

**Sky's The Limit:**  
**Implementing Palm Pilots into the Classroom to Support Curriculum**



**M.C.S. Noble Middle School  
New Hanover County Schools  
Wilmington, NC**

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## **Introduction**

The purpose of the Sky's the Limit: Implementing Palm Pilots into the Classroom Curriculum is to ensure that every student is guaranteed equal exposure to the technology skills needed to graduate from high school while addressing different learning style and improving performance. Using Kurt Lewin's Unfreeze, Change, Refreeze model to observe and implement the needed change, the school has the opportunity to discuss and become involved in how this new plan will be shaped as well as making it a part of the normal educational life at the school.

M.C.S. Noble Middle School, one of seven middle schools located in the New Hanover County School District, was chosen for Sky's the Limit. According to the data provided by the New Hanover County Schools Testing and Accountability Department, around 91% of seventh grade students are scoring at or above proficient in mathematics while 82% of students are passing the North Carolina Computer Skills Test (Appendix D). Although there is a diverse array of socioeconomic backgrounds at Noble, their enrollment in the free and reduced school lunch program is at a very low percentage and they already offer many technological opportunities for students and teachers (See Appendix Z for TAGLIT Summary Information). Other middle schools in this district have an average of 85.5% of seventh grade students scoring at or above grade level in math, and around 90% of eighth grade students passing the Computer Skills Test (See Appendix Z). Another local middle school has implemented palm pilots into their seventh grade language arts classes and has found them to be very successful in improving student performance and understanding (<http://www.nhcs.k12.nc.us/mgms/news.html>). This story, along with many other research articles and web sites promoting the use of handhelds in the classroom, made a convincing argument that this technology can be very helpful to both students and teachers if implemented into the educational environment (See Appendix Z). Having a handheld for each student and teacher in the classroom with the wireless communication option allows students to take an active part in their learning experience and be able to conduct research while they are learning, versus waiting for access to a computer in a lab or classroom. They are also able to complete assignments and have one-on-one contact with their teacher through the use of wireless communication, while the teacher is able to keep track of grades and observe student's every move by tracking the history of each palm pilot and what the student spent time working on in class that day. Students who feel that they are actively involved in their learning are more likely to understand and comprehend the material, therefore increasing performance on end-of-grade testing.

The first goal of this program is to have all seventh grade students receive a score of proficient on the End-of-Grade mathematics test, while the second goal is for all eighth graders to receive a score of “P” on the N.C. Computer Skills Test (Appendix C). Mr. Chris Furr, the principal, is very concerned about offering his students the newest advances in technology and wants them to be prepared for the future. He and his staff are very supportive of any technology change that can benefit their students and teachers, and are excited and interested in the prospect of adding palm pilots and wireless communication to their school. This program meets many of the county technology standards as well as meeting many of the state and national technology standards for students (Appendix A).

To implement this plan, we have divided the process into three phases (Appendix B) which begins in the Fall of 2004 and culminates in the Spring of 2007. Our first phase includes buying thirty handhelds for a seventh grade math classroom and three access points for wireless communication, along with a wireless printer, LCD projector, and Margi. The second phase would include purchasing another set of handhelds for a seventh grade science classroom, an access point for the classroom, wireless printer, LCD projector, and Margi. The third phase, in the 2006-2007 school year, would include another classroom set of handhelds for a seventh grade English classroom and an access point, as well as the other peripherals already mentioned for the other classrooms. Revisions and modifications will be made as needed as the plan progresses and grows, as well as analyzing the changing needs of the school.

This proposal gives an overview of the mission and vision of the plan, as well as how this plan meets the needs of the students and teachers at every phase of implementation.

### **Mission Statement**

It is our mission to supplement middle school subject curriculum with the newest advances in technology to allow our students to compete and succeed in their future educational and career endeavors. Utilizing PDA’s and wireless communication assists teachers with classroom management and lesson planning as well as increasing student performance in computer skills and meeting the goals and objectives of their core subjects.

### **Vision Statement**

Technology skills are now an essential part of the curriculum for all North Carolina middle and high school students. Providing each student and teacher with a PDA and equipping all classrooms and common areas with wireless capabilities allows students the opportunity to develop these needed computer skills while improving their understanding and performance in core subjects with the use of technology. Allowing teachers to have a virtual paperless classroom and use software and shareware to support lesson planning and classroom management gives an opportunity to spend more time with each student via Internet communication and observation as well as decreasing the amount of time spent recording grades and other paperwork. This experience also allows students for group collaboration as well as individual research opportunities, and offers a chance to learn the skills they must have to compete and succeed in a quickly changing, technology-focused society.

## **Curriculum and Instruction**

Mr. Furr is very proud that Noble Middle School is as technologically advanced as it can be with the funding available, but more emphasis on using technology as a medium for delivering instruction and completing assignments could be used to enhance learning. According to the TAGLIT Data Summary which assessed the abilities of both teachers and students, almost 70% of the instructors at Noble try to use the technology they have available to them effectively in the classroom (Appendix D). However, it is difficult to use technology effectively and improve computer skills when all students don't have the same opportunities for access and use as others. Students are able to visit the two computer labs or use one of the thirty CPUs in the Library for research via the Internet and to complete assignments (Appendix D).

The overall goals of this technology change is to increase student performance and understanding of the goals and objectives of the core educational courses while improving their technology and computer skills, and allowing teachers the opportunity to use technology to observe and track student progress as well as a medium for delivering instruction. To accomplish this, the students will:

- 1) Use technology as a core part of curriculum to master skills and concepts,
- 2) Use technology to observe, analyze, and report data,
- 3) Use technology for collaborative and independent learning and research,
- 4) Use technology to acquire communication skills.

In order for the students to achieve these objectives, the teachers must:

- 1) Use technology to observe and assess student performance,
- 2) Use technology as a medium for instruction a minimum of twice each week,
- 3) Communicate with students via technological means (e-mail, instant messaging, etc.),
- 4) Keep abreast of new technology knowledge to improve personal development.

## **Implementation Plan**

This plan takes Noble from their current situation to the culmination of a total technology upgrade in three separate phases. Each phase, beginning in the 2004-2005 school year, adds one core subject from the seventh grade each year to have palm pilots and wireless capabilities integrated into their standard course of study. The pilot phase of our program involves Mrs. Mabry's seventh grade math students, who range in ability from all types of learning disabilities to academically gifted individuals. The second phase would also include a seventh grade science class, and the third phase would include a seventh grade English class. By the end of the third phase, technology integration would be complete in all of the core classes in the standard course of study for seventh graders. This addition of one subject in each phase gives teachers the time to adjust to the change as well as receive training and workshops on palm pilots and the uses of wireless communications. More details about the goals, indicators, benchmarks, and measures for each phase can be found in Appendix B.

## **Communication Plan**

Our Core Management Team would consist of the school principal, technology resource teacher, media specialist, minimum of two teachers, minimum of one parent representative, parent of a special needs child, a student representative, and a UNCW student. Mr. Furr, Mrs. Mabry, and Mrs. Hall, the librarian conveyed their thoughts, wishes and vision for the technology implementation which is how the vision and mission statements were created, as well as the pertinent members of the Core Management Team. Members of the CMT will take full responsibility for communicating the details of each phase of implementation to all the stakeholders involved (Appendix E). The stakeholders engaged in this process include the students, parents, teachers, local communities and businesses, and potential funding agencies. Using a variety of communication methods, the CMT will keep everyone involved in this change aware of the upcoming events that will occur during each step of the implementation process.

### *Phase One*

The pilot stage is most important because it involves having the support of all the stakeholders. The CMT will be responsible for communicating the vision and goals of the plan, as well as conducting research, planning, implementing and evaluating the change at the end of this process.

During the vision stage, members of the Core Management Team will explain how this change can improve curriculum to students, parents, teachers, local communities and businesses, and prospective funding agencies. Presentations can be done at regular PTA meetings for parents, students, and teachers, as well as the school newsletter and website to keep students, parents, and others informed of the proposed change. Emails and faxes can also be used to inform businesses and funding agencies of the potential technology change. Conveying the goals of the technology plan can also be done at this stage to inform the stakeholders of what this implementation plans to accomplish by adding this technology to the curriculum.

Collecting data on the school's current situation will provide stakeholders with an overall idea of the school's existing resources. This type of research can include student's achievement on End of Grade and Computer Skills tests, available technology, staff development and skills, school and county policies and support, and human resources. Providing this information to the stakeholders identifies how the change recognizes the needs of the students and staff and gives everyone affected an idea of the school's potential boundaries and issues surrounding implementation of the plan. Written reports, emails, newsletters, and the school website can be used to disperse the data, and be customized to each group to give only the necessary details and not overwhelm any specific stakeholder with extraneous information. During the planning stage, the goals and activities that can be used to achieve implementation are presented as well as how each outcome can be measured. An approximate timeline of when each phase or portion of the phase will be implemented, as well as cost information are also provided (Appendix F). Presentations, meetings, emails, and the school website are a few of the communication methods that will be used with each stakeholder group involved, as well as receiving feedback from each group for suggestions that could be made to the plan.

The stage of implementation informs stakeholders on how the technology change is progressing in the school. Feedback at this stage from parents, teachers and students is

very important because it will be used in the final Evaluation stage to assess the effectiveness of the implementation as well as what areas need to be modified. Presenting this data at PTA meetings, technology fair nights, via email and the school website, as well as having media coverage of the events will keep every stakeholder updated as to what is currently happening with the new technology change in the school. Finally, during the evaluation stage, research collected on the overall effectiveness of the plan will be presented. Identifying how well the implementation matches the original goals of the plan will alert stakeholders of the successful change. This information will be communicated to all groups using reports, the school website, emails, and press releases containing this data.

### *Phases Two and Three*

These phases will only cover the planning, implementation and evaluation stages because the initial vision, goal, and data collection stages were completed during Phase One. Relevant stakeholders will be educated about any necessary changes that were made in the planning and implementation stages resulting from the conclusions drawn from the data collected from the Phase One or Phase Two evaluation stages. The same information, such as the new budget and timeline for activity completion and objectives and their measurement tools will be communicated to the stakeholders in the same manner as Phase One.

### **Infrastructure Design**

Noble has one computer with Internet access in each classroom, two computer labs with around thirty computers in each one, and thirty new XP machines in the library. Each classroom also has an overhead projector, a printer, and a T1 connection for internet access. Scanners are available for use in the library and computer labs, and teachers can check out one of the three laptops available from the technology resource teacher. Three LCD projectors and 2 digital cameras are also located in the main computer lab for teachers to use.

Software used with the above mentioned hardware includes but is not limited to Windows versions 95, 98, and XP, Microsoft Office with Publisher, MS Works 4.5, Novell, Norton Antivirus, Groupwise, Integrate, and other educational software and games.

There are no adequate storage facilities for technology peripherals, disks, and CDs, and the one technology resource teacher is spread thin between all the teachers and is not able to satisfactorily assist teachers with integrating technology into their classroom because she is too busy trying to run a computer lab and troubleshoot problems inside the classroom.

Each student in the classroom would be given a palm pilot to use for classroom assignments, research, and communication, as well as the teacher. Using shareware, teachers can design online and interactive quizzes for the students to take anonymously to assess their understanding of the concepts. This has been proven to increase student response since they are more likely to attempt to answer questions when the fear of being wrong is eliminated. Since the T1 line connection is already in place, only access points for the classroom and two lobby areas would need to be installed and configured to allow

for wireless communication. A storage facility for the handhelds in the classroom creates a safe and convenient environment to keep the PDA's from being damaged as well as have them easily accessible. Ultimately, another technology resource person to help troubleshoot and repair problems and hardware would alleviate this responsibility from the technology resource teacher so that more time could be spent on helping teachers integrate technology into their curriculum.

The h4150 iPAQ Pocket PC offers students every capability that the desktop PC they are used to working with has with the benefit that it is in the palm of their hand. These handhelds were chosen because they offer the advanced Bluetooth wireless technology already built in, as well as coming equipped with Pocket PC software. Each includes 64 MB SDRAM, a battery charger, runs Windows XP, has both pen and touch interface, weighs less than 5 pounds, and has a three-year warranty. Five additional batteries will also be bought for each classroom since battery life depends on the usage of the device. Access points will be purchased and configured to allow for wireless Internet. An HP 450ci mobile wireless printer with integrated Bluetooth technology will also be purchased for each classroom so that students can beam their assignments and work to the printer from their desks and have the copy of the assignment immediately. A mountable LCD projector will be installed in the classroom ceiling to better utilize space, and a Margi which the teacher uses to display the data on her PDA screen to the LCD projector will also be purchased for each room. Additional hardware and peripherals will be bought at each phase of the Infrastructure Implementation Strategies and Activities Plan (Appendix E).

### **Staff Development**

Regardless of how well thought out our plan is, it will not be successfully without properly understanding the skills and needs of the staff members at Noble Middle School so that proper training and development can take place wherever necessary. In order to successfully implement our goal of Hand-Held computers, we need to make sure that everyone is aware of the expectations that go along with operating in a wireless environment and who to count on for troubleshooting purposes.

After interviewing, surveying, and exploring other means of extant data within Noble Middle School, we realized that technology is a major portion of day-to-day operations within the organization. Teachers are expected to maintain updated websites linked to the school's homepage which also provides email contact. Principal Chris Furr is a strong proponent for email usage to keep in contact with the many staff members at Noble, to send out memos, and to continue encouraging faculty members to utilize technology on a regular basis to meet state expectations.

Our staff development will come mainly in the form of training and understanding of the hand-held computers. Since the majority of the staff is very familiar with computers and technology, the transition to the hand-held devices should be a smooth one. The Technology Resource teacher at Noble is already very familiar with the iPAQ,



and could direct some training workshops for the teachers implementing this new technology into their classroom activities.

Measurable outcomes for teachers that can be accomplished with workshop training include being able to:

- Track student progress with the use of shareware for grade recording,
- Design classroom activities using PDAs and wireless technology,
- Understand and use the shareware and Pocket PC programs installed,
- Use wireless technology to communicate with students.
- Achieve mastery of the advanced technology competencies.

Measurable outcomes for students that can be observed after teachers complete a thorough workshop training session include:

- Communicating with teachers via wireless communications (Instant Messaging, E-mail, etc),
- Increased participation in classroom activities and online activities compared to regular classroom activities,
- Using the PDA and wireless technology to conduct research and report findings,
- Heightened group collaboration and individual contributions to projects and assignments,
- Learners with different learning styles being able to work together more easily,
- Students connecting similarities between different subject areas,
- Increased classroom and state-mandated test scores.

### **Technology Support Services**

The goal of our technology support services are to offer assistance to both students and teachers in our first phase so the assistance can come from the teachers and/or students who utilized the products previously in the next two phases (i.e. Teachers will be able to assume the role of facilitator and integrations specialist). The teachers will participate in staff development activities centered on the understanding of iPAQs in the classroom and will trickle their knowledge down to the students and future users.

Noble Middle School is fortunate to be in a school system, New Hanover County, which has strong support staff within the Central Office and each school in the county. New Hanover County has over 29 technology personnel members who can assist with technology needs in the form of software advice and service, hardware advice and service, help desks, network coordinators, technology specialists and technology coordinators. Noble Middle School is also fortunate to have a knowledgeable media coordinator and a computer resource teacher on site who can utilize their expertise to assure quality assurance during our implementation of the hand-held computers. Having such resources on hand will allow for an ease of implementation of our strategies. After the pilot year of this program, another technology resource technician located in the school is desired to help solely with computer and technology issues to eliminate any time between a problem and waiting for the technology department to send a technician if at all possible.

A major reason for choosing the iPAQ other than cost effectiveness, ease of use, and familiarity, was the level of support offered by Compaq and HP for their products. Compaq offers 24 hour customer service for their products via phone or the web (<http://www.hp.com/country/us/en/support.html>) and take pride in assisting schools with their needs. Faulty equipment is replaced without a hassle, and qualified technicians are located in all areas to assist the county tech team when needed.

### **Project Budget and Timeline**

To begin executing this technology change, hardware, supplies, networking materials, and human resource issues must be purchased. Two ways that this program can receive funds to support this program include applying for grant programs and school fundraising. Some of the possible grants that Noble Middle School could be eligible for are listed in Appendix G. This is not an exhaustive list, but does show that the funding for new technology implementation for schools not qualified for other public assistance is available. Some fundraising ideas besides asking for company donations include a school yard sale, or selling dinner plates with parent volunteers and surrounding restaurants working together to help the school raise money.

Each year the school's technology needs will increase as another classroom will have iPAQs and wireless technology integrated into the classroom curriculum. However, the actual cost of these items will stay relatively constant since they will be purchased through the New Hanover County Schools Technology Department. Making this purchase through the school system allows for the school to receive technology support as well as the extended warranty purchased through Hewlett-Packard so that any problem arising with the handhelds should be easily taken care of. A summary budget for the three phases of our program including final totals is shown below.

## Overview

Research has shown that students of multiple learning styles and abilities can truly excel when technology is integrated into their daily curriculum. Literally putting technology in the palm of their hands can improve student performance in all subject areas and increase concept understanding. Teachers can also benefit from the advanced use of technology in the classroom by communicating with students, creating interesting lesson plans, projects, and online quizzes using Internet capabilities, and on-the-spot record keeping with a virtual grade book. Teachers and students in North Carolina schools are both expected to have a minimum knowledge of computers and technology skills, and implementing this program into the middle school curriculum can keep students abreast of emerging technology while allowing teachers to fulfill their needed technology experience while making the classroom experience more rewarding for everyone involved.

<b>Direct Cost</b>	<b>2004-2005</b>	<b>2005-2006</b>	<b>2006-2007</b>	<b>Total</b>
<b>Tech Support Salary</b>	20,300	\$20,300	\$20,300	\$60,900
<b>iPAQs</b>	\$15,000	\$15,000	\$15,000	\$45,000
<b>Laser Printer</b>	\$250	\$250	\$250	\$750
<b>Margi</b>	\$250	\$250	\$250	\$750
<b>Printer Supplies</b>	\$10,000	\$20,000	\$40,000	\$70,000
<b>Mountable LCD</b>	\$3,100	\$3,100	\$3,100	\$9,300
<b>Access Points</b>	\$1,272	\$424.00	\$424.00	\$2,120
<b>Software (Shareware)</b>	FREE	FREE	FREE	FREE
<b>Training/Development</b>	\$2,000	\$2,000	\$2,000	\$6,000
<b>Extended Warranties</b>	\$6,000	\$6,000	\$6,000	\$18,000
<b>Disposal Costs</b>	NONE	NONE	NONE	NONE
<b>Depreciation</b>	0	\$7,500	\$7,500	\$15,000
<b>Backup Batteries</b>	\$1,500	\$1,500	\$1,500	\$4,500
<b>Storage Cart</b>	\$300	\$300	\$300	\$900
<b>Substitute Pay</b>	\$10,000	\$10,000	\$10,000	\$30,000
<b>Consultants (Evaluations)</b>	\$1,300	\$1,300	\$1,300	\$3,900
<b>Total Requested</b>	\$71,272	\$87,924	\$107,924	\$267,120

## Appendices

### Appendix A

#### National Student and North Carolina Technology Standards: A Comparison

<b>National Technology Standards Grades 6 - 8</b>	<b>North Carolina Technology Standards: Seventh Grade</b> (Other grade standards that will meet the National Standards are shown in <i>Italics</i> .)
1. Apply strategies for identifying and solving routine hardware and software problems that occur during every day use.	
2. Demonstrate knowledge of current changes in information technologies and the effect those changes have on the workplace and society.	1.3 Describe the impact of technology on the skills needed for the workplace.
3. Exhibit legal and ethical behaviors when using information and technology, and discuss consequences of misuse.	1.1 Demonstrate ethical behavior relating to security, privacy, passwords, and personal information. 1.2 Demonstrate an understanding of copyright by citing sources of copyrighted materials in papers, projects, and multimedia presentations.
4. Use content-specific tools, software, and simulations to support learning and research.	3.1 Select and use technology tools to collect, analyze, and display data. 3.3 Research, create, publish, and present projects related to content areas using a variety of technological tools.
5. Apply productivity/multimedia tools and peripherals to support personal productivity, group collaboration, and learning throughout the curriculum.	3.1 Select and use technology tools to collect, analyze, and display data. 3.2 Use word processing/desktop publishing for assignments/projects. 3.3 Research, create, publish, and present projects related to content areas using a variety of technological tools. 3.4 Search and sort information using more than one criterion and explain strategies used to find information. 3.6 Create/modify and use spreadsheets to solve problems related to content areas. 3.7 Choose charts/tables or graphs to best represent data and state reason.
6. Design, develop, publish and present products using technology resources that demonstrate and communicate curriculum	3.2 Use word processing/desktop publishing for assignments/projects. 3.3 Research, create, publish, and present

concepts to audiences inside and outside the classroom.	projects related to content areas using a variety of technological tools. 3.7 Choose charts/tables or graphs to best represent data and state reason.
7. Collaborate with peers, experts, and others using telecommunications and collaborative tools to investigate curriculum-related problems, issues, and information, and to develop solutions or products for audiences inside and outside the classroom.	<i>3.9 Use telecommunications to share and publish information. (Sixth Grade Standard)</i>
8. Select and use appropriate tools and technology resources to accomplish a variety of tasks and solve problems.	2.2 Select appropriate spreadsheet functions to solve problems. 3.1 Select and use technology tools to collect, analyze, and display data. 3.2 Use word processing/desktop publishing for assignments/projects. 3.3 Research, create, publish, and present projects related to content areas using a variety of technological tools. 3.4 Search and sort information using more than one criterion and explain strategies used to find information. 3.5 Create/modify and use a database relevant to a classroom assignment. 3.6 Create/modify and use spreadsheets to solve problems related to content areas. 3.7 Choose charts/tables or graphs to best represent data and state reason. 3.8 Evaluate the information from electronic sources as to validity, appropriateness, content, and usefulness.
9. Demonstrate an understanding of concepts underlying hardware, software, and connectivity and of practical applications to learning and problem solving.	2.1 Enter and edit data into a prepared spreadsheet to test simple “what if” statements. 2.2 Select appropriate spreadsheet functions to solve problems.
10. Research and evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic information sources concerning real-world problems.	3.8 Evaluate the information from electronic sources as to validity, appropriateness, content, and usefulness.

## Appendix B

### Project Implementation Plan

Goals (Outcomes)	Indicators	Benchmarks	Measures
Phase One: 2004-2005 School Year			
1. Students in Mrs. Mabry's seventh grade math classes will demonstrate increased competencies in graphs and data analysis	<ul style="list-style-type: none"> <li>• Students will be produce graphical data representing comparison using PDA's</li> <li>• Students will demonstrate mathematical relationships to real world applications through written expression</li> </ul>	At the end of school year 2004-2005, the overall scores of Mrs. Mabry's seventh grade EOG results increased by 10% more than the previous year	<ul style="list-style-type: none"> <li>• Accuracy of data in graphs</li> <li>• Written expression meets standard course of study and/or Mrs. Mabry's guidelines</li> <li>• Increase of test scores (Teacher Criteria and EOG)</li> </ul>
2. Students will demonstrate using PDA's for in class assignments	<ul style="list-style-type: none"> <li>• Use PDA's when solving math equations</li> <li>• Use PDA's to determine surface area of objects</li> <li>• Use of PDA's for online quizzes</li> <li>• Use of PDA's when writing</li> <li>• Use of PDA's for communication with teacher and students</li> </ul>	By the end of school year 2004-2005, students will have used PDA's for at least 25% of class time	<ul style="list-style-type: none"> <li>• Teacher/Student Checklist</li> <li>• Teacher records of correspondence with students</li> <li>• Online quiz tracking</li> </ul>

Goals (Outcomes)	Indicators	Benchmarks	Measures
Phase Two: 2005-2006 School Year			
1. Students in Mrs. Mabry's seventh grade math classes will demonstrate increased competencies in graphs and data analysis	<ul style="list-style-type: none"> <li>• Students will be produce graphical data representing comparison using PDA's</li> <li>• Students will demonstrate mathematical relationships to real world applications through written expression</li> </ul>	At the end of school year 2005-2006, the overall scores of Mrs. Mabry's seventh grade EOG results increased by 10% more than 2004-2005 school year	<ul style="list-style-type: none"> <li>• Accuracy of data in graphs</li> <li>• Written expression meets standard course of study and/or Mrs. Mabry's guidelines</li> <li>• Increase of test scores (Teacher Criteria and EOG)</li> </ul>
2. Students will demonstrate using PDA's for in class assignments	<ul style="list-style-type: none"> <li>• Use PDA's when solving math equations</li> <li>• Use PDA's to determine surface area of objects</li> <li>• Use of PDA's for online quizzes</li> <li>• Use of PDA's when writing</li> <li>• Use of PDA's for communication with teacher and students</li> </ul>	By the end of school year 2005-2006, students will have used PDA's for at least 50% of class time	<ul style="list-style-type: none"> <li>• Teacher/Student Checklist</li> <li>• Teacher records of correspondence with students</li> <li>• Online quiz tracking</li> </ul>
3. Students in a seventh grade science teacher's classes will use mathematics to gather, organize, and present quantitative data resulting from scientific investigations	<ul style="list-style-type: none"> <li>• Students will produce graphical data representing comparison using PDA's</li> <li>• Students will demonstrate the use of PDA's for the purpose of data analysis</li> <li>• Students will demonstrate use of PDA's for data</li> </ul>	At the end of school year 2005-2006, the overall scores of a seventh grade science teacher's classes on the end of the year test will increase by 25%	<ul style="list-style-type: none"> <li>• Accuracy of data in graphs</li> <li>• Increase of test scores (Teacher Criteria)</li> <li>• Teacher/Student Checklist</li> <li>• Teacher records of correspondence with students</li> <li>• Online quiz tracking</li> </ul>

	collection and research <ul style="list-style-type: none"> <li>• Students will demonstrate use of PDA's for online quizzes</li> <li>• Students will demonstrate use of PDA's for teacher/student communication</li> </ul>		
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Goals (Outcomes)	Indicators	Benchmarks	Measures
Phase Three: 2006-2007 School Year			
1. Students in Mrs. Mabry's seventh grade math classes will demonstrate increased competencies in graphs and data analysis	<ul style="list-style-type: none"> <li>• Students will be produce graphical data representing comparison using PDA's</li> <li>• Students will demonstrate mathematical relationships to real world applications through written expression</li> </ul>	At the end of school year 2006-2007, the overall scores of Mrs. Mabry's seventh grade EOG results increased by 10% of 2005-2006 school year	<ul style="list-style-type: none"> <li>• Accuracy of data in graphs</li> <li>• Written expression meets standard course of study and/or Mrs. Mabry's guidelines</li> <li>• Increase of test scores (Teacher Criteria and EOG)</li> </ul>
2. Students will demonstrate using PDA's for in class assignments in Math and Science	<ul style="list-style-type: none"> <li>• Use PDA's when solving math equations</li> <li>• Use PDA's to determine surface area of objects</li> <li>• Use of PDA's for online quizzes</li> <li>• Use of PDA's when writing</li> <li>• Use of PDA's for communication with teacher and students</li> </ul>	By the end of school year 2006-2007, students will have used PDA's for at least 60% of class time	<ul style="list-style-type: none"> <li>• Teacher/Student Checklist</li> <li>• Teacher records of correspondence with students</li> <li>• Online quiz tracking</li> <li>• Accuracy of graphs</li> </ul>



	<ul style="list-style-type: none"> <li>• Students will produce graphical data representing comparison using PDA's</li> <li>• Students will demonstrate the use of PDA's for the purpose of data analysis</li> <li>• Students will demonstrate use of PDA's for data collection and research</li> </ul>		
<p>3. Students in a seventh grade English teacher's classes will refine critical thinking skills and create criteria to evaluate text and multimedia</p>	<ul style="list-style-type: none"> <li>• Students will demonstrate the use of PDA's for the use of communication skills</li> <li>• Students will demonstrate the use of PDA's for the purpose of online literary critiques/searching for alternative points of view</li> <li>• Students will demonstrate the use of PDA's for the purpose of Word Processing</li> <li>• Students will demonstrate the use of PDA's for the purpose online quizzes and interaction</li> </ul>	<p>At the end of school year 2006-2007, the overall scores of a seventh grade English teacher's classes on the End of Grade Reading Comprehension test will increase by 10% from the 2005-2006 school year</p>	<ul style="list-style-type: none"> <li>• Test scores</li> <li>• Teacher tracking of sites, files, articles used</li> <li>• Teacher/Student Checklist</li> <li>• Teacher records of correspondence with students</li> <li>• Online quiz tracking</li> <li>• Teacher criteria for literary critiques</li> </ul>

**Appendix C  
Needs Assessment**

<b>Performance Outcomes</b>		
<b>Current Conditions</b>	<b>Desired Conditions</b>	<b>Data on Which They Are Based</b>
91.4% of seventh grade students at Noble Middle School scored at or above proficient on the 2002-2003 Mathematics EOG test.	All students receive a proficient score on the Mathematics EOG test.	Summary statistics of student performance from 2002-2003 school year.
Approximately 95% of Mrs. Mabry's students meet her expectations and guidelines for achievement.	All students will meet and exceed Mrs. Mabry's expectations and guidelines for achievement.	Results of interview with Mrs. Mabry about student performance.
92% of students have enough skills and knowledge to receive a 'P' on the Computer Skills Multiple Choice/Performance Test.	All students to receive a 'P' for both parts of the Computer Skills Test before entering high school.	Summary statistics of student performance from 2002-2003 school year.

<b>Curriculum and Instruction</b>		
<b>Current Conditions</b>	<b>Desired Conditions</b>	<b>Data on Which They Are Based</b>
Technology is not a major method of instructional delivery used by Mrs. Mabry.	Technology is integrated into the curriculum and used as a major method of delivering instruction.	Evaluation of classroom environment, results of interview with Mrs. Mabry.
Only 68.1% of teachers use technology effectively in the classroom.	100% of teachers use and integrate technology effectively into classroom instruction.	Results of the TAGLIT Data Summary on teacher technology knowledge, skills, and usage.
None of the teachers surveyed have a level of mastery on any of the basic technology skills.	All teachers have mastered all the basic and advanced technology skills to utilize them both when planning instruction and to analyze and track student data and performance.	Results of the TAGLIT Data Summary on teacher technology knowledge, skills, and usage.

Students do not have immediate access to technology resources during the school day.	Students will be able to access files, applications, assignments, and perform research for projects without going to a computer lab.	Evaluation of School Facilities, Results of Interview with Technology Resource Teacher, Principal, and Mrs. Mabry.
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<b>Professional Development</b>		
<b>Current Conditions</b>	<b>Desired Conditions</b>	<b>Data on Which They Are Based</b>
Less than 20% of teachers are familiar with using palm pilots for either personal or classroom use.	100% of teachers use palm pilots for instructional planning and organizing personal and student data.	Results of the TAGLIT Data Summary on teacher technology knowledge, skills, and usage.
Mrs. Mabry does not know how to use a PDA.	Mrs. Mabry understands the components of the PDA in an effort to utilize it effectively for instruction and assessment of student performance.	Results of interview with Mrs. Mabry concerning technology knowledge and experience.
68.1% of Teachers Make Effort to Use Technology Effectively, 19.1% of Teachers are just beginning to Use Technology, 8.5% naturally use Technology 4.3% don't use Technology at all in instructional design.	100% of teachers naturally and effectively use technology in their instructional design and professional needs.	Results of the TAGLIT Data Summary on teacher technology knowledge, skills, and usage.

<b>Resources</b>		
<b>Current Conditions</b>	<b>Desired Conditions</b>	<b>Data on Which They Are Based</b>
Mrs. Mabry has 3 outdated desktop computers and 1 new laptop computer for 28 students.	All students have access to their own PDA for completing assignments, performing research, and communicating with the teacher and other students.	Evaluation of classroom environment, results of interview with Mrs. Mabry.
A T1 connection supports the entire network of the school.	Wireless technology is installed to allow for wireless computer labs and wireless PDA use.	Technology Inventory, Results of Interview with Technology Resource Teacher and Principal.
There are no adequate storage facilities for technology resources.	Climate-controlled storage areas provided for all types of technology resources.	Results of Interview with Technology Resource Teacher, Evaluation of

		School Facilities and Storage Areas.
One technology resource person supports the curriculum and troubleshooting needs for the entire school.	Additional staff added to repair hardware and troubleshoot software problems and allow the technology resource teacher to assist with instruction-specific technology curriculum needs and questions.	Results of TAGLIT Data Summary from teacher feedback and specific technology-related needs.
There is currently 1 PDA for the entire school.	For each faculty and staff member along with each student to have access to a PDA for personal and classroom-related use.	Technology Inventory, Results of Interview with Principal.

**Appendix D**  
**Hardware and Facilities Inventory**

<b>Current Hardware Conditions</b>	<b>Desired Conditions</b>	<b>Data on Which They are Based</b>
272 Monitors 328 CPUs 110 Printers 8 Scanners 3 Laptops 3 LCD Projectors 2 Digital Cameras 2 Digital Video Cameras 2 CD Writers/Burners 1 PDA (IPAQ 3650)	One handheld computer for every child and teacher in the classroom with wireless capabilities to use for interactive instruction and completing assignments via telecommunications.	Technology Inventory supplied by the Technology Resource Teacher

<b>Current Facilities Conditions</b>	<b>Desired Conditions</b>	<b>Data on Which They are Based</b>
23 Total Computers in Library 2 Computer Labs (32 and 35 Computers respectively) One Computer in every classroom Limited to no storage facilities available T1 Connection Campus wide	While keeping the current computers networked with the T1 line, wireless capabilities combined with a palm pilot for every student and staff member with adequate storage facilities for both working hardware, hardware that needs to be repaired, and software materials.	Technology Inventory supplied by the Technology Resource Teacher Interview with Technology Resource Teacher TAGLIT Data Summary compiled by School Principal

**Appendix E**  
**Stages and Objectives of Communication**

Stage and Objective of Communication	Stakeholder Group	Format	Vehicle	Frequency	Messenger
<b>Vision</b> To communicate vision	Change Management Team	Verbal, written	Presentation, email	Once	Core CMT Members
	Parents	Written	Newsletter		Parent representative from CMT
	Community	Online	NMS website		Community representative from CMT
	Potential Funding Agencies	Verbal, Written	Presentation, fax		Change Management Team
	Teachers	Verbal, written	Presentation, email		Teacher representative from CMT
<b>Goal Setting</b> To communicate the goals of the project	Change Management Team	Verbal, written	Presentation, email	Once	Core CMT Members
	Parents	Written, online	Newsletter, NMS website		Parent representative from CMT
	Community	Online	NMS website		Community representative from CMT
	Teachers	Verbal, written, online	Presentation, email		Teacher representative from CMT
	Potential Funding agencies	Verbal, Written, online	Presentation, email		Change Management Team
<b>Data Gathering</b> To communicate results of the current situation	Change Management Team	Written, Online	Report, Website	As Requested	Core CMT Members
	Parents	Written, Online	Newsletter, Website	Once	Parent Representative from Change Management Team
	Community	Written, Online	Press Release, Website	As requested	Change Management Team
	Teachers	Written, Online	Email, Website	As Requested	Teacher Representative from Change

					Management Team
	Potential Funding Agencies	Written	Report	Report	Change Management Team
<b>Planning</b> To communicate the plans for the program; reiterate the goals and provide objectives, strategies and a timeline	Change Management Team	Verbal, Written, Online	Meeting, Report, Website	Once	Core CMT Members
	Parents	Verbal, Written, Online	Presentation, Newsletter, Website	As needed	Parent Representative from Change Management Team
	Community	Written, Online	Press Release, Website	Once per Implementation Phase	Change Management Team
	Teachers	Verbal, Written, Online	Presentation, Report Synopsis, Website	As needed	Teacher Representative from Change Management Team
	Potential Funding Agencies	Written, Online	Letter of interest, Website	Once per Implementation Phase	Change Management Team
	Students	Verbal, Written	Presentation, Feedback Information Form	Once per Implementation Phase	Principal and Teacher Representative from Change Management Team
<b>Implementation</b> To communicate what is occurring during the implementation process	Change Management Team	Verbal, Online	Presentation, Website	Continually Update Through Stage and Phases as needed	Core CMT members
	Parents	Verbal, Written, Online	Presentation, Newsletter, Feedback Information Form, Website		Parent Representative from Change Management Team
	Community	Video, Written, Online	Television Broadcast, Press Release, Website		Change Management Team
	Teachers	Verbal, Written, Online	Presentation, E-mail Updates, Feedback Information Form, Website		Teacher Representative from Change Management Team
	Potential Funding Agencies	Verbal, Written, Online	Presentation, Report, Website		Change Management Team
	Students	Verbal, Written,	Presentation, Feedback		Principal and Teacher Representative from

			Information Form		Change Management Team
<b>Evaluation</b> To communicate results of measures being evaluated	Coalition Team	Written, Online, verbal	Report, presentation, NMS website	Once Per Phase	Change Management Team
	Parents	Written, Online, verbal	Newsletter, NMS Website, PTA Meeting		
	Community	Written, Online	Press Release, NMS Website		
	Teachers	Written, Online, verbal	Report, email, NMS website, Faculty meeting		
	Potential Funding Agencies	Written, Online	Report, NMS Website		
	Students	Written, Online	Newsletter, Website		
	Central Office and School Board	Written, online	Report, NMS website		



Appendix F

Infrastructure Implementation Strategies and Activities			
Hardware			
Goals & Benchmarks	Description of Strategies/Activities to Achieve Goals and Benchmarks	Timeline (Projected date for Achievement)	Budget
<p>Each classroom will have the handhelds and peripherals to implement this change.</p> <p><b>Benchmark</b></p> <ul style="list-style-type: none"> <li>By the end of the 2004-2005 school year, Mrs. Mabry's seventh grade math classroom will have an iPAQ for each student and the teacher, along with an LCD projector, wireless printer, and Margi.</li> <li>By the end of the 2005-2006 school year, students in another teacher's Science class will have an iPAQ for each student and the teacher, along with an LCD projector, wireless printer, and Margi.</li> </ul>	<ul style="list-style-type: none"> <li>Purchase 30 iPAQs for Mrs. Mabry's seventh grade math classroom so each student and the teacher have one.</li> <li>Purchase a laser printer with Bluetooth technology and a Margi.</li> <li>Purchase a mountable LCD projector.</li> <li>Purchase 30 iPAQs for each student and the teacher in the Science Classroom.</li> <li>Purchase a laser printer with Bluetooth technology and a Margi.</li> <li>Purchase a mountable LCD projector.</li> </ul>	Beginning of August 2004	\$15,000.00
		\$448.99	
		\$2,876.00	
		Beginning of August 2005	\$15,000.00
\$448.99			
\$2,876.00			

<ul style="list-style-type: none"> <li>By the end of the 2006-2007 school year, students in a seventh grade English teacher's classroom will have an iPAQ for each student and the teacher, along with an LCD projector, wireless printer, and Margi.</li> </ul>	<ul style="list-style-type: none"> <li>Purchase 30 iPAQs for each student and teacher in the English classroom.</li> <li>Purchase a laser printer with Bluetooth technology and a Margi.</li> <li>Purchase a mountable LCD projector.</li> </ul>	<p>Beginning of August 2006</p>	<p>\$15,000.00</p> <p>\$448.99</p> <p>\$2,876.00</p>
<b>Network</b>			
<p>The classroom and lobby areas will have the necessary network infrastructure to execute this technology change.</p> <p><b>Benchmark</b></p> <ul style="list-style-type: none"> <li>By the end of the 2004-2005 school year, the school server will be restructured to handle the extra networking devices and access points will be configured and installed in the</li> </ul>	<ul style="list-style-type: none"> <li>Purchase three access points to install into Mrs. Mabry's classroom, and the two lobbies in the main hallways.</li> <li>The server and router will be restructured to handle extra IP addresses.</li> </ul>	<p><b>Beginning of August 2004</b></p>	<p>\$1,272.00</p>

<p>classroom and lobby areas.</p> <ul style="list-style-type: none"> <li>• By the end of the 2005-2006 school year, the server will be restructured to handle another access point and have this point configured and installed in the Science teacher's classroom.</li> <li>• By the end of the 2006-2007 school year, the server will be reconstructed to handle another access point and have the point configured and installed in the English teacher's classroom.</li> </ul>	<ul style="list-style-type: none"> <li>• Purchase, configure, and install an access point into the science classroom.</li> <li>• Reset the server and router to handle extra IP addresses.</li> </ul> <ul style="list-style-type: none"> <li>• Purchase, configure, and install an access point into the science classroom.</li> <li>• Reset the server and router to handle extra IP addresses.</li> </ul>	<p><b>Beginning of August 2005</b></p> <p><b>Beginning of August 2006</b></p>	<p>\$424.00</p> <p>\$424.00</p>
<b>Software</b>			
<p>The classroom will have the software necessary to implement the change. Benchmark</p> <ul style="list-style-type: none"> <li>• By the end of the 2004-2005 school year, Mrs. Mabry's classroom iPAQs will have graphing software and an</li> </ul>	<ul style="list-style-type: none"> <li>• Download the freeware Graph It or Pocket Atlantis onto each iPAQ.</li> <li>• Purchase, install, and configure a</li> </ul>	<p>Beginning of August 2004</p>	<p>FREE</p>

<p>SRS.</p> <ul style="list-style-type: none"> <li>• By the end of the 2005-2006 school year, the science teacher's classroom iPAQs will have spreadsheet software and an SRS.</li> <li>• By the end of the 2006-2007 school year, the English teacher's classroom iPAQs will have E-book software and an SRS.</li> </ul>	<p>Student Response System for inline, interactive learning and communication.</p> <ul style="list-style-type: none"> <li>• Download the freeware Spread CE onto each iPAQ.</li> <li>• Configure each iPAQ to be set up on the SRS.</li> </ul> <ul style="list-style-type: none"> <li>• Download the freeware MobiPocket Reader and University of Virginia's E-Book Library onto each iPAQ.</li> <li>• Configure each iPAQ to be set up on the SRS.</li> </ul>	<p>Beginning of August 2005</p> <p>Beginning of August 2007</p>	<p>FREE</p> <p>FREE</p>
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**Appendix G**  
**Grant Opportunities**

<a href="http://www.ed.gov/programs/edtech/index.html">http://www.ed.gov/programs/edtech/index.html</a>
<a href="http://www.bmfoundation.com/bfa/us/public/en/grants/">http://www.bmfoundation.com/bfa/us/public/en/grants/</a>
<a href="http://grants.hp.com/us/programs/index.html">http://grants.hp.com/us/programs/index.html</a>
<a href="http://www.ed.gov/fund/landing.jhtml">http://www.ed.gov/fund/landing.jhtml</a>
<a href="http://www.ehr.nsf.gov/esie/">http://www.ehr.nsf.gov/esie/</a>
<a href="http://www.intel.com/community/grant.htm">http://www.intel.com/community/grant.htm</a>
<a href="http://www.vernier.com/grants/nsta.html">http://www.vernier.com/grants/nsta.html</a>
<a href="http://www.eschoolnews.com/erc/funding/">http://www.eschoolnews.com/erc/funding/</a>
<a href="http://www.gatesfoundation.org/default.htm">http://www.gatesfoundation.org/default.htm</a>
<a href="http://www.schoolgrants.org/">http://www.schoolgrants.org/</a>
<a href="http://www.educationworld.com/a_admin/grants/index.html">http://www.educationworld.com/a_admin/grants/index.html</a>

## **Web Site References**

<http://www.hamiltonschools.org/davies/tfs.htm>

<http://www.palmone.com/us/education/studies/study59.html>

<http://netschool.abss.k12.nc.us/teccart/middle/electives.html#Palminfo>

<http://www.pencomputing.com/palm/Pen42/pdainschool.html>

<http://members.ozemail.com.au/~cumulus/wireless.htm>

<http://archive.ncsa.uiuc.edu/edu/nie/overview/network/wireless.html>

<http://www.onsted.k12.mi.us/techplan.html>

<http://www.k12handhelds.com/wireless>

<http://www.nhcs.k12.nc.us/techplan>

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- **Mrs. Beth Bruton for providing the Technology Inventory for Noble Middle School and answering school technology related questions.**
- **Mrs. Mabry for providing us with the environment to create the plan as well as providing information about her students and vision for her classroom.**

