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DEPARTMENT OF EDUCATION
LANSING

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MICHIGAN Department of Education

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SUPERINTENDENT OF
PUBLIC INSTRUCTION

May 22, 2009

MEMORANDUM

TO State Board of Education

FROM Michael Flanagan, Chairman

SUBJECT: Presentation on Michigan Educational Technology Standards for Students (METS-S) 2009 – PK-12

It is a goal of Congress, as stated in Title II, Part D (Enhancing Education Through Technology) of the No Child Left Behind Act (NCLB) of 2001, that a school will "Assist every student in crossing the digital divide by ensuring that every student is technologically literate by the time the student finishes the eighth grade, regardless of the student's race, ethnicity, gender, family income, geographic location, or disability."

In June 2005, the State Board of Education (SBE) approved the current Michigan Educational Technology Standards and Expectations for Students (METS-S). These standards were based on the International Society for Technology in Education's (ISTE) National Educational Technology Standards for Students (NETS-S). Michigan educators have utilized the METS-S to assist them with assessing the technology proficiency levels of students. In 2007, ISTE revised the national standards to better identify the knowledge and skills that students need to possess in order to succeed in today's digital age. Soon after ISTE published its 2007 version of the NETS-S, local districts began inquiring as to when Michigan would begin the process of bringing our 2005 METS-S into closer alignment with those revised NETS-S.

Rather than simply adopting the national standards, Michigan has opted to create its own standards (based on the NETS-S), but which offer clarification to and specific suggestions on what technology expertise is expected from students. The updating process of the 2005 METS-S started with modifications to the standards by Michigan Department of Education (MDE) staff. In the fall of 2008, the suggested changes were then shared with members of the Educational Technology Advisory Group (ETAG), which provided that group and colleagues an opportunity for feedback and suggestions. Following input from the ETAG, surveys were then made available to the Regional Educational Media Centers (REMC) Regional Instructional Technology Support (RITS) group. As a final opportunity for input from stakeholders statewide, the revised METS-S for 2009 were then posted at www.techplan.org for further comment and suggestions.

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Attachments to the METS-S document include a glossary of terms (Appendix A), a copy of the ISTE 2007 NETS-S (Appendix B), and a copy of the Framework for 21st Century Learning (Appendix C).

At this time, the Michigan Educational Technology Standards for Students (METS-S) 2009 – PK-12 are presented to the State Board of Education. The next steps include posting the METS-S on the Internet and disseminating through stakeholder groups for several weeks, allowing time for public comment. A final draft is anticipated to be presented to the State Board of Education for action at the September 2009 Board meeting.

Michigan Education Technology Standards and Expectations
Updated June 2009

Rationale:

The International Society for Technology in Education (ISTE) revised their National Educational Technology Standards for Students (NETS-S) in 2007. Soon after the national standards were revised, the Office of Educational Technology and Data Coordination made the decision to review the Michigan Educational Technology Standards and Expectations for Students (METS-S) to determine what modifications should be made to bring the existing standards into closer alignment with the 2007 NETS-S.

Although many of those standards included in the 2005 METS remained unchanged, some fairly significant modifications were made, including changing the names of the main categories. "Basic Operations and Concepts" is now "Technology Operations and Concepts"; "Social, Ethical, and Human Issues" is "Digital Citizenship"; "Technology Productivity Tools" was changed to "Creativity and Innovation"; "Technology Communication Tools" is now "Communication and Collaboration"; "Technology Research Tools" is "Research and Information Fluency"; and "Technology Problem-Solving and Decision-Making Tools" was renamed to "Critical Thinking, Problem Solving, and Decision Making."

The definition of Technology Literacy as "the ability to responsibly use appropriate technology to communicate, solve problems, and access, manage, integrate, evaluate, and create information to improve learning in all subject areas and to acquire lifelong knowledge and skill in the 21st century" has not been altered.

Probably the most noticeable additions to the new standards are those which relate to internet safety in the Digital Citizenship section. Internet safety is addressed in each of the grade level standards.

Michigan Educational Technology Standards for Students (METS-S) 2009 – PK-12
Alignment with NETS 2007 and the 21st Century Framework

Grades PK through 2 –Technology Standards and Expectations – (prior to completing Grade 2)

PK-2.CI Creativity and Innovation - By the end of Grade 2 each student will:	**NETS 2007**	**21st Century**
1. use a variety of digital tools (e.g., word processors, drawing tools, simulations, presentation software, graphical organizers) to learn, create, and convey original ideas or illustrate concepts	1. Creativity/Innov. 2. Comm./Collab. 6. Oper./Concepts	C S, 21st Cent. I, M, T Skills
PK-2.CC. Communication and Collaboration - By the end of Grade 2 each student will:	**NETS 2007**	**21st Century**
1. work together when using digital tools (e.g., word processor, drawing, presentation software) to convey ideas or illustrate simple concepts relating to a specified project	2. Comm./Collab. 6. Oper./Concepts	L, I Skills
2. use a variety of developmentally appropriate digital tools (e.g., word processors, paint programs) to communicate ideas to classmates, families, and others	2. Comm./Collab. 6. Oper./Concepts	L, I Skills C S, 21st Cent.
PK-2.RI. Research and Information Fluency - By the end of Grade 2 each student will:	**NETS 2007**	**21st Century**
1. interact with Internet based resources	3. Res./Info. Lit. 6. Oper./Concepts	I, M, T Skills C S, 21st Cent.
2. use digital resources (e.g., dictionaries, encyclopedias, graphs, graphical organizers) to locate and interpret information relating to a specific curricular topic, with assistance from teachers, school library media specialists, parents, or student partners	3. Res./Info. Lit. 6. Oper./Concepts	I, M, T Skills C S, 21st Cent.
PK-2.CT. Critical Thinking, Problem Solving, and Decision Making - By the end of Grade 2 each student will:	**NETS 2007**	**21st Century**
1. explain ways that technology can be used to make decisions and solve problems (e.g., cell phones, traffic lights, GPS units)	4. CT, PS, DM 6. Oper./Concepts	L, I Skills
2. use digital resources (e.g., dictionaries, encyclopedias, search engines, web sites) to solve developmentally appropriate problems, with assistance from teachers, parents, school library media specialists, or student partners	4. CT, PS, DM 6. Oper./Concepts	L, I Skills
PK-2.DC. Digital Citizenship - By the end of Grade 2 each student will:	**NETS 2007**	**21st Century**
1. describe appropriate and inappropriate uses of technology (e.g., computers, Internet, e-mail, cell phones) and describe consequences of inappropriate uses	5. Digital Citizens. **Internet Safety**	C S, 21st Cent.
2. know the Michigan Cyber Safety Initiative's three rules (Keep Safe, Keep Away, Keep Telling)	5. Digital Citizens. **Internet Safety**	I, M, T Skills
3. identify personal information that should not be shared on the Internet (name, address, phone number, picture, school name)	5. Digital Citizens. **Internet Safety**	I, M, T Skills
4. know to inform a trusted adult if he/she receives or views an online communication which makes him/her feel uncomfortable, or if someone whom he/she doesn't know is trying to communicate with him/her or asking for personal information	5. Digital Citizens. **Internet Safety**	I, M, T Skills
PK-2.TC. Technology Operations and Concepts - By the end of Grade 2 each student will:	**NETS 2007**	**21st Century**
1. identify common uses of technology found in daily life	5. Digital Citizens. 6. Oper./Concepts	I, M, T Skills
2. discuss advantages and disadvantages of using technology	6. Oper./Concepts	I, M, T Skills
3. be able to use basic menu commands to perform common operations (e.g., open, close, save, print)	6. Oper./Concepts	I, M, T Skills
4. recognize, name, and label the major hardware components in a computer system (e.g., computer, monitor, keyboard, mouse, printer)	6. Oper./Concepts	I, M, T Skills

Grades PK through 2 –Technology Standards and Expectations – (prior to completing Grade 2)

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5. discuss the basic care for computer hardware and various media types (e.g., CDs, DVDs, videotapes)	6. Oper./Concepts	I, M, T Skills
6. communicate about technology using developmentally appropriate and accurate terminology	6. Oper./Concepts	I, M, T Skills
7. understand that technology is a tool to help him/her complete a task, and is a source of information, learning, and entertainment	6. Oper./Concepts	I, M, T Skills
8. demonstrate the ability to navigate in virtual environments (e.g., electronic books, games, simulation software, web sites)	6. Oper./Concepts	I, M, T Skills

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Michigan Educational Technology Standards for Students (METS-S) 2009 – PK-12
Alignment with NETS 2007 and the 21st Century Framework

Grades Three through Five – Technology Standards and Expectations – (prior to completing Grade 5)

3-5.CI. Creativity and Innovation - By the end of Grade 5 each student will:	**NETS 2007**	**21st Century**
1. produce a media-rich digital project aligned to state curriculum standards (e.g., fable, folk tale, mystery, tall tale, historical fiction)	1. Creativity/Innov. 3. Res./Info. Lit. 6. Oper./Concepts	C S, 21st Cent. I, M, T Skills
2. use a variety of technology tools and applications to demonstrate his/her creativity by creating or modifying works of art, music, movies, or presentations	1. Creativity/Innov. 6. Oper./Concepts	C S, 21st Cent. I, M, T Skills
3. participate in discussions about technologies (past, present, and future) to understand these technologies are the result of human creativity	1. Creativity/Innov. 2. Comm./Collab.	L, I Skills
3-5.CC. Communication and Collaboration - By the end of Grade 5 each student will:	**NETS 2007**	**21st Century**
1. use digital communication tools (e.g., e-mail, wikis, blogs, IM, chat rooms, web conferencing, Moodle, Blackboard) and online resources for group learning projects	2. Comm./Collab. 6. Oper./Concepts	L, I Skills I, M, T Skills
2. identify how different software applications may be used to share similar information, based on the intended audience (e.g., presentations for classmates, newsletters for parents)	2. Comm./Collab. 6. Oper./Concepts	L, I Skills I, M, T Skills
3. use a variety of media and formats to create and edit products (e.g., presentations, newsletters, brochures, web pages) to communicate information and ideas to various audiences	2. Comm./Collab. 6. Oper./Concepts	L, I Skills I, M, T Skills
3-5.RI. Research and Information Fluency - By the end of Grade 5 each student will:	**NETS 2007**	**21st Century**
1. identify search strategies for locating information with support from teachers and school library media specialists	3. Res./Info. Lit.	L, C Skills I, M, T Skills
2. use digital tools to find, organize, analyze, synthesize, and evaluate information	3. Res./Info. Lit. 6. Oper./Concepts	L, C Skills I, M, T Skills
3. recognize that web sites and digital resources may contain inaccurate or biased information	3. Res./Info. Lit. 6. Oper./Concepts	L, C Skills I, M, T Skills
3-5.CT. Critical Thinking, Problem Solving, and Decision Making - By the end of Grade 5 each student will:	**NETS 2007**	**21st Century**
1. use digital resources to access information that can assist in making informed decisions about everyday matters (e.g., which movie to see, which product to purchase)	4. CT, PS, DM 6. Oper./Concepts	L, I Skills I, M, T Skills
2. use information and communication technology tools (e.g., calculators, probes, videos, DVDs, educational software) to collect, organize, and evaluate information to assist with solving problems	4. CT, PS, DM 6. Oper./Concepts	L, I Skills I, M, T Skills
3. use digital resources to identify and investigate a state, national, or global issue (e.g., global warming, economy, environment) and generate possible solutions	4. CT, PS, DM 6. Oper./Concepts	L, I Skills I, M, T Skills
3-5.DC. Digital Citizenship - By the end of Grade 5 each student will:	**NETS 2007**	**21st Century**
1. understand that web sites or other digital resources may contain information that does not present both sides of an issue	5. Digital Citizens.	I, M, T Skills
2. discuss scenarios involving acceptable and unacceptable uses of technology (e.g., file-sharing, social networking, text messaging, cyber bullying, plagiarism)	5. Digital Citizens.	I, M, T Skills
3. recognize issues involving ethical use of information (e.g., copyright adherence, source citation)	5. Digital Citizens.	L, C Skills I, M, T Skills

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Grades Three through Five – Technology Standards and Expectations – (prior to completing Grade 5)		
4. describe precautions surrounding personal safety that should be taken when online	5. Digital Citizens. **Internet Safety**	I, M, T Skills
5. identify the types of personal information that should not be given out on the Internet (name, address, phone number, picture, school name)	5. Digital Citizens. **Internet Safety**	I, M, T Skills
3-5.TC. Technology Operations and Concepts - By the end of Grade 5 each student will:	**NETS 2007**	**21st Century**
1. use basic input and output devices; access network resources (e.g., printers, servers); use various peripherals (e.g., scanners, digital cameras, video recorders, projectors)	6. Oper./Concepts	I, M, T Skills
2. describe ways technology has changed life at school and at home	6. Oper./Concepts	L, C Skills I, M, T Skills
3. understand and discuss how assistive technologies can benefit all individuals	6. Oper./Concepts	L, C Skills I, M, T Skills
4. know proper keyboard positioning	6. Oper./Concepts	I, M, T Skills
5. demonstrate proper care in the use of computer hardware, software, peripherals, and storage media	6. Oper./Concepts	I, M, T Skills
6. know how to exchange files with other students using technology (e.g., network file sharing, flash drives)	6. Oper./Concepts	I, M, T Skills
7. use digital tools to acquire new knowledge for personal growth and learning	6. Oper./Concepts	L, C Skills I, M, T Skills

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Michigan Educational Technology Standards for Students (METS-S) 2009 – PK-12
Alignment with NETS 2007 and the 21st Century Framework

Grades Six through Eight – Technology Standards and Expectations – (prior to completing Grade 8)

6-8.CI. Creativity and Innovation – By the end of Grade 8 each student will:	**NETS 2007**	**21st Century**
1. apply common software features (e.g., spellchecker, thesaurus, formulas, charts, graphics, sounds) to enhance communication with an audience and to support creativity	1. Creativity/Innov. 2. Comm./Collab. 6. Oper./Concepts	C S, 21st Cent. I, M, T Skills
2. create an original project (e.g., presentation, web page, newsletter, information brochure) using a variety of media (e.g., animations, graphs, charts, audio, graphics, video) to present content information to an audience	1. Creativity/Innov. 2. Comm./Collab. 6. Oper./Concepts	C S, 21st Cent. I, M, T Skills
3. illustrate a content-related concept using a model, simulation, or concept-mapping software	1. Creativity/Innov. 6. Oper./Concepts	C S, 21st Cent. I, M, T Skills
6-8.CC. Communication and Collaboration – By the end of Grade 8 each student will:	**NETS 2007**	**21st Century**
1. use digital resources (e.g., discussion groups, blogs, podcasts, video conferences, web conferences, Moodle, Blackboard) to collaborate with peers, experts, and other audiences	2. Comm./Collab. 6. Oper./Concepts	L, I Skills I, M, T Skills
2. use collaborative digital tools to explore common curriculum content with learners from other cultures	2. Comm./Collab. 6. Oper./Concepts	L, I Skills I, M, T Skills
3. identify effective uses of technology to support communication with peers, family, or school personnel	2. Comm./Collab. 6. Oper./Concepts	L, I Skills I, M, T Skills
6-8.RI. Research and Information Fluency – By the end of Grade 8 each student will:	**NETS 2007**	**21st Century**
1. use a variety of digital resources to locate information	3. Res./Info. Lit. 6. Oper./Concepts	L, C Skills I, M, T Skills
2. evaluate information from online resources for accuracy and bias	3. Res./Info. Lit. 6. Oper./Concepts	L, I Skills I, M, T Skills
3. identify types of web sites based on their domain names (e.g., edu, com, org, gov)	3. Res./Info. Lit. 6. Oper./Concepts	I, M, T Skills
4. employ data-collection technologies (e.g., probes, handheld devices, GPS units, geographic mapping systems) to gather, view, and analyze the results for a content-related problem	3. Res./Info. Lit. 6. Oper./Concepts	L, C Skills I, M, T Skills
6-8.CT. Critical Thinking, Problem Solving, and Decision Making - By the end of Grade 8 each student will:	**NETS 2007**	**21st Century**
1. use databases or spreadsheets to make predictions, develop strategies, and evaluate decisions to assist with solving a problem	4. CT, PS, DM 6. Oper./Concepts	L, I Skills I, M, T Skills
2. evaluate available digital resources and select the most appropriate application to accomplish a specific task (e, g., word processor, table, outline, spreadsheet, presentation program)	4. CT, PS, DM 6. Oper./Concepts	L, C Skills I, M, T Skills
3. gather data, examine patterns, and apply information for decision making using available digital resources	4. CT, PS, DM 6. Oper./Concepts	L, I Skills I, M, T Skills
4. describe strategies for solving routine hardware and software problems	4. CT, PS, DM 6. Oper./Concepts	I, M, T Skills
6-8.DC. Digital Citizenship – By the end of Grade 8 each student will:	**NETS 2007**	**21st Century**
1. provide accurate citations when referencing information sources	5. Digital Citizens.	L, C Skills I, M, T Skills

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2. discuss issues related to acceptable and responsible use of technology (e.g., privacy, security, copyright, plagiarism, viruses, file-sharing)	5. Digital Citizens.	I, M, T Skills
3. discuss the consequences related to unethical use of information and communication technologies	5. Digital Citizens.	L, C Skills I, M, T Skills
4. discuss possible societal impact of technology in the future and reflect on the importance of technology in the past	5. Digital Citizens.	L, C Skills I, M, T Skills
5. create media-rich presentations for other students on the appropriate and ethical use of digital tools and resources	5. Digital Citizens. 6. Oper./Concepts	I, M, T Skills
6. discuss the long term ramifications (digital footprint) of participating in questionable online activities (e.g., posting photos of risqué poses or underage drinking, making threats to others)	5. Digital Citizens. **Internet Safety**	C S, 21st Cent. I, M, T Skills
7. describe the potential risks and dangers associated with online communications	5. Digital Citizens. **Internet Safety**	I, M, T Skills
6-8.TC. Technology Operations and Concepts - By the end of Grade 8 each student will:	**NETS 2007**	**21st Century**
1. use proper keyboarding posture, finger positions, and touch-typing techniques	6. Oper./Concepts	L, C Skills I, M, T Skills
2. identify file formats for a variety of applications (e.g., doc, xls, pdf, txt, jpg, mp3)	6. Oper./Concepts	I, M, T Skills
3. use a variety of technology tools (e.g., dictionary, thesaurus, grammar-checker, calculator) to maximize the accuracy of technology-produced materials	6. Oper./Concepts	C S, 21st Cent. I, M, T Skills
4. perform queries on existing databases	6. Oper./Concepts	L, C Skills I, M, T Skills
5. know how to create and use various functions available in a database (e.g., filtering, sorting, charts)	6. Oper./Concepts	I, M, T Skills
6. identify a variety of information storage devices (e.g., CDs, DVDs, flash drives, SD cards) and provide rationales for using a certain device for a specific purpose	6. Oper./Concepts	I, M, T Skills
7. use accurate technology terminology	6. Oper./Concepts	I, M, T Skills
8. use technology to identify and explore various occupations or careers	6. Oper./Concepts	L, C Skills I, M, T Skills
9. discuss possible uses of technology to support personal pursuits and lifelong learning	6. Oper./Concepts	L, C Skills I, M, T Skills
10. discuss security issues related to e-commerce	6. Oper./Concepts	L, C Skills I, M, T Skills

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Michigan Educational Technology Standards for Students (METS-S) 2009 – PK-12 Alignment with NETS 2007 and the 21st Century Framework

Grades Nine through Twelve – Technology Standards and Expectations – (prior to completing grade 12)

9-12.CI. Creativity and Innovation – By the end of Grade 12 each student will:	**NETS 2007**	**21st Century**
1. apply advanced software features (e.g. built-in thesaurus, templates, styles) to redesign the appearance of word processing documents, spreadsheets, and presentations	1. Creativity/Innov. 6. Oper./Concepts	C S, 21st Cent. I, M, T Skills
2. create a web page which meets accessibility requirements (e.g., Dreamweaver, iGoogle, Kompozer)	1. Creativity/Innov. 6. Oper./Concepts	C S, 21st Cent. I, M, T Skills
3. use a variety of media and formats to design, develop, publish, and present projects (e.g., newsletters, web sites, presentations, photo galleries)	1. Creativity/Innov. 2. Comm./Collab. 6. Oper./Concepts	C S, 21st Cent. I, M, T Skills
9-12.CC. Communication and Collaboration - By the end of Grade 12 each student will:	**NETS 2007**	**21st Century**
1. identify various collaboration technologies and describe their use (e.g., desktop conferencing, listserv, blog, wiki)	2. Comm./Collab. 6. Oper./Concepts	L, I Skills
2. use available technologies (e.g., desktop conferencing, e-mail, groupware, instant messaging) to communicate with others on a class assignment or project	2. Comm./Collab. 6. Oper./Concepts	L, I Skills
3. collaborate in content-related projects that integrate a variety of media (e.g., print, audio, video, graphic, simulations, and models)	2. Comm./Collab. 6. Oper./Concepts	L, I Skills
4. plan and implement a collaborative project using telecommunications tools (e.g., ePals, discussion boards, online groups, groupware, interactive web sites, videoconferencing)	2. Comm./Collab. 6. Oper./Concepts	L, I Skills
5. describe the potential risks and dangers associated with online communications	2. Comm./Collab. 6. Oper./Concepts	L, I Skills **Internet Safety**
6. use technology tools for managing and communicating personal information (e.g., finances, contact information, schedules, purchases, correspondence)	2. Comm./Collab. 6. Oper./Concepts	L, I Skills
9-12.RI. Research and Information Fluency – By the end of Grade 12 each student will:	**NETS 2007**	**21st Century**
1. develop a plan to gather information using various research strategies (e.g., interviews, questionnaires, experiments, online surveys)	3. Res./Info. Lit.	I, M, T Skills C S, 21st Cent.
2. identify, evaluate, and select appropriate online sources to answer content related questions	3. Res./Info. Lit. 6. Oper./Concepts	I, M, T Skills C S, 21st Cent.
3. demonstrate the ability to use library and online databases for accessing information (e.g., MEL, Proquest, Infosource, United Streaming)	3. Res./Info. Lit. 6. Oper./Concepts	I, M, T Skills C S, 21st Cent.
4. distinguish between fact, opinion, point of view, and inference	3. Res./Info. Lit.	I, M, T Skills C S, 21st Cent.
5. evaluate information found in selected online sources on the basis of accuracy and validity	3. Res./Info. Lit.	I, M, T Skills C S, 21st Cent.
6. evaluate resources for stereotyping, prejudice, and misrepresentation	3. Res./Info. Lit.	I, M, T Skills C S, 21st Cent.
7. research examples of inappropriate use of technologies and participate in related classroom activities (e.g., debates, reports, mock trials, presentations)	3. Res./Info. Lit. 2. Comm./Collab 6. Oper./Concepts	I, M, T Skills C S, 21st Cent.

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Grades Nine through Twelve – Technology Standards and Expectations – (prior to completing grade 12)		
9-12.CT. Critical Thinking, Problem Solving, and Decision Making - By the end of Grade 12 each student will:	**NETS 2007**	**21st Century**
1. use digital resources (e.g., educational software, simulations, models) for problem solving and independent learning	4. CT, PS, DM 6. Oper./Concepts	L, I Skills
2. analyze the capabilities and limitations of digital resources and evaluate their potential to address personal, social, lifelong learning, and career needs	4. CT, PS, DM 6. Oper./Concepts	L, I Skills
3. devise a research question or hypothesis using information and communication technology resources, analyze the findings to make a decision based on the findings, and report the results	4. CT, PS, DM 2. Comm./Collab 6. Oper./Concepts	L, I Skills
9-12.DC. Digital Citizenship – By the end of Grade 12 each student will:	**NETS 2007**	**21st Century**
1. identify legal and ethical issues related to the use of information and communication technologies (e.g., properly selecting, acquiring, and citing resources)	5. Digital Citizens.	I, M, T Skills
2. discuss possible long-range effects of unethical uses of technology (e.g., virus spreading, file pirating, hacking) on cultures and society	5. Digital Citizens.	I, M, T Skills
3. use proper netiquette in communications	5. Digital Citizens.	I, M, T Skills
4. discuss the possible consequences of unethical uses of information and technologies	5. Digital Citizens.	I, M, T Skills
5. identify ways that individuals can protect their technology systems from unethical or unscrupulous users	5. Digital Citizens. **Internet Safety**	I, M, T Skills
6. create appropriate citations for resources when presenting research findings	5. Digital Citizens.	I, M, T Skills
7. adhere to fair use and copyright guidelines	5. Digital Citizens.	I, M, T Skills
9-12.TC. Technology Operations and Concepts - By the end of Grade 12 each student will:	**NETS 2007**	**21st Century**
1. complete at least one online credit, or non-credit, course or online learning experience	6. Oper./Concepts	I, M, T Skills
2. use an online tutorial and discuss the benefits and disadvantages of this method of learning	6. Oper./Concepts	I, M, T Skills
3. explore career opportunities and identify their related technology skill requirements	6. Oper./Concepts	I, M, T Skills
4. be familiar with a variety of emerging technology resources (e.g., podcasting, webcasting, compressed video delivery, online file sharing, graphing calculators, global positioning software)	6. Oper./Concepts	I, M, T Skills
5. identify an example of an assistive technology and describe its purpose and use	6. Oper./Concepts	I, M, T Skills
6. participate in a virtual environment as a strategy to build 21st century learning skills	6. Oper./Concepts	I, M, T Skills
7. routinely apply touch-typing techniques	6. Oper./Concepts	I, M, T Skills
8. assess and solve hardware and software problems by using online help or other user documentation	6. Oper./Concepts	I, M, T Skills
9. explain the differences between freeware, shareware, open source, and commercial software	6. Oper./Concepts	I, M, T Skills
10. participate in experiences associated with technology-related careers	6. Oper./Concepts	I, M, T Skills
11. identify common graphic, audio, and video file formats (e.g., jpeg, gif, bmp, mpeg, wav, wmv, mp3, flv, avi, pdf)	6. Oper./Concepts	I, M, T Skills
12. demonstrate how to import/export text, graphics, or audio files	6. Oper./Concepts	I, M, T Skills
13. proofread and edit a document using an application's spelling and grammar checking functions	6. Oper./Concepts	I, M, T Skills
14. have access to and utilize assistive technology tools	6. Oper./Concepts	I, M, T Skills

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Web Resources:

Each of the ISTE resources are © 2007 International Society for Technology in Education.
ISTE NETS for Students 2007
ISTE NETS for Students 2007 – Profiles for Technology (ICT) Literate Students
ISTE NETS for Students 2007 – Essential Conditions

All of the following resources are © 2004 Partnership for 21st Century Skills.
Framework for 21st Century Learning – The Partnership for 21st Century Skills has developed a vision for 21st century student success in the new global economy.
21st Century Standards
21st Century Assessment
21st Century Curriculum & Instruction
21st Century Professional Development
21st Century Learning Environments

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Michigan Educational Technology Standards for Students (METS-S) Glossary

Term	Explanation / Definition
Blackboard	An example of a commonly used learning management system (LMS)
Blogs	weB LOGS - a type of website that allows for users to create virtual journals
C S, 21st Cent.	Core Subjects and 21st Century Themes
Comm./Collab.	Communication and Collaboration
Concept mapping software	Assists in creating diagrams showing the relationships among concepts
Creativity/Innov.	Creativity and Innovation
CT, PS, DM	Critical Thinking, Problem Solving, and Decision Making
Desktop conferencing	Application for allowing real-time conversation between two individuals.
Digital Citizenship	The norms of appropriate, responsible behavior with regards to technology use
Digital footprint	Traces left by someone's activity in a digital environment
Discussion boards	An Internet forum, or message board; an online discussion site
Dreamweaver	An application for creating web pages
E-commerce	Consists of the buying and selling of products or services over electronic systems such as the Internet
ePals	Web site of connected classrooms allowing schools to safely connect and collaborate
File pirating	Unauthorized use of computer files or applications

Michigan Educational Technology Standards for Students (METS-S) Glossary

Term	Explanation / Definition
File sharing	The process of direct or indirect file transfer via the Internet
Flash drives	Storage devices for computer files (also referred to as thumb drives or USB drives)
Geographic mapping systems	Computer applications that assist with the creation of digital maps
GPS units	Global Positioning Systems
Graphical organizers	Programs that provide visual representations of knowledge, concepts, or ideas
Graphing calculators	Typically refers to a class of handheld calculators that are capable of plotting graphs
Groupware	Collaboration software designed to help people involved in a common task achieve their goals
Hacking	Unauthorized "breaking in" to others computers
I, M, T Skills	Information, Media, and Technology Skills
iGoogle	Free internet based application for designing web pages
IM	Instant Messaging; "a form of real-time communication between two or more people based on typed text"
Infosource	Website that provides online technology training and assessments
Kompozer	Web authoring system that enables users to create web sites without knowing computer coding
L, C Skills	Life and Career Skills
L, I Skills	Learning and Innovation Skills

Michigan Educational Technology Standards for Students (METS-S) Glossary

Term	Explanation / Definition
Learning Management System (LMS)	Software for delivering, tracking, and managing training/education
Listserv	Electronic mailing list software application which allows for emailing to a group of recipients
MEL	Michigan Electronic Library
Michigan Cyber Safety Initiative	An Internet safety education program sponsored by Michigan's Attorney General for K-8 students
Moodle	An example of a commonly used learning management system (LMS)
Podcasts	A web-based audio or video broadcast
Proquest	"For fee" online library/research product
Res./Info. Lit.	Research and Information Literacy
SD cards	Secure Digital cards; small storage devices often used with cameras and other portable devices
Social networking	Websites such as Facebook or MySpace which allow individuals to interact with each other virtually
United Streaming	Now known as "Discovery Education"; "For fee" site that provides high quality classroom resources to many educators
Webcasting	The broadcasting of digital content such as news or entertainment, using the Internet, specifically the World Wide Web (also called cyber-casting)
Wikis	Used to create collaborative websites for sharing thoughts and ideas

The ISTE National Educational Technology Standards (NETS•S) and Performance Indicators for Students

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.

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.

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.

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.

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.

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.

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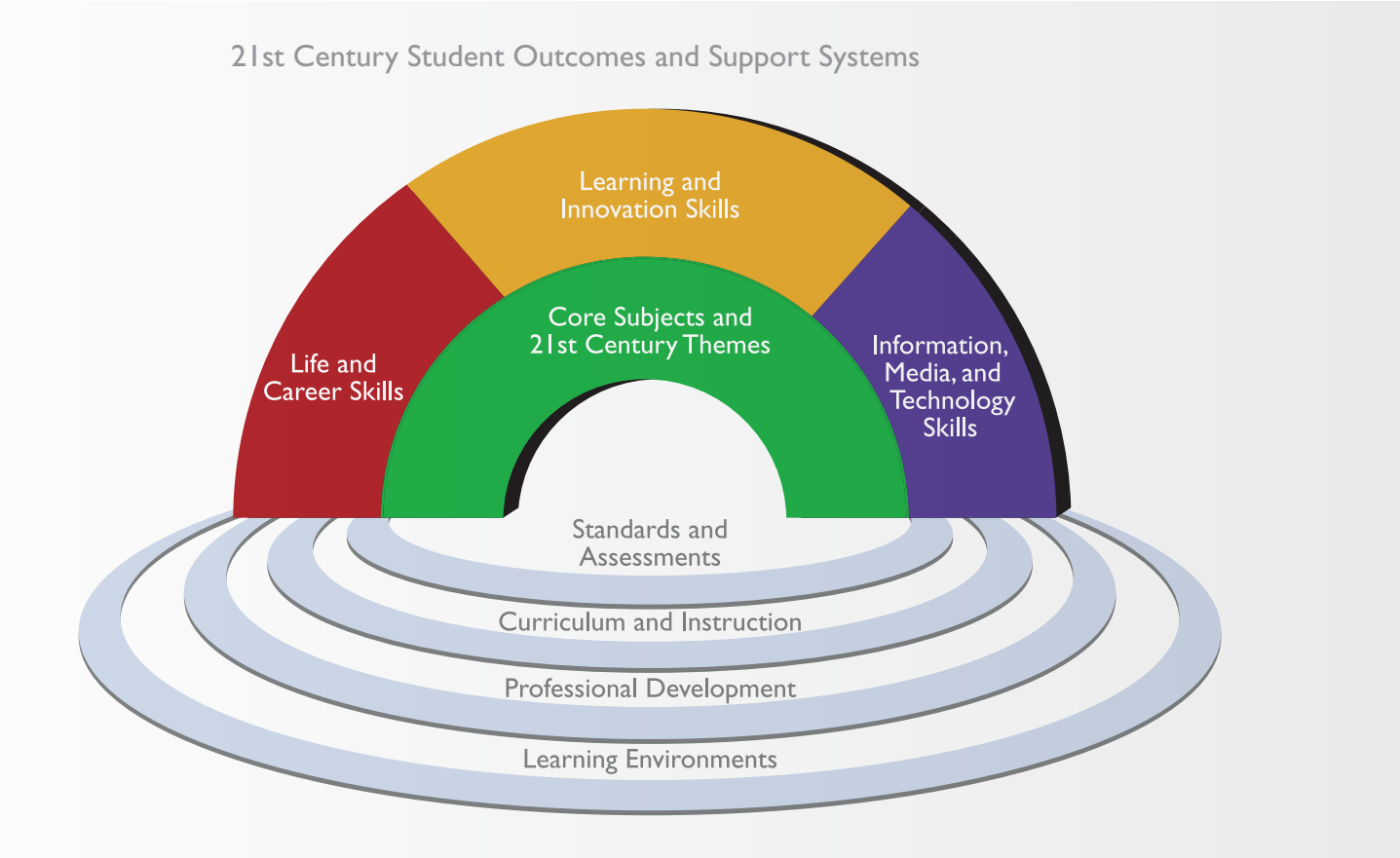
Partnership for 21st Century Skills

Framework for 21st Century Learning

The Partnership for 21st Century Skills has developed a vision for 21st century student success in the new global economy.



21ST CENTURY STUDENT OUTCOMES

The elements described in this section as "21st century student outcomes" (represented by the rainbow) are the skills, knowledge and expertise students should master to succeed in work and life in the 21st century.

The Partnership for 21st Century Skills has developed a unified, collective vision for 21st century learning that will strengthen American education. The Partnership created the Framework for 21st Century Learning, which describes the skills, knowledge and expertise students must master to succeed in work and life. Only when a school or district combines the framework with 21st century professional development, assessments and standards, can the American public be sure that high school graduates are prepared to thrive in today's global economy.

21st century skills represent the necessary student outcomes for the 21st century, i.e. students need to obtain Learning and Innovation Skills (creativity and innovation, critical thinking and problem solving, etc.), Information, Media and Technology Skills, Core Subjects and 21st Century Themes (global awareness, financial literacy, etc.) and Life and Career Skills (initiative and self-direction, among others) – the colored parts of the rainbow.

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Core Subjects and 21st Century Themes

Mastery of **core subjects and 21st century themes** is essential for students in the 21st century. Core subjects include English, reading or language arts, world languages, arts, mathematics, economics, science, geography, history, government and civics.

We believe schools must move beyond a focus on basic competency in core subjects to promoting understanding of academic content at much higher levels by weaving **21st century interdisciplinary themes** into core subjects:

- **Global Awareness**
- **Financial, Economic, Business and Entrepreneurial Literacy**
- **Civic Literacy**
- **Health Literacy**

Learning and Innovation Skills

Learning and innovation skills are what separate students who are prepared for increasingly complex life and work environments in the 21st century and those who are not. They include:

- **Creativity and Innovation**
- **Critical Thinking and Problem Solving**
- **Communication and Collaboration**

Information, Media and Technology Skills

People in the 21st century live in a technology and media-driven environment, marked by access to an abundance of information, rapid changes in technology tools and the ability to collaborate and make individual contributions on an unprecedented scale. To be effective in the 21st century, citizens and workers must be able to exhibit a range of functional and critical thinking skills, such as:

- **Information Literacy**
- **Media Literacy**
- **ICT (Information, Communications and Technology) Literacy**

Life and Career Skills

Today's life and work environments require far more than thinking skills and content knowledge. The ability to navigate the complex life and work environments in the globally competitive information age requires students to pay rigorous attention to developing adequate life and career skills, such as:

- **Flexibility and Adaptability**
- **Initiative and Self-Direction**
- **Social and Cross-Cultural Skills**
- **Productivity and Accountability**
- **Leadership and Responsibility**

21ST CENTURY SUPPORT SYSTEMS

Developing a comprehensive framework for 21st century learning requires more than identifying specific skills, content knowledge, expertise and literacies. An innovative support system must be created to help students master the multi-dimensional abilities required of them in the 21st century. The Partnership has identified five critical support systems that ensure student mastery of 21st century skills:

- **21st Century Standards**
- **Assessments of 21st Century Skills**
- **21st Century Curriculum and Instruction**
- **21st Century Professional Development**
- **21st Century Learning Environments**

For more information, visit the Partnership's website at www.21stcenturyskills.org.

PARTNERSHIP FOR 21ST CENTURY SKILLS

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- Adobe Systems, Inc.
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