

GWAR SLO to PLO Matrix

All GWAR-certifying courses must emphasize writing in disciplinary academic discourse(s), with ample writing activity and instructor feedback and must be reviewed by the University Writing Committee (UWC) for approval.

GWAR-certifying courses shall address these requirements per the GWAR Policy (AA #):

- Student enrollment cap of 25 per section;
- Ten to twelve pages of informal writing that scaffold and build toward the required pages of formal writing;
- Ten to twelve pages of formal writing in the genres and forms that constitute the activities and discourse of defined disciplines;
- All GWAR-certifying courses or course sequences shall total a minimum of 3 credit units OR a minimum of 2 ½ hours of weekly instruction
- Students shall pass GWAR-certifying courses with a grade of C or better to satisfy GWAR.

Student Learning Outcomes

Students who successfully complete a GWAR-Certifying course will:

1. Engage in writing related to disciplinary discourse communities, including identifying the norms, goals, and the historically and socially constructed features of the discourse's practices and artifacts;
2. Participate in a robust writing process throughout the course, which shall include:
 - pre-writing/generating and developing ideas
 - low-stakes write-to-learn activities that allow students to discover and develop their own ideas and understanding of concepts, new vocabulary, and disciplinary theories
 - reading and research, drafting, peer feedback/collaboration, and instructor feedback
 - ample opportunity for revision in light of the iterative process prior to summative assessment of their writing;
 - reflective writing focused on their own processes as well as on reader responses;
3. Demonstrate critical understanding of the discourse's practices and artifacts and situate themselves as writers, readers, and students within broader disciplinary conversations;
4. Increase rhetorical flexibility and agency as writers as they negotiate their own writerly goals and identities with the expectations and conventions of disciplinary discourse communities.

Please contact the WAC Coordinator and Chair of the UWC, Siskanna Naynaha, if you have any questions or need support completing the GWAR SLO to PLO Matrix: snaynaha@csudh.edu

GWAR SLO to PLO Matrix

Course SLO(s)	GWAR PLO(s)	Related Writing in the Disciplines Instructional Materials (e.g., readings, activities, resources, etc.)	Related Assessments & Assignments
<p>1) Analyze and interpret quantitative biological data to be used in biological discourse</p> <p>2) Find, read, understand, critically evaluate, summarize, and use scientific information in different genres of biological writing</p>	<p>Engage in writing related to disciplinary discourse communities, including identifying the norms, goals, and the historically and socially constructed features of the discourse's practices and artifacts.</p>	<p>Instructional materials</p> <ul style="list-style-type: none"> • How to read scientific literature <ul style="list-style-type: none"> ○ How to (seriously) read a scientific paper from Science ○ How to read and understand a scientific paper by Dr. Jennifer Raff • How to search the scientific literature <ul style="list-style-type: none"> ○ DH Library Guide: https://libguides.csudh.edu/bio <p>Activities</p> <ul style="list-style-type: none"> • Library and literature search tutorial • Worksheet on evaluating and synthesizing sources • Reflection on critiquing science news articles • Oral exercise asking students to explain the same idea to different target audiences (e.g., child, high school student, an adult family member) • Reflections and critiques on science-related editorials 	<ul style="list-style-type: none"> • Writing for Biologists <ul style="list-style-type: none"> ○ Self- and peer-review of draft; instructor feedback is given at both of these stages ○ Final draft of expository writing for biologists • Writing for the General Public <ul style="list-style-type: none"> ○ Self- and peer-review of draft; instructor feedback is given at both of these stages ○ Final draft of writing for the general public • Persuasive Writing <ul style="list-style-type: none"> ○ Self- and peer-review of draft; instructor feedback is given at both of these stages ○ Final draft of persuasive writing
<p>1) Analyze and interpret quantitative biological data to be used in biological discourse</p> <p>2) Find, read, understand, critically evaluate, summarize, and use scientific information in different genres of biological writing</p>	<p>Participate in a robust writing process throughout the course (see PLO #2 for full list)</p>	<p>Instructional Materials</p> <ul style="list-style-type: none"> • How to (seriously) read a scientific paper from Science • How to read and understand a scientific paper by Dr. Jennifer Raff • Grant writing in the sciences from Purdue Online Writing Lab • How to write a scientific literature review from the University of Michigan • How can we use the “science of stories” to produce persuasive scientific stories by MD Jones and DA Crow, published in Nature 	<ul style="list-style-type: none"> • Writing for Biologists <ul style="list-style-type: none"> ○ Self- and peer-review of draft; instructor feedback is given at both of these stages ○ Final draft of expository writing for biologists • Writing for the General Public <ul style="list-style-type: none"> ○ Self- and peer-review of draft; instructor feedback is given at both of these stages ○ Final draft of writing for the general public • Persuasive Writing

		<ul style="list-style-type: none"> • 12 Tips for Scientists Writing for the General Public by KL Burke published in the American Scientist <p>Activities</p> <ul style="list-style-type: none"> • Writing for Biologists <ul style="list-style-type: none"> ○ Paper/proposal outline ○ Annotated bibliography ○ Writing a draft ○ Self- and peer-review of draft; instructor feedback is given at both of these stages • Writing for the General Public <ul style="list-style-type: none"> ○ Outlining of draft, including thesis statement, key points to support statement, and integration of sources ○ Writing a draft ○ Self- and peer-review of draft; instructor feedback is given at both of these stages • Persuasive Writing <ul style="list-style-type: none"> ○ Activity in thesis development through small group discussion (e.g.: https://history.ky.gov/wp-content/uploads/2017/10/Understanding-and-Writing-a-Thesis-Statement.pdf but modified for biologists) ○ Outline that summarizes their key argument, supporting evidence, and rebuttals to possible contrary points of view ○ Writing a draft ○ Self- and peer-review of draft; instructor feedback is given at both of these stages 	<ul style="list-style-type: none"> ○ Self- and peer-review of draft; instructor feedback is given at both of these stages ○ Final draft of persuasive writing
1) Analyze and interpret quantitative biological data to be used in biological discourse	Demonstrate critical understanding of the discourse's practices and artifacts and situate themselves as writers, readers,	<p>Instructional Materials</p> <ul style="list-style-type: none"> • How to write grants <ul style="list-style-type: none"> ○ Help funders help you: Five tips for writing effective funding applications from Science 	<ul style="list-style-type: none"> • Writing for Biologists <ul style="list-style-type: none"> • Self- and peer-review of draft; instructor feedback is given at both of these stages • Final draft of expository writing for biologists

<p>2) Find, read, understand, critically evaluate, summarize, and use scientific information in different genres of biological writing</p> <p>3) Communicate a knowledge base in the area of biology to members of the community through writing</p> <p>4) Identify and communicate about ethical issues in science</p> <p>5) Communicate an argument for the relevance of scientific research to society through persuasive writing</p>	<p>and students within broader disciplinary conversations</p>	<ul style="list-style-type: none"> ○ Ten Simple Rules for Getting Grants from PLoS ○ Grant writing in the sciences from Purdue Online Writing Lab • How to write a literature summary / commentary <ul style="list-style-type: none"> ○ What is a literature review from University of West Florida ○ How to write a scientific literature review from the University of Michigan ○ Literature reviews from The University of North Carolina at Chapel Hill ○ What is a literature review from Wesleyan University • How can we use the “science of stories” to produce persuasive scientific stories by MD Jones and DA Crow, published in Nature • 12 Tips for Scientists Writing for the General Public by KL Burke published in the American Scientist • Wired’s 5 Levels YouTube Series • Classroom Activities for Science Communication from The University of Queensland • Purdue Online Writing Lab: Argumentative Essays • Argumentative Essay 5-Paragraph Structure from the University of Colorado Boulder <p>Activities</p> <ul style="list-style-type: none"> • Worksheet on evaluating and synthesizing sources • Classroom discussion of hooks in popular science articles → small group discussion to develop student’s own hook • Oral exercise asking students to explain the same idea to different target audiences (e.g., child, high school student, an adult family member) 	<ul style="list-style-type: none"> • Writing for the General Public <ul style="list-style-type: none"> • Self- and peer-review of draft; instructor feedback is given at both of these stages • Final draft of writing for the general public • Persuasive Writing <ul style="list-style-type: none"> • Self- and peer-review of draft; instructor feedback is given at both of these stages • Final draft of persuasive writing
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		<ul style="list-style-type: none"> • Written exercise asking students to describe scientific ideas using just the 10,000 most common words • Informal debates and discussion on ethical issues in science 	
<p>3) Communicate a knowledge base in the area of biology to members of the community through writing</p> <p>4) Identify and communicate about ethical issues in science</p> <p>5) Communicate an argument for the relevance of scientific research to society through persuasive writing</p> <p>8) Write in standard formats used to build careers in biology (e.g., resume or CV, personal statement, and cover letter)</p>	<p>Increase rhetorical flexibility and agency as writers as they negotiate their own writerly goals and identities with the expectations and conventions of disciplinary discourse communities</p>	<p>Instructional Materials</p> <ul style="list-style-type: none"> • How can we use the “science of stories” to produce persuasive scientific stories by MD Jones and DA Crow, published in Nature • 12 Tips for Scientists Writing for the General Public by KL Burke published in the American Scientist • Wired’s 5 Levels YouTube Series • Classroom Activities for Science Communication from The University of Queensland • Purdue Online Writing Lab: Argumentative Essays • Argumentative Essay 5-Paragraph Structure from the University of Colorado Boulder • How to write a personal statement <ul style="list-style-type: none"> ○ MIT Communication Lab ○ Purdue OWL Center ○ UConn Writing Center ○ Center for Teach and Learning at Yale • How to write a cover letter <ul style="list-style-type: none"> ○ MIT Communication Lab ○ Purdue OWL Center ○ Writing Center at the University of Wisconsin <p>Activities</p> <ul style="list-style-type: none"> • Classroom discussion of hooks in popular science articles → small group discussion to develop student’s own hook • Reflection on critiquing science news articles • Oral exercise asking students to explain the same idea to different target audiences 	<ul style="list-style-type: none"> • Writing for the General Public <ul style="list-style-type: none"> ○ Self- and peer-review of draft; instructor feedback is given at both of these stages ○ Final draft of writing for the general public • Persuasive Writing <ul style="list-style-type: none"> ○ Self- and peer-review of draft; instructor feedback is given at both of these stages ○ Final draft of persuasive writing • Narrative/Persuasive Writing <ul style="list-style-type: none"> ○ Self- and peer-review of draft; instructor feedback is given at both of these stages ○ Final draft of cover letter or personal statement

		<p>(e.g., child, high school student, an adult family member)</p> <ul style="list-style-type: none"> • Written exercise asking students to describe scientific ideas using just the 10,000 most common words • Outlining of draft, including thesis statement, key points to support statement, and integration of sources • Classroom discussion of visual communication in science • Reflections and critiques on science-related editorials • Oral presentations on social topics in science • Informal debates and discussion on ethical issues in science • Activity in thesis development through small group discussion (e.g.: https://history.ky.gov/wp-content/uploads/2017/10/Understanding-and-Writing-a-Thesis-Statement.pdf but modified for biologists) • Outline that summarizes their key argument, supporting evidence, and rebuttals to possible contrary points of view • Classroom activities for careers <ul style="list-style-type: none"> ○ Job search activities ○ Professional and personal strengths (e.g. High 5 Test) ○ Designing Your Life ○ Reflection on workview ○ Flower worksheet on career goals and needs ○ Presentation on different careers in biology ○ Outlining exercise on (1) previous experiences, (2) skills gained, and (3) how relevant to next step 	
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Biological Writing

As biologists, we communicate with multiple discourse communities and therefore we have designed assignments that highlight the importance and differences that come with each community. Each assignment begins with discourse-specific activities leading to informal writing assignments, peer and self-review, and culminates in a formal written communication. In order to capture and reflect the broad diversity of biological writing that our students will engage in throughout their career, we allow for freedom of choice by the student in order to best match their career and discourse community.

- 1) **Writing for biologists:** expository writing for biological professionals that takes standard forms. Throughout a biologist's career, they will need to engage in a professional manner with other biologists or scientists. In written form, this is often done through *literature reviews*, *grant proposals*, *literature commentary* or *reports on emerging problems*. Students select the type of writing that best matches their career goals.

a. Instructional materials

- i. How to read scientific literature
 1. [How to \(seriously\) read a scientific paper](#) from Science
 2. [How to read and understand a scientific paper by Dr. Jennifer Raff](#)
- ii. How to search the scientific literature
 1. DH Library Guide: <https://libguides.csudh.edu/bio>
- iii. How to write grants
 1. [Help funders help you: Five tips for writing effective funding applications](#) from Science
 2. [Ten Simple Rules for Getting Grants](#) from PLoS
 3. [Grant writing in the sciences](#) from Purdue Online Writing Lab
- iv. How to write a literature summary / commentary
 1. [What is a literature review](#) from University of West Florida
 2. [How to write a scientific literature review](#) from the University of Michigan
 3. [Literature reviews](#) from The University of North Carolina at Chapel Hill
 4. [What is a literature review](#) from Wesleyan University

b. Activities

- i. Informal writing [total writing length: ~4-5 pages]
 1. Library and literature search tutorial
 2. Worksheet on evaluating and synthesizing sources
 3. Paper/proposal outline
 4. Annotated bibliography
- i. Formal writing [total writing length: ~3-4 pages]
 1. Writing a draft
 2. Self- and peer-review of draft; instructor feedback is given at both of these stages
 3. Final draft of expository writing for biologists

2) **Writing for the general public:** writing that share biological knowledge with non-biologists. Accurate communication of both biological information and its importance to society is a critical way that biologists communicate throughout their career. Example genres include *blog posts summarizing a paper or describing why a certain field is important*, a *children's book*, an *explainer*, a *popular science article*, or *Wikipedia pages*.

a. **Instructional Materials**

- i. [10 Tips for Effective Science Communication](#) from Northeastern University
- ii. [Quick Guide to Science Communication](#) from Brown University
- iii. [How can we use the “science of stories” to produce persuasive scientific stories](#) by MD Jones and DA Crow, published in Nature
- iv. [12 Tips for Scientists Writing for the General Public](#) by KL Burke published in the American Scientist
- v. Wired's 5 Levels YouTube Series
- vi. [Classroom Activities for Science Communication](#) from The University of Queensland

b. **Activities**

- i. Informal writing [total length: ~3-4 pages]
 1. Classroom discussion of hooks in popular science articles → small group discussion to develop student's own hook
 2. Reflection on critiquing science news articles
 3. Oral exercise asking students to explain the same idea to different target audiences (e.g., child, high school student, an adult family member)
 4. Written exercise asking students to describe scientific ideas using just [the 10,000 most common words](#)
 5. Outlining of draft, including thesis statement, key points to support statement, and integration of sources
 6. Classroom discussion of visual communication in science
- ii. Formal writing [total length: ~2-3 pages]
 1. Writing a draft
 2. Self- and peer-review of draft; instructor feedback is given at both of these stages
 3. Final draft of writing for the general public

3) **Persuasive writing:** students pose a scientific argument. Many important societal concerns have their roots in biology, yet are not argued from a biological perspective. Since all biologists will face a point where they need to justify funding, address an ethical concern, or respond to a multi-faceted issue, being able to effectively argue a point from a biological framework is important. The formal writing for this genre will take the form of a *newspaper editorial*, *blog post*, or a *script for a speech, debate, or podcast episode*.

a. **Instructional Materials**

- i. [How can we use the “science of stories” to produce persuasive scientific stories](#) by MD Jones and DA Crow, published in Nature
- ii. [Purdue Online Writing Lab: Argumentative Essays](#)
- iii. [Argumentative Essay 5-Paragraph Structure](#) from the University of Colorado Boulder

b. Activities

- i. Informal writing [total length: ~3-4 pages]
 1. Reflections and critiques on science-related editorials
 2. Oral presentations on social topics in science
 3. Informal debates and discussion on ethical issues in science
 4. Activity in thesis development through small group discussion (e.g.: <https://history.ky.gov/wp-content/uploads/2017/10/Understanding-and-Writing-a-Thesis-Statement.pdf> but modified for biologists)
 5. Outline that summarizes their key argument, supporting evidence, and rebuttals to possible contrary points of view
- ii. Formal writing [total length: ~3-4 pages]
 1. Writing a draft
 2. Self- and peer-review of draft; instructor feedback is given at both of these stages
 3. Final draft of persuasive writing

4) **Narrative/Persuasive writing:** personal statement or cover letter. A critical piece of Biology 490 is setting students up for success in their chosen career field after graduation. Many students continue on into graduate or professional schools and need to write a *personal statement*. Others enter into biotechnology or industry jobs and need to develop a specialized *cover letter*. Regardless, the students must persuade their audience that they are the right fit for the position.

a. Instructional Materials (all geared specifically towards biology majors)

- i. Classroom activities for background
 1. [Job search activities](#)
 2. Professional and personal strengths (e.g. [High 5 Test](#))
 3. [Designing Your Life](#)
- ii. How to write a personal statement
 1. [MIT Communication Lab](#)
 2. [Purdue OWL Center](#)
 3. [UConn Writing Center](#)
 4. [Center for Teach and Learning at Yale](#)
- iii. How to write a cover letter
 1. [MIT Communication Lab](#)
 2. [Purdue OWL Center](#)
 3. [Writing Center at the University of Wisconsin](#)

b. Activities

- i. Informal Writing [total length: ~4-5 pages]
 1. [Reflection on workview](#)
 2. [Flower worksheet on career goals and needs](#)
 3. Presentation on different careers in biology
 4. Outlining exercise on (1) previous experiences, (2) skills gained, and (3) how relevant to next step
- ii. Formal Writing [total length: ~3 pages]
 1. Writing a draft

2. Self- and peer-review of draft; instructor feedback is given at both of these stages
3. Final draft of persuasive writing

Current Course Description:

Prerequisites: Senior standing; completion of lower division general education courses, GVAR, statistics, and required courses in the biology major. Application and assessment of previously learned material in courses required in biology and general education. Activities such as the design and conduct of an experiment requiring statistical analysis, resume writing, oral presentations on career choices, and critiques of classmates presentations. Three hours of lecture per week.

Updated Course Description:

Students will engage in biological writing for diverse audiences including writing for other biologists and the general public. Synthesis of biological literature, data presentation, and the importance of biology to society will be addressed.