

Ohio Technology Academic Content Standards Grades 3 - 5

Standards, Benchmarks and Indicators by Grade	Comments
Standard 1 Nature of Technology Students develop an understanding of technology, its scope, core concepts*, characteristics and relationships between technologies and other fields.	
Benchmark A: Compare and discuss the characteristics of technology in our community.	
Grade Three	
1. Describe how things that are found in nature differ from things that are human-made (e.g., compare animal structures, such as nests and dens, and human-made structures used for shelter).	
2. Identify technology in the classroom and discuss its use.	
3. Demonstrate the use of technology in the classroom.	
4. List ways that society/government provides technology benefits for everyone (e.g., bus systems, water and sewage systems and mail delivery).	
Grade Four	
1. Describe how the processing of things found in nature result in human-made artifacts (e.g., furniture may be made from lumber, which comes from trees).	
2. Demonstrate how tools, materials and skills are used to perform tasks (e.g., computers and cell phones are used to communicate; pencil sharpeners).	
3. Describe ways creative thinking, economic and cultural influences shape technological development (e.g., Wright Brothers, powered flight, air commerce).	
4. Recognize that creative thinking, economics and culture influence technological development (e.g., a city may need to design a mass transit system for transportation while a small town may use personal vehicles).	
Grade Five	
1. Create a human-made product from natural materials (e.g., process natural materials into new products).	
2. Use tools, materials and processes to produce products and carry out tasks efficiently and effectively.	
3. Demonstrate the use of technology in daily life, noting the advantages and disadvantages those uses provide.	
4. List companies or businesses related to each of the seven technological systems (e.g., hospitals, farms, gas stations, radio stations, airlines, toy manufacturers and home builders).	

Standards, Benchmarks and Indicators by Grade	Comments
Benchmark B: Identify, describe and discuss the core concepts of technology.	
Grade Three	
1. Identify the resources, tools and machines, materials, information, energy, people, capital and time that are needed to complete a task (e.g., digital camera, computer, paper, resource materials, electricity, students, money for notebooks and scheduled lab time).	
2. Describe different properties of materials: color, weight, mass, hardness, temperature.	
3. Describe how tools and machines extend human capabilities such as holding, lifting, carrying, fastening, separating and computing.	
Grade Four	
1. Classify materials by property.	
2. Select and use tools to design, make and modify technology.	
3. Cite examples of how tools and machines extend human capabilities (e.g., automobiles are more efficient than walking great distances).	
Grade Five	
1. Select and use tools to design, make, modify and assess technology.	
2. Test the properties of materials.	
3. Demonstrate how tools and machines extend human capabilities.	
4. Recognize that requirements are the limits to designing or making a product or system.	
Benchmark C: Compare and discuss the relationships among technologies, and the connections between technology and other fields of study.	
Grade Three	
1. List process examples from each of the seven technological systems (e.g., diagnosing, harvesting, transmitting, printing, flying, welding and building).	
2. Understand that each of the seven technological systems have specialized tools and tools in common.	
Grade Four	
1. Describe what is needed to cause a technology to develop further in each of the technological systems (e.g., business support and research initiatives).	
Grade Five	
1. Compare services provided in each of the seven technological systems and identify specialized tools used in each system.	

Standards, Benchmarks and Indicators by Grade	Comments
Standard 2 Technology and Society Interaction	
Benchmark A: Define responsible citizenship relative to technology.	
Grade Three	
1. Discuss how technology may have positive and/or negative consequences.	
2. Identify and discuss how products are developed and modified to meet changing individual needs and wants.	
Grade Four	
1. Explore and compare common uses of technology in daily life, and the advantages and disadvantages those uses provide.	
2. Discuss basic issues related to responsible use of technology and information, and describe personal consequences of inappropriate use.	
3. Describe why it is important for everyone to have access to information sources and information technology.	
Grade Five	
1. Identify and show cooperative and collaborative strategies to work with others when using technology systems.	
2. Analyze common uses of technology in daily life and the advantages and disadvantages those uses provide (e.g., how technology helps us communicate).	
3. Distinguish basic issues related to responsible use of technology and information, and relate personal consequences of inappropriate use.	
Benchmark B: Investigate and explain the interrelationships between technology and the environment.	
Grade Three	
1. Describe how technology affects the environment in positive and/or negative ways.	
Grade Four	
1. Describe how appropriate management of resources and waste can prevent harm to the environment.	
Grade Five	
1. Investigate alternative methods for the protection of the environment.	
Benchmark C: Explain and demonstrate the influence of technology throughout history.	
Grade Three	
1. Illustrate ways that people have made tools to provide food, make clothing and provide protection.	
2. Explain how technology and invention have changed economic and social development in our community.	

Standards, Benchmarks and Indicators by Grade	Comments
Grade Four 1. Describe the advantages that resulted from people making and using tools (e.g., importance of the grist mill, saw mill, carding mill to early Ohio settlements).	
2. Explain the role of Ohio's inventors in the social and economic development of society (e.g., Thomas Edison, the Wright Brothers, Charles F. Bush, Granville T. Woods, Elisha Gray, James W. Packard, Alexander Winton, Frank A. Sieberling, Garrett Morgan, Charles Kettering).	
Grade Five 1. Discuss and create alternative solutions to the ways that people have made tools to provide food, make clothing and provide protection.	
2. Explain how technology and invention have changed economic and social development.	
Benchmark D: Practice responsible use of technology, understand school district guidelines for technology use, and explore technology ownership.	
Grade Three 1. Work collaboratively with others, respecting their ideas and needs, when using technology.	
2. Understand that people use technology to create new items (products, resources, etc.) and that the creator may own the rights to these items (e.g., an author may create a Web site, a programmer may create software, an inventor may create a device).	
3. Know that the district Acceptable Usage Policy (AUP) describes the rules for using classroom technology and the Internet.	
Grade Four 1. Practice respect for intellectual property rights (e.g., another student's ideas and acknowledge all contributions to group work).	
2. Discuss technology ownership rights, including the concept that the creator of the technology may be the owner, and that users must purchase the right to use the technology (e.g., a company may own rights to products made by its employees).	
3. Discuss policies presented in the district Acceptable Usage Policy (AUP) and understand that the AUP describes the rules for using school-based technology.	
Grade Five 1. Discuss patent, copyright, trade name/trademark protection and the rights of the owner of the work (e.g., inventor, manufacturer, software developer, company, Web site creator, author of information).	
2. Discuss basic issues related to responsible use of technology and describe personal consequences of inappropriate use (e.g., plagiarism, intellectual property, and the conditions of the district AUP).	
3. Use technology to collaborate with others and credit all participants for their contribution to the work.	

Standards, Benchmarks and Indicators by Grade	Comments
Benchmark E: Identify development patterns and examine the influence of technology on the world.	
Grade Three	
1. Investigate and assess the influence of a specific technology on an individual.	
2. Examine the trade-offs involved in selecting or using a product or system.	
Grade Four	
1. Classify collected information in order to identify technology development patterns.	
2. Investigate and assess the influence of a specific technology on families and the community.	
3. Develop rules for evaluating the trade-offs when selecting or using a product or system.	
Grade Five	
1. Compare, contrast and classify collected information in order to identify patterns of technology development.	
2. Investigate and assess the influence of a specific technology on the environment.	
3. Examine the trade-offs of using a product or system and decide when it should be used (e.g., determine the amount of supplies/luggage and mode of transportation needed for traveling various lengths of days and distances).	

Standards, Benchmarks and Indicators by Grade	Comments
Standard 3 Technology for Productivity Applications Students learn the operations of technology through the usage of technology and productivity tools.	
Benchmark A: Understand computer and multimedia technology concepts and communicate using the correct terminology.	
Grade Three	
1. Discuss the purpose of various types of computer and multimedia technology equipment using appropriate terminology.	
2. Communicate about computers and multimedia technology using correct terminology.	
Grade Four	
1. Learn and use new technology terminology based on the computer and multimedia technology resources being used.	
2. Define technological terms as discovered.	
Grade Five	
1. Define and use new technology terminology based on the computer and multimedia technology resources being used.	

Standards, Benchmarks and Indicators by Grade	Comments
Benchmark B: Use appropriate tools and technology resources to complete tasks and solve problems.	
Grade Three	
1. Identify and use input and output devices to operate and interact with computers and multimedia technology resources (e.g., scanner, digital cameras).	
2. Discuss networks and their use (e.g., how computers connect to printers, servers and the Internet).	
3. Identify and use a variety of software programs.	
4. Use technologies for particular content areas (e.g., calculators for math, computerized microscopes for science and books on CD-ROM for language arts).	
5. Show how you can find answers to problems using electronic resources including the Internet.	
6. Tell a story using presentation software.	
7. Touch-type letters on the keyboard with both hands (e.g., begin to learn how to type/keyboard, use continuous keystrokes).	
Grade Four	
1. Explain how input and output devices operate and interact with computers and multimedia technology resources.	
2. Demonstrate ability to login and use basic network services.	
3. Discuss different software programs and what they do.	
4. Discuss image formats (JPEG, GIF, TIFF).	
5. Save, transport and access stored information from portable devices (e.g., portable hard drives, universal serial bus—USB devices, memory sticks).	
6. Demonstrate how technology productivity tools can be used to help understand data.	
7. Collect/create digital images and sounds related to a particular topic.	
8. Demonstrate appropriate keyboarding skills.	
Grade Five	
1. Describe how networks are used to access, share and store information (e.g., software, printers, folders, files).	
2. Select the appropriate device to store needed information and independently save and access stored information from portable devices (e.g., how large is the saved information? do others need to use the information? what device will best store this information?).	
3. Collect information for projects using still and video digital cameras, scanners and electronic resources.	
4. Create a presentation using multimedia software that incorporates, graphics, video and sound to present the findings of a group research project.	
5. Investigate technology tools used for researching problems and acquiring information and data.	
6. Use appropriate hand/finger positions to key all letters (e.g., demonstrate ability to appropriately keyboard and assess accuracy).	

Standards, Benchmarks and Indicators by Grade	Comments
Benchmark C: Use productivity tools to produce creative works and prepare publications.	
Grade Three	
1. Use and demonstrate how productivity tools support personal productivity (e.g., a word processing application can be used to create a letter, a spreadsheet application can be used to perform calculations, a database program can be used to compile and analyze data).	
2. Use and demonstrate how peripherals support personal productivity (e.g., digital cameras are used to create images; scanners are used to create digital images; printers are output devices that allow us to make copies of what is created using technology; storage devices make it possible to store large amounts of information).	
3. Identify/recognize technology resources for communication, collaboration, presentation and illustration of thoughts and ideas (e.g., e-mail, graphic organizers, video cameras, handheld devices).	
Grade Four	
1. Use productivity tools and peripherals to increase skills and facilitate learning throughout the curriculum.	
2. Use technology resources for collaborating and brainstorming ideas (e.g., using concept-mapping programs in groups).	
3. Use media and technology resources for presenting information (e.g., projectors, video cameras).	
Grade Five	
1. Select and use appropriate software applications to complete content-specific tasks (e.g., use desktop publishing software to create a newsletter, use drawing programs to create artwork).	
2. Investigate technology resources for individual and collaborative writing, communication and publication of creative works (e.g., video editing, desktop publishing).	
3. Use technology resources for presenting information (e.g., distance learning and interactive boards).	

Standards, Benchmarks and Indicators by Grade	Comments
Standard 4 Technology and Communication Applications Students use an array of technologies and apply design concepts to communicate with multiple audiences, acquire and disseminate information, and enhance learning.	
Benchmark A: Identify the concepts and operations of communication systems.	
Grade Three	
1. Include the elements of design such as contrast, size and arrangement of student-created projects in print and electronic media.	
2. Discuss the costs and connectivity of simple communication systems (e.g., e-mail, phones, Internet services).	

Standards, Benchmarks and Indicators by Grade	Comments
Grade Four	
1. Collect and evaluate examples of good design (contrast, size, arrangement) in print and electronic media.	
2. Investigate online learning environments (e.g., online courses, distance learning, video-conferencing and productions).	
3. Contribute to real time classroom technology communication sessions.	
Grade Five	
1. Implement basic design components (contrast, size, arrangement) in print or electronic media productions.	
2. Determine ways in which people collaborate in real time with individual and groups located in different school districts, communities, states and countries.	
3. Describe and participate in different types of online learning environments (e.g., online classes, distance learning, video conferencing and productions).	
Benchmark B: Develop, publish and present information in print and digital formats.	
Grade Three	
1. Use graphic organizers to sequence and organize information and projects.	
2. Incorporate the use of a digital image into a document (e.g., clipart, picture from digital camera or scanned images).	
3. Use software to publish information in printed form (e.g., card, calendar, banner).	
4. Use graphics and text within a slide show (e.g., create a presentation about Ohio's state bird, symbol or flag, as a presentation using pictures).	
5. Send and receive e-mail.	
Grade Four	
1. Organize presentations by using storyboarding techniques.	
2. Construct information by using a variety of software applications.	
3. Edit digital images (e.g., crop, enhance brightness and/or contrast, adjust color, resize).	
4. Generate a document that includes graphics from more than one source (e.g., find images that match assignment needs and insert them into a document).	
5. Develop a slide show using graphics, text and audio from more than one source (e.g., create a presentation about Ohio government with text, pictures and music or narration).	
6. Present information in a class video project.	
7. Identify the proper structure and components of e-mail: a Address structure; b Signature line; c Body of message; and d Subject line.	
8. Use e-mail to share information.	

Standards, Benchmarks and Indicators by Grade	Comments
Grade Five	
1. Produce a slide show from storyboard, using text, graphics and sound with appropriate transitions and effects.	
2. Collaborate in a class video project (e.g., act as camera operator, actor or director in a video project as part of a unit of study).	
3. Use a simple authoring tool to create class Web page.	
4. Evaluate and modify a presentation or document for different audiences (e.g., one person or a group of people).	
5. Use advanced software features to publish information in printed form (e.g., card, calendar, banner, one-page report, flyer, newsletter).	
Benchmark C: Use technology communications to participate in online group collaborative interactive projects and activities.	
Grade Three	
1. Compose, send and reply to e-mail messages with teacher direction.	
2. Engage in online learning (e.g., Web activities, virtual field trips, video-conferencing).	
Grade Four	
1. Compose, send, receive and reply to e-mail.	
2. Present and receive information in teacher/student directed online learning or video-conferencing activities (e.g., government agencies, historical society or museum).	
Grade Five	
1. Demonstrate how to use e-mail to communicate with another student in a remote location.	
2. Communicate in a monitored, online discussion (e.g., discuss books being read, share local history).	
3. Gather and share information in online learning activities (e.g., examine historical journals and share observations).	

Standards, Benchmarks and Indicators by Grade	Comments
Standard 5 Technology and Information Literacy Students engage in information literacy strategies, use the Internet, technology tools and resources, and apply information-management skills to answer questions and expand knowledge.	
Benchmark A: Describe types of information: facts, opinions, primary/secondary sources; and formats of information: number, text, sound, visual, multimedia; and use information for a purpose.	
Grade Three 1. Distinguish between the concepts of information (organized data and facts) and data (raw facts and figures) and identify examples of each.	
2. Recognize that information gathering is based upon a need (e.g., gather information to learn more about a topic or gather information to answer questions).	
3. Identify primary source information—firsthand information about a person, place or event and secondary source information—secondhand information interpreted by another person about a person, place, thing or event (e.g., primary sources such as diaries, letters, objects, and photographs; and secondary sources such as textbooks or biographies).	
Grade Four 1. Collect information (organized data and facts) and data (raw facts and figures) and identify answers to questions (e.g., locate data in a newspaper article, identify information on a sign).	
2. Discuss and define the difference between fact and opinion (e.g., the cafeteria served pizza today—fact, the pizza was good—opinion).	
3. Identify ways information can be presented (e.g., text, visual information on a map, information displayed in pictures or as graphics).	
4. Use primary source material to describe a person, place, thing or event (e.g., oral history, diary entries, photos, etc.).	
Grade Five 1. Develop a systematic plan for organizing information using a basic organizing concept (e.g., subject, chronology, date).	
2. Choose a variety of formats for presenting information (e.g., pictures, texts, slides).	
3. Understand that there are conditions where information cannot be used (e.g., copyright restrictions on the use of cartoon characters, copying a classmate's project).	
4. Distinguish between relevant and irrelevant information in an information source (e.g., information matches question to be answered, facts apply to the topic).	
5. Apply primary and secondary sources to investigate a person, place, thing or event, and identify each source as primary or secondary.	

Standards, Benchmarks and Indicators by Grade	Comments
Benchmark B: Use technology to find information, applying a research process to decide what information is needed, find sources, use information and check work	
Grade Three	
1. Develop questions about an assigned topic and determine where the information may be found.	
2. Discuss search words: author, title, subject or topic.	
3. Search for information in an online library catalog, electronic encyclopedia or teacher-selected list of Web sites.	
4. Select, record and use needed information to answer a question or complete a project.	
5. Explain how to find copyright information on a resource (e.g., date of publication, copyright notice, statement of ownership).	
6. Give credit to the sources used for work by listing the author, the name of the source and the copyright date.	
7. Explain how information was selected.	
Grade Four	
1. Determine questions to be answered by research.	
2. Identify search terms for identified questions: author, title, subject, keyword.	
3. Select needed information from a defined group of resources: library catalog, online encyclopedia and subject list of age appropriate Web sites.	
4. Record and organize information gathered from selected resources to generate a product.	
5. Construct a list of the sources used in creating the project: author, title of source and date.	
6. Evaluate the product to determine if the research questions were answered.	
Grade Five	
1. Identify questions related to an assigned topic or personal information need.	
2. Determine the best sources to use for the assigned topic or personal information need.	
3. Select and access information resources: online library catalog, Web sites and electronic formats (e.g., CD-ROM, DVD, audio files).	
4. Record and use selected information to create a product for the assigned topic or personal information need.	
5. Cite sources used: author, title of resource, publisher or source of information, and copyright date.	
6. Describe how information about a topic was gathered (e.g., discuss the information process).	

Standards, Benchmarks and Indicators by Grade	Comments
Benchmark C: Use the Internet to find, use and evaluate information.	
Grade Three	
1. Label Internet browser elements and explain their function (e.g., toolbar and buttons, favorites/bookmarks, history).	
2. Type a simple search term in a teacher or librarian selected search engine to find general information (e.g., “weather”).	
3. Review the home page of a teacher or librarian selected Web site.	
4. Read the list of results retrieved from a simple search performed in a search engine and select one of the search results and review the information it provides.	
Grade Four	
1. Choose a search engine or directory specifically designed for students to locate information on the Internet.	
2. Type a simple search term in the search engine or directory to find facts and answer questions.	
3. Read the list of results from the search engine or directory to locate potential Web sites relevant to the search topic.	
4. Choose a Web site and examine the information for facts by identifying information on the Web site: a Author; b Title; c Date produced; d Special features (images, puzzles, activities); and e Available products, services or resources.	
Grade Five	
1. Explain the elements and meaning of a Web site URL: name of the site, domain, and extensions for specific pages.	
2. Perform a search in an age-appropriate search engine or a Web directory by typing in one or more search terms.	
3. Read list of results from the search and select potential relevant Web sites.	
4. Identify information on the Web site: URL extensions, author, title, date produced, special features (images, puzzles, activities), products, services, resources, etc.	
5. Examine the information retrieved from the Web site for the author’s expertise, the accuracy of the information presented and the bias.	

Standards, Benchmarks and Indicators by Grade	Comments
Benchmark D: Identify, access and use electronic resources from both free and fee-based Internet sources.	
Grade Three	
1. Use appropriate access code (username, password) to gain access to online resource (e.g., district network resources, subscription databases and resources that can be accessed remotely—outside the school and/or from home).	
2. Use age-appropriate Internet resources and fee-based (subscription resources) delivered by the Internet.	
Grade Four	
1. Demonstrate use of online fee-based (subscription or pay per use) electronic resources (e.g., state and/or district provided resources such as magazine databases, encyclopedias, dictionaries).	
2. Use a subscription resource or database (fee-based or pay-for-use) to locate information for a curricular need (e.g., select the subscription resource based on the curricular need).	
Grade Five	
1. Use a username and password to access an information source (e.g., an online library catalog, a fee-based Web site requiring user information to access the site, district network requiring student login).	
2. Examine coverage of information in magazine databases, online biography sources and subject guide sources.	
3. Distinguish different types of online information databases (free or fee-based) and select the best resource based on curricular need.	

Standards, Benchmarks and Indicators by Grade	Comments
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Standards, Benchmarks and Indicators by Grade	Comments
Standard 6 Design Students will apply a number of problem-solving strategies demonstrating the nature of design, the role of engineering, and the role of assessment.	
Benchmark A: Describe and apply a design process to solve a problem.	
Grade Three 1. Describe the purpose of the design process (e.g., a purposeful method of planning practical solutions to problems).	
2. List the main elements of the design process - problem identification, possible solutions, refinement, analysis, decision, implementation and feedback.	
3. Identify and collect information about everyday problems that can be solved by technology (e.g., pollution, energy shortage, housing).	
4. Make sketches to visualize possible solutions to a technological problem (e.g., sketch possible locations to more effectively place trash bins in the cafeteria using a computer drawing program or hand drawings).	
5. List questions to use in evaluating solutions to a technical problem and distinguish between practical and poor solutions (e.g., does the solution really solve the problem? is it too expensive? is it too hard to do?).	
Grade Four 1. Apply the design process to purposefully solve a problem (e.g., how to improve recycling at school and home).	
2. Generate solutions for solving a problem using the design process using information collected about everyday technological problems.	
3. Survey potential users to evaluate a solution to a technical problem (e.g., survey other students about which type of model plane they like).	
4. Make sketches and paper models to visualize possible solutions to a technological problem (e.g., use computer draw programs to prepare cut-out patterns).	
5. Recognize where changes to a solution are needed to meet the requirements.	
6. Identify Ohio inventors and designers who contributed to the development of each of the technological systems: a Energy and power; b Transportation; c Manufacturing; d Construction; e Information and communication; f Medical; and g Agricultural and related biotechnologies.	

Standards, Benchmarks and Indicators by Grade	Comments
Grade Five	
1. Arrive at a solution to a technological problem and fabricate a prototype model for the solution.	
2. Use data to test and evaluate the prototype solution.	
3. Make sketches with a list of parts required for a solution to a technological problem.	
4. Analyze the requirements for a design including such factors as the desired elements and features of a product or system, and the limits that are placed on the design (e.g., if the class were to prepare and deliver food to the homeless or to a nursing home, what are the desired features and what limits are there to what can be done?).	
5. Improve the designed prototype solution where tests indicate need.	
6. Identify American inventors and designers who contributed to the development of each of the technological systems.	
Benchmark B: Describe how engineers and designers define a problem, creatively solve it and evaluate the solution.	
Grade Three	
1. Describe the importance of creativity in designing an object.	
2. Identify natural forces that buildings need to be designed to withstand (e.g., rain, earthquakes, tornados).	
3. Recognize the importance of the materials to be used in a design (e.g., materials differ in strength, aesthetics, resistance to corrosion and wear).	
Grade Four	
1. Describe how models are used to communicate and test design ideas and processes (e.g., model truss designs are tested for weight loads using bridge building simulation software).	
2. Describe the structural needs to be met when designing an object (e.g., in designing a bridge, the maximum weight to be supported must be decided).	
3. Identify different types of engineers (e.g., manufacturing, architects, automotive, ceramic, materials, environmental, civil, electrical, agricultural, safety, biological, audio, mechanical, chemical).	

Standards, Benchmarks and Indicators by Grade	Comments
Grade Five 1. Demonstrate steps used in the engineering design process including defining the problem, generating ideas, selecting a solution, testing the solution(s), making the item, evaluating the solution, and presenting the results (e.g., engineer a design to solve a storage problem at the school).	
2. Describe how models are used to communicate and test design ideas and processes (e.g., car models, building models).	
3. Build models which can be used to communicate and test design ideas and processes (e.g., tornado shelters).	
Benchmark C: Understand the role of troubleshooting in problem-solving.	
Grade Three 1. Describe how troubleshooting is a way to find out why something does not work so that it can be fixed.	
2. Identify people whose jobs regularly require them to troubleshoot (e.g., a cable repair person and a computer repair technician).	
Grade Four 1. Apply the process of experimentation to solve a technological problem (e.g., test which glue works best for a given material).	
2. Describe how scientific principles can be used in solving technological problems (e.g., will a stain look the same on different types of wood?).	
3. Identify different types of engineers and the types of problems they troubleshoot (e.g., manufacturing—part the wrong size, architects—weak structural support, automotive—exhaust pollution).	
Grade Five 1. Show that invention and innovation are creative ways to turn ideas into real things (e.g., provide examples of multiple solutions to the same problem—many models of cars, varieties of apples, chess set figures).	
2. Describe how the acceptance of a product can vary because of the size of the market for the product (e.g., why is the commercialization of some products successful and others not?).	

Standards, Benchmarks and Indicators by Grade	Comments
Standard 7 Designed World Students understand how the physical, informational and bio-related technological systems* of the designed world are brought about by the design process. Critical to this will be students' understanding of their role in the designed world: its processes, products, standards, services, history, future, impact, issues and career connections.	
Benchmark A: Develop an understanding of how physical technologies enhance our lives.	
Grade Three	
1. Describe how life would be different if we did not have energy delivered to our homes.	
2. Describe how transportation systems move people and goods from place to place.	
3. Diagram a processing system that converts natural materials into products (e.g., lumber harvested, transported to lumber mill, debarked, sawn to dimension, dried, transported to lumberyard, purchased, transported to site).	
4. List systems that are used in buildings (e.g., electrical, heating and air conditioning, plumbing).	
Grade Four	
1. Describe how energy is converted to produce light, heat and motion in machines and products.	
2. Describe how different devices consume different amounts of energy.	
3. Understand that transportation systems may lose efficiency or fail if one part is missing or malfunctioning, or if a subsystem is not working.	
4. Discuss how modes of transportation have changed over the years in Ohio.	
5. Explore, physically or virtually, manufacturing facilities and describe how products are designed, resources gathered, and tools used to separate, form and combine materials in order to produce products.	
6. Identify types of manufacturing done in Ohio (e.g., pottery, steel, glass, automobiles and chemicals).	
7. Describe ways in which structures need to be maintained (e.g., floors waxed, walls painted, roofs replaced, drains cleaned).	
Grade Five	
1. List tools, machines, products and systems that use energy in order to do work.	
2. Describe how personnel in energy and power technologies are trained (e.g., technician training, engineering school).	
3. Describe how the value of goods and services vary by their location.	
4. Describe how personnel in transportation technology are trained (e.g., apprenticeship, flight school, maritime school).	
5. Describe examples of how manufacturing enterprises exist because of a consumption of goods (e.g., clothing wears out, seasons change and styles change so more must be manufactured).	
6. Describe the guidelines (e.g., zoning and building codes; that impact the construction of houses in your community).	

Standards, Benchmarks and Indicators by Grade	Comments
Benchmark B: Recognize appropriate modes of technical communication across technological systems.	
Grade Three	
1. Explain how the processing of information through the use of technology can be used to help humans make decisions and solve problems.	
2. Explore the importance of both the sender and receiver having the same understanding of the message.	
Grade Four	
1. Describe how information can be acquired and sent through a variety of technological sources, including print and electronic media.	
2. Use letters, characters, icons, symbols and signs to represent ideas, quantities, elements and operations.	
Grade Five	
1. Use communication technology to transfer messages among people and/or machines locally and over distances through the use of technology.	
2. Describe how personnel in information and communication technologies are trained.	
Benchmark C: Develop an understanding of how bio-related technologies improve our lives.	
Grade Three	
1. Know that vaccines are designed to prevent diseases from developing and spreading; medicines are designed to relieve symptoms and stop diseases from developing.	
2. Describe how artificial ecosystems are human-made environments that are designed to function as a unit and are comprised of humans, plants and animals.	
Grade Four	
1. Describe technological advances that have made it possible to create new devices, repair or replace certain parts of the body, and provide a means for mobility.	
2. Identify agricultural waste and ways that it can be recycled or safely processed.	
3. Describe how and explain why food is processed.	
4. List foods grown or produced in Ohio.	
5. Identify machinery used in the production of Ohio agricultural products.	
Grade Five	
1. Describe tools and devices that have been designed to help provide clues about health and provide a safe environment.	
2. Describe how medical personnel are trained.	
3. List processes used in agriculture that require different procedures, products or systems.	
4. Describe how personnel in agricultural and related biotechnologies are trained.	