



***District Technology Plan
2010 – 2015***

Medway Public Schools
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1. Overview

In FY09, Medway witnessed the addition of a town wide Director of Information Services. The goal for this new position is to assess the current state of all technologies and develop a long range plan that provides equitable resources to benefit the entire community. Focusing on stabilization of the current environment, development of adequate budgetary funds to support plans for the future, and providing a forward thinking 21st Century technology plan that will propel our community into the current state of technology and beyond, this document attempts to incorporate the plan for technology, technology integration, and professional development for our community.

Current initiatives focus on stabilizing mission critical infrastructure, increasing communication capabilities (telecommunications, web, wireless access, email systems), and adding 21st Century technological resources that will enhance our environment.

Medway Public Schools Vision Statement

The responsibility of the Medway Public Schools is to assure each student an education of the highest quality possible by optimizing the human and financial resources of the community and focusing those resources on the individual needs of the learner. Through this effort, the school system will seek to encourage young people to commit their minds to inquiry, their hearts to compassion, and their lives to the service and betterment of mankind.

Technology Department Vision Statement

The vision of the Information Services Department is to provide forward thinking technical resources that will promote an effective and efficient environment for all. Through the seamless integration of technology we will empower all to become effective communicators, enhance the educational experience, create valuable resources for our community and lifelong learners.

2. Background

2.1 District Technology Mission Statement

The mission of Technology Department is to provide the technical resources to effectively:

- Manage & Communicate Information
- Provide an effective and efficient work environment
- Enhance the educational experience
- Enhance staff, teacher, and student achievement
- Provide for equal access to educational resources
- Prepare students for real world experiences
- Support the goals and initiatives of all departments
- Provide valuable resources for our community

To accomplish our mission, we will need to create an environment that promotes collaboration of ideas between administrators, educators, and students. We will ensure that the ideas and goals of this collaboration provide equitable resources for our community and promote continued learning. We will also need to support these goals with effective planning and fiscal responsibility.

2.2 District Technology Planning Goals

The Medway Public School District (the District) is charged with creating a plan, envisioning the utilization of existing and evolving technologies, for accomplishing a defined mission relating to the education of Medway students. The overall goals of the District's technology planning process are as follows:

1. Develop, implement, and revise, as appropriate, a plan, to:
 - Identify the existing status of district technology
 - Establish district priorities, a timeline for implementation, and a realistic fiscal plan
 - Incorporate sound funding strategies; operational budget, e-rate, partnerships, grants and entitlements
 - Provide the human resources consistent with this technology and educational endeavor
 - Provide a consistent system for ongoing evaluation and program improvement
 - Establish an evaluation to monitor the progress that is being made towards the integration of technology into the curriculum
2. Involve the school community in decision-making.
3. Improve student learning.
4. Improve district, school, and classroom management.
5. Improve communication within and among buildings, departments, and community.

3. Technology Program Status and Goals

3.1 Current Status

Infrastructure

By August 2010 all sites had an infrastructure consisting of voice, data cabling (Cat5e), and video in all classrooms and office areas. Medway's continued investment in a town wide Metro Area Fiber Optic Network (MAN); expanded to include all municipal and educational locations. This increased our interconnectivity bandwidth to One Gig site-to-site, allowing the district to leverage new and existing technologies across all sites at a lower cost of ownership. Communication of information across all areas will remain to be a top priority for the technology department.

Curriculum and Integration

Medway has begun to recover from prior fiscal instability and has now added four curriculum coaches to assist in the development of curriculum and integration of 21st Century technology skills into the classroom. Medway Public Schools also began participation in Project Lead the Way, focusing on science skills, as well as, Project ABLE which focuses on creating district leaders in the area of blended online learning environments. Development of online communications tools, such as Parent Portal and Constant Contact, have been beneficial in improving communication between school and home and has greatly increased teacher/parent communications. Additional resources and staff development are being fostered through ACCEPT grant initiatives, conferences, and in-house training sessions.

Funding

The district continues to leverage all funding sources (operating budget, capital improvements, E-rate, grants, and entitlements). The Town of Medway has a renewed commitment to technology for both municipal and educational purposes: investing in both infrastructural and peripheral equipment to create efficiencies and enhance the availability of resources for our community. A major funding commitment in FY2011, of over \$400,000, has greatly changed the landscape of our technology status; upgrading over 600 desktop computers and adding an additional 80 laptop computers to our inventory. Continued support

will provide Medway Schools with additional resources, to improve instruction, collaboration, and technical skills of our students.

Human Resources

Medway is making strides with curriculum and technology integration through the addition of curriculum coaches, but still lacks adequate technical support staff to maintain and implement the current hardware fleet in production. Medway hopes to add a high level network administrator within the next two years. This position will be responsible for implementation and support of forward thinking resources that support our 21st Century goals for technology. DESE standards will be reviewed to establish staffing levels and funding will be sought to attain the recommended levels.

Professional Development

Direct technology instruction occurs at the student level in all schools, and Medway is confident that the implementation of curriculum coaches throughout the district will increase our support for staff development. Through the use of new technologies, such as web based grading and attendance, we are decreasing everyday processing time for staff and increasing their ability to attend peer led technology offerings. Medway is also an active member in the ACCEPT Collaborative, which provides many offerings throughout the year in various areas of staff professional development.

Administrative and Management Software

The district has greatly enhanced our student information software by investing in the modules necessary to conduct our everyday business in an effective and efficient manner. Such modules as web based attendance, web based grading, EPIMS, and parent portal have increased our ability to communicate to with the community at large as well as created efficiencies by decreased processing times. The Town of Medway has also invested in a town wide financial database system (Munis) which has streamlined our procurement process, increasing our effectiveness to deliver products and services more efficiently.

Software/Hardware

The current state of hardware has greatly improved this year. With a fleet of roughly 750 computers, 85% replaced at the end of FY2010, Medway has made a substantial investment in the upgrade of critical systems. A five year budget replacement cycle has been developed to ensure the continued maintenance support and growth of our resources. With much of the existing hardware replaced, Medway now begins to focus on advancing our technology to improve student achievement and technical skills. Medway has recognized the importance of proper maintenance and replacement of technology and the benefits it provides and has begun to build appropriate funding levels for support.

3.2 Goals

These goals do not exist in isolation, but come together in concert for the Medway Public Schools to achieve the desired outcomes. These goals are intended for implementation during the life span of the plan. Medway schools have made significant progress in some areas but minimal progress in others. Many of the goals are dynamic; their implementation is a fluid process predicated on many factors, some that will push the plan beyond the intended timeline.

Administrative and Management Goals

- Administration will use technology to enhance all record keeping and sharing of information in a standard format.
- Technology will be used to gather and share current and timely information for decision making.
- Appropriate modules of our administrative software management package will be implemented to enhance access to mission critical information.
- Electronic mail and web technologies will be used to improve communication among all teachers, administrators, support personnel and the Medway community.

Instructional and Curricular Goals

- Department heads, building principals, instructional coaches, and their staff members will review the purchase of software for classroom instruction.
- The District will review the purchase of digital formats when selecting textbook for procurement.
- The District will ensure all students will be able to use technology to improve their reading, writing, and communication skills as well as enhance their presentation and production skills.
- The District will ensure all students will be able to use technology to access and analyze information.
- The District will ensure all students will be able to use technology to enhance interpersonal skills for working both independently and in collaborative groups.
- Students will learn and practice technology skills and ethical use of technologies that will prepare them for the 21st century workplace.
- Students will use technology as a data and statistical analysis tool in the service of mathematics and science to design, build, and test solutions to real-world problems.
- The District will ensure all students will have equal access to current technology in every discipline and at every grade level.

Professional Development Goals

- To enable teachers to use technology as a tool for individualizing instruction.
- To enable teachers to use technology to develop assessment tools.
- To enable teachers and support staff to use telecommunications to enhance curriculum and instruction.
- To enable teachers and support staff to use technology to enhance communications with parents.
- To encourage and support joint development and dissemination of curriculum aligned with the DESE Curriculum Frameworks.
- To improve administrative and management effectiveness, specifically with regards to Massachusetts SIMS and EPIMS.

General Technology Goals

(Including but not limited to funding, hardware/software, HR, telecommunications, information services, access, and E-rate)

- Provide adequate funding to support the maintenance and operation of all of our technologies.
- Replace and properly disposal of obsolete equipment.
- Upgrade the electrical infrastructure of all buildings:
 - to allow the installation of computers in every classroom
 - to utilize the multimedia capabilities within the newer technologies
- Develop a systematic purchasing plan for new equipment as part of the annual operating budget.
- Provide in-house and off-site professional development for all staff and faculty.
- Provide adequate training of network manager(s).
- Maintain current equipment assets in good working order.
- As the need arises, rewire the electrical infrastructure in McGovern School, Burke, and Middle School to support the current technology.
- Coordinate the procurement of application software at all levels to promote curriculum development that incorporates technology in the classroom.
- Improve and stabilize the WAN infrastructure throughout the district.
- Install Metro Area Network - Fiber Optic cabling to leverage and create greater access to resources
- Install telephones to the classroom areas of Burke.
- Provide adequate on-site network / desktop system support.
- Establish a plan to remove outdated equipment from the schools in an environmentally proper manner.
- Institute voicemail systems in all schools.
- Seek alternate sources of funding for projects such as E-rate for:
 - Content filtering and firewall protection
 - Local and long distance telephone services (expand the number of Centrex lines in the district to handle the expanded need)
 - High speed and stable Internet access
 - Direct connect service in the event of emergency
 - Procurement of e-rate reimbursable hardware for our network

3.3 Evaluative processes

- Utilize the MASS DOE STAR chart as one tool to assess the progress that is made towards our goals.
- Allow staff to evaluate their technology background in a non-intimidating environment.
- Conduct on-line staff survey of the implementation and integration of technology into the classroom and work day of the staff in the Medway Public Schools.

Use the results of these tools to better formulate a plan to increase effective use and awareness of the technology capabilities within the Medway Public Schools.

4. GENERAL OVERVIEW

The school district understands that funding and planning are paramount for success. We, the educational community, will strive to meet the commitment to this process by pursuing other potential funding sources: E-rate funds, partnerships, grants and entitlements, etc.

As with any working document, we must review and modify our priority list to allow us to maximize the impact that can be made in the most cost efficient manner.

We must be committed to this plan; we make a commitment to a project that will have ongoing annual costs, beyond the scope of the timeline encompassed in the plan. The primary focus of these recommendations goes beyond the costs of acquiring hardware (i.e., computers, networks, infrastructure, printers, etc.). It is imperative that attention be paid to in-depth quality professional development and training, software licensing and maintenance, and hardware maintenance.

4.1 Hardware and Infrastructure

Medway is committed to stabilizing our infrastructure and increasing our ability to leverage resources for the benefit of our community. Funding has been provided by the Town Capital Improvements Projects Committee and Comcast to establish a Metro Area Network – Fiber Optic Cabling (MAN) which will be completed in FY2011. Additional resources are being provided to install building based wireless systems at all sites and increase mobile devices.

4.2 Software

a. Curricular Areas

The purchase and maintenance of software is, and will continue to be, a big budget issue. To ensure that educated decisions are made, the technology department, curriculum leaders and faculty will review and recommend the purchase of any new software.

Whenever possible, Medway intends to leverage Open Source software and / or provide web based access to any and all curricular software purchases. Recent additions have included, OpenOffice, Story Town Reading, and the Every Day Math programs.

b. Administrative Areas

Medway has made a commitment to the implementation of a new Student Information System (MMS) that is SIF compliant, web-based, and substantially upgrades attendance, scheduling, parental access and grading capabilities. The system will also provide efficient EPIMS and SIMS reporting capabilities for DESE Reporting.

4.3 Training / Professional Development

Training levels based on TSAT or similar data survey:

- Administrators and Administrative Staff
- Professional and Paraprofessional Staff
- Networking and Telecommunications

5. Implementation of the plan

5.1 Staffing

Curriculum Integration to attain the Massachusetts DOE Benchmarks standard

The recommended ratio is 0.5 FTE to support every 30-60 users depending upon their competency. At our present staffing level, it would require 5 – 10 CI persons under the Massachusetts Department of Education benchmarks.

Technology Support to attain the Massachusetts DOE Benchmark standard

The recommended ratio is 1 full time person to support 100-200 computers. This calculates to 5.0 technical support people. At our current equipment level we should strive to have 4.0 technical support personnel. Technical support personnel should include two full time network administrators and two desktop support technicians.

Computer Education – establish a district-wide curriculum that is aligned with the Massachusetts DOE K-12 Curriculum Standards in Technology Education. The district must re-institute formal computer education programs at the high school level and establish a curriculum that fully integrates technology into all disciplines.

5.2 Professional Development

Establish and fund a PD plan to provide adequate technology training to staff so as to achieve and/or exceed the Massachusetts Department of Education guideline of 85% staff participation.

5.3 Funding

Medway Public Schools must establish, fund, and honor line items in the budget for:

- Operating expenses
- Personnel
- Schedule replacement and upgrading of equipment

Medway Public Schools will seek alternate funding sources such as:

- E- rate
- State and Federal Grants and Entitlements

Leveraging E-rate funds is becoming more difficult because of the discount group that Medway falls into. We will continue to apply for e-rate reductions in all available areas as determined within the eligible services list that is published annually.

- Telecommunications services for Centrex lines (approximately 60), local and long distance service, cellular and direct connect service (approximately 36 units)
- Internet Access
- Internal Connections
 - Switch equipment, UPS, firewall services

5.4 Reinvestment or Obsolescence

There should be a plan to upgrade the older systems in the district. Currently, we have no formal, funded plan in place to systematically replace older equipment. As software drives our system into obsolescence,

we find it more of a challenge to escape from the depths. We will utilize the purchase of refurbished computers with extended warranties to increase the impact of available funding. We have approximately 550 workstations that are over six years old, out of warranty, and rate a standard of type B or lower on the DESE Equipment scale. This represents about 85% of our current inventory.

DESE Guidelines for 2009 recommend a replacement cycle of six or fewer years for workstations.

Hardware Replacement

Funding within the operating budget should reflect maintenance and replacement of servers, switches, desktops, etc; and provide for the capacity to replace approximately 20% of the equipment annually once a six year cycle is implemented.

There is a need to change out about 200 systems per year.

Cost Estimate: \$1100 per unit \$220,000 per year

Setup and installation is not factored into the total

5.5 Timeline

Since the opening of our High School in September 2004, the Town of Medway has been under dire financial constraints. This has caused limited to no funding to be devoted to the upgrade and replacement of technology and with an average age ranging over seven years Medway is implementing a plan to bring all schools up to date in fiscal 2011.

Contributors/Reviewers:

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6. Budget Objectives (FY2009 – 2012)

Budget Goals and Initiative Overview:

FY09 witnessed the addition of a town wide Director of Information Services. The goal for fiscal 2009 was to assess and inventory all current technologies, establish existing budgetary funds, and develop a plan that would take advantage of these funds to create immediate effective change for the Town of Medway. FY2009 goals focused on stabilizing infrastructural and communication components, FY2010 focuses on upgrading critical infrastructural components to ensure a stable and effective environment and increase communication capabilities, and FY2011 will focus on stabilizing peripheral equipment such as desktops, interactive, mobile and presentation devices.

FY09 Goals & Accomplishments included:

- Inventory all existing equipment; assess status / warrantee / lifecycle, plan for future replacement. Establish and communicate long range technology vision with appropriate lifecycles.
- Review all communication systems; establish status / warrantee / lifecycle, plan for future needs and possible replacement
 - Upgrade Memorial School phone system to include Burke School offices, allowing the building to more effectively communicate as one site.
 - Facilitate the installation of a public address system link at the Middle and Memorial / Burke Schools; providing emergency service communications for entire site.
 - Research telecommunication needs for all municipal sites, budget to replace all municipal systems and add classroom phones to Burk in FY2010.
- Implement a new permitting and financial database system – Munis
- Centralize Student Information database system (MMS) to improve reporting capabilities and increase communication tools for our community. Institute new modules; K-12 online attendance; 5-12 Gradebook to increase efficiency of state mandated reports.
- Upgrade outdated desktop computers at town hall and the school system (limited funding)
- Merge existing school security authentication systems into one coherent system to lower management and operating costs while increasing redundancy for all school sites.
- Upgrade Memorial / Burke / McGovern infrastructural components, servers and switches, to ensure stability and increase efficiency for all sites.
- Replace school administrative desktop computers with laptop units to provide mobility and increase effective administrative processes.
- Facilitate the installation of a school wide Point of Sale system to decrease checkout timeframes allowing students more time to eat lunch, allow prepayment of meals by parents, and increase anonymity for free and reduced lunch students
 - o Facilitate the installation of all wireless connectivity, software, servers, and registers, compile student demographics information to support this project.

FY2010 Goals include:

- Upgrade computer hardware and software for outdated systems to ensure efficient workflows; use new and off lease technology to effectively leverage departmental needs and budgetary funding to accomplish replacement goals.
- Replace Municipal telecommunication system to increase communication for our community, lower operating costs, and improve service levels for all departments.
- Implement additional modules to the MMS student information system to increase school to home communication and increase state reporting efficiencies
 - o Implement Gradebook module 5th-12th grade
 - o Implement Skills based reporting module K-4

- Implement Parent Portal Communication tool K-12
 - Implement EPIMS State Reporting module
- Facilitate Phase One of the installation plan for a town wide fiber optic Metro Area Network. This system will facilitate increased bandwidth between 4 sites, increasing our ability to leverage resources, communicate more effectively, and reduce operating costs.
- Replace and Upgrade mission critical systems to ensure continuity of service for all areas and departments.
 - Replace town hall domain/email server
 - Replace all middle school servers and backup systems
- Centralize all school technology related purchases; provide centralized specification, bid process, and purchasing to ensure the best possible price.
- Facilitate the funding and installation of a building wide wireless system for the high school site which will increase the access to educational resources
- Improve School to Home Communication by implementing
 - Online form submissions
 - Upgrade / replace the school email system
 - Add web services for all teaching staff to improve communications
 - Implement a new Classroom management system (CMS)
- Increase professional development training offerings for all staff to ensure increased efficiency levels and add value to the educational environment.
- Increase our communication levels throughout our community by providing increased telecommunication services, improved web site information, and easier access to published information, such as rebroadcast of administrative meetings through the use of streaming video.

FY2011 Goals include:

- Upgrade computer hardware and software for outdated systems to ensure efficient workflows; use new and off lease technology to effectively leverage departmental needs and budgetary funding to accomplish replacement goals.
- Increase bandwidth and security features between all town sites. Implement Phase Two on the Fiber Metro Area Network installation project.
- Leverage the benefits of the Metro Area Network to increase fault tolerance and provide greater shared resources for all departments
- Improve our community web communications; improve web site access, content, resources, and communications.
- Increase interactive equipment to enhance the educational process; devices such as interactive white boards, wireless devices, probes, laptops, mobile and I-touch devices, etc.
- Increase the use of technology as an effective communicate tool to enhance the educational experience by:
 - Providing an Enterprise grade wireless security system, with capabilities to leverage both town and personally owned mobile devices; provide greater access to resources at a lower cost of ownership.
 - Increase our online communication tools and resources, such as a content management system, online forms submissions, and staff based web communications
- Implement an online payment system for the education department.
- Increase and leverage technology staff to service the entire town infrastructure; increasing service levels and support for all departments
- Implement new state and federal educational reporting requirements for EPIMS and SIMS data collection
- Implement State Data Warehouse data collection, compilation, and reporting features to help school administration assess the district needs and create a strategic plan to improve standards and reach educational benchmark standards.

FY2012 Goals include:

- Maintain, Support, or Upgrade computer hardware and software for outdated systems to ensure efficient workflows; utilizing new and off lease technology to effectively leverage departmental needs and budgetary funding to accomplish replacement goals.
- Expand the secondary level online course management system
 - o Provide extensive staff professional development
 - o Pilot 21st century Learning environments for students that supports the hardware, software, and developmental needs for a successful implementation.
 - o Increase online course offerings
- Increase interactive equipment to enhance the educational process; devices such as interactive white boards, wireless slates, probes, laptops, mobile and I-touch devices, etc.

Budget Summary

Budget Description	FY09	FY10	FY11	FY12	Description of Use
			<i>estimated</i>	<i>estimated</i>	
CONTRACTED SERVICES	\$ 40,000.00	\$ 29,480.00	\$ 40,000.00	\$ 40,000.00	Internet Access, Maintenance Subscriptions, Contracted Support
MAINTENANCE SUPPLIES	\$ 10,891.00	\$ 10,000.00	\$ 15,000.00	\$ 15,000.00	Repair Maintain Technology Equipment
SOFTWARE/SUPPLIES		\$ 25,500.00	\$ 40,000.00	\$ 40,000.00	Cartridges, Removable Media, Curriculum Software, Supplies
EQUIPMENT PURCHASE	\$ 29,544.00	\$ 51,700.00	\$ 18,000.00	\$ 10,000.00	Purchase of New Equipment
INFRASTRUCTURE-SERVER	\$ 18,000.00				Replacement of outdated servers & voicemail system
INFRASTRUCTURE-SERVER		\$ 10,000.00			Middle School Server Replacement
WIDE AREA NETWORK		\$ 55,000.00			Install Fiber Optic Cabling - Phase 1
TECHNOLOGY UPGRADES			\$ 420,000.00	\$ 50,000.00	Replacement / New Equipment
TOTAL ALLOCATED BUDGET	\$ 98,435.00	\$ 181,680.00	\$ 533,000.00	\$ 155,000.00	

Current Inventory of Equipment and Services

2009-2010															
School	Number Students	High-End Computers	Average	Low-end	Total	Student/ Computer Ratio	Computer Labs ²	% Classrooms with Telephones	Internet Speed	AlphaSmarts	Electronic WhiteBoard	LCD Projectors	Video Cameras	Digital Cameras	Scanners
Burke Elementary	299	0	14	25	39	7.67	0	0%		4	0	0	0	0	1
McGovern Elementary	366	0	25	40	65	5.63	1	100%	8Mb	0	3	2	0	0	2
Memorial Elementary	355	0	82	50	132	2.69	2	100%		0	2	3	1	0	4
Medway Middle School	843	0	145	75	220	3.83	4	100%	8Mb	0	3	3	1	0	4
Medway High School	834	0	327	0	327	2.55	9	100%	16Mb	0	5	68	3	6	10
Totals	2697	0	593	190	783	4.47	16			4	13	76	5	6	21

Staffing and Performance Indicators

Indicator	FY09	FY10	FY11
Technology Department Staff			<i>estimated</i>
Director	1-FTE	1-FTE	1-FTE
Network Administrator	1-FTE	1-FTE	2-FTE
Desktop Support	.8-FTE	.8-FTE	1-FTE
Consultant	.2	.2	.2
Supporting Staffing Levels			
Municipal Employees	80	80	80
School Administrative Staff	50	50	50
Teaching Staff	335	335	335
Maintenance / Custodial Staff	15	15	15
Technology			
Municipal			
Servers	4	10	10
Computers desk/laptop	80	80	80
Network Printers	12	12	12
Email Accounts	80	80	80
Educational			
Servers	18	13	15
Computers desk/laptop	750	750	850
Network Printers	140	140	140
Email Accounts	425	425	425
peripherals (projectors, scanners, etc)	125	130	150
Interactive Equipment (boards, devices, probes, etc)	48	52	100

Appendices

Appendix A: Technology Standards

(extracted from the National Educational Technology Standards Project)

Technology Foundation Standards for All Students

- 1 Basic operations and concepts
 - Students demonstrate a sound understanding of the nature and operation of technology systems.
 - Students are proficient in the use of technology.
- 2 Social, ethical, and human issues
 - Students understand the ethical, cultural, and societal issues related to technology.
 - Students practice responsible use of technology systems, information, and software.
 - Students develop positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits, and productivity.
- 3 Technology productivity tools
 - Students use technology tools to enhance learning, increase productivity, and promote creativity.
 - Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.
- 4 Technology communications tools
 - Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.
 - Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences.
- 5 Technology research tools
 - Students use technology to locate, evaluate, and collect information from a variety of sources.
 - Students use technology tools to process data and report results.
 - Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.
- 6 Technology problem-solving and decision making tools
 - Students use technology resources for solving problems and making informed decisions.
 - Students employ technology in the development of strategies for solving problems in the real world.

- 1 TECHNOLOGY OPERATIONS AND CONCEPTS.
 - Demonstrate a sound understanding of technology operations and concepts:
 - Demonstrate introductory knowledge, skills, and understanding of concepts related to technology (as described in the ISTE National Education Technology Standards for Students)
 - Demonstrate continual growth in technology knowledge and skills to stay abreast of current and emerging technologies.
- 2 PLANNING AND DESIGNING LEARNING ENVIRONMENTS AND EXPERIENCES.
 - Plan and design effective learning environments and experiences supported by technology.
 - Design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners.
 - Apply current research on teaching and learning with technology when planning learning environments and experiences.
 - Identify and locate technology resources and evaluate them for accuracy and suitability.
 - Plan for the management of technology resources within the context of learning activities.
 - Plan strategies to manage student learning in a technology-enhanced environment.
- 3 TEACHING, LEARNING, AND THE CURRICULUM.

- Implement curriculum plans that include methods and strategies for applying technology to maximize student learning.
 - Facilitate technology-enhanced experiences that address content standards and student technology standards.
 - Use technology to support learner-centered strategies that address the diverse needs of students.
 - Apply technology to develop students' higher order skills and creativity.
 - Manage student learning activities in a technology-enhanced environment.
- 4 ASSESSMENT AND EVALUATION.
- Apply technology to facilitate a variety of effective assessment and evaluation strategies:
 - Apply technology in assessing student learning of subject matter using a variety of assessment techniques.
 - Use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning.
 - Apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning, communication, and productivity.
- 5 PRODUCTIVITY AND PROFESSIONAL PRACTICE.
- Use technology to enhance their productivity and professional practice
 - Use technology resources to engage in ongoing professional development and lifelong learning.
 - Continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning.
 - Apply technology to increase productivity.
 - Use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning.
- 6 SOCIAL, ETHICAL, LEGAL, AND HUMAN ISSUES.
- Understand the social, ethical, legal, and human issues surrounding the use of technology in PK-12 schools and apply those principles in practice:
 - Model and teach legal and ethical practice related to technology use.
 - Apply technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities.
 - Identify and use technology resources that affirm diversity
 - Promote safe and healthy use of technology resources.
 - Facilitate equitable access to technology resources for all students.

Educational Technology Standards and Performance Indicators for Administrators

I. LEADERSHIP AND VISION.

Educational leaders inspire a shared vision for comprehensive integration of technology and foster an environment and culture conducive to the realization of that vision. Educational leaders:

- A. Facilitate the shared development by all stakeholders of a vision for technology use and widely communicate that vision.
- B. Maintain an inclusive and cohesive process to develop, implement, and monitor a dynamic, long-range, and systemic technology plan to achieve the vision.
- C. Foster and nurture a culture of responsible risk-taking and advocate policies promoting continuous innovation with technology.
- D. Use data in making leadership decisions.
- E. Advocate for research-based effective practices in use of technology.
- F. Advocate on the state and national levels for policies, programs, and funding opportunities that support implementation of the district technology plan.

II. LEARNING AND TEACHING.

Educational leaders ensure that curricular design, instructional strategies, and learning environments integrate appropriate technologies to maximize learning and teaching. Educational leaders:

- A. Identify, use, evaluate, and promote appropriate technologies to enhance and support

instruction and standards-based curriculum leading to high levels of student achievement.

- B. Facilitate and support collaborative technology-enriched learning environments conducive to innovation for improved learning.
- C. Provide for learner-centered environments that use technology to meet the individual and diverse needs of learners.
- D. Facilitate the use of technologies to support and enhance instructional methods that develop higher-level thinking, decision-making, and problem-solving skills.
- E. Provide for and ensure that faculty and staff take advantage of quality professional learning opportunities for improved learning and teaching with technology.

III. PRODUCTIVITY AND PROFESSIONAL PRACTICE.

Educational leaders apply technology to enhance their professional practice and to increase their own productivity and that of others. Educational leaders:

- A. Model the routine, intentional, and effective use of technology.
- B. Employ technology for communication and collaboration among colleagues, staff, parents, students, and the larger community.
- C. Create and participate in learning communities that stimulate, nurture, and support faculty and staff in using technology for improved productivity.
- D. Engage in sustained, job-related professional learning using technology resources.
- E. Maintain awareness of emerging technologies and their potential uses in education.
- F. Use technology to advance organizational improvement.

IV. SUPPORT, MANAGEMENT, AND OPERATIONS.

Educational leaders ensure the integration of technology to support productive systems for learning and administration. Educational leaders:

- A. Develop, implement, and monitor policies and guidelines to ensure compatibility of technologies.
- B. Implement and use integrated technology-based management and operations systems.
- C. Allocate financial and human resources to ensure complete and sustained implementation of the technology plan.
- D. Integrate strategic plans, technology plans, and other improvement plans and policies to align efforts and leverage resources.
- E. Implement procedures to drive continuous improvement of technology systems and to support technology replacement cycles.

V. ASSESSMENT AND EVALUATION.

Educational leaders use technology to plan and implement comprehensive systems of effective assessment and evaluation. Educational leaders:

- A. Use multiple methods to assess and evaluate appropriate uses of technology resources for learning, communication, and productivity.
- B. Use technology to collect and analyze data, interpret results, and communicate findings to improve instructional practice and student learning.
- C. Assess staff knowledge, skills, and performance in using technology and use results to facilitate quality professional development and to inform personnel decisions.
- D. Use technology to assess, evaluate, and manage administrative and operational systems.

VI. SOCIAL, LEGAL, AND ETHICAL ISSUES.

Educational leaders understand the social, legal, and ethical issues related to technology and model responsible decision-making related to these issues. Educational leaders:

- A. Ensure equity of access to technology resources that enable and empower all learners and educators.
- B. Identify, communicate, model, and enforce social, legal, and ethical practices to promote responsible use of technology.
- C. Promote and enforce privacy, security, and online safety related to the use of technology.
- D. Promote and enforce environmentally safe and healthy practices in the use of technology.
- E. Participate in the development of policies that clearly enforce copyright law and assign ownership of intellectual property developed with district resources.

Appendix B: Profiles for Technology Literate Students

Performance Indicators

A major component of the NETS Project is the development of a general set of profiles describing technology-literate students at key developmental points in their pre-college education. These profiles reflect the underlying assumption that all students should have the opportunity to develop technology skills that support learning, personal productivity, decision making, and daily life. These profiles and associated standards provide a framework for preparing students to be lifelong learners who make informed decisions about the role of technology in their lives.

The Profiles for Technology Literate Students provide performance indicators describing the technology competence students should exhibit upon completion of the following grade ranges:

Grades PreK - 2

Grades 3 - 5

Grades 6 - 8

Grades 9 - 12

These profiles are indicators of achievement at certain stages in PreK-12 education. They assume that technology skills are developed by coordinated activities that support learning throughout a student's education. These skills are to be introduced, reinforced, and finally mastered, and thus, integrated into an individual's personal learning and social framework. They represent essential, realistic, and attainable goals for lifelong learning and a productive citizenry. The standards and performance indicators are based on input and feedback from educational technology experts as well as parents, teachers, and curriculum experts. In addition, they reflect information collected from professional literature and local, state, and national documents.

Grades PreK-2

All students should have opportunities to demonstrate the following performances.

Prior to completion of Grade 2, students will:

1. Use input devices (e.g., mouse, keyboard, remote control) and output devices (e.g., monitor, printer) to successfully operate computers, VCRs, audiotapes, and other technologies.
2. Use a variety of media and technology resources for directed and independent learning activities.
3. Communicate about technology using developmentally appropriate and accurate terminology.
4. Use developmentally appropriate multimedia resources (e.g., interactive books, educational software, elementary multimedia encyclopedias) to support learning.
5. Work cooperatively and collaboratively with peers, family members, and others when using technology in the classroom.
6. Demonstrate positive social and ethical behaviors when using technology.
7. Practice responsible use of technology systems and software.
8. Create developmentally appropriate multimedia products with support from teachers, family members, or student partners.
9. Use technology resources (e.g., puzzles, logical thinking programs, writing tools, and digital cameras, drawing tools) for problem solving, communication, and illustration of thoughts, ideas, and stories.
10. Gather information and communicate with others using telecommunications, with support from teachers, family members, or student partners.

Grades 3-5

All students should have opportunities to demonstrate the following performances.

Prior to completion of Grade 5, students will:

1. Use keyboards and other common input and output devices (including adaptive devices when necessary) efficiently and effectively.
2. Discuss common uses of technology in daily life and the advantages and disadvantages those uses provide.
3. Discuss basic issues related to responsible use of technology and information and describe personal consequences of inappropriate use.
4. Use general-purpose productivity tools and peripherals to support personal productivity, remediate skill deficits, and facilitate learning throughout the curriculum.
5. Use technology tools (e.g., multimedia authoring, presentation, Web tools, digital cameras, and scanners) for individual and collaborative writing, communication, and publishing activities to create knowledge products for audiences inside and outside the classroom.
6. Use telecommunications efficiently to access remote information, communicate with others in support of direct and independent learning, and pursue personal interests.
7. Use telecommunications and online resources (e.g., e-mail, online discussions, Web environments) to participate in collaborative problem-solving activities for the purpose of developing solutions or products for audiences inside and outside the classroom.
8. Use technology resources (e.g., calculators, data collection probes, videos, educational software) for problem solving, self-directed learning, and extended learning activities.
9. Determine which technology is useful and select the appropriate tool(s) and technology resources to address a variety of tasks and problems.
10. Evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic information sources.

Grades 6-8

All students should have opportunities to demonstrate the following performances.

Prior to completion of Grade 8, students will:

1. Apply strategies for identifying and solving routine hardware and software problems that occur during everyday use.
2. Demonstrate knowledge of current changes in information technologies and the effect those changes have on the workplace and society.
3. Exhibit legal and ethical behaviors when using information and technology, and discuss consequences of misuse.
4. Use content-specific tools, software, and simulations (e.g., environmental probes, graphing calculators, exploratory environments, Web tools) to support learning and research.
5. Apply productivity/multimedia tools and peripherals to support personal productivity, group collaboration, and learning throughout the curriculum.
6. Design, develop, publish, and present products (e.g., Web pages, videotapes) using technology resources that demonstrate and communicate curriculum concepts to audiences inside and outside the classroom.
7. Collaborate with peers, experts, and others using telecommunications and collaborative tools to investigate curriculum-related problems, issues, and information, and to develop solutions or products for audiences inside and outside the classroom.
8. Select and use appropriate tools and technology resources to accomplish a variety of tasks and solve problems.
9. Demonstrate an understanding of concepts underlying hardware, software, and connectivity and of practical applications to learning and problem solving.
10. Research and evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic information sources concerning real-world problems.

Grades 9-12

All students should have opportunities to demonstrate the following performances.

Prior to completion of Grade 12, students will:

1. Identify capabilities and limitations of contemporary and emerging technology resources and assess the potential of these systems and services to address personal, lifelong learning, and workplace needs.
2. Make informed choices among technology systems, resources, and services.
3. Analyze advantages and disadvantages of widespread use and reliance on technology in the workplace and in society as a whole.
4. Demonstrate and advocate for legal and ethical behaviors among peers, family, and community regarding the use of technology and information.
5. Use technology tools and resources for managing and communicating personal/professional information (e.g., finances, schedules, addresses, purchases, correspondence).
6. Evaluate technology-based options, including distance and distributed education, for lifelong learning.
7. Routinely and efficiently use online information resources to meet needs for collaboration, research, publications, communications, and productivity.
8. Select and apply technology tools for research, information analysis, problem-solving, and decision-making in content learning.
9. Investigate and apply expert systems, intelligent agents, and simulations in real-world situations.
10. Collaborate with peers, experts, and others to contribute to a content-related knowledge base by using technology to compile, synthesize, produce, and disseminate information, models, and other creative works.