

# Integrating Research with Computer Science and Digital Fluency Standards: *A Comprehensive Framework*



# INTRODUCTION

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Hey there, teachers and librarians! This comprehensive framework mixes library research (you know, finding stuff in books and online) with computer science (using computers and cool tech) and digital fluency (being smart about using technology). In your classrooms, this combo can help you teach skills that are important in the 21st century.

When students conduct research, it's not simply about reading books, articles, and other media. They must analyze both primary and secondary sources, consider how point of view influences the message of a document, and interpret key concepts through specific words and phrases. They also need to analyze data presented in charts, graphs, diagrams, maps, and data sets. Research involves finding facts to support an idea, while digital literacy and computer science skills help students communicate that idea effectively.

As students become proficient in using technology, they are better prepared for success both in school and in their future careers. This framework demonstrates how easily library skills complement computer science and digital fluency standards.

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# KINDERGARTEN

Research Question	Librarian OR Teacher generated
Purpose (ELA/ENG)	Develops questions and participates in shared research and exploration to answer questions and share knowledge. <b>KW6</b>
Search Skills	Identifies fiction and non-fiction
Sources	2 books—Librarian OR Teacher provided <b>KW6</b>
Note Taking	What do you wonder about? Develops questions and participates in shared research and explorations to answer questions and build knowledge. <b>KW6</b> Reading for information is modeled. <b>KW7</b>
Organization	Lists facts
Length	1 Chart paper
In-Text Citations	N/A
Works Cited	Librarian OR Teacher modeled. With help, students write author's name and title of resource.
Focus	Authors write books that provide information.
Computer Science and Digital Fluency Learning Standards	Keyboard introduction <b>K-1, DL.1</b> Creates a basic search based on a provided keyword. <b>K-1, DL3</b> <b>K-1 CSDF Standards at a Glance</b>
Digital Literacy (DL) Focus	Explores physical and/or touchscreen keyboards, and identifies specific keys such as arrow keys, enter, space bar, backspace.

# FIRST GRADE

Research Question	Librarian OR Teacher generated
Purpose (ELA/ENG)	Develops questions and participates in shared research and explorations to answer questions and build knowledge. <b>1W6</b>
Search Skills	Reviews non-fiction.
Sources	2 books provided by the Librarian OR Teacher <b>1W6</b>
Note Taking	What do you wonder about? Develops questions and participates in shared research and explorations to answer questions and build knowledge. <b>1W6</b> Reading for information is modeled. <b>1W7</b>
Organization	Lists facts
Length	1 Chart paper
In-Text Citations	N/A
Works Cited	Librarian OR Teacher modeled. With help, students write author's name and title of resources.
Focus	Non-fiction books provide information. <b>1W7</b>
Computer Science and Digital Fluency Learning Standards	Keyboard introduction <b>K-1, DL.1</b> Creates a basic search based on a provided keyword. <b>K-1, DL3</b> Defines citation/bibliography (establish standard vocabulary). <b>K-1 CSDF Standards at a Glance</b>
Digital Literacy (DL) Focus	The teacher provides keywords to help students conduct basic searches using appropriate tools.

# SECOND GRADE

Research Question	Librarian OR Teacher generated
Purpose (ELA/ENG)	Develops questions and participates in shared research and explorations to answer questions and build knowledge. <b>2W6</b>
Search Skills	Locates a non-fiction book for developing further knowledge.
Sources	1 book <b>2W6</b>
Note Taking	Gathers info. from illustrations, text, features, and interprets information represented. Takes notes to answer research questions by writing down words and phrases or drawing pictures from sources. Does not copy whole sentences. <b>2W7</b> <a href="https://slsa-nys.libguides.com/ifc/gradeassessments">https://slsa-nys.libguides.com/ifc/gradeassessments</a> -Document 2.18
Organization	With help, creates a visual map of connections among ideas and concepts about the topic.
Length	Research is presented in a variety of ways (drawing, writing, speaking).
In-Text Citations	N/A
Works Cited	With Librarian OR Teacher generated form and guidance, student creates a list of sources with title and author.
Focus	Recalls and represents relevant information from experiences or gathers information from provided sources to answer a question. <b>2W7</b>
Computer Science and Digital Fluency Learning Standards	Locates and uses the main keys on a keyboard to enter text independently. <b>2-3, DL.1</b> Conducts basic searches based on student identified keywords. <b>2-3, DL.3</b> Uses a variety of digital tools and resources to create digital artifacts. <b>2-3, DL.4</b> <b>2-3 CSDF Standards at a Glance</b>
Digital Literacy (DL) Focus	Identifies key words and performs an internet search using teacher-approved tool(s) to gather information.

# THIRD GRADE

Research Question	Librarian OR Teacher guided.
Purpose (ELA/ENG)	Conducts research to answer questions, including self-generated questions, to build knowledge. <b>3W6</b>
Search Skills	Searches bookmarked websites and online catalogs (author, title, keywords), with assistance, to locate resources.
Sources	2 sources <b>3W6</b>
Note Taking	Uses simple note-taking strategies. <b>3W7</b> <a href="https://slsa-nys.libguides.com/ifc/gradeassessments">https://slsa-nys.libguides.com/ifc/gradeassessments</a> - Document 3.10
Organization	With help, uses notecards to fill in Librarian OR Teacher created outline.
Length	Research information is presented in a variety of ways (drawing, writing, speaking).
In-Text Citations	N/A
Works Cited	With a Librarian OR Teacher generated form and guidance, student creates a list of sources with title, author, copyright year, publisher. <a href="https://slsa-nys.libguides.com/ifc/gradeassessments">https://slsa-nys.libguides.com/ifc/gradeassessments</a> -Document 5.21
Focus	Recalls relevant information from experiences or gathers information from multiple sources; takes brief notes on sources and sorts evidence into provided categories. <b>3W7</b>
Computer Science and Digital Fluency Learning Standards	Uses a variety of digital tools and resources to create digital artifacts. <b>2-3, DL.4</b> (Library Catalog or database to search, and introduction to Microsoft 365/Google Suite for document creation.) <b>2-3 CSDF Standards at a Glance</b>
Digital Literacy (DL) Focus	Different digital tools are used for different purposes, such as communicating, collaborating, researching, and creating original content.

# FOURTH GRADE

<b>Research Question</b>	Librarian OR Teacher guided.
<b>Purpose (ELA/ENG)</b>	Conducts research to answer questions, including self-generated questions. Builds knowledge by investigating multiple aspects of a topic. <b>4W6</b>
<b>Search Skills</b>	Uses pre-selected primary sources to gather information and compares primary and secondary sources on same topic.
<b>Sources</b>	2 primary and 2 secondary sources <b>4W6</b>
<b>Note Taking</b>	Paraphrases and summarizes information that answers the research question, and notes what is fact and what is opinion. <b>4W7</b>
<b>Organization</b>	With help, uses common organization patterns (chronological order, main idea with supporting details).
<b>Length</b>	1 page. May be accompanied by a drawing or oral presentation.
<b>In-Text Citations</b>	N/A
<b>Works Cited</b>	With Librarian OR Teacher generated form and guidance, student creates a list of sources with title, author, copyright year, publisher.
<b>Focus</b>	Identifies facts and opinions on a topic. Recalls relevant information from experiences or gathers relevant information from multiple sources; takes notes, categorizes information, and provides a list of sources. <b>4W7</b>
<b>Computer Science and Digital Fluency Learning Standards</b>	Selects appropriate digital tools for communicating and collaborating while learning with others. <b>4-6, DL.2</b> <b>4-6 CSDF Standards at a Glance</b>
<b>Digital Literacy (DL) Focus</b>	Students progress from understanding that people use digital tools to communicate and collaborate to how they use the tools. Communication and collaboration should be purposeful and, when possible and appropriate, with an authentic audience.

# FIFTH GRADE

<b>Research Question</b>	Librarian OR Teacher guided.
<b>Purpose (ELA/ENG)</b>	Conducts research to answer questions, including self-generated questions. <b>5W6</b>
<b>Search Skills</b>	Evaluates print, video and electronic resources (primary and secondary) for relevance to the topic and credibility of author/ creator/publisher. (Fact checking)
<b>Sources</b>	Multiple <b>5W6</b>
<b>Note Taking</b>	Uses various note-taking strategies (outlining, underlining, bulleted lists, highlighting, graphic organizers) dependent on purpose. Summarizes and paraphrases information. <b>5W7</b>
<b>Organization</b>	With help, organizes notes and ideas. Develops an outline and mind map/graphic organizer. <a href="https://slsa-nys.libguides.com/ifc/gradeassessments">https://slsa-nys.libguides.com/ifc/gradeassessments</a> -Document 5.16
<b>Length</b>	1 page
<b>In-Text Citations</b>	N/A
<b>Works Cited</b>	With Librarian OR Teacher generated form, student creates a list of sources with title, author, copyright year, publisher. <b>5W7</b>
<b>Focus</b>	Evaluates information within a source for accuracy, relevance, comprehensiveness, and point of view. Recalls relevant information from experiences or multiple sources. <b>5W7</b>
<b>Computer Science and Digital Fluency Learning Standards</b>	Conducts and refines advanced multi-criteria digital searches to locate content relevant to varied learning goals. <b>4-6, DL.3</b> <b>4-6 CSDF Standards at a Glance</b>
<b>Digital Literacy (DL) Focus</b>	Focus should be on the quality of results a search generates, and how to improve search results based on the task or purpose by defining multiple search criteria and using filters.



# SIXTH GRADE

Research Question	Student generated
Purpose (ELA/ENG)	Conducts research to answer questions, including self-generated questions. <b>6W6</b>
Search Skills	Evaluates print, video and electronic resources (primary and secondary) for relevance to the topic and credibility of author/ creator/publisher. Selects information from multiple sources that answers the research question. <b>6W7</b>
Sources	Multiple <b>6W6</b>
Note Taking	Takes notes using one or a variety of note-taking strategies (outlining, underlining, bulleted lists, highlighting, graphic organizers) dependent on purpose. Quotes and paraphrases information. <b>6W7</b>
Organization	Curates information by selecting the best and most appropriate for the topic. Librarian OR Teacher provides graphic organizers.
Length	1 page
In-Text Citations	Introduction to MLA format
Works Cited	With help from Librarian OR Teacher, student creates a list of sources with title, author, copyright year, publisher. Introduced to MLA format. <b>6W7</b>
Focus	Differentiates between important and non-important details. Demonstrates ability to make note cards. Recalls relevant information from multiple sources. <b>6W7</b>
Computer Science and Digital Fluency Learning Standards	Uses a variety of digital tools and resources to create and revise digital artifacts <b>4-6, DL.4</b> (Noodletools, mind maps/graphic organizers, Microsoft 365/Google Suite and intro to advanced tools). <b>4-6 CSDF Standards at a Glance</b>
Digital Literacy (DL) Focus	The focus is on understanding the editing process when creating digital artifacts on multiple platforms.

# SEVENTH GRADE

<b>Research Question</b>	Student generated
<b>Purpose (ELA/ENG)</b>	Conducts research to answer questions, including self-generated questions for focused inquiry. <b>7W6</b>
<b>Search Skills</b>	Evaluates print, video and electronic resources (primary and secondary) for relevance to the topic and credibility of author/ creator/publisher. Effectively navigates a website and identifies features including side bars, menus, tabs, subject headings, etc. (Fact checking). Selects information from a variety of credible sources that answers the research question. <b>7W7</b> Uses navigation skills to find information. Uses boolean searches - and/or/not.
<b>Sources</b>	Uses data from a variety of validated sources, (charts, graphs, diagrams, maps, data sets). <b>7W6</b>
<b>Note Taking</b>	Evaluates different perspectives and points of views. Highlights key thoughts with Librarian OR Teacher instruction. Uses relevant information for paraphrasing or quoting from reliable/credible sources. <b>7W7</b>
<b>Organization</b>	Curates information by selecting most appropriate for chosen topic. Uses common organizational patterns such as chronology, compare/contrast, cause/effect. Librarian OR Teacher provides choices of graphic organizers.
<b>Length</b>	Up to 2 pages
<b>In-Text Citations</b>	Introduction to MLA format for citations.
<b>Works Cited</b>	With help from Librarian OR Teacher, student creates a list of sources with title, author, copyright year, publisher. <b>7W7</b>
<b>Focus</b>	Evaluates the development of an argument or claim, and its strength. Demonstrates skill in creating note cards. Based on research and conclusions, generates additional questions. <b>7W6</b>
<b>Computer Science and Digital Fluency Learning Standards</b>	Compares types of search tools, chooses a search tool for effectiveness and efficiency, and evaluates the quality of search tools based on returned results. <b>7-8, DL.3</b> Navigates webpages and databases and evaluates information. Advanced tools in Microsoft 365/Google Suite are reviewed. <b>7-8 CSDF Standards at a Glance</b>
<b>Digital Literacy (DL) Focus</b>	Understands how different search tools work, why different search tools provide different results, and how and why some websites rise to the top of a search.

# EIGHTH GRADE

<b>Research Question</b>	Student generated
<b>Purpose (ELA/ENG)</b>	Conducts research to answer questions, including self-generated questions for focused inquiry. Narrows or broadens inquiry when appropriate. <b>8W6</b>
<b>Search Skills</b>	Performs keyword searches and uses boolean terms and/or/not. Uses a variety of credible sources. <b>8W7</b>
<b>Sources</b>	Uses data from a variety of validated sources, (charts, graphs, diagrams, maps, data sets). <b>8W6</b>
<b>Note Taking</b>	Highlights text with Librarian OR Teacher instruction. Uses margins to make notes/ create labels. Uses relevant information for paraphrasing or quoting from reliable/ credible sources. <b>8W7</b>
<b>Organization</b>	Librarian OR Teacher provides choices of graphic organizers.
<b>Length</b>	2 pages
<b>In-Text Citations</b>	MLA format for citations is reviewed. Parenthetical citations are introduced.
<b>Works Cited</b>	With help from Librarian OR Teacher, student creates a list of sources with title, author, copyright year, publisher. <b>8W7</b>
<b>Focus</b>	Creates a self-generated question as a basis for research. Demonstrates skill in creating note cards. Based on research and conclusions, generates additional questions. <b>8W6</b>
<b>Computer Science and Digital Fluency Learning Standards</b>	Selects and uses digital tools to create, revise, and publish digital artifacts. <b>7-8, DL.4</b> Uses advanced search tools in databases and Internet. Reviews advanced tools in Microsoft 365/Google Suite. <b>7-8 CSDF Standards at a Glance</b>
<b>Digital Literacy (DL) Focus</b>	A designated school-approved location for students to publish artifacts for an audience to view. Advanced digital tools may refer to the tool itself (i.e. the tool is more advanced) or to utilization of more advanced features on a tool.

# NINTH GRADE

<b>Research Question</b>	Student generated and topic is refined as needed.
<b>Purpose (ELA/ENG)</b>	Conducts research to answer questions, including self-generated questions to solve a problem. Narrows or broadens inquiry when appropriate. <b>9W6</b>
<b>Search Skills</b>	Performs keyword searching in databases, uses boolean truncation and assesses usefulness of each source. <b>9W7</b>
<b>Sources</b>	Demonstrates an understanding of content, and analyzes resources. Effectively uses data to support argument. <b>9W6</b>
<b>Note Taking</b>	Uses note cards to paraphrase text instead of using direct quotes from an author.
<b>Organization</b>	Uses a fill-in-the-blank or guided outline. Integrates information from the text selectively to maintain the flow of an idea. <b>9W7</b>
<b>Length</b>	3+ pages
<b>In-Text Citations</b>	Uses MLA parenthetical citations <b>9W7</b>
<b>Works Cited</b>	Student generated with Librarian or Teacher assistance.
<b>Focus</b>	Independently creates note cards. Effective use of databases to search and locate resources. Uses outlines as tools for organization. Synthesizes multiple resources, and demonstrates fluidity of final paper. <b>9W6</b>
<b>Computer Science and Digital Fluency Learning Standards</b>	Types proficiently on a keyboard <b>9-12.DL.1</b> Uses advanced tools in Microsoft 365/Google Suite. <b>9-12 CSDF Standards at a Glance</b>
<b>Digital Literacy (DL) Focus</b>	The focus is to demonstrate proficient keyboarding skills by the end of 12th grade.

# TENTH GRADE

Research Question	Student generated and topic is refined as needed.
Purpose (ELA/ENG)	Conducts research to answer questions, including self-generated questions to solve a problem. Narrows or broadens inquiry when appropriate. <b>10W6</b>
Search Skills	Performs keyword searches in databases, uses boolean truncation, and assesses usefulness of each source. <b>10W7</b>
Sources	Demonstrates an understanding of content and analyzes resources. Effectively uses data to support argument. <b>10W6</b>
Note Taking	Uses independent searching on databases and Internet. Assesses strengths and limitations of each source for purpose and audience. <b>11W7</b>
Organization	Uses a guided outline. Integrates information from the text selectively to maintain flow of ideas. <b>10W7</b>
Length	4+ pages
In-Text Citations	Uses MLA parenthetical citations <b>10W7</b>
Works Cited	Student generated with limited help.
Focus	Avoids over-reliance on one source <b>11W7</b>
Computer Science and Digital Fluency Learning Standards	Independently selects advanced digital tools and resources to create, revise, and publish complex digital artifacts or collection of artifacts. <b>9-12.DL.4</b> Uses advanced tools in Microsoft 365/Google Suite. <b>9-12 CSDF Standards at a Glance</b>
Digital Literacy (DL) Focus	Mastery of this standard implies an ability to choose and use the technology tool or resource best suited for a task or purpose.

# ELEVENTH GRADE

<b>Research Question</b>	Student generated. Identifies a specific problem, proposes a solution, and uses evidence and data to support solution.
<b>Purpose (ELA/ENG)</b>	Conducts research to answer questions, including self-generated questions to solve a problem. Narrows or broadens inquiry when appropriate. <b>11W6</b>
<b>Search Skills</b>	Performs independent searches in databases and Internet. Assesses strengths and limitations of each source for task, purpose and audience. <b>11W7</b>
<b>Sources</b>	Synthesizes and analyzes multiple sources; demonstrates an understanding of choosing appropriate articles for topic. <b>11W6</b> Creates an annotated bibliography.
<b>Note Taking</b>	Utilizes note cards, paraphrases, and uses direct quotations.
<b>Organization</b>	Student generates an outline and utilizes language to create fluid transitions in organization and structure. <b>11W7</b> Synthesizes information and shows understanding of multiple sources. <b>11W6</b>
<b>Length</b>	5+ pages (1250 words, double-spaced)
<b>In-Text Citations</b>	Uses MLA parenthetical citations. <b>11W7</b> Student generates citations with limited help.
<b>Works Cited</b>	Avoids over-reliance on one source. <b>11W7</b>
<b>Focus</b>	Effectively uses note cards, paraphrases, and uses direct quotations. Synthesizes information and demonstrates an understanding of multiple sources. <b>11W6</b>
<b>Computer Science and Digital Fluency Learning Standards</b>	Transfers knowledge of technology in order to use new and emerging technologies in multiple platforms. <b>9-12.DL.5</b> Uses advanced tools in Microsoft 365/Google Suite. <b>9-12 CSDF Standards at a Glance</b>
<b>Digital Literacy (DL) Focus</b>	New technologies could include different tools for collaboration, creation, etc. that the student has not used before. Platforms could include devices running different operating systems or could be emerging STEAM technologies. Digitally fluent individuals can move between platforms and can use that knowledge when encountering new technology.

# TWELFTH GRADE

<b>Research Question</b>	Student generated. Demonstrates problem-solution proving concepts.
<b>Purpose (ELA/ENG)</b>	Conducts research to answer questions, including self-generated questions to solve a problem. Narrows or broadens inquiry when appropriate. <b>12W6</b>
<b>Search Skills</b>	Performs independent searches in databases and Internet. Assesses strengths and limitations of each source for task, purpose and audience. <b>12W7</b>
<b>Sources</b>	Synthesizes and analyzes multiple sources. Demonstrates an understanding of choosing appropriate articles for topic. <b>12W6</b> Creates annotated bibliography.
<b>Note Taking</b>	Utilizes note cards, paraphrasing, and direct quotations
<b>Organization</b>	Student generates an outline, utilizes language to create fluid transitions in organization and structure. <b>12W7</b> Synthesizes information and shows understanding of multiple sources. <b>12W6</b>
<b>Length</b>	6-8 pages
<b>In-Text Citations</b>	Uses MLA parenthetical citations. <b>12W7</b> Student generated with limited help. <b>12W7</b>
<b>Works Cited</b>	Avoids over-reliance on one source. <b>12W7</b>
<b>Focus</b>	Student demonstrates independence. Synthesizes information to indicate evidence-based critical thinking. Questions ideas and thinks beyond presented material. <b>12W6</b>
<b>Computer Science and Digital Fluency Learning Standards</b>	Transfers knowledge of technology in order to use new and emerging technologies in multiple platforms. <b>9-12.DL.5</b> Proficient in Microsoft 365/Google Suite. <b>9-12 CSDF Standards at a Glance</b>
<b>Digital Literacy (DL) Focus</b>	New technologies could include different tools for collaboration, creation, etc. that the student has not used before. Platforms could include devices running different operating systems or could be emerging STEAM technologies. Digitally fluent individuals can move between platforms and can use that knowledge when encountering new technology.

# RESOURCES



## **Project Look Sharp:**

Engage K-12 students in rigorous and reflective analysis of media documents. Includes complete lessons and a guide for decoding media.



## **Computer Science and Digital Literacy Standards:**

Emphasizes problem-solving and increasing students' abilities to use digital technologies for tasks such as creating, researching, communicating, collaborating, and sharing information and work.



## **Empire State Information Fluency Continuum:**

Emphasizes inquiry in learning and establishes information fluency standards for grades K-12 that encourage students to be thinkers, explorers, and citizens. Includes grade-specific benchmarks and graphic organizers.



## **Next Gen English Standards:**

<https://www.nysed.gov/curriculum-instruction/new-york-state-next-generation-english-language-arts-learning-standards>



## **Noodletools:**

An online research management platform that promotes critical thinking and authentic research. Students stay organized as they evaluate information, build accurate citations, archive source material, take notes, outline topics, and prepare to write. Three differentiated levels support individual students across grades and abilities. Contact [Cecelia\\_Fuoco@caboces.org](mailto:Cecelia_Fuoco@caboces.org) for district-specific information.