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: Recognize the characteristics and scope of technology.
Grade Two
Technology Characteristics
1. Contrast between characteristics that separate natural processes and human-made designed world (e.g., appearance, structure, material).
2. Describe and give examples of how people use tools and processes to solve problems (e.g., using a knife to make a peanut butter sandwich, or using a measuring cup while following a recipe to make a cake).
3. Recall common terms, facts and basic concepts relative to technology (e.g., types of computer equipment, devices by purpose).

Benchmark B: Describe and give examples of technology's core concepts: systems, resources and processes.
Grade Two
Systems
1. Identify and explain that systems have parts or components such as processes and controls that work together to accomplish a goal (e.g., to heat food in a microwave oven, electricity is generated and transmitted, temperature and cook time is controlled).
2. Identify the various component parts of familiar systems and articulate the goals that are accomplished with them (e.g., in a plumbing system, pipes deliver water, the faucet controls the flow).
Processes
3. Describe, identify and demonstrate appropriate systematic
planning strategies in order to complete a task (e.g., steps required to bake cookies, how to complete a class project).

Benchmark C: Describe the relationships among technologies, and the connections between technology and other fields of study.
Grade Two
Connections
1. Describe how problems lead to invention and innovation (e.g., the invention and development of earmuffs).
2. Explore the use of technology in different fields of study (e.g., school subjects, careers and technologies common to them).

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: Identify responsible citizenship relative to technology and its use.

Grade Two

Technology and Citizenship

1. Discuss how making products meets our needs and wants.

2. Give examples of how the use of tools and machines can be helpful and/or harmful.

Benchmark B: Recognize that technology has an interrelationship with the environment.

Grade Two

Technology and the Environment

1. Explain ways communities can manage waste to keep people safe.

2. Classify and differentiate among materials that can be reused and/or recycled (e.g., paper can be recycled to make new products).

Benchmark C: Describe and demonstrate how technology has had an influence on our world.

Grade Two

Technology and History

1. Demonstrate and give examples of how technology has changed the way people lived and worked throughout history.

Benchmark D: Collect information about products and discuss whether solutions create positive or negative results.

Grade Two

Technology Assessment

1. Identify businesses and industries in the community and describe the products or services provided.

2. Determine if the human use of a product or system creates positive or negative results (e.g., large parking lots for cars may cause water run-off problems).

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 basic computer and multimedia technology concepts and terminology.

Kindergarten

Grade Two

Basic Concepts

1. Identify and describe the purpose of various types of computer and multimedia technology (e.g., what is it and what does it do?).

2. Use correct terminology when talking about computers and multimedia technology.

Basic Operations

3. Know that software is necessary to operate computer technology.

4. Use a variety of computer and multimedia technology resources for directed learning activities (e.g., computer, VCR/DVD player, audio player, camera).

Benchmark B: Demonstrate operation of basic computer and multimedia technology tools.

Grade Two

Responsible Usage

1. Demonstrate proper care of computer and multimedia technology resources.

Basic Operations

2. Identify and use input and output devices to operate and interact with computers and multimedia technology resources (e.g., scanner, digital camera, video camera).

Problem-solving

3. Demonstrate problem-solving skills within a software application.

Productivity Tools

4. Develop a slide show presentation with teacher assistance (e.g., small groups work together to create slides or hypermedia products).
Beginning Keyboarding
5. Use proper keyboarding techniques (e.g., placing their fingers on home row keys).
Benchmark C: Use productivity tools to produce creative works.
Grade Two
Productivity Tools
1. Use productivity tools with teacher assistance (e.g., word processing, presentations, drawing programs).
Research Tools
2. Use technology resources with teacher assistance for communication and illustration of thoughts and ideas (e.g., creative stories, drawings, presentations, publication software).

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: Investigate the nature and operation of communication systems.
Grade Two
Media Formats
1. Use media to view information.
2. Participate in the creation of media products (e.g., use appropriate communication tools with teacher assistance).
Benchmark B: Explore how information can be published and presented in different formats.
Grade Two
Productivity Tools
1. Use graphic organizers to plan a presentation (e.g., graphic
organizing, charting or mapping software).
2. Compare digital graphic images used to portray a topic (e.g., students are given images on the same topic from two different sources and explain why one may be better for the assignment than another).
Communication Tools
3. Present information in an electronic format, including text, graphics or multimedia (e.g., write and illustrate a story based on writing prompt, slide show or photo album).
4. Compose class e-mail (e.g., each student has an opportunity to contribute ideas for e-mail messages related to their studies).
Benchmark C: Participate in group projects and learning activities using technology communications.
Grade Two
Use of Communications
1. Use e-mail to share information in a teacher-directed group e-mail activity (e.g., comparing class information with another class at a remote location).
2. Participate in communication sessions (e.g., e-mail, video conferencing, phones, interact with other classes in teacher-directed online project).

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: State what information is, and show where it can be found.
Grade Two
Understanding Information
1. Tell about the purposes for information use (e.g., information is helpful to solve problems, find answers, learn).
2. Distinguish between fact and fiction (e.g., discuss and compare a fact-based document about a topic with a story about the same topic).
Benchmark B: Use a simple research process model which includes deciding what to use, finding resources, using information and checking work to generate a product.
Grade Two
Decide
1. Discuss the question assigned by the teacher and where the information might be found.
Find
2. Use the online library catalog to locate information sources by title, author or subject.
3. Select needed information from teacher-selected Web sites, electronic encyclopedias and other electronic collections.
Use
4. Record and organize information to generate a product.
5. Give credit to the sources used for work by listing the author and the name of the source.
Check
6. Tell how information was found.
Benchmark C: Apply basic browser and navigation skills to find information from the Internet.
Grade Two
Internet Concepts
1. Demonstrate the use of browser elements including the toolbar, buttons, favorites or bookmarks, and tell their function.
2. Search for information in an online encyclopedia using a topical search (e.g., choose from a list of topics, moving from broad—animals, to more specific—panda).
3. Read information from a Web site assigned by teacher and identify the name and topic of the Web site.

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. 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: Identify problems and potential technological solutions.
Grade 2
Technical Problem-solving
1. Describe how experience has helped in solving a new problem (e.g., painting skills can be applied to different materials and similarities in software program operation).
2. Brainstorm multiple solutions to problems to be solved by the design process (e.g., how to transport a piece of paper in order to turn in an assignment across the classroom).
3. Plan, construct and evaluate a model to test a problem's solution (e.g., to harness wind energy, build a model windmill).
Innovation and Invention

4. Demonstrate how design is a creative process (e.g., each student brings in an old, pre-owned toothbrush and looks at the differences).
Benchmark B: Understand that changes in design can be used to strengthen or improve an object.
Grade Two
Strength and Materials
1. Describe a situation where a technology failed because it was not strong enough (e.g., a bike, wagon or swing that was broken when too much weight was on it).
2. Recognize that when weaker materials are combined together they become stronger (e.g., one thread is easy to break, but combined into a rope they are strong).
Design Process
3. Distinguish the engineering design process elements of identifying a problem, looking for ideas, developing solutions and sharing solutions with others.
Technical Communication
4. Describe why expressing ideas to others verbally and through sketches and models is an important part of the design process (e.g., provides opportunity to test ideas, better plan the work, and organize needed tools and materials).
Benchmark C: Explore how products are invented and repaired.
Grade Two
Technical Problem-solving
1. List steps to follow to test something that has malfunctioned (e.g., steps followed to check a computer, radio or game player that is not working properly).
Design Process
2. Describe something that you think should be invented (e.g., an airplane kids can pilot, a doll that can jump rope).
Inventors/Inventions
3. Identify famous inventors and products available today based on their inventions.

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.
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 the goals in physical technologies.
Grade Two
Energy and Power
1. Describe various ways energy can be conserved (e.g., limiting the number of times the refrigerator/freezer doors are opened; not leaving the water running while brushing your teeth).
2. List job titles that are in the technological system of energy and power technologies (e.g., auto mechanic, electric, lineperson, coal miner).
Transportation
3. Understand that transportation vehicles need to be cared for to prolong their use (e.g., scheduled maintenance on cars).
4. List job titles that are in the technological system of transportation technology (e.g., driver, pilot, captain, attendant, reservations agent).

Manufacturing
5. Explain that manufactured products are designed.
6. List job titles that are in the technological system of manufacturing technology (e.g., engineer, machinist, repair person, marketer, industrial designer).
Construction
7. Explain how the type of a structure determines how parts are put together (e.g., bricks, lumber, concrete).
8. List job titles that are in the technological system of construction technology (e.g., carpenter, architect, building inspector, bulldozer operator, plumber).
Benchmark B: Develop an understanding of the goals of informational technologies.
Grade Two
Information and Communication
1. Understand that information is data that has been organized (e.g., make a table of data that has been collected).
2. List job titles that are in the technological system of information and communication technologies (e.g., reporter, camera person, printer, newscaster).
Benchmark C: Develop an understanding of the goals of bio-related technologies.
Grade Two
Medical
1. List products designed specifically to help people take care of themselves (e.g., toothbrush, soap, clothing).
2. List job titles that are in the technological system of medical technology (e.g., nurse, doctor, emergency medical technician).
Agriculture and Related Biotechnologies
3. Describe how the use of technologies in agriculture makes it possible to conserve resources (e.g., computer controlled machinery, equipment and facilities).
4. List job titles that are in the technological system of agricultural and related biotechnologies (e.g., farmer, picker, bottler, scientist and grocer).