

Ohio's Model Curriculum

# Technology Grades 3-5

ADOPTED JULY 2022

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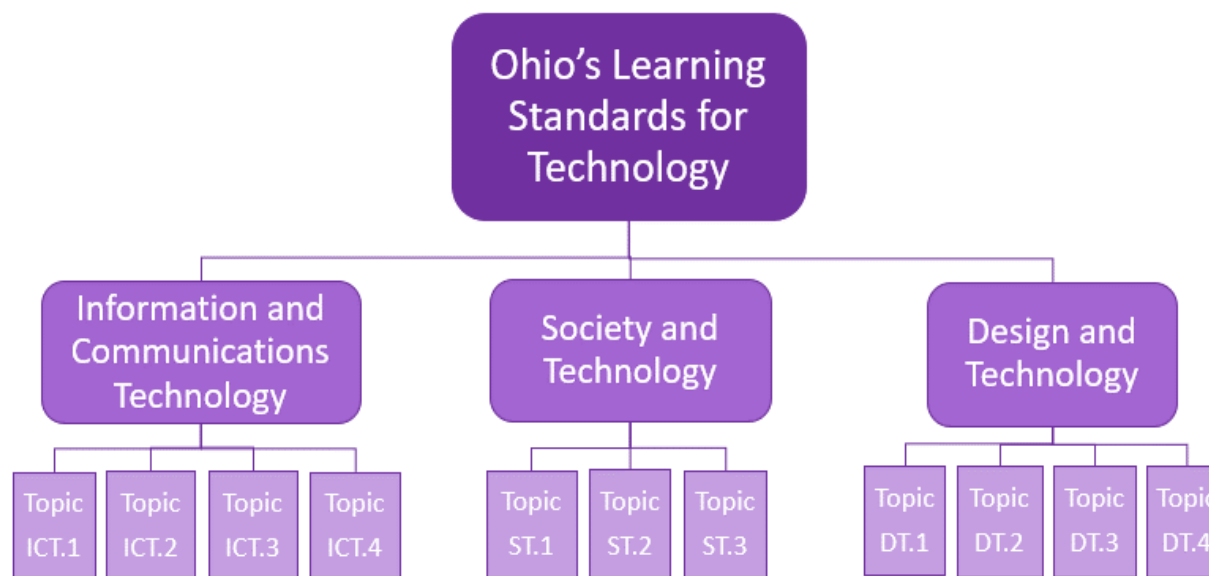
## Organization of Ohio's Model Curriculum for Technology

The organization of Ohio's Model Curriculum for Technology follows the same format as [Ohio's Learning Standards for Technology](#). The Technology Learning Standards and Model Curriculum consist of strands, topics and content statements. Both are organized by grade bands so students at the end of each grade band have acquired the knowledge and skills outlined.

**Strands** are overarching categories and provide three lenses through which kindergarten through grade 12 students consider and engage with technology.

**Topics** organize and focus the instruction. Each strand is broken into several topics. *Topic statements remain consistent from kindergarten through grade 12.*

**Content Statements** further refine the topic statements to define what students should know and be able to do at each grade band. Content statements are organized *by K-2, 3-5, 6-8 and 9-12 grade bands.*



## STRAND AND TOPIC DESCRIPTIONS

Below, are the strand and topic statements for kindergarten through grade 12:

### Information and Communications Technology

The understanding and application of digital learning tools for accessing, creating, evaluating, applying and communicating ideas and information.

Topic 1: Identify and use appropriate digital learning tools and resources to accomplish a defined task.

Topic 2: Use digital learning tools and resources to locate, evaluate and use information.

Topic 3: Use digital learning tools and resources to construct knowledge.

Topic 4: Use digital learning tools and resources to communicate and disseminate information to multiple audiences.

### Society and Technology

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

Topic 1: Demonstrate an understanding of technology's impact on the advancement of humanity – economically, environmentally and ethically.

Topic 2: Analyze the impact of communication and collaboration in both digital and physical environments.

Topic 3: Explain how technology, society and the individual impact one another.

### 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.

Topic 1: Define and describe technology, including its core concepts of systems, resources, requirements, processes, controls, optimization and trade-offs.

Topic 2: Identify a problem and use an engineering design process to solve the problem.

Topic 3: Demonstrate that solutions to complex problems require collaboration, interdisciplinary understanding and systems thinking.

Topic 4: Evaluate designs using functional, aesthetic and creative elements.

## CONTENT STATEMENTS

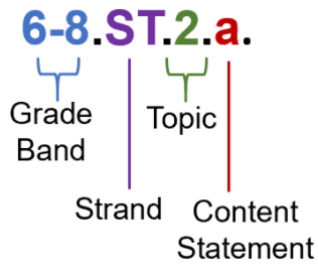
Below, is an example of a content statement for grade band 6-8 with its corresponding content statement code. This content statement addresses Topic 2 within the Society and Technology (ST) Strand.

### SOCIETY AND TECHNOLOGY

Topic 2: Analyze the impact of communication and collaboration in both digital and physical environments.

**6-8.ST.2.a.** Critique specific instances of how technology has impacted access to information, communications and collaboration.

The example below breaks down the content statement code into its components.



*NOTE: The topic statement numbers and content statement letters do not dictate curriculum or teaching methods. For example, while Topic 1 appears before Topic 2 in the standards for a given grade band, teachers do not need to teach Topic 1 before Topic 2. A teacher might prefer to teach Topic 2 before Topic 1 or to highlight connections by teaching Topic 1 and Topic 2 at the same time.*

*The lowercase letters for content statements do not indicate a preferred order. They do not identify relationships between content statements across grade bands. They are included to facilitate discussions, planning and implementation of the standards.*

# Ohio's Model Curriculum & Instructional Supports for Technology

## OVERVIEW OF THE MODEL CURRICULUM COMPONENTS

The model curriculum contains two sections: **Expectations for Learning** and **Content Elaborations**.

### Expectations for Learning

#### LEARNING PROGRESSION

Explains the position of the content statement within its respective learning progression, including previous and future learning

#### IMPORTANT CONCEPTS

Identifies important concepts students should develop

#### KEY SKILLS/PROCEDURES

Identifies key skills and procedures students should know and demonstrate

The information above clarifies the expectations for student learning and guides teachers in developing lessons and assessments, both formative and summative.

### Content Elaborations

#### CLARIFICATIONS

Provides clarification of the content

#### CONTENT FOCUS

Identifies the aspects of the content that teachers should stress with their students

## OVERVIEW OF THE INSTRUCTIONAL SUPPORTS

Instructional supports will offer instructional strategies and resources that target specific content statements. The Department will add instructional supports as they are identified and developed, after careful vetting and review.

These supports will include descriptive examples of instructional strategies. Supports will also identify connections to other content statements in technology, across content areas and to careers to help teachers plan instruction and incorporate technology content into their curricula. Other supports woven throughout will include descriptions of common misconceptions and ways to structure technology experiences that are equitable and accessible to all students.



## Ohio's Model Curriculum for Technology: Career Connections

It is important for students to understand how the knowledge and skills they acquire in school apply to their ultimate career and life goals. Ohio's Model Curriculum for Technology provides examples of Career Connections. These Career Connections are a starting point for teachers to begin drawing connections to careers for students. The Instructional Supports mentioned earlier will continue this work and address Career Connections more fully.

When developing Career Connections, schools and districts may consider using the [Career Connections Framework](#). The framework is a planning tool districts and schools can use to provide students with opportunities to develop a vision and realistic plans for their future. It aligns the many efforts around college and career readiness to support students in becoming productive and engaged citizens. While many of the career connections throughout this model curriculum are designed to help students become aware, explore and plan for specific careers, it is understood that students often will change career pathways of interest over time.

Throughout Ohio's Learning Standards and Model Curriculum for Technology, many of the skills students are beginning to learn and refine can be associated with work environments. *Career Connections in this model curriculum are organized by the Technology Standards Strands, providing one example per grade band for each strand.* In this way, teachers can see how these connections relate to key technological knowledge and skills in each strand and progress by grade band. The Career Connections lend themselves to interdisciplinary connections and students explore careers that go well beyond those involving information technology. Again, these are a suggested starting point for educators and can be modified or expanded.

Career Connections are located in a separate section within those model curriculum entries that contain them.

Strand: Information & Communications Technology	
Topic 3: Use digital learning tools and resources to construct knowledge.	
<p><b>K-2.ICT.3.c.</b> Collect, record and organize observations and data during student explorations using digital learning tools and resources.</p>	<p><b>Expectations for Learning</b></p> <p><b>LEARNING PROGRESSION</b> In grades K-2, students collect, record and organize observations and data during explorations using digital learning tools and resources. In grades 3-5, students will organize observations and data collected during explorations to determine if patterns are present.</p> <p><b>IMPORTANT CONCEPTS</b></p> <ul style="list-style-type: none"> <li>Digital learning tools and resources can be used to collect and record data.</li> <li>Digital learning tools can be used to organize collected data.</li> </ul> <p><b>KEY SKILLS/PROCEDURES</b></p> <ul style="list-style-type: none"> <li>Make and record observations using digital learning tools as appropriate.</li> <li>Collect/gather data using digital tools as appropriate.</li> <li>Organize data using digital tools as appropriate.</li> </ul> <p><b>Content Elaborations</b></p> <p><b>CLARIFICATIONS</b> While conducting hands-on explorations, students can use digital learning tools and resources to track their observations and data. Tools like audio or video recording devices can be used to collect data. Tools like spreadsheets, graphic organizers and charts can be used to organize this collected information.</p> <p><b>CONTENT FOCUS</b> The focus is on students making and recording observations, gathering data and organizing information gathered during explorations using digital learning tools and resources as appropriate.</p> <p><b>Career Connections</b></p> <p><b>CAREER AWARENESS</b> Help students become more aware of the career options available to them. Using digital tools to learn about career options provides an avenue to begin introducing the world of work to students. One way to do this would be to have students watch "ABC Jobs Song for Kids" and identify three to five careers unfamiliar to them. Tools like spreadsheets, graphic organizers and charts can be used to organize collected information. Begin leading discussions on which of these careers use digital tools.</p>

## CAREER CONNECTIONS ACROSS K-12

### Career Awareness - Elementary Grades (K-5)

Students become familiar with careers through learning that connects classroom instruction to future work. Career awareness strategies show students various types of careers and stimulate interest in future work.

**Technology Model Curriculum Example:** Giving elementary students opportunities to learn about work environments and discover unique career opportunities associated with the technology skills they are learning will aid in stimulating student interest in future work. Discussing careers that use digital tools can be an effective way to tie technology to career awareness.

(3-5.ICT.3.c.) Engage students in organizing observations and data collected during student explorations to determine if patterns are present by using a video library such as [Kids Work](#) and having students record whether the career video they have watched is something they would enjoy doing. Ask students to record this information for multiple careers. Have the class

record their thoughts and then use the class data to determine if there is a pattern across the classroom of the careers that students would and would not enjoy.

## **BUILDING SKILLS ALIGNED TO THE OHIOMEANSJOBS-READINESS SEAL**

Career Connections learning strategies are an effective way for students to establish an understanding of and demonstrate the professional skills that will be essential for success in their career and life goals. The professional skills outlined in the [OhioMeansJobs-Readiness Seal](#) can be found across the career connection learning strategies within the model curriculum. These associations will help students make connections to the expected skills and behaviors within

the world of work and can be used to support high school students in meeting the seal requirements.

There are clear associations between Ohio's Learning Standards and Model Curriculum for Technology and the professional skills outlined in the OhioMeansJobs-Readiness Seal. For example, a distinct connection exists between the knowledge and skills in the standards and model curriculum and professional skills involving digital technology where the student has "an in-depth understanding of emerging technology and leverages technology to solve problems, complete tasks and accomplish goals." Additional associations (such as those involving creativity and innovation, teamwork and collaboration and critical thinking and problem-solving) exist through the use of the outlined Career Connections found throughout this model curriculum.



## Grades 3-5 Model Curriculum

### STRAND: INFORMATION AND COMMUNICATIONS TECHNOLOGY

*The understanding and application of digital learning tools for accessing, creating, evaluating, applying and communicating ideas and information.*

#### Topic 1: Identify and use appropriate digital learning tools and resources to accomplish a defined task.

**3-5.ICT.1.a.** With guidance, identify and use digital learning tools or resources to support planning, implementing and reflecting upon a defined task.

#### Expectations for Learning

##### LEARNING PROGRESSION

In grades K-2, students developed basic skills for using digital learning tools and resources to accomplish a defined task. In grades 3-5, students identify and use digital learning tools or resources with guidance to support planning, implementing and reflecting upon a defined task. In grades 6-8, students will independently select and use digital learning tools to support planning, implementing and reflecting upon a defined task.

##### IMPORTANT CONCEPTS

- It is important that an appropriate digital learning tool or resource is chosen for a defined task.
- Digital learning tools can help humans.
- It is important to consider multiple tools because of the wide variety of functions tools may possess.

##### KEY SKILLS/PROCEDURES

- Apply features of different digital learning tools to determine an appropriate digital tool to complete a defined task.

#### Content Elaborations

##### CLARIFICATIONS

Students should understand there may be more than one tool or resource to complete a certain task. They need to be guided to identify, choose and use a variety of digital learning tools to plan, implement and reflect on a task.

For example, when planning a task that requires text, such as writing a letter, students could use a tool that has word processing capabilities (such as spellcheck, thesaurus and speech-to-text) to support planning, implementation and reflection. Speech-to-text features can allow students to concentrate on their ideas, as the tool captures their ideas, and can be particularly helpful in planning or reflecting upon a task. Students can use spellcheck, dictionary or thesaurus capabilities when refining their writing. Journals or blog posts are additional tools that could allow for reflection on a task.

Topic 1: Identify and use appropriate digital learning tools and resources to accomplish a defined task.	
	<p><b>CONTENT FOCUS</b> This content statement focuses on providing a variety of resources or digital learning tools and guiding students to choose one that they feel is appropriate.</p>
<p><b>3-5.ICT.1.b.</b> Explain the use of selected digital learning tools and resources to support productivity and learning.</p>	<p><b>Expectations for Learning</b></p> <p><b>LEARNING PROGRESSION</b> In grades K-2, students learned how to identify a learning goal and determine how digital learning tools could help accomplish that goal with guidance. In grades 3-5, students explain the use of selected digital learning tools and resources to support productivity and learning. In grades 6-8, students will learn how to evaluate digital learning tools and resources to support learning and productivity.</p> <p><b>IMPORTANT CONCEPTS</b></p> <ul style="list-style-type: none"> <li>• It is important to be able to describe why a digital learning tool or resource was chosen.</li> <li>• Choosing the right digital tool for the task helps humans complete a project with efficiency.</li> </ul> <p><b>KEY SKILLS/PROCEDURES</b></p> <ul style="list-style-type: none"> <li>• Justify why a digital learning tool was chosen to complete a task and how the selected tool or resource supports productivity and learning.</li> </ul> <p><b>Content Elaborations</b></p> <p><b>CLARIFICATIONS</b> Students should be able to identify specific tools or resources that could be used to support their own productivity and learning. They should be able to elaborate on their reasons for choosing the specific tools or resources (such as a digital portfolio, word processing, data entry and databases, presentations and digital libraries like INFOhio). For example, a digital portfolio would help productivity by collecting and organizing student artifacts.</p> <p><b>CONTENT FOCUS</b> The focus is on the student explaining his or her choice of a digital learning tool or resource used to complete a task. The explanation should focus on how the selected tool or resource supports the student's productivity and learning.</p>

**Topic 2: Use digital learning tools and resources to locate, evaluate and use information.**

**3-5.ICT.2.a.** Identify questions related to a topic of interest to broaden or narrow the topic as needed.

### Expectations for Learning

#### LEARNING PROGRESSION

In grades K-2, students learned how to identify main ideas and details within digital resources. In grades 3-5, students construct questions to broaden or narrow a topic. In grades 6-8, students will learn advanced search techniques to locate information.

#### IMPORTANT CONCEPTS

- When thinking about a topic to explore, sometimes it is necessary to ask questions to expand or limit the topic.
- Asking questions about a topic helps narrow the focus.

#### KEY SKILLS/PROCEDURES

- Compose and revise questions to narrow or broaden a topic of interest for exploration.

### Content Elaborations

#### CLARIFICATIONS

As students consider ideas for further exploration, they will construct and ask a number of questions to make the overarching research question more or less specific.

#### CONTENT FOCUS

This content statement focuses on the students revising their questions to broaden or narrow the results of their searches. This process should be used to provide more focus to the students' research.

**3-5.ICT.2.b.** Use appropriate search techniques to locate needed information using digital learning tools and resources.

### Expectations for Learning

#### LEARNING PROGRESSION

In grades K-2, students developed basic skills for locating information using digital learning tools and resources. In grades 3-5, students learn appropriate search techniques needed to locate information. In grades 6-8, students will learn advanced search techniques to locate information.

#### IMPORTANT CONCEPTS

- Specific search terms can lead to locating needed information more effectively.

#### KEY SKILLS/PROCEDURES

- Demonstrate appropriate search techniques to obtain appropriate information using a digital learning tool or resource.

Topic 2: Use digital learning tools and resources to locate, evaluate and use information.	
	<p><b>Content Elaborations</b></p> <p><b>CLARIFICATIONS</b> Students will enter specific language when using search engines, online databases, digital card catalogues and websites to find information. For example, students can use keywords from a question to conduct research rather than utilizing the entire question word for word.</p> <p>Students can use phrases in quotation marks or qualifiers like AND and “+” (Boolean Logic) to refine their searches as they locate information. Search techniques also are addressed in Ohio’s Model Curriculum for Computer Science beginning in fourth grade.</p> <p><b>CONTENT FOCUS</b> The focus is on students selecting and using appropriate digital search techniques for their situations or tasks. They may need to narrow or expand their results.</p>
<p><b>3-5.ICT.2.c.</b> Use multiple criteria developed with guidance to differentiate between relevant and irrelevant information found with digital learning tools and resources.</p>	<p><b>Expectations for Learning</b></p> <p><b>LEARNING PROGRESSION</b> In grades K-2, students identified main ideas and details found with digital learning tools and resources. In grades 3-5, students use multiple criteria developed with guidance to differentiate between relevant and irrelevant information found with digital learning tools and resources. In grades 6-8, students will use criteria to evaluate the validity of information found with digital learning tools and resources.</p> <p><b>IMPORTANT CONCEPTS</b></p> <ul style="list-style-type: none"> <li>It is important to analyze search results and the information found for relevance.</li> </ul> <p><b>KEY SKILLS/PROCEDURES</b></p> <ul style="list-style-type: none"> <li>Develop criteria with guidance for determining the relevance of information.</li> <li>Using developed criteria, differentiate between relevant and irrelevant information found with digital learning tools and resources.</li> <li>Justify the importance of analyzing search results for relevancy or irrelevancy using developed criteria.</li> </ul> <p><b>Content Elaborations</b></p> <p><b>CLARIFICATIONS</b> With guidance, students create a set of criteria that provide a process for determining the relevance of information found by using digital learning tools and resources (for example, search engines, news websites, apps and digital libraries such as INFOhio).</p>

Topic 2: Use digital learning tools and resources to locate, evaluate and use information.	
	<p>Possible criteria could include the publication date (depending on the topic) and whether the information located meets the needs of the defined task.</p> <p><b>CONTENT FOCUS</b> The focus is on helping students form criteria for determining the relevancy of information and using the criteria they have developed to differentiate between relevant and irrelevant information found using digital learning tools or resources.</p>
3-5.ICT.2.d. Explain basic ideas of plagiarism and copyright.	<p><b>Expectations for Learning</b></p> <p><b>LEARNING PROGRESSION</b> In grades K-2, students developed the idea that people not only own things, but ideas and content as well. In grades 3-5, students learn basic ideas of plagiarism and copyright. In grades 6-8, students will apply principles of copyright, use digital citation tools and use strategies to avoid plagiarism.</p> <p><b>IMPORTANT CONCEPTS</b></p> <ul style="list-style-type: none"> <li>• Copyright law protects creators of information.</li> <li>• Plagiarism is when one claims others' work or ideas as one's own.</li> <li>• It is important to give credit to the work of others.</li> <li>• There are consequences when people plagiarize or break copyright laws.</li> </ul> <p><b>KEY SKILLS/PROCEDURES</b></p> <ul style="list-style-type: none"> <li>• Explain the importance of following copyright laws and avoiding plagiarism.</li> <li>• Explain possible consequences that could occur if people plagiarize or break copyright laws.</li> </ul> <p><b>Content Elaborations</b></p> <p><b>CLARIFICATIONS</b> Students need to understand the legality of taking someone else's work and claiming it as theirs. Students should be aware of the consequences of plagiarism and copyright issues so they can appropriately research and communicate ideas.</p> <p><b>CONTENT FOCUS</b> The focus is on students identifying the consequences of using someone else's work as their own.</p>

**Topic 2: Use digital learning tools and resources to locate, evaluate and use information.**

**3-5.ICT.2.e.** Use digital citation tools to cite sources with appropriate guidance.

### Expectations for Learning

#### LEARNING PROGRESSION

In grades K-2, students developed the idea that people not only own things, but ideas and content as well. In grades 3-5, students use digital citation tools to cite sources with guidance. In grades 6-8, students will apply principles of copyright, use digital citation tools and use strategies to avoid plagiarism.

#### IMPORTANT CONCEPTS

- There are digital learning tools to help one cite where one obtained information.

#### KEY SKILLS/PROCEDURES

- Use digital citation tools to cite sources using proper formatting.

### Content Elaborations

#### CLARIFICATIONS

Given the understanding of plagiarism and copyright, students need to be shown and then use a citation tool to cite the content and resources they utilized to gather information.

#### CONTENT FOCUS

The focus is on adequately documenting where students obtained their information and images and inputting the source documentation via digital learning tools.

**Topic 3: Use digital learning tools and resources to construct knowledge.**

**3-5.ICT.3.a.** Gather, organize and summarize information from multiple digital learning tools and resources to build knowledge of a topic.

## Expectations for Learning

### LEARNING PROGRESSION

In grades K-2, students learned basic skills for gathering and organizing information from multiple digital sources. In grades 3-5, students gather, organize and summarize information from multiple digital sources. In grades 6-8, students will analyze and integrate textual, visual and quantitative information from multiple digital learning tools and resources.

### IMPORTANT CONCEPTS

- Digital learning tools (such as apps and e-books) and resources (like databases and online encyclopedias) can contain information for building knowledge of a topic.
- Digital tools and resources can be useful when organizing and summarizing information from multiple sources.
- Knowledge of a topic that includes adequate summaries can provide a deeper understanding of a topic.
- Creating a visual representation of knowledge can locate gaps in information to key questions.

### KEY SKILLS/PROCEDURES

- Select digital learning tools and resources to organize and summarize information from multiple sources.
- Determine an organizational method to gather and summarize information from multiple digital resources.
- Build knowledge of a topic by summarizing information across multiple sources.

## Content Elaborations

### CLARIFICATIONS

Information is everywhere. Being able to gather, organize and summarize information from multiple locations to build knowledge is a valuable skill for students to learn. When gathering information on a topic, students should use more than one digital learning tool or resource. Free e-books are available at public and school libraries and through INFOhio.

Students may be accessing information from digital learning tools like apps and e-books or resources like videos, databases and online encyclopedias as they learn more about their world. Digital tools resembling sticky notes or bulletin boards can help students organize the information they gather.

Using an organizational method or strategy, students need to record information gathered and summarized from more than one digital learning tool or resource to answer questions about a topic and organize the information to create a complete repository of knowledge about a topic.



Topic 3: Use digital learning tools and resources to construct knowledge.	
	<p><b>CONTENT FOCUS</b></p> <p>This content statement focuses on the student evaluating digital learning tools and resources then selecting those that contain the content needed to increase their knowledge of the topic of interest. Students also can evaluate digital tools and resources to select and use those that aid in organizing and summarizing information.</p>
<p><b>3-5.ICT.3.b.</b> Interpret images, diagrams, maps, graphs, infographics, videos, animations, interactives, etc., in digital learning tools and resources to clarify and add to knowledge.</p>	<p><b>Expectations for Learning</b></p> <p><b>LEARNING PROGRESSION</b></p> <p>In grades K-2, students used the visuals found in digital learning tools and resources to add knowledge. In grades 3-5, students interpret visual information in digital learning tools to add to knowledge. In grades 6-8, students will analyze and integrate textual, visual and quantitative information from multiple digital learning tools and resources.</p> <p><b>IMPORTANT CONCEPTS</b></p> <ul style="list-style-type: none"> <li>• Visual resources can be used to better understand information.</li> <li>• Information can be communicated visually.</li> <li>• Visual representations provide additional details and information to assist with the interpretation of written text.</li> <li>• People can use digital learning tools and resources to add information to and interpret visual resources.</li> </ul> <p><b>KEY SKILLS/PROCEDURES</b></p> <ul style="list-style-type: none"> <li>• Interpret visual representations or resources to clarify or add new knowledge of a topic.</li> <li>• Deduce information, interpret data and communicate information visually.</li> </ul> <p><b>Content Elaborations</b></p> <p><b>CLARIFICATIONS</b></p> <p>Gleaning information from visual resources, such as pictures, graphs, data charts and visual advertisements, in digital learning tools and resources can help students gain a better understanding of information and add to their knowledge base. To understand the information found in these visual resources, students need to deduce information, interpret data and communicate information.</p> <p>Visual resources may be found in digital tools like e-books and apps or in resources like online videos, encyclopedias or databases. Free e-books are available at public and school libraries and through INFOhio.</p> <p>Students need to communicate what they learned from information in a visual resource as well as be able to represent information visually. Students can use digital tools to assist when interpreting visual resources.</p>

Topic 3: Use digital learning tools and resources to construct knowledge.	
	<p>Drawing apps can add labels or text to an image to show important aspects or features. Students can show understanding by using presentation software to add a voice-over explanation to images.</p> <p>For example, given a visual advertisement, students should be able to determine the company and its product.</p> <p><b>CONTENT FOCUS</b></p> <p>The focus is on students interpreting visual resources to add additional information or clarify existing knowledge.</p>
<p><b>3-5.ICT.3.c.</b> Organize observations and data collected during student explorations to determine if patterns are present.</p>	<p><b>Expectations for Learning</b></p> <p><b>LEARNING PROGRESSION</b></p> <p>In grades K-2, students used digital learning tools to collect, record and organize observations and data during exploration. In grades 3-5, students organize observations and data collected during student explorations to determine if patterns are present. In grades 6-8, students will analyze data collected or retrieved from a variety of digital learning tools and resources to determine if patterns or trends are present.</p> <p><b>IMPORTANT CONCEPTS</b></p> <ul style="list-style-type: none"> <li>• Digital learning tools and resources can be used to collect data.</li> <li>• Digital tools can be used to organize data and observations.</li> <li>• Once information is collected, data and observations need to be organized to determine if patterns are present.</li> <li>• Identified patterns can provide clarifying information about knowledge of a topic.</li> </ul> <p><b>KEY SKILLS/PROCEDURES</b></p> <ul style="list-style-type: none"> <li>• Make observations and collect and assemble data to determine if patterns are present.</li> </ul> <p><b>Content Elaborations</b></p> <p><b>CLARIFICATIONS</b></p> <p>Databases containing primary sources (such as records of events as they are first described) and secondary sources (such as records written after the events have taken place by people who were not present at the events) can be sources of content for students to explore and make observations. Mind maps are one tool students can use to organize their observations, look for common themes, determine if patterns are present or see if there are changes over time.</p>

Topic 3: Use digital learning tools and resources to construct knowledge.	
	<p>Digital notebooks, journals or portfolios can be used to collect observations and data during students' scientific investigations. They can use survey tools or forms to create and collect information and use tables, spreadsheets, graphs and charts to visually depict patterns in the data they collect. Allow time for students to critically examine and construct notes during explorations to determine if patterns are present.</p> <p><b>CONTENT FOCUS</b> The focus is on students determining if patterns exist in the data collected during student observations and then identifying those patterns to determine if the patterns relate to or add to their knowledge of a topic.</p> <p><b>Career Connections</b></p> <p><b>CAREER AWARENESS</b> Using a video library such as <a href="#">Kids Work</a>, have students record whether or not the career video they have watched is something they would enjoy doing. Ask students to record this information for multiple careers. Consider having students film their own “reaction videos” to the career videos. Have students record their thoughts and then use the class data to determine if there is a pattern in the careers that students would and would not enjoy. Teachers can identify outliers in the data and communicate positive aspects of those career options as well. Students choose a digital method to communicate patterns in class career interests overall.</p>
3-5.ICT.3.d. Create artifacts using digital learning tools and resources to demonstrate knowledge.	<p><b>Expectations for Learning</b></p> <p><b>LEARNING PROGRESSION</b> In grades K-2, students created artifacts with guidance using digital learning tools and resources to demonstrate knowledge. In grades 3-12, students will create artifacts using digital learning tools and resources to demonstrate knowledge. Since this content statement is present in multiple grade bands, student artifacts will vary based on grade-level content. Artifacts should progress in complexity, variety and sophistication as students reach each grade band.</p> <p><b>IMPORTANT CONCEPTS</b></p> <ul style="list-style-type: none"> <li>• People can use digital learning tools and resources to create products that communicate knowledge.</li> </ul> <p><b>KEY SKILLS/PROCEDURES</b></p> <ul style="list-style-type: none"> <li>• Construct digital artifacts to demonstrate knowledge.</li> <li>• Create an artifact using digital learning tools and resources.</li> </ul>

**Topic 3: Use digital learning tools and resources to construct knowledge.****Content Elaborations****CLARIFICATIONS**

Digital learning tools and resources can provide content for students to incorporate into the artifacts and products they create to demonstrate their content knowledge. These tools and resources also can be used as students build, develop and create the artifacts. Artifacts could include videos, annotated images, graphs or charts, video games, diagrams or pictures with a voice-over explanation or any demonstration of student knowledge.

For example, students can create visual brochures using the research they conducted on their chosen countries in social studies class. Students could create their own ABC-style e-books to demonstrate their knowledge of producers, consumers and decomposers using appropriate English language arts conventions while using other ABC-style books as anchor texts. Students could take pictures using digital cameras or create their own artwork drawings (or in collaboration with the fine arts teacher) to add original artwork to their e-books.

**CONTENT FOCUS**

The focus is on students using digital learning tools and resources to create products that demonstrate their knowledge.

**Topic 4: Use digital learning tools and resources to communicate and disseminate information to multiple audiences.**

**3-5.ICT.4.a.** With guidance, discuss and identify communication needs considering goals, audience and content.

## Expectations for Learning

### LEARNING PROGRESSION

In grades K-2, students discussed and identified communication needs with guidance considering their tasks, information and situations. In grades 3-5, students discuss and identify communication needs for a task considering their goals, audience and content with guidance. In grades 6-8, students will independently identify communication needs, considering goals, audience and content using digital learning tools and resources.

### IMPORTANT CONCEPTS

- Identifying communication needs is a first step in making a plan to publish information.
- There are many details to consider to provide the appropriate information to meet the desired outcome and delivery for a specific audience.

### KEY SKILLS/PROCEDURES

- Determine the communication goals (such as to inform parents, share student work, demonstrate content knowledge or call to action).
- Determine the content to include in the communication to meet a certain goal (for example, text, videos, pictures and audio).
- Consider the audience as it relates to the goals (such as students, parents, teachers, community members and visitors to a district website).

## Content Elaborations

### CLARIFICATIONS

Digital learning tools can be used to communicate ideas and information to audiences. Before disseminating information to an audience, students need to identify their communication goals, consider the content they want to share and determine the audience. Students should think about the purpose of various products, such as digital flyers, podcasts and websites.

With help from teachers and peers, students will identify their communication needs and begin to form a plan to produce and publish information.

This content statement is one of four content statements, 3-5.ICT.4.a.-4.d., that together guide students in planning, producing and publishing an artifact.

*Note: Ohio's Learning Standards for English Language Arts introduce the consideration of "audience" in the Production and Distribution Writing Strand beginning in grade 4.*

Topic 4: Use digital learning tools and resources to communicate and disseminate information to multiple audiences.	
	<p><b>CONTENT FOCUS</b> This content statement focuses on students identifying communication needs that consider student goals and the content to be shared for a selected audience.</p>
<p><b>3-5.ICT.4.b.</b> With guidance, select media formats appropriate to content and audience.</p>	<p><b>Expectations for Learning</b></p> <p><b>LEARNING PROGRESSION</b> In grades K-2, students used digital learning tools with guidance to add audio and/or visual media to clarify information. In grades 3-5, students select with guidance media formats appropriate to the content and audience. In grades 6-8, students will independently select and use a variety of media formats to communicate information to a target audience.</p> <p><b>IMPORTANT CONCEPTS</b></p> <ul style="list-style-type: none"> <li>• It is important to select media formats that are appropriate and provide necessary details of the content.</li> <li>• Knowing which media format to use for audiences is an important part of meeting the audience's need.</li> </ul> <p><b>KEY SKILLS/PROCEDURES</b></p> <ul style="list-style-type: none"> <li>• Determine which media formats to use for specific content types and audiences.</li> </ul> <p><b>Content Elaborations</b></p> <p><b>CLARIFICATIONS</b> Communication can occur in person or online, in real time or asynchronously, between individuals, groups or worldwide. Selecting the media format that will be used to communicate and disseminate information depends on both its content and audience. Students consider the audience's needs and how information would best be presented (such as through a podcast, audio/video, graphic design, an interactive presentation or blog that can be presented to peers, educators, the local community, the administration or global audiences).</p> <p>For example, a third grade class could collaboratively create an e-book including text, pictures of drawings or diagrams, audio explanations and graphs to explain how they had different approaches in solving the same math problem. An audio/visual presentation may be best for an audience of elderly adults rather than just a podcast. Another option could be for students to use graphic design and interactive presentations for younger students still learning to read.</p>

Topic 4: Use digital learning tools and resources to communicate and disseminate information to multiple audiences.	
	<p>Students select media formats and continue to create their plans to produce and publish information. This content statement is one of four content statements, 3-5.ICT.4.a.-4.d., that together guide students in planning, producing and publishing an artifact.</p> <p><i>Note: Ohio's Learning Standards for English Language Arts introduce the consideration of "audience" in the Production and Distribution Writing Strand beginning in grade 4.</i></p> <p><b>CONTENT FOCUS</b></p> <p>The focus is on students selecting media formats after considering the content they are sharing and their audience while keeping in mind the differences between and uses of different media formats.</p>
<p><b>3-5.ICT.4.c.</b> Evaluate the features of digital learning tools and resources based on the characteristics of a specific audience.</p>	<p><b>Expectations for Learning</b></p> <p><b>LEARNING PROGRESSION</b></p> <p>In grades K-2, students selected appropriate digital learning tools and resources to produce and publish information with guidance. In grades 3-5, students evaluate the features of digital learning tools and resources based on the characteristics of a specific audience. In grades 6-8, students will discuss and identify ways to communicate and disseminate information so that users with varied needs can access information. Students also will evaluate the effectiveness of a digital tool to communicate information with multiple audiences.</p> <p><b>IMPORTANT CONCEPTS</b></p> <ul style="list-style-type: none"> <li>• Not all digital resources meet the needs of the audience.</li> <li>• Some digital learning tools have features that better communicate certain content to specific groups of people.</li> <li>• Evaluating different digital tools is an important part of decision-making to ensure communication is effective and engaging.</li> </ul> <p><b>KEY SKILLS/PROCEDURES</b></p> <ul style="list-style-type: none"> <li>• Identify characteristics of an intended audience to consider when evaluating digital learning tools and resources (for example, language spoken and accessibility needs).</li> <li>• Determine the features of different digital learning tools and resources to provide better communication support to a particular audience.</li> </ul>



**Topic 4: Use digital learning tools and resources to communicate and disseminate information to multiple audiences.****Content Elaborations****CLARIFICATIONS**

After students have selected the media format and specific audience, they need to consider what features the digital learning tools and resources they want to use will need to have. Will they need photo editing tools? Will they need to record audio or video? Where will the publication be shared and who will be able to access it?

Students determine criteria, evaluate different options, then select appropriate digital tools and resources to disseminate information to that audience. Students need to understand their audience, what they want to communicate and the most effective tool to do so.

The evaluation and selection of digital tools and resources continue the plan students create to produce and publish information. This content statement is one of four content statements, 3-5.ICT.4.a.-4.d., that together guide students in planning, producing and publishing an artifact.

*Note: Ohio's Learning Standards for English Language Arts introduce the consideration of "audience" in the Production and Distribution Writing Strand beginning in grade 4.*

**CONTENT FOCUS**

The focus is on comparing the features of digital learning tools to meet the needs of a specific audience, such as the ability to edit content, alter display settings, use audio description or have access to subtitle features for presentation software.

**3-5.ICT.4.d.** Produce and publish information appropriate for a target audience using digital learning tools and resources.

**Expectations for Learning****LEARNING PROGRESSION**

In grades K-2, students selected digital learning tools and resources to publish information with guidance. In grades 3-5, students produce and publish information appropriate for a target audience using digital learning tools and resources. In grades 6-8, students will publish information and evaluate the effectiveness of a digital tool to communicate information with multiple audiences.

**IMPORTANT CONCEPTS**

- Producing and publishing information requires a plan.
- Digital learning tools can be used to produce content and present information to many different audiences.
- It is important to choose a medium to present information clearly.

**Topic 4: Use digital learning tools and resources to communicate and disseminate information to multiple audiences.****KEY SKILLS/PROCEDURES**

- Produce content that meets communication goals.
- Produce content in a format using digital learning tools that meet the audience's need.
- Publish the information, communication or publication.

**Content Elaborations****CLARIFICATIONS**

Students use the information gathered in understanding who their audience is to make important decisions, such as how formal or informal they can make their presentation. Using digital learning tools and resources, they can disseminate information to their target audience. For example, students presenting to educators should not use texting language and emojis.

This content statement is one of four content statements, 3-5.ICT.4.a.-4.d., that together guide students in planning, producing and publishing an artifact.

*Note: Ohio's Learning Standards for English Language Arts introduce the consideration of "audience" in the Production and Distribution Writing Strand beginning in grade 4.*

**CONTENT FOCUS**

The focus is on students using selected digital learning tools and resources to produce and publish information with consideration to their target audience.

**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.*

**Topic 1: Demonstrate an understanding of technology's impact on the advancement of humanity – economically, environmentally and ethically.**

**3-5.ST.1.a.** Demonstrate appropriate use of technology and explain the importance of responsible and ethical technology use.

### Expectations for Learning

#### LEARNING PROGRESSION

In grades K-2, students demonstrated appropriate uses of technology and identified inappropriate uses of technology as part of being a responsible technology user. In grades 3-5, students demonstrate appropriate uses of technology and explain the importance of responsible and ethical technology use. In grades 6-8, students will advocate for and exhibit ethical, legal and responsible practices when utilizing technology.

#### IMPORTANT CONCEPTS

- Technology should be used in a way that does not harm or impact others negatively.
- Technology should be used in a positive and ethical way to research, create and communicate.

#### KEY SKILLS/PROCEDURES

- Define the phrase "appropriate use of technology."
- Demonstrate examples of appropriate and responsible uses of technology.
- Communicate examples of inappropriate, unethical or irresponsible uses of technology.

### Content Elaborations

#### CLARIFICATIONS

Technology should be used responsibly. Technology includes processes, ideas, infrastructure, products, materials, tools and knowledge.

Giving credit to creators of content is an important part of ethical technology use. For example, when using a picture of a tornado for a report, students find the content owner or creator of the photo and properly credit that photo within the report.

An example of an inappropriate use of technology could be putting a second rider on a bicycle built for one person. This can be dangerous for the riders and also can break the bicycle.

#### CONTENT FOCUS

This content statement focuses on the appropriate use of technology and understanding why it is important to use technology responsibly and ethically. Students apply their understanding by demonstrating appropriate use and providing examples of responsible uses of technology.

**Topic 1: Demonstrate an understanding of technology's impact on the advancement of humanity – economically, environmentally and ethically.**

**3-5.ST.1.b.** Identify positive and negative impacts one's use of personal technology and technology systems (e.g., agriculture, transportation, energy generation, water treatment) can have on one's community.

## **Expectations for Learning**

### **LEARNING PROGRESSION**

In grades K-2, students identified positive and negative impacts their use of technology can have on themselves and their families. In grades 3-5, students identify positive and negative impacts their use of technology can have on their communities. In grades 6-8, students will explore advantages and disadvantages of widespread use, accessibility and reliance on technology in the world.

### **IMPORTANT CONCEPTS**

- While technology and technology systems may help humans do their work more easily, there may be positive and negative outcomes.
- What people do impacts more than just themselves. Their actions can affect their local communities.

### **KEY SKILLS/PROCEDURES**

- Identify positive and negative impacts of one's use of technologies and systems on one's community.

## **Content Elaborations**

### **CLARIFICATIONS**

Given a technological device or system, students should be able to identify the positive and negative impacts on the community. Students should consider the unintended consequences of technological advancement.

An example of this would be students identifying that agriculture produces food for communities, both near and far. However, runoff from animal manure or pesticides used could pollute area streams. Students also could investigate how farming has changed throughout history and how those changes could have impacted the farmers and their communities. Students could consider how the transition from using horses and steel plows to today's tractors and combines may have altered factors such as the speed, cost and productivity of farming.

Another example would be how cellphones offer quick, easy access to information and communication but also can distract users from important tasks like driving their cars.

Thinking beyond oneself is an important skill in becoming a good global citizen. Students should consider how technology has the potential to help or hurt individuals in their daily lives (for example, in terms of the community, economics, the environment and family dynamics).

**Topic 1: Demonstrate an understanding of technology's impact on the advancement of humanity – economically, environmentally and ethically.**

	<p><b>CONTENT FOCUS</b></p> <p>The focus is on the positive and negative impacts one's use of technology has on one's community. Students should be able to identify these effects on a given situation, understanding that what one does impacts more than just oneself.</p>
<p><b>3-5.ST.1.c.</b> Describe legal and responsible practices when utilizing technology.</p>	<p><b>Expectations for Learning</b></p> <p><b>LEARNING PROGRESSION</b></p> <p>In grades K-2, students were introduced to responsible technology usage. In grades 3-5, students explain how to use technology legally and responsibly. In grades 6-8, students will advocate and exhibit ethical, legal and responsible technology use and further investigate how these practices apply to creating and using digital technologies.</p> <p><b>IMPORTANT CONCEPTS</b></p> <ul style="list-style-type: none"> <li>• Technology can be used in ways that can result in negative and positive consequences.</li> <li>• One should use technology in ways that are legal and responsible.</li> </ul> <p><b>KEY SKILLS/PROCEDURES</b></p> <ul style="list-style-type: none"> <li>• Describe real-life examples of technology use – the positive and negative impacts – and how they relate to responsible technology practices.</li> <li>• Describe real-life examples of technology use – the positive and negative impacts – and how they relate to legal technology practices.</li> </ul> <p><b>Content Elaborations</b></p> <p><b>CLARIFICATIONS</b></p> <p>Technology should be used in responsible and legal ways. Remember that technology includes processes, ideas, infrastructure, products, materials, tools and knowledge, so the scenarios and practices students describe can include examples of many types of technology.</p> <p>For example, students can discuss responsible uses of digital cameras, including asking people's permission before taking their pictures and showing them the picture to make sure they approve of the image. However, taking a picture of a test and posting it to social media is not a responsible use. Sending inappropriate pictures through digital communication tools can be illegal.</p> <p>Another example considers ways people obtain rare earth minerals and other resources for use in the production of technology. Students could examine how the local people and environment are or are not protected (economically, ethically or environmentally, as grade-level appropriate).</p>

**Topic 1: Demonstrate an understanding of technology's impact on the advancement of humanity – economically, environmentally and ethically.**

**CONTENT FOCUS**

Use real-life examples regarding how the use of technology has impacted our environmental, social, economic and personal issues (for example, legal repercussions) in both positive and negative ways.

**Topic 2: Analyze the impact of communication and collaboration in both digital and physical environments.**

**3-5.ST.2.a.** Create a plan and select collaboration and/or communication tools to complete a given task.

### Expectations for Learning

#### LEARNING PROGRESSION

In grades K-2, students demonstrated their understanding of digital tools when used collaboratively. Students also communicated using a variety of digital methods. In grades 3-5, students create plans and select collaboration and/or communication tools to complete a given task. In grades 6-8, students will critique specific instances of how technology has impacted access to information, communications and collaboration.

#### IMPORTANT CONCEPTS

- Creating a plan helps determine what steps are required and which tools are needed to complete a task.
- Digital tools can enhance communication and collaboration efforts.
- Developing criteria based on the task requirements and then using those criteria to select digital communication and collaboration tools results in a better match between tool and task.

#### KEY SKILLS/PROCEDURES

- Develop a plan for completing a given task using the specifications of that task.
- Produce criteria to select and use a tool for collaboration and communication to complete a given task.

### Content Elaborations

#### CLARIFICATIONS

Students determine the specifications of a given task and create a plan to complete the task. This includes a focus on using tools to communicate and collaborate in digital and physical spaces. When communicating and/or collaborating, students develop criteria for selecting appropriate tools. The criteria students develop need to address communication goals, content and audience. For example:

- Are students sending text, pictures, videos or files that are very large?
- Do students need to communicate in real time or will asynchronous communication work?
- If real-time communication is needed, will voice-only work or do they need video too?
- Will they need to simultaneously see someone's slideshow using a shared desktop or use tools like a shared whiteboard to draw on the slides?



**Topic 2: Analyze the impact of communication and collaboration in both digital and physical environments.**

Collaboration could include working as an in-class group on a task or could involve working with others outside of their class meeting time (for example, a different class with the same teacher) or outside of their building (such as a different building in the district or with peers in a different district, city or state). Students also may be collaborating with content experts like scientists, city planners, museum staff, university partners, state agencies or other resources.

**CONTENT FOCUS**

This content statement focuses on students creating a plan based on the specifications of the task and then determining and selecting appropriate tools for communication and collaboration.

**Career Connections****CAREER AWARENESS**

Students work in small groups to identify and plan a “career awareness interview” with a professional in their community. Consider professionals who represent diverse groups and populations when inviting professionals to share their work experiences with students.

Work with the student groups to help them develop and finalize plans for how they will conduct their interviews. Student plans can outline:

- What methods students within a group will use to communicate during the interview planning process, including the digital tools necessary;
- Which tools will be necessary for securing the interview with the professional;
- What materials and digital tools are needed to conduct the interview with the professional; and
- How group members will evaluate and summarize the interview they conducted.

Conduct a classroom discussion on the digital tools used throughout the planning and implementing of the interviews. Students reflect on which tools were most effective for the particular tasks performed.

**3-5.ST.2.b.** Exercise digital etiquette when communicating and collaborating.

**Expectations for Learning****LEARNING PROGRESSION**

In grades K-2, students understood positive and negative ways to interact with their peers in digital and physical environments. In grades 3-5, students practice positive behaviors while communicating and collaborating with their peers. In grades 6-8, students will explain how technology can have both positive and negative impacts on personal, professional and community relationships. Students also will apply digital etiquette appropriate to varying contexts, reflecting on the impact of their actions in both digital and physical environments.

Topic 2: Analyze the impact of communication and collaboration in both digital and physical environments.	
	<p><b>IMPORTANT CONCEPTS</b></p> <ul style="list-style-type: none"> <li>There are appropriate ways to communicate and collaborate in both digital and physical environments.</li> </ul> <p><b>KEY SKILLS/PROCEDURES</b></p> <ul style="list-style-type: none"> <li>Demonstrate appropriate digital etiquette when collaborating and communicating with others.</li> </ul> <p><b>Content Elaborations</b></p> <p><b>CLARIFICATIONS</b></p> <p>Many students need to know the difference between casual communication and communication used in more formal settings such as academia and business (for example, knowing when it is appropriate to use emoticons). Also, students need a clear understanding of expectations for working as a member of a team; this is true in digital and physical environments.</p> <p><b>CONTENT FOCUS</b></p> <p>Teachers demonstrate, guide and assist students in the practice of appropriate behavior while students actively communicate and collaborate with each other in digital and physical environments.</p>
<p><b>3-5.ST.2.c.</b> Identify the positive and negative impact the use of technology can have on relationships, communities and self.</p>	<p><b>Expectations for Learning</b></p> <p><b>LEARNING PROGRESSION</b></p> <p>In grades K-2, students investigated how technology impacts the ways families communicate. In grades 3-5, students identify both the positive and negative impacts of technology use on relationships, communities and self. In grades 6-8, students will explain how technology can have both positive and negative impacts on personal, professional and community relationships. Students also will investigate how social media impacts society and the digital identities of individuals and organizations.</p> <p><b>IMPORTANT CONCEPTS</b></p> <ul style="list-style-type: none"> <li>Technology has both positive and negative impacts on communication and collaboration within and among communities.</li> <li>Technology can have both positive and negative impacts on communication and collaboration in relationships.</li> <li>Technology can have both positive and negative impacts on communication and collaboration that have consequences to oneself.</li> </ul>

**Topic 2: Analyze the impact of communication and collaboration in both digital and physical environments.****KEY SKILLS/PROCEDURES**

- Identify how the use of technology when communicating and/or collaborating can have both positive and negative impacts on relationships, communities (such as neighborhoods, churches and schools) and individuals.

**Content Elaborations****CLARIFICATIONS**

Technology provides convenient and immediate access to information, communication and collaboration tools, as well as the ability to interact with individuals around the world. Although many benefits can be derived from these technological advancements, students should be aware of the potential negative consequences.

Consider providing activities that will elicit an understanding of methods of communication and collaboration and how pictures and words can be used to help or hurt.

Cyberbullying would be considered one possible negative impact. The ability to video chat with grandparents across the country or world could be a positive result of technological advancement.

**CONTENT FOCUS**

The focus is on student exploration of examples of how technology has and can impact relationships, both positively and negatively.

**Topic 3: Explain how technology, society and the individual impact one another.**

**3-5.ST.3.a.** Describe the advantages and disadvantages of technology (past, present, future) to understand the relationship between technology, society and the individual.

## **Expectations for Learning**

### **LEARNING PROGRESSION**

In grades K-2, students recognized the benefits and drawbacks of technology in their lives. In grades 3-5, students describe the advantages and disadvantages of technology to understand the relationship between technology, society and the individual. In grades 6-8, students will discuss how the development and use of technology has influenced societal issues and how society and the individual impact the development of new technologies.

### **IMPORTANT CONCEPTS**

- There are technological advancements that positively and negatively impact society and the individual.
- Society and individuals impact technology, both positively and negatively.

### **KEY SKILLS/PROCEDURES**

- Identify and explain the positive and negative impacts technological advancements can have on society and individuals.
- Identify and explain how societies and individuals impact technology, both positively and negatively.

## **Content Elaborations**

### **CLARIFICATIONS**

Students may understand there are processes of turning ideas into objects (for example, a pair of glasses) but do not always associate those with technology. Students need to recognize there are technologies (knowledge, artifacts, infrastructure, tools, materials, processes and products) that were developed in the past that were revised and improved for a present need or want. These innovations could then take on other forms in the future. Students should be able to identify disadvantages or advantages of technologies on themselves and society.

An example could be primary source documents that showcase the changes in roads over the span of 200 years. Students could analyze data showing changes in wildlife in surrounding areas during the same time.

### **CONTENT FOCUS**

This content statement focuses on students identifying technological inventions or innovations and the different advantages or disadvantages of a technology on society and individuals, as well as how society impacts that technology.

**Topic 3: Explain how technology, society and the individual impact one another.**

**3-5.ST.3.b.** Demonstrate how technology innovations/inventions can have multiple applications.

### Expectations for Learning

#### LEARNING PROGRESSION

In grades K-2, students identified how technology innovations/inventions can have multiple applications. In grades 3-5, students demonstrate how technology innovations/inventions can have multiple applications. In grades 6-8, students will analyze how technological innovations and inventions can have multiple applications, both intended and unintended.

#### IMPORTANT CONCEPTS

- Inventions and innovations are not singular in use.
- Technology can be used in a variety of ways.

#### KEY SKILLS/PROCEDURES

- Demonstrate a variety of ways a technology invention or innovation can be applied for other purposes.

### Content Elaborations

#### CLARIFICATIONS

Students often see technological inventions or innovations in isolation. They need to be able to view those technologies in relation to their other possible functions. They also need to understand the process of turning ideas into devices and systems (an invention) and modifying existing systems for improvement (an innovation).

For example, Velcro™ is used by astronauts in space suits who have limited dexterity due to their bulky gloves. Velcro™ also is used on shoes for individuals with limited dexterity, such as young children and older adults.

#### CONTENT FOCUS

The focus is on students recognizing that inventions and innovations can have more than one purpose. Encourage students to think creatively about how a technology could be used in another way or for another purpose.

**Topic 3: Explain how technology, society and the individual impact one another.**

**3-5.ST.3.c.** Identify and discuss how the use of technology affects self and others in various ways.

### Expectations for Learning

#### LEARNING PROGRESSION

In grades K-2, students identified how technology use impacts self and others in a variety of ways. In grades 3-5, students identify and discuss how the use of technology can impact themselves and others. In grades 6-8, students will identify how technological innovations and inventions can have multiple applications, both intended and unintended. Students also will continue their examination of the relationship between technology, society and the individual in terms of the influence of technology development on societal issues and impacts of the individual on technology development.

#### IMPORTANT CONCEPTS

- Personal use of technology can have impacts on self and others.
- Using technology can affect people's behaviors, actions or feelings in positive, negative or neutral ways.

#### KEY SKILLS/PROCEDURES

- Describe the ways personal technology affects self and others.
- Identify how the use of knowledge, artifacts, infrastructure, tools, materials, processes and products can impact people.

### Content Elaborations

#### CLARIFICATIONS

Students use technology daily and often do not realize how their own personal use of technology can impact themselves and others. Students need to be able to identify how the use of technology (knowledge, artifacts, infrastructure, tools, materials, processes and products) affects themselves and others.

For example, the invention of the light bulb has allowed people to work longer hours by extending the day. Light bulbs produce more light than candles and could extend the day beyond daylight hours more effectively than candles did. This also can have an effect on people's sleeping habits. Instead of waking up when the sun rises and going to bed when it sets, people are able to wake earlier and stay up later.

#### CONTENT FOCUS

The focus is on students identifying that what they do while using technology can help or harm themselves and others. As students use technology, they need to consider the possible impacts of that technology.

**Topic 3: Explain how technology, society and the individual impact one another.**

**3-5.ST.3.d.** Identify the components of one's digital identity and one's digital footprint.

### Expectations for Learning

#### LEARNING PROGRESSION

In grades K-2, students defined the term digital identity and digital footprint and they discussed what information is appropriate to share as part of their digital footprints. In grades 3-5, students identify components that make up their own digital identities and digital footprints. In grades 6-8, students will manage components of their digital identities and digital footprints.

#### IMPORTANT CONCEPTS

- All users of technology have digital identities and digital footprints (also called digital tattoos).
- Components of one's digital identity include personal identifiers (for example, birthdate and addresses) created by online behaviors (such as when an adult creates an online account).
- Components of one's digital footprint include online activities, actions and communications.
- Permanency of information (students' digital footprints) allows words and actions to be accessed at any time, in any location and can follow individuals through their entire lives.
- Words and actions can impact our world in both positive and negative ways when using technology to communicate.

#### KEY SKILLS/PROCEDURES

- Identify how the use of technology can affect a digital identity and footprint over time.
- Explain how information communicated using digital tools can be permanent and publicly available.

### Content Elaborations

#### CLARIFICATIONS

Students may think that what they do online will disappear and not impact others, not realizing that their posts can cause complications for themselves or others in the future. Students may not realize which parts of their digital activities will stay online and which parts will be anonymous.

#### CONTENT FOCUS

The focus is on students knowing what parts of their online presence will remain online and be searchable in the future. They also should be able to recognize that their own content could have an extended effect on others who are associated with that online content.

**Topic 3: Explain how technology, society and the individual impact one another.**

**3-5.ST.3.e.** Identify and discuss laws and rules that apply to digital content and information.

### Expectations for Learning

#### LEARNING PROGRESSION

In grades K-2, students developed the idea that people not only own things but ideas and content as well. In grades 3-5, students discuss basic rules and laws that protect someone's ownership of ideas and content found online. They also discuss basic rules and laws that ensure equitable access to digital content. In grades 6-8, students will evaluate revisions to laws, rules and policies as society responds to technological advancements (for example, revisions to laws that address ownership involving online ideas and content).

#### IMPORTANT CONCEPTS

- All digital content has an owner who deserves credit for that content.
- There are legal guidelines on how digital content and information should be utilized and how to provide equitable access to this content.
- Rules and laws that govern digital content and information should be followed.

#### KEY SKILLS/PROCEDURES

- Describe legal guidelines that govern digital content and information.

### Content Elaborations

#### CLARIFICATIONS

Laws and rules regarding digital content and information exist for different reasons. Those appropriate for this grade band are the following: 1) to protect ownership of ideas and digital content, and 2) to ensure equitable access to digital content.

As students use digital content, it becomes even more important to understand these laws and rules (such as those relating to accessibility, intellectual property rights, copyright law, Creative Commons guidelines, fair use guidelines and open source). Engage students in discussions as they identify what digital content they may use, how they may use it and how the content should be cited or attributed.

These laws and rules also have a direct impact on what students decide to use when creating their own digital content. They can identify the proper type of content and which laws or guidelines apply to that content. Students should be able to discuss the similarities and differences between the types of laws and guidelines governing the use of digital content and information.

#### CONTENT FOCUS

The focus is on understanding and adherence to the basic rules and laws about digital content. This includes accessibility, intellectual property and copyright.



## 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.*

**Topic 1: Define and describe technology, including its core concepts of systems, resources, requirements, processes, controls, optimization and trade-offs.**

**3-5.DT.1.a.** Demonstrate how applying human knowledge using tools and machines extends human capabilities to meet our needs and wants.

### Expectations for Learning

#### LEARNING PROGRESSION

In grades K-2, students distinguished between natural and human-designed items and learned that technology is something someone made to meet needs and wants. In grades 3-5, students demonstrate how applying knowledge using tools and machines extends human capabilities to design products that meet their needs and wants. In grades 6-8, students will explore and document how technology can impact efficiency, as well as analyze the impact these tools and processes have on natural and human-designed worlds.

#### IMPORTANT CONCEPTS

- People have the ability to apply knowledge through their use of tools and machines.

#### KEY SKILLS/PROCEDURES

- Demonstrate how using tools and machines extends capabilities to meet needs and wants.

### Content Elaborations

#### CLARIFICATIONS

Throughout human history, there is evidence of technology in the form of tools and primitive machinery being used to solve problems to meet basic human needs and wants. As time progresses, technologies continue to change and improve to increase human efficiency and solve problems. As knowledge grows, humans design more tools and machines to expand capabilities and meet both needs and wants.

Building and using tools and machines allows humans to work smarter, faster and stronger, helping to satisfy needs and wants. For example, using a hammer to drive a nail into wood requires less effort and makes it faster to fasten structural parts together when building a shelter.

#### CONTENT FOCUS

This content statement focuses on how humans use their knowledge to create tools that expand their capabilities. Students need to have hands-on experiences using tools and machines. Through these hands-on experiences, they can build an understanding of how applying knowledge through the use of tools and machines is able to extend human capabilities to meet needs and wants.

**Topic 1: Define and describe technology, including its core concepts of systems, resources, requirements, processes, controls, optimization and trade-offs.**

**3-5.DT.1.b.** Give examples of how requirements for a product can limit the design possibilities for that product.

### Expectations for Learning

#### LEARNING PROGRESSION

In grades K-2, students gave examples of how resources such as tools or materials help people get a job done. In grades 3-5, students give examples of how requirements for a product can limit the design possibilities for that product. In grades 6-8, students will define and categorize the requirements of a design as either criteria or constraints.

#### IMPORTANT CONCEPTS

- Requirements of a project create limitations on the design.

#### KEY SKILLS/PROCEDURES

- Discuss how limitations impact the design possibilities for a product.
- Give examples of how requirements for a product can limit design.

### Content Elaborations

#### CLARIFICATIONS

During a design process, there may be times when limiting factors, such as funding shortages, time requirements or improper materials, may limit the design of the product. It may be necessary to change a design to accommodate a limiting factor even though some benefits are lost.

Students need to be given limitations in the midst of a design challenge so they may experience how possibilities can change as a result of the requirements or limitations. For example, when designing a house, students would consider using materials that are appropriate and readily available in a given region.

#### CONTENT FOCUS

The focus is on helping students understand how to incorporate requirements for a product within a design process when designing products or solving problems.

**3-5.DT.1.c.** Describe a process as a series of actions and how it is used to produce a result.

### Expectations for Learning

#### LEARNING PROGRESSION

In grades K-2, students explained that systems have parts or components that work together to accomplish a goal. In grades 3-5, students describe a process as a series of actions and how it is used to produce a result. In grades 6-8, students will define and categorize the requirements of a design as either criteria or constraints and explain how optimization is a process of making a product as fully functional and effective as possible.

**Topic 1: Define and describe technology, including its core concepts of systems, resources, requirements, processes, controls, optimization and trade-offs.**

**IMPORTANT CONCEPTS**

- A process is a series of actions leading to a result.
- Processes and products serve different purposes. Processes are what and how tools are used to make a product. A product is a result that serves to meet a need or want.

**KEY SKILLS/PROCEDURES**

- Explain the actions used to create a specific result.

**Content Elaborations**

**CLARIFICATIONS**

In grades K-2, students learned that technology was something someone made to meet a need or want. People often think of technology as an object or device, but it also can be a process used to produce a result, which can be a product. Students should be able to explain a series of steps or actions and how it could be used to produce a result.

For example, the process of lining up for lunch has a number of actions, with a result of students moving quickly and quietly from chairs and tables to a line at the door.

**CONTENT FOCUS**

The focus is on breaking down a process into the necessary steps or actions to accomplish the given task.

**3-5.DT.1.d.** Identify and describe examples of technology products and processes.

**Expectations for Learning**

**LEARNING PROGRESSION**

In grades K-2, students defined technology as something someone made to meet needs or wants. In grades 3-5, students identify a technology product and technology process and describe how they satisfy needs or wants. In grades 6-8, students will explore and document how technology can impact efficiency, as well as analyze how tools, materials and processes are used to alter the natural and human-designed worlds.

**IMPORTANT CONCEPTS**

- Technology is a product or process that is created to meet a want or a need.

**KEY SKILLS/PROCEDURES**

- Describe a technology product and a technology process and how they meet needs or wants.

**Topic 1: Define and describe technology, including its core concepts of systems, resources, requirements, processes, controls, optimization and trade-offs.**

	<p><b>Content Elaborations</b></p> <p><b>CLARIFICATIONS</b> Technology is anything that modifies the natural environment to meet a need or a want. Technology includes knowledge (for example, the proper tool use), products (for example, sliced bread), processes (such as lining up for lunch; or scanning items at a self-checkout, getting the total, paying, and getting change and the receipt), infrastructure (for example, the freeway system) and materials (for example, plastic, Velcro™ and rubber).</p> <p><b>CONTENT FOCUS</b> The focus is on describing examples of technology products and processes and how they satisfy wants or needs.</p>
<p><b>3-5.DT.1.e.</b> 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.</p>	<p><b>Expectations for Learning</b></p> <p><b>LEARNING PROGRESSION</b> In grades K-2, students learned that systems have components that work together to accomplish a goal. In grades 3-5, students explain how controls use information to cause systems to change. In grades 6-8, students will learn how technology can impact efficiency and how optimization makes a product as fully functional and effective as possible. Controls can help optimize products.</p> <p><b>IMPORTANT CONCEPTS</b></p> <ul style="list-style-type: none"> <li>• System controls use provided information to communicate if/then (cause and effect) commands to produce a result.</li> </ul> <p><b>KEY SKILLS/PROCEDURES</b></p> <ul style="list-style-type: none"> <li>• Determine the effect of a given cause.</li> <li>• Create an if/then script or process. (For example, if the temperature in the room falls, then the heat turns on.)</li> </ul> <p><b>Content Elaborations</b></p> <p><b>CLARIFICATIONS</b> Systems have parts or components that work together to accomplish a goal. Controls use the information provided by the components to cause changes in the system. In grades K-2, students were introduced to the concept of systems (parts or components that work together to accomplish a goal).</p> <p>In the content statement example, the thermostat is the control. It sends information (such as turn off or turn on) to other parts of the heating system. The thermostat temperature sensor measures the temperature of</p>

**Topic 1: Define and describe technology, including its core concepts of systems, resources, requirements, processes, controls, optimization and trade-offs.**

the air in the room. If it is below a certain temperature, it sends the signal to turn the heater on. When the temperature sensor measures the temperature of the air again and the air is at the maximum temperature setting, the signal is sent to turn off the heater.

Another example could be a motion-activated kitchen faucet. If the sensor "sees" motion, the faucet will turn on.

**CONTENT FOCUS**

The focus is on how system controls use the information provided to determine the changes that should be made to the system.

**Topic 2: Identify a problem and use an engineering design process to solve the problem.**

**3-5.DT.2.a.** Critique needs and opportunities for designing solutions.

## Expectations for Learning

### LEARNING PROGRESSION

In grades K-2, students learned what a design process was and applied a simplified design process to solve a problem. In grades 3-5, students plan and implement a design process to solve a problem, which includes a focus on the process of identifying a problem to solve. In grades 6-8, students will apply a complete design process to solve a problem, including research and consideration of criteria and constraints.

### IMPORTANT CONCEPTS

- When identifying problems, it is important to identify the needs and opportunities to be able to create efficient and effective solutions.

### KEY SKILLS/PROCEDURES

- Identify a problem to solve, thoroughly explaining the problem.
- Identify any limits given to the problem that will need to be considered in the solution.

## Content Elaborations

### CLARIFICATIONS

Identify classroom problems or school problems that could be solved using a design process. Analyze a problem and determine possible needs for a solution. Students may be able to find problems to solve by looking for ways to design seating, classroom processes that need to be refined or looking to overall school or community problems.

Erosion control or algae growth in an aquarium or pond may be ideas that could be seen on school grounds or in the community and have connections to grade-level science and social studies content.

Other opportunities for designing solutions can be found in novels students are reading in other content area studies. Are the characters facing problems that students could help the characters solve? Could they find solutions on behalf of a character in a story they already are reading?

As students work to identify a problem, they must ask themselves questions about the needs and opportunities that exist for designing a solution. Is there already a solution for this problem? If so, can they improve on the solution? If there is not a solution, what do they need to do to solve the problem?

### CONTENT FOCUS

This content statement focuses on students identifying problems to solve. (This will tie into the next content statement of using a design process to solve problems.)

## Topic 2: Identify a problem and use an engineering design process to solve the problem.

### Career Connections

#### CAREER AWARENESS

Using the identified problem and potential solutions, students discuss what careers exist that are aligned to the solutions they have identified. Are there people who implement these solutions or solve these problems? Invite professionals from one of the career fields discussed to speak with the class about their jobs and the steps they took to prepare for their careers. Have a class discussion on how careers are continually changing based on new solutions people find to existing problems, especially in the technology field.

**3-5.DT.2.b.** 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.

### Expectations for Learning

#### LEARNING PROGRESSION

In grades K-2, students learned what a design process was and applied a simplified design process to solve a problem. In grades 3-5, students plan and implement a design process to solve a problem. In grades 6-8, students will apply a complete design process to solve a problem.

#### IMPORTANT CONCEPTS

- A design process can help solve many problems.
- Using a design process helps keep thinking systematic and focused.

#### KEY SKILLS/PROCEDURES

- Explain the problems a design solution (product or process) solves.
- Identify a problem.
- Generate solutions to the problem.
- Test and evaluate solutions.
- Present a possible solution.
- Redesign to improve the solution based on testing, evaluation and feedback.

### Content Elaborations

#### CLARIFICATIONS

A design process is continuous and cyclical by nature. Using the problems and ideas created in 3-5.DT.2.a., students can use a design process cycle to plan and implement possible solutions.

Topic 2: Identify a problem and use an engineering design process to solve the problem.	
	<p>Collaborating in small groups to identify and solve problems may be helpful. Encourage students to think about different ways to solve the problems. The first few times students experience a design process, more instruction may be needed. As students become more familiar with the process, they can become more independent.</p> <p>Drawing sketches and then building models out of blocks, recyclables or craft supplies can help students test, redesign and improve their solutions. Building 2D or 3D models using digital blocks or other tools may be helpful as well.</p> <p><b>CONTENT FOCUS</b> The focus is on using steps of a design process and the importance of evaluating the role each of these steps plays within the entire nonlinear cycle.</p>
<p><b>3-5.DT.2.c.</b> Generate, develop and communicate design ideas and decisions using appropriate terms and graphical representations.</p>	<p><b>Expectations for Learning</b></p> <p><b>LEARNING PROGRESSION</b> In grades K-2, students learned what a design process was and applied a simplified design process to solve a problem. In grades 3-5, students plan and implement a design process to solve a problem, which includes a focus on communicating their ideas and decisions. In grades 6-8, students will apply a complete design process to solve a problem, including considering multiple factors to justify design decisions.</p> <p><b>IMPORTANT CONCEPTS</b></p> <ul style="list-style-type: none"> <li>Once a problem has been identified and solutions have been considered, the design ideas can be shared.</li> </ul> <p><b>KEY SKILLS/PROCEDURES</b></p> <ul style="list-style-type: none"> <li>Communicate design ideas using appropriate terms and graphical representation.</li> </ul> <p><b>Content Elaborations</b></p> <p><b>CLARIFICATIONS</b> As students continue through a design process to solve a problem, they need to generate many ideas and decide which of these alternatives to further develop. Using grade-level appropriate terms, they need to record and communicate their ideas and the decisions they made.</p> <p>Graphical representations could include sketches, drawings, pictures with a recorded voice explanation, diagrams with labels and videos. Students could also use 2D or 3D sketches or mock-up models.</p>



**Topic 2: Identify a problem and use an engineering design process to solve the problem.****CONTENT FOCUS**

The focus is on communicating design ideas and decisions. Students could use a variety of tools to present information and create a representation of their design solutions.

**Topic 3: Demonstrate that solutions to complex problems require collaboration, interdisciplinary understanding and systems thinking.**

**3-5.DT.3.a.** Design a product with multiple components and describe how the components interact to form a system.

### Expectations for Learning

#### LEARNING PROGRESSION

In grades K-2, students learned that systems have components that work together to accomplish a goal. In grades 3-5, students produce a product with multiple components and describe the interaction between these components. In grades 6-8, students will understand how changing one component will impact that system. Students will deconstruct a system into its component parts and describe how they interrelate.

#### IMPORTANT CONCEPTS

- Systems include a variety of components.
- Components within a system interact (work together) to make a product work.
- People use a design process to integrate components in the design of a system or product.

#### KEY SKILLS/PROCEDURES

- Communicate examples of system components and identify components of the system.
- Describe the interaction between a product's components, including ways the parts of that system impact or are impacted by its other parts.
- Design a product that contains multiple components.

### Content Elaborations

#### CLARIFICATIONS

In grades K-2, students learned systems have parts or components that work together to accomplish a goal. Before designing their own product, students may find it helpful to look at other products and see how the components work together to make the product function.

Products could be built physically or using online models and simulations.

Products could contain simple circuits such as a light bulb powered by a battery. Toy cars could be used to investigate speed. These projects could integrate fourth and fifth grade-level science content.

#### CONTENT FOCUS

This content statement focuses on the interaction of the components that comprise a system.

**Topic 3: Demonstrate that solutions to complex problems require collaboration, interdisciplinary understanding and systems thinking.**

**3-5.DT.3.b.** Explore and document connections between technology and other fields of study.

### Expectations for Learning

#### LEARNING PROGRESSION

In grades K-2, students described how technologies are used in different fields. In grades 3-5, students explore connections between technology and other fields of study. In grades 6-8, students will learn how inventions and innovations in one field can transfer into other fields of technology.

#### IMPORTANT CONCEPTS

- Technology can be used in a variety of ways across many disciplines affecting multiple facets of society.
- Multiple disciplines affect the development of technology.

#### KEY SKILLS/PROCEDURES

- Discuss how various disciplines utilize the same technology.
- Identify ways a given piece of technology can be used in many different fields.

### Content Elaborations

#### CLARIFICATIONS

Identifying different technologies (knowledge, artifacts, products, processes, infrastructure, tools and materials) can help students relate how a technology could impact multiple disciplines and also is impacted by multiple disciplines.

For example, lenses are used in telescopes, microscopes, reading glasses, contact lenses and cameras. The same basic technology of a lens is used to help people see things that are large but far away and see things that are close but small. The field of medicine also has influenced the development of lens technology itself as advances in contact lenses have been made to meet the wants or needs of patients.

#### CONTENT FOCUS

The focus is on examples of how knowledge and skills from multiple disciplines can contribute to design solutions and how a technology can impact multiple disciplines.

**3-5.DT.3.c.** Identify a product and describe how people from different disciplines combined their skills in the design and production of the product.

### Expectations for Learning

#### LEARNING PROGRESSION

In grades K-2, students worked as a team to identify possible problems to solve and potential technological solutions to these problems. In grades 3-5, students describe how people from different disciplines apply their knowledge and skills as they collaborate to design a product. In grades 6-8, students will collaborate to

**Topic 3: Demonstrate that solutions to complex problems require collaboration, interdisciplinary understanding and systems thinking.**

solve a problem as an interdisciplinary team. Students will evaluate the effectiveness of the group's collaboration during a design process and the contribution of the various roles.

**IMPORTANT CONCEPTS**

- Products are designed and produced by people in various disciplines.

**KEY SKILLS/PROCEDURES**

- Explain how people from different disciplines create a single product.

**Content Elaborations****CLARIFICATIONS**

Identify that a product requires the integration of different ideas from multiple disciplines and a variety of backgrounds to create the end product. People in each discipline bring different knowledge and skills together when they collaborate to solve a problem to meet a need or want.

For example, a robotic vacuum incorporates parts and functions from many disciplines. Robotics, vacuum and radio/wireless technologies and more need to work together to make the robotic vacuum function properly.

**CONTENT FOCUS**

The focus is on the collaboration between individuals knowledgeable in their disciplines to create an end product.

**Topic 4: Evaluate designs using functional, aesthetic and creative elements.**

**3-5.DT.4.a.** Use criteria developed with guidance to evaluate a new or improved product for its functional, aesthetic and creative elements.

## Expectations for Learning

### LEARNING PROGRESSION

In grades K-2, students identified and discussed the aesthetics, functional aspects and creativity of everyday objects. In grades 3-5, students develop criteria with guidance and apply these criteria to evaluate a product for its functional, aesthetic and creative elements. In grades 6-8, students will examine the progression of a product to identify how the functional, aesthetic and creative elements were applied. They also will apply the design principle "form follows function" to develop a product.

### IMPORTANT CONCEPTS

- Criteria, whether given or created, can be used to evaluate a product.
- Designers emphasize some or all of the functional, aesthetic and creative elements in their designs. Resources impact the importance of each element.

### KEY SKILLS/PROCEDURES

- Create with guidance a list of criteria that could be used to improve a product.
- Evaluate a product against a set of criteria.

## Content Elaborations

### CLARIFICATIONS

Students critique a product using a collaboratively developed set of criteria. The functional element considers if the product fulfills the intended purpose. The aesthetic element considers the appeal of the product, including visual, audio and tactile. The creative element considers the uniqueness of the way the product fulfills the intended purpose.

Suggestions for evaluation could include a rubric, checklist or grading sheets for students to use as they evaluate functional, aesthetic and creative elements.

For example, a chair can be evaluated to see if it is functional (Does it support an individual's weight? Does it tip over easily?) and aesthetically pleasing (What materials are used? Is it pleasing to look at or touch?). For the creativity element, the chair can be evaluated to see if it performs the function of a chair but in a new or unusual way (for example, shaped like a shoe or hanging from the ceiling).

### CONTENT FOCUS

This content statement focuses on having students develop criteria for evaluating a product design based on functional, creative and aesthetic elements. Students then apply these criteria to complete the evaluation of a product.

**Topic 4: Evaluate designs using functional, aesthetic and creative elements.**

**3-5.DT.4.b.** Examine a familiar product or process and suggest improvements to its design.

### Expectations for Learning

#### LEARNING PROGRESSION

In grades K-2, students discussed and gave examples of how changes in design can be used to strengthen or improve a product. In grades 3-5, students examine, evaluate and suggest improvements to a product. In grades 6-8, students will analyze environments or products that are applications of universal or inclusive design and examine how designs can be improved to better meet the needs of all users. They also will apply the design principle "form follows function" to develop a product.

#### IMPORTANT CONCEPTS

- Products and processes can be analyzed and evaluated to make improvements.

#### KEY SKILLS/PROCEDURES

- Evaluate a product and process to make it better.

### Content Elaborations

#### CLARIFICATIONS

Products and processes are everywhere in a student's world. In this grade band, students are introduced to a process as a series of actions and learn that a process can be used to produce a result. Classrooms and schools have many processes that could be examined, such as lining up for recess or handing in homework. Each classroom might have a different series of steps to line up for recess, but the result of those processes still could be a group of children moving from one room and ending up outside.

Students take an existing product (such as a classroom chair or desk) or process and look for ways to make it better. For example, students could evaluate the current process for the end-of-day dismissal pattern and suggest a more efficient design.

#### CONTENT FOCUS

The focus is on how to improve a product or process.