Ag Biotech Industry in the Classroom

Middle School Workshop 2015

Instructed by
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Thank you to the following organizations for their support

Workshop Sponsors

Program Development
Ag Biotech Industry in the Classroom

Monday, July 27 (NC State University)

The Intersection of Agriculture and Biotechnology

8:00 a.m. – 8:30 a.m.  Registration / Breakfast / Pre-Workshop Surveys (Robles, Frame, Howell)

8:30 a.m. – 8:45 a.m.  Setting the Stage
Deborah Thompson, Ph.D., Director of Partnership Development, College of Agriculture and Life Sciences, North Carolina State University

8:45 a.m. – 9:30 a.m.  Activity: Extra, Extra! Biotechnology in Agriculture (Frame, Howell)
Gallery walk of news articles introductory literacy activity.

9:30 a.m. – 10:15 a.m.  Lecture: Biotechnology and Its Role in Agriculture (Robles)

10:15 a.m. – 10:30 a.m.  Break

10:30 a.m. – 11:00 a.m.  Activities
- Cell Activity – Observation and Structure (Frame)
- Fruit DNA Isolation (Howell)

11:00 a.m. – 11:45 am  Lecture: Cells, DNA, RNA and Proteins (Robles)

11:45 a.m. – 12:45 p.m.  DNA, RNA and Protein and Its Role in Agriculture

12:45 p.m. – 2:00 p.m.  Activities
- Fast Plants – Who is your Daddy, Setup (Frame)
- DNA to Protein

2:00 p.m. - 2:15 p.m.  Break

2:15 p.m. – 3:15 p.m.  Activity: Proteins at Work / Enzyme Lab (Howell)

3:15 p.m. – 4:00 p.m.  Guest Speaker: Meat and Milk Production – Biotech's Role
Joy Parr Drach, President and Chief Executive Officer, Advanced Animal Diagnostics

4:00 p.m.  Closing Remarks (Robles)
Tuesday, July 28 (NC State University)

**Manipulating Crops: Traditional and GMO Methods**

8:00 a.m. – 8:30 a.m.  **Check-In and Breakfast** (Robles, Frame, Howell)

8:30 a.m. – 9:30 a.m.  **Lecture: Genotype Determination and Manipulation** (Robles)

9:30 a.m. – 10:45 a.m.  **Activities** (Frame)
  - Corn Cob Genetics
  - Paperclip PCR – Identifying Genes

10:45 a.m. – 11:00 a.m.  **Break**

11:00 a.m. – 12:00 p.m.  **Activities** (Howell)
  - Fast Plant Pigment Chromatography
  - Biotechnology Vocabulary

12:00 p.m. – 1:00 p.m.  **Lunch**

**Crop Improvement in the Biotech Era**

1:00 p.m. – 2:00 p.m.  **Guest Speaker: Plant Breeding and Tissue Culture**
  Allan Wenck Ph.D., J.D., Head of Trait Validation – United States, Bayer CropScience

2:00 p.m. – 4:00 p.m.  **Activities: Plant Cloning and Reproduction**
  - Plant Cloning Techniques (Howell)
  - Fast Plant - Who is your Daddy, 24 hour Observations (Frame)

4:00 p.m.  **Closing Remarks** (Robles)
  - Company Tours Announcement

Wednesday, July 29 (NCBiotech)

**Careers in Ag Biotech**

8:00 a.m. – 8:30 a.m.  **Check-In and Breakfast** (Niebauer)

8:30 a.m. – 9:00 a.m.  **Assemble and Depart for Tours**
  Amber Niebauer, Program and Resource Development Manager, NCBiotech

9:00 a.m. – 12:00 p.m.  **Company Tours**
  Arrive and check-in at the company. Company hosts will provide an introductory talk; provide a tour of the facility, including labs and...
greenhouses; and provide opportunities to speak with company representatives about what they do.

12:00 p.m. – 12:15 p.m.  
**Assemble and Depart for NCBiotech**

12:15 p.m. – 2:15 p.m.  
**Lunch: Ag Biotech Pathways after High School** (Facilitated by Aghoram)  
Representatives from the companies, North Carolina State University, North Carolina A&T State University, community colleges, FFA, Ag Careers, and Ag Future of America will be invited to join.

**Answering Tough Questions about GMOs**

2:15 p.m. – 2:30 p.m.  
**Break**

2:30 p.m. – 3:30 p.m.  
**Guest Speaker: Safety Testing of GM Crops**  
Hope Hart, Team Leader, Syngenta

3:30 p.m. – 4:00 p.m.  
**Guest Speaker: GMO Answers**  
Fran Castle, Global Brand & Media Communications Senior Manager, BASF Plant Science

4:00 p.m.  
**Closing Remarks** (Aghoram and Robles)

**Thursday, July 30 (Meredith College)**

**Non-Food Uses of Agricultural Products**

8:00 a.m. – 8:30 a.m.  
**Check-In and Breakfast** (Robles, Frame, Howell)

8:30 a.m. – 9:15 a.m.  
**Activity: Identifying Biotechnology Concept Mapping** (Frame)  
Literacy activity on making meaningful connections

9:15 a.m. – 10:00 a.m.  
**Lecture: Present and Future Challenges in Agriculture** (Robles)

**Exploring Agriculture: Organic, Sustainable, Conventional, GMO**

10:00 a.m. – 11:30 a.m.  
**Farmer/Grower Panel: View from the Field**  
Dialog among organic and conventional farmers/growers and educators about agricultural practices and sustainability.  
- Deborah Ballance, Owner, White Oak Farm  
- Billy Carter, Owner, Carter Farms  
- Shawn Harding, Owner, Southside Farms  
- Moderator: Deborah Thompson, Ph.D., Director of Partnership
Development, College of Agriculture and Life Sciences, North Carolina State University

11:30 a.m. – 12:30 p.m.   Lunch

12:30 p.m. – 1:30 p.m.   Activity: "No-Drip Diapers" (Howell)

1:30 p.m. – 2:30 p.m.   Activity: Biogas – Yeast Fermentation (Frame)

2:30 p.m. – 2:45 p.m.   Break

2:45 p.m. – 4:00 p.m.   Debate: Food Labels: Organic, Natural, Free Range, GMO-free, and Beyond (Robles, Frame, Howell)

4:00 p.m.   Closing Remarks (Robles)

Friday, July 31 (NC State University)

Incorporating Ag Biotech into the Standard Course of Study

8:00 a.m. – 8:30 a.m.   Check-In and Breakfast (Robles, Frame, Howell)

8:30 a.m. – 9:00 a.m.   Activity: Fast Plants – Who is your Daddy, 72 hour Genetics Experiment Observations (Frame)

9:00 a.m. – 11:00 a.m.   Standard Course of Study, Careers, and Science: Where does Biotechnology Fit in? (Robles, Frame, Howell)

Classroom implementation and follow-up activity planning - How can we use these ideas to teach our content?

11:00 a.m. – Noon   Lunch

Noon – 1:00 p.m.   Howling Cow Networking Reception

An opportunity to connect with faculty from the College of Ag and Life Sciences at NC State University over a bowl of their signature Howling Cow ice cream.

1:00 p.m. – 1:30 p.m.   Post-Workshop Evaluations / Closing Remarks (Robles)