DRAFT Course Syllabus

Cloning DNA to Make Protein

Part 3 of the 3 Part Workshop: Easy as ABC: Applications of Biotechnology in the Classroom

Dates:
Friday, June 21, 2013, 9:00 AM – 5:00 PM
Saturday, June 22, 2013, 9:00 AM-5:00 PM

Location: Shoreline Community College
16101 Greenwood Avenue North
Shoreline, WA 98133

Instructors:

Adrienne Houck

The Amgen Bruce Wallace Lab program coordinator, Adrienne Houck, has worked for Shoreline Community College for 7 years in biotechnology outreach and science education. She got her BA in secondary education with biology, earth science and general science endorsements from Western Washington University. With her classroom experience as well as field experience working as a pipette vendor for Rainin and companies like Geospiza, My Girl Boat marine science outreach and assisting with the middle school program at NWABR, she has a unique view of the importance of local biotech and how to merge new curriculum into current classroom logistics. Adrienne is driven to provide opportunities that assist teachers in bringing current science to the classroom.

Dina Kovarik, M.S., Ph.D.

Bio-ITEST Program Manager, Bioinformatics, NWABR. Dina has fifteen years of experience in molecular biology, obtaining an M.S. in Epidemiology and a Ph.D. in Molecular and Cellular Biology from the University of Washington working primarily on HIV/AIDS. She also worked as a Teaching Associate in the Department of Biology, Sonoma State University, and was a founding member of FOSEP, the Forum for Science, Ethics and Policy. She has been the Program Manager for NWABR's Bio-ITEST bioinformatics program since 2009, assisting with professional development workshops for teachers, development of bioinformatics curricula, and team-teaching "Dynamic DNA: Exploring Biological Systems" through the Washington Innovative Careers Network (WaNIC).

Program Description

This is the final workshop of a three-part series, *Easy as ABC: Applications of Biotechnology in the Classroom*, developed as a partnership between Shoreline Community College's Amgen Bruce Wallace Lab Program and the Northwest Association for Biomedical Research (NWABR)'s Bio-ITEST bioinformatics program. This workshop is designed for high school biology, biotechnology, marine biology or chemistry teachers who have experience with micropipetting, DNA extraction, and agarose gel electrophoresis and want opportunities to build on these skills while bringing authentic research experiences into their classrooms. Teachers will learn the basic techniques used in DNA cloning which include: using restriction enzymes, ligation, bacterial transformation, protein expression and purification. Teachers will also receive training in bioinformatics and explore ways to infuse science career awareness into their classrooms. Basic skills in micropipetting and agarose gel electrophoresis are required (for example, participation in prior Shoreline-NWABR workshops A ("An Understanding of DNA" in December 2012 or "Bringing PCR into the Biology Classroom in February 2013), NWABR's Bio-ITEST advanced bioinformatics summer workshop, "Using Bioinformatics: Genetic Research;" the

Science Education Partnership (SEP) through the Fred Hutchinson Cancer Research Center (FHCRC); or the Amgen-Bruce Wallace Biotechnology Lab Program held for teachers each summer at Shoreline Community College.

For links to the Amgen Bruce Wallace laboratory activities and NWABR's bioinformatics lessons covered in this workshop, as well as regular program updates, visit the Shoreline Partnership Workshop at: http://www.nwabr.org/shoreline-partnership-workshop

Clock Hours and Resources

Twelve clock hours will be provided free of charge. Lunch will be provided on Friday and Saturday. A light breakfast will be available prior to each session, from 8:30-9:00 AM. Teachers will also receive access to various biotechnology and bioinformatics resources, including free access to all lab equipment, supplies and reagents used in these trainings to bring many of these labs into your classroom!

Workshop C Agenda

Friday

Friday	Topic / Event	Instructor(s)	Location
9:00-9:30	Introductions, Logistics, Program Overview	Adrienne & Dina	Room 2928
9:30-10:00	Using Plasmids as Engineering Tools: Overview of the Process from Bench to Product	Adrienne & Dina	Biotech Lab (Room 2930)
10:00-11:00	Lab 2: Restriction Digestion of p-ara and pKan-R plasmids	Adrienne	Biotech Lab (Room 2930)
11:00-11:15	Break		
11:15-12:00	APS Archive of Teaching Resources	Dina	Biotech Lab (Room 2930)
12:00-12:45	Lunch		Room 2928
12:45-1:15	Lab 3: Ligations	Adrienne	Biotech Lab (Room 2930)
1:15-2:15	Lab 4: Confirmation of Restriction Digests	Adrienne	Biotech Lab (Room 2930)
2:15-2:45	Taking Gel Pictures and Break	Adrienne	Biotech Lab (Room 2930)
2:45-3:15	Teacher Background: Transformation	Adrienne	Biotech Lab (Room 2930)
3:15-3:45	Lab 5: Transformation	Adrienne	Biotech Lab (Room 2930)
3:45-4:00	Break, Transition to Computer Lab		
4:00-4:45	Practice with the APS Archive	Dina	Computer Lab (Rm 2601)
4:45-5:00	End-of-Day Wrap-Up, Stars and Wishes	Adrienne & Dina	Computer Lab (Rm 2601)

Saturday

Saturday	Topic / Event	Instructor(s)	Location
9:00-9:15	Review of Day 1, Stars and Wishes	Adrienne & Dina	Room 2928
9:15-10:00	Lab 5: Transformation: Review of Results, Photos of Plates	Adrienne	Biotech Lab (Room 2930)
10:00-10:30	Discussion of Lab 6: Amplified Cells	Adrienne	Biotech Lab (Room 2930)
10:30-11:00	Lab 7, Part 1: Lysing Cells	Adrienne	Biotech Lab (Room 2930)
11:00-11:15	Break, Transition to Computer Lab		
11:15-12:00	Using BLAST to Analyze Sequences, Part 1	Dina	Computer Lab (Rm 2601)
12:00-12:45	Lunch		Room 2928
12:45-2:00	Using BLAST to Analyze Sequences, Part 2	Dina	Computer Lab (Rm 2601)
2:00-3:30	Lab 7, Part 2: Column Purification of RFP	Adrienne	Biotech Lab (Room 2930)
3:30-3:45	Break, Transition to Computer Lab		
3:45-4:30	Infusing Careers into Science Classes	Dina	Computer Lab (Rm 2601)
4:30-5:00	Program Wrap-Up	Adrienne & Dina	Computer Lab (Rm 2601)

Updated May 21, 2013

Workshop Collaborators

The Amgen Bruce Wallace Lab program, funded by the Amgen Foundation was established in California as a way to connect Amgen pharmaceutical research with the local communities. With about 7 centers in the locations where the Amgen company is established across the country, Shoreline Community College and the Seattle area were lucky enough to be awarded the program and SCC has been training teachers coming upon its 8th year. We reach over 5000 students a year through our curriculum trainings, kits to classrooms and classroom visits.

NWABR is a non-profit dedicated to promoting an understanding of biomedical research and its ethical conduct through dialogue and education. A membership organization with over 60 institutional and associate members conducting or involved closely with biomedical research, NWABR connects the scientific and education communities and helps the public understand the vital role of research in promoting better health outcomes. Members include industry, academia, health care, and voluntary health organizations. Major collaborators with NWABR's Bio-ITEST bioinformatics program include Digital World Biology, the EdLab Group (formerly the Puget Sound Center for Teaching, Learning, and Technology), and Shoreline Community College. The program also draws on NWABR's strong relationships with school districts, community groups, bioethicists and NWABR member research institutions.

Bruce Wallace
BIOTECHNOLOGY LAB PROGRAM

For more information, including links to the laboratory activities covered in this workshop and many more, visit: http://www.bwbiotechprogram.com/

The Bio-ITEST program is made possible by an *Innovative Technology Experiences for Students and Teachers* grant award from the National Science Foundation, DRL-0833779

For more information about the Bio-ITEST program, visit: http://www.nwabr.org/education/itest.html

For links to the introductory bioinformatics lessons and activities covered in this workshop, visit: http://nwabr.org/teacher-center/introductory-bioinformatics-genetic-testing

For links to the advanced bioinformatics lessons and activities covered in this workshop, visit: http://nwabr.org/teacher-center/advanced-bioinformatics-genetic-research

Learn More

The APS Archive of Teaching Resources is a collaborative digital library of peer-reviewed life science teaching resources that is free and open to educators worldwide. As of January 2013, the Archive contained more than 5,500 peer-reviewed teaching resources including audiovisual materials, lesson plans, teaching journal articles, and scientific content materials. NWABR is a partner in the Archive, and all NWABR educational materials, including dozens of teacher-developed case studies, are being added to the Archive. When the revision of the Amgen Bruce Wallace curriculum is released later this summer, those lessons will be added to the Archive as well.

Collaborative Digital Library of Life Sciences

To explore the Archive, visit: http://www.apsarchive.org/