



Computational thinking makes students better thinkers, writers, & researchers

Don't be fooled—computational thinking isn't all about computer science! It has more to do with language arts than you might realize. Computational thinking equips students with valuable problem-solving tools. By using strategies that computers use to solve problems, students learn new ways to identify patterns and themes, break assignments into manageable pieces, and edit to fix errors. As a language arts educator, you know that these skills overlap with CCSS knowledge and skills. These engaging and fun standards-aligned resources give you the tools to integrate computational thinking into your language arts classroom.

Computational thinking strategies:

Collecting data—how to find the right information

[Data.gov: Open Data from the U.S. Government](#)

Collecting data helps writers shape their topic and support it with details. The U.S. General Services Administration publishes open source data under the provision of the 2013 Federal Open Data Policy. The site offers a variety of topics from which to collect data for the purpose of research, writing, and speaking, ranging from agriculture to education and public safety. Search terms can also be entered for a specific topic of interest. Blog entries on the web page also highlight more recent data and publications. Several other government sites store data that can be used as credible sources of evidence for informative/explanatory texts or to support arguments.

- [U.S. Census Bureau Data](#)
- [Centers for Disease Control and Prevention](#)
- [U.S. Geological Survey Data](#)

Connect to: [Identifying credible sources](#), [interpreting data](#), [research](#), [explanatory writing](#)

Analyze data—find relationships and predict outcomes

[Create a Graph, by The National Center for Educational Statistics](#)

Producing charts and graphics helps writers support ideas and convey information. The National Center for Educational Statistics hosts a web page that allows users to create a variety of graph types by inputting data. The interface is user friendly and includes many visuals to help navigate the controls for making a graph or chart. Examples on the side tab and a "Create A Graph Tutorial" help users get started. Students will need to analyze collected data to determine relevant data to graph to best support their thesis or key ideas.

Connect to: [Interpreting data](#), [cause and effect](#), [utilizing different media](#), [publishing writing online](#)

Decompose—break a text or project into smaller, manageable pieces

[Library of Congress: Author Webcasts](#)

Becoming a better writer often involves breaking down and examining what good writers do and trying out their writing craft tips. Literacy also requires evaluating content presented in diverse formats and media. Students can research and decompose the techniques of their favorite authors using the Library of Congress website. The Author Webcasts page provides a list of videos in which authors, poets, and illustrators read selections and discuss their works. Links allow searches of related books and information. Students can answer the question “What makes my favorite author a good writer?”

Connect to: [Strengthening writing](#), [establishing a writing style](#)

Find Patterns—identify themes and connections

[Letter Writing in America, from the Smithsonian](#)

Identifying patterns in a genre of writing is part of analyzing text structure. Students explore the art of letter writing through the Smithsonian National Postal Museum’s site, Letter Writing in America. The site examines the history of letter writing, letter writing as an art, and the future of letter writing. Starting with letters from before the Revolutionary War, and continuing through the twentieth century, significant time periods and letters are showcased. Compare and contrast letter styles through each time period, discuss rules of letter writing, and predict the future of this genre of writing and the impacts of technology on the patterns students identified.

Connect to: [Archetypes](#), [understanding context](#), [conventions of language](#), [making inferences](#)

Abstract—remove unnecessary detail to see central themes

[Library of Congress: America’s Story](#)

Sorting out details and reducing complexity is important to both identifying the main idea or theme when reading, and in summarizing when writing. The Library of Congress showcases “America’s Story” through literature that shaped the country. Students study the works of significant writers in American History, find out how they positively impacted America, and see timelines and biographies for influential figures like Langston Hughes, Dorothea Lange, Mark Twain, and Frank Lloyd Wright. Students can identify a formative life event, a primary contribution, or a main theme of an author’s work as they produce a summary.

Connect to: [Figurative language](#), [themes](#), [summarizing](#)

Build models—outline, review, and edit to fix errors

[Purdue OWL Online Writing Lab \(Purdue University\)](#)

Writing is a text-based model—and the writing process includes creating, experimenting, and finding and fixing errors in the model. Students should view revision as an iterative process of building models, each a bit better than the last. Introduce students to the resources at the Purdue OWL Online Writing Lab, a great asset through high school, college, and beyond. The page “Full OWL Resources for Grades 7-12 Students and Instructors” provides support for every stage of the writing process, beginning with building a text model using an outline. It also helps students find and fix common errors such as proper quotations and citation, evaluating sources, or proper punctuation and grammar.

Connect to: [Revising and editing](#), [citing sources](#)

Develop algorithms—structure a process using step-by-step instructions

[Choose Your Own Adventure, by Scratch \(MIT\)](#)

Emphasize the event sequences of the narrative structure by developing step-by-step instructions in Scratch (MIT). Choose your own adventure stories are based around decision matrices just like an algorithm with a sequence of steps or choices. Students explore examples on Scratch—a block style coding platform that allows drag and drop programming. Select a story, choose events, and then click on “See Inside” to view how the blocks are organized. Encourage students to develop their own storyboard or algorithm, and then build the story in Scratch.

Connect to: [Writing narratives](#), [identifying key steps in a process](#), [literary devices](#)
