



## Technology Plan 2009-2011

(December 22, 2008)

### Technology Plan Committee Members (Alphabetical Order):

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January, 2009

**Cover Page – SECTION 1**

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Technology Plan Start Date		Technology Plan End Date			
July 1, 2009		June 30, 2012			

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**URL of the District Educational Technology Plan:** [www.mapsnet.org](http://www.mapsnet.org)

## Introductory Material - Section 2

### MAPS Mission

#### **Mission Statement**

*"The staff of the Marquette Area Public Schools believes that ALL students can learn and achieve mastery of basic skills. We accept responsibility, in collaboration with the home and community, to teach ALL students so that they can attain their maximum educational potential and become responsible, contributing members of society." [www.mapsnet.org](http://www.mapsnet.org)*

#### Introduction: Demographics

Marquette Area Public Schools (School code 52170) is located in Marquette, MI on Lake Superior covering about 128 square miles within the district boundaries.

Marquette County reflects a moderate rate (11.1-24.8%) of childhood poverty. However, household income is about 20% less than the average across Michigan with a median household income of \$35,584.

There are four K-3 elementary schools, one intermediate 4-5 school, one middle school and one high school. In the Fall of 2009, one K- 3 elementary will be incorporated into the three remaining K-3 schools.

MAPS enrollment for 2008 - 09 year is 3349 students and continues to drop annually. At this time, about 25% of students qualify for free and reduced lunch and this data has been holding steady at this level. MAPS employs 210 teachers.

## Section 3: Vision and Goals

### MAPS District Vision & Maps Technology Vision

The Mission statement and Goal/Strategies below provide a framework for all teachers to integrate technology skills and knowledge into the daily content of the classroom.

MAPS Mission: The mission of the Marquette Area Public School District, a nurturing leader of educational excellence, is to embolden all of our students to succeed as global citizens through a system distinguished by personalized, relevant and challenging experiences, utilizing the diverse resources of our vibrant Lake Superior community and our world. 2/15/2007

Technology Vision– “MAPS will provide a supportive and dynamic learning environment that ensures all students have the appropriate opportunities to develop the technology skills necessary to be successful in their future studies, the increasingly technology intensive workplace, and their personal lives. This environment will be utilized to benefit the entire Marquette Community.” Found on *MAPS Technology Curriculum Guide CD*

### INTEGRATION GOALS

**1. Technology Integration: To integrate technology into the K-12 curriculum.**

**Objectives/Strategies**

*Update K-12 Technology Curriculum.*

- *Develop and implement a plan to integrate the Technology curriculum into the full curriculum for use as a tool in learning.*
- *Provide information retrieval and resources in the K-12 media program.*
- *Administer the district, school and classroom using technology.*

**2. Staff Development: To provide training for staff to acquire skills and knowledge in integrating technology into the school environment.**

**Objectives/ Strategies**

- *Develop a plan to acquire technology skills.*
- *Utilize acquired skills as teaching tools.*
- *Utilize acquired skills in the staff's administrative tasks.*
- *Integrate technology curriculum into the individual discipline curriculum.*

**3. Resources: To provide the resources necessary to insure the successful implementation of the Technology Plan.**

**Objectives/ Strategies**

- *Provide staff necessary to support the technology.*
- *Provide necessary space or provide alternatives.*
- *Purchase equipment and materials to meet determined curriculum and administrative needs.*
- *Expand and update the infrastructure to a full voice-data-video network.*
- *Research and assess new technology, implementing those that are appropriate.*

**4. Community: To provide the community with the benefits of technology.**

**Objectives/ Strategies**

- *Provide community activities involving technology.*
- *Develop partnerships.*

**5. Funding: To provide appropriate funding to accomplish the goals.**

**Objectives/ Strategies**

- *Provide district funding.*
- *Pursue grants.*
- *Develop a funding and acquisition process through the Technology Director and the Technology Committee.*

**6. Evaluation: To evaluate the progress of the implementation of the Technology Plan.**

**Objectives/ Strategies**

- *Provide ongoing needs assessment and annual evaluation to ensure continued relevance of the district's technology mission and to consider new technologies.*
- *Determine the progress of students meeting the Technology Benchmarks.*
- *Evaluate the progress of staff in becoming proficient in the usage of technology.*

**Relationship of goals to long-term vision**

Technology goals fulfill the support and learning environment identified in the technology vision. They provide a framework for teachers to integrate technology skills and knowledge into the daily world of the classroom content. They offer students a world view of global knowledge and how to tap into it for personal growth and cultural appreciation.

**Describe how goals address objectives of School Improvement Plan**

**A. Goals of Student Improvement Plan**

- 1) The primary role of our educational system is to create a dynamic environment for the purpose of educating a diverse community of learners. Accordingly, the District accepts the responsibility of offering programs and providing opportunities that maximize learning experiences for each student.
- 2) The primary role of the faculty, administration, staff, parents and Board is to fulfill the District's mission and goals by implementing, monitoring and evaluating curriculum and instruction that are most effective in promoting student achievement. All students are capable of achieving mastery of essential skills through a systematic instructional process that recognizes all students learn at different rates.
- 3) Using the Michigan Curriculum Framework as a guide, the district will use continuous school improvement to align all district initiatives for the purpose of increasing student achievement; build a curriculum based on rigorous content standards and benchmarks; use student achievement data to make decisions about continuous supported teaching and learning standards into daily instructional practice.
- 4) The primary evidence for determining the effectiveness in a school is by monitoring and evaluating student outcomes. The outcomes will be observable and measurable to assure students, parents, teachers, administrators, and community that students are mastering essential skills.
- 5) The effective school system is successful in teaching all students the essential skills they need to know. The focus of each effective school is on quality and equality. The outcome indicators selected to demonstrate student achievement will reflect with accuracy the curriculum being taught. The outcome results will be analyzed to be certain that no major subset of the student population is performing below expectations.

**B. Relationship to Technology**

Emphasis on mastery of essential skills is enhanced and supported by good technology integration goals. The purpose of the technology strategies is to increase student knowledge and skills in all curriculum areas through incorporation of technology resources.

**I. Curriculum Section 4:Curriculum Integration**

**Alignment to State & National Technology Standards**

MAPS district goals are aligned to State & National standards. Academic achievement will be improved through adoption of these standards and benchmarks as the student technology goals. These goals are designed to meet the demands of the 21<sup>st</sup> Century information access and job skills as outlined by National ISTE and State of Michigan standards.

These are located in the *MAPS Technology Curriculum Guide* CD as Appendix I and also online at:

<http://www.mapsnet.org/Pages/DistrictK-12Curriculum/Chapter%20II/II%20CONTENTS.htm>

### **Integration Strategies for student improvement in academic achievement and tech literacy**

From the Integration Goals in Section 3 of this plan, Staff Development will be used to introduce strategies that improve student academic achievement and tech literacy. The philosophical overview found in the learning strategies noted in the article: “*Building Better Instruction*” (Learning and Leading, (2004). V 31 (5) Pp 6-11. International Society of Technology Education. ISTE) is a focus for technology professional development instruction, resources and materials. Here nine basic research-proven classroom instructional strategies, such as compare and contrast; summarizing; cooperative learning; nonlinguistic representation; advance organizers; generating and testing hypothesis; and providing feedback, are supported by technology.

### **Promotion of curricula & teaching strategies**

In the 2007 MAPS teacher technology survey, 80% of the respondents indicated that they felt technology was a learning tool. In line with this philosophy, many specific strategies are gathered for teachers into our *MAPS Technology Curriculum Guide* CD (Appendix I). These CDs were copied and distributed to all district teachers during various group training sessions in 2005. In Fall 2008 *Essential Student Technology Understandings* (Appendix IX) correlated activities to many of these technology benchmarks. This correlation is posted to individual computer desktops for K-5 teachers and students. It is online at: [http://www.mapsnet.org/pages/fdarling/index\\_files/Page370.htm](http://www.mapsnet.org/pages/fdarling/index_files/Page370.htm)

Other models and programs currently used in sessions and offered throughout the year:

1. INTEL Teach to the Future- (K-12 teachers); approximately 40 teachers have graduated from this program since 2007.
2. Hands-on workshops such as, Digital Media support student story development and use of electronic media. Examples of this media include the use of digital still and video cameras, scanning, audio, Microsoft Movie Maker and Creative Commons music and other digital resources from the Internet.
3. Promotion of use of visual organizers through Mapping Workshops focus on research and use software and resources that include: Timeliner 5.1, Visio, Inspiration & Kidspiration, Map Maker, Microsoft Powerpoint and Internet Google Maps.
4. Over the past 3.5 years, 48 teachers have participated in a nine-session class *Integrate Video Technology through Lesson Study* focusing on Video-on- Demand with *unitedstreaming*, includes features of *unitedstreaming*; exploring other video resources (YouTube, TeacherTube, SchoolTube, and many others); correlating videos to specific curriculum benchmarks; and using in PowerPoint and Movie Maker presentation programs to create classroom materials.
5. In our most recent 9-session class, 7 teachers have completed *Web 2.0 Tools Study – Integrate Interactive Technology* in summer of 2008 and a 3 have already signed up for the January 2009 offering. This class explores many interactive web tools (blog, wiki, audio & video podcasting) in perspective of curriculum based activities. Teachers create

and store individual and student web projects on the district's web content management system.

## I. Curriculum Section 5: Student Achievement

**Specific samples of technology integration from the MAPS Technology Curriculum, MAPS Core Curriculums, MAPS Literacy program, and other programs currently in place.**

**1. Technology Curriculum** - For example, in the High School Technology Curriculum technology resources are suggested for each Technology Standards in the specific Content area. These resource are located online at:  
<http://www.mapsnet.org/Pages/DistrictK-12Curriculum/Chapter%20II/II%20CONTENTS.htm>

### High School Technology Benchmarks: English

#### Standard 2: Social, Ethical & Human Issues

	Students understand the ethical, cultural & societal issues related to technology.	Students practice responsible use of technology systems, information & software.	Students develop positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits & productivity.
<b>Word Processing – MS Office 2003</b>			
Compose well-written, visually pleasing documents using basic word processing skills.	X	X	X
Create computer-generated with title page, outline, text, works cited and parenthetical referencing:			
Incorporate the following into their documents			X
-spacing & indenting			
- variety of sizes and fonts			
-centering, setting margins, tabs, tab stops			
-spell check & -thesaurus			
-pagination			
-documentation using MLA or APA guidelines	X	X	

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<b>Multimedia – PowerPoint &amp; Movie Maker</b>			
To use multimedia presentations (i.e., PowerPoint) with graphics, text and sound to communicate, illustrate and illuminate their ideas.	X	X	
To create a visual representation of a timeline, using tools such as TimeLiner, PowerPoint & Microsoft Word or Excel.	X	X	
<b>Databases – Excel &amp; Access</b>			
Analyze and create database documents for research and presentation of information.	X		
<b>Telecommunications</b>			
Use the Internet to research and share information	X		

### Suggested Activities and Resources

#### Word processing

- Write stories and essays.
- Write arguments for an issue you are studying.
- Research a famous person and write a news article.
- Write fictional autobiographies.
- Create a poster related to the topic you're studying.
- Create a newspaper from the time period you are studying.
- Draw a map of an area or place
- Make invitations encouraging people to join in a protest or historical event.
- Write articles and feature stories to make a newspaper.
- Create personal resumes.

#### Multimedia:

- Students create a collection of literature.
- Create a multimedia and/or video presentation on current events and issues.
- Report information researched.
- Create stories or reports and publish writing on the World Wide Web.
- Create a multimedia book report.
- Have students create a video presenting persuasive information.
- Students present reports using presentation software.
- Have students create a branching or choose your own ending story.
- Use video and TV commercials to analyze persuasion and the difference between fact and opinion. Have students create their own commercial with video.
- Have students select literature that best depicts conditions of an era and defend their choice in a multimedia presentation.

#### Telecommunications:

- Research.
- Collaborate in online projects.
- Have students write their resumes and publish on the Internet.
- Have students use OCLC First Search as a research tool.

#### Software:

- Use *Microsoft Office* from [www.microsoft.com](http://www.microsoft.com)

Use *TimeLiner* from Tom Snyder Productions

**2. MAPS district Core Curriculum** -- MAPS Content Area Curriculum Standards and Benchmarks have Technology Resources and Activities incorporated directly. These are posted with the benchmarks online at: <http://www.mapsnet.org/Pages/DistrictK-12Curriculum/contents/MAPS%20K-12%20St%20&%20BmksTOC6-23-05.htm>.

Additionally, students are taught appropriate online behavior, including interacting with other individuals on social networking websites and in chat rooms, and cyberbullying awareness and response.

Bothwell Middle School Language Arts Department has continued to support and promote technology integration in the 6<sup>th</sup> – 8<sup>th</sup> grade GLECs. Here are examples of their current correlated projects:

- Grade 7 - R.NT.07.01, 3, 4 & R.CM.07.01, 2, 3

Clay Marble-Realistic Fiction: Cambodia *unitedstreaming* video; PowerPoint comparing US and Cambodia using Internet resources; CIA World Factbook web site

- Grade 7 R.NT.07.01, 2, 3, 4 & R.CM.07.01, 2, 3, 4

Myths and Legends: Web search Olympian Gods & Goddesses

- Grade 7 R.NT.07.01, 2, 3, 4 & R.CM.07.01, 2, 3

Memoir: Names brochure writing project: Publisher brochure; Web search meaning of name; write and publish a resume

- Grade 7 -W.ST.07.01

Personal Style Multi-genre Magazine Project

Word processing, URL citing for information & art, Puzzlemaker, Web searching

- Grade 8 - R.NT.08.01; RCM.08.01, 02; WGN. 08.03

Holocaust research – Web-Site evaluation; Holocaust Museum and Anne Frank Web sites; Organize information with Inspiration, Use PowerPoint to visualize content.

- Grade 8 - R.NT.08.01; S.Ds.08.02; RCM.08.03; WGN. 08.03; L.RP.08.06

Animal rights research – Using MeL Databases & Facts.com & MLA Citations. Organize information with Inspiration

- Grade 8 - R.CM.08.01; WGN. 08.01, .02

Use TimeLiner software to facilitate Journal writing and visualize story exposition

**3. MAPS Literacy program** -- Use of Scholastic Reading Inventory testing 2-3 times a year in all grade levels (K-12) to create profiles for students reading based on student preferences and lexile scores.

Use of *Reading Counts* reading quizzes (K-5) grades for motivation and increased reading abilities.

Incorporation of Literacy Coaches who use DIBELS data collection & fluency assessments for all K-5 students. Many of our literacy staff members are currently exploring use of Digital Voice Recorders as tools that provide the audio modality for students' reading.

**4. Video resources correlated to Standards and Benchmarks:** Also at <http://www.mapsnet.org/Pages/DistrictK-12Curriculum/contents/MAPS%20K-12%20St%20&%20BmksTOC6-23-05.htm> correlations to *unitedstreaming* and other video resources are posted in charts created by teachers who participated in the nine-session class focusing on Video-on-Demand with *unitedstreaming*, correlating videos to specific curriculum benchmarks.

**5. Technology Activities Linked to Technology Standards and Benchmarks:** All K-5 teachers and students can access directly correlated technology activities complete with How To instructions, web site links, and teacher/student templates. These are the correlated activities identified in *Essential Student Technology Understandings* which is available in a desktop folder and is posted to individual computer desktops for K-5 teachers and students. It is also on the District Shared folder and online at: [http://www.mapsnet.org/pages/fdarling/index\\_files/Page370.htm](http://www.mapsnet.org/pages/fdarling/index_files/Page370.htm)

**6. Use of Web 2.0 Interactive Tools:** Many teachers are now using interactive Web 2.0 tools incorporated into many content areas. Some examples are: WIKIs for poetry comments, book study, and class discussions; audio and video casting supporting Five Themes of Geography for US Indian tribes, interviewing a guest speaker, student newscast, narrating student writing projects, poetry movies; and Blog book review postings.

Many of these products can be found at these web sites:

<http://teachers.mapsnet.org/Default.aspx?alias=teachers.mapsnet.org/gisstudents>  
<http://teachers.mapsnet.org/Default.aspx?alias=teachers.mapsnet.org/bookclub>  
<http://teachers.mapsnet.org/pdiedrich/Home/PoetryWiki/tabid/818/Default.aspx>  
<http://teachers.mapsnet.org/pdiedrich/Home/Blogs/tabid/383/Default.aspx>  
<http://teachers.mapsnet.org/dhaughey/ClassroomChats/tabid/926/Default.aspx>

**7. Use of Interactive Content Management System for Class Organization and Communication:**

1) A Hybrid Distance Learning model is currently being piloted for Marquette Senior High School's Economics class. Starting this fall students can fulfill class requirements using MAPS content management web portal with minimal (one day/week) seat time required. This class is posted online at:

<http://teachers.mapsnet.org/mstevenson/ECONOMICS/tabid/253/Default.aspx>

2) The 9<sup>th</sup> Grade Academy groups and Small Learning Community information site also use this software resource. These are located at:

<http://teachers.mapsnet.org/Default.aspx?alias=teachers.mapsnet.org/mshsfreshman>

<http://www.mapsnet.org/SchoolsAcademics/Schools/MarquetteSeniorHighSchool/MSHS SmallerLearningCommunities/tabid/1340/Default.aspx>

3) Other individual teachers organize and focus teaching materials and student products through the use of our MAPS content management system. An example of this is:  
<http://teachers.mapsnet.org/Default.aspx?alias=teachers.mapsnet.org/ehammerstrom>

**Timeline for integration** – will be included with the overview timetable section...  
See Section 13.

## **I. Curriculum Section 6: Technology Delivery**

### **Use of Distance Learning Resources**

#### **A. Current resources:**

##### 1. MAPS Subscription Resources:

- Research: Facts on File.com reference for K-12
- Courses offered: Alternative Education students taking online courses to complete needed credits
- Resources: *unitedstreaming* Video on Demand; *Reading A to Z* for K-5 teacher Literacy resources; *edHelper* subscriptions for all district teachers
- As new curriculum texts are purchased through the district curriculum cycle, technology resources are included. For example: Scholastic, Holt Rinehart, and Harcourt curriculum textbooks have both audio CDs and Internet content available.
- District account to the free [www.Gaggle.net](http://www.Gaggle.net) e-mail accounts for students. These accounts can be added as teachers request them for students. They are used primarily as teaching tools in the technology classes. But they can be specifically activated to meet student needs, as in the case of one third grade boy whose father just left for Iraq. We activated a personal account for him to be able to communicate with his father throughout the school day as needed to help him through this traumatic experience.
- Online assessments are also increasingly used by teachers through a number of resources: the text publishers; eInstruction CPS hardware located at the middle and high schools; and other Internet sources such as *Quia* and *Quiz Star*.

##### 2. **Interactive Web 2.0** handouts, examples and resources are posted online at:

<http://teachers.mapsnet.org> > **Web 2.0 Tools**

#### **B. Current Distance Learning activities:**

1. NMU's Distance Learning Department works with teacher requests for Virtual Field Trips. NMU also provides a link to virtual tours and conferencing at: <http://www.nmu.edu/av/k-12fieldtrips.html> and resources from TWICE for such projects as *Read Across America* at: <http://www.twice.cc/read/> These can be accessed by teachers through assistance from NMU and are coordinated by the MAPS Technology office.
2. MAPS technology now has a Polycom video conferencing unit available for use throughout the district. This hardware includes Polycom, data projector, document

camera and speakers. MAPS Supervisor of Technology Integration coordinates with MAPS Technology staff, NMU staff and MAPS teachers for resources and assistance with use in the classroom. Currently 6 classes (from grades 2 – 12) have registered dates for a variety of Video Conference events in 2009. Many teachers are looking forward to accessing this technology to link their classes to live remote sites that relate to their classroom content and continuing with favorite events they have participated in over the last few years.

3. A High School Social Studies teacher uses SKYPE to conference peer to peer voice service, talking to instructors and their classes in Finland and Italy. She uses a Web site called World Class Schools for Global Communities for the teacher contacts.

4. Promote and use Annenberg's Journey North projects that provide content, lesson planning resources, collaborative projects and Professional Development for teachers. "Journey North engages students in a global study of wildlife migration and seasonal change. K-12 students share their own field observations with classmates across North America." <http://www.learner.org/jnorth/>

5. A number of Elementary teachers are currently participating in the *e-Iditarod* online <http://surfaquarium.com/eIDITAROD> Sled Dog races. This includes e-mailing comments to mushers as students track their progress across Alaska using Internet resources and information.

7. Primary Source Social Studies for Michigan History, includes hands-on at Michigan Iron Mining Museum, visit to NMU Central UP Archives and internet resources and Michigan history web Pathfinder at:

[http://www.mapsnet.org/Pages/fdarling/MI\\_History/Web%20Site%20Intro%20to%20Michigan%20History%20Unit.htm](http://www.mapsnet.org/Pages/fdarling/MI_History/Web%20Site%20Intro%20to%20Michigan%20History%20Unit.htm)

### **C. Future:**

1. Section 12 in this Technology Plan will evaluate hardware issues of bandwidth and accessibility that impose technical & logistical barriers to our Distance Learning capabilities.

2. Our new MAPS web site is a content management system that has capabilities for Distance Learning which we are continuing to explore. Teachers can use this for class forums, blogs, wikis and other Distance opportunities for anytime access.

3. We are currently exploring the use of an online reporting system that will allow teacher assessment creation and storage.

## **I. Curriculum Section 7: Parental Communications & Community Relations**

### **Delivery of the Technology Plan to the Community**

1. The current Technology Plan is posted on MAPS Web site, [www.mapsnet.org](http://www.mapsnet.org) and will continue to be posted.

2. Technology notes are delivered in the District Technology Newsletter sent annually and also posted on MAPS web site at:

<http://www.mapsnet.org/DistrictInformationDepartments/DistrictDepartments/Technolog>

[y/NewsandAnnouncements/tabid/202/Default.aspx](http://www.mapsnet.org/NewsandAnnouncements/tabid/202/Default.aspx)

3. Technology Sessions and Classes are posted on MAPS Interactive Web site at:  
<http://teachers.mapsnet.org> > Tech Classes & Workshops

### **Effective Parent Communication with Technology**

1. All teachers have e-mail accounts that are available for communication with parents from school or home.
2. All teachers have web-creation tools (both static and interactive), training, and storage available to them for better parent communication. Many of our teachers create and maintain their classroom sites. Bothwell Middle School and Marquette Senior High School have undertaken a planned posting of a web home page for every teacher. Instruction from the district Supervisor of Technology Integration is ongoing and supportive in this effort. A recent example of communication in curriculum is found on the Poetry WIKI where comments by Bothwell Middle School students *and* parents have been posted as they review the online poetry selection together. See this at:  
<http://teachers.mapsnet.org/pdiedrich/Home/PoetryWiki/tabid/818/Default.aspx>
3. The District Web site has links to all schools, board information and meeting minutes, events and other pertinent activities and information.
4. Technology Links page: [www.mapsnet.org/pages/fdarling](http://www.mapsnet.org/pages/fdarling) has information related to resources and sites for student and parent content information, as well as How To's for software programs and integration ideas, and Technology Newsletter. Also the web links for K-5 students and teachers to access correlated internet activities are posted here.
5. The district uses Skyward's Gradebook program which provides online access to grades, assignments, attendance and other information to all parents for students in grades 6-12.
6. *unitedstreaming* and Facts on File databases offer home logins for parents to view movies assigned to students or help research topics assigned.
7. Middle and High School Libraries are part of the UPROC which has home logins for accessing all the library catalogs and resources across the UP. Links are also available from the MAPS web site at:  
<http://www.mapsnet.org/SchoolsAcademics/Libraries/tabid/199/Default.aspx>
8. High School Video Journalism Class school events videos are posted on MQTube, a MACUL award-winning site, online at: <http://mqtube.org/>. Comments about these videos have been received through e-mails from parents and grandparents across the country.

### **Parent and Community Representation**

Parents and community members are involved in all aspects of MAPS technology. This past year many parents have volunteered to help with technology activities for their child's computer classes.

We have always had parent representation on the Technology Planning Committee. Marquette City and NMU representatives are present and provide input, as well.

Involvement from parents and assistance from NMU-TV program department are seen directly in many technology programs, including Kids on the Air and other video news

programs, and computer lab assistance. Other community assistance and collaboration for technology has been with NMU Archivist, Marcus Robyns and Michigan Iron Museum Education specialist, Barry James.

Most recently, the Marquette History Museum Education Director has been coordinating a primary source project with Graveraet Intermediate and Bothwell Middle School involving primary source interviews, research and presentations. Technology equipment has been grant funded for cameras, digital voice recorders and storage and web access. MAPS Technology Department also supports this project through resources and personnel.

## **I. Curriculum Section 8: Collaboration**

### **Continuing Education and Alternative Education Collaborations**

1. Classes are offered each semester for Adult and Continuing Education. These include a number of technology offerings for the general community. They are provided guest logins to access network resources for storage and Internet exploration.
2. GED classes use the lab facilities and all have networked files and access to all computer software
3. The Alternative High School has full capabilities and lab facilities the same as traditional High School students: Web Access, Software, networked files and folders, Internet and DL use. Photoshop and Gaming software has recently been loaded on these stations. Students have created Virtual Tours of Michigan using this software.
4. The Technology Department works with Alternative Ed students and staff and GED & Adult Ed teachers for training, materials and resource information.
5. Assistive Technology Center/United Cerebral Palsy at the MARESA facility assesses technology needs for our students. MAPS Supervisor of Technology Integration attends assessments for special education students and assists teams in selecting and implementing appropriate technology products.
6. District Technology and Special Ed provides hardware and software not available from ATC for students with special needs and collaborates on installation and training needs. We will continue to provide all software and hardware updates through our regular rotation processes outlined in the hardware section below, as well as continued support for special students assistive technology needs.
7. The ATC director, Sara Menzel, offers workshops in assistive software and collaborating with MAPS Supervisor of Technology Integration on uses of Microsoft Word in assistive activities. The Assistive Technology Center computer lab is available to teachers, students and parents from MAPS district to explore programs and products.
8. MITS (Michigan Integrated Technology Supports) for whom Sara Menzel is regional coordinator, has been a very active support within the MARESA area, offering grants, workshops, and conference opportunities. They also provide resources and consultations for use of the *bookshare.org* the digital materials source for students needing reading support.

## **II. Professional Development - Section 9: Professional Development**

### **Professional Development Strategies**

**Current Strategies** – Note: almost all of these are open to any staff member at MAPS. Participants have included custodians, aides, library and other support staff, as well as administrators, all teachers. All activities are planned and coordinated by the MAPS Supervisor for Technology Integration. Classes are taught by MAPS Supervisor for Technology Integration or other teachers in the district, local institutions, or professional trainers from administrative programs:

- 1) **Short-term courses**- Summer and after school general technology skill e.g. Kidspiration & Inspiration, Digital Cameras, Office 2007(offered for SBCEU credit in spring and summer 2008), and interactive content management web sites.
- 2) **Long term Classes** – offered over the summer and during evenings throughout the school year. These currently are: Web 2.0 Technology Integration and Video Integration Lesson Study using *unitedstreaming*, YouTube, Teacher & School Tubes; and other online video sources. Link. These classes are posted online at: <http://teachers.mapsnet.org/TechClassesWorkshops/tabid/821/Default.aspx> These classes are typically offered for NMU or SBCEU continuing credit for participants.
- 3) **Classroom-focused Workshops**, e.g. Digital Media, Graphic Organizers, Map programs (Map Maker’s Tool Kit & Map Point) for Social Studies Geographic topics- instituted through a MAPS Foundation Grant, Classroom Performance System (CPS), Student Computer Activities.
- 4) **Weekly Technology Visits** - to each K-8 school and MSHS by appointment to assist teachers with questions, work in their classrooms with students, follow-up on previous tech information, and collaborate on projects
- 5) **One-On-One Planned Sessions** -visits planned by School Administration using a roving sub to meet with individual teachers.
- 6) **Trainer Workshops for Grade**–level teams, e.g. Scholastic Lesson Planner for K-3 teachers
- 7) **District-wide PD** for Technology conducted a K-5 workshop for incorporation of the K-5 Student Technology Activities materials and online Time-Off & Sub request programs.
- 8) **MARESA, State and National Technology Conferences** for teachers
- 11) **Re-activated Curriculum Council** – district-level body assembled to address global curriculum issues.
- 13) **Web page resources** [www.mapsnet.org/pages/fdarling](http://www.mapsnet.org/pages/fdarling) and <http://teachers.mapsnet.org> used in training sessions and remain posted for ongoing reference and the *MAPS Technology Curriculum Guide* CD and *Essential Student Technology Understandings* guide.
- 14) **Classroom Intervention** directly with students to conduct technology activities with teachers and their classes by MAPS Supervisor of Technology Integration acting as “guest teacher” or standby support, depending on teacher comfort level.
- 15) **Purchase and distribute manuals**, activity books and software for teachers appropriate to grade level libraries and teachers.
- 16) **Online Grading programs** - workshops, support, assistance and coordination of training for use and upgrades. Currently, MAPS Technology is providing input in the selection of a K-5 online grading program.

17) **K-5 Student video news** programs. Modeled after MACUL award-winning “Kids on the Air” developed by MAPS Superior Hills Elementary parents and staff. It has been replicated at Graveraet Intermediate School.

18) K-5 Library Media staff and MAPS Technology participates in *Reading Counts* as point persons and teacher support.

**Future Strategy:**

1. Provide more resources and information to raise awareness of the principles of Universal Design for Learning (UDL). In the past few years, a number of MAPS teachers have participated in UDL activities including lesson creation, but more needs to be done to promote this “learning for all” approach especially in the general ed. classrooms. One focus is for more information on new teaching methods and strategies that involve meeting students’ needs individually in multiple content formats. This will facilitate the process of teacher development towards more technology expertise.

2. Continue one-on-one planned sessions with individual/team teachers or their classes using roving subs. This has been a successful way to support teachers in individual projects and interventions now needed since reduction in Technology classes as specials for students in Fall of 2007.

3. Use results of the MAPS Teacher Technology survey (posted in the Appendix of this plan) increase teachers’ basic competence and comfort level with student technology integration and to promote and create more awareness of staff individual technology needs in order to promote more “just-in-time” delivery of technology training.

4. Use the new 2008 ISTE Technology Standards for teachers as a checklist for teacher skill competence. (See Appendix)

5. List of technology equipment available for loan to be distributed to all staff.

6. Continue processes to “re-work the learning environment” with a more interactive integration of networked, distance resources, and student-driven projects.

7. Promote Information Literacy as a part of 21<sup>st</sup> Century Learning among all teachers and staff to guide users to seek, find, evaluate and communicate the vast amounts of information now available online in a more effective and accurate way.

8. Continue to inform and instruct on the issues of copyright, plagiarism, and the techniques of citation of all types of sources.

9. Continue to promote the ISTE Technology *Standards for School Administrators* (TSSA) as support for teaching and learning with technology continues to evolve in each building.

**Professional Development offerings for Technology Integration**

Workshops and classes are created on-site, mostly in the Technology Office and are individualized for personal and grade level/content area needs. All formal workshops are introduced through a rationale for using the technology in the classroom. These include research that supports student achievement; teacher testimonials; and other similar technology “hooks.” They are also directly linked to classroom content and activities by using such resources as GLECs activities search and MAPS Online Core Curriculum. MeL (Michigan Electronic Library) is also linked as a resource for providing Internet materials linked to content standards. Presenting current research that reveals increased student achievement when using a program such as *unitedstreaming* or ISTE resource

articles for concept mapping programs such as TimeLiner, or Inspiration/Kidspiration, for example, is also stressed when introducing these programs.

Workshops and classes use *INTEL Teach to the Future* model promoting classroom practices where teachers create materials using digital tools and distributing these materials to others through CDs or web posting. These promote “active learning” and are designed to help teachers meet individual needs and engage students in project-based learning activities. Workshops on how to use hardware (data projectors, digital cameras, digital voice recorders, audio recording and editing software and TV scan converters) are presented using content-area materials and integration ideas based in the INTEL model when training on this equipment. Woven into all classes and workshops is information and resources regarding appropriate online behavior, including interacting with other individuals on social networking websites and in chat rooms and cyber-bullying awareness and response.

The philosophical overview for effective “just in time” integration and promotion of active learning strategies is supported in the following articles:

Student immersion in all things digital is changing the way students think and learn and how that in turn affects how teacher should teach in:

*Digital Natives, Digital Immigrants*. Prensky, Marc. NCB University Press, Vol. 9 No. 5, October 2001) © 2001 Marc Prensky

Success for technology integration is more dependent on intrinsic factors than external factors. This means that inner drive, personal beliefs, commitment, confidence, previous success (intrinsic factors) outweigh hardware access, support and time (extrinsic factors) in:

Ertmer, P., Ottenbreit-Leftwich, A., York, C. (2006). Exemplary Technology –using Teachers: Perceptions of Factors Influencing Success. *Journal of Computing in Teacher Education, Vol. 23 (2)*. ISTE

### **State and National Standards**

Use of State and National Technology Standards for Students, Teachers and administrators is shown by:

1. Including *ISTE Standards* on the MAPS Technology Curriculum CD as stated in Curriculum III, Section 4.
2. Promoting the new 2007 – 08 *NETS for Students and Teachers* online at: <http://www.iste.org/AM/Template.cfm?Section=NETS> and Appendices VII & VIII.
3. Membership in ISTE to facilitate purchase and dissemination of standards publications.

### **Timeline for PD Implementation**

See Section 13

<b>II. Professional Development Section 10: Supporting Resources</b>
<b>MAPS Policies</b>  MAPS Technology policies are located in the <i>MAPS Technology Curriculum Guide</i> CD & MAPS web site: <a href="http://www.mapsnet.org/District/DistrictInformation/DistrictPolicies/tabid/108/Default.aspx">http://www.mapsnet.org/District/DistrictInformation/DistrictPolicies/tabid/108/Default.aspx</a>
<b>Manuals and printed materials</b>  <i>MAPS Technology Curriculum Guide</i> CD, <i>Essential Student Technology Understandings</i> hardcopy guide and posted with Technology Curriculum, web site, Newsletters and tips, and District internal informational shared network folders, Activity Resources and Manuals also distributed among the 7 school libraries.
<b>Video on Demand</b>  <i>unitedstreaming</i> supported with its own server in Fall 2005; teachers can download and burn videos, and create and burn PowerPoint and Movie Maker presentations with embedded video clips. MAPS Workshops are offered to integrate this resource directly into curriculum benchmarks and create classroom resources mentioned above. Teacher narratives are also available to help promote use of this resource among teachers. The book marking feature of <i>unitedstreaming</i> allows teachers to share video selections with their school and across the district. A selection of Professional Development videos is offered in this resource. Teachers also have the capability to download from YouTube and other video storage sites (using online conversion software) and store these in networked folders or portable storage.
<b>District Web &amp; Network Resources</b>  MAPS Technology Links web site: <a href="http://www.mapsnet.org/pages/fdarling">www.mapsnet.org/pages/fdarling</a> and MAPS Interactive Web site: <a href="http://teachers.mapsnet.org">http://teachers.mapsnet.org</a> include Technology Newsletters and tips; e-mail Technology instruction and How To's both individually and mass district. Instructions (text and video) and resources are posted and updated on District internal network shared folder, including a PowerPoint library of teacher-created and downloaded presentations by content area. Each school has shared drives, as well as school web pages to post photos, student work and files of local school interest and information. Here are some examples: The award-winning Graveraet Blazing Comet news posted at: <a href="http://www.mapsnet.org/SchoolsAcademics/Schools/GraveraetIntermediateSchool/tabid/119/Default.aspx">http://www.mapsnet.org/SchoolsAcademics/Schools/GraveraetIntermediateSchool/tabid/119/Default.aspx</a> Poetry videos created by 3 <sup>rd</sup> grade students at Sandy Knoll and Superior Hills Elementary schools: <a href="http://www.mapsnet.org/SchoolsAcademics/Schools/SandyKnollElementary/SandyKnollStudentPage/tabid/1387/Default.aspx">http://www.mapsnet.org/SchoolsAcademics/Schools/SandyKnollElementary/SandyKnollStudentPage/tabid/1387/Default.aspx</a> <a href="http://www.mapsnet.org/SchoolsAcademics/Schools/SuperiorHillsElementary/SuperiorHillsStudentPage/tabid/1425/Default.aspx">http://www.mapsnet.org/SchoolsAcademics/Schools/SuperiorHillsElementary/SuperiorHillsStudentPage/tabid/1425/Default.aspx</a>

### **Instructional & Training Software**

KEY training modules for Microsoft Office and Windows – distributed to Building Technology Coordinators; *INTEL Teach to the Future*; Software Manuals with CDs and packaging distributed to libraries and lab teachers and available in the Tech Office to borrow. Information on Microsoft online tutorials is also provided for all Office programs and VISTA.

### **Online Subscription services**

*Facts on File Reference Suite* (6-12 grades) and *Facts for Learning* (K-6 grades) – guided reference; *unitedstreaming* Video (K-12); *Reading A to Z* (K-3); and *edHelper* online activities site.

### **MARESA**

MARESA (Marquette-Alger Regional Education Service Agency) offers many programs which teachers and the MAPS Technology Department have participated in, such as: TELL Teacher Leaders; TELL district and Administrator Technology Proposals and workshops; Administrator Class; CPS Training; Video in the Classroom; Internet for Project-Based Learning; JASON Project; DL coordination

MITS - UDL resource for workshops, information and conference programs.

### **Higher Education**

Partnerships with NMU Teacher Education program include: set up of NMU student wireless access in MAPS school buildings; NMU Instructors coordinating SRI student data collection program in MSHS; NMU Video Conference coordinator; NMU Archives Summer Workshop coordinated by MAPS Supervisor of Technology Integration and NMU representation on Technology Planning Committee.

*Integrate Video Technology through Lesson Study and Web 2.0 Tools Study – Integrate Interactive Technology* courses are currently offered twice a year through the MAPS Technology Department and approved for two graduate credits at NMU and 6 SBCEU continuing education credits with MAPS Supervisor of Technology Integration as teacher of record with the university.

### **Other resources**

Marquette Senior High School teachers are participating in a number of projects supported by MAPS Technology. These include a pilot hybrid distance learning Economics class, Science Department use of the CPS instant assessment tool, and participation in CCWIM Watershed Collaborative Project.

District-wide, staff, students and teachers participated in a MAPS national election web site created for Fall 2008 Presidential and Congressional elections.

## **III. Section 11: Infrastructure Needs/Technical Specifications, and Design**

The following is a description of the current status of hardware, software, network infrastructure, telecommunications, and other technology service:

**Network:**

All buildings are equipped with a switched Ethernet network with a minimum of 100Mbps connections. Each building is connected to the Technology Department network via fiber optic cabling for Internet access and other servers.

**Servers:**

Multiple servers are in place for file storage and printer sharing. Additionally there are separate servers for services such as e-mail, webserver, and student database. We also have servers for the Skyward Administrative software and *unitedstreaming* digital video access.

**Computers:**

All computers are capable of running Windows XP professional and/or Windows Vista, and are configured for Internet/Intranet access. Of these computers, over 630 are on a five-year lease divided into three groups. At the end of the five year lease cycle the computers are purchased and deployed while removing the oldest computers from the network.

**Software:**

MAPS participates in the Microsoft School Agreement, making the latest version of the Windows desktop operating system and the Microsoft Office Suite available to all computers. In addition, many stand-alone and networked programs are installed on an as-needed basis.

**Future acquisitions planned:**

1. Investigate the possibility of replacing the leased fiber cable with privately owned fiber to the last of our schools. Review Internet bandwidth needs and adjust as economically feasible.
2. Review presentation equipment coverage in schools, such as data projectors.
3. Continue to investigate and pursue cooperative ventures with our local ISD where feasible.

**Current and ongoing:**

To ensure the interoperability of equipment, strategies used are to require Schools and Departments such as Special Education to send technology requests for hardware and software to the Technology Office so compatible equipment can be purchased. It is also strongly encouraged that technology equipment requested by parent groups and from grants be researched, priced, and ordered by the Technology Department to ensure that is compatible with current hardware and software.

**In the Future:**

Continue exploring and adjusting leasing and buy-back options.

Within the district, there are many sources of technical support that is available. These are currently in place, evaluated and upgraded as needed.

**Technology Office Supervisors:**

Manager of Technology; Supervisor of Technology Integration (note, this position is currently included in the upcoming budget cuts proposal)

**Technology Office Staff:**

Helpdesk/Secretary and Network and Systems Technician

**School-based :**

None

**Personal support strategies include:**

1. Weekly visits to all schools (except MSHS where visits are by appointment) by Technology Personnel that includes field support for hardware or software.
2. Help Desk support is initially delivered by our Secretary who can solve the issue or escalate the problem to other staff members. More complex problems are escalated to the Network and Systems Technician and Manager of Technology. Technology staff has the ability to provide remote computer assistance at anytime during the day to any computer in the district.
3. Personal visits to any schools as needed by the Network and Systems Technician and Manager of Technology.

**Support media include:**

1. E-mail
2. Step-by-step instructions and handouts posted online, on the Shared network folders, and by attachments to e-mail.
3. Remote assistance to any networked district computer via phone.
4. Direct phone communication from 7:00 am – 4:00 daily.
5. District online Work Order system.
6. MAPS Technology web pages with handouts, videos, templates, instructions and web links posted at: [www.mapsnet.org/pages/fdarling](http://www.mapsnet.org/pages/fdarling) and <http://teachers.mapsnet.org>

**III. Infrastructure, Hardware, Technical Support and Software –  
Section 12 Increase Access**

Currently all students have access within the district. Some access remotely via Internet, such as library reference resources, staff Web Access e-mail, information posted (see above) on MAPS Web site. MAPS website is now an online course management system which supports: survey, forums and chat features for teachers, students and parents.

We currently offer support with hardware, software, and training for assistive technology for students with assessed needs and their teachers and aides. We plan to increase

individualized support through continued attendance by Supervisor of Technology Integration at Assistive Technology assessments provided at our regional ATC office.

**IV. Funding and Budget Section 13: Budget and TimeLine**

**Budget**

Budget amounts will remain essentially static, with available funding to be shifted to add additional hardware and software as deemed necessary and when fiscally possible. Inflationary pressures may cause shifting of amounts within the categories below.

<b>Category</b>	<b>2009-2010</b>	<b>2010-2011</b>	<b>2011-2012</b>
Computer Lease Costs (includes Lease Cost and Purchase cost)	\$125,500.00	\$130,000.00	\$130,000.00
Software Annual License Fees (Varies by year due to multi-year agreements)	\$177,500.00	\$177,500.00	\$177,500.00
Maintenance & Supplies	\$53,000.00	\$54,000.00	\$55,000.00
Professional Development	\$15,000.00	\$15,000.00	\$15,000.00
New/Replacement "Hardware"	\$20,000.00	\$20,000.00	\$20,000.00
Internet Connectivity	\$30,000.00	\$40,000.00	\$40,000.00
Telephone	\$59,100.00	\$60,200.00	\$61,400.00
<b>Total</b>	<b>\$480,100.00</b>	<b>\$496,700.00</b>	<b>\$498,900.00</b>

**Technology Plan Timeline**

**Support:**

2009 - 2010

- Offer individual building technology support for both classroom and minor technical needs. Reducing technology support sends the message that technology integration is not a district priority.
- Increase embedded Professional Development time, as recommended by National Council for Staff Development (and adopted by MDE).

2010 - 2011

- Provide support for future technology surveys using strategies for increasing participation
- Assure access to well-maintained hardware and presentation data projectors for seamless integration of technology tools with content curriculum

**Curriculum:**

2009 - 2010

- Fully incorporate/correlate technology standards (as were created with our MAPS Technology Curriculum Guide, 2004) into content area curriculum standards. We have a few instances of correlation with United Streaming content integration and BMS Language Arts, K-6 Student Technology Activities but it is still limited.
- Provide computer lab time for 1 – 3 grade students to learn keyboarding and basic technology skills, so teachers can accomplish various technology projects and activities with students.

2010 - 2011

- Establish a committee (possibly a sub-committee of the Curriculum Council) to address Technology for 21<sup>st</sup> Century Learning, focusing on Information & Communications Technology -- ICT
- Re-establish the MAPS Technology Writers Committee to develop assessments for technology competencies using the NETS for teachers and students\* (this will help address the NCLB 8<sup>th</sup> grade Technology Standards).
- Apply UDL Principles and strategies in these committees to reach the “whole” student. The ability to provide multiple forms of resources is made possible to a very great extent on the wide-variety of technology programs and resources that support universal student achievement. Focusing on UDL is a way to intrinsically motivate teachers to incorporate technology as a means to provide a wide variety of student resources and modalities

#### **Assessment**

2010 - 2011

- Require teacher technology assessments included in teacher classroom evaluations that meet individually established goals and needs based on NETS for teachers
- Provide district incentives for teachers who meet NETS Standards assessments. This could be in the form of increased hardware (they would really use it since they have demonstrated technology skills) or opportunities for Professional Development, such as MACUL attendance, etc.

#### **Hardware/software access –**

2009 - 2010

- a. MAPS Manager of Technology will continue to explore solutions, based on cost and network speed, to increase bandwidth through IP service providers and/or fiber installation.
- b. Purchase Online Report Card software for electronic entry and analysis of student data  
MAPS Technology Department will review presentation equipment coverage in schools,

such as data projectors.

c. List of technology equipment available for loan to be distributed to all staff. To be completed and distributed by Supervisor for Technology Integration by Fall 2009.

2010 – 2011

**3) Hardware Access/software –**

a. Incorporate bandwidth upgrades to MAPS WAN.

b. Continue to expand K-5 libraries electronic resources and catalog

c. Continue update of software lists in the Technology newsletter and posted online in Technology Links Web site.

d. Continue to increase number of computers in classrooms based on teacher application of how it will be used to increase student achievement. Implement starting Fall 2007 – through Technology Plan Period.

**IV. Funding and Budget: Section 14: Coordination of Resources**

**MAPS Financial plan for long-term technology investment includes:**

1. Continued leasing of computers

2. Exploration of potential advantages of the buy-back program to purchase some computers at the end of a lease cycle.

2. Continued use of free Compaq software Paqs to supplement the standalone software titles.

3. Continued use of temp employees to install and rotate hardware during the summer lease cycle.

Funding sources will continue to be explored and sought as they arise. These include but are not limited to: Title Technology Funds, Federal Grants as applicable, Marquette Foundation and Excellence in Education Awards, partnerships with NMU and MARESA, NEA semi-annual grants, other corporate grants such as the *HP Technology for Teaching* Grant which a team of Graveraet Intermediate School teachers are currently applying for.

**V. Monitoring and Evaluation: Section 15: Evaluation**

The following strategies are used by MAPS Technology Department and the district at large to determine the extent to which activities are effective. These strategies help by integrating technology into curricula and instruction, increasing the ability of teachers to teach, and enabling students to increase individual achievement.

**Formal Evaluations --Technology Department:**

**Currently teacher evaluation** has been more individualized and outreaching. Various instruments have been used to gauge staff technology comfort and ability, such as: MAPS Technology Department District Needs Survey Winter 2003; NSDC Professional Development survey in Fall 2004; WMU TELL Survey Fall 2004 and

The MAPS Teacher Technology Survey using ISTE Core Competencies was administered Fall 2006 both online using the MAPS Web Site Survey tool and on paper, as teachers choose to complete. The results are posted in a compiled Excel spreadsheet comparing general areas of skills with the previous 2001 MAPS Teacher Technology Survey (See Appendix VI). This instrument will be re-issued to teachers in 2010 to see ongoing progress by the Supervisor for Technology Integration. If the Supervisor for Technology Integration position has been eliminated by current budget cut proposals, this duty will fall to the Assistant Superintendent for Curriculum as immediate supervisor of teacher training. The effectiveness of this approach is based on building relationships, following up as much as possible, and being timely with content offerings and services.

**Informal Evaluations-**

1. Currently most planned workshops and programs are evaluated using a Technology Professional Development form (Appendix III). These forms are tabulated and recorded with other district data on Professional Development effectiveness.
2. The *unitedstreaming* two-week course provided teachers the opportunity to submit a narrative of the effects of integrating *unitedstreaming* in classroom curriculum. (Appendix V).
3. Daily input is gathered and used through e-mail, phone, Work Orders and helpdesk communications by all Technology Department staff.

In order to meet future goals, more applied technology Professional Development (as outlined above in Sections II.9 and II.10) in focused areas indicated by the MAPS Teacher Technology Survey results will be continuously conducted by district Supervisor of Technology Integration. If the Supervisor for Technology Integration position has been eliminated by current budget cut proposals, this duty will fall to the Assistant Superintendent for Curriculum as immediate supervisor of teacher training.

**V. Monitoring and Evaluation: Section 16 Acceptable Use Policy**

MAPS District recognizes existing federal requirements for privacy and safety as stated in The Children's Internet Protection Act [CIPA]. All District Acceptable Use Policies are posted online at [www.mapnet.org](http://www.mapnet.org)

The district currently uses the Surf Control software to block sites by chosen categories and blocks student e-mail, as well. Students are not allowed to use instant messaging.

Educating minors about appropriate online behavior, including interacting with other individuals on social networking websites and in chat rooms and cyber-bullying awareness and response is currently a part of the Technology Curriculum noted in Area I. Section 5. We currently provide direct student activity applications that illustrate Internet Safety in the K-5 Student Computer Activities folder posted on all K-5 student and teacher computer desktops and online at:

[http://www.mapsnet.org/pages/fdarling/index\\_files/Page370.htm](http://www.mapsnet.org/pages/fdarling/index_files/Page370.htm)