Ohio's Learning Standards for Technology

STRAND: Information and Communications Technology
The understanding and application of digital learning tools for accessing, creating, evaluating, applying and communicating ideas and information.

Grade K-2	Grade 3-5	Grade 6-8	Grade 9-12
Topic 1: Identify and use appropriate digital learning tools and resources to accomplish a defined task.			
- Develop basic skills for using digital learning tools and resources to accomplish a defined task. - With guidance, identify a goal and determine how digital learning tools can help accomplish that goal.	- With guidance, identify and use digital learning tools or resources to support planning, implementing and reflecting upon a defined task. - Explain the use of selected digital learning tools and resources to support productivity and learning.	- Develop criteria for selecting digital learning tools and resources to accomplish a defined task. - Select and use digital learning tools or resources to support planning, implementing, and reflecting upon a defined task. - Evaluate the use of digital learning tools and resources to support learning and productivity.	- Develop strategies for using digital learning tools and resources to plan, implement and reflect upon a complex task. - Based on project-specific requirements, develop criteria to select digital learning tools and resources to support the concurrent management of multiple projects. - Analyze and evaluate the ease of use and effectiveness of available features of selected digital learning tools and resources.

STRAND: Information and Communications Technology
The understanding and application of digital learning tools for accessing, creating, evaluating, applying and communicating ideas and information.

Grade K-2	Grade 3-5	Grade 6-8	Grade 9-12
Topic 2: Use digital learning tools and resources to locate, evaluate and use information.			
• Develop basic skills for locating information using digital learning tools and resources. • Identify main ideas and details in information found with digital learning tools and resources.	• Identify questions related to a topic of interest to broaden or narrow the topic as needed. • Use appropriate search techniques to locate needed information using digital learning tools and resources. • Use multiple criteria developed with guidance to differentiate between relevant and irrelevant information found with digital learning tools and resources. • Explain basic ideas of plagiarism and copyright. • Use digital citation tools to cite sources with appropriate guidance.	• Use advanced search techniques to locate needed information using digital learning tools and resources. • Use multiple criteria to evaluate the validity of information found with digital learning tools and resources. • Apply principles of copyright, use digital citation tools and use strategies to avoid plagiarism.	• Use advanced search and filtering techniques to locate needed information using digital learning tools and resources. • Independently construct an evaluative process for information sources chosen for a learning task. • Analyze the complexities and discrepancies found in digital-information to make informed decisions. • Apply principles of copyright, use digital citation tools and use strategies to avoid plagiarism when using the work of others as well as creating personal work.

Ohio | Department of Education

STRAND: Information and Communications Technology
The understanding and application of digital learning tools for accessing, creating, evaluating, applying and communicating ideas and information.

Grade K-2	Grade 3-5	Grade 6-8	Grade 9-12
Topic 3: Use digital learning tools and resources to construct knowledge.			
• Develop basic skills for gathering and organizing information from multiple digital learning tools and resources to build knowledge. • Use visuals found in digital learning tools and resources to clarify and add to knowledge. • Collect, record and organize observations and data during student explorations using digital learning tools and resources. • With guidance, create artifacts using digital learning tools and resources to demonstrate knowledge.	• Gather, organize and summarize information from multiple digital learning tools and resources to build knowledge of a topic. • Interpret images, diagrams, maps, graphs, infographics, videos, animations, interactives, etc. in digital learning tools and resources to clarify and add to knowledge. • Organize observations and data collected during student explorations to determine if patterns are present. • Create artifacts using digital learning tools and resources to demonstrate knowledge.	• Analyze and integrate textual, visual, and quantitative information (images, diagrams, maps, graphs, infographics, videos, animations, interactives, etc.) from multiple digital learning tools and resources. • Analyze data collected or retrieved from a variety of digital learning tools and resources to determine if patterns or trends are present. • Create artifacts using digital learning tools and resources to demonstrate knowledge.	• Synthesize textual, visual, and quantitative research and data (images, diagrams, maps, graphs, infographics, videos, animations, interactives, etc.) from a variety of digital learning tools and resources. • Analyze relationships and forecast outcomes using data collected by students or retrieved from a variety of digital learning tools and resources. • Create artifacts using digital learning tools and resources to demonstrate knowledge.

Ohio | Department of Education

STRAND: Information and Communications Technology
The understanding and application of digital learning tools for accessing, creating, evaluating, applying and communicating ideas and information.

Grade K-2	Grade 3-5	Grade 6-8	Grade 9-12
Topic 4: Use digital learning tools and resources to communicate and disseminate information to multiple audiences.			
• With guidance, discuss and identify communication needs considering the task, situation and information to be shared. • With guidance, use digital learning tools to add audio and/or visual media to clarify information. • With guidance, select appropriate digital learning tools and resources to produce and publish information.	• With guidance, discuss and identify communication needs considering goals, audience and content. • With guidance, select media formats appropriate to content and audience. • Evaluate the features of digital learning tools and resources based on the characteristics of a specific audience. • Produce and publish information appropriate for a target audience using digital learning tools and resources.	• Use digital learning tools and resources to identify communication needs considering goals, audience and content. • Select and use a variety of media formats to communicate information to a target audience. • Discuss and identify ways to communicate and disseminate information so that users with varied needs can access information. • Evaluate the effectiveness of a digital tool to communicate information with multiple audiences.	• Use digital learning tools and resources to identify communication needs considering goals, audience, content, access to tools or devices, timing of communication (time zones), etc. • Based on communication needs, develop, implement and evaluate a communication plan to disseminate information to multiple audiences. • Integrate accessibility principles to effectively communicate to, and meet the needs of, multiple audiences. • Use digital learning tools to represent and model complex systems of information to a target audience.

Ohio | Department of Education

STRAND: Society and Technology
The interconnectedness of technology, self, society and the natural world, specifically addressing the ethical, legal, political and global impact of technology.

Grade K-2	Grade 3-5	Grade 6-8	Grade 9-12
Topic 1: Demonstrate an understanding of technology's impact on the advancement of humanity – economically, environmentally and ethically.			
• Demonstrate appropriate and identify inappropriate uses of technology required to be a responsible user. • Identify positive and negative impacts your use of technology can have on you and your family.	• Demonstrate appropriate use of technology and explain the importance of responsible and ethical technology use. • Identify positive and negative impacts your use of personal technology and technology systems (e.g., agriculture, transportation, energy generation, water treatment) can have on your community. • Describe legal and responsible practices when utilizing technology.	• Advocate and exhibit ethical, legal and responsible practices when utilizing technology. • Explore the advantages and disadvantages of widespread use, accessibility, and reliance on technology in your world. • Review and demonstrate ethical considerations and legal requirements involved in the creation and use of digital technologies. • Analyze an environmental concern and investigate technology solutions to that problem.	• Interpret and practice ethical considerations and legal requirements involved in the creation, and use of digital technologies. • Debate the advantages and disadvantages of widespread use, accessibility, and reliance on technology in your world, in the workplace and in global society. • Select a technology and analyze its global impact across multiple disciplines.

STRAND: Society and Technology
The interconnectedness of technology, self, society and the natural world, specifically addressing the ethical, legal, political and global impact of technology.

Grade K-2	Grade 3-5	Grade 6-8	Grade 9-12
Topic 2: Analyze the impact of communication and collaboration in both digital and physical environments.			
• Communicate and collaborate using several digital methods. • Identify positive and negative ways of collaborating in digital and physical environments. • Investigate how technology does (or does not) impact the way(s) your family communicates.	• Create a plan and select collaboration and/or communication tools to complete a given task. • Exercise digital etiquette when communicating and collaborating. • Identify the positive and negative impact the use of technology can have on relationships, communities and self.	• Critique specific instances of how technology has impacted access to information, communications and collaboration. • Explain the positive and negative impact the use of technology can have on personal, professional and community relationships. • Investigate how social media impacts society and the digital identities of individuals and organizations. • Apply appropriate interactions and digital etiquette in varying contexts, reflecting upon potential impacts in both digital and physical environments.	• Demonstrate and advocate effective collaboration strategies and techniques using technology. • Describe and demonstrate professionalism and civility in communications and collaborative environments. • Analyze how social media impacts society, individuals and organizations. • Manage and adjust appropriate interactions and digital etiquette in varying contexts, in digital, physical and cultural environments.

STRAND: Society and Technology
The interconnectedness of technology, self, society and the natural world, specifically addressing the ethical, legal, political and global impact of technology.

Grade K-2	Grade 3-5	Grade 6-8	Grade 9-12
Topic 3: Explain how technology, society, and the individual impact one another.			
• State the advantages/disadvantages of technology in your life. • Identify examples of how technology innovations/inventions can have multiple applications. • Identify how the use of technology affects self and others in various ways. • Define and discuss digital identity and digital footprints. • Provide examples of how rules for respecting others' belongings apply to digital content and information.	• Describe the advantages/disadvantages of technology (past, present, future) to understand the relationship between technology, society and the individual. • Demonstrate how technology innovations/inventions can have multiple applications. • Identify and discuss how the use of technology affects self and others in various ways. • Identify the components of your digital identity and your digital footprint. • Identify and discuss laws and rules that apply to digital content and information.	• Discuss and define how issues (such as economic, political, scientific and cultural) are influenced by the development and use of technology. • Explain how new technology development is driven by factors such as commercialization, creative/inventive thinking, and cultural/historical influence. • Analyze how technological innovations/inventions can have multiple applications, both intended and unintended. • Describe the impact of an individual's wants, values and interests on the development of new technologies. • Manage components of your digital identity and your digital footprint. • Evaluate current and past revisions to laws, rules and policies as society responds to technological advancements.	• Debate how demand for technology and innovation have reshaped the social, cultural, political and/or economic landscape, citing references and examples. • Discuss how technological innovation has resulted when ideas, knowledge or skills have been shared across multiple fields. • Forecast the need to review, adapt, and innovate laws and policies applied to copyrights, patents, trademarks and speech. • Predict changes in society and intentional and unintentional consequences resulting from continued technological progress and defend the rationale within a given context. • Analyze and influence your digital identity and digital footprint while considering past, present, and future implications.

Ohio | Department of Education

STRAND: Design and Technology
Addresses the nature of technology to develop and improve products and systems over time to meet human/societal needs and wants through design processes.

Grade K-2	Grade 3-5	Grade 6-8	Grade 9-12
Topic 1: Define and describe technology, including its core concepts of systems, resources, requirements, processes, controls, optimization and trade-offs.			
• Identify and discuss differences between the human-designed world and the natural world. • Describe technology as something someone made to meet a want or need. • Explain that systems have parts or components that work together to accomplish a goal. • Give examples of how resources such as tools and materials are things that help people get a job done.	• Demonstrate how applying human knowledge using tools and machines extends human capabilities to meet our needs and wants. • Give examples of how requirements for a product can limit the design possibilities for that product. • Describe a process as a series of actions and how it is used to produce a result. • Identify and describe examples of technology products and processes. • Explain how controls use information to cause systems to change, like a home thermostat turning on the heat based on the low temperature of a room.	• Explore and document how technology can impact efficiency. • Analyze how tools, materials and processes are used to alter the natural and human-designed worlds. • Define and categorize the requirements of a design as either criteria or constraints. • Explain how optimization is the process of making a product as fully functional and effective as possible. • Describe how trade-offs involve a choice of one quality over another. • Give examples of how trade-offs must occur when optimizing a design in order to maintain design requirements.	• Explore and document how systems theory includes the concepts of system dynamics, systems thinking and computational thinking. • Discuss how the design process builds on the core concepts of technology, including the relationship between systems.

Ohio | **Department of Education**

STRAND: Design and Technology
Addresses the nature of technology to develop and improve products and systems over time to meet human/societal needs and wants through design processes.

Grade K-2	Grade 3-5	Grade 6-8	Grade 9-12
Topic 2: Identify a problem and use an engineering design process to solve the problem.			
• Observe and describe details of an object's design. • Demonstrate the ability to follow a simple design process: identify a problem, think about ways to solve the problem, develop possible solutions, and share and evaluate solutions with others. • Explain that the design process is a plan to find solutions to problems. • Demonstrate that there are many possible solutions to a design problem. • Communicate design plans and solutions using drawings and descriptive language.	• Critique needs and opportunities for designing solutions. • Plan and implement a design process: identify a problem, think about ways to solve the problem, develop possible solutions, test and evaluate solution(s), present a possible solution, and redesign to improve the solution. • Generate, develop, and communicate design ideas and decisions using appropriate terms and graphical representations.	• Apply a complete design process to solve an identified individual or community problem: research, develop, test, evaluate and present several possible solutions, and redesign to improve the solution. • Describe how invention is a process of turning ideas and imagination into devices and systems. • Explain how innovation is the process of modifying an existing system or system element(s) to improve it. • Consider multiple factors, including criteria and constraints, (e.g. research, cost, time, materials, feedback, safety, etc.) to justify decisions when developing products and systems to solve problems. • Identify and explain why effective designs develop from non-linear, flexible application of the design process.	• Evaluate a design solution using conceptual, physical, digital and mathematical models at various intervals of the design process in order to check for proper design and note areas where improvements are needed (e.g., check the design solutions against criteria and constraints). • Implement, document and present the design process as applied to a particular product, process or problem.

Ohio | Department of Education

STRAND: Design and Technology
Addresses the nature of technology to develop and improve products and systems over time to meet human/societal needs and wants through design processes.

Grade K-2	Grade 3-5	Grade 6-8	Grade 9-12
Topic 3: Demonstrate that solutions to complex problems require collaboration, interdisciplinary understanding, and systems thinking.			
• Describe how different technologies are used in various fields. • Work as a team to identify possible problems to solve and their potential technological solutions.	• Design a product with multiple components and describe how the components interact to form a system. • Explore and document connections between technology and other fields of study. • Identify a product and describe how people from different disciplines combined their skills in the design and production of the product.	• Collaborate to solve a problem as an interdisciplinary team modeling different roles and functions. • Explain ways that invention and innovation within one field can transfer into other fields of technology. • Evaluate the effectiveness of the group's collaboration during the engineering design process and the contribution of the varying roles. • Give examples of how changes in one part of a system can impact other parts of that system. • Deconstruct a system into its component parts and describe how they interrelate.	• Evaluate a technological problem that has benefited from a multidisciplinary approach. • Locate and evaluate past predictions about the development of technology. • Describe techniques for making decisions about the future development of technology. • Analyze the interactions within systems and between systems. • Apply systems thinking to solve a complex problem.

STRAND: Design and Technology
Addresses the nature of technology to develop and improve products and systems over time to meet human/societal needs and wants through design processes.

Grade K-2	Grade 3-5	Grade 6-8	Grade 9-12
Topic 4: Evaluate designs using functional, aesthetic and creative elements.			
- Identify and discuss the use of aesthetics in everyday objects. - Identify and discuss functional aspects of everyday objects. - Identify and discuss examples of creativity found in everyday objects. - Discuss and give examples of how changes in design can be used to strengthen or improve a product.	- Use criteria developed with guidance to evaluate a new or improved product for its functional, aesthetic and creative elements. - Examine a familiar product or process and suggest improvements to its design.	- Examine the progression of a product to identify how the functional, aesthetic and creative elements were applied. - Analyze environments or products that are examples of the application of the principles of universal or inclusive design. - Apply the design principle "form follows function" to develop a product.	- Evaluate project/product solutions and communicate observations of the entire design process results. - Interpret data/information related to product testing to determine revisions and modifications to a design's function and aesthetics. - Critically evaluate a design solution at multiple points of the design process. Consider design requirements and adjust processes and outcomes as needed. - Explain the interrelationship between technology, creativity and innovation.