

Literature Review: Critically Analyzing Sources

Literature reviews are a significant part of scientific writing. The skills involved in a literature review encompass more than synthesis of multiple sources. A literature review provides a single, comprehensive narrative of a particular topic within a discipline. The writer must determine which literature is relevant to the scope of their paper and critically analyze the methodology, claims and inferences of each piece. In some cases the literature might present gaps in research or conflicting interpretations that will need further debate. A literature review also requires the writer to consolidate supportive evidence in order to formulate a theory, identifying and distinguishing papers based on facts that support a theory versus papers presenting assumptions based on a theory.

Educators may wish to develop their students' literature review skills by providing a topic for review or allowing students to choose a topic in their own area of interest. In either case, students will develop research skills, critical analysis skills, and reading and comprehension skills.

The following is an example (with partial scaffolding) of how an educator may use *Science Reference Center*™ in a lesson on writing literature reviews and how students will interact with *Science Reference Center* to complete their assignment.

Objectives

Students will be able to:

- Read and comprehend multiple resources
- Differentiate between facts, opinions, and logical/reasoned information
- Determine if arguments or claims are supported by evidence, and if the reasoning is sound
- Summarize and analyze information across multiple resources to present a single theory with supporting evidence
- Support or deny the theory that our solar system was formed from a disk of dust, drawn together by gravity*

Standards

CCSS-Literacy.RI.8.8, CCSS-Literacy.RI.8.9, CCSS.ELA-Literacy.RST.6-8.10, CCSS.ELA-Literacy.RST.6-8.8, CCSS.ELA-Literacy.RST.6-8.11, NGSS MS-ESS1-2*

** This objective and associated standards can be interchanged with any desired topic and associated Science Standard (i.e. another NGSS DCI or state-specific standard) or left off if topics are chosen by students.*

Materials

1. Computer/laptop/tablet
2. Access to *Science Reference Center*

Procedures

Educator:

1. Collect 2-3 resources from *Science Reference Center* on the designated topic to provide to students.
Note: Educators may adapt these procedures to include more or less scaffolding by increasing or limiting the number of articles provided to students.
 - a. Conduct a search on a topic of your choosing; use the suggested search:
 - i. See **Best Practices: Integrating Multiple Sources** for information on collecting multiple sources for students.
 - ii. Sample Search: Find an article about the formation of the solar system: **("Solar System" and (dust and gravity) or formation)**
- OR
- b. Provide time for students to conduct their own research using *Science Reference Center*.
2. Ask students to critically read each article. Practice the following strategies as a class or in groups:
 - a. Highlight any claims that are common throughout the articles.
 - b. Create a summarizing statement (a scientific theory) that is supported by evidence within the articles.
 - c. Differentiate facts, reasoned statements and opinions.
3. Ask students to write a definition for each statement type and identify the value of each in supporting a theory in their literature review. Follow each definition with appropriate statements from the articles that may support the theory.
4. Ask students to conduct further literature research and find 1-2 secondary articles relevant to the theory they intend to use in their literature review.
5. Provide students with assignment guidelines for a one-page literature review:
 - a. Identify the common claims across all articles.
 - b. Express comprehension of the topic through accurate summarization of claims.
 - c. Provide the best supportive evidence for these claims.
 - d. Describe any gaps in the literature (areas that lack supportive evidence).
6. **Extension Activities:**
 - a. Ask students develop a new hypothesis to test
 - b. Ask students assess their peers' literature reviews

Student:

1. Read articles provided by educator or collected in your own research and participate in class development of a summarizing statement (a scientific theory).
2. Review the articles again, highlighting all claims relevant to the scientific theory, and identify three types of supporting statements:
 - a. Facts that support the theory
 - b. Reasoned statements that support the theory
 - c. Opinions that follow the theory
3. Write definitions for each statement type and provide examples of statements from the provided articles that may be used to support the theory.
 - a. Determine which supportive statements will be most valuable to your readers.
 - b. Determine which supportive statements lack sufficient evidence.
4. Use *Science Reference Center* to find 1-2 more relevant articles for your literature review.
5. Analyze these secondary articles along with the initial articles:
 - a. Highlight common claims across all sources.

- b. Summarize and integrate these claims to explain the theory defined by your class.
 - c. Identify relevant statements as supportive evidence for your theory; exclude irrelevant statements.
6. Write a one-page literature review following the guidelines provided by your educator.

Assessment

Formative Assessment: Review students' definitions and supportive evidence examples.

Summative Assessment: Review final literature review for a clear explanation of the theory, valid integration of ideas from all sources, use of relevant supportive evidence, and proper structure.