ISB Systems Education Experiences

BOEING

SYSTEMS THINKERS IN STEM

A CONVERSATION WITH:

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Which systems thinking skills do you use?

#2: Consider the Wholes and Parts
Learning is supported by short-term, diverse lessons or workshops. Each one is an opportunity to engage the audience and build their appreciation of science and its relevance to their life. Learning to use new pieces of equipment in the lab or new assays and the principals behind them builds confidence through successful experiences and thoughtful, creative contributions through discussions.

#9: Identify Relationships
Biotechnology involves many overlapping technical areas but it also has a role in understanding social and ethical issues affecting many aspects of society. It takes many different skills to develop new medicines, therapies or devices and companies need people with science backgrounds to work in human resources, law, marketing and regulatory affairs departments. It is also important that biotechnology and medical advances take ethical concerns and social norms into consideration when advancing new technologies. Societal discussions are an important part of advancing science in an ethical and acceptable manner.

#15: Respond to Changes Over Time
Science research and education involve constant evaluation of data and feedback, which informs improvements, new approaches & greater relevance. We introduce new camp themes as new topics become relevant, and new activities as new equipment and reagents become available. We monitor the level of science and lab experience of students and adjust our instructions and materials to match the student abilities, and provide individual, paired and group learning as appropriate for each unique group of students.

1. **What is your role within the STEM community?**
   I organize and teach at biotech summer camps for high school students that are held at Shoreline Community College. I recruit scientists to speak at camp, organize tours at biotech companies and recruit camp sponsors from the corporate biotech community. I promote science education by judging at science fairs, and presenting at workshops. I am active in the Seattle Chapter of Association for Women in Science (AWIS).

2. **What complex problem do you address in your work?**
   The work I do addresses the big issues of science literacy, explaining the scientific process and effectively communicating science to non-scientists. Whether preparing for camp or developing workshops, my goal is to excite audiences about science, introduce them to the scientific process and encourage them to contribute to future innovations in all areas of STEM. Conveying basic information, new discoveries and current areas of research in a manner that makes science exciting and relevant to all students and adults is important. I encourage scientists to become role models by sharing their education and career paths with students and adults. Communicating science is much more than presenting facts. It includes listening, answering questions, and sharing the pleasure and excitement of discovery and innovation.

3. **What elements do you need to consider when addressing this problem?**
   Understanding students' science background, lab experience, and exposure to science careers is important for developing camp programs. Incorporating the latest teaching and learning strategies, including relevant, hands-on, inquiry-based lessons is a primary goal. We pick camp themes that are in the news, such as exploring infectious diseases, Orca whales and environment conservation, or genetics and disease. Getting daily feedback from students enables us to adjust our teaching style and the lesson content. Introducing students to scientists with very diverse education paths and careers is important to show that a STEM education can open doors to many opportunities and careers beyond the stereotypic lab technician. Adults may appreciate how science has contributed to new consumer products and their health but feel alienated from scientists and the scientific process. Through fun and informative workshops, I hope to build their confidence in "doing" and understanding science.

4. **How did you get where you are today?**
   My unpredicted career path has been a terrific mix of amazing people, interesting science, rewarding teaching, and continuous learning. I received my BS from Oregon State University in Foods & Nutrition and PhD in Genetics from the UW in 1987. I worked for 13 years in the biotech industry at multiple drug development companies in Seattle. My career took me from bench scientist to company director which meant involvement in business and regulatory decisions as well as discovery science. My industry experience served as a great foundation for my shift into science education. I was Program Manager for Science Outreach at NWABR for nine years. Currently I am Program Coordinator for PROJECT BIOTECH at Shoreline Community College.

5. **What advice do you have for becoming a systems thinker?**
   As scientists, we find ourselves becoming specialists in very narrow fields of science but you can't forget the context of your work. You need to continually remind yourself of the "big picture" – how your work and interests fit into the larger fields of science and society. Consciously look for the causes and effects of your work. Look for applications of your interests in many areas, including fields that are not usually associated with it.