**A Letter to a Young Scientist:** Prompting Students To Reflect On And Recognize Their Own Growth As Scientists.

 **Description:**
Undergraduate students, even those with little or no prior research experience, will develop a suite of technical and critical thinking skills by the end of an authentic research experience. These gains, however, may not be apparent to them. Indeed, the introduction of new experimental techniques throughout their research experience has the potential to make a student feel like a constant novice, and as a result, not recognize their accomplishments and growth in critical thinking. This reflection activity, called “Letters to a Young Scientist”, is an opportunity to prompt students to reflect on and recognize their own growth. By providing students with the opportunity to reflect on their own accomplishments, this activity may help develop student self-efficacy and science identity.

After completing this module, students should be able to recognize the suite of experimental and thinking skills they have gained from conducting research.

**Intended Teaching Setting**

**Course level:** for all students, particularly for those with little to no prior research experience
**Instructional Setting:** in-person classroom/laboratory
**Implementation Time Frame:** ~ 20 minutes

**Project Documents**

**Facilitator document:** this document; instructions on subsequent pages.**Learning activity document(s):** none, activity provided on subsequent pages.**Assessment document(s):** none, recommendations provided on subsequent pages.

**Implementation Instructions**

To implement this activity:

1. in-class or out-of-class, have students write an anonymous and brief letter addressed to the next cohort of students that will participate in the same research project/program. The letter should include a brief description of the skills that the incoming student can expect to gain throughout the project, and advice for how the incoming student could approach the research opportunity (e.g. how to handle ambiguous data, tips or tricks for success).
2. To help your students write that letter, you should
	* articulate to students that the introduction of new experimental techniques throughout the project may make them feel like a constant novice and not recognize their accomplishments and growth in critical thinking.
	* articulate to students the skills they have gained, both in experimental techniques and in critical thinking, and
	* encourage students to review some of their early notes from their research (e.g. lab notebook or from the 5Qs activity) and to take note of the skills and confidence they developed, both in executing experimental techniques and in interpreting data.
3. This activity should be implemented towards the end of the semester, when students have completed the majority of their research project.
4. Once the activity is completed, you should find ways to acknowledge their reflection. For example:
	* You can share a non-attributed summary from these letters with your students, in written or oral form, which highlights some shared experiences. With consent, you can also share this summary with the next incoming class of students.
	* You can write a short and personalized response to your students, that acknowledges their growth and thanks them for sharing.
	* You can return the letters to students with a date when they should reread their letter (either a year later or at graduation). You could also save the letters and let students know you will hand it to them at graduation.