TECHNOLOGY STANDARDS
Grade 3

Standard 1 Nature of Technology

Students develop an understanding of technology, its characteristics, scope, core concepts* and relationships between technologies and other fields.Students learn that technology extends human potential by allowing people to do things more efficiently than they would otherwise be able
to do. Students learn that useful technological development is a product of human knowledge, creativity, invention, innovation, motivation and demand for new products and systems. They learn that the natural and human-made designed worlds are different, and that tools and materials are used to alter the environment. Students learn that the development of emerging technology is exponential, driven by history, design, commercialization, and shaped by creative/inventive thinking, economic factors and cultural influences.*The core concepts of technology include
systems, resources, requirements, optimization and trade-offs, processes and controls.

Benchmark A: Compare and discuss the characteristics of technology in our community.

Grade Three

Natural or Human-made

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).

Tools, Materials, Skills

2. Identify technology in the classroom and discuss its use.

3. Demonstrate the use of technology in the classroom.

Creating Technology

4. List ways that society/government provides technology benefits for everyone (e.g., bus systems, water and sewage systems and mail delivery).

Benchmark B: Identify, describe and discuss the core concepts of technology.

Grade Three

Resources

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.

Processes

3. Describe how tools and machines extend human capabilities such as holding, lifting, carrying, fastening, separating and computing.

Benchmark C: Compare and discuss the relationships among technologies, and the connections between technology and other fields of study.

Grade Three

Connections

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.

Standard 2 Technology and Society Interaction

Students recognize interactions among society, the environment and technology, and understand technology's relationship with history. Consideration of these concepts forms a foundation for engaging in responsible and ethical use of technology.Students learn that the interaction between society and technology has an impact on their lives, that technology may have unintended consequences which may be helpful or harmful. They learn that interaction of technology will affect the economy, ethical standards, environment and culture. Students evaluate the impact of products or systems by gathering and synthesizing information, analyzing trends and drawing conclusions. Students analyze technological issues and the implications of using technology. They acquire technological understanding, and develop attitudes and practices that support ethical decision-making and lifelong learning.

Benchmark A: Define responsible citizenship relative to technology.

Grade Three
Technology and Citizenship
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.
Benchmark B: Investigate and explain the interrelationships between technology and the environment.
Grade Three
Technology and the Environment
1. Describe how technology affects the environment in positive and/or negative ways.
Benchmark C: Explain and demonstrate the influence of technology throughout history.
Grade Three
Technology and History
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.
Benchmark D: Practice responsible use of technology, understand school district guidelines for technology use, and explore technology ownership.
Grade Three
Intellectual Property
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).
Acceptable Use
3. Know that the district Acceptable Usage Policy (AUP) describes the rules for using classroom technology and the Internet.
Benchmark E: Identify development patterns and examine the influence of technology on the world.
Technology and Assessment
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.

Standard 3 Technology for Productivity Applications
Students learn the operations of technology through the usage of technology and productivity tools. Students use computer and multimedia resources to support their learning. Students understand terminology, communicate technically and select the appropriate technology tool based on their needs. They use technology tools to collaborate, plan and produce a sample product to enhance their learning, and solve problems by investigating, troubleshooting and experimenting using technical resources.
Benchmark A: Understand computer and multimedia technology concepts and communicate using the correct terminology.
Grade Three
Basic Concepts
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.
Benchmark B: Use appropriate tools and technology resources to complete tasks and solve problems.
Grade Three
Basic Operations
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).
Problem-solving
5. Show how you can find answers to problems using electronic resources including the Internet.

Productivity Tools
6. Tell a story using presentation software.
Keyboarding
7. Touch-type letters on the keyboard with both hands (e.g., begin to learn how to type/keyboard, use continuous keystrokes).
Benchmark C: Use productivity tools to produce creative works and prepare publications.
Grade Three
Productivity Tools
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).
CommunicationTools
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).

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. Students acquire and publish information in a variety of media formats. They incorporate communication design principles in their work. They use technology to disseminate information to multiple audiences. Students use telecommunication tools to interact with others. They collaborate in real time with individuals and groups who are located in different schools, communities, states and countries. Students participate in distance education opportunities which expand academic offerings and enhance learning.
Benchmark A: Identify the concepts and operations of communication systems.
Grade Three
Design Elements
1. Include the elements of design such as contrast, size and arrangement of student-created projects in print and electronic media.
Use of Communications
2. Discuss the costs and connectivity of simple communication systems (e.g., e-mail, phones, Internet services).
Benchmark B: Develop, publish and present information in print and digital formats.
Grade Three
Design Elements
1. Use graphic organizers to sequence and organize information and projects.
Multimedia Applications
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).
Use of Communications
5. Send and receive e-mail.
Benchmark C: Use technology communications to participate in online group collaborative interactive projects and activities.
Grade Three
Use of Communications
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).

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. Students become information-literate learners by utilizing a research process model. They recognize the need for information and define the problem, need or task. Students understand the structure of information systems and apply these concepts in acquiring and managing information. Using technology tools, a variety of resources are identified, accessed and evaluated. Relevant information is selected, analyzed and synthesized to generate a finished product. Students evaluate their information process and product.

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

Understanding Information

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).

Primary/Secondary Sources

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).

Benchmark B: Use technology to find information by applying a research process to decide what information is needed, to find sources, to use information and to check work.

Grade Three

Decide

1. Develop questions about an assigned topic and determine where the information may be found.

Find

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.

Use

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.

Check

7. Explain how information was selected.

Benchmark C: Use the Internet to find, use and evaluate information.

Grade Three

Internet Concepts

1. Label Internet browser elements and explain their function (e.g., toolbar and buttons, favorites/bookmarks, history).

Beginning Searching

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.

Benchmark D: Identify, access and use electronic resources from both free and fee-based Internet sources.

Grade Three

Electronic Resources

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.

Standard 6 <u>Design</u>

Students will apply a number of problem-solving strategies demonstrating the nature of design, the role of engineering and the role of assessment. Students recognize the attributes of design; that it is purposeful, based on requirements, systematic, iterative, creative, and provides solution and alternatives. Students explain critical design factors and/or processes in the development, application and utilization of technology as a key process in problem-solving. Students describe inventors and their inventions, multiple inventions that solve the same problem, and how design has affected their community. They apply and explain the contribution of thinking and procedural steps to create an appropriate design and the process skills required to build a product or system. They critically evaluate a design to address a problem of personal, societal and environmental interests. Students systematically solve a variety of types of problems using different design approaches including troubleshooting, research and development, innovation, invention and experimentation.

Benchmark A: Describe and apply a design process to solve a problem.

Grade Three

Design Process

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.

Research and Development

3. Identify and collect information about everyday problems that can be solved by technology (e.g., pollution, energy shortage, housing).

Technical Communication

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).

Evaluating, Testing the Solution

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?).

Benchmark B: Describe how engineers and designers define a problem, creatively solve it and evaluate the solution.

Grade Three

Innovation and Invention

1. Describe the importance of creativity in designing an object.

Strength and Materials

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).

Benchmark C: Understand the role of troubleshooting in problem-solving.

Grade Three

Technical Problem-solving

1. Describe how troubleshooting is a way to find out why something does not work so that it can be fixed.

Technical Careers

2. Identify people whose jobs regularly require them to troubleshoot (e.g., a cable repair person and a computer repair technician).

<u>Standard 7 Designed World</u>

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. Students learn that the designed world consists of technological systems* reflecting the modifications that humans have made to the natural world to satisfy their own needs and wants. Students understand how through the design process the resources: materials, tools and machines, information, energy, capital, time and people are used in the development of useful products and systems. Students develop a foundation of knowledge and skills through participation in technically oriented activities for the application of technological systems. Students demonstrate understanding, skills and proficient use of technological tools, machines, instruments, materials and processes across technological systems in unique and/or new contexts. Students identify and assess the historical, cultural, environmental, governmental and economic impacts of technological systems in the designed world. *The technological systems areas include energy and power technologies, transportation technologies, manufacturing technologies, construction technologies, information and communication technologies, medical technologies, agricultural and related biotechnologies.

Benchmark A: Develop an understanding of how physical technologies enhance our lives.

Grade Three

Energy and Power

1. Describe how life would be different if we did not have energy delivered to our homes.

Transportation

2. Describe how transportation systems move people and goods from place to place.

Manufacturing

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).

Construction

4. List systems that are used in buildings (e.g., electrical, heating and air conditioning, plumbing).

Benchmark B: Recognize appropriate modes of technical communication across technological systems.

Grade Three

Information and Communication

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.

Benchmark C: Develop an understanding of how bio-related technologies improve our lives.

Grade Three

Medical

1. Know that vaccines are designed to prevent diseases from developing and spreading; medicines are designed to relieve symptoms and stop diseases from developing.

Agriculture and Related Biotechnologies

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.