Discovering the Library and the Librarian in Science Textbooks: Representations and Implications

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Across all disciplines, these were our findings by theme:

Library
- Libraries are digital spaces that students can access.
- Libraries are warehouses that store the supplemental resources students need.
- Libraries are spaces students can go to solve difficult problems or receive help.

Librarian
- Librarians are mentioned but their expertise is equated to an undergraduate student’s ability to use search tools like Google Scholar or library databases.
- Convenience of off-campus resources like databases are weighed against the expertise of library professionals.

Peer Review
- Mostly mentioned in acknowledgements section (especially for Physics and Chemistry).
- Peer review is thought to be a device that is used to uphold the integrity and the high standards of published research and is conducted by experts or peers of the researchers in their respective fields.
- Peer review helps to mitigate bias and make sure that mistakes are caught and reversed before publication.

Primary Literature
- Primary literature is often cited in the end of chapters and referenced as “scientific literature.”
- Scientific journals are mentioned as a good place to start research and a common place to find primary literature which are referred to as “original research articles.”

Secondary Literature
- Book-length works are usually mentioned as secondary sources.
- Defined as review articles, textbooks, and popular magazine articles.
- Secondary literature is helps ground researchers in current research.

Research
- Research is inextricably tied to the concepts of experimentation, observation, and inquiry.
- Research is asking the “right” questions.

Scientific Method
- Iterative process.
- Observation and hypothesis are emphasized.
- Process with steps: observation, hypothesis, experimentation—and sometimes—communication.
- Way to test potential or established theories and laws.
Textbooks often discussed information literacy as science literacy. Here were our findings by discipline for the theme of *science literacy*:

<table>
<thead>
<tr>
<th>Science Literacy</th>
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<tbody>
<tr>
<td><strong>Physics</strong></td>
<td>Most physics textbooks do not explicitly mention scientific literacy:</td>
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<tr>
<td></td>
<td>▪ Reframed as strategies to “think like scientists”</td>
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<td></td>
<td>▪ Outlines scientific process as scientific method</td>
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<td></td>
<td>▪ Emphasis on proper units and measurements</td>
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<td></td>
<td>▪ Critical thinking for transfer</td>
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<td></td>
<td>▪ Warns of pseudoscience</td>
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<td><strong>Chemistry</strong></td>
<td>Chemistry textbooks mention skills that are needed to “do” science:</td>
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<tr>
<td></td>
<td>▪ Emphasis on scientific naming and measuring</td>
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<td></td>
<td>▪ Science as a transferable process</td>
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<td></td>
<td>▪ Warns against bias in science</td>
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<td></td>
<td>▪ Science literacy is learned by practicing chemistry</td>
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<td><strong>Biology</strong></td>
<td>Biology textbooks emphasize the importance of scientific literacy as a defense against fake news and pseudoscience:</td>
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<tr>
<td></td>
<td>▪ Stresses observation and critical thinking of literature and experimentation</td>
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<td>▪ Emphasis on real-world tech and environment problems as examples</td>
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<td></td>
<td>▪ Determining fact from fiction</td>
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**Checklist for Information and Science Literacy:**

- The scientific method is written as an iterative, social process that incorporates the social aspects of science as well as inquiry as a method of discovery. *Frames: Scholarship as Conversation & Information Creation as Process*
  - The textbook explains the value of knowing how to measure, analyze, and think like a scientist and empowers students toward understanding the scientific information they come across in everyday life.

- Science literacy or information literacy are explicitly mentioned and defined alongside learning objectives for these literacies. *Frames: Authority is Constructed and Contextual & Information Has Value*
  - The field of science (chemistry, biology, physics, etc.) is identified as a complex, social process that goes beyond experimentation; the textbook also includes communication in this process. *Frames: Authority is Constructed and Contextual; Information Creation as Process; Scholarship as Conversation*
    - The author(s) write about how communicating findings in the scientific community creates accountability and prevents misinformation while reinforcing and creating knowledge.

- The library and librarians are part of the textbook's narrative. *Frames: Searching as Strategic Exploration & Scholarship as Conversation*
  - The library is a physical place where students can get help from librarians with their research or discover sources about their questions, experiments, and coursework.

- The author(s) reference and cite primary and secondary literature throughout the work or at the end of chapters. *Frames: Authority is Constructed and Contextual; Searching as Strategic Exploration*
  - When students understand how primary or secondary literature influences the textbook, it provides context that the textbook is not the only authoritative source.