**Diocese of Sioux City**

**21st Century Skills Standards and Benchmarks**

**Technology Literacy**

**Grade Level 6-8**

**Standard 1:** Technology Literacy: **Each Iowa student will be empowered with the technological knowledge and skills to learn effectively and live productively.**

1. **Grade Level Benchmark:** Demonstrate creative thinking in the design and development of innovative technology products and problem solving.

**Objective(s):**

1. Design, develop, create, and/or test digital technology products.

 a. Understands that nonphysical objects and physical objects are both subject to the design process

 b. Knows that invention is the process of creating a new system or object out of an idea while innovation is the process of modifying an existing system or object to improve it

1. Individually or collaboratively create media-rich products and display, publish, or perform them for a variety of audiences.

 a. Designs a solution or product, taking into account needs and constraints

1. Use simulations to help understand complex, real-world systems, identify problems, develop models, and analyze the output.

 a. Designs a solution or product, taking into account needs and constraints

 b. Understands that nonphysical objects and physical objects are both subject to the design process

 c. Assembles and disassembles systems to manage, control, and improve their performance

 d. Knows that systems are usually linked to other systems, both internally and externally, and can contain subsystems as well as operate as subsystems

1. Investigate global issues and make informed choices based on knowledge of technology systems, resources, and services.

 a. Knows ways in which technology has influenced the course of history

1. **Grade Level Benchmark:** Collaborate with peers, experts, and others using interactive technology.

**Objective(s):**

1. Interact and collaborate with peers, experts, and others using technology.
2. Designs and creates web pages and simple websites (e.g., incorporates text, images, video, and audio; incorporates navigation and linking; publishes files on local and remote systems)
3. Implements a proposed design
4. Contribute to a content knowledge base by creating, producing, and sharing information, models, and other creative works.
5. Designs and creates web pages and simple websites (e.g., incorporates text, images, video, and audio; incorporates navigation and linking; publishes files on local and remote systems)
6. Implements a proposed design
7. Efficiently use technology tools and resources for communication and to access remote information and exchange it with a variety of audiences.
8. Designs and creates web pages and simple websites (e.g., incorporates text, images, video, and audio; incorporates navigation and linking; publishes files on local and remote systems)
9. Engage in learning activities with learners from other countries and/or cultures using telecommunication tools to create, produce, and share information, models, and other projects with a global or cultural focus.
10. Share knowledge and skills with local or distant teams of peers, experts, or others using technology tools and resources to create group works and/or innovative solutions.
11. **Grade Level Benchmark:** Plan strategies utilizing digital tools to gather, evaluate, and use information.

**Objective(s):**

1. Create a plan for the use of digital tools and resources to investigate a real-world issue.
2. Uses boolean searches to execute complex searches on a database.
3. Knows that scientific inquiry and technological design have similarities and differences
4. Knows that the design process is a slow, methodical process of test and refinement
5. Locate, organize, analyze, evaluate, and synthesize information from a variety of sources and media and use this information in a legal and ethical manner.
6. Understands and uses a variety of input devices (e.g., keyboard, scanner, speech recognition, mouse, touch screen, stylus, digital camera, digital video printer, MP3 player)
7. Uses a spreadsheet to update, add, and delete data, and to write and execute valid formulas on data
8. Uses Boolean searches to execute complex searches on a database
9. Designs and creates web pages and simple websites (e.g., incorporates text, images, video, and audio; incorporates navigation and linking; publishes files on local and remote systems)
10. Knows that technology and science have a reciprocal relationship
11. Knows ways in which technology and society influence one another
12. Knows ways technology is used to protect the environment and prevent damage caused by nature
13. Knows that the design process is a slow, methodical process of test and refinement
14. Identifies the elements, structure, operation, and control of systems
15. Evaluate resources in terms of their usefulness and validity for research.
16. Understands and uses a variety of input devices (e.g., keyboard, scanner, speech recognition, mouse, touch screen, stylus, digital camera, digital video printer, MP3 player)
17. Uses a spreadsheet to update, add, and delete data, and to write and execute valid formulas on data
18. Evaluates the ability of a technological design to meet criteria established in the original purpose, suggests improvements, and tries proposed modifications
19. Understands ways in which medical technology improves the quality of health care
20. Knows ways in which biotechnology results in benefits for humans, including more convenience, less labor, improved health and medicine, and improved food
21. Knows that most technological systems require an input of energy, which is an important consideration both in designing an object or a system and in conserving energy
22. Use technological tools to select data and organize it into a format that is easily understood by others

 a. Evaluates the ability of a technological design to meet criteria established in the original purpose, suggests improvements, and tries proposed modifications

1. **Grade Level Benchmark:** Use critical thinking skills to conduct research, solve problems, and make informed decisions using appropriate technological tools and resources.

**Objective(s):**

1. Identify real-world issues and analyze technological resources for developing and refining questions for investigation.

 a. Knows that scientific inquiry and technological design have similarities and differences

 b. Knows that technology and science have a reciprocal relationship

 c. Knows ways in which technology and society influence one another

 d. Knows ways technology is used to protect the environment and prevent damage caused by nature

 e. Identifies appropriate problems which can be solves using technological design

 f. Understands that nonphysical objects and physical objects are both subject to the design process

 g. Identifies the elements, structure, sequence, operation, and control of systems

 h. Knows that an open-loop system has no feedback and requires human intervention, where a closed-loop system uses feedback

 i. Knows the components of a communication system

 j. Knows that individual transportation vehicles contain several subsystems

 k. Knows that manufacturing processes use hand tools, human-operated machines, and automated machines to separate, form, combine, and condition natural and synthetic materials; these changes may either be physical or chemical

 l. Knows that construction design is influenced by factors such as building laws and codes, style, convenience, cost, climate, and function

1. Effectively use multiple technological resources to develop a systematic plan for conducting research.  Develop possible solutions or a complete product to demonstrate knowledge and skills.

 a. Knows that the design process relies on different strategies; creative brainstorming to establish many design solutions, evaluating the feasibility of various solutions in order to choose a design, and troubleshooting the selected design

 b. Designs a solution or product, taking into account needs and constraints

 c. Knows how part of a system can provide feedback when its output (in the form of material, energy, or information) becomes input for another part of the system

1. Use technology to gather, analyze, and assess data and its effectiveness to design, develop and test possible solutions that assist students in making decisions.

 a. Knows that science cannot answer all questions and technology cannot solve all human problems or meet all human needs

 b. Knows ways in which technology has influenced the course of history

 c. Knows ways technology is used to protect the environment and prevent damage caused by nature

 d. Knows that the design process relies on different strategies; creative brainstorming to establish many design solutions, evaluating the feasibility of various solutions in order to choose a design, and troubleshooting the selected design

 e. Designs a solution or product, taking into account needs and constraints

 f. Understands that nonphysical objects and physical objects are both subject to the design process

 g. Understands ways in which medical technology improves the quality of health care

 h. Knows ways in which biotechnology results in benefits for humans, including more convenience, less labor, improved health and medicine, and improved food

 i. Knows that most technological systems require an input of energy, which is an important consideration both in designing an object or a system and in conserving energy

1. Analyze and evaluate information from a variety of perspectives and resources in order to assess multiple solutions and investigate them from differing viewpoints.

 a. Knows that the design process relies on different strategies; creative brainstorming to establish many design solutions, evaluating the feasibility of various solutions in order to choose a design, and troubleshooting the selected design

 b. Designs a solution or product, taking into account needs and constraints

 c. Knows how part of a system can provide feedback when its output (in the form of material, energy, or information becomes input for another part of the system

1. **Grade Level Benchmark:** Understand the legal and ethical issues of technology as related to individuals, cultures, and societies.

**Objective(s):**

1. Use technology efficiently and in a manner that does not harm them or others.
2. Designs and creates web pages and simple websites (e.g., incorporates text, images, video, and audio; incorporates navigation and linking; publishes files on local and remote systems)
3. Knows examples of copyright violations and computer fraud and possible penalties
4. Knows etiquette rules when using the Internet
5. Knows that construction design is influenced by factors such as building laws and codes, style, convenience, cost, climate and function
6. Demonstrate awareness of legal and ethical responsibilities when using copyrighted material, and how a disregard of legal and ethical responsibilities affects others.

 a. Knows etiquette rules when using the Internet

1. Use online resources to work with others to complete a task and accept responsibility for the results.
2. Uses advanced features and utilities of word processors (e.g., uses clip art, spell-checker, grammar checker, thesaurus, outliner)
3. Knows ways technology is used to protect the environment and prevent damage caused by nature
4. Knows examples of copyright violations and computer fraud and possible penalties
5. Knows etiquette rules when using the Internet
6. Identify capabilities of contemporary technology resources.

a. Designs and creates web pages and simple websites (e.g., incorporates text, images, video, and audio; incorporates navigation and linking; publishes files on local and remote systems)

b. Knows etiquette rules when using the Internet

1. Develop examples of how technology systems and services can assist them in pursuing personal interests.
2. **Grade Level Benchmark:** Understand the underlying structure and application of technology systems.

**Objective(s):**

1. Utilize technology for everyday use and understand how technology systems can be applied to various situations.
2. Knows the differing capacities and trade-offs for computer storage media (e.g., local, removable, remote)
3. Knows basic characteristics and functions of an operating system.
4. Knows that a system can include processes as well as components
5. Knows how part of a system can provide feedback when its output (in the form of material, energy, or information0 becomes input for another part of the system
6. Identifies the elements, structure, sequence, operation, and control of systems
7. Assembles and disassembles systems to manage, control, and improve their performance
8. Understands ways in which medical technology improves the quality of health care
9. Knows ways in which biotechnology results in benefits for humans, including more convenience, less labor, improved health and medicine, and improved food
10. Knows that most technological systems require an input of energy, which is an important consideration both in designing an object or a system and in conserving energy
11. Knows the components of a communication system
12. Knows that individual transportation vehicles contain several subsystems
13. Knows that manufacturing processes use hand tools, human-operated machines, and automated machines to separate, form, combine, and condition natural and synthetic materials; these changes may either be physical or chemical
14. Knows that construction design is influenced by factors such as building laws and codes, style, convenience, cost, climate, and function
15. Select and use technology applications to conduct research, solve problems and produce finished products.
16. Uses advanced features and utilities of word processors (e.g., uses clip art, spell-checker, grammar checker, thesaurus, outliner)
17. Knows the common features and uses of desktop publishing software (e.g., documents are created, designed, and formatted for publication; data, graphics, and scanned images can be imported into a document using desktop software)
18. Knows the common features and uses of spreadsheets (e.g., data is entered in cells identified by row and column; formulas can be used to update solutions automatically; spreadsheets are used in print form, such as look-up tables, and electronic form, such as to track business profit and loss)
19. Uses a spreadsheet to update, add, and delete data, and to write and execute valid formulas on data
20. Assembles and disassembles systems to manage, control, and improve their performance
21. Knows that systems are usually linked to other systems, both internally and externally, and can contain subsystems as well as operate as subsystems
22. Identify the source of a problem with technology, and, if necessary, the appropriate support personnel needed.

 a. Knows that the design process relies on different strategies; creative brainstorming to establish many design solutions, evaluating the feasibility of various solutions in order to choose a design, and troubleshooting the selected design

1. Apply knowledge of technology to explore other technologies and be able to identify commonalities among them.

 a. Knows that invention is the process of creating a new system or object out of an idea while innovation is the process of modifying an existing system or object to improve it