DIGITAL LITERACY AND COMPUTER SCIENCE CURRICULUM FRAMEWORK

Developed 2018-2019
Implemented 2019-2020

Mountain Brook Schools
32 Vine Street
Mountain Brook, AL 35213

DIGITAL LITERACY AND COMPUTER SCIENCE CURRICULUM FRAMEWORK

Mountain Brook Schools
Board of Education

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Digital Literacy and Computer Science Curriculum Committee

Brookwood Forest Elementary
Sarah Katherine Nichols – K
Jennifer Jinnette - K
Tanishia Sims – K
Tara Smith – K
Perry Wright – K
Sammye Davis – 1
Jennifer Hunt – 1
Stacey Kirkpatrick – 1
Carrie Knight – 1
Travis Morgan – 1
Cindy Burns – 2
Caroline Peek – 2
Ashley Scott – 2
Eleanor Walker – 2
Dawn Elsberry – 3
Linda Mason – 3
Caroline Pridgen – 3
Kelly Stout – 3
Natalie Borland – 4
Ann Scott Cohen – 4
Laura Frenz – 4
Lane Walker – 4
Carla Dudley – 5
Jolie Welner – 5
Audrey Williams – 5
John Woolard – 5
Marion Bray – 6
Tracy Cole – 6
Jessica Meriwether – 6
Virginia Moore – 6
Kathy Snyder – 6
Sarah Katherine Nichols - Parent
Sharon Mumm – Technology Coordinator
Christy Christian – Assistant Principal

Cherokee Bend Elementary
Heather Brown – K
Cynthia Echols – K
Leah Saab – K
Hannah Umphrey – K
Suzy Brown – 1
Roby Gaut – 1
Trish Humphries – 1
Bethny Lee – 1
Kelly Anderson – 2
Kelley Finley – 2
Emily Griner – 2
Meredith Lusco – 2
Samantha Austin – 3
Danean Davis – 3
Maggie Helms – 3
Lyndsi Kirk – 3
Beth Dean – 4
Shelley Hunt – 4
Sally Till – 4
Karan Bush – 5
Anna DeBell – 5
Stacy Freeman – 5
Barbara Parker – 5
Alexandra Andrews – 6
Laurie Fuentes – 6
Lane Tucker – 6
Claire Puckett - Parent
Kenneth Camp – Technology Coordinator
Blair Inabinet – Assistant Principal

Crestline Elementary
Jenny Azar – K
Jayne Euwer – K
Phyllis Farrar – K
Melanie Hennessy – K
Johnna Noles – K
Sarah Norris – K
Michele Ramsey – K
Rachel Anderson – 1
Greer Black – 1
Marlyss Green – 1
Deborah Holder – 1
Chelsey Summerrow – 1
Lindsey Westlake – 1
Tracey Barringer – 2
Kendra Bierbrauer – 2
Allison Davis – 2
Kay Haley – 2
Christy Neely – 2
Sarah Stradley – 2
Susan Weston – 2
Tara Davis – 3
Kelsey Long – 3
Kelly Mitchell – 3
Carly Morgan – 3

Becca Pigg – 3
Laura Rives – 3
Sally Baker – 4
Caroline Ferrarone – 4
Scott McKerley – 4
Bradley O'Neill – 4
Jennifer Preston – 4
Jenny Wood – 4
Sarah Neale Bearden – 5
Cindy Carlisle – 5
Bill Garner – 5
Melinda Howe – 5
Amanda Johnson – 5
Lori Sullivan – 5
Lawson Hollans – 6
Teresa Howell – 6
Karen Scott – 6
Elizabeth Studinka – 6
Jamie Underwood – 6
Jackie Woodall – Parent
Paula Stanbridge – Technology Coordinator
Catherine Waters – Assistant Principal
Josh Watkins – Assistant Principal

Moutain Brook Elementary
Kelsey Frey – K
Mitchel Nelson – K
Katie Potts – K
Julie Summers – K
Joy Bohringer – 1
Julie Cox – 1
Connie Liddle – 1
Paige Ward – 1
Katherine Brown – 2
Katherine Cochran - 2
Bethany McCandless – 2
Julie Tuck – 2
Judy Dyess – 3
Kim Hall – 3
Paulina Haskins – 3
Cindy Peavy – 3
Meredith Collins – 4
Ashley Margaritis – 4
Loretta Rowan – 4
Jennifer Wilson – 4
Bill Andrews – 5
Suzanne Andrews – 5
Ruthie Gravlee – 5
Alex McCain – 6
Lauren Merrill – 6
Bethany Tompkins – 6
Missy Wright – 6
Suzanne Perkins - Parent
Thea Patrick – Technology Coordinator
Brannon Aaron – Assistant Principal

Mountain Brook Jr. High
Ruth Beenken - English
Andrew Cotton - English
Anne Carter Finch - English
Julie Garret - English
Andrew Grayson - English
Trip Hubbard - English
Anna McCain - English
Mary Phillips - English
Pam Pugh - English
Theresa Shadrix - English
Leslie Stephenson - English
Kimberly Wilder - English
Renee Collingwood - Math
Mary Riley Deer - Math
Nidia Fernandez-Lee - Math
Denise Grisham - Math
Brittany Henegar - Math
Madeline Hunt - Math
Drew Jackson - Math
Adam Johnson - Math
Cathy Laswell - Math
Lars Porter - Math
Wendy Spiller - Math
Priscilla Stokes - Math
Brittany Wilson – Math
Mariya Breaux - Science
Marisa Burns - Science
Susan Haggard - Science
Bruce Henricks - Science
Daniel Sipes - Science
Pearle Smith - Science
Debbie Stump - Science
Vicki Webb - Science
Courtney Burger - Social Studies
Leslie Carlson - Social Studies
D. C. Hall - Social Studies
Paul Hnizdil - Social Studies
Derek Kennedy - Social Studies
Lisa Lewis - Social Studies
Beth Lippeatt - Social Studies
John Pledger - Social Studies
Ben Smith - Social Studies

Tami Genry - Librarian
Suzan Brandt – Technology Coordinator
Brook Gibbons – Assistant Principal
Holly Martin – Staff Development Specialist

Mountain Brook High School
Krissie Allen - English
Melinda Cammarata - English
Nancy Glaub - English
Julie Kash - English
Angela Knox - English
Catherine Lowe - English
Jane Major - English
Shannon Marks - English
Christina McGovern - English
Mattie Newson - English
Jeff Roberts - English
Denise Trimm - English
Summer Upton - English
Greg Wald - English
Wanda Burns - Math
Morgan Chatham - Math
Jacqueline Cotter - Math
Amy Kathryn Gannon - Math
Rhonda Guillory - Math
Nancy Hollis - Math
Paul Kustos - Math
Fred Major - Math
Kristina Noto - Math
Christy Stamps - Math
Casey Truesdale - Math
Lauren Wright – Math
Rhonda Aust - Science
Christi Elias - Science
Lynn Faulk - Science
Toula Froemelt - Science
Barry Hartley - Science
Michelle Holdbrooks - Science
Marcy Jordan - Science
Michael McGovern - Science
Melissa Scott Palmer - Science
Bryan Rosenstiel - Science
Walt Rogers - Science
Ashley Van Beek - Science
Ginny Bakken - Social Studies
Ben Callaway - Social Studies
Jake Collins - Social Studies
Missy Cunningham - Social Studies
Matt Ferguson - Social Studies
Pete Giangrosso - Social Studies
Leah Kilfoyle - Social Studies
Glenn Lamar - Social Studies
Shane Martin - Social Studies
Brock Rotter - Social Studies
Alessia Sartorio - Social Studies
Sherri Traffica - Social Studies
Joe Webb - Social Studies
Holly Alexander – World Languages
John Binet – World Languages
Jessie Creech – World Languages
Heather Fitch – World Languages
Audrey Laird – World Languages
Drew Lasater – World Languages
Lori Leopard – World Languages
Allison Price – World Languages
Crawford Bumgarner – Parent
Joani Kay – Technology Coordinator
Carrie Busby – Assistant Principal

Central Office
Dr. Missy Brooks – Director of Instruction
Lanie Kent – Assistant Director of Instruction
Donna Williamson – Director of Technology

Preface

The *Mountain Brook Digital Literacy and Computer Science Curriculum Framework* was developed using the *Alabama Course of Study: Digital Literacy and Computer Science*. Content standards in this document define minimum requirements, in accordance with provisions of the Code of Alabama (1975, §16-35-4). The standards are fundamental and specific but not exhaustive. This document provides an overview and learning goals for each grade band and outlines minimum standards for each grade.

Alabama Course of Study:
Digital Literacy and Computer Science
General Introduction

Technology allows educators and students to transform teaching and learning and to develop crucial skills for communicating, creating, and interacting with each other in a global society. Although technology is not a panacea for all instructional problems, it equips students with tools that have not existed in the past. Technology allows digitally and computationally literate students to transition from being simply consumers of information and media to being producers as well.

Attaining digital and computational literacy strengthens life skills such as solving problems creatively, thinking critically, and working cooperatively in teams. Because technology is at the center of almost every aspect of daily life, the digitally literate person is more likely to face the challenges of a dynamic global society with confidence.

Digitally literate students can use technology responsibly and appropriately to create, collaborate, think critically, and apply algorithmic processes. They can access and evaluate information to gain lifelong knowledge and skills in all subject areas.

The *Mountain Brook Digital Literacy and Computer Science (DLCS) Curriculum Framework* defines the minimum required content that students should know and be able to do in order to learn effectively and become capable, responsible, and self-reliant citizens in this information-based global society. Content standards in this document are minimum and required, as specified in the Code of Alabama (1975), §16-35-4. They are fundamental but not exhaustive.

This plan draws upon the requirements of nationally recognized programs. The International Society for Technology in Education (ISTE) Standards for Students emphasize the skills and qualities we want to foster in students, enabling them to engage and thrive in a connected, digital world. The Course of Study standards are designed for use by educators across the curriculum at every grade level, so that these skills are cultivated throughout a student's academic career (2016 ISTE Standards for Students). The K-12 Computer Science Framework illuminates the big ideas of computer science through the lenses of concepts (what students should know) and practices (what students should do), representing the behaviors that computationally literate students use to engage with the core concepts of computer science.

The DLCS standards will enable students to employ cognitive and technical skills to find, evaluate, create, and communicate information via existing and emerging technologies. The standards introduce the study of computers and algorithmic processes, including computer science principles, hardware and software designs, applications, networks, and societal impact, and lay the groundwork for students to use their increasingly valuable knowledge and skills in college and careers.

Students will use digital tools to create, communicate, and collaborate. These tools provide powerful, engaging learning experiences which pervade their daily lives and impact the future. Technological understanding prepares students to be productive citizens.

Digital Literacy and Computer Science
Conceptual Framework

Conceptual Framework

The Conceptual Framework graphic exemplifies the purpose of the *Mountain Brook Digital Literacy and Computer Science Curriculum Framework,* which is to enhance students' lives by providing them the knowledge and skills to be innovators and positive contributors to the society in which they live. An Alabama student, a citizen of the world, is depicted as the epicenter from which six strands radiate around the globe. The student's heart is a prominent feature because communication, collaboration, creativity, and critical thinking all require empathy. Empathy begins with understanding the human condition and opening the mind to new perspectives and ideas. Without understanding and openness, progress cannot be made.

Technology has the potential to amplify students' capacity to collaborate, create, and communicate in an increasingly global economy. In order to improve the world, one must understand how technology shapes the landscape and reshapes our institutions at an ever-increasing speed. To employ and produce new technologies, a global citizen not only needs to be proficient in the use of digital tools but must also understand how and why these tools work. Global citizens must utilize technological tools, algorithmic thinking, and digital strategies as means to acquire knowledge, to communicate and collaborate locally and globally, to identify and solve complex problems, and to share solutions and ideas with the world.

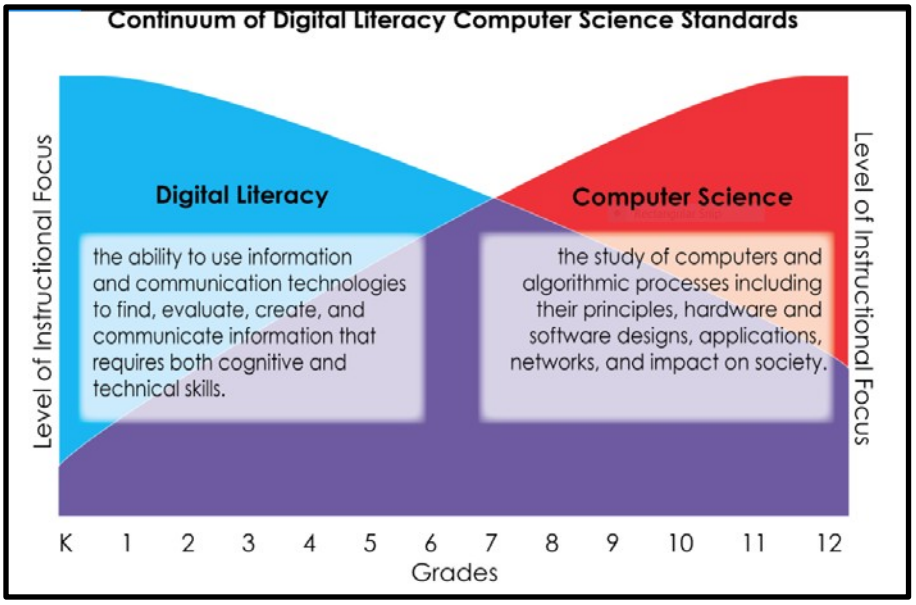
The conceptual framework graphic succinctly summarizes the structure and goals of digital literacy and computer science education in Alabama. The strands emerging from the student to encircle the globe represent digital connection to the world and specify the roles filled by students of today and tomorrow: **Computational Thinker, Citizen of the Digital Culture, Global Collaborator, Computing Analyst,** and **Innovative Designer.** These titles indicate that digital citizens should not merely connect, but responsibly work together to improve the world. The careful observer notices a sixth ribbon, currently unlabeled to indicate that new and emerging technologies will require openness to future changes.

In the background, underpinning the strands, are two elements that are key to their implementation. The map of Alabama is depicted by a circuit board, which represents tangible hardware. The continents on the globe are marked with binary code, the language of software and computer science. Students will not only interact with both of these on a daily basis but also take part in their construction in order to become the innovative citizens the world needs today and tomorrow.

The goal of the Digital Literacy and Computer Science standards is to enable students to use cognitive and technical skills responsibly in finding, evaluating, creating, and communicating information. Standards will also introduce students to the study of computers and algorithmic processes, including computer science principles, hardware and software design, applications, networks, and societal impacts, so that students will be fully equipped with the important, increasingly valuable knowledge and skills needed in college and careers.

Position Statements

A Vision for K-12 Computer Science:



In the early grades, the continuum focuses more on digital literacy, the skills that students must learn with the introduction of computer science standards. In the later grades, the instructional focus transitions toward computer science while continuing to address more advanced digital literacy skills. While both focus areas are present along the entire continuum, this graph represents the transition in the level of instructional focus as students progress along the continuum.

Digital Literacy

A digitally literate student is able to work with digital tools both alone and in networked environments. Students must also have the skills to adapt to new tools throughout their lifetimes as resources and platforms continue to evolve. The operating systems, interfaces, resources, and collaborative technology of today require students to advance with the latest innovations in collaboration and creation as new systems appear.

Computer Science

Computing is essential for today's students to possess the computational thinking skills required for the workforce both now and in the future. A computational mindset helps students engage the digital world in which they live. An understanding of Internet protocols, data representation, and solution-based and algorithmic processes allows students to meet the challenges of computational thinking confidently.

Global Collaboration

Students need opportunities to connect with others locally and globally, giving each the opportunity to learn together, share knowledge, and develop cultural understandings and relationships. Technology is the conduit that provides easy-to-implement experiences and opportunities for teaching and learning. It is imperative that students be provided with opportunities to exercise these skills in an authentic environment without respect to physical boundaries.

Assessment

Students must be digitally competent if they are to be successful in academic, professional, and personal arenas. Their competence must be effectively assessed to guide classroom planning. Digital literacy and computer science cannot be adequately measured using traditional, paper-and-pencil objective tests. These skills are best assessed through problem- and/or project-based assignments, preferably as content-embedded tasks that solve authentic problems.

Directions for Interpreting the Minimum Required Content

1. **Content Standards** are statements that define what students should know and be able to do at the conclusion of a course or grade. Content standards in this document contain minimum required content. The order in which standards are listed within a course or grade is not intended to convey
a sequence for instruction. Each content standard completes the phrase "*Students can*."

> *Students can:*
>
> Create a research-based product collaboratively using online digital tools.
>
> (Grade 1 – Content Standard 13)

2. **Lettered Subtitles** denote content that is related to the standards and required for instruction. Subtitles are listed under standards and identify additional minimum required content.

> *Students can:*
>
> Differentiate between a generalized expression of an algorithm in pseudocode and its concrete implementation in a programming language.
> a. Explain that some algorithms do not lead to exact solutions in a reasonable amount of time and thus approximations are acceptable.
>
> (Grades 9 – 12 – Content Standard 3)

3. **Examples** clarify certain components of content standards and are not required content. They are illustrative but not exhaustive.

> *Students can:*
>
> Explain social engineering, including countermeasures, and its impact on a digital society.
> Examples: Phishing, hoaxes, impersonation, baiting, spoofing.
>
> (Grade 7 – Content Standard 12)

Recurring Standards for the Mountain Brook Digital Literacy and Computer Science Curriculum Framework

Recurring standards are key practices or concepts that recur at grade levels along the K - 12 continuum with progressive complexity. Rather than repeating these standards at multiple grade levels in this document, the standards are outlined below.

Safety, Privacy, and Security

1. Identify, demonstrate, and apply personal safety use of digital devices.

Legal and Ethical Behavior

2. Recognize and demonstrate age-appropriate responsible use of digital devices and resources as outlined in school/district rules.

Impact of Computing

3. Analyze the potential impact of computing.

Systems

4. Identify and employ appropriate troubleshooting techniques used to solve computing or connectivity issues.

Collaborative Research

5. Locate, curate, and evaluate information from digital sources to answer research questions.

Digital Tools

6. Produce, review, and revise authentic artifacts using appropriate digital tools.