

Rochester School Department Technology Plan Revision 4

Adopted by the Rochester School Board
October 15, 2009

Technology Planning Committee

This document has been developed by two separate committees. The first plan, which provides the basis for this revision and still constitutes much of the content, was created by a broad-based committee whose members spent countless hours in developing the district's vision and initial goals. Because the original committee was so thorough, this revision has required little more than updates. While the quality and speed of equipment and software are moving quickly, the instructional needs of children have not changed significantly in the past several years.

We are grateful to the time and efforts of the original committee and those who have reviewed the revision.

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Executive Summary

In the twelve years since adoption of Rochester's first Technology Plan, the district has moved from having a few, ineffectively used, Apple IIe computers to a position of national respect and leadership.

The transition and recognition have hinged not so much on acquisition of better computers and creation of a high-speed network, but more importantly, on effective staff training, careful selection of goals and uses of the equipment, and robust design standards that have made the network both dependable and efficient.

The next phase of this technology plan shifts the focus from decisions about how to design and operate the system to (1) how the school district can use the technology more effectively for improved student learning and increased operational efficiency, (2) planning and funding the systematic maintenance, replacement, and upgrade of equipment, and (3) projection of technological needs and changes.

Although projections go three to five years, the plan assumes regular and frequent adjustments as technology and district needs change.

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Introduction: Technology in the Schools

There is currently an ongoing debate about whether the use of technology makes a difference in what students learn and can do. While there are no conclusive research findings regarding the effectiveness of technology as an instructional tool, evidence seems to favor the use of technology in many instructional settings. More importantly, findings support the common sense notion that if technology use is based on, and combined with, effective instructional techniques, it will have a greater and more positive impact on learning than if technology purchases and use are based first on the availability and features of the hardware and software, with secondary attention to quality of instruction.

Regardless of the value of technology as a tool for teaching reading, math and other core subjects, the need for students to understand technology for their future careers is unassailable. Basic skills can no longer be characterized simply as "reading, writing and arithmetic". Even unskilled positions require at least some familiarity with computers and other technology. Students who will go into skilled or professional positions must be expert in the use of technology if they are to be successful.

Further, the value of technology for increasing efficiency and effectiveness in administration and operations is no longer questioned. Everything from climate controls to student record systems have been greatly improved through the use of computers. Like business and industry, schools can help to control costs and improve services by investing in technology appropriate to their needs.

It is in this larger context that a technology plan must look at needs for school districts. That is, neither instructional uses of technology nor operational applications alone can be considered sufficient for a school district to claim that it is working well with technology.

In addition to relying on national research studies, the district must continually look at its own technology use to determine the effectiveness of its programs. Planning for the use of technology in schools must necessarily include all aspects of school operations and product use, from selection of equipment and software, to training, evaluation, scope of services to be provided, and resources available for maintaining and upgrading

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Part 1: Curriculum, Instruction and Operations - The Major Focus

Three Uses of Technology in the Curriculum

Technology generally fits into the school curriculum in three different ways. We teach *about* the technology, *with* the technology, and finally, have students *apply* the technology to problem solving, either theoretical or real life.

It is first necessary to teach *about* the technology. That is, we must teach the students how to turn on a computer, how it works, and what to do with it. At the elementary level, this may involve an introduction to the keyboard, elementary word processing for publishing books in the writing process, the use of specialty software such as *Photo Shop* for special projects and an introduction to the Internet. At the middle school, students may be introduced to spreadsheet, database, and multimedia presentation software, basic programming and graphics, as well as basic telecommunications and fundamental research skills using the Internet. At the high school level, this area involves teaching students how to use specialized software such as CAD/CAM, accounting software, the more sophisticated word processors and desktop publishing, advanced programming, electronics, musical composition software, more advanced Internet usage, web page design, use of scientific instrumentation, and other applications of technology.

Teaching *with* technology is the second common approach. In this mode, technology is used to enhance more traditional instruction. Audio and video technologies, such as slides, filmstrips, 16 mm films and video cassette recorders have been used in the classroom for years. The focus is shifting from these technologies to more interactive technologies, such as computers. Every classroom in the Rochester School Department is now equipped with at least one networked computer having high speed Internet access. Computer use is no longer limited to stand alone instructional software. Teachers and students now access specialized software across the LAN that provides individualized reading and math instruction using *Accelerated Reader* and *Accelerated Math*. All classroom computers also have access to a variety of research resources as well, including Microsoft electronic reference tools. These are accessed from each school's LAN. At the high school, *Choices*, career education software, and the *Athena* online library card catalog are also available on the LAN. File sharing and electronic portfolios provide opportunities to share teacher/student created projects from school to school throughout the district.

Internet access provides almost limitless opportunities for teaching with technology, ranging from acquiring content area information using effective search strategies to communicating and collaborating with teachers and students in the next classroom, neighboring communities and around the world. The district website provides vital information to students, teachers, and the community. Web based subscriptions to such services as the EBSCO databases and *Grolier's Encyclopedias*, as well as individual school web sites also enhance the teaching/learning experience.

A danger exists, however, in the use of technology as an instructional aid. It is easy for the teacher to let the technology become the primary instructor because the student's interest is more easily held by the variety of images. We must not allow ourselves to view our mission as entertaining the students on a daily basis. Commercial videos and web sites produced for entertainment will very seldom fulfill the objectives of the curriculum and should not become a replacement for good, solid instruction.

The third use of technology in schools is the *application of technology by students* in problem-solving. This takes the use of such things as CAD/CAM a step further than in the first mode by applying the software and other tools they have learned about on the computer to solve design problems as they would in industrial settings. This particular use of technology will necessarily be more prevalent at the high school level than either elementary or middle school. In a high school that is technologically sophisticated, it will occur across the curriculum. Graphic programs will be used in art and graphic arts classes, business and financial applications in the business areas, medical technology in health occupations, word processing and desktop publishing in the English curriculum, graphing calculators and scientific programs in the math and science departments, and virtually every other form of technology in various other courses.

For the most effective use of technology in the classroom, individual teachers, departments, and entire grade level staff should look at the available technologies, determine how they can best be used to strengthen existing curriculum, and what modifications should be made in the curriculum to capitalize on the strengths of technology.

Administrative hardware and software should, likewise, be evaluated in terms of their contribution to the mission of the school district and their ability to make operations more efficient. "Heat seeking," or purchasing the most recent version of everything just to keep up with the state of the art, has no place in public school administration.

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Developing Technology Use in the Schools

Although technology has been used in classrooms since early in the twentieth century and computers have been in the classroom for more than twenty five years, the effective use of a broad range of technologies remains elusive in many classrooms, schools, and school districts. There is a multitude of reasons for this, including a reluctance to purchase

equipment because of a fear that it will quickly become obsolete to insecurity on the part of teachers and administrators regarding their ability to understand and keep up with the rapid change of a technological world.

Teaching with Technology

As teachers review curriculum and plan their lessons, "technology" is to be used as an additional resource, an alternative method for bringing the subjects into focus for students. Teachers should have access to the following technologies:

- *audio*: electronic sound sources, including broadcast TV, broadcast radio, cable, streaming audio, compact discs;
- *video*: digital video, still-image cameras, video projectors, PC with large screen displays, DVD recorders, streaming services, smartboards;
- *computer*: acting as a hub of the technology; used to capture, store, process, transform, communicate and publish;
- *telecommunications*: linking classroom to classroom, down the hall, across the city and around the world; classrooms separated by thousands of miles conduct joint investigations by communicating images, sounds, text and animations from computer to computer via the Internet;
- *distance learning*: two-way data, voice and video carriers enable students to 'plug into' other researchers and experts in the local community and across the planet; guest speakers conduct joint inquiry activities with students;
- *multimedia*: creating interactive informational packets in the form of presentations, publications, tele-presentations, tele-publications, integrating music, text, images, live-action video, spoken voices, colorful animations into simulations of real-world situations.
- *website*: posting vital information to enhance learning for students, teachers, and the community.

This does not mean that all equipment must be present in each classroom to be effective, but that teachers and students *have access* to it. No matter what the size of the class, or the size or location of the building, the inequities of "large school vs. small school" disappear when a turn of a knob or the flick of a switch brings students into contact with scientists from Woods Hole Oceanographic Institute, or a DVD provides a tour of the Museum of Modern Art in New York. However, the issue of access cannot overshadow the issue of *use*. If students use computers simply for drill and practice, rather than hands-on activities and those that call for higher-order thinking skills with richer, more challenging activities that enhance learning, inequities will remain. Technology can enhance the process of learning by providing students with a variety of experiences

requiring more than listening and regurgitating. Effective use of technology requires critical thinking, problem solving, researching, remembering, and, most importantly, doing.

All technologies need to be used with these considerations in mind:

- *Is the activity worth doing in the classroom?* If the content is not suitable, or if the emphasis is wrong, then it should not be considered;
- *Is the activity worth doing through technology?* It is useful to consider technology in the context of the larger delivery system, i.e., the use of materials such as measuring devices, maps, art materials, manipulatives, artifacts, specimens, and people resources;
- *Does the activity use the uniqueness of the available technology?* Technologies available now offer learning opportunities that are not possible in any other context; this is the most justifiable use of technology in the classroom allowing teachers to extend the curriculum into entirely new areas.

The emphasis must always be placed on the learning, not on the technology itself. We must ask what we expect the students to *do* with the technology? After this question is answered for each student, each class, and each school, then the appropriate hardware and software may be utilized. Within every segment of the curriculum, students may be writing stories with word processors, illustrating science diagrams with paint utilities, creating interactive multimedia reports, graphing data using spreadsheets, contacting scientists for up-to-the-minute research findings, participating in parallel projects with other students from around the world, or filming a program to be broadcast throughout the school and/or district.

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Staffing Issues

One thread that runs through the research on successful implementation of all types of technology is the issue of technical and in-service support. It is essential to provide sufficient technical support to sustain the programs we wish to see put in place.

To this end, Rochester has already employed a full-time Media/Technology Coordinator to plan the instructional and in-service aspects of the operation. Additionally, the technical staff provides training in troubleshooting and operation of the technology. The district will need to maintain these positions and allow for contracting of special programs and events in addition.

In addition to the staff training, the technical support staff will need to cover the following on a city-wide level:

- keeping the hardware up and running
- providing on-going technical training for teachers and administrators who wish this level of expertise
- keeping abreast of technological advances and trends (not necessarily specific to education)
- planning with the "technology coordinator" on how to implement the technology most effectively and efficiently
- coordinating and coexisting with the maintenance department in maintaining other electronic equipment
- planning and coordination of district website

Several other suggestions have been made for the best use of personnel. When teachers with expertise have been identified in each school, these teachers should be recognized for their leadership, and should comprise a committee in and of itself. This may be the source of teachers who serve on the software sub-committee or the teachers who will lead workshops. These teacher representatives could be recognized by giving them some amount of release time for in-service planning, or extra professional days to attend workshops outside the district, or even a small stipend for curriculum work they accomplish.

Paraprofessionals already in place in the schools could be utilized in the implementation of technological instruction. Expanding their job descriptions slightly might put extra personnel at our disposal in computer labs or clusters, or monitoring the on-line services.

Volunteers and student interns provide other sources of expertise and assistance in the use of technology. Many parents and students already have the types of technology the schools can only dream of. There is most likely a whole new group of volunteers to be tapped for their knowledge and background in technology. Consideration should be given to searching these people out and providing training in the educational applications of technology.

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Part 2: An Overview of Educational Technology

Virtually every area of technology can have an impact on the classroom and the operation of school districts. Areas that should be considered in bringing technology into a school district include communications, audio/visual equipment, computers and their peripherals, and scientific equipment such as oscilloscopes and equipment for chemical analysis.

Further, any technology plan needs to address all operations in the school district. First and foremost is the integration of technology into the curriculum and instructional practices. However, the plan should not ignore the importance of technology in the administration of the schools and in managing the schools' facilities and resources.

Finally, don't assume that the technologies already in place are being used with optimum effect. In selection of resources, the district should be reviewing not only the new technologies that might be desirable, but should also be looking at existing technologies to see how they can be integrated with the new and how their use can be improved for the benefit of the school district and its students.

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System Components

The current solution for Rochester, consist of seven major components as follows:

1. Technology to support all other components

- Wide area communications network on Fiber Optic cable provided by the local Cable Television System.
- A series of powerful file servers that support windows and web based applications. The servers are housed in a single location rather than being placed in the same location as their respective LANs for security purposes and to facilitate easier maintenance.
- Electronic mail and Collaboration software, and a school web site (Internet and Intranet).
- Voice Mail Message System
- Ethernet Based LANs
- Windows/Intel based PC Platforms
- Cable TV access
- High-speed Internet access with content filtering (CIPA- Children Internet Protection Act) approved device with automatic filtering updates through a consolidated firewall appliance for all district building located at the Internet gateway.

2. Instructional support

- PCs will be purchased on a rotational basis with maximum use of industry standard upgrades instead of purchase of all new equipment. Labs will have priority for such upgrades and cycling of new PCs.
- Curriculum databases with curriculum frameworks, curriculum assessment materials, and sample units and lesson plans to be shared among teachers.
- Test item databases, scanners and statistical software for test management and validation.
- Individualized instructional record-keeping for individual teachers.
- Multi-media instructional resources including SMART Boards, CD-ROM/DVD recorders and players, web sites, etc.
- Research access and dissemination.
- Website that meets Web Content Accessibility Guidelines (WCAG)

3. Instructional systems technology

- Specialized instructional support housed in the Spaulding High School and other school media centers and elsewhere.
- Multi-media software permitting development of multi-media lesson plans by teachers, multi-media research projects by students, and administrative presentations.
- Trained maintenance personnel for support of the entire system.
- Electronic and physical distribution of programs, software, and other resources.
- Maintenance of local area networks within each building.
- Intra-building, inter-building and inter-district video conferencing.

4. Library services

- Acquisitions.

- Collection management including cataloging, circulation weeding, etc.
- Reference materials and inter-library networking.
- On-line catalog, networked to other state, regional and university libraries.
- Inter-library loans.
- Data-base management for student, staff, and community use.

5. Software library (networked, with site licenses for the full system)

- Word processing with supporting software (i.e. spell check, grammar check, thesaurus, math formula generators, etc.).
- Desktop publishing.
- Forms management.
- CAD-CAM.
- Financial software (other than for school district financial management which is currently housed in a windows server at city hall).
- Databases.
- Spreadsheets.
- Graphics.
- Statistical analysis tools (Infinite Campus, Northwest Evaluation Association, etc.).
- Instructional software.
- Business analysis and other specialized software.

6. Administrative support

- Financial management and planning.
- Personnel management.

- Board communications.
- Fixed asset management and inventory services.
- Student records network.
- Scan sheets and test analysis
- Transportation planning.
- Special education compliance.
- Research services.
- Food service management.
- Operations
- Honeywell Instant Alert System

7. Facilities management

- Preventive maintenance records.
- Human resource allocation.
- Life safety and security systems.
- Climate control and energy management.
- Key control.
- Video security.

There is flexibility in the plan, however. The district can opt for any or all of the above components or may phase in different parts of the plan over the course of several years, with periodic looks at the details of the plan to account for changes in technology that could make some of these ideas obsolete.

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Technology Center - the Hub

The Technology center is the center for information systems for the entire school district, both for staff and students. It houses a collection of servers, media-towers, and other

electronic media for all grade levels and serves the entire school district as a central clearinghouse and origination site of all transmissions.

The main components of this center are:

1. A powerful series of computers working as file servers with communications software on ethernet to allow exchange of information between windows based computers. These computers are the hub of a district-wide network to all classrooms, administrative offices, city hall, etc. The system is connected to a multi-media interface to permit connection to a multiplicity of devices including the following:

- A series of media servers and websites. All of students have access to encyclopedias and other standard references permanently mounted and web-based.
- Media as specified above to include encyclopedias, national directories, mapping software, and other databases.

2. Digital projectors and smartboards for use in large group presentations throughout the district.

3. Other computers with presentation software for generating multi-media projects.

4. A series of central labs available to staff for business applications, administrative software, multimedia, etc

5. Equipment for scanning still photos and slides for transfer to digital media.

6. Digital cameras - for still and video pictures

7. Test scoring scanner and software with statistical capabilities (IC, NEWA, etc)

8. Audio for music history, electronic keyboard and music composition software

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Television Studio

A second major facility serving the entire school district will be located in the Spaulding High School. The school district has signed an agreement for installation of Television Studio on television channels licensed to the Rochester Schools from the local cable company.

The district has a wide array of options for utilizing this resource, from broadcasting only commercial and learning channels at absolutely no cost to the district, to establishing a well equipped television studio to provide students with experience in video production and originate distance learning programs that can help to offset any cost of the facility.

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Building Level Systems

The key to providing equal access throughout the district in a cost effective manner is shared resources through the network and central work areas within each building. The elements common to each building include the following:

- Access to cable TV programming and cable TV transmission facilities
- Each building has at least one computer lab. The size of each lab and the number and types of labs would depend on the level and enrollment of the building. These labs are be networked and would have additional resources not always available in the classroom, including multimedia resources and laser printers.
- Each building has at least one computer monitor projector, either self-contained or for use with an overhead projector.
- The teachers workroom has workstations and printers, group conferencing capabilities, and portable multimedia carts.

Regular Classrooms

The typical classroom includes a teacher computer workstation connected to the network. The teacher accesses the curriculum support system, student records software, and other instructional support via password and an e-mail address for each teacher in the district.

Some classrooms may have two or more computers to give students access to instructional "skills and drills" software, the library catalog and electronic reference materials. Any non-networkable, stand-alone systems can be left in the classrooms as an additional resource. Interactive teaching and learning stations consisting of a digital whiteboard, a document camera, personal student input device, a wireless keyboard/mouse, and on-demand online resources will be implemented in selected classrooms.

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Specialized Classrooms

Some classrooms will continue to need specialized equipment and materials. CAD/CAM with plotters, business software, desktop publishing, robotics, and other special projects are an integral part of vocational curricula. Scientific data gathering, statistical analysis and graphics can be used by various high school departments, and some classrooms can share resources with administration for specialized tasks such as high resolution scanning, transfer of slides and photographs for digital display and reversal of that process.

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Administration

The central office, principal's offices, guidance department, school nurses, special education, and other administrative, classroom, and support personnel have abandoned Macintosh altogether in favor of PCs in order to provide absolute compatibility in software and data sharing. The sharing of a dedicated database with student records, personnel information, and other administrative information specific to the school district, is easier and more accurate if done within a single platform.

The Central Office will continue to be the communications hub for telephone and radio communication with a base station for the two-way FM radio system and cell phones used to contact the maintenance department and transportation operations. Honey Instant Alert can be used to send immediate alerts to staff, students, parents, and the community.

All administrative offices have a common student records database. Health records, to be accessed only by nurses, would be included within the student records database to avoid duplication of efforts in entering basic student data. Additionally, personnel records, financial data and other administrative information are contained in the network.

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Facilities Management

The Buildings and Grounds Department is already connected by two-way FM radio and cell phones. This capability will be expanded slightly to include school nurses and other personnel who need to be accessible at all times. Because the district already has the license and base station, it has been more cost effective to purchase additional radios than to lease pagers/cell phones and pay an ongoing monthly fee. Individual phones are leased for people leaving the district that would be beyond the range of the radio transmissions.

An energy conservation project completed by Honeywell, Inc. has now provided the Buildings and Grounds Department with a comprehensive climate control and energy management system and instant alert system that can be centrally monitored and controlled and that will permit web based control from remote locations.

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Part 3: Staff Development

Without adequate staff development programs available, the money spent on upgrading the technology would be largely wasted. There are few things more frustrating to a computer savvy parent than to visit his or her child's classroom and see an expensive computer sitting unused.

The district has identified three staff development goals to provide the background necessary for efficient, effective, and beneficial use of the technology in the classroom. These goals will provide for a comprehensive continuum of sophistication so that programs are available to every staff member, from the computer neophyte to seasoned veterans who have used technology in their classrooms for several years. The goals are submitted as follows, with a recommendation that some protection be built into the budget process so that the program is not abandoned before full implementation:

GOAL 1: To provide computer training to all certified teachers in the district at their level.

Novice:

Time: 30 hours; summer, fall

Credit: 1

Description: Introduction to word processing, spreadsheets, multimedia presentation software, the Internet and email, using Microsoft Word, Excel, PowerPoint, Internet Explorer, and Email software;

Curriculum integration;

Ongoing display of software;

Possible project due outside class.

Intermediate:

Time: 40 hours during summer and fall

Credit: 1

Description: Introduction to data bases design using Microsoft Access, basic web page design using Sea Monkey composer, and evaluating and integrating web resources;

Curriculum integration;

Ongoing display of software;

Possible project due outside class.

Individualized Workshops:

Time: 2-6 hours on staff development days, after school, evenings, and Saturdays

Credit: Staff Development hours

Description: a variety of software and programs designed to fit all levels of expertise (e.g., trouble-shooting, choosing and evaluating software, student portfolios, utilities, Microsoft Office, Grading systems, Statistical Analysis systems, networking, Internet, etc.)

1. Courses will be presented on an on-going basis throughout one month in the summer, with the Novice course offered all four weeks. The Intermediate and Advanced courses will be offered as needed during the summer.
2. A maximum of twenty-four teachers will be allowed in each class. A minimum of twelve computers will be available in a lab.
3. Summer courses will be repeated during the fall semester, one afternoon or evening per week, and/or on several weekends as needed.

GOAL 2: To provide ongoing training for teachers (and support staff) on software programs and integration issues.

1. Coordinators and/or elementary computer leaders (the "experts" in each building) will lead monthly workshops of one to two hours each, displaying several software programs which could be integrated into the curriculum.
2. Workshops will be conducted at all school sites on a variety of software packages. For example, several math programs will be previewed for elementary teachers at an elementary school while Data Transfer Protocol may be shown at another site. The topics and sites will be determined by the coordinators and leaders.
3. Samples of selected software programs will be available throughout the day in all buildings.

4. One day, hands-on workshops on evaluating and using Internet resources will be held during the summer for school leaders who will, in turn, offer workshops for their staff members. If the *optimum* plan is supported, these workshops will be essential during the first years of the program as all classrooms will be electronically linked and teachers will need immediate experience with the Internet, e-mail, etc., to work effectively with students.

5. Ongoing hands-on workshops on evaluating and using Internet resources will be held during the school year at each building, led by the curriculum teacher, the curriculum coordinator, and/or school leaders who have been previously trained.

6. Ongoing workshops on web development held during the school year by district webmaster.

GOAL 3: To provide technological support for teachers in all buildings.

1. Computer leaders will be solicited from each building to become a committee of trainers and technical support persons.

2. This group should be persons who have completed at least the Intermediate course or its equivalent.

3. This committee will meet monthly with the coordinators to plan software survey workshops and to receive additional training.

4. Reimbursement for these leaders may be in the form of (1) additional staff development day's yearly, (2) additional reimbursement for technology-related professional days, or (3) released time for specific training.

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Part 4: Staffing Required for Effective Implementation of the Plan

Staffing needs have not changed dramatically since adoption of the initial plan. Specifically, staff development opportunities and technical support still need to be ongoing and easily accessible for each certified staff member at his or her own level of technological sophistication. In order to accomplish this, the committee recommends the following:

1. A minimum of four technicians will be required to maintain the system. One will need expertise in network operation and maintenance as well as communication skills that would permit him or her to work with everyone from computer novices to engineers. The others need the technical skills to troubleshoot and correct problems in the network and/or workstations and Audio/Visual equipment.

2. A first through eighth grade media generalist position has been created and filled. This position coordinates staff development programs, purchase of instructional software, and oversight of elementary school computer use. Further, this individual will provide "technological" support for all staff members and will work cooperatively with the high school coordinator.
3. A high school technology coordinator will create and implement all staff development programs for this level and will purchase or direct the purchase of hardware and software after the initial purchase. This individual will also oversee teachers of technology at this level and will provide technical support to the entire district. He or she will work cooperatively with the technology coordinator for grades one through eight.
4. A computer teacher will provide direct, intense instruction to all third, fourth, and fifth grade student sin the district. This teacher will spend four to five weeks during each year at each elementary school, providing this direct instruction and will also provide "technological" support and enthusiasm to building leaders and staff.
5. Technology leaders will be solicited from each elementary building to become a committee of trainers and technical support persons.
6. Part-time aides or volunteers will be needed at each elementary school to support teachers and student in the computer labs.
7. Web development position to coordinate staff development and maintaining district wide website.

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Part 5: Curriculum Goals and Implementation

The haphazard use of technology in instruction does not provide the comprehensive and valuable experience that is desired for our students. We believe that curriculum in technological based areas must be well integrated and provide a logical progression from learning about the technology through using it for problem-solving. The district has adopted the following curriculum goals:

Elementary:

All elementary students will have direct instruction in keyboarding, word processing, spreadsheets, databases, multimedia presentations and the Internet.

1. All third graders will be exposed to keyboarding and basic word processing using MS Word. Students will publish individual stories electronically to be

shared with other classrooms across our school district network and around the world via the Internet.

2. All fourth graders will practice basic word processing using MS Word and *have exposure to Power Point multimedia presentation software*. Students will produce curriculum related projects utilizing *multimedia* techniques.
3. All fifth graders will have exposure to data collection for use in basic Excel spreadsheets and databases. Students will produce research reports utilizing spreadsheets and/or databases to organize and share their findings.
4. A computer club will be organized as an extended day program at each elementary school. Students will explore curriculum enhancing software as well as Internet resources.
5. Each school develops a website to provide vital information to the community.

Middle School:

All Middle School students will complete the state required curriculum in computer science and will expand their ability to use computers and other technology as research and information management tools.

1. All sixth grade students will participate in a twelve week course that will include word processing with MS Word, conducting research using the Internet, an introduction to graphics, and graphing using Excel spreadsheet software.
2. All seventh graders will participate in a twelve week course that will include keyboarding, word processing with MS Word and searching the Internet for graphics and information. Students will write a personal business letter and design and write a magazine.
3. All eighth graders will participate in a twelve week course that will include a review of word processing with MS Word, collecting and sharing of data using Excel spreadsheets and FileMaker Pro databases, Power Point presentation software and searching the Internet for graphics and research data. Students will produce a Social Studies related multimedia presentation incorporating all of the skills learned.
4. School develops a website to provide vital information to the community.

High School:

High School students will receive training in specialized technologies as appropriate for their courses of study and will be assisted by technology in career selection, college counseling, and other real-life decisions related

to education and career goals. Computers and other resources will be readily available for students for research and information management purposes.

1. Each High School student will use technology as a research tool in preparing class reports and term papers and will be able to apply research techniques to real-life situations in preparation for entry into college and/or the workplace.
2. High School students in specialized courses related to career preparation (e.g. vocational courses) will be exposed to and utilize the technologies they will encounter in the careers related to their course work.
3. High School students will utilize technology in college and career searches, and in securing financial aid and college application materials.
4. School develops a website to provide vital information to the community and students enroll in web development classes.

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Part 6: Network Design and Future Planning

Vision: "Provide the children of Rochester with a world-class telecommunications network to ensure they have the proper tools necessary to be successful in the Information Age."

Major Components of the Network (2009)

1. Over 1500 Pentium based PCs on the network
2. 70 Servers
3. Over 300 printers (Inkjet and Laserjet)
4. Scanners, disk backup's, digital camera's, etc
5. 2000 Gigabit certified LAN connections
6. Fiber optic backbone for SHS, MS, and VTC
7. Fiber optic connection between buildings
8. Switched 100/1000 ethernet
9. All PCs have high-speed Internet access
10. Multiple wireless access points
11. Policies and procedures (can be viewed at <http://rochesterschools.com/cic>)

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Standardization (Key to our Success)

1. Pentium based PC/Servers
2. Inkjet and laserjet printers
3. TCP/IP as networking protocol with NAT – Network Addressable Translation
4. Switched ethernet LAN's
5. Microsoft Windows 2000/XP/Vista for clients and 2003/2008 Server for servers
6. Microsoft Office Suite
7. Microsoft Educational Software
8. Microsoft programming, graphics, browsers
9. File Servers, Memory Sticks, SNAP, and DAT Backups
10. WIN Systems PBXs

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Future Projects (1-3 Years)

1. Fiber Optic System between buildings with 1GB LAN Capacity for additional services (Security, Heat, Voice, etc).
2. Identify and plan cycling of new PCs (new Capitol Improvement Projects)
3. Training (Tech Leaders and workshops)
4. Network updates, security, and additions (Grant PCs)
5. Upgrade to Operating systems for additional security (Vista and beyond)
6. Additional file storage for student portfolios
7. Enhancements to active directory services for enhanced centralized management and security features
8. Enhanced Intranet services
9. Enhanced collaboration tools (Exchange, IC, etc)
10. Voice Over IP telephone systems
11. Full NWEA (on-line student testing) implementation
12. Full IC (Student Information System) implementation
13. Increase usage of Smartboards

In line with the discussions above regarding appropriate technologies for schools, the areas considered for each option are divided into sixteen parts as follows:

1. The *network backbone* is a fiber optic system provided through the local cable television provider. It interconnects 12 school buildings.

2. *Telephone Communications*. As the school system has grown, our need for telephone communication has also grown. It has been suggested in professional literature that each teacher should have a telephone in his or her room. Although this plan does not subscribe to that philosophy, we have noted that there are some times of day when it is difficult for parents to reach their children's schools and when teachers are unable to get an outside line for contact with their students' parents. Accordingly, we have recommended an increase in the number of

available telephones, voice mail boxes, and telephone lines through use of Voice Over IP over VOIP systems.

3. *Audio/Visual Operations*. This addresses both the individual AV needs in the classroom as well as equipment to be housed in each school's library. This area, more than any other, is affected by the selection of a network backbone because of a proposal to replace the individual AV equipment we have in numerous buildings with a centralized system for distribution of electronic signals, including television, audio and other formats.

4. *Television*. This area refers to the installation and operation of the TV studio in Spaulding High School. It has no mandatory costs associated with it, although the district has the option of utilizing the system in a number of ways and may want to invest in equipment for more sophisticated use.

5. *Administrative Computers*. The district has moved to a PC platform with all student data run on a common program to reduce the current duplication of efforts we have in grading, attendance and other record-keeping functions. These PCs will be upgraded or replaced on a cyclical basis.

6. *Teacher Computers - Elementary*. We have provided a PC in each classroom so that teachers can keep their grade and attendance records, can create test item pools, and can share information with other teachers. The entire pupil permanent record is being stored electronically. These PCs will be upgraded or replaced on a cyclical basis.

7. *Teacher Computers - Middle School*. The district has provided a PC in each classroom. The reasoning for providing computer access is the same as for elementary schools. These PCs will be upgraded or replaced on a cyclical basis.

8. *Teacher Computers - High School*. Computer access becomes even more important at the high school level because of the complexity of student records and a need to standardize them for sharing with other educational institutions, including higher education. Further, as the students are getting closer to career choices where they will need to be at home with computers, their instructors need to have more experience and a higher comfort level with the technology. These PCs will be upgraded or replaced on a cyclical basis.

9. *Student Computers - Elementary*. Elementary students don't need constant access to PCs because they are still learning the basics of computer use. In the higher levels of sophistication, PCs have been placed in each classroom and elementary libraries because of their greater capabilities to access outside information and because a number of elementary students are already familiar with the workings of Windows. These PCs will be upgraded or replaced on a cyclical basis.

10. *Student Computers - Middle School.* PCs have been placed in the library, 5 labs, and in each classroom, so the students would still have access to that platform. These PCs will be upgraded or replaced on a cyclical basis.

11. *Student Computers - High School.* The Library, Labs and classroom PCs have been replaced with Pentium based WINTEL platforms and will be upgraded or replaced on a cycling basis. These students are getting ready for the world of work and require a familiarity with the machines they are most likely to use after graduation.

12. *Vocational Equipment - Business.* The Business Department labs and PCs has been replaced with Pentium based WINTEL platforms and will be upgraded or replaced on a cycling basis.

13. *Infinite Campus (IC)* – The Infinite Campus Student Information system is a web based system that allows faculty, students and parent’s access to a student’s information from any PC that is connected to the Internet.

The main sections of IC are:

Groups - Disaggregate student, teacher and parent data into custom-designed “Groups” for analysis and reporting.

Goals - Determine Goals and set Targets to monitor student progress towards meeting standards.

Reports - Create understandable and actionable charts and graphs as a basis for decision-making

Gradebook - Track student performance at the classroom level.

Students - Input and organize student work samples and view a longitudinal history of each student.

14. *NWEA* – Northwest Evaluation Association assessments are used by educators to ensure that every student is learning and growing—from at-risk students to high achievers. Schools using assessment data make student focused, data driven decisions. Services include accurate assessments, timely reporting, and data-tools that make practical use of test results—to measure and promote academic student growth and school improvement. It creates a culture that is strengthening education by keeping the focus squarely on meeting the individualized needs of students.

15. *Collaboration Software* - also known as groupware, is application software that integrates work on a single project by several concurrent users at separated workstations. IC and Microsoft Exchange has this capability.

16. Thin Clients - Thin client-server architecture refers to the small boot image which such clients typically require - perhaps no more than required to connect to a network and start up a dedicated web browser or "Remote Desktop" connection such as X11, Citrix ICA or Microsoft RDP.

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Software Issues

Recommending specific software, other than a few basic business applications and system software for word processing and data handling and networking/communications, is beyond the scope of this plan. Because of the fast development of software and the vast array of curriculum needs, these recommendations should be made by teachers, business leaders, and other community members on software committees, etc.

When considering the purchase of software for the classroom, there are several considerations to remember, including the following:

1. The program should conform to the subject being taught and not vice versa.
2. The program should contain a tutorial to make it easy to learn and should have clear, concise manuals and other documentation.
3. The program should be easy for the teacher to manage and manipulate, with particular attention to its compatibility with an existing network if it is to be shared.
4. The program should be of high quality.
5. The program should be appropriate for the age of the students involved.
6. The school district will strictly comply with copyright laws and purchase enough copies and/or licenses for all computers or devices on which the software or media will be installed.

Part 7: Maintaining Current Technology and Financing Future Projects

Financial Issues

Local ordinance and school board policy will require that most, if not all, of this project be publicly bid, either through Requests for Proposals or detailed specifications. Specialists are necessary to assist in developing the RFPs and specifications.

A sub-committee should be appointed to look more closely at financing options available to the school district, including grant sources. Proposed Budget requests can be found in Appendix C.

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Financing Technology Projects

There are two basic ways to provide the funds for projects. The first is the "pay as you go" method, which would involve the district's budgeting some amount each year for technology upgrades. The advantage to this is that it would be least costly in the long-run because there would be no interest involved. However, there is a great risk that projects will never be fully implemented, even at the minimal level, because each year's budget for technology would be subject to elimination from the budget and because some of the expenses associated with creating the network would be extraordinarily high for the regular operating budget.

The second method of financing projects is to use short-term bonds of five to seven years to finance future projects. These bonds would permit the district to spread the cost over several years, would assure stability in the program, and would provide a short enough payment schedule that the project would be completely paid for before the district had to move heavily into updating, maintenance, and replacements. While technology is constantly changing, the introduction of new capabilities does not make old technologies useless. The majority of the equipment purchased as a result of this plan should benefit the school district for a minimum of five years. Regardless of this, it is financially prudent to avoid finance charges, so purchase of individual components and replacement equipment, other than extremely large refitting projects, should not be purchased with long-term debt options.

With either financing option, the district will need to pursue grants, as it already has through TLCF and Goals 2000, and other forms of financial assistance such as donations, and partnerships with local businesses.

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Part 8: Conclusion

Rochester School Department has created a powerful and reliable city-wide network, has implemented a strong and flexible staff development program related to technology, and has made the technology equitably available to all public school students in the community.

However, simply "having done" all of this will be insufficient to meet the future needs of the students and the community. To maximize the value of the investment that has already been made, the district must maintain a constant vigil to upgrade the quality of instruction, availability of resources, and protect the reliability of the system. To this end,

it is recommended that the Rochester School Board adopt this plan as a formal commitment not to let the advances that have been made in our community languish for lack of renewal and support.

Further, it is recommended that the plan be revisited and adjusted at least annually by administration, instructional staff, and technology support personnel to assure that the program remains focused and viable.

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Appendix A

Technology Inventory as of April 15, 2009

Location	Devices on Network	PCs	Printers
SAU/CC/BCA/Travel	147	136	29
Allen	83	73	19
Chamberlain	82	73	21
E. Rochester	67	61	12
E. Roc Annex	27	21	8
Gonic	59	52	16
Maple	27	22	4
McClelland	82	74	17
SSS	38	33	9
MAPS/NWEA	11	0	0
School Infrastructure Systems	20	0	0
SAU/Elem Totals	643	545	135
Middle School			
Admin/Guide	31	21	7
A Wing	26	25	9
B Wing	32	30	14
C Wing	25	24	8
D Wing	12	11	3
E Wing	24	22	4
H Wing	8	6	4

Lab 240	29	27	2
Lab 242	30	27	3
Lab 244	33	29	3
Wireless 1	26	24	1
Wireless 2	26	24	1
Wireless 3	26	24	1
Library	29	23	1
MS Totals	357	317	61
Technology Center			
Admin/Guide	13	8	4
Lab 220	25	22	2
Lab 230	23	21	1
Lab 245	22	19	1
Lab 255	21	19	1
CAD Lab	23	22	3
Lab 265	23	21	1
Classrooms	31	26	9
CIC	20	16	3
CSC	26	23	4
FCS	14	13	2
Graphics Lab	27	20	4
Machine Shop	10	9	2
Tech Main Systems	22	0	0
Drafting Lab	6	5	1
Tech Center Total	306	245	38
Spaulding HS			
Admin/Guidance	41	33	15
Athletics	8	7	4
Lab 207	26	24	1
English	18	17	5
Foreign Language	7	7	2
JROTC	22	20	3
Spec Ed	25	24	11

Library	27	23	2
Math	25	24	9
Science	18	17	7
Social Studies	18	16	9
Art	28	25	8
Music	16	15	3
Yearbook	13	12	1
Food Service	19	19	3
SHS Wireless A	26	24	1
SHS Wireless B	26	24	1
Lab 30	36	33	1
Grierson Center	15	12	2
SHS Totals	414	376	88
Maintenance Systems			
HVAC/ETC	31	3	2
District Subtotal	1751	1486	324
New devices to be deployed in 2009			
Donations/New Devices	50	50	5
District Grand Total by 4/15/09	1801	1536	329

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Appendix B

Computer and Communications Policy Statement as of April 15, 2009

Rochester School District Computer & Communications Policy Statement

Introduction

The Rochester School Board recognizes the value of computer and other electronic resources to improve student learning and enhance the administration and operation of its schools. To this end, the Board encourages the responsible use of computers, computer

networks, including the Internet, and other electronic resources, in support of the mission and goals of the Rochester School Department and its schools

Because the Internet is an unregulated, worldwide vehicle for communication, information available to staff and students is impossible to control fully. Therefore, the Board adopts this policy governing the voluntary use of electronic resources and the Internet in order to provide guidance to individuals and groups obtaining access to these resources on School Department-owned equipment or through School Department-affiliated organizations.

School Department Rights and Responsibilities

It is the policy of the Rochester School Board to maintain an environment that promotes ethical and responsible conduct in all computer and communications equipment activities by staff and students. It shall be a violation of this policy for any employee, student, or other individual to engage in any activity that does not conform to the established purpose and general rules and policies of computer/communications equipment use. Within this general policy, the School Department recognizes its legal and moral obligation to protect the well being of students in its charge. To this end, the School Department retains the following rights and recognizes the following obligations:

1. To monitor the use of computer network and the communications network activities. This may include real-time monitoring of Internet access and/or maintaining a log of Internet activity, or attempted activity, for later review.
2. To provide internal and external controls as appropriate and feasible. Such controls shall include the right to determine who will have access to School Department owned equipment and, specifically, to exclude those who do not abide by the School Department's acceptable use policy or other policies governing the use of school facilities, equipment, and materials.
3. To restrict on-line destinations, including in-coming signals, through software or other means.
4. To remove a user's access, a device, or connection to the network that is not approved and secure.
5. To provide guidelines and make reasonable efforts to train staff and students in acceptable use and policies governing on-line, wide-area, and local use of computers and communication equipment.
6. Prior to allowing user access, a signed statement of compliance will be executed, certifying that the user understands and agrees to comply with Rochester School District policy.

Staff Responsibilities

1. Staff members who supervise students, control electronic equipment, or otherwise have occasion to observe student use of said equipment shall make reasonable efforts to monitor the use of this equipment to assure that it conforms to the mission and goals of the Rochester School District.
2. Staff should make reasonable efforts to become familiar with the Internet and its use so that effective monitoring, instruction, and assistance may be achieved.

User Responsibilities

Use of the computer and communication equipment provided by the School Department is a privilege that offers a wealth of information to improve research and productivity. Where it is available, these resources are provided to staff, students, and other patrons at no cost. In order to maintain the privilege, users agree to learn and comply with all of the provisions of this policy.

Acceptable Use

1. All use of the computer and communications equipment must be in support of educational and research objectives consistent with the mission and objectives of the School Department.
2. Proper codes of conduct in electronic communication must be used. All users are representing the Rochester School District and must use polite and respectful language in any dealings through this equipment.

Unacceptable Use

Prohibited activities include, but are not limited to, the following:

1. Users will not obtain, or provide to others, illicit copies of copyrighted software or documents. Only software provided by or approved by the Rochester School District may be installed on a School District computer. Users will not download or install software, or upgrades to approved software already installed, unless directed to do so by the Superintendent or his designee(s). Users will not download or install any unauthorized software, including freeware and shareware, on School District computers.
2. Users will not use the computer network to attempt to gain unauthorized access to any computer or communications system.
3. Users will not use the computer or communications equipment to give out any personal information about another person.
4. Any use of the computer or communications system for commercial, advertising, profit, or political purposes is prohibited.
5. Users shall not intentionally seek information on, obtain copies of, or modify files, other data, or passwords belonging to other users, or misrepresent other users on the network.
6. No use of the network shall serve to disrupt the use of the network by others. Hardware and/or software shall not be destroyed, modified, or abused in any way.
7. Malicious or mischievous use of the network to develop programs that harass other users or infiltrate a computer or computing system and/or damage the software components of a computer or computing system is prohibited.
8. Hate mail, chain letters, harassment, profanity, obscenity, racist and other antisocial behaviors are prohibited on the network.
9. Use of the network to access or process pornographic material, inappropriate text files (as determined by the system administrator or building administrator), or a file dangerous to the integrity of the network is prohibited.
10. Use of the network for any unlawful purpose is prohibited.

11. Playing games is prohibited unless specifically authorized by a teacher for instructional purposes.
12. Establishing network or Internet connections to live communications, including voice and/or video (relay chat) is prohibited unless specifically authorized by a teacher and a system administrator.

Disclaimer

1. The School Department cannot be held accountable for the information that is retrieved via the network.
2. Pursuant to the Electronic Communications Privacy Act of 1986 (18 USC 2510 *et seq.*), notice is hereby given that there are no facilities provided by this system for sending or receiving private or confidential electronic communications. System administrators have access to all mail and will monitor messages. Messages relating to or in support of illegal activities will be reported to the appropriate authorities.
3. The School Department will not be responsible for any damages you may suffer, including loss of data resulting from delays, non-deliveries, or service interruptions caused by our own negligence or your errors or omissions. Use of any information obtained is at your own risk.
4. The School Department makes no warranties (expressed or implied) with respect to:
 - The content of any advice or information received by a user, or any costs or charges incurred as a result of seeing or accepting any information;
 - Any cost, liability or damages caused by the way the user chooses to use his or her access to the network.
5. The School Department reserves the right to change its policies and rules at any time.

User Signature and Date _____

Printed Name of User _____

Supervisor Signature and Date _____

Printed Name of Supervisor _____

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Appendix C

Proposed Budget Request as of April 15, 2009

Budget for Years 2009-2010

1. Technology Services = \$17,000

- a. Symantec Anti-Virus/Spam = \$8,000
- b. Verisign Digital Certificate for Web services = \$2,000
- c. Training and Consulting = \$7,000
- 2. Repair and Maintenance = \$53,000
 - a. Firewall Filter Subscription = \$1,000
 - b. LANDesk Management Subscription = \$17,000
 - c. PC, Server, Switch Maint = \$35,000
- 3. Data Communications = \$196,000
 - a. Backup Software = \$1,000
 - b. Upgrades = \$11,000
 - c. New PC's = \$125,000 (We budget \$1,000 per PC to include: hardware, 3 year on-site warranty, and associated software – We have need for 125 PC's to replace Compaq PIII that were purchased in 2002 – Many are used for MUNIS and NWEA)
 - d. New Printers = \$10,000 (Replacement for older HP4000 Series Laser jets and other printers – Many are approaching 8 years old)
 - e. New Servers = \$10,000 (Replacement for Servers that were purchased in 2000/2001)
 - f. New Wireless Cart = \$30,000 (Replacement for RMS Wireless Cart that was purchased in 2004 – This is used for MAPS/NWEA testing)
 - g. Smartboards = \$10,000
- 4. Travel = \$5,000
- 5. General Supplies = \$1,500
- 6. New Equipment/Tools = \$1,200
- 7. Furniture = \$2,000
- 8. Replacement Equipment/Interns Salary = \$37,000 (Cabling, Infrastructure, wiring, phone system expansion, and various replacement equipment)

Proposed Budget for Years 2010-2011

- 1. Technology Services = \$17,300
 - a. Symantec Anti-Virus/Spam = \$8,100
 - b. Verisign Digital Certificate for Web services = \$2,100
 - c. Training and Consulting = \$7,100
- 2. Repair and Maintenance = \$54,600
 - a. Firewall Filter Subscription = \$1,100
 - b. LANDesk Management Subscription = \$17,500
 - c. PC, Server, Switch Maint = \$36,000
- 3. Data Communications = \$200,100
 - a. Backup Software = \$1,100
 - b. Upgrades = \$12,000
 - c. New PC's = \$126,000
 - d. New Printers = \$11,000
 - e. New Servers = \$11,000
 - f. New Wireless Cart = \$30,000
 - g. Smartboards = \$10,000

4. Travel = \$5,100
5. General Supplies = \$1,600
6. New Equipment/Tools = \$1,300
7. Furniture = \$2,100
8. Replacement Equipment/Interns Salary = \$38,000

Proposed Budget for Years 2011-2012

1. Technology Services = \$17,600
 - a. Symantec Anti-Virus/Spam = \$8,200
 - b. Verisign Digital Certificate for Web services = \$2,200
 - c. Training and Consulting = \$7,200
2. Repair and Maintenance = \$56,200
 - a. Firewall Filter Subscription = \$1,200
 - b. LANDesk Management Subscription = \$18,000
 - c. PC, Server, Switch Maint = \$37,000
3. Data Communications = \$204,200
 - a. Backup Software = \$1,200
 - b. Upgrades = \$13,000
 - c. New PC's = \$127,000
 - d. New Printers = \$12,000
 - e. New Servers = \$12,000
 - f. New Wireless Cart = \$30,000
 - g. Smartboards = \$10,000
4. Travel = \$5,200
5. General Supplies = \$1,700
6. New Equipment/Tools = \$1,400
7. Furniture = \$2,200
8. Replacement Equipment/Interns Salary = \$39,000

Proposed Budget for Years 2012-2013

1. Technology Services = \$17,900
 - a. Symantec Anti-Virus/Spam = \$8,300
 - b. Verisign Digital Certificate for Web services = \$2,300
 - c. Training and Consulting = \$7,300
2. Repair and Maintenance = \$57,800
 - a. Firewall Filter Subscription = \$1,300
 - b. LANDesk Management Subscription = \$18,500
 - c. PC, Server, Switch Maint = \$38,000
3. Data Communications = \$209,300
 - a. Backup Software = \$1,300
 - b. Upgrades = \$14,000
 - c. New PC's = \$128,000
 - d. New Printers = \$13,000
 - e. New Servers = \$13,000

- f. New Wireless Cart = \$30,000
- g. Smartboards = \$10,000
- 4. Travel = \$5,300
- 5. General Supplies = \$1,800
- 6. New Equipment/Tools = \$1,450
- 7. Furniture = \$2,300
- 8. Replacement Equipment/Interns Salary = \$40,000

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