

DEPARTMENT OF MARINE, EARTH, AND ATMOSPHERIC SCIENCES
Writing and Speaking Outcomes

Students should demonstrate the ability to:

1. analyze, criticize, and synthesize scientific literature in the field.

- to show that they can distill the important information from scientific articles and describe that information clearly and concisely, explaining the scientific concepts in common terms.
- to show that they can read scientific studies critically: assessing the knowns and unknowns, identifying the strengths and weaknesses, evaluating the arguments, and making recommendations for improvement.
- to show that they can effectively perform a review of the literature, both in its abbreviated form (as in the introduction of a scientific article) and its extended form. Students should integrate material in an organized fashion and build a logical case concerning the literature. In other words, students should not merely catalogue their sources but instead make an argument using the reading as evidence.

2. engage in clear and careful scientific reasoning.

- to show that they can apply deliberate and thorough observational skills in the context of a scientific experiment.
- to show that they have a basic understanding of the scientific method: building hypotheses, accumulating appropriate evidence, supporting or refuting hypotheses, and offering alternative hypotheses.
- to show that they can mount an effective scientific argument. Students should be able to make clear scientific claims and support those claims with appropriate scientific evidence. And they should arrange the claims and evidence in a logical way that allows the intelligent reader to follow the argument and anticipate the conclusions.
- to show that they can draw conclusions from evidence and can apply those conclusions to in a constructive way, such as making predictions, offering recommendations for action, and suggesting hypotheses for additional studies.

3. interpret and generate models for understanding and explaining scientific data.

- to show that they can reconceptualize processes and relationships in forms that make the processes and relationships clear. For example, students should demonstrate that they can both explain and create three-dimensional models of large systems, inferred from limited data. Students should also be able to demonstrate that they can both explain and create graphs, tables, maps and other figures appropriate for representing scientific data.

4. work productively in teams.

- to show that they can work well in teams. Students should demonstrate that they have the negotiating skills to generate a successful team-based product.

5. express themselves confidently and competently in oral communication.

- to show that they can explain scientific information concisely and cogently to non-scientists who need to understand and/or use that information.

6. communicate effectively in the forms or genres that define academic discourses in the sciences.

- to show that they can write and speak effectively in the key scientific genres, including the lab report, scientific article (introduction, methods, results, and discussion), literature review, poster presentation, scientific oral presentation, abstract, and scientific essay.

7. communicate effectively in the professional discourses of the field.

- to show that they are proficient in the kinds of writing and speaking they must do to be successful in non-academic professions. These kinds of writing and speaking vary according to the students' fields. They include: journalism/popular writing, feasibility studies, proposals, project reports, technical reports, internal memos, forecasts, activity reports (consulting), reports that follow federal and state guidelines and regulations, progress reports, and geologic mapping reports.