

Acknowledgments

The success of the *Base Pair* Summer Research Institute depends upon the hard work of a number of individuals. Foremost among these are Ms. Lisa McCammon, Department of Pharmacology and Toxicology and Ms. Rose Willis, School of Health Related Professions. The program is deeply indebted to their efforts.

The cover was developed by Mr. Cliff Leverette of the Department of Public Affairs, University of Mississippi Medical Center.

Large Background: In controlled drying experiments with high molecular weight calf thymus DNA, the liquid crystalline phases reach a maximum concentration of about 650 milligrams per milliliter, approximately the same density as observed in prokaryotic and viral genomes. The image above is a liquid crystalline DNA phase that reached the highest density observed with high molecular weight DNA. The DNA concentration for this specimen is approximately 600 milligrams per millimeter, and the magnification is approximately 150x. The digital image presented above was originally recorded on Fujichrome 64T transparency film using a Nikon Optiphot-Pol microscope with crossed polarized illumination. Exposures were recorded about 2.5 f-steps under the recommended value given by an in-camera photomultiplier and were push-processed approximately 1.5 f-steps in the first E-6 developer.

Small Insert - Left: One of the most beautiful photomicrographs in our DNA collection, this specimen displays a color transition from yellow to purple in the focal conic texture. Heavy striations also indicate that the specimen is approaching the concentrations observed in single crystals. The DNA concentration for this specimen is approximately 475 milligrams per millimeter, and the magnification is approximately 350x. The digital image presented above was originally recorded on Fujichrome 64T transparency film using a Nikon Optiphot-Pol microscope with crossed polarized illumination. Exposures were recorded about 2.5 f-steps under the recommended value given by an in-camera photomultiplier and were push-processed approximately 1.5 f-steps in the first E-6 developer.

Small Insert - Right: With striations that are beginning to resemble chevron patterns, this highly concentrated DNA specimen is probably a single crystal. The DNA concentration for this specimen is approximately 550 milligrams per millimeter, and the magnification is approximately 350x. The digital image presented above was originally recorded on Fujichrome 64T transparency film using a Nikon Optiphot-Pol microscope with crossed polarized illumination. Exposures were recorded about 2.5 f-steps under the recommended value given by an in-camera photomultiplier and were push-processed approximately 1.5 f-steps in the first E-6 developer.

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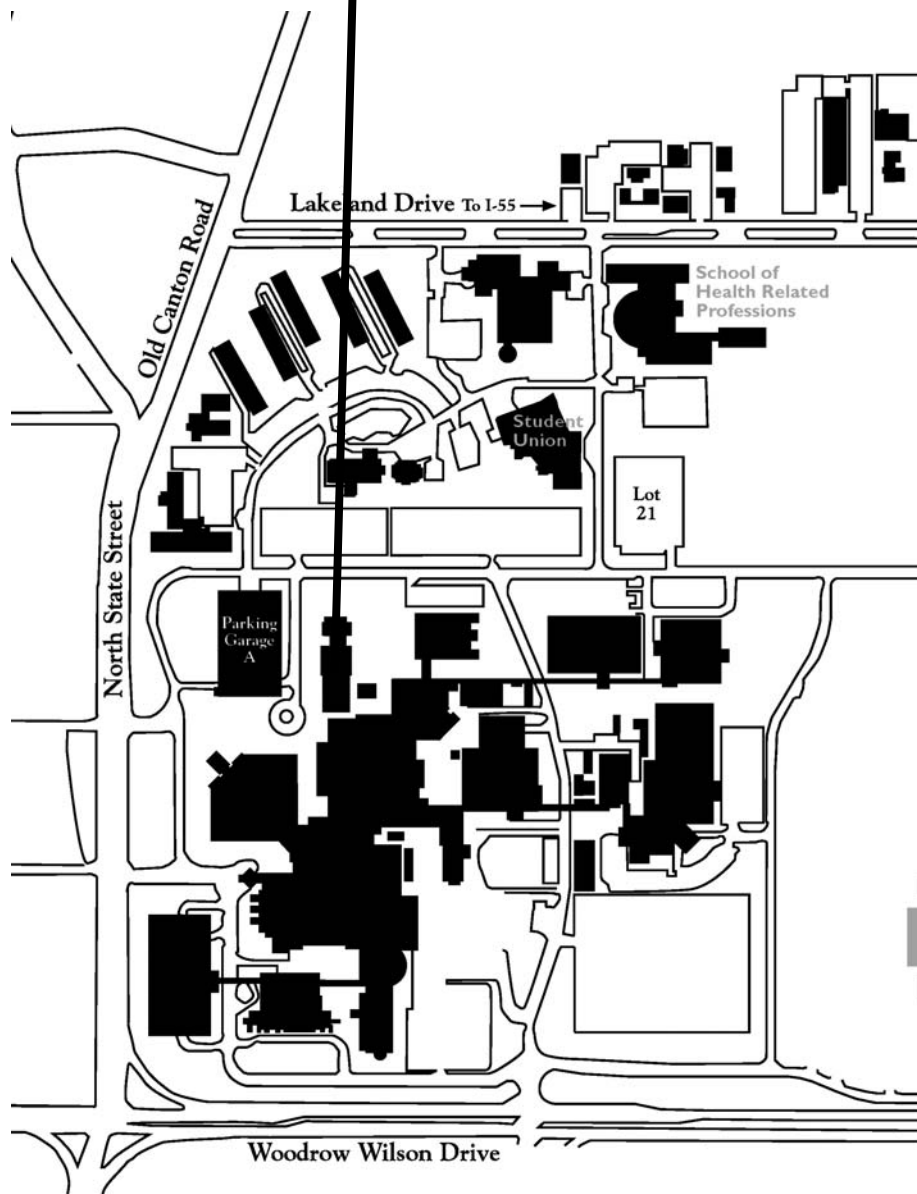
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UMC Campus Map

The School of Health Related Professions building, the Norman C. Nelson Student Union, parking lot 21 and the parking garage are identified.

The School of Nursing building (room A103 for employee orientation on Monday, June 16) is shown by the solid line.



**2004 *Base Pair*
Summer Teacher Training**

**June 21 – July 30
9:00 a.m. – 5:00 p.m.**

The ***Base Pair*** Program at the University of Mississippi Medical Center, with funding from the Howard Hughes Medical Institute, is sponsoring a 6-week program of laboratory training and curriculum development for middle and high school science teachers **and students** this summer

Program objectives include:

- 1) acquainting science teachers **and students** with modern skills in **molecular biology** laboratory techniques, in a manner that will facilitate utilization in routine science courses;
- 2) familiarizing teachers with the fundamental knowledge required to incorporate www-based inquiry as an essential component of science teaching;
- 3) assisting teachers in the development and funding of specific, inquiry-based exercises that will be incorporated at their home schools.

A maximum of six (6) teachers **and 20 high school students** will be selected to participate in the summer institute. Preference will be given, initially, to teachers **and students** from target high schools from the Jackson Public School District (JPSD), to teachers from other JPSD middle and high schools, and when appropriate, to personnel from other Jackson Metro area secondary schools. Selection criteria **for teachers** include a review of a **current resume**, **a letter that states how an applicant would apply the concepts of biotechnology and information technology within their classroom**, and a **personal interview** by Dr. Rob Rockhold, the Program Director. **Selection criteria for students include a recommendation by the lead science teacher at the school attended by the student.**

The ***Base Pair*** program is committed to building the capacity of secondary schools in the Jackson Metro area to implement and sustain high-quality curricular and instructional programs for all students. Emphasis will, therefore, be on the selection of individuals who are proven academic leaders and have the initiative and willingness to work for implementation of the activities developed in the summer program.

An honorarium will be available.

If you are interested in participating in the *Base Pair* Summer Research Institute,

- **contact Dr. Rockhold by May 1, 2004, by phone (984-1634), by e-mail rockhold@pharmacology.umsmed.edu, and**
- **fax a current resume to 984-1637, attention Dr. Rob Rockhold.**

Program Description

The Summer Research Institute at the University of Mississippi (UMC) School of Health Related Professions (SHRP). *Base Pair*, a biomedical research mentorship program, pairs faculty from the UMC with students and educators from the largest Mississippi public school system, the Jackson Public School District (JPSD). Initiated in 1992, *Base Pair* seeks also to meet an increasing demand for the teacher training that it provides in the area of laboratory-based science instruction in biology and chemistry. The primary objective is to establish a state-of-the-art laboratory science training facility at the UMC-SHRP (the **Summer Research Institute**) to enhance professional development of high school science teachers **and to provide educational incentives to advanced placement high school students. Teachers and students will participate to** stimulate inquiry-based science curriculum formulation. Teachers **and students** are recruited from programs directed toward the current *Base Pair* target site, Murrah High School, a second JPSD site, Jim Hill High School, and from other Jackson Metro area secondary schools. The impact of the **Summer Research Institute** is documented by continuation of a record of high school teacher **and student** presentation/publication of science research in professional scientific forums; submission by, and awarding of external education grants to, science teachers; adoption of a *Base Pair*-created science course, *Biomedical Research*, at high school sites; and utilization of laboratory activities fostered by **Summer Research Institute** graduates. Use of the inquiry-based course, *Biomedical Research* (Mississippi Department of Education Course Code 260502), by teachers is strongly encouraged. Research ethics, laboratory safety, electronic communications and information retrieval, grant writing and the use of contemporary popular literature about science and scientists as an integral resource for science teaching are actively promulgated.

The SHRP has provided access to a clinical laboratory science training facility for use by **Summer Research Institute** teachers. The space provided (Rooms SH254/259) includes approximately 1,840 ft² of bifunctional laboratory/classroom area with an additional 820 ft² of biotechnology preparatory laboratory space. These state-of-the-art laboratory facilities are designed specifically to teach biotechnology-oriented disciplines to clinical laboratory science professionals-in-training.

Objectives of the **Summer Research Institute** are to:

- 1) acquaint secondary school science teachers **and students** with modern skills in **molecular** biology and chemical laboratory technique, in a manner that facilitates utilization in routine high school science courses. The skills include quantitative measurement and preparatory methods, centrifugation, use of preparatory and analytical chromatography (column and electrophoretic), sterile technique, microbiological culture, and protein analysis.
- 2) familiarize teachers with the fundamental knowledge required to incorporate web-based inquiry, by students, as an essential component of science teaching.
- 3) assist teachers in the development, and funding, of specific, inquiry-based, exercises that will be incorporated at their home schools. To the maximum extent possible, exercises are structured around simple, low-cost, commercially available biotechnology-oriented kits. Training in writing of proposals for funding of such activities for independent classroom use is provided and teachers are expected to prepare and submit a proposal as an outcome of the summer training.
- 4) propose web-based mechanisms by which teachers **and students** can communicate with one another, and have the ability to readily access biomedical expertise, information and equipment resources during the school year, and

5) promulgate adoption of the course, *Biomedical Research*, at each teacher's home school.

The program will take place within the SHRP research/teaching laboratory building, from 9:00 a.m. to 5:00 p.m., 5 days/week, during the summer of 2004. An overarching theme for participating teachers will be self-evaluation, with the goal of refreshing and enhancing classroom instruction. The inclusion of students in the program will provide teachers with an immediate feedback of laboratory based exercises while providing gifted high school students access to additional educational opportunities. The program will essentially be conducted in two parts: The first third of the course will be attended by teachers only and will involve curriculum development, grantsmanship, and intense laboratory skills training. The last two thirds of the course will include both teachers and high school students. During the teacher training portion of the program, mornings will be devoted to didactic lectures in molecular biology and chemistry required to teach modern, biotechnology-oriented science curricula. Practical training in safety, electronic communications, biomedical information retrieval, and professional skills development will also be emphasized. Teachers will be familiarized with the objectives, design and implementation of inquiry-based learning using *Biomedical Research* as the model. The teacher-student portion will also utilize didactic lectures during the morning sessions, the use of educational videos and student participation activities, as well as laboratory exercises coordinated to emphasize lectures. Afternoon sessions will be laboratory-oriented, with emphasis being placed on development of quantitative laboratory skills and acquiring familiarity with selected kit-based biotechnology laboratory exercises. This will also provide the teachers an opportunity to practice their newly acquired laboratory skills. A detailed reading list has been prepared of books that identify and present science, particularly relating to contemporary biomedicine and bioterrorism, in interesting, and informative ways. These include two books by the science journalist, R. Preston, including the best-selling depiction of exposure to Ebola and Marburg viruses (*The Hot Zone*, 1995), and *The Cobra Event* (2002). In addition, videos, such as *Medicine Man*, starring Sean Connery, that fictionalizes discovery of a unique anticancer drug in the endangered Amazonian rain forest, *The Coming Plague*, *Brain Eaters*, *Jefferson's Genes*, and *Planted Evidence* from various Nova and A&E programs will be screened by teachers prior to being shown to students. These videos will set the stage for a laboratory exercises in which teachers and students will participate. Based on presentations, videos, and laboratory exercises, one breakout session/week for the teacher participants will be devoted to group discussions of the materials used in the summer program as well as a forum to share websites and resources used by the participants in their own curriculum. In addition, sessions with both student and teachers will discuss the perception of scientists by the lay public and the role of ethics in science. Such sessions are designed to encourage teachers to utilize similar material in teaching efforts in their home schools.

The laboratory exercises will be focused on BioTechnology Explorer™ kits developed by Bio-Rad Laboratories in conjunction with the San Francisco Bay Area Biotechnology Education Consortium, <http://www.explorer.bio-rad.com>. Other kits will be obtained from such sources as Edvotek (<http://www.edvotek@aol.com>). Several of these kits have been tested by *Base Pair* teachers, and are being used in Murrah High School. One such kit formed the basis for a successful grant application by a *Base Pair* teacher. The kits are inexpensive (generally less than \$100/kit), serve groups of 8-10 students each, are extremely well documented, and dramatically capture the interest of teachers and students alike. These, more than any other single strategy tested by *Base Pair*, seem to fulfill existing needs of secondary science teachers. The low cost will enable teachers and districts to realistically maintain usage when *Base Pair* support ceases. A considerable component of the summer training will be in grantsmanship, with the expectation that **Summer Research Institute** teacher alumni will be able to gain external funds to support the use of such kits at their home schools. Again, experience from the existing *Base Pair*

activities indicates that this is a very realistic expectation. Participants will engage in web-based e-learning courses; one of which is formatted using a commercially available e-learning software platform (www.blackboard.com) and which provides instruction in assessment of information resources. Faculty mentors who will participate in the teaching program include A. Haaland, M.L.S. (Assist. Professor, Academic Information Services, Rowland Medical Library), R. Rockhold, Ph.D. (**Program Director**; Professor, Pharmacology & Toxicology), David Fowler, Ph.D. (Professor and Chair, Clinical Laboratory Sciences, SHRP), L. Spence, Ph.D. (Assoc. Professor, SHRP), D. Sullivan, Ph.D. (Assoc. Professor, Medicine and **Program Co-Investigator**), Susan Wellman, Ph.D. (Professor of Pharmacology), William Lushbaugh, Ph.D. (Professor of Microbiology), Thais Tonore, M. D. (Professor of Family Medicine, and Olga McDaniel, Ph.D. (Professor of Surgery).

Parking will be available at no cost on campus (details to be provided).

University of Mississippi Medical Center Participants

Summer Research Institute Oversight Committee

Dr. David Fowler is Chairman of the Department of Clinical Laboratory Sciences in the School of Health Related Professions at UMC. He holds a Ph.D. in Information Systems and Quantitative Sciences from Texas Tech University and has held administrative and teaching positions at Texas Tech University, the University of Southern Mississippi, and UMC. He has been awarded a variety of citations for Scientific Creativity, Service, Achievement and Excellence in Teaching.

Ms. Janis Quinn serves as the Associate Director of the Department of Public Affairs at UMC and has a distinguished record of accomplishment in Public Affairs and news reporting. She is the author of several important publications, including the book, *Arthur C. Guyton: His Life, His Family, His Achievements*, Oakdale Press, Jackson, MS, 1989.

Ms. Ada Seltzer is the Chair of the Department of Academic Information Services and Director of the Rowland Medical Library at UMC. She holds an M.S. in Library Science from Florida State University and an M.A. in Community College Education from the University of South Florida. She has been awarded numerous grants to develop and disseminate library-based information resources in technologically-oriented and innovative ways. She was awarded a Phil Hardin Foundation Award for Innovative Uses of Computer Technology in 1996.

Faculty mentors

Faculty mentors who will participate in the Summer Research Institute teaching program include A. Haaland, M.L.S. (Asst. Professor, Academic Information Services, Rowland Medical Library), L. McDaniel, Ph.D. (Assoc. Professor, Microbiology), R. Rockhold, Ph.D. (Program Director; Professor, Pharmacology & Toxicology), and D. Sullivan, Ph.D. (Program Co-Director, Associate Professor, Medicine, Microbiology and Clinical Laboratory Science).

Ms. Haaland serves as a reference information research professional in the Rowland Medical Library, and has a primary responsibility for training over 500 medical and health-related personnel in biomedical information technology and retrieval each year. She has served as a major training resource in this capacity for the **Base Pair** program since 1993.

Dr.'s McDaniel and Sullivan both maintain active research laboratories, in conjunction with extensive teaching responsibilities, within their respective departments of the medical school. Both have participated as mentors in the existing **Base Pair** program since its inception.

Other Participants

Including the individuals listed above, close to two dozen faculty and staff from the University of Mississippi Medical Center Schools of Medicine, Nursing, Dentistry and School of Health Related Professions will participate in teacher training activities. Those not previously mentioned include:

O. Allen, D.N.S.

R. Black, Ed.D.

D.T. Brown, Ph.D.

S. Wellman, Ph.D.

S. Nolan, M.D.

T. Dellinger, Ph.D.

L. Spence, Ph.D.

R.E. Lewis, Jr., M.D.

R. Vishwanatham

Olga McDaniel, Ph.D.

L. Serpa

T. Tonore, M.D.

M. Coburn

K. Crews, D.M.D.

W. Lushbaugh, Ph.D.

Teacher Resources to be Provided to Participants Free of Charge

- 1) Textbook: *Molecular Biology Made Simple and Fun:* Clark, D.P. and Russell, L.D., Cache River Press, Vienna, IL, 1997.
"Written primarily for the science student, but suitable for the non-scientist, the reader will gain a solid understanding of the fundamentals and tools of molecular biology. The book also details how this rapidly advancing field has and will continue to have and impact on health, law, agriculture, biotechnology and our understanding of the origins of the species."
- 2) CD-ROM: HyperCELL 1998: Williams, G., Garland Publishing, 1997.
"A powerful cell biology learning program with over 275 animated diagrams. Easy-to-follow animated diagrams illuminate and clarify kinetic cellular processes that are otherwise difficult to grasp."
- 3) 3-Ring binder and laboratory notebook:
- 4) Reading/Video material on using literature about science:
 - A. *The Hot Zone.* Preston, R., Anchor Books, New York, NY, 1995.
 - B. *The Cobra Event.* Preston, R., Anchor Books, New York, NY, 1995.
 - C. *The Demon in the Freezer: A True Story.* Preston, R., Random House, New York, NY, 2002.
 - D. *Germs: Biological Weapons and America's Secret War.* Broad, W., Miller, J., Engelberg, S., Touchstone Books, 2002.
 - E. *The Medicine Man.* VHS format, Hollywood Pictures, 1992.
 - F. *The Coming Plague.* DVD format,
 - G. *Brain Eaters,* DVD format
 - H. *Planted Evidence,* DVD format
 - I. *Jefferson's Genes,* DVD format
- 5) Curriculum Material:
 - A. Career planning for the health sciences
 - B. Grant writing for high school teachers
 - C. Research and medical ethics
 - D. Laboratory safety
 - E. Science curriculum development
 - F. Use of Internet and medical library resources for science teaching
 - G. Introduction to molecular biology
 - H. Biotechnology laboratory kit use in the classroom
 - I. Drug abuse and health care information
- 6) Biotechnology Explorer Laboratory Kits:
Sets of 14 biotechnology oriented laboratory experiment kits will be evaluated and 5 kits will be provided to the teachers, enough to serve a class of 25, for classroom use during the academic year
- 7) Grant Application Program:
An opportunity to prepare individual, teacher-initiated grant proposals for funding of classroom activities.

Outcome Expectations for Participants

The overarching purpose for the *Base Pair* Summer Research Institute is to enhance the opportunities for science learning in the Jackson Metro area, utilizing the resources of the University of Mississippi Medical Center to foster incorporation of contemporary, laboratory-based and inquiry-oriented activities as the primary means to enhance learning. Having stated that as the objective, attention must next be focused on determination of the degree to which the program achieves that goal. Accordingly, a series of specific, task-oriented outcomes has been selected that participants are directed to address. Pursuit of these outcomes has distinct educational value within the context of the principal objective and provides measures that can be easily quantified. The outcomes that each participant is asked to accomplish are:

- Completion of the tasks identified in the **Personal Professional Philosophy Development Plan** (described below) , including,
 - Enumeration of personal learning objectives.
 - Listing behaviors/activities describing leadership qualities in education.
 - Formulation of methods to measure your success in enhancing personal leadership skills.
 - Description of lesson plan involving one or more activities generated from Summer Research Institute training, including evaluation of the effectiveness of that lesson plan.

- Preparation of a **teacher-initiated application for funding** from a granting agency of the participant's choice. Submission of the application will be coordinated by the Program Director. Participants will be asked to notify the Program Director of the final decision concerning funding of the application.

- Active participation in **weekly discussion of science-related literature**.

- Submission of **evaluation instruments** throughout the course of the program, including the
 - Pre- and post-program evaluations.
 - Exit interview with Program Co-Investigator.
 - University of Mississippi Medical Center Continuing Education evaluation form.
 - **University of Mississippi Medical Center Student evaluation form.**
 - **Student pre- and post-program career preferences.**

Development Plan

Personal Professional Philosophy (Teachers)

One of the most intellectually stimulating activities engendered by participation in programs sponsored by the Howard Hughes Medical Institute Precollege Science Education Initiative has been the development of methods for evaluation of the impact generated by individual sponsored programs. In order to do so, each Program Director underwent a process requiring us to rigorously articulate both the objectives he or she desires for their program and specific outcomes that would determine the degree to which those objectives are met. As a part of that process, it was necessary to review critically the arguments (need) for such a program, the facilities already available, additional resources that would be needed, and the impact anticipated on the local educational environment. Because this process has proven to be so valuable, you are being asked to engage in a similar activity, which can aptly be called enunciation of your individual philosophy towards education, career development and commitment to pursuit of teaching excellence.

The most important requirement for development of such a statement will be for you to devote a period of time for consideration of your attitudes and expectations with regard to these issues. It is for this reason that we ask you to prepare this worksheet prior to the first session of the summer program. Each of you will be expected to revisit, refine and reformulate this statement both during the program and, hopefully, throughout your future career. As this is intended as a personal manifesto, it is important for you to decide, and then clearly state, what you expect your goals to be and how you will measure their impact. You will be introduced to additional criteria for evaluation and standards to which contemporary educators can expect to be held during the program, which may help you shape your final document. Initially, however, you must create the foundation for a personal professional philosophy.

Your initial assignment will be to prepare a written response to items 1.a. and 2.a. and bring that with you on June 21th. If you wish, these may be prepared as Microsoft Word documents and e-mailed to me prior to that date at rockhold@pharmacology.umsmed.edu. They can also be faxed to me at 984-1637. If you do not have access to word processing/internet capability, you can use our facilities on campus to format your responses after the course has begun. You will be expected to complete the remaining questions and submit responses upon conclusion of the summer program.

1. Personal learning objectives
 - a. Attempt to identify specifically why you chose to join this program. If it is to gain didactic content or laboratory ("hands-on") skills, outline or summarize the scope/detail that you realistically expect to carry with you upon completion of the program. You may wish to consider this in the form of test questions that you anticipate being able to answer at the end of the six-week sequence. Remember, the idea is to challenge yourself to achieve, with our guidance, realistic, attainable and quantifiable outcomes.
2. Personal career goals in education
 - a. Consider the question "What constitutes leadership in education?". In doing so, first enumerate activities or behaviors that are demonstrated by classroom teachers whom you would consider educational leaders. Second, identify those characteristics that are common to all whom you view as educational leaders. Neither list need be expansive, but should summarize those attributes about which you feel most strongly.
 - b. Identify, within the context of your lesson plan(s) for the 2003-2004 academic year, when, where and how you will incorporate one or more of the activities, behaviors or characteristics you have just listed.

- c. At the end of the 2003-2004 academic year, how will you measure the extent to which you have achieved this goal or goals?
3. Plan for incorporation of learned activities in daily classroom program
 - a. Exposure to contemporary concepts of and activities in bioscience is meaningless unless the results translate into measurable enhancement of classroom learning. It is important to this program that we be able to document, for student learning, where, when and how you plan to incorporate one or more of the hands-on laboratory activities in your classroom during the upcoming academic year.
 - b. Begin to develop a written plan through which you will measure the impact of such an activity or activities. These must take the form of observable demonstrations of future learning by your students.
 - c. Previous participants in this program have suggested that a principal reason why “hands-on” laboratory activities and (to a lesser degree) incorporation of inquiry-based learning strategies are not used in the classroom is because they “detract from time needed to prepare for standardized exams” and “do not help meet required curriculum standards”. For each activity that you plan to incorporate, detail which curriculum standards that activity will fulfill.

Personal Learning Philosophy (Students)

As students, you must also begin to develop a personal manifesto. It is important for you to decide, and then clearly state, what your goals are to be and how you feel this course and the concepts presented in it have and will impact your future. Your only assignment will be to prepare a written response to the following items.

1. Personal learning experience
 - a. Identify topics considered in this program that you feel would be particularly interesting for your fellow students. It is important to provide feedback, both positive and negative, to the teacher participants so that your ideas may be incorporated into their curriculum development plans.
 - b. Identify paper based and laboratory exercises that you felt were most noteworthy. Your ease of understanding and following instructions in such exercises will be important in their evaluation.
2. Personal goal identification
 - a. At the beginning of this course, what were your personal career goals?
 - b. Following presentations from various scientific disciplines, how have your opinions changed, if at all, toward science? Have you identified new avenues of interest? Have your attitudes toward science changed?

Weekly Schedule

A. Week 1 – June 21-25: “A Contemporary Tool Kit for Bioscience”

Didactic section – Purpose:

1. The tools of modern molecular biology
2. Introduction to inquiry-based curriculum design
3. Introduction to granting (supporting your own teaching)
4. Introduction to web-based teaching using Blackboard™

Laboratory section - Purpose:

1. General orientation to laboratory kits
 - a. Bacterial transformation kits
 - b. DNA isolation kits
2. Introduction to needed laboratory techniques
 - a. Lab safety
 - b. Research ethics and note-keeping
 - c. Wet chemistry accuracy and precision
 - d. Pipetting skills
 - e. DNA isolation
 - f. Gel electrophoresis
 - g. Sterile culture and bacterial media preparation

Resources of science section – Purpose:

1. Using literature to promote science learning
2. Introduction to reading list
3. Review of web based resources
4. Choice of weekly assignments

B. Week 2 – June 28July 2: “See One, Do One, Teach One”

Didactic section – Purpose

1. Introduction to information organization
2. Introduction to academic program design
3. Introduction to biotechnology based grantsmanship
4. Preliminary selection of teacher-initiated mini-grant proposals

Laboratory section-Purpose:

1. DNA fingerprinting kits
2. PCR amplification kits
3. Protein purification kits

Resources of science section-Purpose:

1. Review of video resources
2. Review of laboratory preparation, excercises
3. Review of web based resources for laboratory excercises
4. Group performance evaluation

C. Week 3 –July 6-July 9: “Infectious Diseases: The Bug Du Jour”

Didactic section – Purpose:

1. Introduction to molecular biology of the cell
2. Infectious diseases and epidemiology
3. Bioterrorism
4. Background information on bacterial transformation
5. Using computer-based biomedical information sources

Laboratory section - Purpose:

1. Laboratory safety
2. Bacterial Transformation kits
3. Simulated biological agent kit

Resources/literature of science section – Purpose:

1. Presentation and discussion of “The Cobra Event”
2. Evaluation of video material
3. Group performance evaluation

D. Week 4 – July 12-16: “How and Enzyme from Yellowstone Changed Genetics”

Didactic section – Purpose:

1. The Polymerase Chain Reaction
2. The Human Genome Project
3. Human genetics
4. DNA Forensics

Laboratory section – Purpose:

1. DNA fingerprinting kits
2. Crime scene simulation laboratory
3. Sickle cell gene identification kit

Resources/literature of science section – Purpose

1. Paper activities
2. Evaluation of video material
3. Group performance evaluation

E. Week 5 – July 19-23: “We Can Make You Well/We Can Make You Better”

Didactic section – Purpose

1. Carcinoma: recognition, prevention, treatment and outcome
2. Stem cells and gene therapy
3. Biochemistry of cancer

Laboratory section – Purpose

1. PCR amplification kits
2. In search of a cancer gene kit
3. Genetic typing laboratory tour/demonstration
4. DNA Damage and repair kit

Resources/literature of Science section – Purpose

1. Presentation and discussion of “The Hot Zone”

2. Lincoln/Douglas style debate: Stem cells
3. Evaluation of video material
4. Group performance evaluation

F. Week 6 – July 26-30: “Sex, Drugs and Rock ‘n’ Roll”

Didactic section – Purpose

1. Sex education for high school students
2. The pharmacology of drug abuse
3. Practical applications and ethical implications of biotechnology/molecular biology
4. Professional biomedical careers orientation

Laboratory section – Purpose

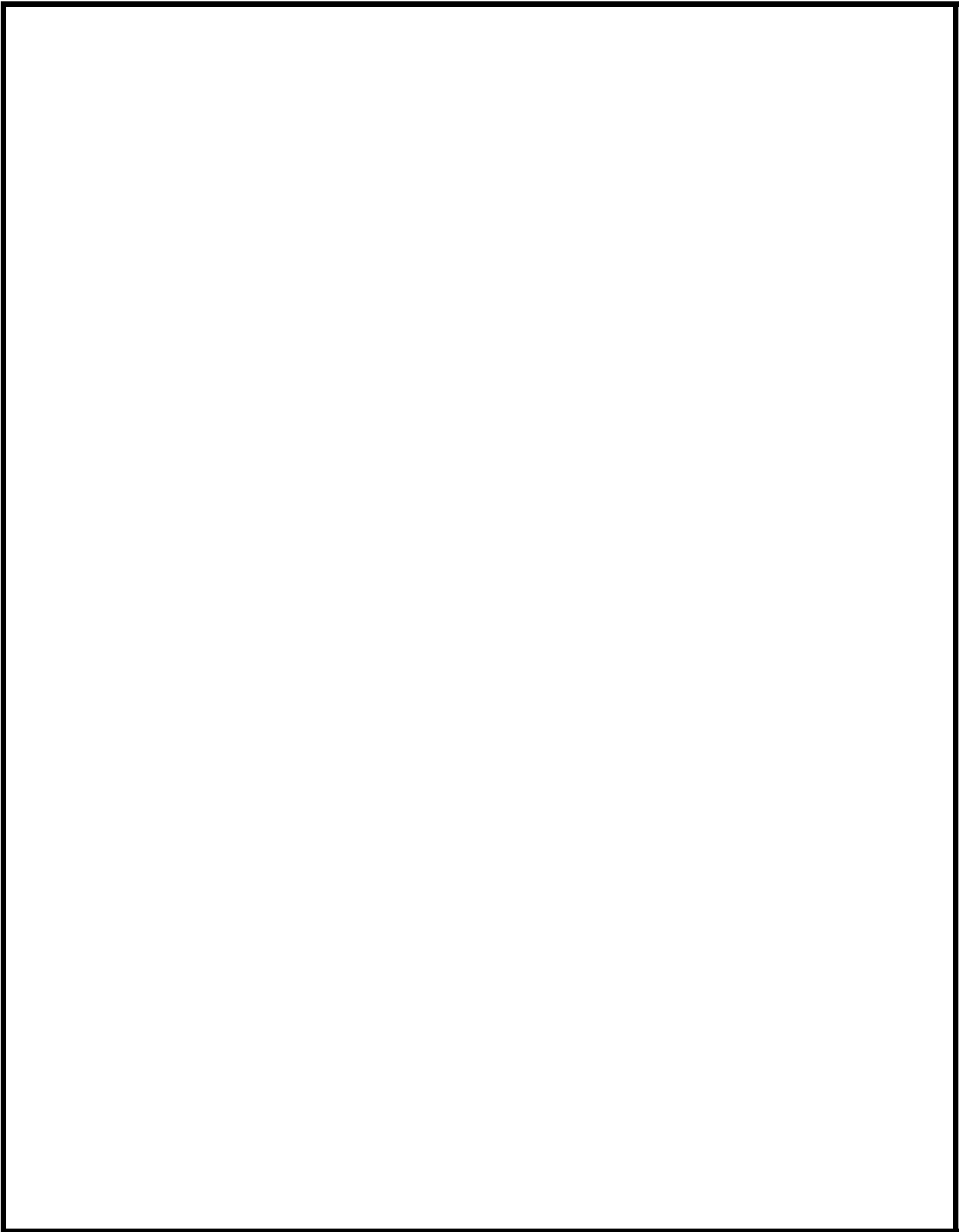
1. Sexually transmitted disease laboratory kits
2. Drug testing kits
3. Secrets of the Rain Forest kit

Resources/literature of science section – Purpose

1. Molecular biology panel discussion/Ethics of science
2. Presentation of finished grant proposals
3. Group performance evaluation

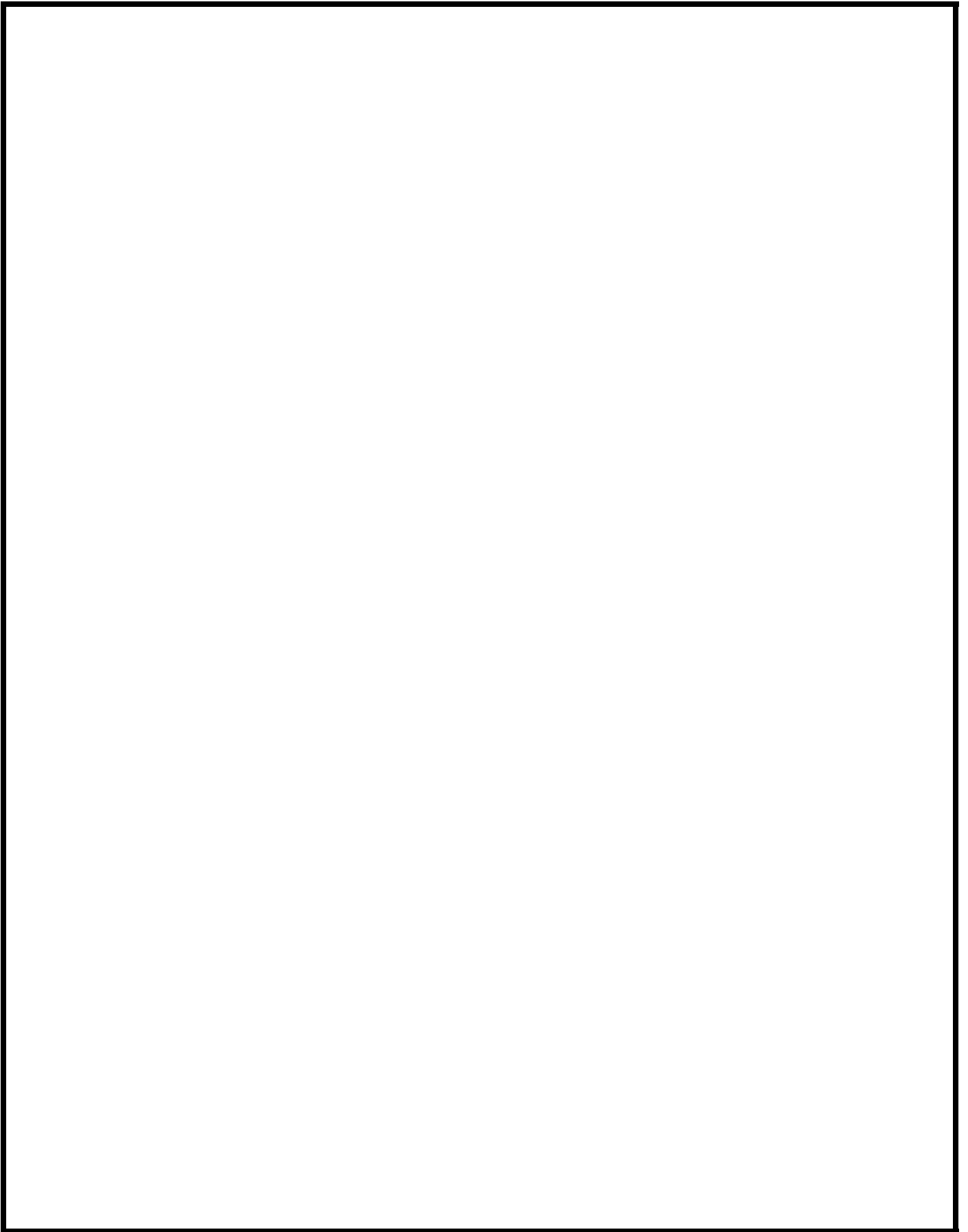
WEEK 1: TEACHERS ONLY
A Contemporary Tool Kit for Bioscience
June 21-25

MONDAY			
TIME	TOPIC	FACULTY	ROOM
9:00	Introduction to Course	Sullivan	SH254
10:00	Tour of SHRP and Laboratory	Sullivan	SH254
11:00	Orientation to Rowland Medical Library		
12:00	<u>LUNCH: Meet Your Predecessors</u>		
1:30	Discussion with previous participants	Faculty	TBA
2:30	Introduction to Curriculum	Rockhold	SH254
3:30	Hazards in High School Laboratories	Fowler/Spence	SH259
4:30			
TUESDAY			
9:00	Introduction to Biotechnology	Sullivan	SH254
10:00	(Continued)	Sullivan	SH254
11:00	Introduction to Curriculum	Rockhold	SH254
12:00	<u>LUNCH</u>		
1:30	(Continued)	Rockhold	SH254
2:30	Laboratory Techniques: Sterilization	Fowler/Spence	SH259
3:30	Laboratory Techniques: Pipetting, Accuracy, Precision	Fowler/Spence	SH259
4:30			
WEDNESDAY			
9:00	Introduction to Laboratory Kits: Overview	Sullivan	SH259
10:00	Bacterial Culture Plate Preparation	Sullivan	SH259
11:00	(Continued)	Sullivan	SH259
12:00	<u>LUNCH</u>		
1:30	Bacterial Transformation Kit	Sullivan	SH259
2:30	Both BioRad pGlo and Carolina Blue/Green Selection kits	Sullivan	SH259
3:30	Video Previews		SH254
4:30			
THURSDAY			
9:00	Introduction to Restriction Enzymes and Cloning	Sullivan	SH254
10:00	Introduction to Blots and Microarrays	Sullivan	SH254
11:00	Polymerase Chain Reaction	Sullivan	SH254
12:00	<u>LUNCH</u>		
1:30	Bacterial Transformation Kit: Completion	Sullivan	SH259
2:30	Gel Electrophoresis Demonstration, PCR Thermocyclers	Sullivan	N503
3:30	(Continued)	Sullivan	N503
4:30			
FRIDAY			
9:00	Grantsmanship: Curriculum Design	Rockhold	SH254
10:00	Grantsmanship: Supporting Your Own Curriculum	Rockhold	SH254
11:00	(Continued)	Rockhold	SH254
12:00	<u>LUNCH</u>		
1:30	DNA Isolation Kit: Overview and Lab	Sullivan	SH259
2:30	Video Previews	Sullivan/	SH254
3:30	Share Ware: Dry labs, videos, web sites, etc	Bender/Cook	
4:30	Weekly Wrap-up Session for Teacher participants		



WEEK 2: TEACHERS ONLY
See One, Do One, Teach One
June 28-July 2

MONDAY			
TIME	TOPIC	FACULTY	ROOM
9:00	Blackboard Lesson 2: Information Organization	Library	
10:00	(Continued)	Library	
11:00	Blackboard Lesson 3: Information Storage and Retrieval	Library	
12:00	LUNCH		
1:30	Introduction to DNA Fingerprinting and Laboratory	Sullivan	SH259
2:30	(Continued)	Sullivan	SH259
3:30	(Continued)	Sullivan	SH259
4:30			
TUESDAY			
9:00	Blackboard Lesson 4: Critical Thinking Skills and Databases	Library	
10:00	(Continued)	Library	
11:00		Library	
12:00	LUNCH		
1:30	Overview of Chromosome 8 PCR Laboratory	Sullivan	SH259
2:30	(Continued)	Sullivan	SH259
3:30	(Continued)	Sullivan	SH259
4:30			
WEDNESDAY			
9:00	Student Oriented Academic Research Project Design	Bender	SH254
10:00	Base Pair Program	Cook	SH254
11:00	Curriculum Design	Rockhold	SH254
12:00	LUNCH		
1:30	Chromosome 8 PCR Laboratory	Sullivan	SH259
2:30	(Continued)	Sullivan	SH259
3:30	Secrets of the Rain Forest Introduction	Sullivan	SH259
4:30			
THURSDAY			
9:00	Grantsmanship: Using Biotechnology as A Tool	Rockhold	SH254
10:00	(Continued)	Rockhold	SH254
11:00			
12:00	LUNCH		
1:30	Secrets of the Rain Forest Laboratory	Sullivan	SH259
2:30	(Continued)	Sullivan	SH259
3:30	(Continued)	Sullivan	SH259
4:30			
FRIDAY			
9:00	Review of Laboratory Exercises	Sullivan	SH259
10:00	(Continued)	Sullivan	SH259
11:00			
12:00	LUNCH		
1:30	Video previews		SH254
2:30	Share ware, Web site reviews		SH254
3:30	Weekly Wrap-up for Teacher participants		SH254
4:30			



WEEK 3: STUDENTS/TEACHERS
Infectious Diseases: The Bug Du Jour
July 6-9

MONDAY				
TIME	<u>TOPIC</u>		<u>FACULTY</u>	<u>ROOM</u>
	<u>HOLIDAY</u>			
TUESDAY				
9:00	Introduction to DNA and RNA, Protein Synthesis		Sullivan	SH254
10:00	Introduction to Micro: More than a Parade of Bugs		Sullivan	SH254
11:00	Laboratory Safety: Accident at Jefferson High Video			SH254
12:00	LUNCH			
1:30	Isolation of DNA: Introduction and Laboratory		Sullivan	SH259
2:30	Bacterial Transformation Lab BioRad/ Carolina Blue Green kits		Sullivan	SH259
3:30	Paper Helix Activity/Protein Synthesis Game/		Teachers/	SH254
4:30	From Genes to Proteins Activities		Faculty	
WEDNESDAY				
9:00	Emerging Infections: As Bad As You Think? (Glow Germ Exp)		Sullivan	SH254
10:00	(Continued)		Sullivan	SH254
11:00	It Came in on a Jet at JFK: West Nile Virus		Sullivan	SH254
12:00	LUNCH			
1:30	Lab Aids: Disease Transmission			
2:30	Epidemiology Case Study: SARS		Sullivan	SH254
3:30	Bacterial Transformation Lab: Conclusion		Sullivan	SH259
4:30	Teacher Evaluations/Teacher Lab Preparation			
THURSDAY				
9:00	AIDS Update		Sullivan	SH254
10:00	Origin of HIV		Sullivan	SH254
11:00	ELISA Assay for AIDS Kit			
12:00	LUNCH			
1:30	AIDS Video			SH254
2:30	Mad Cows and Englishmen		Sullivan	SH254
3:30	Brain Eaters Video (Teachers Break-out session)			SH254
4:30	Group Performance Evaluations		Teachers/Facult y	SH254
FRIDAY				
9:00	Food and Water Borne Diseases		Sullivan	SH254
10:00	Bioterrorism		Lushbaugh	SH254
11:00	Raw Terror Video			SH254
12:00	LUNCH			
1:30	Cobra Event: Book Discussion		Faculty	SH254
2:30	Detection of a Simulated Agent Kit		Sullivan	SH259
3:30	The Coming Plague Video			SH254
4:30	Weekly wrap-up		Teachers/Facult y	SH254

WEEK 4: STUDENTS/TEACHERS

How an Enzyme from Yellowstone Changed Genetics

July 12-16

MONDAY			
TIME	TOPIC	FACULTY	ROOM
9:00	Polymerase Chain Reactions and Everything	Sullivan	SH254
10:00	(Continued/Karen Evans PCR Handout)	Sullivan/Evans	SH254
11:00	PCR paper activity	Sullivan/Evans	SH254
12:00	LUNCH		
1:30	DNA Fingerprinting Kit: Introduction and Laboratory	Sullivan	SH259
2:30	(Continued)	Sullivan	SH259
3:30	(Continued)	Sullivan	SH259
4:30	Teacher participant Breakout		
TUESDAY			
9:00	The Human Genome Project	Sullivan	SH254
10:00	Introduction to Human Genetics: More than Fruit flies and Peas	Sullivan	SH254
11:00	Paternity Testing	Lewis	SH254
12:00	LUNCH		
1:30	FBI and CODIS	Sullivan	SH254
2:30	DNA Fingerprinting Kit: Laboratory	Sullivan	SH259
3:30	Looking for Pitchford Video	Sullivan	SH254
4:30	Teacher Lab Preparation		
WEDNESDAY			
9:00	Forensic DNA Case Studies: What REAL CSI and Lawyers Do	Sullivan	SH254
10:00	Identity Crisis: WTC and other Disasters	Sullivan	SH254
11:00	Murder, Rape and DNA Video	Faculty	SH254
12:00	LUNCH		
1:30	Crime Scene: CSI at the UMC (Lab Simulation)	Faculty	TBA
2:30	(Continued)		
3:30	A Case of the Bloody Knife	Faculty	SH254
4:30			
THURSDAY			
9:00	Evolution/Migration of Humans: The 18 Daughters of Eve	Sullivan	SH254
10:00	Jefferson's Genes Video	Teachers/Faculty	SH254
11:00	The Last of the Romanovs Video	Teachers/Faculty	SH254
12:00	LUNCH		
1:30	Planted Evidence Video	Teachers/Faculty	SH254
2:30	In Search of Sickle Cell Kit: Laboratory	Sullivan	SH259
3:30	(Continued)		
4:30	Group Performance Evaluations	Teachers/Faculty	SH254
FRIDAY			
9:00	Genetic Diseases of Humans	Sullivan	SH254
10:00	Sickle Cell Disease: A Balanced Polymorphism	Sullivan	SH254
11:00			

12:00

LUNCH

1:30

In Search of Sickle Cell Kit (Cont)

Teachers/Facult SH259

y

2:30

Genotypes of Sickle Cell Anemia Activity

Teachers/Facult SH254

y

3:30

Adventure in Dog Hair Activity

Teachers/Facult SH254

y

4:30

Weekly Wrap-up: Teacher Participants

Teachers

WEEK 5: STUDENTS/TEACHERS
We Can Make You Well/ We Can Make You Better
July 19-23

MONDAY			
TIME	TOPIC	FACULTY	ROOM
9:00	Stem Cells: What are they?	Wellman	SH254
10:00	What is a Transgenic Animal?	Wellman	SH254
11:00	Bioethics and Stem Cell Research	Faculty	SH254
12:00	<u>LUNCH</u>		
1:30	Case Studies in Bioethics	Bender/Cook	SH254
2:30	Chromosome 8 PCR Analysis Kit	Sullivan	SH259
3:30	(Continued)	Sullivan	SH259
4:30	<u>Teacher Lab Prep</u>		
TUESDAY			
9:00	Gene Therapy: Cloning for Fun and Profit	Wellman	SH254
10:00	Gene Therapy: What you didn't get from Mom and Dad	Wellman	SH254
11:00	Student Groups: Lincoln/Douglas Style Debate Strategy Session	Bender/Cook	SH254
12:00	LUNCH		
1:30	Chromosome 8 PCR Analysis Kit	Sullivan	SH259
2:30	Student Groups: Lincoln/Douglas Debate Strategy Session	Bender/Cook	SH254
3:30	Medicine Man (Video)		
4:30			
WEDNESDAY			
9:00	Lincoln Douglas Debate: Stem Cell Research	Bender/Cook/	SH254
10:00	(Continued)	Faculty	
11:00			
12:00	<u>LUNCH</u>		
1:30	Cancer Warrior Video	Faculty	SH254
2:30	In Search of a Cancer Gene Laboratory	Sullivan	SH259
3:30	(Continued)	Sullivan	SH259
4:30	<u>Teacher Evaluation: Debate</u>	Teachers/Faculty	SH254
THURSDAY			
9:00	Biochemistry of Cancer	Wellman	SH254
10:00	Biochemistry of Cancer	Wellman	SH254
11:00	What Do You Mean Cancer is Infectious?	Sullivan	SH254
12:00	LUNCH		
1:30	DNA Damage and Repair Laboratory	Sullivan	SH259
2:30	(Continued)	Sullivan	SH259
3:30			
4:30	Group Performance Evaluation	Faculty	SH254
FRIDAY			
9:00	Genetic Typing and a Tour (Dr. Olga McDaniel's Lab)	McDaniel	
10:00			
11:00			
12:00	LUNCH		
1:30	Hot Zone Book Discussion	Faculty	SH254
2:30	<u>Ebola Video</u>	Faculty	SH254

3:30	Health Care in the Developing World: How much and for whom? (Discussion)	Faculty	SH254
4:30	Weekly Wrap-up		

WEEK 6: STUDENTS/TEACHERS
Sex, Drugs, and Rock'n'Roll
July 26-July 30

MONDAY

TIME	<u>TOPIC</u>	<u>FACULTY</u>	<u>ROOM</u>
9:00	Oh, Yes, It Can Happen to You: Sex and STDs	Tonore	SH254
10:00	(Continued)		SH254
11:00	Alternative Reproduction: IVF	TBA	SH254
12:00	<u>LUNCH</u>		
1:30	Sexually Transmitted Diseases: AIDS and HBV Laboratory	Sullivan	SH259
2:30	<u>Transmission Patterns Lab</u>	Sullivan	SH259
3:30	(Continued)	Sullivan	SH259
4:30	Teacher Lab Prep		SH259

TUESDAY

9:00	Dr. Rockhold's Favorite Drugs	Rockhold	SH254
10:00	(Continued)	Rockhold	SH254
11:00	Dr. Rockhold's Least Favorite Drugs	Rockhold	SH254
12:00	<u>LUNCH</u>		
1:30	Mississippi Bureau of Narcotics Speaker	TBA	SH254
2:30	Drug Testing kits (No, you don't have to study)	Rockhold	SH259
3:30	(Continued)		SH259
4:30	Teacher Lab Prep		

WEDNESDAY

9:00	ACT: Tobacco and Teens	TBA	SH254
10:00	Molecular Biology: The Bright Side	Faculty	SH254
11:00	Molecular Biology: The Dark Side	Faculty	SH254
12:00	<u>LUNCH</u>		
1:30	Secrets of the Rain Forest Kit	Sullivan	SH259
2:30	(Continued)		SH259
3:30			SH259
4:30	Group Performance Evaluation	Teachers/Faculty	SH254

THURSDAY

9:00	<u>CAREERS IN MEDICINE: SHRP</u>	Fowler	SH254
10:00	CAREERS IN MEDICINE: Medicine	Lushbaugh	SH254
11:00	CAREERS IN MEDICINE: Dental	TBA	SH254
12:00	<u>LUNCH</u>		
1:30	CAREERS IN MEDICINE: Nursing	TBA	SH254
2:30	CAREERS IN MEDICINE: Graduate	Rockhold	SH254
3:30			
4:30	Weekly Wrap-up		

FRIDAY

9:00	<u>EVALUATION AND OUTPROCESSING</u>	Faculty	SH254
10:00			SH254
11:00			
12:00	LUNCH: ALL PARTICIPANTS		
1:30	Student Evaluations	Faculty	SH254
2:30			
3:30	Teacher Evaluations	Faculty	SH254

4:30