

Lincoln Public Schools

Ballfield Road.

Lincoln Public Schools Technology Plan

2006-2011

August 30, 2006

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Acknowledgements

This report was created through the efforts of staff members and outside consultants working under the direction of the central administration of Lincoln Public Schools.

Over the course of the 2005-2006 school year, a Steering Committee for technology was assembled and began to examine the current status of educational technology use for this school district and map a course for future technology investments.

The Lincoln Public Schools team members contributing to this effort include the following:

Category	Member	School/Role
Teachers	Kate Desjardins Liz Clancy	Lincoln School, Grade 7 Mathematics Hanscom Middle School, Grade 4
Special Education Teacher	Alechia Torchia	Lincoln School, Grade 2
Specialist	Claire Groden	Hanscom Primary School, Mathematics Specialist, Grade K-3
Technology Integration Specialists	Gez Ebbert Cindy Matthes	Hanscom Primary School, Grades K-3 Lincoln School, Grades K-8
Administrators	Barry Hopping Paul Naso Mickey Brandmeyer	Hanscom Middle School, Principal District, Assistant Superintendent District, Superintendent

In addition, Lincoln has secured the services of two outside consultant groups to assist in the formulation of a technology plan. These consultants are FreshPond Education, based in Cambridge and The Bench Group, based in Franklin. These companies, under the auspices of the Steering Committee, have assisted the district in collecting data about current technology use, assessed the current infrastructure, and assisted in formulating a plan for professional development in technology use that is focused on teaching and learning and is aligned with the mission of Lincoln Public Schools.

Lincoln Public Schools referred to the Massachusetts Department of Education's Educational Technology office for guidelines in preparing this report.

Executive Summary

It is the mission of the Lincoln Public Schools to provide technology and support in the service of improved teaching and learning. To this end, the district has convened a Technology Steering Committee that will meet on an ongoing basis to determine budget, make plans for technology purchases, and evaluate progress against benchmarks established by the Commonwealth of Massachusetts.

This document presents the Steering Committee's evaluation of the state of educational technology use in the Lincoln Public Schools as of the academic year 2005-2006, and presents a plan for the coming years. The report is organized around the six technology benchmarks prepared by the Department of Education. Key points are given below.

Benchmark 1: Commitment to a Clear Vision and Mission Statement

- The Steering Committee is committed to helping the district achieve the plan proposed here for the next several academic years. The Committee will meet regularly to review, evaluate, budget, and plan for future technology initiatives.
- The total budget for technology and support for 2005-2006 was \$519,719. For 2006-2007, the budget will be \$520,752.
- The Steering Committee will continue to meet, assess, and evaluate the needs of students and teachers throughout the life of this plan.

Benchmark 2: Technology Integration

- A recent survey suggests that approximately 74% of all participating Lincoln teachers use technology with students each week—significantly less than the benchmark 85% *daily* rate set by the state.
- Only a small number of the teachers surveyed believed that the technology applications they are using can make concepts easier to teach or help students to understand content or learn skills more easily—suggesting the need for increased or improved professional development.
- Nevertheless, teachers reported that they would use technology more with the students if they had good working equipment in their classrooms.
- Lincoln Public Schools provides 2.0 FTE IT positions as well as a 3.8 FTE Technical Integration Specialist positions. Increased technical support will be necessary if the district is to meet the Massachusetts Department of Education's target of one technician responsible for no more than 200 computers.
- The district will weigh the possibility of adding a part-time data management specialist and/or technology leadership position.

Benchmark 3: Technology Professional Development

- A number of teachers are working with consultants from FreshPond Education to develop a set of model lessons incorporating technology—organized around "Essential Standards" in mathematics and science.
- From spring to winter of 2006, FreshPond will conduct Curriculum and Technology Integration Institutes in order to give teachers experience with technology applications that are appropriate to their own grade levels and subject areas.

- Teachers have taken distance learning courses through EDCO and other providers. Additional teachers will participate in distance learning as it becomes more widely available for subject area training in the state.

Benchmark 4: Accessibility of Technology

- The state benchmark calls for one “modern” computer for every five students by 2007. The ultimate goal set by the Massachusetts Department of Education is to have a 1:1 ratio of students to modern computers. (See the appendix for the state’s classifications for computers.)
- The ratio is 5:1 in the Lincoln school, but only 11:1 at Hanscom.

Benchmark 5: Infrastructure for Connectivity

- A report prepared by The Bench Group calls for a number of infrastructure improvements including upgrading of networks and servers, cabling and electrical improvements, enhanced security, and improved response time for IT issues.
- Classrooms at the Hanscom campus, which is owned by the US Department of Defense and operated under contract with the federal government, have only one drop for networking and many have insufficient access to electricity. In the most recent proposal to the DoD, it is requested that budget be allotted toward updating the infrastructure for networking.

Benchmark 6: Access to the Internet outside the School Day

- The district maintains a Web site that includes information for parents.
- Internet resources are available for teachers to post assignments and projects on the district Web site.
- The district is working with the community and parents to allow students Internet access beyond the school day.
- The district will determine if there are ways in which Hanscom students can attain access to computers and the Internet after school hours on campus.

Introduction

The introduction of technology has changed the way teachers and administrators do their jobs, especially with respect to online reporting, data collection, and communication with parents. However, there is a general belief that continuing investments in technology hardware, software, infrastructure, and support can only be justified if they lead to substantial improvements in teaching and learning.

Across the country, teachers are faced with increasing expectations to use technology in the classroom. Sometimes, these expectations can lead to hardware and software being purchased and set up in classrooms before sufficient thought is given to how technology can actually support learning goals. Purchasing equipment without an eye to appropriate integration strategies can lead to instances of integrating technology that are forced and artificial.

It is generally believed that technology can add a significant amount of value in the classroom by illustrating complex relationships or concepts through simulations and modeling. In addition, technology can support students in performing repetitious calculations quickly. Assistive technology has proved to be a transformative force in providing access to the curriculum for special needs students.

Technology, however, can cause complications in the classroom especially if insufficient equipment, infrastructure, and resources exist. Even with the optimal infrastructure in place, the integration of technology can sometimes be cumbersome and difficult to manage. For these reasons, the district must carefully weigh the impact of technology integration activities against the cost of support and equipment.

Lincoln Public Schools has technology integration support staff in place to assist classroom teachers. Classroom teachers are currently engaged in integrating technology where support and equipment is available. The district aims to continue its support of staff that can assist teachers as the district expands its capabilities and programs for technology integration.

In Lincoln, a professional development planning process has already been set in motion—with the aim of identifying learning goals, then identifying the technology that can help students and teachers to reach those goals. The district intends to purchase the equipment and put structures in place that support essential learning goals.

In order to integrate technology meaningfully in the classroom, the district's infrastructure needs to be up-to-date and designed around classroom needs. Additional investments in infrastructure will be necessary to meet goals for teaching and learning. These investments, in the short term, will include upgrading wiring and electrical service as well as servers and the networking equipment. Security will be strengthened by upgrading the firewall, security, filtering, and virus protection. Information Technology (IT) staffing and supervision will be examined to determine the best way to support classroom equipment.

MA DOE Local Technology Plan Guidelines

(School Year 2004-2005 through 2006-2007)

From the Massachusetts Department of Education Educational Technology

Office: http://www.doe.mass.edu/edtech/tplanguide04_07.html

In order to be eligible for E-Rate discounts, as well as federal and state technology funding, every school district is required to have a long-range strategic technology plan approved by the Department of Education. School districts must have their plans on file locally, including a full description of their implementation strategies. Each year, to approve school districts' technology plans, the Department asks districts to report on the progress they have made in implementing their plans through the Department's secure Web portal.

In 2000, to help districts develop purposeful plans, the Department worked with technology stakeholders across the state to develop a set of recommended guidelines called "Local Technology Benchmark Standards for 2003". These guidelines represent recommended conditions for the effective integration of technology into instruction.

In 2001, the Board of Education established the Educational Technology Advisory Council (ETAC) to advise the Department on issues relating to the use of technology in schools. ETAC developed the School Technology and Readiness (STaR) Chart to illustrate the "complex set of interactions of people, materials and dimensions" that are involved in using technology effectively in schools. ETAC believes that the STaR Chart represents "the beginning of a new strategic plan for Massachusetts to improve student learning with the use of technology." Based on the recommendations of the STaR Chart and advice from stakeholders across the Commonwealth, the Department has developed this new set of guidelines for schools to use in technology planning. These guidelines are not mandated but rather recommended benchmarks for districts to meet by the end of the school year 2006 to 2007. The Department will use these guidelines to gauge the progress of districts' implementation in order to approve their technology plans annually.

Benchmark 1: Commitment to a Clear Vision and Mission Statement

- A. The district's technology plan contains a realistic and clearly stated set of goals and strategies that align with the district-wide school improvement plan. It is committed to achieving its vision by the end of the school year 2006-2007.
- B. The district has a technology team with representatives from a variety of stakeholder groups. The technology team has the support of the district leadership team.
- C. Budget
 1. The district has a budget for its local technology plan with line items for technology in its operational budget.
 2. The budget includes staffing, hardware, software, professional development, support, and contracted services.
 3. The district leverages the use of federal, state, and private resources.
- D. Evaluation
 1. The district evaluates the effectiveness of technology resources toward attainment of educational goals on a regular basis. Prior to purchasing the district assesses the products and services that are needed to improve teaching and learning.

2. The district's technology plan includes an evaluation process that enables the district to monitor its progress in achieving its technology goals and to make mid-course corrections in response to new developments and opportunities as they arise.

Benchmark 2: Technology Integration

- A. Teacher and Student Use of Technology
 1. Outside the Classroom
At least 85% of teachers use technology everyday, including some of the following areas: lesson planning, administrative tasks, communications, and collaboration. Teachers share information about technology uses with their colleagues.
 2. Within the Classroom
At least 85% of teachers use technology appropriately with students each week, including some of the following areas: research, multimedia, simulations, data interpretation, communications, and collaboration.
 3. At least 85% of students from grades 5 to 8 show proficiency in all the Massachusetts Recommended PreK-12 Instructional Technology Standards for Grades 5 to 8.
 4. At least 90% of teachers are working to meet the proficiency level in technology, and by the school year 2006-2007, 60% of teachers will have reached the proficiency level as defined by the Massachusetts Technology Self-Assessment Tool (TSAT)2.
 5. The district has a CIPA -compliant Acceptable Use Policy (AUP) regarding Internet use.
- B. Staffing
 1. The district has a full-time equivalent (FTE) district-level technology director/coordinator.
 2. The district provides one FTE instructional technology teacher per 40-80 instructional staff.
 3. The district has one FTE person dedicated to data management and assessment.

Benchmark 3: Technology Professional Development

- A. By the end of the school year 2006-2007, at least 85% of district staff will have participated in 45 hours of high-quality technology professional development covering technology skills and the integration of technology into instruction.
- B. Technology professional development is sustained and ongoing and includes coaching, modeling best practices, district-based mentoring, and study groups. The professional development includes concepts of universal design and scientifically based, researched models.
- C. Professional development planning includes an assessment of district and teachers' needs. The assessment is based on the competencies listed in the Massachusetts Technology Self-Assessment Tool
- D. The Department, the Educational Technology Advisory Council and stakeholders will review the levels of competencies in the Massachusetts Technology Self-Assessment Tool on an annual basis.

Benchmark 4: Accessibility of Technology

- A. Students per Instructional Computer
 1. The district has an average ratio of fewer than five students per high-capacity, Internet-connected computer. The Department will work with stakeholders to review the capacity of the computer on an annual basis. (The ultimate goal is to have a one-to-one, high-capacity, Internet-connected computer ratio.)
 2. The district considers students' access to portable and/or handheld electronic devices appropriate to their grade level.
 3. The district has established a computer replacement cycle of six years or less.
- B. Technical Support

1. The district makes a commitment to provide timely in-classroom technical support with clear information on how to access the support, so that technical problems will not cause major disruptions to curriculum delivery.
2. The district provides a FTE network administrator.
3. The district provides at least one FTE person to support 100-200 computers. Technical support can be provided by dedicated staff or contracted services.

Benchmark 5: Infrastructure for Connectivity

- A. Internet Access
 1. The district provides connectivity to the Internet in all classrooms in all schools including wireless connectivity, if appropriate.
 2. The district provides bandwidth of at least 10/100 MB to each classroom.
- B. Networking (LAN/WAN)
 1. The district provides a minimum 10/100 MB Cat 5 switched network and/or 802.11b/g wireless network.
 2. The district provides services for secure file sharing, backups, scheduling, email, and web publishing, either internally or through contracted services.
- C. E-Learning Environments
 1. The district encourages the development and use of innovative strategies for delivering specialized courses through the use of technology.
 2. The district deploys IP-based and or ISDN-based connections for access to web-based and/or interactive video learning on the local, state, regional, national, and international level.
 3. Classroom applications of e-learning include courses, cultural projects, virtual field trips, etc.

Benchmark 6: Access to the Internet outside the School Day

- A. The district maintains an up-to-date web site that includes information for parents.
- B. The district works with community groups to ensure that students and staff have access to the Internet outside of the school day.
- C. The district web site includes an up-to-date list of places where students and staff can access the Internet after school hours.

Benchmark 1: District Technology Vision, Mission, and Goals

The Lincoln Public Schools has worked for several months to develop a plan, documented in this report, that focuses on the meaningful integration of technology that best leverages district resources. The district will concentrate its efforts on providing infrastructure, hardware, software, and professional development in those areas where technology can make a significant impact in teaching and learning.

Technology Plan: Goals 2006-2011

The following goals will guide decisions and budgeting for technology for the next five years:

- Lincoln Public Schools will support a Steering Committee for technology that meets periodically to review, evaluate, budget, and plan for future technology initiatives.
- Lincoln Public Schools will maintain a technology integration and IT staff that actively supports teachers as they integrate technology in the classroom.
- Lincoln will seek system-wide integration of technology into the curriculum across all grade levels and content areas so that educational content, skills, and pedagogies will be enhanced.
- Opportunities for professional development will be provided, ensuring that staff is supported in using technology that is fully integrated into school experiences, wherever appropriate.
- The district will work to ensure that students and teachers have access to "modern"* computers and equipment that are needed to integrate technology in the classroom.
- The district aims to establish, support, and maintain a technology infrastructure that enables all staff and students to easily integrate technology in teaching and learning and communicate throughout the local and global community.

Technology Team

The district has convened a Steering Committee for technology planning, comprised of teachers, administrators, and community members. This team will meet monthly, and their work will focus on implementing the technology plan.

The Steering Committee will evaluate ongoing professional development programs and determine future areas for focus.

Each year, the Steering Committee will develop a plan and budget for technology related activities based on an assessment of hardware, software, infrastructure and professional development needs.

Budget for Technology

The total budget for technology and support for 2005-2006 was \$519,719. For 2006-2007, the budget will be \$520,752. Details are given in the table on the next page.

* See Department of Education definition of "modern" computers in the appendix.

Table 1: Technology Budget

Category	Description	Budget FY06	Budget FY07
Leadership (tech planning, budgeting, selecting/purchasing equipment, etc.)	5% Superintendent 10% Assistant Superintendent	\$19,100	\$20,500
Tech Integration (time spent guiding and supporting teachers to use tech in the classroom) (percentage of staff time and budget for salary)	3.8 FTE specialists: .6 allotment for integration	\$160,522	\$164,982
Administration (tech admin functions) (percentage of staff time and budget for salary)	3.8 FTE specialists: .4 allotment for management	\$107,015	\$109,988
Contracted Services		\$10,000	\$10,000
Maintenance and support	Salaries of IT support personnel	\$117,000	\$117,000
Hardware	Operational budget	\$33,538	\$22,172
	Budget warrant	\$47,800	\$40,000
Software	Published materials	\$20,260	\$16,301
Capital expenditures			
Supplies		\$12,992	\$13,057
Other	Private sources	\$27,582	\$27,582
	Total	\$555,809	\$541,582
		\$443 per pupil	\$431 per pupil

Program Evaluation

Lincoln Public Schools recognizes that technology needs change, and may change quickly. Because of these conditions, the district's Technology Steering Committee will continue to meet, assess, and evaluate the needs of students and teachers throughout the life of this plan.

The Technology Plan will be evaluated each year to assess the progress toward goals in each of the benchmarked areas. The Technology Steering Committee will continue to examine the changing needs of our district as well as the technology standards. This group will keep up with changes in policy and expectations set by the state as well as the changing budget landscape so that the district can best use technology dollars to improve student learning.

The Superintendent and Assistant Superintendent will be working with staff on aligning school improvement and curriculum goals with the technology plan. The district will also work to align professional development efforts in technology with teaching and learning goals.

The Technology Steering Committee will also work to communicate the district's steps toward meeting the goals and benchmarks to other members of the Lincoln Public School community. The Steering Committee will plan outreach events and produce publications that will serve to inform the community about the strides made toward technology improvement.

Next Steps

In order to meet goals for Lincoln Public Schools' Technology Vision, Mission, and Goals, the district will take the following steps:

- The district will seek community support for this plan through School Committee approval.
- The district will evaluate current IT support structures to improve IT support for teachers.
- The district will create and maintain a sufficient budget to address IT, maintenance, and support.

The following table summarizes progress toward the state benchmark.

Table 2: Summary of progress in meeting Benchmark 1 (Technology vision, mission, and goals)

State benchmark	Level of progress toward state benchmark	Evidence of progress toward the state benchmark	Recommended next steps
<p>The district's technology plan contains a realistic and clearly stated set of goals and strategies that align with the district-wide school improvement plan. It is committed to achieving its vision by the end of the school year 2006-2007.</p> <p>The district has a technology team with representatives from a variety of stakeholder groups. The technology team has the support of the district leadership team.</p>	Developing	<p>Plan is:</p> <ul style="list-style-type: none"> Aligned with MA Technology Plan Supported by district administrators Collaboratively developed Supportive of a vision for technology use in the service of improved teaching and learning, teacher professionalism, and data management 	<p>Plan should be:</p> <ul style="list-style-type: none"> Approved by the school committee Integrated into the district improvement plan Used for making budget decisions and applying for external funding
<p>The district has a budget for its local technology plan with line items for technology in its operational budget.</p> <p>The budget includes staffing, hardware, software, professional development, support, and contracted services.</p> <p>The district leverages the use of federal, state, and private resources.</p>	Developing	<p>Plan does include:</p> <ul style="list-style-type: none"> Budget for purchases of hardware, software Technology integration staffing support Local funding for technology 	<p>Plan should include:</p> <ul style="list-style-type: none"> Incentives for professional development Sufficient IT staffing support Budget for addressing backlog of IT issues

Benchmark 2: Technology Integration

When surveyed in 2006, most Lincoln teachers reported using computers with students each week, but very few believed that the technology applications they are using can make concepts easier to teach or help students to understand content or learn skills more easily. (A complete report of the staff surveys is included with this plan.) This underscores the importance of thinking carefully about how, when, and why teachers are using technology. Indeed, it is clear that the district must focus efforts to integrate technology in the classroom only where there is good reason to believe that technology use will lead to real and significant improvements in teaching and student learning.

Student and Teacher Technology Use

According to a 2006 survey, 74% of all participating Lincoln teachers use technology with students each week. Many additional teachers reported that they would use technology more with the students if they had good working equipment in their classrooms.

Nearly all of the teachers report using computers for productivity, and many report that they have advanced skill in using technology for administrative and productivity purposes.

Students are using technology in many ways and are working toward proficiency. The following are just a few examples of current technology projects in the Lincoln Public Schools:

- In some grade levels, teachers have participated in the Tufts University LEGO Engineering program. Through this program, students have had access to specialized software to program robots.
- At the Lincoln campus, fifth grade students are engaged in a keyboarding program so that they enter the middle school years with necessary skills to navigate and use computer keyboards more efficiently and independently.
- At the Hanscom campus, students engage in a slide show project that prepares them to create PowerPoint presentations.

Acceptable Use Policy

Lincoln Public Schools has adopted an acceptable use policy (AUP) (full text in appendix) for all staff and students. The AUP is sent home to all families in the district and is posted on the district Web site in order to effectively communicate the policies and procedures for proper use of computers and technology.

Technology Staff

Lincoln Public Schools believes that technology support is a critical component of a successful technology program within the schools. Lincoln Public Schools provides salaried positions in support of the integration of technology in the individual classrooms. Lincoln supports 2.0 FTE IT positions as well as a 3.8 FTE Technical Integration Specialist positions.

Curriculum Integration Support

The district's long-range technology plan calls for the following activities:

- Professional development including onsite professional development institutes and off-site workshops
- In-class support
- Peer-observation
- Instructional Technology Specialists (co-teaching)

Technical support

IT – The district employs 2.0 FTE to provide information technology support for all classrooms. The district plans to implement new staff protocols in order to more quickly address technology issues in the classrooms. All classrooms will have clear information on how to access technical support. The district currently has a full-time network administrator. The district is working towards providing technical staff to have each technician responsible for less than 200 computers.

Next Steps

In order to reach our goals for technology integration, Lincoln Public Schools will take the following steps:

- The district will continue to maintain integration teacher and IT staff positions to support teachers.
- The district will consider adding technology leadership and data management staff.
- The district will engage in an ongoing, sustained professional development program that supports teachers in integrating technology in support of student learning.

The table on the following page summarizes our progress in meeting the state benchmark for technology integration.

Table 3: Summary of progress in meeting Benchmark 2 (Technology Integration)

State benchmark	Level of progress toward state benchmark	Evidence of progress toward the state benchmark	Recommended next steps
<p>At least 85% of teachers use technology everyday.</p> <p>At least 85% of teachers use technology appropriately with students each week</p> <p>At least 85% of students from grades 5 to 8 show proficiency in all the Massachusetts Recommended PreK-12 Instructional Technology Standards for Grades 5 to 8.</p> <p>At least 90% of teachers are working to meet the proficiency level in technology</p> <p>60% of teachers will have reached the proficiency level</p>	Developing	<p>74% of teachers report using technology with students each week</p> <p>Integration activities currently involve:</p> <p>Mostly teacher-facilitated or teacher-directed technology activities</p> <p>Individual students use computers for self-paced work</p>	<p>Devise a plan to:</p> <p>Incorporate student centered, technology-enhanced activities</p> <p>Use technology for project-based and inquiry-based learning</p> <p>Focus on areas where technology can transform teaching and learning</p> <p>Measure students' progress toward achievement of instructional technology skills</p>
<p>The district has a CIPA compliant AUP.</p>	Advanced		
<p>The district has a full-time equivalent (FTE) district-level technology director/coordinator.</p> <p>The district provides one FTE instructional technology teacher per 40-80 instructional staff.</p> <p>The district has one FTE person dedicated to data management and assessment.</p>	Developing	<p>Each FTE Instructional technology teacher supports fewer than 40-80 instructional staff</p>	<p>District may consider the need for hiring a part- or full-time technology director or coordinator</p> <p>District may consider hiring part- or full-time data management specialist</p>

Benchmark 3: Technology Professional Development

From a national perspective, many of the technology professional development programs that are currently offered to teachers fail to provide the kind of ongoing support teachers need to make effective use of educational technology, and as a result, few teachers are in a position to integrate new technologies into their classroom practices. Teachers may attend a one-day workshop and return to school the following day not knowing how to integrate what they learned into their curricula, or they may lack the support from colleagues that is necessary for their attempts to be successful. To be successful in their endeavors to implement appropriate technologies, teachers need hands-on learning rooted in their own curricula that will enable them to translate training into practice.

According to research by the Eisenhower Professional Development Program, a sound professional development approach should be built around focused, long-term team-based professional development, rather than one day, in-service training programs.

Teacher Skill Development

Teachers will engage in a professional development process that will help them to map optimal technology integration activities to content area expectations.

In the school years 2005-2006 and 2006-2007, teachers will work with FreshPond Education to identify "Essential Standards" in math and science.[†]

After Essential Standards are identified, teachers will engage in a process whereby they will analyze student work and existing teaching practices. Participants will work in teams to create and publish model lessons, instructional strategies, and common assessments. All the while, teachers will be developing new skills and teaching strategies that integrate technology into the curriculum. These lessons will be implemented and shared with team members and teachers will have opportunities to peer-review and observe the process.

In addition to the math and science programs, individual workshops will be offered to assist teachers in integrating available technology in the curriculum.

In subsequent years, the Steering Committee will evaluate ongoing programs and canvass the faculty in order to provide additional professional development that meets the needs of students and teachers.

Professional Development Plan

Once each subject area is identified for technology integration, teachers will participate in a facilitated professional development program to develop, peer-review, implement, and share the lessons.

[†] "Essential Standards" are prioritized standards that are derived from a systematic and balanced approach to distinguishing the standards that are absolutely essential for student success from those that are "nice to know." Essential standards are a subset of the complete list of standards for each grade and for each subject. They represent the "safety net" of standards that each teacher needs to make sure that every student learns prior to leaving the current grade. Students who acquire this "safety net" of knowledge and skills will thus exit one grade better prepared for the next grade.[†]

Project Timeline

FreshPond Education, in partnership with Lincoln Public Schools, will provide a professional development program:

- Spring 2006: FreshPond Education will provide Lincoln educators with introductory sessions in order to acquaint all faculty members with best practices appropriate to their own grade levels and subject areas.
- Summer 2006: FreshPond Education will conduct Curriculum and Technology Integration Institutes in order to give teachers hands-on, in-depth experience with technology applications that are appropriate to their own grade levels and subject areas.
- Math and technology integration - May 2006- December 2007
- Science/engineering and technology integration - Summer 2006- Winter 2007
- General Sessions – Summer 2006

The lessons created through these programs will be aligned with the Scope and Sequence of Technology Skills and the Massachusetts Instructional Technology Standards (see appendix).

Each year the Technology Steering Committee will evaluate the needs and interests of staff as well as available resources to determine the design and execution of high quality professional development programs. Subsequent areas of focus will be determined by the Steering Committee using data from evaluation of the pilot and other programs. Ongoing communication with staff in Lincoln will also be used to determine future needs.

Staffing for Technology Integration

The district employs four curriculum and technology integration specialists that work both with students and teachers. These teachers serve as leaders and as resources for conducting activities aimed at developing student and teacher technology skills.

Distance Learning

Teachers have taken distance learning courses through EDCO and other providers for professional development. Additional teachers will participate in distance learning as it becomes more widely available for subject area training in the state.

Next Steps

In order to reach district goals in technology professional development, the district will take the following steps:

- The district will continue to support technology integration specialists to work with both students and teachers.
- The Steering Committee will regularly evaluate staff needs for professional development.
- The district will work to support teachers by providing in-district training that is high-quality, on-going and sustained, and customized to meet the particular needs of Lincoln teachers.

The table below summarizes our progress in meeting the state benchmark for professional development in technology integration.

Table 4: Summary of progress in meeting Benchmark 3 (Technology Professional Development)

State benchmark	Level of progress toward state benchmark	Evidence of progress toward the state benchmark	Recommended next steps
<p>By the end of the school year 2006-2007, at least 85% of district staff will have participated in 45 hours of high-quality technology professional development covering technology skills and the integration of technology into instruction.</p> <p>Technology professional development is sustained and ongoing and includes coaching, modeling best practices, district-based mentoring, and study groups. The professional development includes concepts of universal design and scientifically-based, researched models.</p>	<p>Early</p>	<p>In 2005-6 and 2006-7, three groups of teachers will be engaged in professional development programs to develop lessons that integrate technology in ways that support teaching and learning in dynamic ways</p> <p>The professional development model includes scientifically based, effective models for lesson development and implementation</p>	<p>Expand the professional development to include more groups each year</p>
<p>Professional development planning includes an assessment of district and teachers' needs. The assessment is based on the competencies listed in the Massachusetts Technology Self-Assessment Tool. The Department, the Educational Technology Advisory Council and stakeholders will review the levels of competencies in the Massachusetts Technology Self-Assessment Tool on an annual basis.</p>	<p>Proficient</p>	<p>In 2005-2006, all teachers were surveyed and had opportunities to participate in focus groups to assess their needs and interests in technology professional development.</p> <p>The assessment was customized for the district in order to focus on Lincoln's own specific needs and requirements in planning for the professional development.</p>	<p>Continue assessment on an annual basis</p> <p>Steering Committee continues to evaluate staff needs and interests as well as effectiveness of ongoing programs.</p>

Benchmark 4: Accessibility of Technology

Over the next five years, the district aims to maintain a computer-to-student ratio of one modern computer for every five students. Lincoln Public Schools also aims to provide additional hardware and software to ensure the best possible exposure for students in their classrooms.

Another goal is to provide, as is appropriate to grade level and curriculum expectations, access to handheld computers, probes, and portable keyboards as well as appropriate assistive technologies.

The Bench Group made an assessment of the infrastructure of technology in Lincoln Public Schools in January of 2006. They used the following questions to guide recommendations:

- **Flexibility**
Can the network be adapted to new curriculum focus areas, growth in class size, demands for different kinds of applications and activities, and the incorporation of new technologies?
- **Longevity**
Will the equipment physically last for a sufficiently long period of time? Will the selected technology be appropriate in the future? If so, for how long?
- **Upgradeability**
Is it possible to add new features and equipment to the network to keep up with ever-increasing speeds and performance standards that will arise in the next several years? Can the network we install keep pace with technology - with reasonable equipment and software additions - or will we have to discard some of today's purchases to make way for tomorrow's technological developments?
- **Scalability**
Can any new equipment be efficiently used if the network is expanded? Will all its elements integrate easily into a larger future network?

With these questions in mind, The Bench Group recommended that the district make significant improvements to the infrastructure, upgrade the servers and network, upgrade security and filtering, and re-assess current staffing structures.

A complete report from The Bench Group is included with this plan.

Hardware Inventory 2006

In 2006, the MA Department of Education defines a "Modern" Type A or Type B computer as specified below:

- Type A – high end multimedia, able to run virtually all current software, including the latest video and graphics; 256 MB RAM or higher; Pentium 4 or equivalent (PC); G4 or equivalent (Mac)
- Type B- average multimedia, able to run most software except the latest video and graphics; 128-256 MB RAM; Pentium 3 (PC); G3 (Mac)
- Type C – low end multimedia; can run most software/productivity applications; less than 128 MB RAM; Pentium 2 or lower (PC); Power PC 6043 or lower (Mac).

The following table shows the ratio of students to computers of different types in each school. As can be seen, the ratio of students to computers falls short of the standard at both Hanscom schools.

Table 5: Ratio of Students to Internet-Connected Computers

School	Ratio of students to "modern" (Type A) computers	Ratio of Students to "Modern" (Type A/B) Computers	Ratio of Students to Computers of any type	Percentage of classrooms connected to the Internet	Percentage of instructional computers on Internet
Lincoln K-8	5:1	2:1	2:1	100%	100%
Hanscom Primary	11:1	2:1	2:1	100%	100%
Hanscom MS	11:1	2:1	2:1	100%	100%

Table 6: Total Computers in the District

School	Total A Computers	Total B Computers	Total C Computers	Total Computers
Lincoln K-8	130	126	59	315
Hanscom Primary	33	106	14	153
Hanscom MS	35	104	12	151

On the Lincoln campus, about 30 computers run Windows while the rest are on OS9 and OSX for the Apple Mac. The school has two mobile labs and three permanent labs with 24 computers in each lab. Both the Lincoln and Hanscom campuses have building based tech support. All teachers have telephones and voicemail in their classrooms.

The Lincoln campus has a dozen Alphasmarts keyboards and six handheld/PDAs, two LCD projectors for teacher use (these are shared among the teachers and the computer lab), three video cameras, ten digital still cameras, and three scanners.

The Hanscom campus' physical plant is owned by the Department of Defense and is maintained and operated under contract with the federal government. Each classroom has only one drop for networking and many have insufficient access to electricity. In the most recent proposal to the DoD, it is requested that budget be allotted toward updating the infrastructure for networking.

Hanscom has 22 computers running Windows, while the remaining machines run OS9 and OSX. Each building on the Hanscom campus has a lab, with 25 computers in the middle school and 18 in the primary lab. In addition, the middle school has a mobile lab. The campus has building based tech support. All teachers have voicemail and phones in the classrooms. The elementary school has one electronic whiteboard. Probes and data loggers are available through the Tufts/Lego engineering program and are used by teachers who attend specialized training. Hanscom Middle School has two LCD projectors (one is housed in the computer lab, and one is shared among the teachers), while the primary school has three more. The primary school has two digital video cameras and five digital still cameras. Teachers have access to five scanners on the campus.

The district has a Web site that is updated periodically. Teachers are able to post homework assignments on individual school pages.

Assistive Technologies and Universal Design

The district has used and continues to incorporate many assistive technologies to accommodate students with special needs. Special needs and classroom teachers incorporate the following devices and software into their teaching to help all students gain access to the curriculum:

- Kurzweil – scan and read software
- Cowriter
- Boardmaker
- Dragon Naturally Speaking

Next Steps

In order to improve the infrastructure in support of teaching and learning, the district will create a plan and budget to enable the following:

- Upgrade network and servers
- Improve cable and electricity
- Improve security, by adding firewall, filtering, and virus protection
- Improve response time to IT issues
- Provide professional development for assistive technology
- Provide resources for teachers to create and maintain classroom Web pages

The following table summarizes the district's progress in meeting the state benchmark for accessibility to technology.

Table 7: Summary of progress in meeting Benchmark 4 (Accessibility of Technology)

State benchmark	Level of progress toward state benchmark	Evidence of progress toward the state benchmark	Recommended next steps
<p>Students per Instructional Computer:</p> <p>The district has an average ratio of fewer than five students per high-capacity, Internet-connected computer. (The ultimate goal is to have a one-to-one, high-capacity, Internet-connected computer ratio.)</p> <p>The district considers students' access to portable and/or handheld electronic devices appropriate to their grade level.</p> <p>The district has established a computer replacement cycle of six years or less.</p>	<p>Developing</p>	<p>District has a ratio between 5:1 and 11:1 of students to high-end computers</p>	<p>Determine appropriate student: modern computer ratio in order to meet the district's curriculum goals</p> <p>Establish a purchasing plan and replacement cycle for hardware</p> <p>Determine appropriateness of using handheld technology</p> <p>Provide state-of-the-art peripheral equipment where needed (laser printers, digital cameras, white boards, etc.)</p> <p>Improve ability to share files and provide policy for using the same software across the district</p> <p>Expand digital communication between school and family; students and teachers</p> <p>Establish consistent core set of software applications (e.g. word processor, etc)</p>
<p>Technical Support</p> <p>The district makes a commitment to provide timely in-classroom technical support with clear information on how to access the support, so that technical problems will not cause major disruptions to curriculum delivery.</p> <p>The district provides a FTE network administrator.</p> <p>The district provides at least one FTE person to support 100-200 computers.</p>	<p>Early</p>	<p>The district provides a FTE network administrator</p>	<p>Additional classroom technical support is needed in order to:</p> <p>Provide classroom technical help in a timely manner</p> <p>Manage backlog of IT issues</p> <p>Keep teachers informed about status of their technology repairs</p> <p>Leadership support is needed to:</p> <p>Set up a management system to "triage" IT issues</p> <p>Provide FAQ to support staff in troubleshooting</p> <p>Inform staff of system-wide maintenance and issues that impact classroom use</p>

Benchmark 5: Infrastructure for Connectivity

The Lincoln Public Schools network consists of approximately 300 workstations and servers consisting of Macintosh OS 9, and OS X. This heterogeneous environment is segmented into single logical VLAN segments for managing local IP traffic. The Lincoln Public Schools network infrastructure consists of primarily HP Switches implementing HP's switching fabric Resilient Spanning Tree Protocol. Cisco routers are used for routing, routing boundary connections, and providing firewall services via a Checkpoint.

The center of the network is a single HP 4108 switch. Each of these switches then connects to either: local network service hosts, HP 4000, or HP 2524 Switch (24 or 48 ports) into each of the physical network locations on campus.

Internet Access

External connectivity to the Lincoln network provides Internet and telephone connections. Telephone connectivity comes off the DSU/DSU switch into the network. CentNet Internet Inc. provides Internet connectivity on a T-1 link providing a Class C network through a BayNetworks router and a JoBox Firewall.

The district does provide Internet access in all classrooms in all schools and supplants that with wireless access, where appropriate. The district does provide services for students and administrators to share files, calendaring, e-mail, report cards, IEPs, SIMS, and more.

Next Steps

The Steering Committee will determine a budget and a plan for improvements to the infrastructure, while district administration will periodically adjust IT support positions to meet the needs of classroom teachers.

The following table summarizes the progress the district has made toward the state benchmark for technology infrastructure.

Table 8: Summary of progress in meeting Benchmark 5 (Infrastructure for Connectivity)

State benchmark	Level of progress toward state benchmark	Evidence of progress toward the state benchmark	Recommended next steps
<p>Internet Access</p> <p>The district provides connectivity to the Internet in all classrooms in all schools including wireless connectivity, if appropriate.</p> <p>The district provides bandwidth of at least 10/100 MB to each classroom.</p>	<p>Advanced</p>	<p>All classrooms are connected to the Internet</p> <p>Wireless is available in each building</p>	
<p>Networking (LAN/WAN)</p> <p>The district provides a minimum 10/100 MB Cat 5 switched network and/or 802.11b/g wireless network.</p> <p>The district provides services for secure file sharing, backups, scheduling, email, and web publishing, either internally or through contracted services.</p>	<p>Developing</p>	<p>The district provides LAN/WAN</p> <p>The district provides services for file sharing, email, calendaring</p>	<p>Network is in need of upgrade</p> <p>Network monitoring needs to be implemented</p> <p>Wiring needs updating</p> <p>Servers need to be upgraded</p> <p>Upgrade virus protection, filtering, firewall</p>
<p>E-Learning Environments</p> <p>The district encourages the development and use of innovative strategies for delivering specialized courses through the use of technology.</p> <p>The district deploys IP-based and or ISDN-based connections for access to web-based and/or interactive video learning on the local, state, regional, national, and international level.</p> <p>Classroom applications of e-learning include courses, cultural projects, virtual field trips, etc.</p>	<p>Developing</p>	<p>Some classrooms are engaged in activities and lessons that include cultural projects and virtual field trips</p> <p>District has used Web-based learning modules for teachers and some students</p>	<p>District may explore appropriateness of offering additional Web-based courses for students and teachers once equipment becomes more widely available</p>

Benchmark 6: Access to the Internet Outside of the School Day

District Web Site

The district maintains a Web site that includes information for parents. Internet resources are available for teachers to post assignments and projects on the district Web site.

Access Outside of School Day

The district is working with the community and parents to allow students Internet access beyond the school day.

Locations

Internet access is available to students at the Lincoln campus through extended library hours:

Tuesdays and Thursdays until 3:30

In addition, the town library is open into the evening for student access according to the following schedule:

Monday	1:00 - 8:30
Tuesday	9:00 - 6:00
Wednesday	9:00 - 8:30
Thursday	9:00 - 6:00
Friday	9:00 - 6:00
Saturday	10:00 - 5:00 (Labor Day - end of June)
Sunday	1:00 - 5:00 (Columbus Day - end of April)

The Hanscom AFB library is open for student Internet access during the following hours:

Monday 9:00 – 5:00

Tues-Thurs 9:00 – 8:00

Friday-Sat 10:00 – 5:00

Next Steps

- The district will determine if there are ways in which Hanscom students can attain access to computers and the Internet after school.
- The district will provide resources to teachers who wish to post classroom information on the district Web site.

The following table outlines the district's progress toward providing Internet access outside the school day.

Table 9: Summary of progress in meeting Benchmark 6 (Access to the Internet Outside of the School Day)

State benchmark	Level of progress toward state benchmark	Evidence of progress toward the state benchmark	Recommended next steps
The district maintains an up-to-date web site that includes information for parents.	Developing	District has a Web site that is updated periodically Each school posts information for parents Middle school teachers post homework assignments on the Web	Provide resources for teachers to develop Web pages that support classroom projects
The district works with community groups to ensure that students and staff have access to the Internet outside of the school day.	Proficient	Access to the Internet is provided on one campus during after school hours Public library both in the Town of Lincoln and on Hanscom Air Force Base	Provide after school Internet access at Hanscom campus
The district web site includes an up-to-date list of places where students and staff can access the Internet after school hours.	Early		Web site needs to be updated to include this information

Timeline

Following is a timeline for creating and implementing an action plan for the next two years.

2005-2006

- Steering Committee is assembled
- Five-Year Technology Plan formulation
- Beginning of professional development programs

2006-2007

- Continuation of Steering Committee
- Evaluation of Technology Plan
- Evaluation of completed and ongoing professional development
- Designation of new technology professional development initiatives
- Creation of a plan and budget for infrastructure improvements (2006-2008)
- Upgrade servers
- Virus protection, security, firewall, network monitoring
- Purchase software licenses in order to provide all teachers with the same software package on the teacher computers
- Eliminate backlog of IT issues
- Establish a hardware replacement cycle

2007-2008

- Continuation of Steering Committee
- Evaluation of Technology Plan
- Evaluation of completed and ongoing professional development
- Designation of new technology professional development initiatives
- Evaluation of ongoing infrastructure improvements
- Purchase new equipment for classrooms
- 2008-2009
- Continuation of Steering Committee
- Evaluation of Technology Plan
- Evaluation of completed and ongoing professional development

- Designation of new technology professional development initiatives
- Evaluate ongoing infrastructure improvements
- Create an assessment for student technology skills
- Upgrade peripheral equipment

Appendix and Accompanying Documents

Computer Classifications

Massachusetts Technology Standards

Lincoln Public Schools Acceptable Use Policy (AUP)

The Bench Group Report

Report on Focus Groups and Surveys