

Course Learning Objectives Resource

Research shows that courses that use specific and measurable learning objectives create transparency. **The Program in Biology aims to ensure all BIOL courses provide students with learning objectives that are specific, measurable, attainable, relevant, and timely - AKA “SMART” format.** Learning objectives are required by the [College Curriculum Council](#) at Brown University as part of the concentration review process and should be [present on all course syllabi](#).

We are asking all faculty to help towards achieving the goal below by including a bulleted list of course learning objectives on their syllabi to make them explicit for our learners.

WHAT are learning objectives?

Course [learning objectives](#) are statements indicating what a student should know and/or be able to do by the end of the course. They should be written in “SMART” format (specific, measurable, attainable, relevant, timely). “SMART” format objectives were [first introduced](#) in 1981 by George Duran in the field of management, but since then, have been used in many fields, including [biology](#).

WHY are they important?

[Research on learning objectives has shown that greater transparency](#) (such as stating learning objectives) increases student achievement. Objectives help students to [organize their studying](#) and overall learning. They also allow us to ensure that we are teaching the appropriate level of material and [assessing student learning](#) adequately. *As we innovate, we must evaluate!*

BUT are they important in Biology?

Yes! For example, [research](#) has shown that using Bloom’s Taxonomy for learning objectives and assessment methods in Biology significantly increased students’ performance on written NIH-style research proposals.

WHERE are we, in Biology?

We continuously review course syllabi on Courses @ Brown each academic year. Syllabi are reviewed for course objectives and assessment methods. The figure on the right illustrates more courses are including learning objectives on their syllabi each year. We aim to continue this trend.

HOW can I write learning objectives?

Think about what you want students to know and/or be able to do by the end of the course you are teaching. For a one-semester course, 4-6 course learning objectives are usually an appropriate number. Assessments included in your course (problem sets, exams, presentations) should link to the learning objectives in order to demonstrate student achievement of those objectives. Ideally, assessments include both direct objective measures of student knowledge (e.g., exams) and indirect subjective measures of student attitudes (e.g., reflections).

WHO can I ask for help?

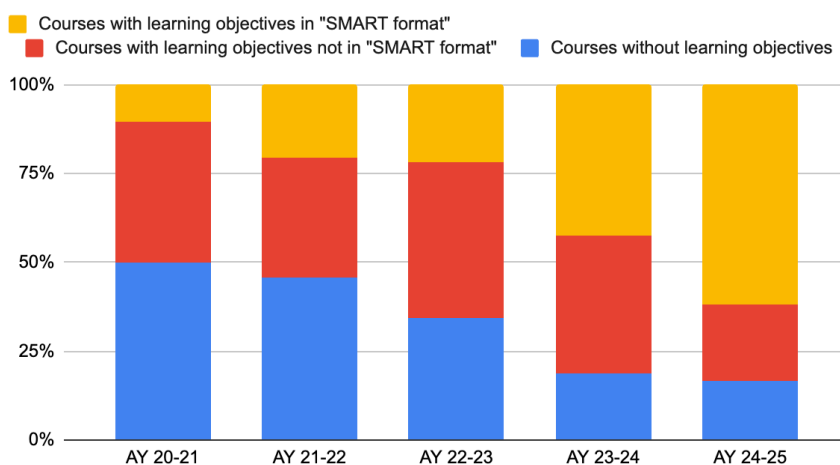
Kristina Monteiro, PhD

Director, Academic Assessment & Evaluation for Biology
Contact: Kristina_Monteiro@Brown.edu or [Calendly](#)

Toni-Marie Achilli, PhD

Associate Dean for Biology Undergraduate Education
Contact: Toni-Marie_Achilli@Brown.edu or [Calendly](#)

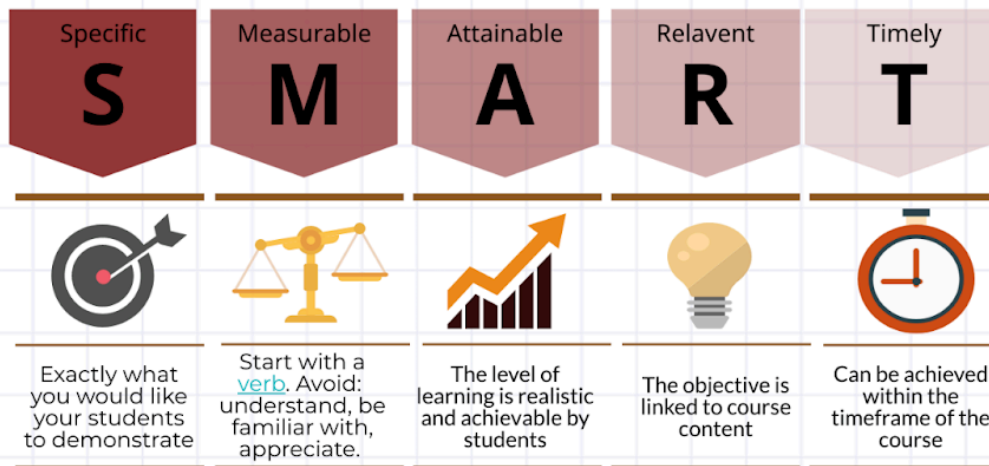
Course Learning Objectives in BIOL Courses



Making Learning Objectives "SMART"er in Biology at Brown

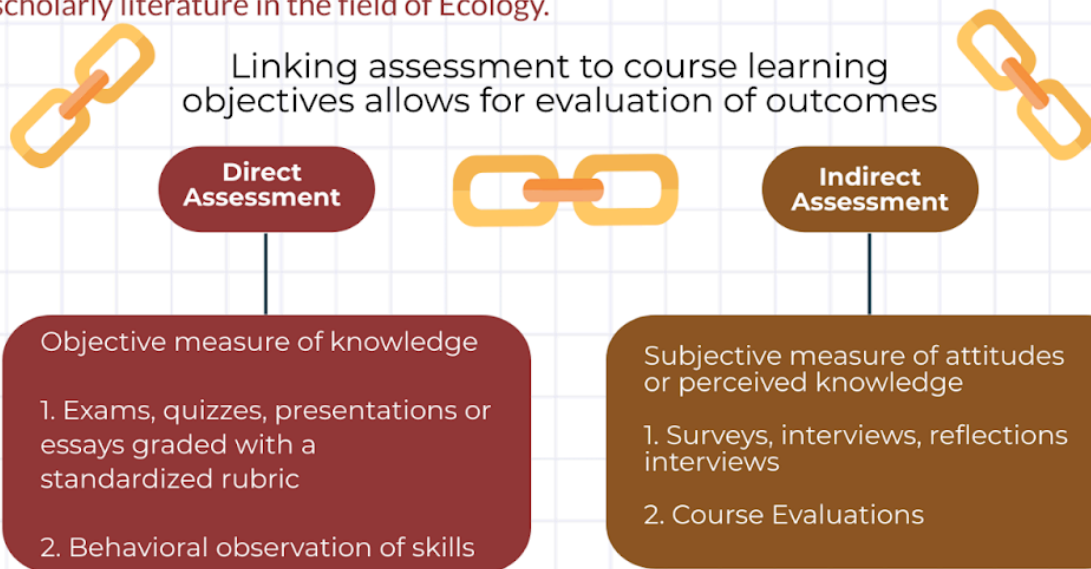
Writing learning objectives in a "SMART" format allows for courses to improve innovation and evaluation with measurable outcomes.

To write or transform learning objectives to this format write objectives that are:



Non-"SMART" format LO: Students will understand the biases within a research article in Ecology.

"SMART" format LO: By the end of this course, students will be able to evaluate scholarly literature in the field of Ecology.



To gather evidence of student learning, it is recommended that a variety of assessment methods (direct, indirect, qualitative, quantitative) should be used to provide adequate feedback to the program to identify strengths and weaknesses of the curriculum (Maki, 2004).

Please visit the [Biology Undergraduate Education](#) website for additional resources or contact Toni-Marie Achilli (Toni-Marie_Achilli@Brown.edu) or Kristina Monteiro (Kristina_Monteiro@Brown.edu)

powered by

Course Learning Objective Examples

Learning objectives begin with a [verb](#) and make a specific statement about the knowledge and/or skills to be obtained.

By the end of [this course](#), students will...

1. Describe the relationship between carbon dioxide level and photosynthesis. ([Link to source](#))
2. Explain the major types of molecules that make up living organisms and how these molecules enable life functions. ([Link to source](#))
3. Communicate effectively through written reports, oral presentations and discussion. ([Link to source](#))
4. Apply quantitative skills such as estimation, graphing data, statistical analyses, and analysis of large datasets. ([Link to source](#))
5. Practice safety and proper techniques in the laboratory. ([Link to source](#))

TIP: Avoid verbs such as “understand” and “appreciate” that are difficult to measure.

Quick fix: Think about what you ultimately want the students to do with the knowledge that they now understand or appreciate. Do you want them to describe the concept? Communicate the concept to others? Synthesize the concept with other knowledge? The underlined verbs are more easily measurable and can be linked to assessments, such as problem sets, presentations, or exams.

TIP: Avoid double-barreled objectives where a student could achieve a portion of the objective.

Quick fix: Split the double-barreled objective into multiple pieces. This will allow students to demonstrate competency in each area you are interested in teaching and assessing.

TIP: Avoid using “describe” for each learning outcome.

Quick fix: Use [Bloom's Taxonomy](#) to write learning objectives that have differing levels of learning.

For additional support, contact Krisina or Toni-Marie with any questions or to schedule a 1-1 course consultation.

<p>Kristina Monteiro, PhD Director, Academic Assessment & Evaluation for Biology Contact: Kristina_Monteiro@Brown.edu or Calendly</p>	<p>Toni-Marie Achilli, PhD Associate Dean for Biology Undergraduate Education Contact: Toni-Marie_Achilli@Brown.edu or Calendly</p>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------