Welcome back! Before we start...

- Check out your security badge
- Sit where your name card is
- In your journal, write:
  - Your goals for your experience in this program
  - Any concerns/apprehensions
  - (If you missed Opening Day, leave the first few pages blank for a Table of Contents)
Door Prizes!
Logistics and Program Overview
SCIENCE EDUCATION PARTNERSHIP

Labs & Lessons

SEP Guides

- Gel Electrophoresis
- PCR
- Elephant Trunk
- Bacterial Transformation
- ELISA
- DNA Extraction
Welcome!

Welcome to SEP!
2018 Cohort

DNA Labs

- DNA Background
- DNA Lab 1 - Tech Guide
  Student guide for DNA Lab 1. In this lab students work with pre-cut lambda DNA.
- DNA Lab 2 - Tech Guide
  This is the UPDATED DNA Lab 2, in which students conduct a restriction enzyme digest.
  **This is the lab to flowchart prior to the SEP summer session**
- DNA Lab 2 Data and Analysis Sheet
  This is the data and analysis sheet that accompanies DNA Lab 2.

Transformation

- Tx Teacher Guide
  Basic information for teachers interested in doing pFLO or pBLU transformation. Please read to familiarize yourself with transformation if you have not done this process before.
Focus on Scientific Practices
Science and Engineering Practices

- Asking questions (for science) and defining problems (for engineering)
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Constructing explanations (for science) and designing solutions (for engineering)
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

NRC, Frameworks for K-12 Science Education, p. 42
Welcome from Fred Hutch!

Elizabeth Boyd, VP, Research Adm
Marion Dorer, Assc VP Interdisc Sci Adm
Icebreaker
Norms
Our cohort

- What is your preferred style when working with others in workshops?
  - “I think out loud” vs “I mull and think before speaking”
  - “Arguments make me uncomfortable” vs. “I like to argue”
Norms and Accountable Talk

- Accountability to Accurate Knowledge
- Accountability to Rigorous Thinking
- Accountability to the Learning Community (Equity, Respect)
Lab Safety
DNA Extraction
Science Seminars

Procedures/Design
Results/Data
Science-related Texts
Science Seminars

Procedures/Design
Results/Data
Science-related Texts
Argumentation as a Scientific Practice
The notion that there is a single scientific method of observation, hypothesis, deduction, and conclusion – a myth perpetuated to this day by many textbooks – is fundamentally wrong...the picture of scientific reasoning is richer, more complex, and more diverse than the image of a linear and unitary scientific method would suggest.

What engages all scientists, however, is a process of critique and argumentation. Because they examine each other’s ideas and look for flaws, controversy and debate among scientists are normal occurrences, neither exceptional nor extraordinary.
Central Role of Argument

NRC Framework for K-12 Science Education, 2012, p. 45
Argumentation Elements

**EVIDENCE**
Students use high quality evidence to support their claims.

**REASONING**
Students make clear how their evidence supports their claim.

**INTERACTIVE**
Students build off of and critique each others’ ideas.

**COMPETING CLAIMS**
Students critique competing claims.
INTERACTIVE
Students build off of and critique each others’ ideas.

COMPETING CLAIMS
Students critique competing claims.
Science Seminar
Lab Meeting
Sensemaking about procedures
Shared inquiry, not debate

The goal is to achieve an enlarged understanding of the material discussed
Norms for Seminar

- Don’t raise hands
- Speak to everyone in the group
- Ground your claims in evidence
- Listen carefully and address one another respectfully
- Ask questions and build on the ideas of others
- Monitor your airtime
Teaching the Lesson

Reflection
DNA Lab 2
Restriction Digest
Closing Reflection
Closing Reflection

**What?**
- What stood out to you? What was memorable?

**So what?**
- Why did the things you notice matter? Why are they significant?

**Now what?**
- What do you want to take away and do in the future based on today?
Closure

• Summary
• Looking ahead
  • Finish DNA Lab 2
  • Discuss CER argumentation
  • Tour Fred Hutch
  • Transformation

If you’ve not done a transformation before, please read over the protocols on your Cohort Page.

• Feedback