

OHIO ACADEMIC CONTENT STANDARDS TECHNOLOGY STANDARDS

Adopted from the Ohio Department of Education



Grade 10

New Richmond Exempted Village School District

Grade 10

Academic Correlation

Standard 1 ~ Nature of Technology

Benchmark A: Synthesize information, evaluate and make decisions about technologies.

1. Describe how the rate of technological development and diffusion is increasing rapidly.
2. Articulate how inventions and innovations are results of specific goal-directed research.
3. Explain how technological development is influenced by many factors, including profit incentive and market economy.

Benchmark B: Apply technological knowledge in decision-making.

1. Describe situations when the selection of resources involves trade-offs between competing values, such as availability, desirability, cost and waste (e.g., use of plastic in manufacturing has many advantages, but may put the environment at risk and deplete natural resources).

Benchmark C: Examine the synergy between and among technologies and other fields of study when solving technological problems.

1. Analyze technology transfer scenarios.
2. Describe how technological innovation often results when ideas, knowledge, or skills are shared within a technology.
3. Define examples of how technological progress is integral to the advancement of science, mathematics, and other fields of study.

Standard 2 ~ Technology and Society Interaction

Benchmark A: Interpret and practice responsible citizenship relative to technology.

1. Understand that the development of technology may be influenced by societal opinions and demands, in addition to corporate cultures (e.g., ways government policy has been shaped regarding energy policy).

2. Contrast ethical considerations and how they are important in the development, selection and use of technologies.

3. Provide examples of how transfer of a technology from one society to another can cause cultural, social, economic, and political changes affecting both societies to varying degrees (e.g., World War II industrial mobilization drew women and minorities into the work force).

4. Identify capabilities and limitations of contemporary and emerging technology resources and assess the potential of these systems and services to address personal, lifelong learning and workplace needs.

5. Analyze advantages and disadvantages of widespread use and reliance on technology in the workplace and in society as a whole.

Benchmark B: Demonstrate the relationship among people, technology and the environment.

1. Explain how, with the aid of technology, various aspects of the environment can be monitored to provide information for decision-making (e.g., satellites can be used to monitor wetlands in order to control disease spread by mosquitoes).

2. Understand that the appropriate design of technological devices and systems maximizes performance and reduces negative impacts on the environment.

Benchmark C: Interpret and evaluate the influence of technology throughout history, and predict its impact on the future.

1. Examine the social/economic climate for invention and innovation in different periods of history.

2. Explain how the evolution of civilization has been directly affected by, and has affected, the development and use of tools and materials.

Benchmark D: Analyze ethical and legal technology issues and formulate solutions and strategies that foster responsible technology usage.

1. Describe/discuss the ethical considerations involved in the development or deployment of a technology.

2. Analyze technology law, legislation and policy in context of user rights and responsibilities.

3. Understand the importance of diverse information and access to information in a democratic society.

Benchmark E: Assess the impact of products and systems.

1. Synthesize data, analyze trends and draw conclusions regarding the effect of technology on the individual, society and environment (e.g., current and historical time periods).

2. Produce graphs and/or charts to describe trends and visualize data.

3. Describe how a technological change has affected the local community (e.g., how a new highway has changed traffic and building patterns).

Standard 3 ~ Technology for Productivity Applications

Benchmark A: Integrate conceptual knowledge of technology systems in determining practical applications for learning and technical problem solving.

1. Apply strategies for identifying and solving routine hardware and software problems that occur during everyday use.

2. Analyze various types of connectivity, and list pros and cons of each.

3. Examine current and past devices for storing data and predict potential devices for the future.

Benchmark B: Identify, select and apply appropriate technology tools and resources to produce creative works and to construct technology-enhanced models.

1. Identify/recognize state-of-the-art technology tools for solving problems and managing personal/professional information.

2. Utilize advanced word processing and desktop publishing features and programs.

3. Use equipment related to computer and multimedia technology imaging (e.g., digitalization, optical characters recognition, scanning, calculators, computerized microscopes).

Standard 4 ~ Technology and Communication Applications

Benchmark A: Apply appropriate communication design principles in published and presented projects.

1. Identify and incorporate common organizational techniques used in electronic communication (e.g., cause and effect, compare and contrast, problem and solution strategies).

2. Manipulate communication design elements (image, language, sound and motion) based on intent of the message (e.g., inform or persuade).

3. Compare and contrast the accuracy of the message/communication product with the audience results (e.g., was the audience influenced by inaccurate information?).

4. Verify accessibility components of the communication product and adapt as needed.

Benchmark B: Create, publish and present information, utilizing formats appropriate to the content and audience.

1. Publish information in printed and electronic version, and select appropriate publication format (e.g., paper, Web, video).

2. Evaluate communication products.

Benchmark C: Identify communication needs, select appropriate telecommunication tools and design collaborative interactive projects and activities to communicate with others, incorporating emerging technologies.

1. Contribute to organized e-mail discussions (e.g., discussion list (list serv), threaded discussion list, courseware discussion).

2. Employ online communication capabilities to make inquiries, do research and disseminate results (e.g., develop dialogues on issues in U.S. government).

3. Implement online-structured learning experiences (e.g., tutorials, virtual classes, industry certification courses).

Standard 5 ~ Technology and Information Literacy

Benchmark A: Determine and apply an evaluative process to all information sources chosen for a project.

1. Examine information for its accuracy and relevance to an information need (e.g., for a report on pollution, find information from sources that have correct and current information related to the topic).
2. Identify relevant facts, check facts for accuracy and record appropriate information (e.g., follow a standard procedure to check information sources used in a paper).
3. Create a bibliography of sources in an electronic format.
4. Select appropriate information on two sides of an issue (e.g., identify the author of each information source and their expertise and/or bias).

Benchmark B: Apply a research process model to conduct research and meet information needs.

1. Select the essential question to be examined by the research.
2. Identify sources most likely to have the needed information and determine subjects and keywords to be used in searching magazine databases and other electronic reference resources.
3. Evaluate information and select relevant and pertinent information found in each source, and maintain accurate records of sources used.
4. Organize and analyze information, finding connections that lead to a final product.
5. Follow copyright law and guidelines, using standard bibliographic format to list sources.
6. Assess whether the essential questions are answered, gather more information and data and modify search terms as needed. Edit the product.
7. Review and evaluate research process and resources used (e.g., how can the research process be improved?).

Benchmark C: Formulate advanced search strategies, demonstrating an understanding of the strengths and limitations of the Internet, and evaluate the quality and appropriate use of Internet resources.

1. Construct an effective search strategy to retrieve relevant information through multiple search engines, directories and Internet resources.
2. Narrow or broaden the search strategy by modifying the keywords entered in the original search strategy.
3. Employ a systematic approach to judge the validity of Web information match against the defined information need (e.g., researching an author through the Web requires finding biographical information plus criticisms of the author's works).
4. Examine the information retrieved through Internet searching for authenticity of information, bias, currency, relevance and appropriateness.

Benchmark D: Evaluate choices of electronic resources and determine their strengths and limitations.

1. Choose a topic and identify appropriate electronic resources to use, citing the name and date of the resource medium database, archive collection.

2. Research and critique information in different types of subscription (fee-based) electronic resources to locate information for a curricular need.	
3. Investigate tools within electronic resources to generate search strategies (e.g., use a thesaurus to identify subject terms for improved retrieval of information).	
Standard 6 ~ Design	
Benchmark A: Identify and produce a product or system using a design process and evaluate the final solution and communicate findings.	
1. Discuss how requirements of a design, such as criteria, constraints, and efficiency, sometimes compete with each other.	
2. Apply the conceptual and technical principles that underpin design processes (e.g., the concept of contradiction, of constraints, separation principles, necessary condition logic instructions, and sufficient cause logic instructions).	
3. Explain the uniqueness principle in the design and development of systems and draw the distinction between design and research.	
4. Apply common statistical tools to solve problems (e.g., statistical process control).	
5. Describe several systems archetypes and how they explain the behavior of systems.	
6. Identify criteria and constraints for a design problem and determine how these will affect the design process (e.g., factors such as concept generation, development, production, marketing, fiscal matters, use, and disposability of a product or system).	
7. Understand the role of outsourcing in the engineering process and how effective communication is essential.	
8. Describe quality and how it is evaluated in a product or system.	
9. Select and use simulation in the design process.	
10. Describe how trademarks, patents and copyrights are obtained.	
Benchmark B: Recognize the role of teamwork in engineering design and of prototyping in the design process.	
1. Evaluate a design using established design principles, to collect data on the designs effectiveness, and suggest improvements (e.g., how can bicycles be made safer?).	
2. Explain how engineering design is influenced by personal characteristics, such as creativity, resourcefulness, and the ability to visualize and think abstractly.	
3. Build a prototype to test a design concept and make actual observations and necessary design adjustments.	
4. Explain how established design principles are used to evaluate existing designs, collect data and guide the design process.	
5. Identify where statistical tools might be used to identify problems in a system.	

6. Explain how gender-bias, racial-bias and other forms of stereotyping and discrimination can affect communication within an engineering team.	
7. Design a prototype using quality control measures (e.g., measuring, checking, testing, feedback).	
Benchmark C: Understand and apply research, development, and experimentation to problem solving.	
1. Explain why technological problems must be researched before they can be solved.	
2. Research previous solutions to a problem.	
3. Select and apply emerging technology in consultation with experts, for research, information analysis, problem solving and decision-making in content learning.	
4. Categorize inventions in each of the technology systems as one of the five levels of innovation (e.g., apparent or conventional solution, small invention inside paradigm, substantial invention inside technology, invention outside technology, discovery).	
Standard 7 ~ Designed World	
Benchmark A: Classify, demonstrate, examine, and appraise energy and power technologies.	
1. Identify the source of energy, conversion process, and load in a variety of power systems (e.g., tractor, electrical grid, elevator).	
2. Understand that all energy delivery systems need an infrastructure.	
3. Safely use the tools and processes of energy and power technological systems.	
4. Differentiate between open (e.g., irrigation, forced hot air system) and closed (e.g., forced hot water system, hydroponics) fluid systems and their components such as valves, controlling devices, and metering devices.	
5. Differentiate among conduction, convection, and radiation in a thermal system (e.g., heating and cooling a house, cooking).	
6. Identify and explain the components of a circuit including a source, conductor, load, and controllers (controllers are switches, relays, diodes, transistors, integrated circuits).	
7. Explain the relationship between resistance, voltage, and current (Ohm's Law).	
8. Build energy and power devices using the appropriate technological tools, machines, equipment, materials, and technical processes to solve a problem in the community.	
Benchmark B: Classify, demonstrate, examine, and appraise transportation technologies.	
1. Describe how transportation services and methods have led to a population that is regularly on the move.	
2. Describe the factors that influence the cost of producing technological products and systems in transportation technologies.	

Benchmark C: Classify demonstrate, examine and appraise manufacturing technologies.	
1. Demonstrate how the interchangeability of parts increases the effectiveness of manufacturing processes (e.g., manufacture a product using interchangeable parts, repair a product using replacement parts).	
2. Use marketing to establish a product's viability and identity, conduct research on its potential, advertise it, package it, distribute it and sell it.	
3. Explain the manufacturing processes of casting and molding, forming, separating, conditioning, assembling, and finishing.	
4. Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.	
5. Identify and investigate modern production technology practices and equipment in manufacturing technologies (e.g., just-in-time, lean production, six-sigma, new automation processes, systems, materials, tools).	
Benchmark D: Classify, demonstrate, examine and appraise construction technologies.	
1. Construct a structure using a variety of processes and procedures (e.g., material use, how it is assembled, and skill level of worker).	
2. Describe how structures can include prefabricated materials (e.g., residences, bridges, commercial buildings).	
3. Identify and explain the purposes of common tools and measurement devices used in construction (e.g., spirit level, laser transit, framing square, plumb bob, spring scale, tape measure, strain gauge, venturi meter, pitot tube).	
4. Identify and explain the engineering properties of materials used in structures (e.g., elasticity, plasticity, thermal conductivity, density).	
5. Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.	
6. Identify and investigate modern production technology practices and equipment in construction technologies (e.g., new building techniques, materials, tools).	
Benchmark E: Classify, demonstrate, examine and appraise information and communication technologies.	
1. Use multiple ways to communicate information, such as graphic and electronic means (e.g., graphic—printing and photochemical processes; electronic—computers, DVD players, digital audiotapes, MP3 players, cell and satellite phones; multimedia—audio, video, data).	
2. Communicate technological knowledge and processes using symbols, measurement, conventions, icons, graphic images and languages that incorporate a variety of visual, auditory and tactile stimuli.	
3. Identify and explain the applications of light in communications (e.g., reflection, refractions, additive, and subtractive color theory).	
4. Compare the difference between digital and analog communication devices.	

Benchmark F: Classify, demonstrate, examine and appraise medical technologies.	
1. Describe how technology has impacted medicine in the areas of prevention, diagnostic, therapeutic treatment and forensics (e.g., medical tools, instruments, materials, monitoring equipment).	
2. Describe how medicines and treatments have both positive and negative effects.	
Benchmark G: Classify, demonstrate, examine, and appraise agricultural and related biotechnologies.	
1. Explain the conservation practices of controlling soil erosion, reducing sediment (contamination) in waterways, conserving water, and improving water quality (e.g., terraces as used in gardens and farmland).	
2. Grow a plant using hydroponics and traditional methods and compare the results.	
3. Prioritize and apply appropriate safety measures when working with agricultural and related biotechnologies.	