

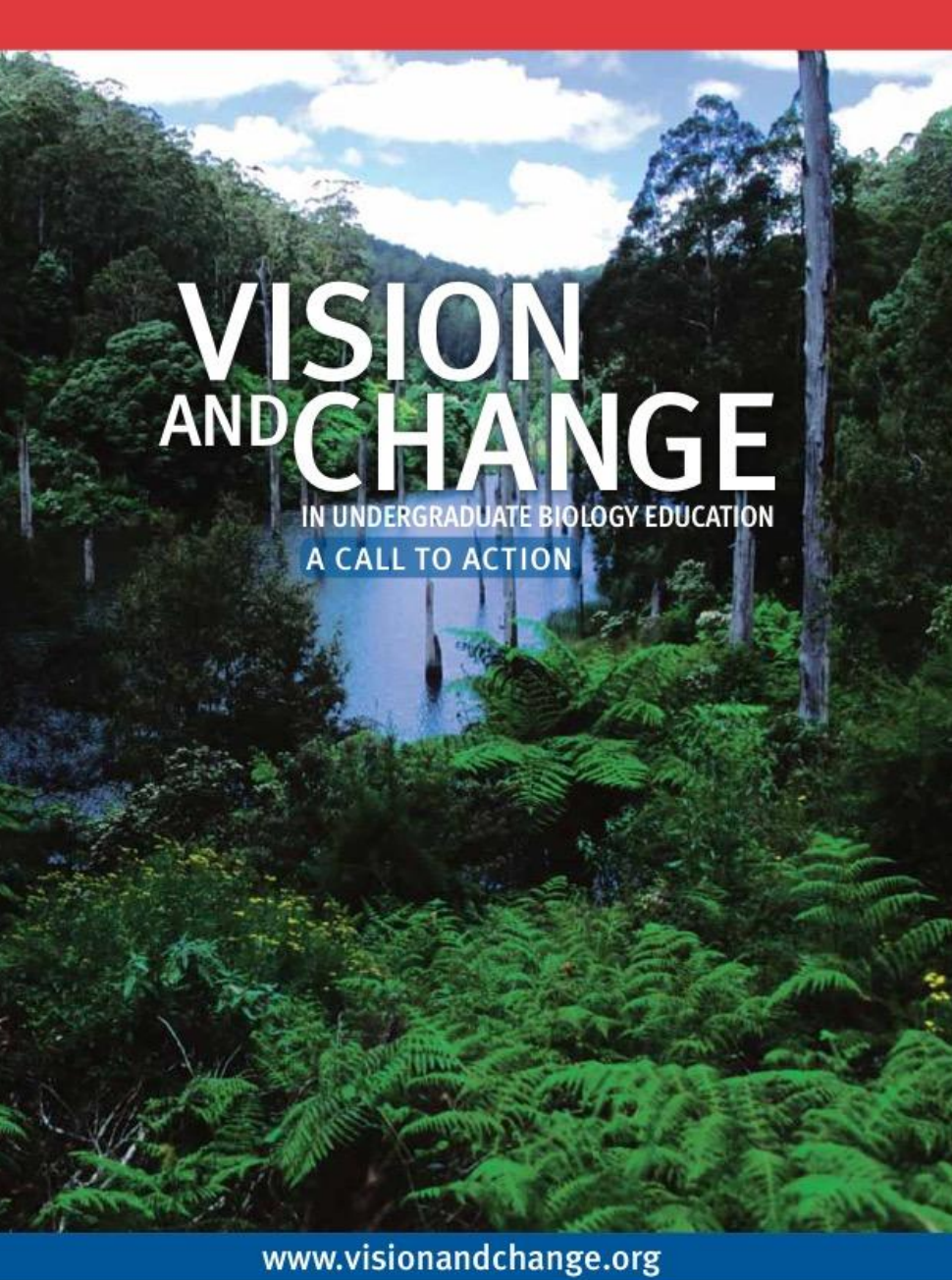
Scaffolding Core Competency Learning Outcomes across the Undergraduate Biology Curriculum

Welcome! Please find your name card.

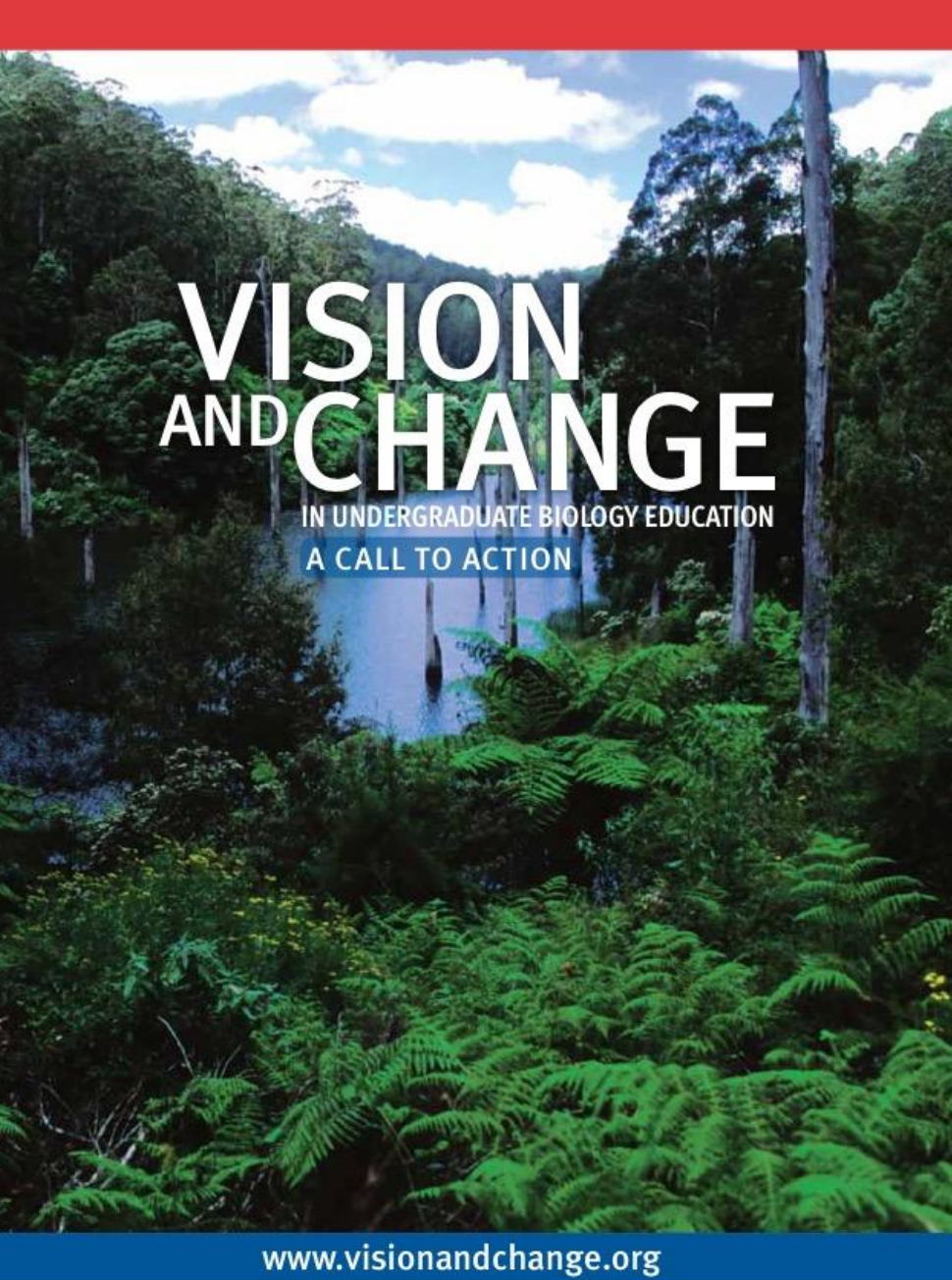
If you didn't pre-register for the workshop, please come
introduce yourself to one of the facilitators!

Alexa Clemmons, Christine Andrews, & Stacey Kiser
SABER West 2019





-
- **Evidence-based teaching**
 - **5 core concepts**
 - **6 core competencies**



Core Competencies

1. Process of Science
2. Quantitative Reasoning
3. Modeling & Simulation
4. Interdisciplinary Nature of Science
5. Communication & Collaboration
6. Science & Society



Introduce yourself to your neighbors, and discuss...

- 1- Why did you choose (your group's competency) as one you'd like to focus on?
- 2- What do you like about teaching/learning it?
What is challenging about teaching/learning it?



Motivations for today's workshop

- Competencies pose a challenge (assessment, resources, etc.)
 - New resources now (or soon) available!
- Scaffolding is important
 - Introductory level?
 - Capstone level?
 - Repeated practice?



Today's Goals

- *Apply existing resources and your expertise to...* Compile a scaffolded set of competency learning outcomes at the capstone-, developing-, and introductory-levels.
- *Then, as needed...* Draft measurable competency learning outcomes (or revise existing outcomes) to fill gaps.

Why start with learning outcomes?

Identify
desired
outcomes

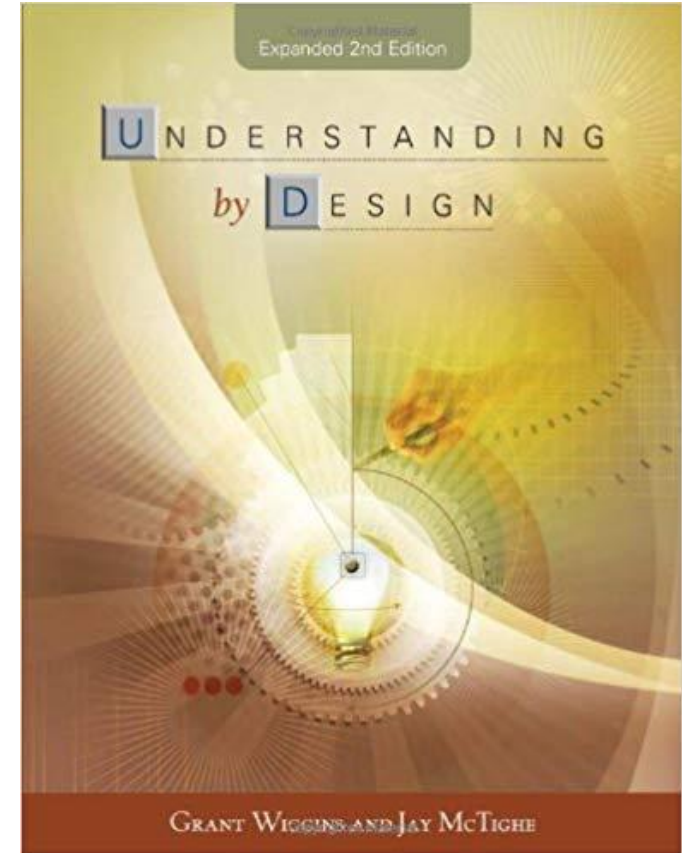
*What will
students be able
to do?*

Plan
assessments

*How will you
know they can
do it?*

Plan lessons

*How will they
learn and
practice?*



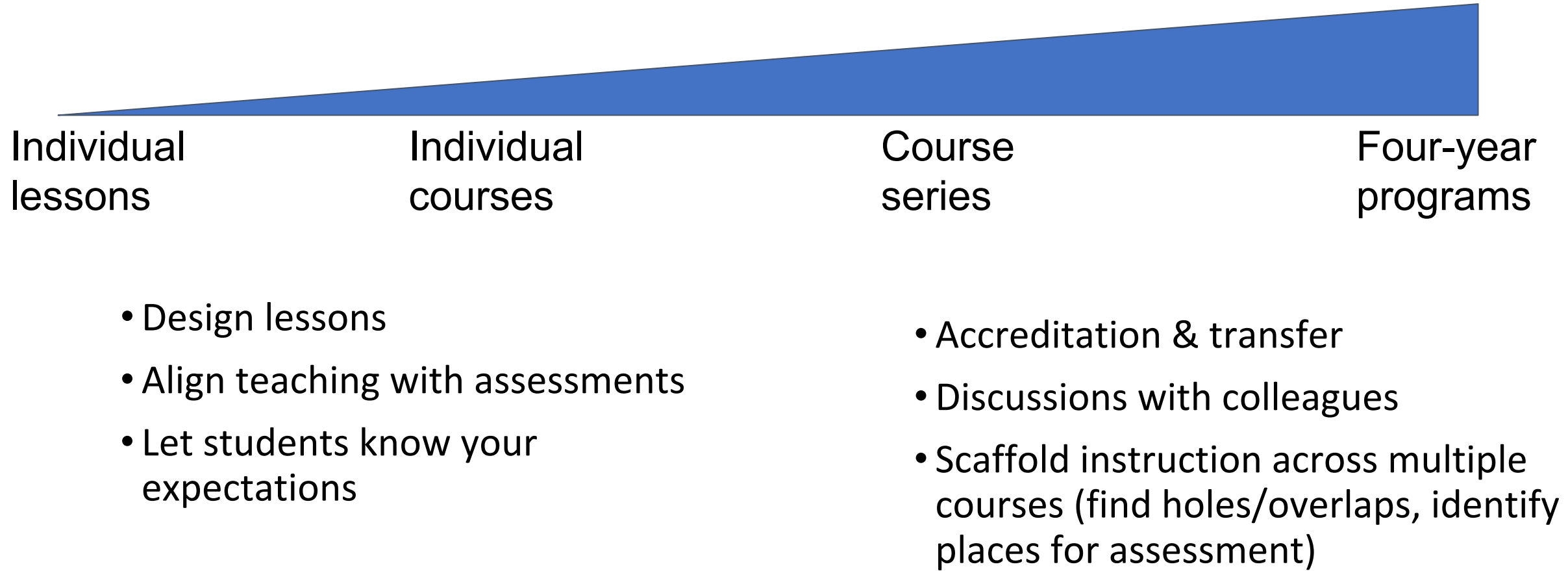
Based on: Wiggins. & McTighe
(2005). *Understanding by design*.

Which learning outcome(s) do you find most informative? Why?

1. Understand the nature, purpose, and utility of models and simulations.
2. Hardy-Weinberg model of population genetics.
3. Given two models of the same biological process or system, compare their strengths, limitations, and assumptions.
4. Appreciate models and simulations.

- Clear how it can be assessed
- Scope is defined

Why use learning outcomes?

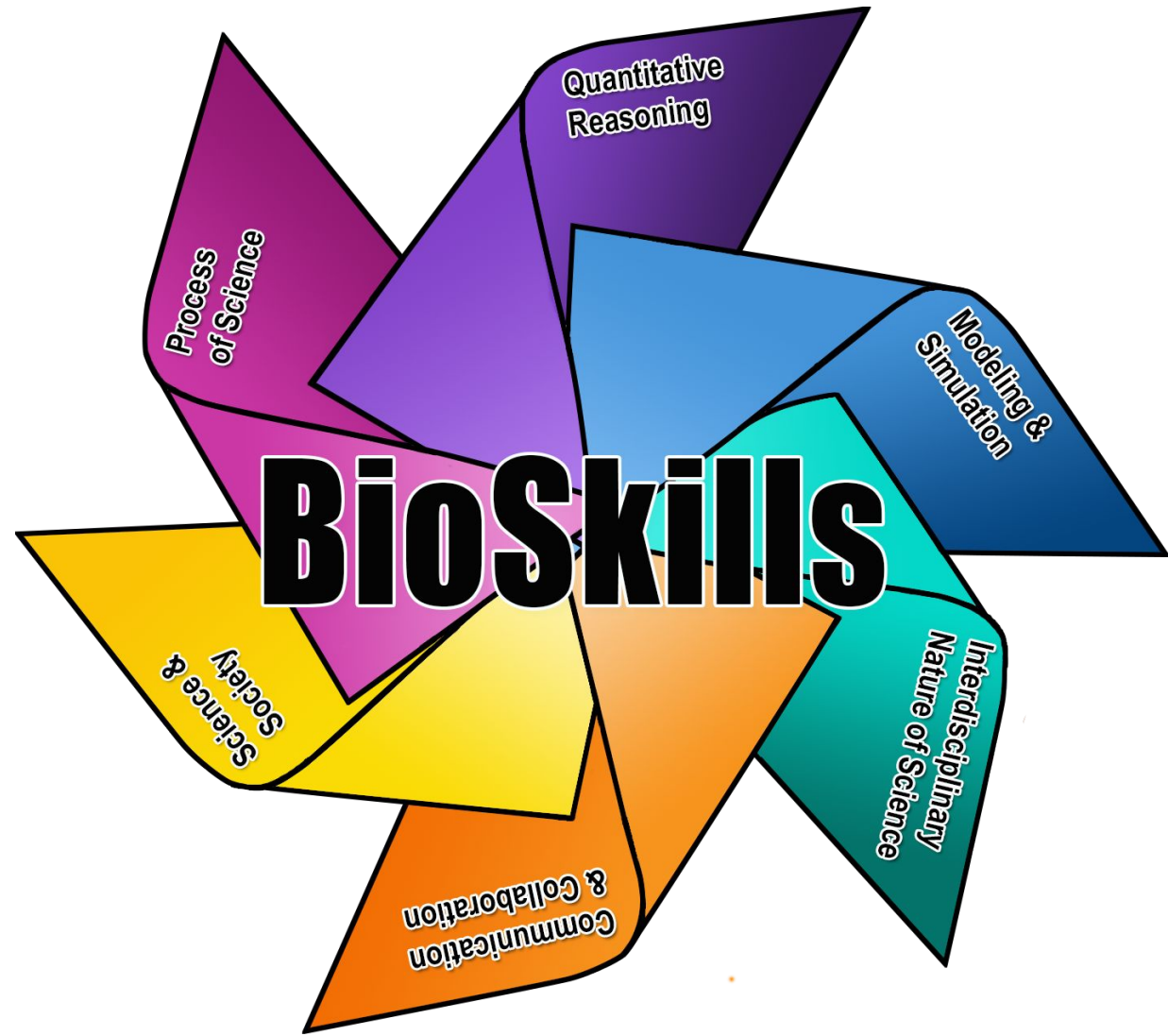


Today's Goals

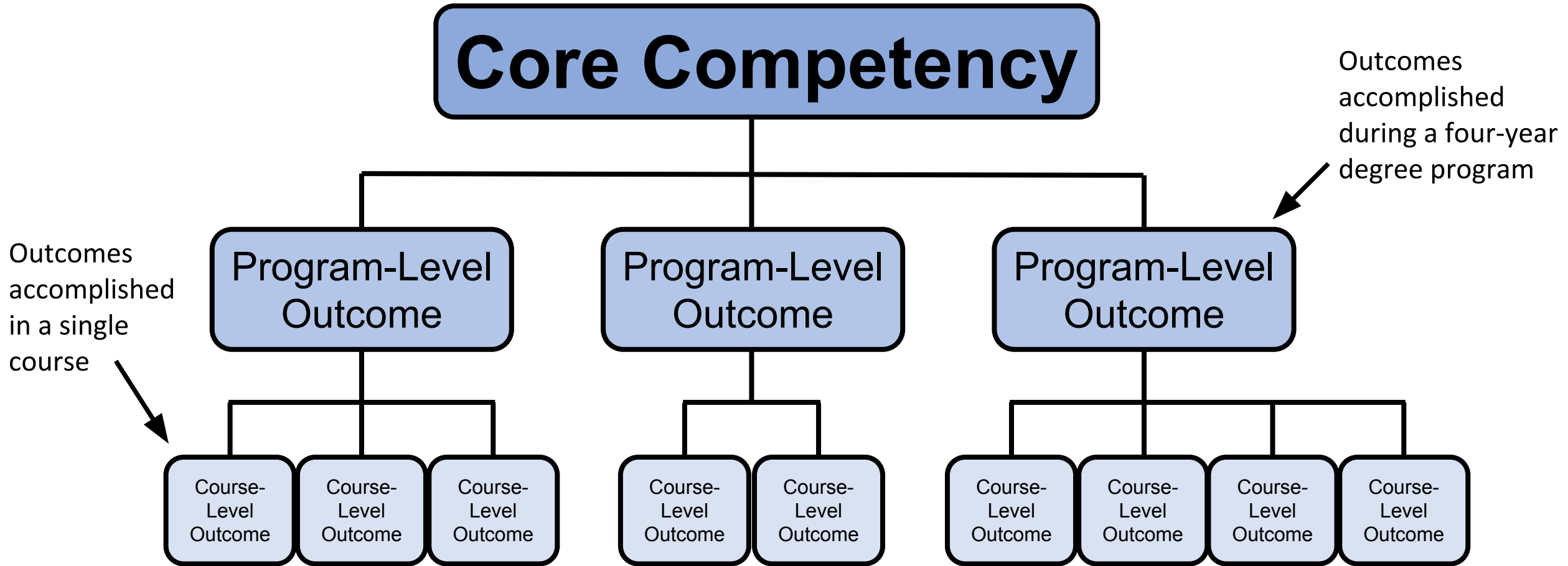
- *Apply existing resources and your expertise to...* Compile a scaffolded set of competency learning outcomes at the capstone-, developing-, and introductory-levels.
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BioSkills Guide: a validated set of essential learning outcomes for the six core competencies for graduating general biology majors.

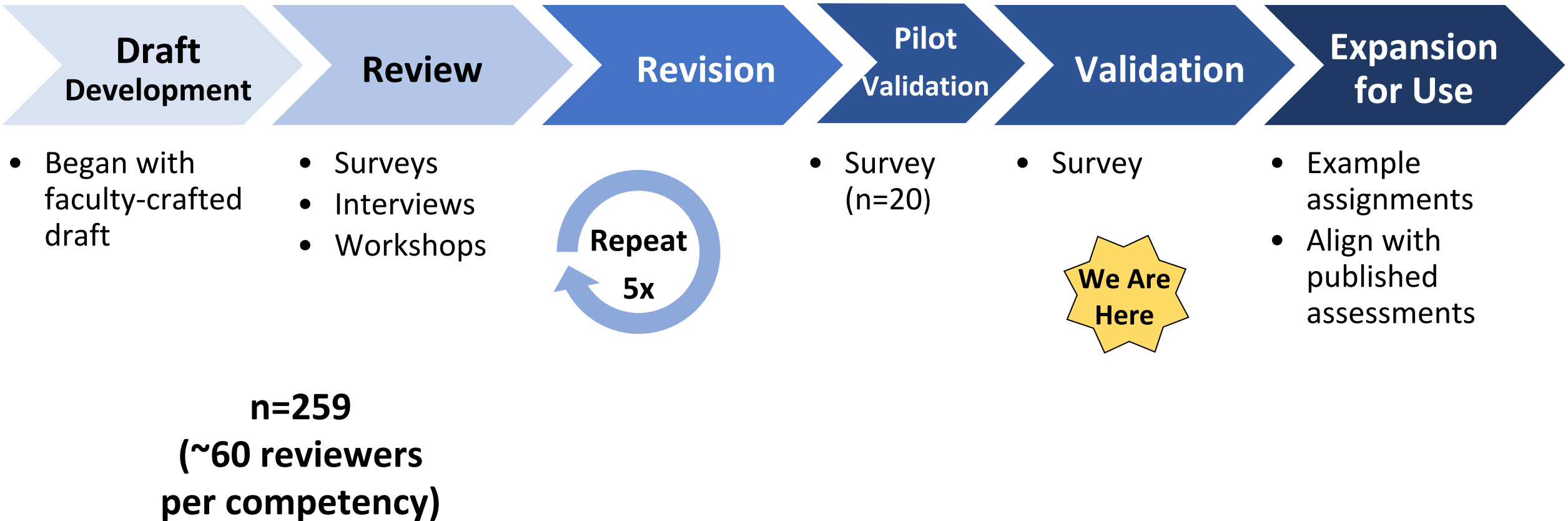
**A resource,
not a prescription.**



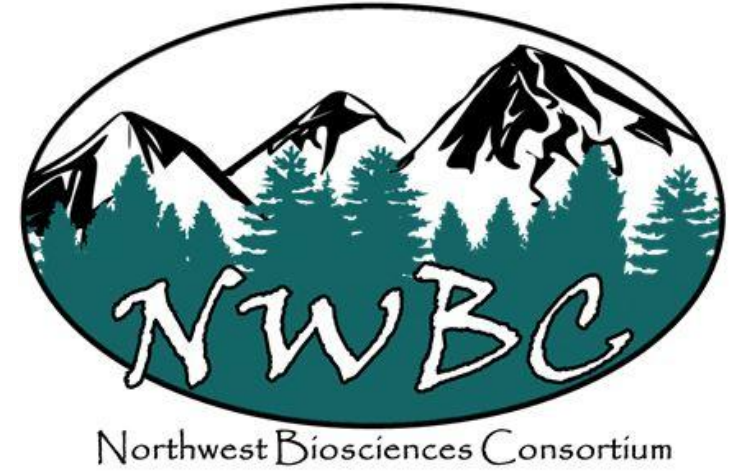
What does the BioSkills Guide look like?



BioSkills Guide Development & Validation Plan



NWBC 2018 Workshop



- Five year NSF RCN (2013-2018)
- Goal: use Vision and Change to improve “vertical transfer” in Oregon colleges and universities
- 2018 workshop: Course Learning Outcomes created by as many college and university biology faculty representatives as we could get from Oregon (and Washington)
- State mandated articulation work (in parallel)

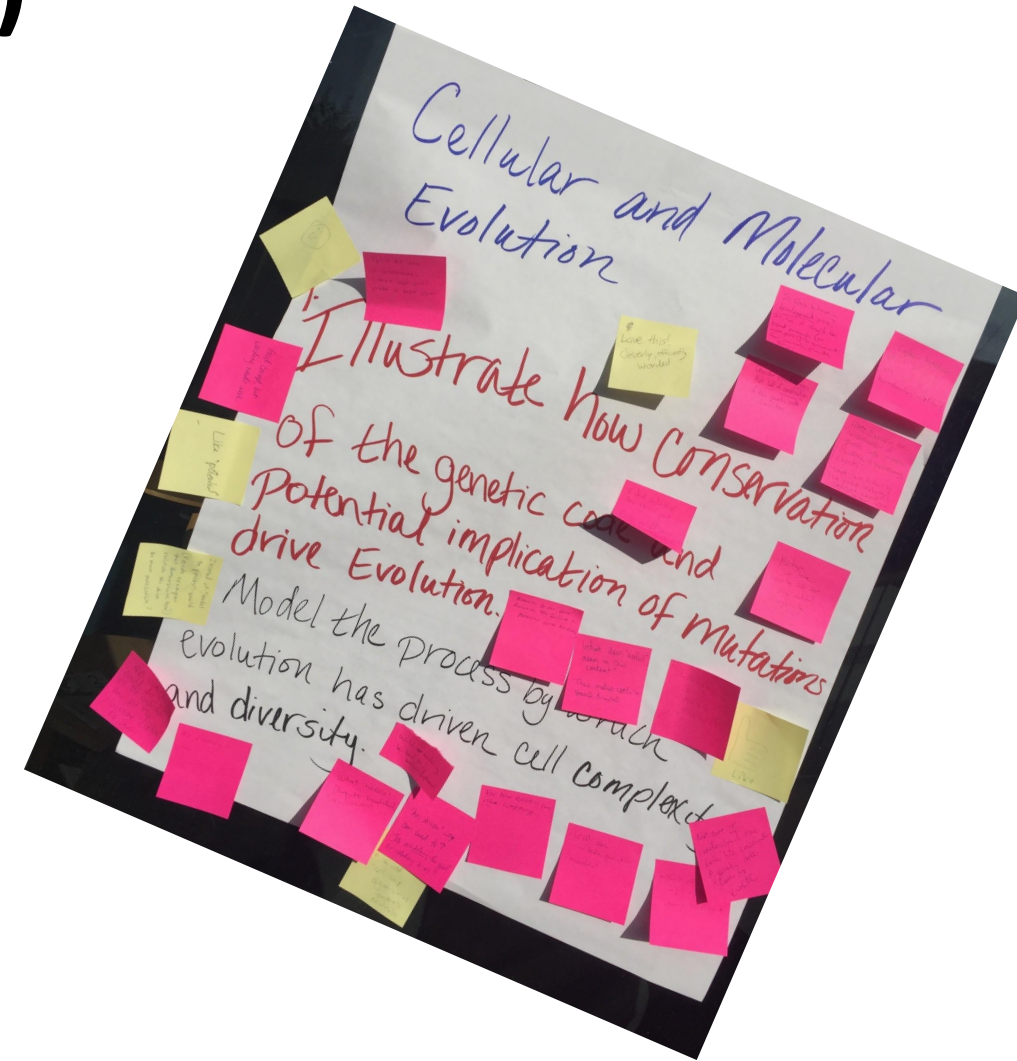
How do we develop a mutually agreeable set of learning outcomes in Introductory Biology?



- Wait for an external authority who tells us the learning goals we should meet
- Hold a series of meetings where every stakeholder is required to come and reach a consensus
 - Discuss and debate a set of potential learning outcomes in an unstructured setting where the loudest voice controls the conversation
- **Work as a full group of 70-80 people to construct a set of learning outcomes**

How the Plan Worked (no, really!)

- Heterogeneous groups by discipline based on BioCore Guide
- Two rounds of review (most LOs, finished at regional meeting)
- Final Consent via Survey



Process: Dynamic Governance

- Consent, not consensus
- Distributed leadership
- Paramount objections
- Cycles of review

Brought to us by our
collaborators NW PULSE AND
Bill Davis!

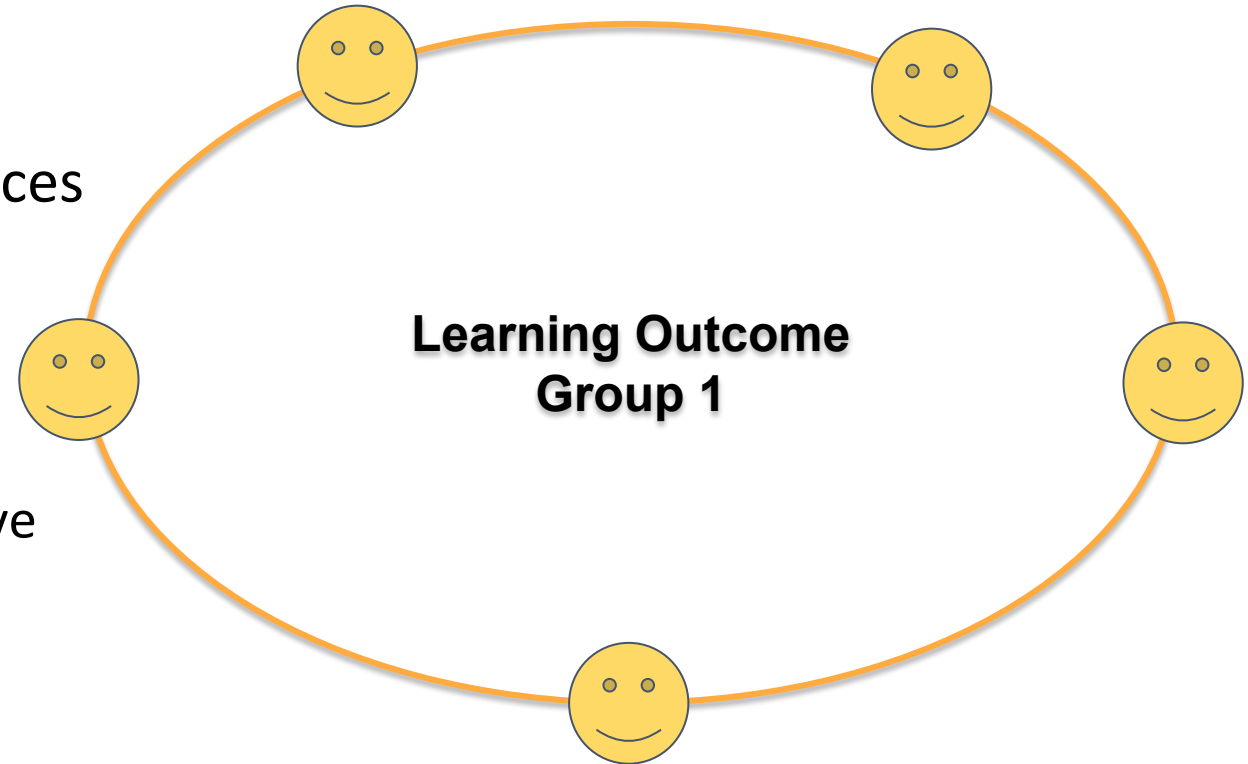


Partnership for Undergraduate Life Sciences Education

Dynamic Governance: Decision Making

Perfect is the enemy of good

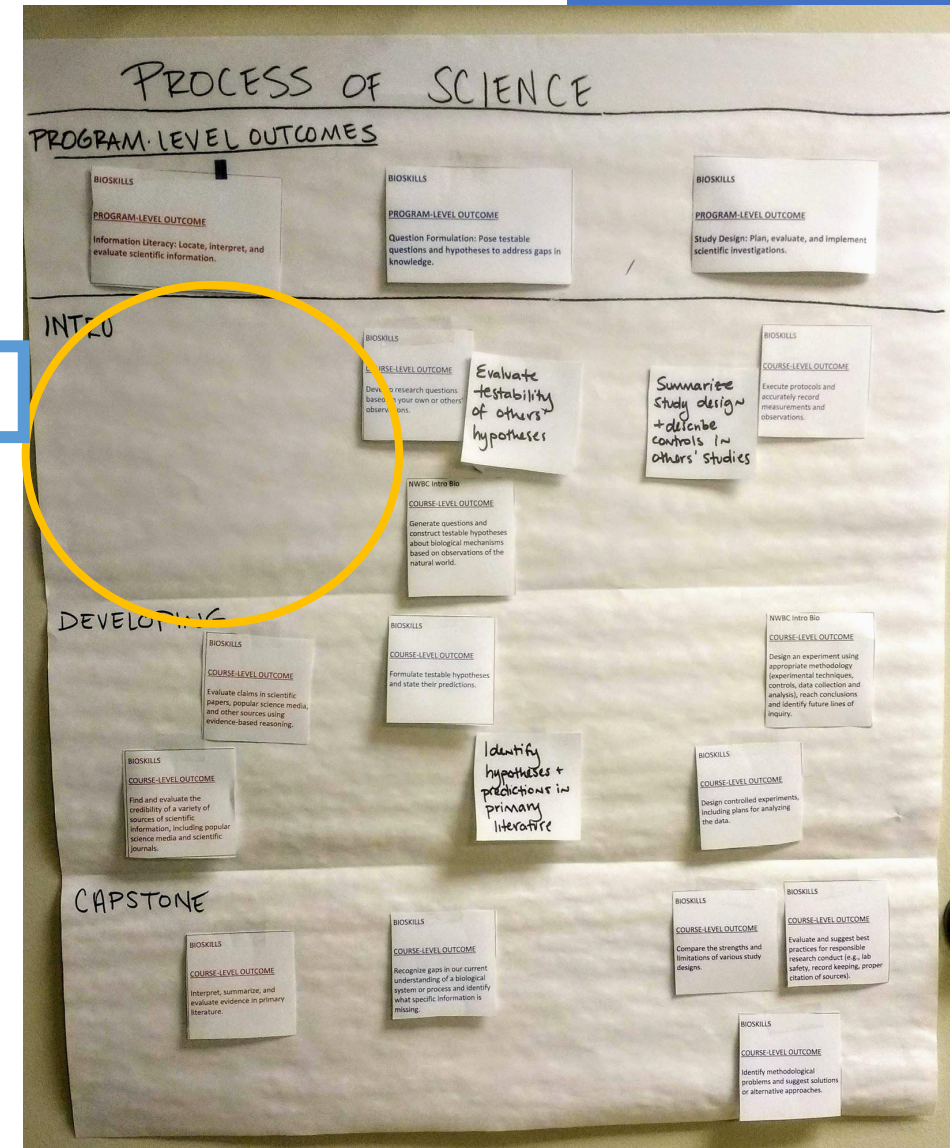
- Inclusive participation: requires that *all* voices are heard, working to *consent*
 - Work in a round: *everyone* must speak
 - *Paramount objections* require an alternative route to the specific aim
 - Agree to a specific period of time



Instructions: Scaffold Learning Outcomes

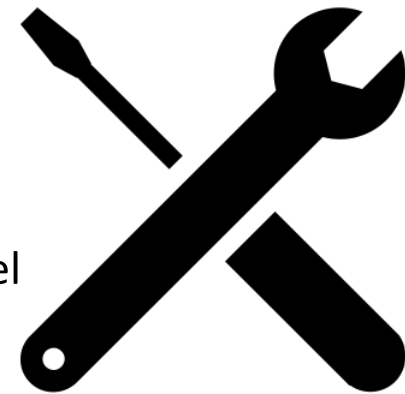
1. Place “program-level” outcomes at the top.
2. Arrange “course-level” outcomes under them. Use your group’s combined expertise to scaffold over:
 - Intro (100-200 level)
 - Developing (~300 level)
 - Capstone (400 level)
3. Add missing outcomes.

We will post completed maps on QUBES. Feel free to adapt for your courses and institution.



Tool box

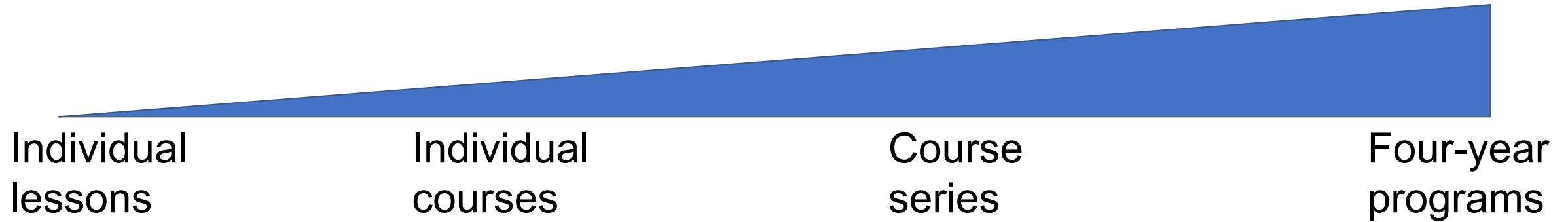
- Large post-it and tape = Curriculum map template
- Rectangles = BioSkills (4 year) program-level outcomes
- Squares = Sub-outcomes (“course-level”)
 - BioSkills outcomes - span a 4-year curriculum
 - You decide whether they are intro, developing, or capstone level
 - Matched to their program-level outcomes by text color
 - NWBC Intro outcomes - first year of biology
 - Use blank squares to draft your own outcomes



What can you use from this activity after you return home?



Learning outcomes serve a range of purposes



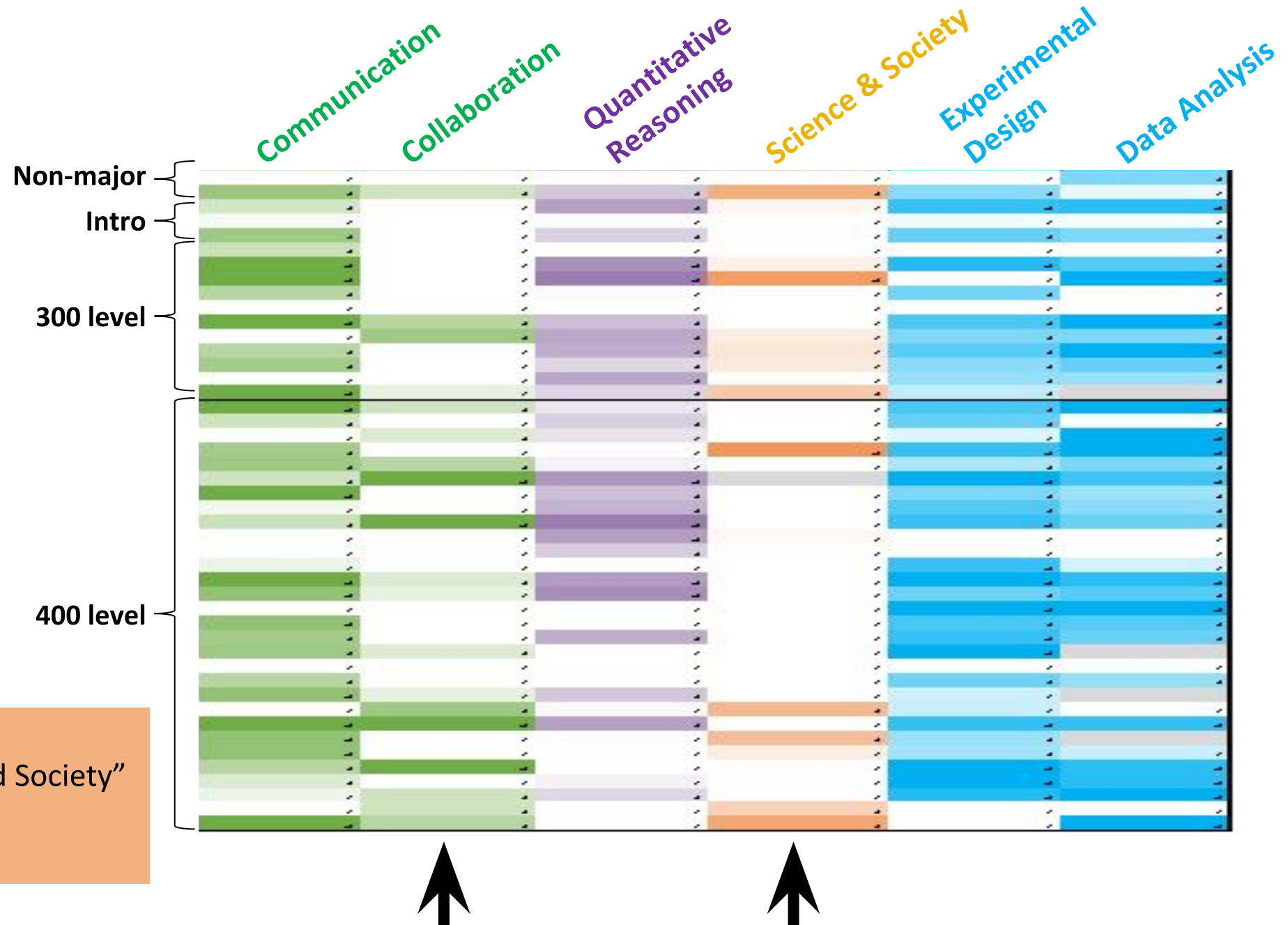
Heat Map Scale

Graded
Practiced
Exposed
Not covered

Team-based learning added
to new Anatomy course

New classes introduced:

- “Controversies in Biology and Society”
- “Civilizational Biology”
- “Making a Mutant”



NW PULSE Webinars:

The Northwest PULSE Fellows and our Steering Committee members have produced several webinars on Curricular and Departmental Change Strategies that you may find of interest. Click on the following to get to our YouTube video recordings of these events.

1. [Concept Inventories](#)
2. [Dynamic Governance](#)
3. [Curriculum Mapping](#)

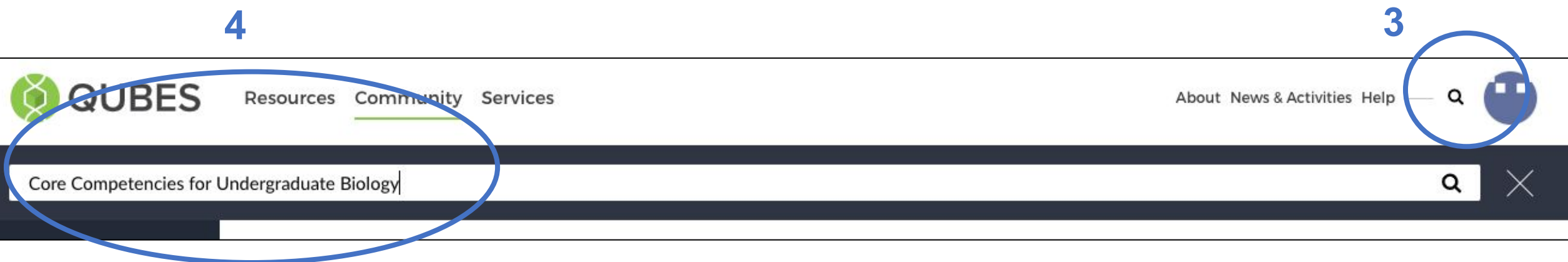
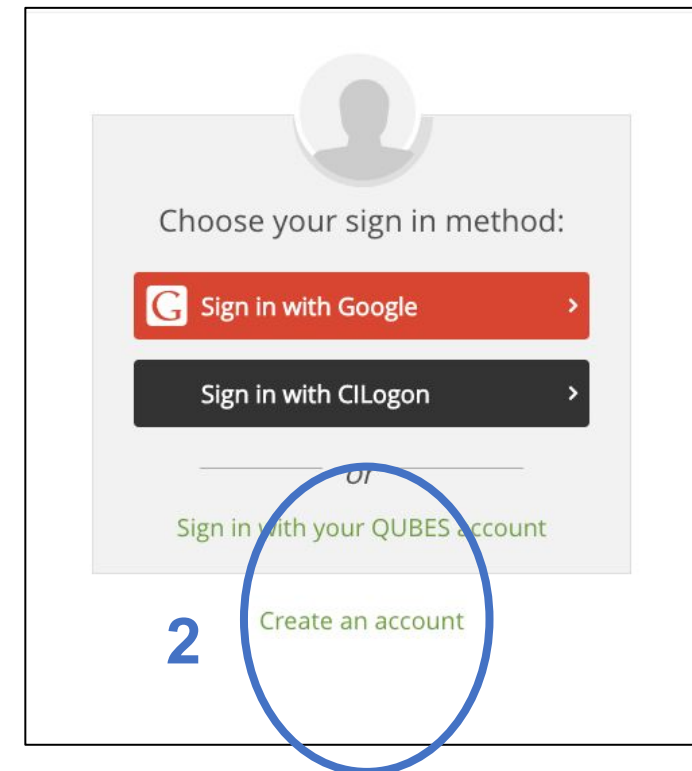
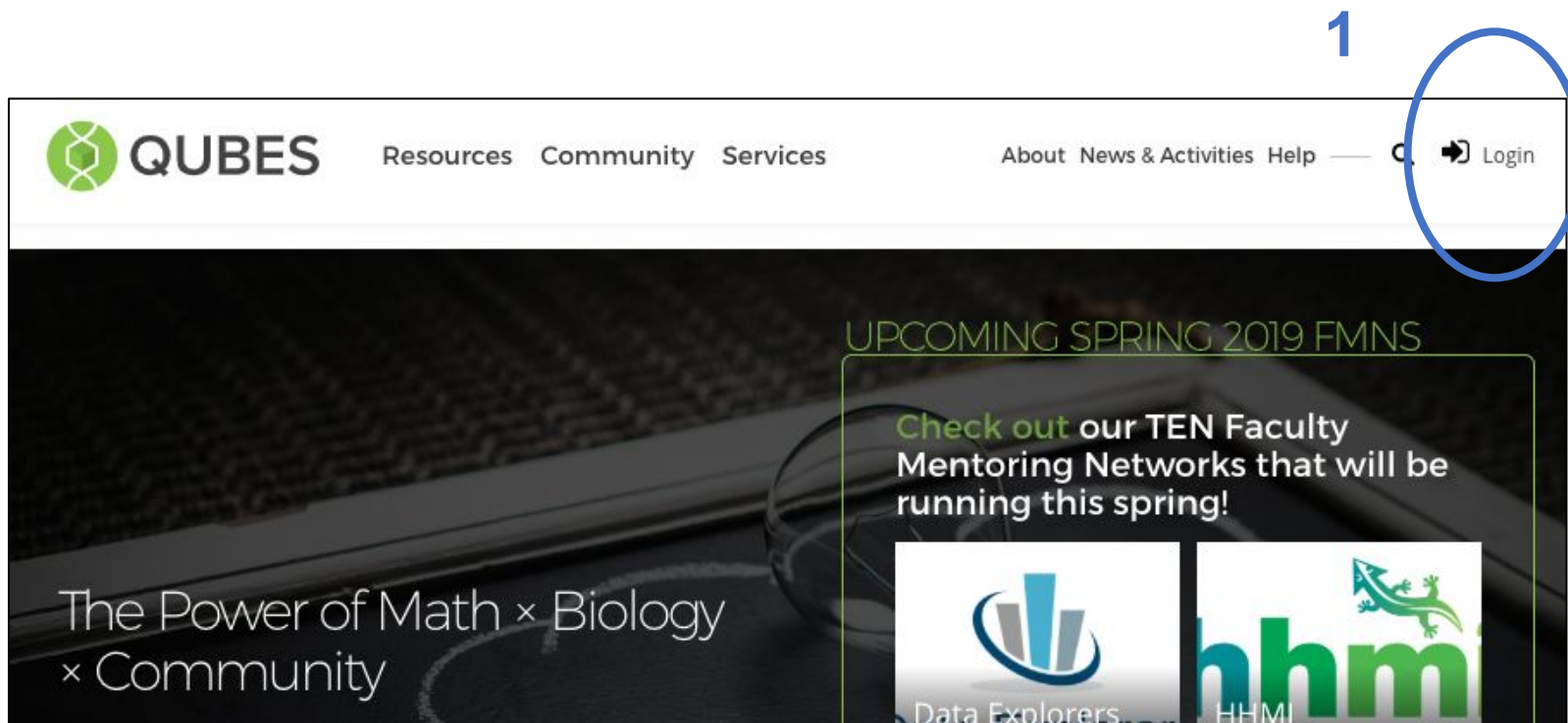
(If you would like the materials for the Curriculum Mapping Webinar, contact [Bill Davis](#))

PULSE



Partnership for Undergraduate Life Sciences Education

<http://www.pulsecommunity.org/page/northwest-pulse>



Discoverability:
Visible

Join Policy:
Open/Anyone

Created:
03 Jan 2019

Core Competencies for Undergraduate Biology

Collections

 Getting started

2 collections

7 posts

0 followers

 Settings Follow

New collection

Resources

Resources referenced during the workshop

0 likes 7 posts



Scaffolded competency learning outcomes

Materials generated during the workshop

0 likes 0 posts



What's next?

- Visit QUBES for resource links and materials from workshop
- Continue conversations with each other (via QUBES or elsewhere)
- Continue these conversations at your home institution
- *15-minute survey on the BioSkills Guide*

bit.ly/BIOSKILLS