

## **ISTE NETS-S 2007**

### **1. Creativity and Innovation**

Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students:

- a. apply existing knowledge to generate new ideas, products, or processes.
- b. create original works as a means of personal or group expression.
- c. use models and simulations to explore complex systems and issues.
- d. identify trends and forecast possibilities.

[McREL Topic: Invention & Innovation](#)

### **2. Communication and Collaboration**

Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. Students:

- a. interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media.
- b. communicate information and ideas effectively to multiple audiences using a variety of media and formats.
- c. develop cultural understanding and global awareness by engaging with learners of other cultures.
- d. contribute to project teams to produce original works or solve problems.

[McREL Topic: Communications Systems](#)

### **3. Research and Information Fluency**

Students apply digital tools to gather, evaluate, and use information. Students:

- a. plan strategies to guide inquiry.
- b. locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
- c. evaluate and select information sources and digital tools based on the appropriateness to specific tasks.
- d. process data and report results.

[McREL Topic: Computer networks/Internet](#)

### **4. Critical Thinking, Problem Solving, and Decision Making**

Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. Students:

- a. identify and define authentic problems and significant questions for investigation.
- b. plan and manage activities to develop a solution or complete a project.
- c. collect and analyze data to identify solutions and/or make informed decisions.
- d. use multiple processes and diverse perspectives to explore alternative solutions.

[McREL Topic: Computer networks/Internet](#)

[McREL Topic: Impact of Technology](#)

[McREL Topic: Uses of Technology](#)

### **5. Digital Citizenship**

Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. Students:

- a. advocate and practice safe, legal, and responsible use of information and technology.
- b. exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.
- c. demonstrate personal responsibility for lifelong learning.
- d. exhibit leadership for digital citizenship.

[McREL Topic: Ethics, the law and technology](#)

[McREL Topic: Impact of Technology](#)

[McREL Topic: Technology in society](#)

[McREL Topic: Uses of Technology](#)

[McREL Topic: Advances in technology](#)

[McREL Topic: Technological design and development](#)

## 6. Technology Operations and Concepts

Students demonstrate a sound understanding of technology concepts, systems, and operations. Students:

- a. understand and use technology systems.
- b. select and use applications effectively and productively.
- c. troubleshoot systems and applications.
- d. transfer current knowledge to learning of new technologies.

[McREL Topic: Computer hardware](#)

[McREL Topic: Computer maintenance and troubleshooting](#)

[McREL Topic: Computer networks/Internet](#)

[McREL Topic: Computer operation](#)

[McREL Topic: Computer software](#)

[McREL Topic: Spreadsheets/databases](#)

[McREL Topic: Typing](#)

[McREL Topic: Uses of Technology](#)

[McREL Topic: Word processing/desktop publishing](#)

[McREL Topic: Interaction of system components](#)

## Student Profiles:

### Grades PreK-2

1. Illustrate and communicate original ideas and stories using digital tools and media-rich resources. (1, 2)  
Uses computers for a variety of purposes (e.g., playing games, listening and interacting with storybooks, working with numbers, drawing) McREL:2
2. Identify, research, and collect data on an environmental issue using digital resources and propose a developmentally appropriate solution. (1, 3, 4)  
Uses computers for a variety of purposes (e.g., playing games, listening and interacting with storybooks, working with numbers, drawing) McREL:2
3. Engage in learning activities with learners from multiple cultures through e-mail and other electronic means. (2, 6)
4. In a collaborative work group, use a variety of technologies to produce a digital presentation or product in a curriculum area. (1, 2, 6)  
Uses computers for a variety of purposes (e.g., playing games, listening and interacting with storybooks, working with numbers, drawing) McREL:2
5. Find and evaluate information related to a current or historical person or event using digital resources. (3)  
Knows that communication technology allows people to exchange and find information quickly, cheaply, and reliably over a distance McREL:6
6. Use simulations and graphical organizers to explore and depict patterns of growth such as the life cycles of plants and animals. (1, 3, 4)  
Uses computers for a variety of purposes (e.g., playing games, listening and interacting with storybooks, working with numbers, drawing) McREL:2
7. Demonstrate the safe and cooperative use of technology. (5)  
Handles diskettes and other computer equipment with care McREL:1  
Understands that when an individual creates something on a computer, the created work is that person's property, and only that person has the right to change it McREL:3
8. Independently apply digital tools and resources to address a variety of tasks and problems. (4, 6)  
Knows that tools have specific functions, such as to observe, measure, make things, and do things better or more easily; selecting the right tool makes the task easier McREL:4  
Knows that because there may be multiple solutions to a design problem, each appropriate to different situations, many creative ideas can be useful McREL:4
9. Communicate about technology using developmentally appropriate and accurate terminology. (6)  
Knows names of basic computer hardware (e.g., mouse, keyboard, touch screen) McREL:1  
Understands that actions can control software programs McREL:2  
Knows basic distinctions among computer software programs, such as word processors, special purpose programs, and games McREL:2  
Knows that communication technology allows people to exchange and find information quickly, cheaply, and reliably over a distance McREL:6
10. Demonstrate the ability to navigate in virtual environments such as electronic books, simulation software, and Web sites. (6)  
Uses computers for a variety of purposes (e.g., playing games, listening and interacting with storybooks, working with numbers, drawing) McREL:2  
Knows that communication technology allows people to exchange and find information quickly, cheaply, and reliably over a distance McREL:6

## Grades 3-5

1. Produce a media-rich digital story about a significant local event based on first-person interviews. (1, 2, 3, 4)  
Uses a word processor to edit, copy, move, save, and print text with some formatting (e.g., centering lines, using tabs, forming paragraphs) McREL:2
2. Use digital-imaging technology to modify or create works of art for use in a digital presentation. (1, 2, 6)
3. Recognize bias in digital resources while researching an environmental issue with guidance from the teacher. (3, 4)  
Knows that technology facilitates better communication by providing storage and retrieval of large amounts of data, an easy means of accessing data, a means of processing and displaying data, and faster communication among individuals McREL:6
4. Select and apply digital tools to collect, organize, and analyze data to evaluate theories or test hypotheses. (3, 4, 6)  
Knows the common features and uses of databases (e.g., databases contain records of similar data, which is sorted or organized for ease of use; databases are used in both print form, such as telephone books, and electronic form, such as computerized card catalogs) McREL:2  
Uses database software to add, edit, and delete records, and to find information through simple sort or search techniques McREL:2  
Knows that the design process is a series of methodical steps for turning ideas into useful products and systems McREL:4  
Knows constraints that must be considered when designing a solution to a problem (e.g., cost, materials, time, space, safety, scientific laws, engineering principles, construction techniques, appearance, environmental impact, what will happen if the solution fails) McREL:4  
Evaluates a product or design (e.g., considers how well the product or design met the challenge to solve a problem; considers the ability of the product or design to meet constraints), and makes modifications based on results McREL:4
5. Identify and investigate a global issue and generate possible solutions using digital tools and resources. (3, 4)  
Knows that technology facilitates better communication by providing storage and retrieval of large amounts of data, an easy means of accessing data, a means of processing and displaying data, and faster communication among individuals McREL:6
6. Conduct science experiments using digital instruments and measurement devices. (4, 6)  
Identifies a simple problem that can be solved using technology McREL:4  
Uses appropriate tools, techniques, and quantitative measurements to implement proposed solutions McREL:4  
Knows that people have invented and used tools throughout history to solve problems and improve ways of doing things McREL:4  
Knows that medical technology is used to provide information about a patient's body (e.g., measuring blood glucose levels) and to repair, replace, and support parts of the body McREL:6
7. Conceptualize, guide, and manage individual or group learning projects using digital planning tools with teacher support. (4, 6)  
Knows that group collaboration is useful as the combination of multiple creative minds can yield more possible design solutions McREL:4
8. Practice injury prevention by applying a variety of ergonomic strategies when using technology. (5)  
Uses proper fingering for all keys, beginning from the home row, maintaining proper posture while using the keyboard McREL:1

9. Debate the effect of existing and emerging technologies on individuals, society, and the global community. (5, 6)

Knows that technologies often have costs as well as benefits and can have an enormous effect on people and other living things McREL:3

Knows areas in which technology has improved human lives (e.g., transportation, communication, nutrition, sanitation, health care, entertainment) McREL:3

Knows that new inventions often lead to other new inventions and ways of doing things McREL:3

Knows that new inventions reflect people's needs and wants, and when these change, technology changes to reflect the new needs and wants McREL:3

Understands that technology may affect the environment both negatively and positively (e.g., a mass transit system may both reduce the number of cars in an area, but also cause harm to wildlife in the area) McREL:3

Knows that medical technology is used to provide information about a patient's body (e.g., measuring blood glucose levels) and to repair, replace, and support parts of the body McREL:6

Knows that elements of an agricultural system are designed to maximize the interaction and production of all the elements in the system (e.g., by composting, using plants for food, oxygen, and water and air filtration) McREL:6

Knows that different types of energy (e.g., solar, fossil fuels) have different advantages and disadvantages (e.g., solar energy is a cleaner source of energy than fossil fuels, but currently is more expensive), and that regardless of the source of energy, the technological design should attempt to maximize the use of it McREL:6

Knows that technology facilitates better communication by providing storage and retrieval of large amounts of data, an easy means of accessing data, a means of processing and displaying data, and faster communication among individuals McREL:6

Knows that transportation systems affect society (e.g., where people live) and are affected by society and nature (e.g., activists may request more public transit, a severe thunderstorm may cause flights to be canceled) McREL:6

Knows that manufacturing processes include designing the product, gathering natural and/or synthetic resources, and final production McREL:6

Knows that construction technology requires building materials, specialized tools and machines, money, time, energy, land, and human work and that the final structures are subject to local building codes McREL:6

Knows that buildings require several subsystems (e.g., a phone system, heating) and these subsystems may be associated with other types of technology (e.g., communications, energy) McREL:6

10. Apply previous knowledge of digital technology operations to analyze and solve current hardware and software problems. (4, 6)

Knows the basic functions of hardware (e.g., keyboard and mouse provide input; printer and monitor provide output; hard and floppy disk provide storage; the cpu processes information) McREL:1

Knows potential hazards to computer media (e.g., the damage caused to floppies by magnetic fields, dirt, and dust; caused to computers by excessive heat, smoke, and moisture) McREL:1

Knows basic facts about networked computers (e.g., computers can connect to each other via modem and telephone line, or through local network systems, or internet and intranet) McREL:1

Trouble-shoots simple problems in software (e.g., re-boots, uses help systems) McREL:2

Knows how formats differ among software applications (e.g., word processing files, database files) and hardware platforms (e.g., Macintosh, Windows) McREL:2

## Grades 6-8

1. Describe and illustrate a content-related concept or process using a model, simulation, or concept-mapping software. (1, 2)
2. Create original animations or videos documenting school, community, or local events. (1, 2, 6)
3. Gather data, examine patterns, and apply information for decision making using digital tools and resources. (1, 4)  
Uses a spreadsheet to update, add, and delete data, and to write and execute valid formulas on data McREL:2  
Uses boolean searches to execute complex searches on a data base McREL:2  
Identifies appropriate problems which can be solved using technological design (e.g., identifies a specific need, considers its various aspects, considers criteria for a suitable product) McREL:4  
Designs a solution or product, taking into account needs and constraints (e.g., cost, time, trade-offs, properties of materials, safety, aesthetics) McREL:4  
Implements a proposed design (e.g., organizes materials and other resources, plans one's work, makes use of group collaboration when appropriate, chooses suitable tools and techniques, works with appropriate measurement methods to ensure accuracy) McREL:4
4. Participate in a cooperative learning project in an online learning community. (2)  
Connects via modem to other computer users via the internet, an on-line service, or bulletin board system McREL:1
5. Evaluate digital resources to determine the credibility of the author and publisher and the timeliness and accuracy of the content. (3)  
Connects via modem to other computer users via the internet, an on-line service, or bulletin board system McREL:1  
Knows examples of copyright violations and computer fraud (e.g., computer hacking, computer piracy, intentional virus setting, invasion of privacy) and possible penalties (e.g., large fines, jail sentences) McREL:3
6. Employ data-collection technology such as probes, handheld devices, and geographic mapping systems to gather, view, analyze, and report results for content-related problems. (3, 4, 6)  
Uses a spreadsheet to update, add, and delete data, and to write and execute valid formulas on data McREL:2  
Identifies appropriate problems which can be solved using technological design (e.g., identifies a specific need, considers its various aspects, considers criteria for a suitable product) McREL:4  
Designs a solution or product, taking into account needs and constraints (e.g., cost, time, trade-offs, properties of materials, safety, aesthetics) McREL:4  
Implements a proposed design (e.g., organizes materials and other resources, plans one's work, makes use of group collaboration when appropriate, chooses suitable tools and techniques, works with appropriate measurement methods to ensure accuracy) McREL:4
7. Select and use the appropriate tools and digital resources to accomplish a variety of tasks and to solve problems. (3, 4, 6)  
Uses advanced features and utilities of word processors (e.g., uses clip art, a spell-checker, grammar checker, thesaurus, outliner) McREL:1  
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) McREL:1  
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) McREL:1  
Uses a spreadsheet to update, add, and delete data, and to write and execute valid formulas on data  
McREL:1

Uses boolean searches to execute complex searches on a data base McREL:1

Identifies appropriate problems which can be solved using technological design (e.g., identifies a specific need, considers its various aspects, considers criteria for a suitable product) McREL:4

Designs a solution or product, taking into account needs and constraints (e.g., cost, time, trade-offs, properties of materials, safety, aesthetics) McREL:4

Implements a proposed design (e.g., organizes materials and other resources, plans one's work, makes use of group collaboration when appropriate, chooses suitable tools and techniques, works with appropriate measurement methods to ensure accuracy) McREL:4

8. Use collaborative electronic authoring tools to explore common curriculum content from multicultural perspectives with other learners. (2, 3, 4, 5)

Connects via modem to other computer users via the internet, an on-line service, or bulletin board system  
McREL:1

9. Integrate a variety of file types to create and illustrate a document or presentation. (1, 6)

Uses advanced features and utilities of word processors (e.g., uses clip art, a spell-checker, grammar checker, thesaurus, outliner) McREL:2

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) McREL:2

10. Independently develop and apply strategies for identifying and solving routine hardware and software problems. (4, 6)

Knows the differing capacities and trade-offs for computer storage media, such as CD-ROMs, floppy disks, hard disks, and tape drives McREL:1

Knows basic characteristics and functions of an operating system McREL:1

## Grades 9-12

1. Design, develop, and test a digital learning game to demonstrate knowledge and skills related to curriculum content. (1, 4)  
Uses a variety of input devices (e.g., keyboard, scanner, voice/sound recorders, mouse, touch screen) McREL:1  
Knows features and uses of current and emerging technology related to computing (e.g., optical character recognition, sound processing, cable TV, cellular phones, ABS brakes) McREL:1  
Knows how to import, export, and merge data stored in different formats (e.g., text, graphics) McREL:2  
Knows how to import and export text, data, and graphics between software programs McREL:2
2. Create and publish an online art gallery with examples and commentary that demonstrate an understanding of different historical periods, cultures, and countries. (1, 2)  
Uses a variety of input devices (e.g., keyboard, scanner, voice/sound recorders, mouse, touch screen) McREL:1  
Knows features and uses of current and emerging technology related to computing (e.g., optical character recognition, sound processing, cable TV, cellular phones, ABS brakes) McREL:1  
Knows how to import, export, and merge data stored in different formats (e.g., text, graphics) McREL:2  
Knows how to import and export text, data, and graphics between software programs McREL:2
3. Select digital tools or resources to use for a real-world task and justify the selection based on their efficiency and effectiveness. (3, 6)  
Knows of significant advances in computers and peripherals (e.g., data scanners, digital cameras) McREL:1  
Uses a variety of input devices (e.g., keyboard, scanner, voice/sound recorders, mouse, touch screen) McREL:1  
Knows limitations and trade-offs of various types of hardware (e.g., laptops, notebooks, modems) McREL:1  
Knows features and uses of current and emerging technology related to computing (e.g., optical character recognition, sound processing, cable TV, cellular phones, ABS brakes) McREL:1  
Knows how to import, export, and merge data stored in different formats (e.g., text, graphics) McREL:2  
Knows how to import and export text, data, and graphics between software programs McREL:2  
Identifies some advanced features of software products (e.g., galleries, templates, macros, mail merge) McREL:2  
Uses desktop publishing software to create a variety of publications McREL:2  
Knows examples of advanced and emerging technologies (e.g., virtual environment, personal digital assistants, voice recognition software) and how they could impact society McREL:3
4. Employ curriculum-specific simulations to practice critical-thinking processes. (1, 4)  
Proposes designs and uses models, simulations, and other tests to choose an optimal solution McREL:4
5. Identify a complex global issue, develop a systematic plan of investigation, and present innovative sustainable solutions. (1, 2, 3, 4)  
Proposes designs and uses models, simulations, and other tests to choose an optimal solution McREL:4  
Evaluates a designed solution and its consequences based on the needs or criteria the solution was designed to meet McREL:4
6. Analyze the capabilities and limitations of current and emerging technology resources and assess their potential to address personal, social, lifelong learning, and career needs. (4, 5, 6)  
Knows of significant advances in computers and peripherals (e.g., data scanners, digital cameras) McREL:1  
Knows limitations and trade-offs of various types of hardware (e.g., laptops, notebooks, modems) McREL:1  
Knows features and uses of current and emerging technology related to computing (e.g., optical character

recognition, sound processing, cable TV, cellular phones, ABS brakes) McREL:1

Understands the uses of listservs, usenet newsreaders, and bulletin board systems McREL:2

Knows ways in which social and economic forces influence which technologies will be developed and used (e.g., cultural and personal values, consumer acceptance, patent laws, availability of risk capital, the federal budget, local and national regulations, media attention, economic competition, tax incentives)

Knows that alternatives, risks, costs, and benefits must be considered when deciding on proposals to introduce new technologies or to curtail existing ones (e.g., Are there alternative ways to achieve the same ends? Who benefits and who suffers? What are the financial and social costs and who bears them? How serious are the risks and who is in jeopardy? What resources will be needed and where will they come from?)

Knows examples of advanced and emerging technologies (e.g., virtual environment, personal digital assistants, voice recognition software) and how they could impact society

Knows the role of technology in a variety of careers

Knows that the rate of technological development and diffusion is increasing rapidly, even though individual technologies may be developed at a slow pace due to technical difficulties or consumer resistance

Knows that technology can benefit the environment by providing scientific information, providing new solutions to older problems, and reducing the negative consequences of existing technology (e.g., monitoring a habitat or measuring greenhouse gases, improving renewable energy sources, and creating scrubbers to improve coal-burning facilities) McREL:3

Knows that genetic engineering is the process by which controlled changes in a genetic structure can be made and that this process is used to research and diagnose disease and create pharmaceuticals McREL:6

Knows that biotechnology is used in a variety of areas (e.g., agriculture, pharmaceuticals, food and beverage, fuels and energy, the environment, genetic engineering) and requires specific scientific knowledge about the natural system being modified McREL:6

Knows that communication systems can transfer information from person to person (e.g., a telephone), person to machine (e.g., a person inputting information into a computer), or machine to machine (e.g., an automated payroll system where the record of the money goes from one computer to another) McREL:6

**7. Design a Web site that meets accessibility requirements. (1, 5)**

Uses a variety of input devices (e.g., keyboard, scanner, voice/sound recorders, mouse, touch screen) McREL:1

Knows how to import, export, and merge data stored in different formats (e.g., text, graphics) McREL:2

Knows how to import and export text, data, and graphics between software programs McREL:2

Knows examples of advanced and emerging technologies (e.g., virtual environment, personal digital assistants, voice recognition software) and how they could impact society McREL:3

Observes common courtesies and acceptable use policies while telecomputing McREL:3

Knows that communication systems can transfer information from person to person (e.g., a telephone), person to machine (e.g., a person inputting information into a computer), or machine to machine (e.g., an automated payroll system where the record of the money goes from one computer to another) McREL:6

**8. Model legal and ethical behaviors when using information and technology by properly selecting, acquiring, and citing resources. (3, 5)**

Observes common courtesies and acceptable use policies while telecomputing McREL:3

**9. Create media-rich presentations for other students on the appropriate and ethical use of digital tools and resources. (1, 5)**

Uses a variety of input devices (e.g., keyboard, scanner, voice/sound recorders, mouse, touch screen) McREL:1

- Knows how to import, export, and merge data stored in different formats (e.g., text, graphics) McREL:2
- Knows how to import and export text, data, and graphics between software programs McREL:2
- Knows examples of advanced and emerging technologies (e.g., virtual environment, personal digital assistants, voice recognition software) and how they could impact society McREL:3
- Observes common courtesies and acceptable use policies while telecomputing McREL:3
- Knows that communication systems can transfer information from person to person (e.g., a telephone), person to machine (e.g., a person inputting information into a computer), or machine to machine (e.g., an automated payroll system where the record of the money goes from one computer to another) McREL:6
10. Configure and troubleshoot hardware, software, and network systems to optimize their use for learning and productivity. (4, 6)
- Knows limitations and trade-offs of various types of hardware (e.g., laptops, notebooks, modems) McREL:1
- Identifies malfunctions and problems in hardware (e.g., hard drive crash, monitor burn-out) McREL:1
- Knows that complex systems are subject to failure and are designed with various elements and procedures (e.g., performance testing, overdesign, redundancy, more controls) that help reduce system failure McREL:5