

NOVEL STRATEGIES FOR ASSESSING STUDENT THINKING IN BIOLOGY CLASSROOMS

Assessments Types

Challenge Statements: Students are given a statement that could be true or untrue and are charged to take a stance whether they agree or disagree and explain their reasoning. Challenge statements are particularly effective at uncovering student misconceptions.

Multiple-Response Questions: Allows students multiple opportunities to respond to a single assessment prompt. 1) On their own, 2) After talking with a neighbor, and 3) After teacher or student-led discussion on topic. This type of assessment conveys to students that the instructor expects them to change their mind over the course of a class session.

Concept Maps: Students are charged to brainstorm list of concepts related to a particular topic and then diagrammatically show how the concepts are related, using connect words on arrows and lines that connect terms. Also called as a mind-map or flow-chart. Concept maps often reveal that students are familiar with terms but have little understanding of their connections or an overall organization of biological knowledge.

Retrospective Post-Assessments: Students are given a template to fill in their what their previous ideas were about a particular topic and then elaborate on what their ideas are now. Retrospective Post-Assessments are particularly effective at prompting students to be meta-cognitive about what they have learned and reflect on how their ideas may have changed or not changed.

Drawings: Students are asked to draw representations, usually of objects and processes that are microscopic. Drawings are useful in probing the mental models that students have (or do not have) for the relative size and scale of things in the microscopic realm.

Comics: Using comics from a variety of sources, students are charged to explain the biological ideas or the biological misconceptions represented in the comic. Comics can be an engaging way to understand student thinking at the beginning of a new topic, as well as to connect biology learning to things that students may read outside of school.

When can I use them?!?!

During Class

- *Write-Pair-Share: Similar to a think-pair-share, students charged to write on their own for 1-5 minutes before talking through their ideas with a neighbor.*
- *Index Cards: Quick and easy ways to ask assessment questions on the fly and collect writing from all your students. Good to use at beginning of write-pair-share.*
- *Clickers: Allows instructor to get a quick, real-time read of what all their students are thinking and allows students to see what their peers are thinking.*

Homework

- *Typically submitted electronically, this can be a venue for students to discuss their ideas in more detail without the time constraints of the classroom, in response to any of the above assessments.*

Exams and Quizzes

- *These assessment types can be used on exams and quizzes and scored with a rubric.*