02 Analyzing Research Articles and Text

Content Area: **Science**
Course(s):
Time Period: **Full Year**
Length: **Ongoing**
Status: **Published**

General Overview, Course Description or Course Philosophy

Advanced Science Research Methods Honors is the third course in a three year sequence of courses. Students learn research methodology in the natural sciences by accessing scientific databases, using online bibliographic search techniques, learning how to analyze and create scientific presentations to be shared in class and during the end of year Symposium. Students must have an established research project and mentor during this year in order to participate in Advanced Science Research Methods Honors. Students will be expected to complete a scientific research abstract (proposal) for submission (competition), a research paper, poster and presentation based on an authentic research project. Students will have the opportunity to apply basic research methods in the area of Molecular Biology and Bioinformatics.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Students will understand that authors choose evidence to shape and support their arguments. Individuals evaluate the line of reasoning and evidence to determine to what extent they believe or accept an argument. Scientific journals are peer-reviewed and provide information that can be used to reproduce scientific work in the laboratory or in the field. Scientific ideas from a variety of sources can provide perspective to inform the development of a new authentic research topic.

ESSENTIAL QUESTIONS

What do I want to know, learn, or understand?

What questions have yet to be asked?

How does my research question shape how I go about trying to answer it?

How does my project goal shape the research or inquiry I engage in to achieve it?

What information/evidence do I need to answer my research question?

CONTENT AREA STANDARDS

LA.RI.11-12.2	Determine two or more central ideas of a text, and analyze their development and how they interact to provide a complex analysis; provide an objective summary of the text.
LA.RI.11-12.5	Analyze and evaluate the effectiveness of the structure an author uses in his or her exposition or argument, including whether the structure makes points clear, convincing, and engaging.
LA.RI.11-12.7	Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.
TECH.9.4.12.TL.2	Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data.
TECH.9.4.12.TL.4	Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem (e.g., 7.1.AL.IPERS.6).
TECH.9.4.12.IML.1	Compare search browsers and recognize features that allow for filtering of information.
TECH.9.4.12.IML.2	Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source, and relevance of information, in media, data, or other resources (e.g., NJSLSA.W8, Social Studies Practice: Gathering and Evaluating Sources.
TECH.9.4.12.IML.8	Evaluate media sources for point of view, bias, and motivations (e.g., NJSLSA.R6, 7.1.AL.IPRET.6).
VHEL.9-12.9.4.12.H.5	Select and employ appropriate reading and communication strategies to learn and use technical concepts and vocabulary in practice.
VHEL.9-12.9.4.12.H.16	Employ critical thinking skills (e.g., analyze, synthesize, and evaluate) independently and in teams to solve problems and make decisions.
VHEL.9-12.9.4.12.H.42	Conduct and participate in meetings to accomplish tasks.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

TECH.9.4.12.TL.1	Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task (e.g., W.11-12.6.).
TECH.9.4.12.TL.3	Analyze the effectiveness of the process and quality of collaborative environments.

STUDENT LEARNING TARGETS

Declarative Knowledge

Students will understand that:

1. How to employ reading strategies such as annotating text, highlighting, summarizing, and presenting verbally to gain a greater understanding of scientific writing.
2. How to effectively discuss topics in class using various techniques to further understand the scientific text.
3. That scientific evidence must be evaluated for credibility and validity by examining the primary source document.
4. Topics may have multiple points of view and may produce conflicting studies that may need to be evaluated.

Procedural Knowledge

Students will be able to:

1. Employ appropriate reading strategies to scientific journals and scientific writing
2. Summarize and explain the text aim while avoiding generalizations and oversimplification.
3. Evaluating the relevance and credibility of evidence used.
4. Interpret, use, and synthesize qualitative and/or quantitative data/information from various perspectives and sources (e.g., primary, secondary, print, nonprint) to develop and support an argument.
5. Evaluating the validity of a study based on data.
6. Evaluating multiple perspectives about a topic of study.
7. Provide insightful and cogent commentary that links evidence with claims.
8. Integrate ideas from various papers to synthesize an independent research topic based on current research.

EVIDENCE OF LEARNING

Formative Assessments

Scientific journal summaries

Scientific Journal - annotations

Journal Presentations

Group discussions

Summative Assessments

Benchark Assessment:

Lab binders evaluation

Biweekly assessment

Alternative assessment:

Lab notebook assessment

RESOURCES (Instructional, Supplemental, Intervention Materials)

http://www.albany.edu/uhs/src.php

http://www.albany.edu/scienceresearch/

http://static.nsta.org/files/PB297Xweb.pdf

www.Sciencebuddies.com

https://www.aaas.org/

INTERDISCIPLINARY CONNECTIONS

Statistics

Presentation skills

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.