

APPENDIX A: TECHNOLOGY SKILLS AND CCSS

The CCSS reference technology explicitly in several areas, particularly in the ELA standards. In addition, the mathematics standards include the ability to select appropriate tools, including technology, to solve math problems and the use of technology to create mathematical models and visualize mathematical concepts. Figure A.1 displays references to technology within the Common Core State Standards.

Figure A.1: Technology Competencies Referenced in the Common Core State Standards

STANDARD OR TOPIC	RELEVANT LANGUAGE
English Language Arts Standards⁸³	
Introduction » Students Who are College and Career Ready in Reading, Writing, Speaking, Listening, & Language	Students employ technology thoughtfully to enhance their reading, writing, speaking, listening, and language use. They tailor their searches online to acquire useful information efficiently, and they integrate what they learn using technology with what they learn offline. They are familiar with the strengths and limitations of various technological tools and mediums and can select and use those best suited to their communication goals.
Anchor Standards » College and Career Readiness Anchor Standards for Writing » 6	Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
Anchor Standards » College and Career Readiness Anchor Standards for Writing » 8	Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
Anchor Standards » College and Career Readiness Anchor Standards for Reading » 7	Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
Anchor Standards » College and Career Readiness Anchor Standards for Speaking and Listening » 2	Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
Anchor Standards » College and Career Readiness Anchor Standards for Speaking and Listening » 5	Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
Reading: Literature » Grade 2 » 7	Use information gained from the illustrations and words in a print or digital text to demonstrate understanding of its characters, setting, or plot.
Reading: Literature » Grade 5 » 7	Analyze how visual and multimedia elements contribute to the meaning, tone, or beauty of a text (e.g., graphic novel, multimedia presentation of fiction, folktale, myth, poem).
Reading: Literature » Grade 7 » 7	Compare and contrast a written story, drama, or poem to its audio, filmed, staged, or multimedia version, analyzing the effects of techniques unique to each medium (e.g., lighting, sound, color, or camera focus and angles in a film).
Reading: Informational Text » Grade 5 » 7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
Reading: Informational Text » Grade 6 » 7	Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.

⁸³ English Language Arts Standards in Figure A.1 taken verbatim from: "English Language Arts Standards." Common Core State Standards Initiative. <http://www.corestandards.org/ELA-Literacy/>

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Reading: Informational Text » Grade 7 » 7	Compare and contrast a text to an audio, video, or multimedia version of the text, analyzing each medium's portrayal of the subject (e.g., how the delivery of a speech affects the impact of the words).
Reading: Informational Text » Grade 8 » 7	Evaluate the advantages and disadvantages of using different mediums (e.g., print or digital text, video, multimedia) to present a particular topic or idea.
Reading: Informational Text » Grade 9-10 » 7	Analyze various accounts of a subject told in different mediums (e.g., a person's life story in both print and multimedia), determining which details are emphasized in each account.
Reading: Informational Text » Grade 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.
Writing » Kindergarten » 6	With guidance and support from adults, explore a variety of digital tools to produce and publish writing, including in collaboration with peers.
Writing » Grade 1 » 6	With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers.
Writing » Grade 2 » 6	With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers.
Writing » Grade 3 » 8	Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.
Writing » Grade 4 » 2 » a	Introduce a topic clearly and group related information in paragraphs and sections; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.
Writing » Grade 4 » 8	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
Writing » Grade 5 » 2 » a	Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.
Writing » Grade 5 » 8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
Writing » Grade 6 » 2 » a	Introduce a topic; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.
Writing » Grade 6 » 8	Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.
Writing » Grade 7 » 2 » a	Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.
Writing » Grade 7 » 8	Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
Writing » Grade 8 » 2 » a	Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.
Writing » Grade 8 » 8	Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

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Writing » Grade 9-10 » 2 » a	Introduce a topic; organize complex ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
Writing » Grade 9-10 » 8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
Writing » Grade 11-12 » 2 » a	Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
Writing » Grade 11-12 » 8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
Speaking & Listening » Grade 2 » 2	Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
Speaking & Listening » Grade 3 » 2	Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
Speaking & Listening » Grade 4 » 2	Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
Speaking & Listening » Grade 5 » 2	Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
Speaking & Listening » Grade 5 » 5	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.
Speaking & Listening » Grade 6 » 2	Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.
Speaking & Listening » Grade 6 » 5	Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.
Speaking & Listening » Grade 7 » 2	Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.
Speaking & Listening » Grade 7 » 5	Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.
Speaking & Listening » Grade 8 » 2	Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation.
Speaking & Listening » Grade 9-10 » 2	Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.
Speaking & Listening » Grade 9-10 » 5	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
Speaking & Listening » Grade 11-12 » 2	Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.
Speaking & Listening » Grade 11-12 » 5	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
Language » Grade 2 » 4 » e	Use glossaries and beginning dictionaries, both print and digital, to determine or clarify the meaning of words and phrases.

STANDARD OR TOPIC	RELEVANT LANGUAGE
Language » Grade 3 » 4 » d	Use glossaries or beginning dictionaries, both print and digital, to determine or clarify the precise meaning of key words and phrases
Language » Grade 4 » 4 » c	Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases.
Language » Grade 6 » 4 » c	Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.
Language » Grade 7 » 4 » c	Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.
Language » Grade 8 » 4 » c	Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.
Language » Grade 9-10 » 4 » c	Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, or its etymology.
Language » Grade 11-12 » 4 » c	Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, its etymology, or its standard usage.
History/Social Studies » Grade 6-8 » 7	Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.
History/Social Studies » Grade 9-10 » 7	Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital texts.
History/Social Studies » Grade 11-12 » 7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.
Science & Technical Subjects » Grade 6-8 » 9	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
Science & Technical Subjects » Grade 11-12 » 7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
Mathematics Standards⁸⁴	
Standards for Mathematical Practice » Use appropriate tools strategically	Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

⁸⁴ Mathematics Standards in Figure A.1 taken verbatim from: “Mathematics Standards.” Common Core State Standards Initiative. <http://www.corestandards.org/Math/>

STANDARD OR TOPIC	RELEVANT LANGUAGE
Grade 1 » Measurement & Data » Tell and write time. » 3	Tell and write time in hours and half-hours using analog and digital clocks.
Grade 2 » Measurement & Data » Work with time and money. »	Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
Grade 7 » Geometry » Draw construct, and describe geometrical figures and describe the relationships between them. »	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
Grade 8 » Expressions & Equations » Expressions and Equations Work with radicals and integer exponents.	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.
High School: Functions » Introduction	Sometimes functions are defined by a recursive process, which can be displayed effectively using a spreadsheet or other technology.
High School: Functions » Trigonometric Functions » Model periodic phenomena with trigonometric functions. » 7	(+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.*
Modeling	When making mathematical models, technology is valuable for varying assumptions, exploring consequences, and comparing predictions with data. The range of models that we can create and analyze is also constrained by the limitations of our mathematical, statistical, and technical skills, and our ability to recognize significant variables and relationships among them. Diagrams of various kinds, spreadsheets and other technology, and algebra are powerful tools for understanding and solving problems drawn from different types of real-world situations. Graphing utilities, spreadsheets, computer algebra systems, and dynamic geometry software are powerful tools that can be used to model purely mathematical phenomena (e.g., the behavior of polynomials) as well as physical phenomena.
High School: Geometry » Congruence » Experiment with transformations in the plane »	Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).
High School: Geometry » Congruence » Experiment with transformations in the plane »	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.
High School: Statistics & Probability » Interpreting Categorical & Quantitative Data » Interpret linear models » 8	Compute (using technology) and interpret the correlation coefficient of a linear fit.
Statistics	Technology plays an important role in statistics and probability by making it possible to generate plots, regression functions, and correlation coefficients, and to simulate many possible outcomes in a short amount of time.