Briar College

Session C: "What is Inquiry?: The Inquiry Continuum , the NSES, and Historical Perspective", Dr. Hank Yochum, Dpt of Physics, Sweet Briar College

Session D: "Assessment Strategies that Support Inquiry Instruction", Dr. Tim Loboschfski, Dpt of Psychology, Sweet Briar College

Session Descriptions

Discovering plants in the classroom
Classification, anatomy, reproduction, growth, and experimentation. The objective is to understand plant characteristics and life processes as well as their role in maintaining a healthy ecosystem.
SOL Science: 3.1 e-f, 3.5 a, 4.4 a-b, 5.5 b-c
Instructor: Heather Griscom, Assistant Professor, Dept of Biology, James Madison University

Discovering plants outside:
Diversity, identification, habitats, and ecology. The objective is to increase teachers' botanical knowledge, observation powers, appreciation and curiosity about plants within the context of their outdoor environment.
SOL Science 3.1 a-c, 3.6 a-c, 4.4 c-d, 4.5, 6.1 a-c, 6.1 h-i
Instructor: Heather Griscom, Assistant Professor, Dept of Biology, James Madison University

Ecosystems
Investigations with a terrarium ecosystem. We will subject the terrarium to a variety of conditions and observe which plants grow and which ones die and why. We will also observe ecosystems in the natural world.
SOL Science: 3.5a, 3.6b, 4.5d,e; **LS**- 4a,c, 7c, 8a, 9c, 11b, 14
Instructor: Arlene Vinion-Dubiel, Adjunct Instructor, Depts. Biology and Chemistry, Sweet Briar College

Exploring My Watershed: Investigations to Bring the Watershed Concept Home
Using schoolyard and classroom activities that focus on watersheds (water quality, forests, wetlands, aquatic food chains, erosion, water chemistry), participants will build an understanding of human impact on watersheds.
SOL Science 4.1, 4.8, 5.1, 5.7, 6.1, 6.7;
SOL Math 5.11, 5.19, 6.9, 6.18
Instructor: Judy Strang, Education Specialist, R.E.Lee Soil & Water Conservation District www.releeswcd.com and Program Coordinator, Pedlar River Institute www.streamcritters.org

Geometry: The Bridge Between Math and Art
We will investigate a wide range of geometric concepts in two dimensions, from grades 3 through 8, touching wherever possible on the geometric ties between art and math, from classical Greek times through the 20th century. Hands-on activities with manipulatives and paper folding will be employed. The majority of Geometry Standards of Learning for Grades 3 through 8 will be involved, most notably:
SOL Math 3.19, 3.20, 4.16, 4.17, 5.14, 5.15, 6.14, 6.16, 7.10, 7.13, 8.8, 8.10.
Instructor: Steve Wassell, Professor of Mathematical Sciences, Sweet Briar College

The Giant Cell
We will build a giant cell-to scale-while discussing the different cell organelles and their functions. We will also relate the size of a typical eukaryotic cell with the size of bacteria and viruses.
SOL Science 5.5a and LS 2 a,b;
SOL Math SOL 6.9 and 7.6
Instructor: Arlene Vinion-Dubiel, Adjunct Instructor, Departments of Biology and Chemistry, Sweet Briar College

Investigating Matter: Molecules, Mixtures, and Solutions
Teachers will be introduced to FOSS investigations on mixtures and solutions; as well as AIMS activities that integrate the math and science related to matter (properties, changes, conservation, etc.). Graphing and measuring skills will be emphasized.
SOL Science: 3.1, 3.3, 4.1, 5.1, 5.4, 6.1, 6.4, 6.5, PS.1, PS.2;
SOL Math: 3.14-17, 3.21-22, 3.24, 4.10-4.12, 4.19-20; 5.18-19, 5.21, 6.9-10, 6.18-20
Instructor: Jill Granger, Professor of Chemistry, Sweet Briar College

Investigations with Food
Teachers will be introduced to excellent inquiry-based modules on Food and Nutrition. In addition to science process skills, concepts of general nutrition (energy balance, living systems) and chemical and physical testing methods will be introduced. Math concepts involving measurement, graphing, and data analysis will be included.
SOL Science: 5.1, 6.1-2,4, LS.1,3,6,7, PS.1,2,5,6
Instructor: Jill Granger, Professor of Chemistry, SBC

Investigations with Light: Reflection, Refraction, and Cool Optical Devices
We will use hands-on investigations to gain a deeper understanding of reflection and refraction. Participants will construct optical devices, such as telescopes, cameras, and projectors.
SOL Science 5.3, PS.9 and Math SOLs: 3.21, 3.22, 4.20
Instructor: Hank Yochum, Associate Professor of Physics, Sweet Briar College

Investigations with Magnets and Motors
This is a two-part session.
Part I: Teachers will perform hands-on investigations with magnets and study magnetic fields around various objects. They will perform experiments to determine the strength of different combinations of magnets, build a compass, and investigate the magnetic field of the earth. Also, they will build various electromagnets, and explore the magnetic field produced by different configurations of wire with electrical current flowing through them.
Part II: Teachers will apply their understanding of magnets and electromagnets to create two different types of electric motors from basic household items. Elementary circuits will be created in order to study the current that runs through the motors. They will also take apart a manufactured motor to compare the internal mechanisms in a "factory-built" motor to those in their "home-made" motors.
SOL Science 4.3;
SOL Math 3.21, 3.22, 4.20
Instructor: Marcia Yochum, Physics Teacher, Virginia Episcopal School

Investigations for the Whole School Year
Utilizing materials from AIMS Education Foundation, we will explore investigations for teaching the SOL strands on Scientific Investigation, Reasoning, and Logic throughout the entire school year. Integrating math and science is a focus of the AIMS materials.
Materials are specific for Grades 5 and 6, but may be adapted up or down.
Instructor: Jill Granger, Professor of Chemistry, Sweet Briar College

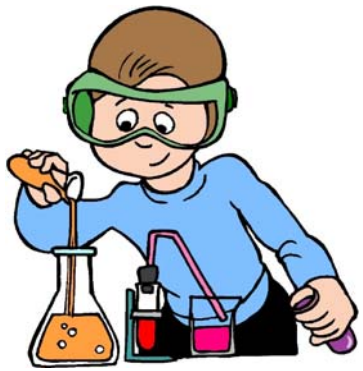
It's a Small World - Adventures in Microscopy
Use Brock Magiscopes to explore the world of the small. We will prepare and examine slides from a variety of living and non-living sources, including sands, soils, fabrics, papers, plants, animals, algae, fungi and protozoa from a range of readily available sources. We will also investigate how the microscope can be used to teach a variety of science concepts. Borrow the classroom set of these microscopes and explore with your students!
SOL Science 6.1, LS.1, LS.2, LS.3, PS.2, PS.9
Instructor: Robin Davies, Professor of Biology, Sweet Briar College

Learning about force, motion, and energy by graphing - Experiments with a Personal Hovercraft
By doing a variety of hands-on experiments with a small single-person hovercraft (available for teachers to borrow during the academic year), participants will gain an increased understanding of the concepts of position, speed, force, kinetic energy, and friction. Participants will gain experience in data collection and data analysis that can be used for many other experiments. Emphasis will be placed on the mathematical skills necessary for data analysis.
SOL Science 4.1, 4.2;
Math SOLs: 3.21, 3.22, 4.20
Instructor: Hank Yochum, Associate Professor of Physics, Sweet Briar College

What causes the Phases of the Moon? Hands-on Earth and Space Science
Participants will use inexpensive supplies and learn to do simple measurements to understand the causes of the phases of the moon.
SOL Science K.7, 1.6, 3.8, 4.7, 6.8
Math SOLs: 3.21, 3.22, 4.20
Instructor: Hank Yochum, Associate Professor of Physics, Sweet Briar College

School Yard Science: "You can't get this from books"
Opportunities abound in a typical schoolyard for students to practice scientific thinking, hone observation skills, and record and interpret data using field-tested activities from a six-year project at the Forest Study Site at Pleasant View Elementary School. Get tips on starting a schoolyard habitat. Lots of language arts/technology.
SOL Science – 3.1, 4.1, 5.1, 6.1; 3.4, 4.5, 4.8, 5.5;
SOL Math - grades 3-5 measurement and probability/statistics
Instructor: Judy Strang, Education Specialist, R.E.Lee Soil & Water Conservation District www.releeswcd.com and Program Coordinator, Pedlar River Institute www.streamcritters.org

Understanding the Periodic Table
Learn about the organization of the Periodic Table while also learning about atomic structure. The Bohr concept of atomic structure will be studied and compared to a more modern understanding. Historically important details will be connected to the development of our understanding.
SOL Science: 5.4, 6.4, PS.2, PS.3, PS.4
Instructor: Jill Granger, Professor of Chemistry, SBC



Variables in Scientific Investigation
We will analyze the variable components of experimentation as presented in several different types of simple, fun investigations. Investigations will touch on a wide variety of content topics. We will be drawing curricular materials from the FOSS program, which includes cross-curriculum materials to connect the science unit to other subjects. In-process and summative assessments appropriate for the evaluation of student inquiry will also be presented. The workshop content is ideally suited for inclusion in the grade 5-8 grade curricula, but could be adapted for other grades.
SOLs addressed include investigation skills-related standards and can be applied toward an inquiry approach to teaching/learning of all other content topics. Multiple math SOLs will also be addressed through data collection and analysis.
Instructor: Jill Granger, Professor of Chemistry, SBC

Water: Fresh and (Mostly) Salt
Without water, Earth would not be such an interesting place. We will model, explore and investigate a variety of water-related subjects, including aspects of the importance of water to living systems as well as ocean habitats and use of ocean resources.
SOL Science 6.3, 6.4, 6.5, 6.7, 6.9, LS.1, LS.4, LS.7, LS.10, LS.11, LS.12, PS.1, PS.2, PS.7
Instructor: Robin Davies, Professor of Biology, SBC

Weather
This two-part session will include the study of weather phenomena and the forces responsible for weather patterns as well as construction of instruments for making weather measurements.
SOL Science 3.1, 3.11, 4.1, 4.6, 5.1, 6.1, 6.3, 6.5, 6.6, LS.1, PS.1, PS.7;
SOL Math: 3.3, 3.5, 3.7, 3.11, 3.12, 3.14-3.17, 3.21, 3.22; 4.2, 4.4, 4.9, 4.11, 4.12, 4.20; 5.1, 5.2, 5.4, 5.11-5.13, 5.16, 5.18-5.22; 6.1, 6.9, 6.10, 6.13, 6.18, 6.19; 7.16-7.18; 8.6, 8.7, 8.12
Instructor: Robin Davies, Professor of Biology, SBC