Bill as Introduced

HB 528 – AS INTRODUCED

2003 SESSION

03-0826
04/10

HOUSE BILL ***528***

AN ACT establishing a commission to study computer standards used in public schools in New Hampshire.

SPONSORS: Rep. Carson, Rock 75

COMMITTEE: Education

ANALYSIS

This bill establishes a commission to study computer standards used in public schools in New Hampshire.

Explanation: Matter added to current law appears in ***bold italics.***
Matter removed from current law appears [~~in brackets and struckthrough.~~]
Matter which is either (a) all new or (b) repealed and reenacted appears in regular type.

HB 528 –AS INTRODUCED

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STATE OF NEW HAMPSHIRE

In the Year of Our Lord Two Thousand Three

AN ACT establishing a commission to study computer standards used in public schools in New Hampshire.

Be it Enacted by the Senate and House of Representatives in General Court convened:

1 Commission Established. There is established a commission to study computer standards used in public schools in New Hampshire.

2 Membership; Compensation; Terms.

I. The members of the commission shall be as follows:

(a) Two members of the house of representatives, one of whom shall be from the education committee and one of whom shall be from the science, technology, and energy committee, appointed by the speaker of the house.

(b) One member of the senate, appointed by the president of the senate.

(c) The commissioner of the department of education, or designee.

(d) One high school teacher who has experience teaching in the New Hampshire Information Technology Pathway program, appointed by the executive director of the program.

(e) One member who represents the New Hampshire Information Technology Pathway program, appointed by the executive director of the program.

(f) The executive director of the New Hampshire School Boards Association, or designee.

(g) The executive director of the New Hampshire School Administrators Association, or designee.

(h) One member from the business community, appointed by the governor and council.

II. Members of the commission shall serve without compensation except that legislative members of the commission shall receive mileage at the legislative rate when attending to the duties of the commission.

III. The members listed in subparagraphs I (d), (e), and (h) shall serve 2-year terms. The members listed in subparagraphs (c), (f), and (g) shall serve 3-year terms. The remaining members shall serve a term coterminous with the term of office which qualifies them to serve on the commission.

3 Duties. The commission shall study computer standards used in public schools in New Hampshire. The commission shall:

I. Evaluate the New Hampshire Information Technology Pathway program and determine if it would be appropriate to adopt such program in the public schools.

II. Determine if the New Hampshire Information Technology Pathway program meets the requirements of the No Child Left Behind Act of 2001.

III. Study increasing the number of credit hours required for computer education at the elementary and secondary school levels.

4 Chairperson; Quorum. The members of the commission shall elect a chairperson from among the members. The first meeting of the commission shall be called by the first-named house member. The first meeting of the commission shall be held within 45 days of the effective date of this section. Three members of the commission shall constitute a quorum.

5 Report. No later than November 1 of each year, the commission shall report its findings and any recommendations for proposed legislation for that year to the speaker of the house of representatives, the senate president, the house clerk, the senate clerk, the governor, and the state library. Each recommendation contained in the report shall include proposed implementation schedules with timelines, and details regarding agency personnel and resources needed.

6 Prospective repeal. Sections 1-5 of this act, relative to the commission to study computer standards used in public schools in New Hampshire, are repealed.

7 Effective Date.

I. Sections 1-5 of this act shall take effect upon its passage.

II. The remainder of this act shall take effect July 1, 2005.

Amendments

Rep. Carson, Rock. 75
March 4, 2003
2003-0485h
04/09

Amendment to HB 528

Amend the bill by replacing section 3 with the following:

3 Duties. The commission shall study computer standards used in public schools in New Hampshire. The commission shall:

I. Evaluate the New Hampshire Information Technology Pathway program and determine if it would be appropriate to adopt such program in the public schools.

II. Determine if the New Hampshire Information Technology Pathway program meets the requirements of the No Child Left Behind Act of 2001.

III. Study increasing the number of credit hours required for computer education at the elementary and secondary school levels.

IV. Apply for, receive, and expend any available federal, state, or private funds.

V. Accept donations, gifts, equipment, or other items which may assist the commission in the completion of its charge.

Hearing Minutes

HOUSE COMMITTEE ON EDUCATION

PUBLIC HEARING ON HB 528

BILL TITLE: establishing a commission to study computer standards used in public schools in New Hampshire.

DATE: February 19, 2003

LOB ROOM: 207 **Time Public Hearing Called to Order:** 10:04 a.m.

Time Adjourned: 11:00 a.m.

(please circle if present)

Committee Members: Reps. L'Heureux, Alger, Dearborn, Flint, Carson, Colcord, Balboni, Leone, McHugh, Naro, Laurent, Tufts, M. Carter, Hagan, Ingbretson, Snyder, Claire Clarke, Jean, Rush, Scovner and J. Dunn.

Bill Sponsors: Rep. Carson

TESTIMONY

* Use asterisk if written testimony and/or amendments are submitted.

Rep. Sharon M. Carson, sponsor. Introduced the bill that would establish a commission to study computer standards. In New Hampshire, students are required to take .5 credit of computer science. They need to know more than e-mail. They need it for college and to open doors to new opportunities. Two separate categories – manufacturing, and computer-based technology. Does the IT program meet the requirement of "No Child Left Behind"? Rep. Ingbretson (Question): Is there a fiscal note on this? (Answer): A fiscal note is not needed. Rep. Alger (Question): Many schools are doing it. Why not just have them all do it? (Answer): IT can keep the pulse and write new regulations while also monitoring.

*Marsha Miller, Regional Director of the Western New Hampshire Business & Education Partnership and Tech prep consultant to IT & Education. Written testimony, in file. Rep. Leone (Question): What is the most recent requirement to teach computers? (Answer): My understanding is in certification, the concern was that they would have to get someone from industry. Rep. Leone (Question): How do we get kids to keyboard? (Answer): Teachers address keyboarding in middle school. It creates a problem for junior and high school when you assess computer literacy – hope kids get a foundation. Rep. Tufts (Question): "IT & ME"? (Answer): It's "Information Technology and Me". Show us through a PowerPoint demonstration something of yourself that also shows computer competency.

Gary McKenney, network teacher at Sugar River Valley Technical Center in Claremont. In 1999, we started a computer center with six computers; only four were working. Grants permitted us to equip our center with a network of computers that work, but others still needed to be repaired. Cisco Systems provided not only equipment, but also a curriculum. Many others in industry have made donations. High schoolers now can earn 12 credits for college training. Claremont kids are getting better work opportunities after high school. They also donated repaired computers to other schools,

YMCA, prisons, nonprofit organizations, and after-school programs, etc. Customer service is an area being expanded. They get service calls from teachers. Some students can troubleshoot over the phone. Some teachers install upgrades to others' computers. Students experience hands-on learning. Some students build their computers even over their vacation. Students also have choices within the curriculum. Attendance is high. Some classes are offered at 7:30 a.m. and kids who otherwise have attendance problems show up. This program works for highly motivated students going to college, as well as for dropouts. Computers are an integral part of all our lives. Rep. Leone (Question): In view of the fact that there is a big demand on subjects for credit hours – are there problems? (Answer): Not generally, but we've had to cut credit from ½ to ¼ for computer repair to accommodate more students. We offer classes for 11th and 12th graders only. (Unidentified) (Question): Do you know how many teachers are not computer literate? (Answer): It depends on whether we're talking software or hardware. Rep. Colcord (Question): How do you suggest we keep the standard high? (Answer): If this were lumped in. Rep. Colcord (Question): How do we keep this upgraded? (Answer): Our computers, even those that are two years old, sometimes cannot handle the latest technology. Rep. Alger (Question): Are you certified? (Answer): No. When I began four years ago, certification wasn't required. Rep. Leone (Question): Is there a certificate in New Hampshire? (Answer): Yes, now, as of this year (2002).

Virginia O. Irwin, DOE, Career Development. Opposes this legislation. These are kids helping kids. Marsha's vision is applaudable. The Department is emphasizing that we are reviewing all standards. Yes, some of our computers are dinosaurs. We support higher standards. The courses that Gary McKenney is teaching are doing great. 92% of students (vs. 89% of students) graduated. The DOE is able to achieve this evaluation without a commission. We expect to have all are evaluations done by November. We support the curriculum, but not the commission. Rep. Dearborn (Question): How far along are you in evaluating the minimum standard? (Answer): There is an Office of Technology dealing with curriculum, not just installing. Rep. Naro (Question): How often is a review of minimum standards reviewed? (Answer): Every 10 years, if not longer. Rep. Naro (Question): That being the case, why would you oppose a commission that would pass determinations on an area that needs ongoing reviews? (No answer recorded). Rep. Dearborn (Question): If there is currently a delay for the Department of Education to study the issue, wouldn't a commission speed up a study of standards? (Answer): Quite possibly, yes. Rep. Dunn (Question): Who at the DOE is responsible for school approved accountability and assessment? Sits here for administrative function? The Department is organized in a variety of bureaus. (Answer): Education consultants are responsible for content, and work with the bureau that is responsible for minimal standards. Rep. Balboni (Question): If I wanted to speak to someone about minimum standards, who would I contact? (Answer): Joyce Johnson is generally responsible for minimum standards. (271-3582). Or call Chrys Bouvier (271-3875) for technology questions. Rep. Alger (Question): Would you put computer standards in math? And in what framework? (Answer): We have no framework for computers. IT has a competency. There are certain criteria in computers – minimal. Rep. Carter (Question): Re: Lines 26-28 – is the DOE doing that? (Answer): Yes. Rep. L'Heureux (Question): Does it provide three sources of information? (Answer): Yes.

Pink Cards:
- ✓ Rep. Sharon Carson, sponsor. Supports the bill.
- ✓ Marsha A. Miller, Western NH Business & Education Partnership, 7 Harding St., Rochester. 332-0925. Supports the bill.
- ✓ Gary McKenney, Sugar River Valley Regional Tech Center, 111 South St., Claremont. Supports the bill.
- ✓ Virginia O. Irwin, NH Department of Education, 101 Pleasant St., Concord. 271-3867. Opposes the bill.

Respectfully submitted,

Sharon M. Carson

Rep. Sharon M. Carson
Committee Clerk

SMC:co

Testimony

New Hampshire Department of Education

KIM RUNION, MA, C.R.C.
STATE DIRECTOR TECH PREP

101 PLEASANT ST.
CONCORD, NH 03301-3860
FAX: (603) 271-4079

VOICE MAIL (603) 271-7977
E-MAIL: KRUNION@ED.STATE.NH.US
CITIZENS SERVICES 1-800-339-9900

MISSION STATEMENT

The mission of the Department of Education is to provide educational leadership and services which promote equal educational opportunities and quality practices and programs that enable New Hampshire residents to become fully productive members of society.

The Information Technology Career Pathway

"Preparing students to live, learn and work in the knowledge economy"

What is Information Technology?

Information Technology (IT) is the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware.

Is there a need for IT workers?

The need for a technically literate workforce cuts across all industries as the largest manufacturer to the smallest store relies on IT to run its business and compete in a global economy. In the most recent survey by the Information Technology Association of America, it was found that ninety-two percent of IT workers are employed by non-IT companies.

What skills are taught in the IT Career Pathway?

Students learn industry skills and standards that align with four occupational strands; multimedia, programming, network systems, and business information studies.

Are there core courses?

Yes, in order to live, learn and work in a global economy, students must be technically literate. The purpose of the core courses — IT & ME and IT & ME Works — is to prepare all students to do the following:(a) read, understand and communicate technical information, (b) apply technical concepts to solve problems and make decisions, (c) perform basic functions in multimedia, programming, network systems, and business information studies.

Who developed the core courses?

Since the summer of 2001, twenty-eight teachers have worked with the Western NH Business & Education Partnership to design, develop and implement IT & Me and IT & ME Works. All participating teachers who assisted in the development of these curriculums felt that the resources developed will be invaluable to educating the youth of New Hampshire. One such teacher notes, "My students will have new projects that will make their computer work more relevant."

Which schools are involved in developing the IT Pathway?

Thirteen High Schools: Alvirne, Berlin, ConVal Regional, Exeter, Goffstown, John Stark Regional, Lisbon, Londonderry, Mascenic Regional, Milford, Oyster River, Pinkerton Academy, and Raymond.

Five Vocational Centers: Dover Technical Center, Cheshire Career Center, Creteau Technical Center, Seacoast School of Technology, and Sugar River Valley Technical Center.

What has been the role of industry?

As a "Center of Excellence" for the National Techforce Initiative - which is spearheaded by the National Alliance of Business, the Information Technology Association of America and the Education Development Center, Inc. - the Western NH Business & Education Partnership has participated in, and presented at, six workforce development convocations across the country.

Nationally, New Hampshire's IT Career Pathway has been recognized as a "best practice" for addressing the IT skills gap and is being modeled by other states.

What has been the role of postsecondary partners?

The IT faculty from New Hampshire Community-Technical College (NHCTC) at Stratham/ Pease and McIntosh College have been involved in developing the curriculum. Each occupational strand has an articulation agreement that serves as the model for other schools/ vocational centers. All of the seventeen schools offering the Cisco Networking Program have a system-wide articulation agreement with NHCTC's four regional campuses that offer this advanced program. Other schools with articulation agreements include:

- The Seacoast School of Technology and NHCTC-Stratham for Programming
- The Sugar River Valley Technical Center and NHCTC-Claremont for Network Systems
- Alvirne High School and NHCTC-Stratham for Multimedia
- Goffstown High School and NHCTC-Stratham for Business Information Studies

What resources are available to help schools implement the IT Career Pathway?

The IT Resource Guide, prepared by the Western NH Business & Education Partnership, is available at no charge to New Hampshire schools. It includes the following information:

- student outcomes, skills, standards and sequence of courses
- the teacher's course outline and lesson plans
- the employment outlook, earnings and career planning forms
- the postsecondary connections and agreements.

In addition, schools can access this information through the State Department of Education's website – New Hampshire Educators Online (NHEON).

What is the first step in implementing the IT Career Pathway?

Call the Western Region's Tech Prep Consultant for IT, who will arrange an on-site visit to discuss local implementation needs and objectives.

For More Information

"Preparing students to live, learn and work in the knowledge economy"

Marsha A. Miller
Tech Prep Consultant for IT
7 Harding Street
Rochester, NH 03867

Tel: (603) 332-0925
Fax: (603) 335-7365
E-mail: mamiller@ttlc.net

Information Technology: Network Systems – Cisco
High School Career Planning Outline

Career Pathways in: Information Technology

Career Focus: Network Systems - Cisco

What is it? Network analysis, planning and implementation; includes design, installation, maintenance and management of network systems.

Salary Range: $30,000 - $80,000

College and Employment Planning:

JOB TITLES	CERTIFICATE PROGRAMS	ASSOCIATE DEGREES	BACHELOR DEGREES
1. LAN Technician 2. Communications Analyst 3. Hardware Installations Coordinator 4. Customer Service Coordinator 5. Telecommunications Technician 6. Network Administrator 7. Network Analyst 8. Wide Area Network Technician	**NHTI – Concord** Computer Information Systems Computer Technology / Programming **McIntosh College-Dover** Computer Systems Management Web & Graphic Design / Net+ (CompTIA) **NHCTC – Nashua** Computer Networking / Web Site Design Internet Server Administration Internet Developer **NHCTC – Claremont** CAD / Computer Networking & Web Site Design **NHCTC – Stratham/Pease** Multimedia Production / Office Technologies Web Development **Franklin Pierce College** Information Technology Graphic Design / Computer Science	**Computer Science** Franklin Pierce, Hesser College, McIntosh College **Information Science and Systems** Daniel Webster College, NHCTC at Berlin, Laconia, Manchester, Pease, Nashua, Claremont, Hesser and McIntosh **Data Processing Tech/Technician** NHCTC at Nashua, Claremont **Computer Programming** Hesser College **Computer & Information Sciences** NHCTC Concord, Claremont, Nashua **Computer Systems Analysis** McIntosh College	**Computer Science** Daniel Webster, Dartmouth, Franklin Pierce, Keene State, Plymouth State, UNH, Saint Anselm, Rivier College **Information Science and Systems** Daniel Webster **Computer Programming** Daniel Webster, Franklin Pierce **Computer and Information Science** New Hampshire College Plymouth State **Management and Information Technology** Daniel Webster College

NOTE: *The level to which an advanced degree is required will vary from one employer to the next and one position to the next.*

High School Course Planning:

	9TH GRADE	10TH GRADE	11TH GRADE	12TH GRADE	SCHOOL-TO-CAREER CONNECTIONS
English	English 9 with emphasis on Business/Technical Writing	English 10	English 11	English 12 with emphasis on oral presentation	• Informational Interview with a local employer
Math	Algebra I	Geometry	Algebra II	Personal Finance	• Industry Tour
Social Studies	World History	United States History I with unit on Technology and Society	United States History II or American Studies	Human Relations & the Organization	• Apprenticeship or Internship
Science	Introduction to Science	Biology	General Chemistry		• School-Based Enterprise such as maintaining/ repairing computers, installing new network systems and staffing technical help desk
Foreign Language	Foreign Language I	Foreign Language II			
Technical Core	IT & ME IT & ME Works	Programming Logic Introduction to Computer Networking	Cisco Level I/II LAN Technologies	Cisco Level III/IV WAN Technologies	
Elective Core	Introduction to Business	Consumer Behavior	Oral Communication	Network Systems Internship	

NOTE: *Check with your guidance counselor to identify the comparable courses offered at your high school or vocational center. Sample course descriptions are listed on the back.*

For more information on how to implement this pathway in your school, call Marsha Miller at (603) 332-0925

Information Technology: Network Systems – Cisco

NHCTC – Stratham Course Descriptions

IT & ME	As a foundation course to learning how to operate a personal computer, students will explore the three major theory topics of - hardware, software, and communication. Using a fully integrated, hands-on approach, students will learn the fundamental elements of the most current version of Microsoft Office- Word, Excel, Access, and PowerPoint. Students are required to have basic keyboarding skills before taking this course. Recommended for non-computer majors and students needing basic computer skills.
IT & ME Works	In this course, students will gain knowledge, skills and experience in four career strands; Business Information Studies, Network Systems, Programming, and Multimedia. They will learn the principles of marketing, eCommerce and the challenge of securing on-line transactions; they will use advanced skills to customize documents, using graphics, tables, charts, multimedia clips. Students will learn programming logic and build databases and web pages. They will explore the inner workings of a computer network and acquire the proficiency to build and repair a computer. Through this in-depth exploration of the technical and employability skills required for each of the four career stands, students will be prepared to enroll in the upper level courses. Prerequisite: IT & ME
BUS 110 – Intro to Business	This is an introductory course designed to provide students with a basic understanding of the structures and operations of business and an awareness of social and ethical responsibility as it relates to the environment, consumers, employees, and investors. An appreciation of the global economy will also be explored.
MKTG 135 – Consumer Behavior	An in-depth analysis of the internal and external forces in the consumer decision-making process as it relates to Marketing. Areas of study include consumer reaction, personal selling, product positioning, brand loyalty and image management. Applications in non-profit and government areas also discussed.
ENGL113 – Oral Communication	This course is designed to give a student confidence and poise in a public speaking situation through practice in speech preparation and presentation or equivalent and/or permission of the instructor.
CIS 112 – Programming Logic	This course will emphasize systems thinking as an approach to solving computer problems and understanding formal logic. Programming theory and logic will be presented with hands-on practice in model environments, while students are provided with essential problem-solving methods, techniques and disciplines. Control flow, data manipulation and planning methods will be emphasized. Students will develop confidence in applying programming solutions, will be exposed to pertinent terminology, and will learn the effective use of reference materials.
CIS 116 – Introduction to Computer Networking	This course introduces students to the fundamentals of computer connectivity. Students will compare peer-to-peer versus client-server configurations, Windows, Unix, Linux and Mac Network Operating System Environments, local and wide-area networks in addition to relevant network communication protocols. Co-requisite: CIS111.
IST 118 – LAN Technologies	This course covers the first two of the four modules of the Cisco Academy Certified Cisco Network Associate (CCNA) certification preparation program (the last two modules are covered in IST121 WAN Technologies). This course covers the characteristics and implementation details of Local Area Network technologies, primarily focusing on Ethernet LANS. Networking devices including hubs, switches, and routers are investigated in theory and practice through both discussion and extensive laboratory experiences. Horizontal layer and vertical backbone networking implementation are explored, implemented, and analyzed.
IST 121 – WAN Technologies	This course covers the last two modules in the Cisco Academy Cisco Certified Network Associate (CCNA) certification preparation program. The primary foci of these modules are WAN technologies including Frame Relay, ISDN, and ATM. In addition, advanced switching and encapsulation protocols such as VLAN and PPP are addressed. Pre-requisite: IST118.

Information Technology: Programming and Software
High School Career Planning Outline

Career Pathways in: Information Technology

Career Focus: Programming and Software

What is it? The design, development, implementation and maintenance of computer systems and software, requiring knowledge of computer operating systems, programming languages and software development.

Salary Range: $35,000 - $90,000

College and Employment Planning:

JOB TITLES	CERTIFICATE PROGRAMS	ASSOCIATE DEGREES	BACHELOR DEGREES
1. Systems Analyst 2. Test Specialist 3. Programmer Analyst 4. Operating Systems Specialist 5. Senior Level Programmer 6. Software/Application Support 7. Software Designer 8. Database Software Technician	**NHTI – Concord** Computer Information Systems Computer Technology / Programming **McIntosh College-Dover** Computer Systems Management Web & Graphic Design / Net+ (CompTIA) **NHCTC – Nashua** Computer Networking / Web Site Design Internet Server Administration Internet Developer **NHCTC – Claremont** CAD / Computer Networking & Web Site Design **NHCTC – Stratham/Pease** Multimedia Production / Office Technologies Web Development **Franklin Pierce College** Information Technology Graphic Design / Computer Science	**Computer Science** Franklin Pierce, Hesser College, McIntosh College **Information Science and Systems** Daniel Webster College, NHCTC at Berlin, Laconia, Manchester, Pease, Nashua, Claremont, Hesser and McIntosh **Data Processing Tech/Technician** NHCTC at Nashua, Claremont Computer Programming Hesser College **Computer &Information Sciences** NHCTC Concord, Claremont, Nashua **Computer Systems Analysis** McIntosh College	**Computer Science** Daniel Webster, Dartmouth, Franklin Pierce, Keene State, Plymouth State, UNH, Saint Anselm, Rivier College **Information Science and Systems** Daniel Webster **Computer Programming** Daniel Webster, Franklin Pierce **Computer and Information Science** New Hampshire College Plymouth State **Management and Information Technology** Daniel Webster College

NOTE: *The level to which an advanced degree is required will vary from one employer to the next and one position to the next.*

High School Course Planning:

	9TH GRADE	10TH GRADE	11TH GRADE	12TH GRADE	SCHOOL-TO-CAREER CONNECTIONS
English	English 9 with emphasis on Business/Technical Writing	English 10	English 11	CP Composition and Speech	• Informational Interview with a local employer • Industry Tour • Community Service Project with Non Profit Agency • School-Based Enterprise such as designing, developing and maintaining a school-based or community-based website
Math	Algebra I	Geometry	Algebra II	Applied Logic	
Social Studies	World History	United States History I with unit on Technology and Society	United States History II	Human Relations & the Organization	
Science	Introduction to Science	Biology	General Chemistry	Physics	
Foreign Language	Foreign Language I	Foreign Language II	Foreign Language III	Advanced Foreign Language	
Technical Core	IT & ME IT & ME Works	Programming Logic Database Design & Management	Programming I Web Programming I	Java Script Intro to C++	
Elective Core	Introduction to Business	Consumer Behavior	Oral Communication	Programming Internship	

NOTE: *Check with your guidance counselor to identify the comparable courses offered at your high school or vocational center. Sample course descriptions are listed on the back.*

For more information on how to implement this pathway in your school, call Marsha Miller at (603) 332-0925

Information Technology: Programming and Software

NHCTC – Stratham Course Descriptions

IT & ME	As a foundation course to learning how to operate a personal computer, students will explore the three major theory topics of - hardware, software, and communication. Using a fully integrated, hands-on approach, students will learn the fundamental elements of the most current version of Microsoft Office- Word, Excel, Access, and PowerPoint. Students are required to have basic keyboarding skills before taking this course. Recommended for non-computer majors and students needing basic computer skills.
IT & ME Works	In this course, students will gain knowledge, skills and experience in four career strands; Business Information Studies, Network Systems, Programming, and Multimedia. They will learn the principles of marketing, eCommerce and the challenge of securing on-line transactions; they will use advanced skills to customize documents, using graphics, tables, charts, multimedia clips. Students will learn programming logic and build databases and web pages. They will explore the inner workings of a computer network and acquire the proficiency to build and repair a computer. Through this in-depth exploration of the technical and employability skills required for each of the four career stands, students will be prepared to enroll in the upper level courses. Prerequisite: IT & ME
BUS 110 - Intro to Business	This is an introductory course designed to provide students with a basic understanding of the structures and operations of business and an awareness of social and ethical responsibility as it relates to the environment, consumers, employees, and investors. An appreciation of the global economy will also be explored.
CIS112 Programming Logic	This course will emphasize systems thinking as an approach to solving computer problems and understanding formal logic. Programming theory and logic will be presented with hands-on practice in model environments, while students are provided with essential problem-solving methods, techniques and disciplines. Control flow, data manipulation and planning methods will be emphasized. Students will develop confidence in applying programming solutions, will be exposed to pertinent terminology, and will learn the effective use of reference materials.
CIS113 Database and Design Management	This course is an introduction to database analysis, planning, designing, and implementation with emphasis on the relational model. Students will study the theory behind relational databases, relational database nomenclature, and relational concepts. The course will include sections studying Structured Query Language (SQL) and optimizing databases through normalization. Students will apply their knowledge with hands-on exercises designed to teach the intricacies of database design methodology. Prerequisite and co-requisite: CIS111. Technical core course requirement.
MKTG 135 Consumer Behavior	An in-depth analysis of the internal and external forces in the consumer decision-making process as it relates to Marketing. Areas of study include consumer reaction, personal selling, product positioning, brand loyalty and image management. Applications in non-profit and government areas also discussed.
CIS118 Programming I	This course will provide the students with an understanding of structured, procedural, and event-driven programming. The students will develop techniques for problem solving through the application of programming methods and will gain experience in the nuts-and-bolts of program design as they complete lab-work and assignments. Students will learn to use the Visual Basic language and programming environment. Prerequisite: CIS112, CIS111. CIS098 recommended as a prerequisite for students with minimal or no programming experience.
CIS124 Web Programming I	This course covers all introductory web page development syntax. Students will study in detail the required tags, semantics, and idioms of HTML (hypertext markup language) as defined by the current version of the W3 Consortium standard. The course will cover all HTML tags and attributes, rules, images, links, and document layout, with and an emphasis on cascading style sheets. CIS111 and CIS114 are prerequisite courses.
ENGL113 Oral Communication	This course is designed to give a student confidence and poise in a public speaking situation through practice in speech preparation and presentation or equivalent and/or permission of the instructor.
CIS148 Introduction to Java Programming	The purpose of this course is to provide a solid foundation in the Java programming language. Program planning, object oriented design, and Java language syntax will be emphasized. This course will prepare students for advanced study of the Java language as well as introduce students in other fields of computer study to general object programming. Prerequisites: CIS112.
CIS158 Introduction to C++	This course introduces students to the fundamentals of structured programming and to the procedural aspects of the C++ programming language. Students will create programs to demonstrate the topics of program control, functions, arrays, and pointers. Microsoft's Visual C++ will be used as the primary development tool; however, other environments may also be utilized. Emphasis will be placed on the creation of platform-independent applications in order to allow students to become familiar with the core features of the C++ language. If students do not have any previous programming experience, CIS111 and CIS112 are prerequisites.

Information Technology: Business Information Studies
High School Career Planning Outline

Career Pathways in: Information Technology

Career Focus: Business Information Studies

What is it? Planning, managing, and providing administrative support, information processing, accounting, and human resource management services and related management support services.

Salary Range: $28,000 - $75,000

College and Employment Planning:

JOB TITLES	CERTIFICATE PROGRAMS	ASSOCIATE DEGREES	BACHELOR DEGREES
1. Accountants 2. Auditors 3. Database Managers 4. Information Processing Specialist 5. Info Management Systems Managers 6. Hotel/Motel Managers 7. Restaurant Managers 8. Retail Managers 9. Manufacturing Managers 10. Small Business Entrepreneurs 11. Human Resource Managers	**NHTI – Concord** Computer Information Systems Computer Technology / Programming **McIntosh College-Dover** Computer Systems Management Web & Graphic Design / Net+ (CompTIA) **NHCTC – Nashua** Computer Networking / Web Site Design Internet Server Administration Internet Developer **NHCTC – Claremont** CAD / Computer Networking & Web Site Design **NHCTC – Stratham/Pease** Multimedia Production / Office Technologies Web Development **Franklin Pierce College** Information Technology Graphic Design / Computer Science	**Computer Science** Franklin Pierce, Hesser College, McIntosh College **Information Science and Systems** Daniel Webster College, NHCTC at Berlin, Laconia, Manchester, Pease, Nashua, Claremont, Hesser and McIntosh **Data Processing Tech/Technician** NHCTC at Nashua, Claremont **Computer Programming** Hesser College **Computer & Information Sciences** NHCTC Concord, Claremont, Nashua **Computer Systems Analysis** McIntosh College	**Computer Science** Daniel Webster, Dartmouth, Franklin Pierce, Keene State, Plymouth State, UNH, Saint Anselm, Rivier College **Information Science and Systems** Daniel Webster **Computer Programming** Daniel Webster, Franklin Pierce **Computer and Information Science** New Hampshire College Plymouth State **Management and Information Technology** Daniel Webster College

NOTE: *The level to which an advanced degree is required will vary from one employer to the next and one position to the next.*

High School Course Planning:

	9TH GRADE	10TH GRADE	11TH GRADE	12TH GRADE	SCHOOL-TO-CAREER CONNECTIONS
English	English 9 with emphasis on Business/Technical Writing	English 10	English 11	English 12	• Informational Interview with a local employer • Industry Tour • Paid or unpaid Internship • Community Service Project • School-Based Enterprise such as a school store
Math	Business Math	Math Applications	Consumer Math	Personal Finance	
Social Studies	World History I	United States History I with unit on Technology and Society	United States History II or American Studies	Human Relations & the Organization	
Science	Introduction to Science	Biology	General Chemistry		
Foreign Language	Foreign Language I	Foreign Language II			
Technical Core	IT & ME IT & ME Works	Database Design and Management Management	Accounting Principles of Marketing	Introduction to eCommerce Intro Computer Info Assurance	
Elective Core	Introduction to Business	Consumer Behavior	Oral Communication	BIS Internship	

NOTE: *Check with your guidance counselor to identify the comparable courses offered at your high school or vocational center. Sample course descriptions are listed on the back.*

For more information on how to implement this pathway in your school, call Marsha Miller at (603) 332-0925

Information Technology: Business Information Studies

NHCTC – Stratham Course Descriptions

IT & ME	As a foundation course to learning how to operate a personal computer, students will explore the three major theory topics of - hardware, software, and communication. Using a fully integrated, hands-on approach, students will learn the fundamental elements of the most current version of Microsoft Office- Word, Excel, Access, and PowerPoint. Students are required to have basic keyboarding skills before taking this course. Recommended for non-computer majors and students needing basic computer skills.
IT & ME Works	In this course, students will gain knowledge, skills and experience in four career strands; Business Information Studies, Network Systems, Programming, and Multimedia. They will learn the principles of marketing, eCommerce and the challenge of securing on-line transactions; they will use advanced skills to customize documents, using graphics, tables, charts, multimedia clips. Students will learn programming logic and build databases and web pages. They will explore the inner workings of a computer network and acquire the proficiency to build and repair a computer. Through this in-depth exploration of the technical and employability skills required for each of the four career stands, students will be prepared to enroll in the upper level courses. Prerequisite: IT & ME
BUS 110 - Intro to Business	This is an introductory course designed to provide students with a basic understanding of the structures and operations of business and an awareness of social and ethical responsibility as it relates to the environment, consumers, employees, and investors. An appreciation of the global economy will also be explored.
ENGL113 Oral Communication	This course is designed to give a student confidence and poise in a public speaking situation through practice in speech preparation and presentation or equivalent and/or permission of the instructor.
MKTG 135 Consumer Behavior	An in-depth analysis of the internal and external forces in the consumer decision-making process as it relates to Marketing. Areas of study include consumer reaction,-personal selling, product positioning, brand loyalty and image management. Applications in non-profit and government areas also discussed.
CIS113 Database and Design Management	This course is an introduction to database analysis, planning, designing, and implementation with emphasis on the relational model. Students will study the theory behind relational databases, relational database nomenclature, and relational concepts. The course will include sections studying Structured Query Language (SQL) and optimizing databases through normalization. Students will apply their knowledge with hands-on exercises designed to teach the intricacies of database design methodology. Prerequisite and co-requisite: CIS111. Technical core course requirement.
ACCT 113 - Accounting I	An introduction to accounting as the language of business. The student will be introduced to accounting procedures necessary to prepare financial statements utilizing current concepts and principles. This includes journalizing transactions, trial balance, adjustments, closing entries, accounts receivable and payable, special journals, payroll, cash receipts, disbursements and banking procedures.
BUS 114 – Management	The principles and techniques underlying the successful organization and management of business activities. This course combines the traditional analysis of management principles with the behavioral approach to case studies. The study includes the management functions of planning, organization, leadership, staffing control, and the decision-making process.
MKTG 125 - Principles of Marketing	An introduction to basic concepts with primary application to public and non-profit organizations, national and global, including marketing objectives, strategies, segmentation and promotion.
IST 161 - Intro to Information Assurance	Provide information systems and users with the basic know- ledge of their role and responsibilities towards protecting information systems resources. Discussion will include workstation and office security, types of malicious programs such as viruses, access control schemes and management. This will provide a foundation for further study of systems security and protection issues such as terminology, threats to information resources, computer abuse, and system vulnerabilities.
INT 171 - Introduction to eCommerce	Electronic commerce clearly crowns the list of technology- related media topics, as evidenced by the abundance of technical and legal literature. The Economics of Electronic Commerce applies standard microeconomic analysis to an entirely new industry, laying the foundation for the development of radically new business models. With detailed analysis to those involved in the actual production, marketing, and distribution of digital information products as well as professionals doing business in the electronic marketplace, this valuable reference demonstrates that businesses that achieve early success from applying these theories will enjoy a distinct competitive advantage in this newly defined world of business.

Information Technology: Network Systems
High School Career Planning Outline

Career Pathways in: Information Technology

Career Focus: Network Systems

What is it? Network analysis, planning and implementation; includes design, installation, maintenance and management of network systems.

Salary Range: $30,000 - $80,000

College and Employment Planning:

JOB TITLES	CERTIFICATE PROGRAMS	ASSOCIATE DEGREES	BACHELOR DEGREES
1. LAN Technician 2. Communications Analyst 3. Hardware Installations Coordinator 4. Customer Service Coordinator 5. Telecommunications Technician 6. Network Administrator 7. Network Analyst 8. Wide Area Network Technician	**NHTI – Concord** Computer Information Systems Computer Technology / Programming **McIntosh College-Dover** Computer Systems Management Web & Graphic Design / Net+ (CompTIA) **NHCTC – Nashua** Computer Networking / Web Site Design Internet Server Administration Internet Developer **NHCTC – Claremont** CAD / Computer Networking & Web Site Design **NHCTC – Stratham/Pease** Multimedia Production / Office Technologies Web Development **Franklin Pierce College** Information Technology Graphic Design / Computer Science	**Computer Science** Franklin Pierce, Hesser College, McIntosh College **Information Science and Systems** Daniel Webster College, NHCTC at Berlin, Laconia, Manchester, Pease, Nashua, Claremont, Hesser and McIntosh **Data Processing Tech/Technician** NHCTC at Nashua, Claremont **Computer Programming** Hesser College **Computer & Information Sciences** NHCTC Concord, Claremont, Nashua **Computer Systems Analysis** McIntosh College	**Computer Science** Daniel Webster, Dartmouth; Franklin Pierce, Keene State, Plymouth State, UNH, Saint Anselm, Rivier College **Information Science and Systems** Daniel Webster **Computer Programming** Daniel Webster, Franklin Pierce **Computer and Information Science** New Hampshire College Plymouth State **Management and Information Technology** Daniel Webster College

NOTE: *The level to which an advanced degree is required will vary from one employer to the next and one position to the next.*

High School Course Planning:

	9TH GRADE	10TH GRADE	11TH GRADE	12TH GRADE	SCHOOL-TO-CAREER CONNECTIONS
English	English 9 with emphasis on Business/Technical Writing	English 10	English 11	English 12	• Informational Interview with a local employer • Industry Tour • Apprenticeship or Internship • School-Based Enterprise such as maintaining/ repairing computers, installing new network systems and staffing technical help desk
Math	Algebra I	Geometry	Algebra II	Personal Finance	
Social Studies	World History	United States History I with unit on Technology and Society	United States History II or American Studies	Human Relations & the Organization	
Science	Introduction to Science	Biology	General Chemistry		
Foreign Language	Foreign Language I	Foreign Language II			
Technical Core	IT & ME IT & ME Works	Computer Networking Technology I Computer Networking II	PC Installation and Repair Hardware PC Installation and Repair Software	LAN Management I LAN Management II	
Elective Core	Introduction to Business	Consumer Behavior	Oral Communication	Network Systems Internship	

NOTE: *Check with your guidance counselor to identify the comparable courses offered at your high school or vocational center. Sample course descriptions are listed on the back.*

For more information on how to implement this pathway in your school, call Marsha Miller at (603) 332-0925

Information Technology: Network Systems

NHCTC – Stratham Course Descriptions

IT & ME	As a foundation course to learning how to operate a personal computer, students will explore the three major theory topics of - hardware, software, and communication. Using a fully integrated, hands-on approach, students will learn the fundamental elements of the most current version of Microsoft Office- Word, Excel, Access, and PowerPoint. Students are required to have basic keyboarding skills before taking this course. Recommended for non-computer majors and students needing basic computer skills.
IT & ME Works	In this course, students will gain knowledge, skills and experience in four career strands; Business Information Studies, Network Systems, Programming, and Multimedia. They will learn the principles of marketing, eCommerce and the challenge of securing on-line transactions; they will use advanced skills to customize documents, using graphics, tables, charts, multimedia clips. Students will learn programming logic and build databases and web pages. They will explore the inner workings of a computer network and acquire the proficiency to build and repair a computer. Through this in-depth exploration of the technical and employability skills required for each of the four career stands, students will be prepared to enroll in the upper level courses. Prerequisite: IT & ME
BUS 110 - Intro to Business	This is an introductory course designed to provide students with a basic understanding of the structures and operations of business and an awareness of social and ethical responsibility as it relates to the environment, consumers, employees, and investors. An appreciation of the global economy will also be explored.
MKTG 135 Consumer Behavior	An in-depth analysis of the internal and external forces in the consumer decision-making process as it relates to Marketing. Areas of study include consumer reaction, personal selling, product positioning, brand loyalty and image management. Applications in non-profit and government areas also discussed.
ENGL113 Oral Communication	This course is designed to give a student confidence and poise in a public speaking situation through practice in speech preparation and presentation or equivalent and/or permission of the instructor.
Computer Networking Technology (SRVTC)	This course will utilize a hands-on approach to the fundamentals of PC-class computer maintenance and repair as well as the theory of computer network design. Course Technology text materials will provide the basis for instruction along with instructor designed activities. The focus of the networking curriculum will be the design and configuration of Ethernet LAN network using Enterasys (Cabletron) equipment and technology. Additionally, students will learn the fundamentals of marketing with an emphasis on the organization and operation of a computer related business. Interested students will also be given the opportunity to participate in business related competitive events at the annual DECA conference. An integral part of the program will be the computer maintenance/networking lab component through which students will experience hands-on exposure to the fundamentals of computer maintenance and network technology.
Computer Networking II (SRVTC)	This sequential component of the computer networking curriculum will provide the opportunity for students who successfully completed the first course to further refine the skills in computer repair and networking technology through additional lab activities and projects. The activities will focus on troubleshooting, eliminating network problems, and using Windows NT/2000 software to administer a functioning network. Network diagnostic hardware and software will be used to gauge network performance as a variety of variables are introduced into the network. WAN network technology will be introduced through the linking of two or more networks, including token ring and Ethernet topologies, using Cisco Systems routing technology.
CSM 160 PC Installation and Repair Hardware	This hands-on course covers a broad range of hardware and technologies. The PC installation and repair hardware course contains situational, traditional and identification types that will prepare the students for the A+ certification exam. A+ certification is a COMPTIA-program that prepares the students and measures competency of entry-level computer service technicians.
CSM 165 PC Installation and Repair Software	This hands-on course covers a broad range of operating systems: Win 9X, Win NT, Win Pro and technologies. The PC installation and repair software course contains situational, traditional and identification types that will prepare the students for at the A+ certification exam. A+ certification is a COMPTIA-program that prepares the student and measures competency of entry-level computer service technicians. Prerequisite: CSM 160.
CSM 250 LAN Management I	This course will introduce the student to the concepts of networking, including its history, standards, protocols, media types and their application, hardware and architecture and topologies. This course should bring the major networking elements to life through the use of the Text and the Internet. We will approach means and methods used in troubleshooting network problems and investigate the proper methods to maintaining a network. Students will gain understanding and basic skills to start pursuing a career in Network Administration. Prerequisite: CSM 165.
CSM 251 LAN Management II	Students will continue to learn the different types of technology of Local Area Networking (LANS), Wide Area Networks (WANS) and the Internet. The focus will be given to various software installation and administering tools, students will complete a number of network scenarios in a variety of utilization settings. Students will learn the concepts administering and maintaining an interoperable network platform (Novell Netware, Linux/Unix and Window 9X/NT/Pro 2000). The student will be introduced to Fault Tolerance, Disaster Recovery, and backup consideration. Troubleshooting, encryption and network security are also explored.

Information Technology: Multimedia
High School Career Planning Outline

Career Pathways in: Information Technology

Career Focus: Multimedia

What is it? The creation, design, and production of interactive multimedia products and services, the development of digitally generated or computer enhanced media used in business, training, entertainment, communications and marketing.

Salary Range: $35,000 - $85,000

College and Employment Planning:

JOB TITLES	CERTIFICATE PROGRAMS	ASSOCIATE DEGREES	BACHELOR DEGREES
1. Imaging Specialist 2. Interactive Digital Media Specialist 3. Web Designer 4. Graphic Designer 5. Animator 6. Media Designer 7. Multimedia Technician 8. Visual Design Consultant	**NHTI – Concord** Computer Information Systems Computer Technology / Programming **McIntosh College-Dover** Computer Systems Management Web & Graphic Design / Net+ (CompTIA) **NHCTC – Nashua** Computer Networking / Web Site Design Internet Server Administration Internet Developer **NHCTC – Claremont** CAD / Computer Networking & Web Site Design **NHCTC – Stratham/Pease** Multimedia Production / Office Technologies Web Development **Franklin Pierce College** Information Technology Graphic Design / Computer Science	**Computer Science** Franklin Pierce, Hesser College, McIntosh College **Information Science and Systems** Daniel Webster College, NHCTC at Berlin, Laconia, Manchester, Pease, Nashua, Claremont, Hesser and McIntosh **Data Processing Tech/Technician** NHCTC at Nashua, Claremont **Computer Programming** Hesser College **Computer & Information Sciences** NHCTC Concord, Claremont, Nashua **Computer Systems Analysis** McIntosh College	**Computer Science** Daniel Webster, Dartmouth, Franklin Pierce, Keene State, Plymouth State, UNH, Saint Anselm, Rivier College **Information Science and Systems** Daniel Webster **Computer Programming** Daniel Webster, Franklin Pierce **Computer and Information Science** New Hampshire College Plymouth State **Management and Information Technology** Daniel Webster College

NOTE: *The level to which an advanced degree is required will vary from one employer to the next and one position to the next.*

High School Course Planning:

	9TH GRADE	10TH GRADE	11TH GRADE	12TH GRADE	SCHOOL-TO-CAREER CONNECTIONS
English	English 9 with emphasis on Business/Technical Writing	English 10	English 11	CP Composition and Speech	• Informational Interview with a local employer • Industry Tour • Paid or unpaid Internship • Community Service Project with Non Profit Agency • School-Based Enterprise such as a yearbook and/or school newspaper
Math	Algebra I	Geometry	Algebra II	Applied Logic	
Social Studies	World History I	United States History I with unit on Technology and Society	United States History II or American Studies	Human Relations & the Organization	
Science	Introduction to Science	Biology	General Chemistry		
Foreign Language	Spanish, French, German or Latin I	Spanish, French, German or Latin II	Foreign Language III		
Technical Core	IT & ME IT & ME Works	Introduction to Graphic Design Principles of Marketing	Introduction to Multimedia Introduction to 3D Animation	Sound Editing Video Production	
Elective Core	Introduction to Business	Consumer Behavior	Oral Communication	Multimedia Internship	

NOTE: *Check with your guidance counselor to identify the comparable courses offered at your high school or vocational center. Sample course descriptions are listed on the back.*

For more information on how to implement this pathway in your school, call Marsha Miller at (603) 332-0925

Information Technology: Multimedia

NHCTC – Stratham Course Descriptions

IT & ME	As a foundation course to learning how to operate a personal computer, students will explore the three major theory topics of - hardware, software, and communication. Using a fully integrated, hands-on approach, students will learn the fundamental elements of the most current version of Microsoft Office- Word, Excel, Access, and PowerPoint. Students are required to have basic keyboarding skills before taking this course. Recommended for non-computer majors and students needing basic computer skills.
IT & ME Works	In this course, students will gain knowledge, skills and experience in four career strands; Business Information Studies, Network Systems, Programming, and Multimedia. They will learn the principles of marketing, eCommerce and the challenge of securing on-line transactions; they will use advanced skills to customize documents, using graphics, tables, charts, multimedia clips. Students will learn programming logic and build databases and web pages. They will explore the inner workings of a computer network and acquire the proficiency to build and repair a computer. Through this in-depth exploration of the technical and employability skills required for each of the four career stands, students will be prepared to enroll in the upper level courses. Prerequisite: IT & ME
BUS 110 - Intro to Business	This is an introductory course designed to provide students with a basic understanding of the structures and operations of business and an awareness of social and ethical responsibility as it relates to the environment, consumers, employees, and investors. An appreciation of the global economy will also be explored.
ENGL113 Oral Communication	This course is designed to give a student confidence and poise in a public speaking situation through practice in speech preparation and presentation or equivalent and/or permission of the instructor.
MKTG 125 - Principles of Marketing	An introduction to basic concepts with primary application to public and non-profit organizations, national and global, including marketing objectives, strategies, segmentation and promotion.
MKTG 135 Consumer Behavior	An in-depth analysis of the internal and external forces in the consumer decision-making process as it relates to Marketing. Areas of study include consumer reaction, personal selling, product positioning, brand loyalty and image management. Applications in non-profit and government areas also discussed.
CIS115 Introduction to Graphic Design	This design course will explore design and layout considerations for various production media. Students will study principles of design including color theory, line, texture, pattern, balance, space, and movement. Students will be introduced to computer graphics creation using industry standard software packages such as Macromedia Freehand and Adobe PhotoShop. Students will also experience hands on drawing and design lessons to develop their own senses, learn how to use paths, manipulate basic shapes and text, apply color and gradients implement styles, work in multiple layers, trace, and scale. Students will be able to use these design applications for future study in Web Design and Multimedia Production. Co-requisite: CIS111.
CIS125 Introduction to 3D	Students will explore 3D concepts including camera, lighting, timelines, tweening, movement, form, morphing, nurbs, splines, motion paths and special effects. Students will focus on techniques and visual aesthetics and design. Hands-on experience using the most current applications which may include Rhino, Bryce, Poser, Flash, and Carrerra. Prerequisites: CIS111, CIS115
CIS145 Introduction to Multimedia	This project-based course introduces students to multimedia concepts through a production environment. Students will learn how to create and manipulate objects, develop screen designs, and begin to build computer applications to incorporate graphics, animation, audio, and video. Students will be introduced to current industry standards using Macromedia Director. Prerequisites: CIS111. CIS115 recommended.
CIS155 Sound Editing	This course will introduce students to essential audio components and techniques. Use of sound in media will be examined with emphasis on technical skills in recording, mixing, and editing of analog and digital sounds. This is a studio course with a concentration on use of audio equipment. Little or no computer work will be required. Class evaluation will be based heavily on both group and individual projects.
CIS165 Video Production	The fundamentals of video production and pre-production will be studied in detail through individual or team productions. Students will learn script writing, story boarding, and production planning as a necessary precursor to successful video production. A technical foundation will be established regarding rudimentary aspects of video engineering. All aspects of the production process including camera functions, lighting, shooting techniques (studio and location), audio-for-video, and voice over acquisition will be presented. Functioning as the first class in a two-part series, CIS165 will culminate in the acquisition of video footage to be used in the second class, CIS275 Video Post Production. Prerequisites: CIS111, CIS115.

The Future Educators Academy

"Building a bridge to New Hampshire classrooms"

What is the purpose of the Pathway?

To create a pipeline of well-prepared high school students, who after earning their teaching credentials, will return to New Hampshire classrooms as passionate, high quality educators.

How does the Pathway accomplish this goal?

It creates opportunities for students to gain information, skill and knowledge in the art of teaching prior to enrollment in a postsecondary program.

The First Step – The Future Educators Exploring Teaching (FEET) Club – offers a series of supervised activities that include informational interviews, classroom observations, field-based teaching, and a college admission workshop. After each activity, students prepare a reflection paper as a way to assess their interest in this pathway. An end-of-the year celebration recognizes the FEET students along with the teacher/person who inspired them to be a teacher.

The second step is the Future Educators Academy (FEA), which offers a series of recommended courses that, depending upon academic readiness, could earn dual credit. It also provides a supervised field-based experience where FEA students teach a set of uniform lesson plans for elementary, middle and high school classrooms. An assessment tool, modeled on Danielson's, "A Framework of Good Teaching," gives the students concrete evidence of their ability to be a quality educator.

Are the field-based experience and recommended courses open to ALL FEA students?

In order to participate, students must earn and maintain a cumulative grade point average of 3.0 or higher.

Which postsecondary institution awards the dual credits?

Through Project Running Start, these credits, referred to as "Advanced Professional Credit" (APC), are awarded by New Hampshire Technical Institute in Concord, New Hampshire.

Note: Need-based assistance to cover enrollment in these courses may be available through NEA-NH.

Why be a teacher?

Consider the words of these recent "top ten" graduates:

Scott Currier, Class of 2002 at Nute High School in Milton, interned at the elementary school as a math teacher and soccer coach. When asked why he chose a career in education, he responded:

"The first time one of the students walked by me and said, 'Hey coach, what's up?' I had to stop and lean against the wall." "I just thought – wow, that was pretty great."

Nico Piro, Class of 2002, at Farmington High School, aspires to be a history teacher.
"I have been lucky in my school career because my history teachers have taught me to look for the 'whys' and the 'hows' of the past. I want to teach history this way. I want to make kids realize that the history books are full of regular people who take action. I think that history makes a much bigger impact when a teacher makes these events personal."

Are the FEA Advanced Professional Credits accepted at any institution other than NHTI?

The possibility of transferring credits within and outside of a specific system depends on the postsecondary institution to which the student is applying. Specifically, transfer credits might be applied in one of two ways; (a) towards the course requirement(s) for the academic major or (b) towards the general education/elective requirement(s). To ensure a seamless transition of credit, students should discuss their high school transcript with their postsecondary admissions counselor in addition to their guidance counselor.

Why should a student enroll in the Future Educators Academy?

The educational services industry is one of the largest industries in our economy with over 11 million jobs. Recent reforms to the national educational system - in response to declining test scores and increased global competitiveness – have increased demand for administrative personnel and teachers of all kinds, especially para-educators, secondary school teachers, college professors, preschool teachers and special education teachers.

Which schools offer these programs?

The first step – FEET - is being offered at the following high schools: Kennett, Keene, White Mtn. Regional, Inter-Lakes, Londonderry, Salem, Pelham, Stevens, and Pembroke Academy.

The second step, the Future Educators Academy, will be accepting FEET students for academic year 2003-2004. These aspiring educators will serve as co-facilitators of the FEET Club by mentoring and advising the new members.

Who has endorsed this model for attracting quality educators?

The Commissioner of Education, Nicholas Donohue and the President of NEA-NH, Karen McDonough.

What resources are available to help schools implement the Education Pathway?

A Future Educators Manual has been developed by Kelly Budd, the FEET/FEA Coordinator for Keene High School and Marsha Miller, Regional Director of the Western NH Business & Education Partnership and FEA Director. The manual, which is provided at no cost to all New Hampshire schools and vocational centers, includes everything a school needs to implement the pathway.

For More Information

Marsha A. Miller
Tech Prep Consultant for FEA
7 Harding Street
Rochester NH 03867

Tel: (603) 332-0925
Fax: (603) 335-7365
E-mail: mamiller@ttlc.net

Future Educator's Academy
High School Career Planning Outline

Career Pathways in: Education

Career Focus: Educational Services

What is it? The educational services industry is one of the largest industries in our economy with over 11 million jobs. Recent reforms to the national educational system – in response to declining test scores and increased global competitiveness – have increased demand for administrative personnel and teachers of all kinds, especially para-educators, secondary school teachers, college professors, preschool teachers, and special education teachers.

Salary Range: Starting salaries are set by local school boards and will vary from one school district to the next. **Estimated Salary:** $28,000 - $70,000

College and Employment Planning:

CAREER OPPORTUNITIES	CAREER EXPLORATION FUTURE EDUCATORS EXPLORING TEACHING (FEET)	CAREER IDENTIFICATION FUTURE EDUCATORS ACADEMY (FEA)	POSTSECONDARY SCHOOLS THAT OFFER TEACHER CERTIFICATION PROGRAMS(S)
1. Early Childhood Teacher 2. Elementary Teacher 3. Middle/High School Teacher 4. College Professor 5. Guidance Counselor 6. Special Educator 7. School Administrator 8. Technology Coordinator 9. Human Resource Manager 10. Corporate Trainer 11. Para-Educator	The FEET Club is for students who want to learn more about a career in education. FEET was developed by Kelly Budd, an English Teacher at Keene High School, who is also one of New Hampshire's Milken Educators. FEET helps students gain an understanding of the knowledge, skills and experience required of today's educators. Scheduled monthly activities include job shadowing a classroom teacher, teaching a mini-lesson, attending a college admissions workshop, engaging in a dialogue with new and veteran teachers, coaches, administrators, and PTA/PTO members. **For more information, contact your guidance counselor or school-to-career coordinator**	The Future Educators Academy is for high school juniors and seniors who have identified education as a career choice. The pathway of courses and experiences lead to postsecondary admission in a teacher education program. For students enrolled in the Future Educators Academy with a cumulative grade point average of 3.0 or higher, there is the opportunity to earn both high school and college credit through New Hampshire Technical Institute in Concord, NH. These college credits are transferable both within and outside of the two-year system. **For more information, contact your high school guidance counselor.**	**4-YEAR** Colby-Sawyer College, Daniel Webster College, Dartmouth College, Franklin Pierce College, Keene State College, New England College, Notre Dame College, Plymouth State College Rivier College, Southern NH University, St. Anslem College, University of NH **2-YEAR** NHTI – Concord

NOTE: *The level to which an advanced degree is required will vary from one employer to the next and one position to the next.*

High School Course Planning:

	9TH GRADE	10TH GRADE	11TH GRADE	12TH GRADE	SCHOOL-TO-CAREER CONNECTIONS
English	English 9 with emphasis on Business/Technical Writing	English 10	English 11	English Composition	• Classroom Observations • Teacher's Aide • Informational Interviews with School Administrators • Preparing and Teaching • Mini-Lessons • Campus Visit(s) at 2-year/ 4-year Postsecondary Schools
Math	Algebra I	Intermediate Algebra	Algebra II		
Social Studies	World History	United States History I with unit on Technology and Society	United States History II	Introduction to Psychology	
Science	Introduction to Science	Biology	General Chemistry	Physics	
Foreign Language	Foreign Language I	Foreign Language II	Foreign Language III	Advanced Foreign Language	
Technical Core	IT & ME, IT & ME Works	Introduction to Graphic Design	Foundations of Education	Introduction to Disabilities FEA Practicum	
Elective Core	Child Growth & Development	Child Growth & Development II	Oral Communication	Human Relations & the Organization	

NOTE: *Check with your guidance counselor to identify the comparable courses offered at your high school or vocational center. Sample course descriptions are listed on the back.*

For more information on how to implement this pathway in your school, call Marsha Miller at (603) 332-0925.

Future Educator's Academy

Course Descriptions

HIGH SCHOOL	RUNNING START	
English	EN 101 English Composition	Required of all freshmen and designed to teach students to write clear, vigorous prose. An individualized approach which emphasizes the composing process is used.
Algebra	MT 123 Intermediate Algebra	Topics include: real numbers, linear equations and inequalities, graphs of linear equations, systems of linear equations, exponents, polynomials, quadratic (and higher degree) equations, rational expressions, roots and radicals, exponential and logarithmic functions, sequences and series. A graphing calculator will be required. Prior knowledge of high school Algebra I is assumed.
Social Studies	PY105 Intro to Psychology	An introductory college course in psychology which focuses on the fundamental facts and principles of psychology within the broader context of contemporary personal and social concerns. Topics may include the historical development of the discipline, scientific methodology, human development, motivational theory, consciousness, sensation and perception, learning, thinking, memory, emotions, biological basis of behavior, personality theory, psychopathology, sexuality, and measurements and statistics.
IT & ME IT & ME Works	CIS 111 Computer Technologies	A required course for all computer majors, this foundation course provides students with a firm foundation in computer technology to include: hardware components, software applications, processors, memory management, secondary storage, file management, operating systems, networking essentials, ethics, and emerging technologies. The application portion will concentrate on Windows concepts and discuss the impact of Windows on software applications. Students will study the fundamentals of Microsoft Office - Word, Excel and PowerPoint, using the most current available technology. Students are required to have basic keyboarding skills before taking this course. Technical Core course requirement.
Desktop Publishing	CIS 115 Intro to Graphic Design	This design course will explore design and layout considerations for various production media. Students will study principles of design including color theory, line, texture, pattern, balance, space and movement. Students will be introduced to computer graphics creation using industry standard software packages such as Macromedia Freehand and Adobe PhotoShop. Students will also experience hands-on drawing and design lessons to develop their own senses, learn how to use paths, manipulate basic shapes and text, apply color and gradients implement styles, work in multiple layers, trace, and scale. Students will be able to use these design applications for future study in Web Design and Multimedia Production. Co-requisite: CIS111.
Speech	ENGL 113 Oral Communication	This course is designed to give a student confidence and poise in a public speaking situation through practice in speech preparation and presentation or equivalent and/or permission of the instructor.
Human Relations Seminar	BUS 116 Human Relations & Organization	This course develops basic understanding of organizational behavior. The human relations approach is stressed. It includes management philosophy; the organizational climate; motivation, leadership and management; supervision; communication, group participation and other forces in the work environment. Students learn techniques for becoming more effective managers, subordinates, peers or people.
Child Growth & Development I	ECE100 Early Childhood Growth & Development	An in-depth study of normal growth and development from conception through age eight with an emphasis on the needs and characteristics of each developmental level. Prominent theories of child psychology will also be introduced such as Piaget, Erikson and behaviorism.
Child Growth & Development II	ECE104 Foundations of Early Childhood Education	This course provides an overview of the history of childhood and child care as well as a survey of the existing programs models. Various environments, materials and resources that meet developmental and educational needs of young children will be presented. Students will observe and evaluate programs based on principles of developmentally appropriate practice as outlined by the National Association for the Education of Young Children. Operating Standards.
FEA Practicum	RS equivalent will be a part of NHCTC's AA Degree	
No Equivalent	ED 104 Foundations of Ed	This is a survey course which investigates the philosophical, historical and social/cultural character of education in the United States. It is intended to be an examination of how schools function organizationally. Discussions will include the role of education, system philosophy and trends which have shaped contemporary education; field observations are included. This course is a concentration requirement for both Teacher Assistant and the Associate of Science in Education programs; while it is intended to be the first in a series of learning experiences for those interested in career as teachers, it also fulfills a Social Science elective requirement.
No Equivalent	ED 101 Intro to Disabilities	This course will introduce the basic values that underlie supporting students who experience disabilities and the roles of Teacher Assistants in supporting those individuals including: the value of inclusion in home, education, work and community life; respect for the inherent worth and dignity of each person; respect for students' basic rights to effect the conditions of their own existence. Through readings, in-class discussions, and on-site visits to schools and classrooms, Teacher Assistants will develop strategies on how to facilitate students' independence, learning, social connections, and self-advocacy skills. Curriculum will emphasize the philosophical and practical applications of valuing students' abilities and diversity, collaborating with educators and families, supporting classroom teachers, curriculum modifications, and problem solving strategies. Topical issues to be explored include: A History of Disability; Civil Rights and Self-Advocacy; Legal Issues and Disability; Growing-Up with a Disability; Families of Individuals with Disabilities; Early Intervention and Pre-School Services; Inclusive Education; Free Speech and Communication; Individuals with Challenging Behavior, and Literacy and Students with Disabilities.

Biotechnology Career Pathway

What is the Biotechnology Pathway?

The biotechnology pathway focuses on preparing students for careers in the rapidly growing biotechnology industries. These industries include biomanufacturing, bioinformatics, genomics and pharmaceuticals. Other related fields are agriculture, aquaculture, biomedical sciences, ethics and law, and forensics.

The pathway begins in middle school when students are exposed to biotechnological concepts in science classes. In high school the pathway includes courses in Biology, Chemistry and a foundation in mathematics at least to the level of Algebra II. Technology courses and a solid foundation in the language arts provide more options for the students as they move along the pathway. A few high schools offer microbiology and advanced level sciences courses, which provide students with opportunities for acceleration.

Nashua and Milford High Schools and Seacoast School of Technology offer Biotechnology Programs providing students with a more specialized approach within the pathway. These programs offer three year-long courses that cover a wide variety of biotechnology topics while providing the basic core curriculum of three New Hampshire Community Technical College courses: Microbiology, Biology and a Biotechnology Externship.

The Post-Secondary Connection

The New Hampshire Community Technical College offers students the opportunity to receive college credit in approved courses within the pathway through the Project Running Start program. In addition to the courses in the Biotechnology Programs, Microbiology and General College Biology are also offered in several high schools.

The New Hampshire Community Technical College Emerging Technologies campus at the Pease International Tradeport offers a Biotechnology certificate program and a two-year associate degree program that articulates to Rochester Institute of Technology. The University of New Hampshire offers degrees in Microbiology, Molecular, Cellular and Developmental Biology as well as Biochemistry. Plymouth State College's Bachelor of Science degree in Biotechnology provides a broad approach and is well suited for students with a variety of career objectives.

The School-to-Career Connection

Students in the third year of the Biotechnology Programs have the opportunity to do an internship. Students have experienced the world of work at Lonza Biologics, BioConcepts, VHG Labs and St. Joseph's Hospital. They are on site at the work place for a minimum of 140 hours and complete a journal and major project. ~ Portsmouth High School's School-to-Career Department sponsors career luncheons, which focus on different segments of the economy. During the biotechnology career luncheon, students have the opportunity to discuss the various careers in biotechnology with professionals in the field. ~ Students take field trips to the state-of-the-art biotechnology lab at the New Hampshire Community Technical College Pease, where they can experience a true workplace environment for discovery research and biomanufacturing.



Angela Salemi
Milford Applied Technology Center

What students, educators and employers say about the Biotechnology Pathway

"Biotechnology is the future. This century will be shaped by the developments and decisions made surrounding it. Cloning, stem cell research, and antibiotic resistant organisms are just a few topics which impact our lives. The students in this program are on the cutting edge of science. They are learning the techniques and being schooled in the ethical issues that affect us daily. They are becoming scientists, and just as important, they are becoming citizens who are able to make the decisions that will be facing us this century."

Carolyn Kelley, Biotechnology Teacher,
Seacoast School of Technology



Michael Littlefield and Michael Yu
Seacoast School of Technology

"Taking the biotechnology course has really opened my eyes to a new level of biology. I feel like I am in the process of being adequately prepared for a profession in biology. I learned so much!"

Nina O'Connell, Milford Applied Technology Center

"Students in the Biotechnology Pathway come to the NH Community Technical College prepared to begin their studies in the Biotechnology Program. Our "Virtual Workplace", along with academic courses, opens doors to employment and/or further study at a four-year institution."

Sonia Wallman, PhD, Director, Biotechnology Program, NHCTC ~ Pease

"The biotechnology industry has reached a stage when many of the promises to provide better medicines made 10 to 15 years ago are being realized. As a result, the need for trained employees for the manufacturing sector of the industry is growing dramatically. We are constantly looking for candidates who have a good work ethic, reading and math skills, and a desire for continuous improvement through learning. Additional specialized training is available for high school students through programs at Seacoast School of Technology and Milford and Nashua High Schools. Post-secondary students can receive this training through community college programs such as the one at New Hampshire Community Technical College. I urge you to become part of this biotech revolution and develop a career in this new frontier. The opportunities are immense!"

Ronald J. Midgett, PhD, Operations Training Manager, Lonza Biologics Inc.

For More Information

Kathleen Totten
Tech Prep Consultant for Biotechnology
320 Corporate Drive
Pease International Tradeport
Portsmouth, NH 03801

Tel: (603) 433-1964
Fax: (603) 334-6308
E-mail: admin@erpartnership.org
www.erpartnership.org

Biotechnology
High School Career Planning Outline

Career Pathways in: Biotechnology

Career Focus: Discovery Research, Process Development and Biomanufacturing

What is it? Focuses on research, development or production in biotechnology companies

Salary Range: Technical Staff: $30,000 - $60,000, Technical Middle Management: $50,000 - $80,000, Executive, R&D: $70,000 - $100,000

College and Career Planning

JOB TITLES	CERTIFICATE PROGRAMS	ASSOCIATE DEGREES	BACHELOR DEGREES	POST GRADUATE DEGREES
1. Process Technician 2. Laboratory Technician/Analyst 3. Quality Control Technician/Analyst 4. Metrologist 5. Research Assistant/Associate 6. Quality Assurance 7. Validation 8. Genomics/Bioinformatics 9. Research Scientist 10. Management 11. University Professor	**NH Community Technical College** **Pease** Biotechnology Bioprocessing	**NH Community Technical College** **Pease** Biotechnology	**University of New Hampshire** Biochemistry Molecular, Cellular and Developmental Biology Microbiology **Plymouth State College** Biotechnology **Rochester Institute of Technology** Biotechnology	**University of New Hampshire** Biochemistry Biology Business Administration Genetics Microbiology

NOTE: *The level to which an advanced degree is required will vary from one employer to the next and one position to the next.*

High School Course Planning

	9TH GRADE	10TH GRADE	11TH GRADE	12TH GRADE	SCHOOL-TO-CAREER CONNECTIONS
English	English 9 Technical English	English 10	English 11	English 12 and or College Composition I*	• Informational Interview with a local employer • Industry Tour • Postsecondary laboratory Tour • Paid or unpaid Internship • Project Based Learning • Community Service or Service Learning Project
Math	Algebra I	Geometry	Algebra II	Pre-Calculus or Calculus	
Science	Physical Science	Biology Biotechnology I (Microbiology*)	Chemistry Biotechnology II (General Biology*)	Microbiology* AP or General Biology I* AP or General Chemistry I* Biotechnology Internship*	
Social Studies	World History	Government and or Ethics	United States History	Economics	
Foreign Language	Foreign Language I	Foreign Language II	Foreign Language III	Foreign Language IV	
Technology	IT & ME	Introduction to Programming with emphasis on database design and maintenance	Programming Logic* Database Design & Management*	Programming I* Introduction to C++*	
Electives	Introduction to Business	Ethics & Society	Communication for the Workplace	Human Relations & the Organization	

** College Credit Courses through NH Community Technical College Project Running Start Program*

NOTE: *Check with your guidance counselor to identify the comparable courses offered at your high school or technical center.*

For more information on how to implement this pathway in your school, call Kathleen Totten at (603) 433-1964.

Engineering Career Pathway

What is the Engineering Pathway?

The Project Lead the Way (PLTW) pre-engineering curriculum serves as the engineering career pathway for New Hampshire. The focus of the program is on enhancing students mathematics and science performance and providing students the information necessary to make informed decisions about careers in engineering and engineering technology. The PLTW curriculum is a five-course sequence that starts at the ninth grade and includes course in engineering design, electronics, principles of engineering, manufacturing and mechanical engineering, and, beginning with 2002-03 school year, civil and architectural engineering. The courses meet national standards in math, science, and technology education, and New Hampshire standards in math and science.

What will PLTW prepare students to do?

The United States is suffering from a severe shortage of engineers and well-educated technical workers. Introducing high school students to engineering and engineering technology will attract more of them to these fields and will allow them to determine whether they are interested in pursuing an engineering-related career. Those students who pursue engineering related careers find they command attractive wage and benefit packages as they enter their chosen field.

Which New Hampshire schools are involved?

Thirteen New Hampshire high schools will be offering PLTW courses this fall; they include Hopkinton, John Stark, Milford, Kearsarge, Bow, Merrimack Valley, Nashua, Lisbon, Hillsboro-Deering, Hollis-Brookline, Littleton, Newport, and Laconia.

Is there financial support for schools?

Yes. During its 2002 session, the New Hampshire General Assembly passed into law funds for schools wishing to implement a pre-engineering curriculum. The funding is in the form of matching grants, up to $25,000 for comprehensive high schools, and $50,000 for career and technical centers. Schools wishing more information should contact Jim Leon at the Educational Partnership of Central New Hampshire (603) 271-6954 or Ed Taylor at the NH Department of Education (603) 271-3886.

What are the connections with the business community?

PLTW has, since it's beginning, had strong employer support. Each school has a local advisory board that includes members of the business community. The PLTW State Leadership Team either currently includes, or has included: Graphicast, Freedom Partners, Haley and Aldrich, Celestica, BAE Systems, Intelitek, H.L. Turner, The Nashua Group, Heidelberg Press, and Praxair-Tafa.

Does PLTW have articulation agreements with local colleges?

New Hampshire Technical Institute has established articulation agreements with each of the PLTW. In addition, the students of PLTW schools who meet accreditation standards established by the Rochester Institute of Technology are eligible for credit in engineering technology majors.

Are there other arrangements with local colleges?

Yes. PLTW students can earn up to twelve credits at the New Hampshire Technical Institute through the Community/Technical College Systems' Project Running Start.

For More Information

Jim Leon
Tech Prep Consultant for Engineering
NH Technical Institute
10 Institute Drive, 111 North Hall
Concord, NH 03301-7412

Tel: (603) 271-6954
Fax: (603) 271-4142
E-mail: jleon@tec.nh.us
www.EPCNH.org

Engineering
High School Career Planning Outline

Career Pathway: Engineering

Career Focus: Engineering, Engineering Technology, Research, Manufacturing, Process and Systems development

What is it?: Development of procedures and applications based on scientific and mathematical principles

JOB TITLES	ASSOCIATE DEGREES	BACHELOR DEGREES	GRADUATE DEGREES
Engineer, Engineering Technician, Research, Project Planning and Management, Plant Managers	**New Hampshire Technical Institute: Engineering Technology** Mechanical, Manufacturing, Electronic, Computer, Architectural, Communications	**University of New Hampshire – Durham: Engineering** Mechanical, Electrical, Chemical, Civil, Computer, Engineering Technology **University of New Hampshire – Manchester: Engineering Technology** Electrical, Mechanical **Dartmouth** Engineering	**University of New Hampshire** Chemical, Civil, Electrical, Mechanical, Ocean Systems, Materials Science **Dartmouth College** Biomedical, Biochemical, Electrical, Environmental, Mechanical, Materials Science, Management *NOTE: The level to which an advanced degree is required will vary by employer and position*

High School Planning

	9TH GRADE	10TH GRADE	11TH GRADE	12TH GRADE
English	English	English	English	English
Mathematics	Algebra I	Geometry	Algebra II	Pre-Calculus
Science	Physical Science	Biology	Chemistry	Physics
Social Science	World History	U.S. History	Economics	Government
Pre-engineering	*Introduction to Engineering Design*	*Digital Electronics*	*Principles of Engineering* and *Computer Integrated Mathematics*	*Engineering Design and Development*
Modern Language	Modern Language	Modern Language	Modern Language	Modern Language
Electives	Electives	Electives	Electives	Electives

College credit available through articularion agreements with New Hampshire Technical Institute and Rochester Institute of Technology

For more information on how to implement this pathway in your school, call Jim Leon at (603) 271-6954

Manufacturing Career Pathway

What is the Manufacturing Career Pathway?

The manufacturing career pathway initiative is in its second year and is based on national skill standards for manufacturing industries. It combines elements of the Project Lead the Way pre-engineering curriculum with elements of the existing manufacturing programs to provide students the opportunity to develop entry level skills and knowledge applicable across sectors of manufacturing.

Is there a need for manufacturing workers?

Yes. During the last decade, manufacturing jobs in New Hampshire increased by 15%, the second largest increase by any state during that period. Most of New Hampshire's manufacturing job growth occurred in high tech areas, a trend economists contend will continue if an educated workforce can be sustained.

What skills are taught in the Manufacturing Technology Career Pathway?

Students learn basic skills in machine operation, quality control, environmental and safety engineering, inventory and material management and control, computer integrated manufacturing, and teamwork.

What will the program prepare students to do?

Students who complete the program will have the general set of skills necessary to work at a beginning level in most manufacturing sectors. In addition, students will have information and skills necessary to begin careers in production, quality control, safety and/or environmental engineering, engineering technology, and maintenance, repair and installation.

Is the program connected to the manufacturing community?

Yes. The program's advisory board includes representatives from PH Precision Manufacturing, New Hampshire Ball Bearing, Timberland Shoes, and Lonza Biologics. In addition, a number of national organizations play an ongoing role in the program, including the National Association of Manufacturers, Manufacturing Skill Standards Council, Manufacturing Industries Career Alliance, National Skills Standards Board, Precision Metalforming Association, National Institute of Metalworking Skills, and the National Council for Advanced Manufacturing.

Is there a relationship with post-secondary institutions?

Yes. Articulation agreements exist between Regional Career and Technical Centers and campuses the NH Community/Technical College System, e.g., The J. Oliva Huot Technical Center at Laconia High School and the Laconia/Berlin Community/Technical College. Articulation agreements are also in place between NH Technical Institute and high schools offering Project Lead the Way.

For More Information

Jim Leon
Tech Prep Consultant for Manufacturing
NH Technical Institute
10 Institute Drive, 111 North Hall
Concord, NH 03301-7412

Tel: (603) 271-6954
Fax: (603) 271-4142
E-mail: jleon@tec.nh.us
www.EPCNH.org

Manufacturing
High School Career Planning Outline

Career Pathway: Manufacturing

Career Focus: Engineering Technology, Engineering, Manufacturing, Machine Tool Trades

What is it?: Development and/or implementation of procedures and applications based on scientific and mathematical principles in a manufacturing setting

JOB TITLES	ASSOCIATE DEGREES	BACHELOR DEGREES	GRADUATE DEGREES	CERIFICATION
Engineer, Engineering Technician, Machinist, Tool and Dye Maker, Machine Operator	**New Hampshire Technical Institute: Engineering Technology** Mechanical, Manufacturing, Electronic, Computer, Architectural, Communications	**University of New Hampshire – Durham: Engineering** Mechanical, Electrical, Chemical, Civil, Computer, Engineering Technology **University of New Hampshire – Manchester: Engineering Technology** Electrical, Mechanical **Dartmouth** Engineering	**University of New Hampshire** **Dartmouth College** **NOTE:** *The level to which an advanced degree is required will vary by employer and position*	**Apprenticeship in accord with etablished standard** **Certification by demonstration of skills specific to particular trade**

High School Planning

	9TH GRADE	10TH GRADE	11TH GRADE	12TH GRADE
English	English	English	English	English
Mathematics	Algebra I	Geometry	Algebra II	Pre-Calculus
Science	Physical Science	Biology	Chemistry	Physics
Social Science	World History	U.S. History	Economics	Government
Manufacturing Technology	*CADD*	*Manufacturing Technology: Level I**	*Manufacturing Technology: Level II**	*Manufacturing Technology: Level III**
Modern Language	Modern Language	*Manufacturing Technology: Level I**	*Manufacturing Technology: Level II**	*Manufacturing Technology: Level III**
Electives	Electives	Electives	Electives	Electives

**Training occurs at Regional Career and Technical Center*

College credit available through articulation agreements with New Hampshire Community/Technical College System campuses – Laconia and Berlin

For more information on how to implement this pathway in your school, call Jim Leon at (603) 271-6954

Financial Services Career Pathway

What is the Financial Services Pathway?

The financial services pathway focuses on preparing students for careers in Financial Services. The pathway includes a program called the Academy of Finance (AOF). AOF is a nationally acclaimed, industry-validated curriculum model sponsored by the National Academy Foundation. The model includes course work in areas such as banking and credit, securities and insurance, and financial planning; a paid summer internship between the student's junior and senior year of high school; and articulation agreements with two and four year colleges. For more information about NAF visit their website at www.naf.org.

What will the Financial Services Pathway prepare students to do?

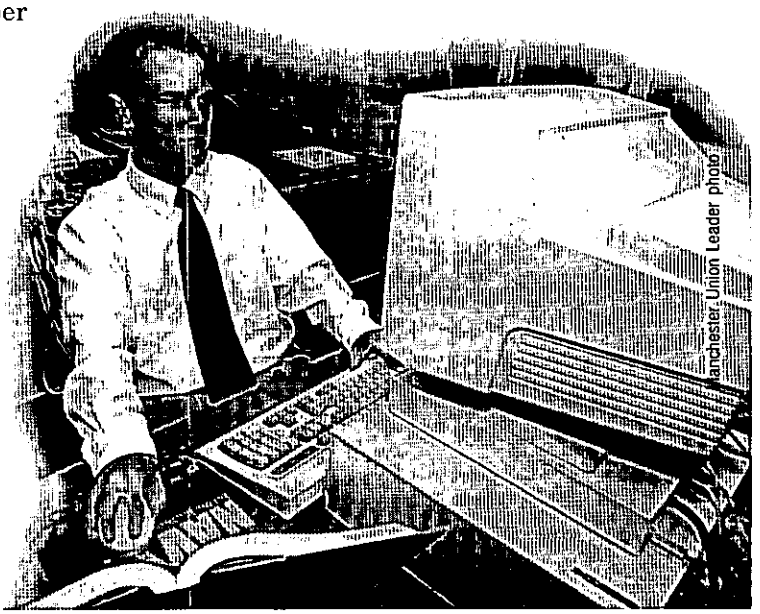
Growth in the financial services industry has slowed slightly, but the Bureau of Labor Statistics still anticipates an additional 1.4 million jobs will be created nationally in the finance, insurance and real estate sector of the economy by 2005. In addition, much like information technology, financial services cuts across many sectors of our economy. For example, accountants and financial analysts work in a wide range of industries including health care, high tech manufacturing, hospitality and even the non-profit sector.

What schools are involved?

Five high schools—Londonderry, Manchester School of Technology, Alvirne, Merrimack and Nashua. Pinkerton Academy will pilot their program in 2002-2003. Existing academies will continue to serve as mentors for new sites.

What are the connections with the business community?

Employers are excited about the potential of the Academy of Finance to better prepare students as entry-level workers at their companies. The Partnership has established an Academy of Finance Advisory Board to oversee the financial services pathway development effort. Members of the AOF Advisory Board include American Express Financial Advisors, BAE Systems, Citistreet Copeland Companies, Citizens Bank, Federal Home Loan Bank of Boston, Fidelity Investments, Merrimack Chamber of Commerce, St. Joseph Hospital, Triangle Credit Union, and local school district and college representatives. They are exploring ways to replicate the AOF model statewide and expand employer involvement in the internship program.


Manchester Union Leader photo

Tom Lavery, AOF Senior, Fidelity Investments Intern

Does the Academy of Finance Program have articulation agreements with local colleges?

Southern NH University, Daniel Webster College and NH Community College-Nashua have articulation agreements with the New Hampshire's Academy of Finance. The latter two colleges include advanced standing. Details of these agreements are available upon request.



Michelle Simard, AOF Intern, and Tom D'Alessandro, The Telegraph Credit Manager, review reports. Michelle handled A/R, A/P, and payroll for the newspaper, website, and three magazines.

What employers and interns say about the AOF Internship Program

"I would tell other employers that the AOF Internship Program is a win-win situation for both the students and the employers. The students have a chance to learn "real world" work skills and apply what they've learned in school. They are a true asset to the company."

Karen Robator, Financial Advisor
American Express Financial Advisors

"The interns who worked with us were both very mature. We were pleasantly surprised by their consistently responsible and eager performance. We have offered both interns continued employment on a part-time basis and we plan to participate in the AOF summer internship program in the future."

Nick D. Ruscio, Financial Specialist, BAE Systems

"The AOF program has given me the opportunity to gain knowledge on what I might like to major in when I get to college. I would highly recommend this to any of my fellow classmates that are remotely interested in going into business. I know it has inspired me to further my knowledge in the business field."

Jameson Meschino, AOF Senior, Triangle Credit Union Intern

For More Information

Judy King
Tech Prep Consultant for Financial Services
NHCTC-Nashua
505 Amherst St
Nashua NH 03063

Tel: (603) 882-6923 x 1806
Fax: (603) 578-9342
E-mail: scnhstc@aol.com
www.scnhstc.org

Financial Services
High School Planning Outline

Career Pathways in: Financial Services

Career Focus: Business and Finance - related fields

What is it? The pathway includes a program called the Academy of Finance(AOF). AOF is a nationally acclaimed, industry-validated curriculum model sponsored by the National Academy Foundation. The model includes finance specific curriculum and a paid internship between the student's junior and senior year of high school. See www.naf.org for more information.

Salary Range: $30,000 - $42,000 (entry-level)

College and Employment Planning:

JOB TITLES	CERTIFICATE PROGRAMS	POST SECONDARY ASSOCIATE DEGREES	BACHELOR DEGREES
Financial Manager, Financial Analyst, Bank Teller, Accounts Clerk, Accountant, Auditor, Insurance Adjuster, Bookkeeper, Loan Officer, Securities Broker, Retirement Planning Specialist, Claims Processor, Accounting Clerk, Real Estate Broker, Mutual Funds Clerk, Underwriter, Budget Analyst, Certified Financial Planner	Community Technical College – Nashua – Spreadsheet Certificate Community Technical College – Nashua – Accounting Diploma	Community Technical College – Nashua – Business Administration: Accounting/Finance	Daniel Webster College – Business Management Franklin Pierce – Finance New England College – Business Administration: Finance Plymouth Sate College – Management: Finance Rivier College – Business Major Saint Anselm College – Financial Economics So. NH University – Business, Finance, Accounting Major The Whittemore School of Business & Economics through UNH – Accounting and Finance

NOTE: *The level to which an advanced degree is required will vary from one employer to the next and one position to the next.*

High School Course Planning:

9TH GRADE	10TH GRADE	11TH GRADE	12TH GRADE	SCHOOL-TO-CAREER CONNECTIONS
Generic Course plans *Strategies for Success (career Course) 9th/10th grade	Economics Computer Applications	Accounting I Accounting II		Boston Field Trip to Financial District Business Protocol Seminar for Job Preparedness
Specialized course plans: i.e. Academy of Finance, National Academy Foundation		Banking and Credit Securities and Insurance Introduction to Finance	Financial Planning International Finance	Paid Internships Southern NH University, Center for Financial Studies, including Mock Stock Room Floor-Providing Teacher Training and Student Field Trip

NOTE: *Check with your guidance counselor to identify the comparable courses offered at your high school or vocational center.*

**Course sequence is flexible. Some schools offer courses within another existing course. Ex. – Securities and Insurance may be offered in Financial Planning.*

For more information on how to implement this pathway in your school, call Judy King at (603) 882-6923 ext. 1807.

Law, Public Safety, and Security Pathway - Pelham High School

Contacts

Louise Paulauskas School-to-Career Coordinator, Pelham/Windham SAU #28
lpaulauskas@pelhamsd.org **(603) 635-6907**

Ken Roberts Social Studies Teacher kenrob@juno.com **(603) 635-2115**

Cynthia Evans English Teacher cynthiaeva@yahoo.com **(603) 635-2115**

Tony Savaris Science Teacher asavaris@pelhamsd.org **(603) 635-2115**

Summary

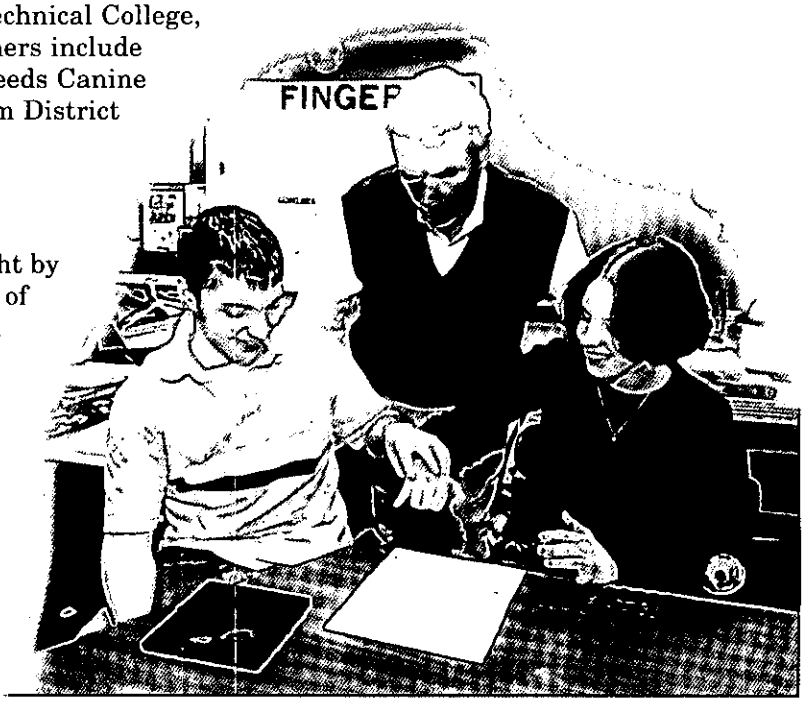
Pelham High School is a 600 student comprehensive public school in southern New Hampshire. The Law, Public Safety, & Security Pathway is in its first year of planning and will be fully implemented in the fall of 2002-2003. It will be based on existing curriculum at Pelham High School: Criminology, Psychology, Anatomy & Physiology, Chemistry, Introduction to Forensics, Oral Communications (which includes the NH Bar Association Mock Trial Competition), College Writing, World Literature and Law, Spanish, Computer Applications, and Internships. Additional courses currently being planned and developed for the Pathway include: Forensics Practicum, and Pathway Health & Fitness. The Pathway will be designed to build competencies in math, science, and communication through a sequential course of study to coordinate with two and four year post-secondary programs. Graduating students will be academically prepared and have practical experience to enter two and four-year college programs leading to certificates, associate or bachelor degrees and/or to pursue careers in public safety and security at age 18. Many of the Pathway courses will carry "Running Start" college credit (see Other Highlights).

Partnerships

Primary partners in this initiative are the Pelham School District, SAU #28 School-to-Career Partnership, Pelham Police Department, Pelham Fire Department, New Hampshire State Police, Southern New Hampshire School-to-Careers Partnership, New Hampshire Department of Education, New Hampshire Technical Institute, New Hampshire Community Technical College, and Hesser College. Secondary Partners include Windham Police Department, All Breeds Canine Training Center (K-9 training), Salem District Court, and Lowell District Court.

Teachers

All Pathway specific courses are taught by full-time personnel who are members of the regular Pelham High School staff. Internships are coordinated and supervised by the school-to-career coordinator.



Ken Roberts, center, watches as students from his Criminology class demonstrate fingerprinting techniques.

Curriculum

Coursework will be taken in the areas of existing courses: Criminology, Psychology, Chemistry, Anatomy & Physiology, Forensics (Fall 2002), Oral Communications, World Literature and Law (Fall 2002), Spanish, Internships, Computer Applications, and Pathway Health & Fitness.

College Relationships

We participate in the New Hampshire Community Technical Colleges' "Project Running Start" which offers college credits for several of our Pathway courses (see Other Highlights, below). We will be working on further articulation agreements with four-year post-secondary institutions.

Extracurricular and Special Programs

Students will have the opportunity to participate in Pelham Police and Fire Explorer Posts, Police and Fire Summer Academies, and the New Hampshire Bar Association Mock Trial Competition. 40 hours of community service are required for graduation.

Student Requirements

Students must make formal application to enter into the Pathway Program. All Pathway courses are, however, open to the general student body population. Applicants must have a B cumulative average. Applications must be approved by teacher and board members.

Graduation Requirements

Students must meet all requirements prescribed by the Pelham School District and the NH State Board of Education, plus successful completion of all prescribed Pathway courses with a minimum B cumulative average. Students must have 40 hours of approved community service. In addition to their high school diploma, students who meet the listed criteria will receive a Pathway Certificate upon graduating.

Parent Involvement Requirements

Parents must agree to the application criteria and sign the application; they must sign a form of understanding and agreement regarding the requirements for the student to remain in the program; and they must attend teacher/parent/student meetings on a regular basis.

Funding Sources

The initial funding for the development of this Pathway is a NH Tech Prep Grant. Supplemental funding is obtained through the regular high school budget, the school-to-career budget, and some assistance from the Southern New Hampshire School-to-Careers Partnership.

Other Highlights

The following courses are "Running Start" courses which are accepted for college credit by New Hampshire Community Technical College, New Hampshire Technical Institute, most four year colleges in New Hampshire, and many out of state colleges through articulation agreements or the regular admissions process. These courses include: Oral Communications, Computer Applications II & III, Criminology, Psychology, and College Writing.

For More Information

Judy King
Tech Prep Consultant for Law,
Public Safety and Security
NHCTC – Nashua
505 Amherst St, Nashua NH 03063

Tel: (603) 882-6923 x 1806
Fax: (603) 578-9342
E-mail: scnhstc@aol.com
www.scnhstc.org

Law Public Safety & Security
High School Career Planning Outline

Career Pathways in: Law, Public Safety & Security

Career Focus: Criminal justice, legal and protective services

What is it? Planning, managing, and providing judicial, legal, and protective services and homeland security, including professional and technical support services.

Salary Range: Entry Level: $12,000 - $30,000 Degree: $25,000 - $50,000 Advanced Degree: $40,000 - $100,000

College and Career Planning

JOB TITLES	CERTIFICATE PROGRAMS	ASSOCIATE DEGREES	BACHELOR DEGREES
Criminal Justice & Corrections: Security Guard, Forensic Expert, Police Chief, Police Officer; Detective, Investigator, Sheriff, Deputy, Correction Officer & Jailer, Parole Officer, Rail & Transit Police, Bailiff, US Marshall, Animal Control Officer, Park Ranger, Border Patrol **Law & Legal Public Services:** Legislator, Legislative Aide, Judge, Magistrate, Lawyer, Law Clerk, Legal Assistant, Paralegal Personnel, Inspector & Compliance Officers, Court Reporter **Fire Protection:** Dispatcher, Firefighter, Firefighter Supervisor, Captain, Chief, Fire Inspector, Fire Investigator, Forest Fire Fighter, EMT, Paramedic	**NHTI – Concord** Addiction Counseling/Criminal Justice Paralegal Studies **NHCTC – Laconia** Paralegal Studies **NHCTC – Nashua** Paralegal Studies	**NHTI-Concord:** Addiction Counseling, Criminal Justice, Paralegal Studies, Paramedic **NHCTC-Nashua:** Paralegal Studies **NHCTC-Laconia:** Fire Investigation, Fire Protection, Fire Science, Paralegal Studies **Hesser College:** Corrections, Probation, & Parole, Law Enforcement, Paralegal Studies **McIntosh College:** Paralegal Studies, Criminal Justice	**Franklin Pierce:** Criminal Justice **Hesser College:** Criminal Justice **New England College:** Criminal Justice **Plymouth College:** Criminal Justice **Saint Anselm College:** Criminal Justice/ Corrections

NOTE: *The level to which an advanced degree is required will vary from one employer to the next and one position to the next.*

	9TH GRADE	10TH GRADE	11TH GRADE	12TH GRADE	SCHOOL-TO-CAREER CONNECTIONS
English	Freshmen English	Sophomore English	American Literature **Oral Communication** (RS) Essay Writing	**World Literature and Law** College Writing * (RS)	• Project Based Learning • Informational Interview with a local employer
Math	Algebra I	Geometry	Algebra II (RS)	Probability & Statistics* (RS)	• Job Shadows
Social Studies	World Geography	Western Civilization, Economics/Civics	**Criminology** (RS), US History (RS)	**Psychology** (RS)	• Industry Tours
Science	Integrated Science I	Integrated Science II, Health Anatomy & Physiology*	Chemistry * or Biology or	**Introduction to Forensics** Physics*	• Paid or unpaid Internship • Community Service
Foreign Language	**Spanish I**	**Spanish II**	Spanish III*	Spanish IV*	
Technical Core	Computer Applications I* (RS)	Computer Applications II* (RS)	Photography Technology *(Crime Scene)		
Electives		Drawing & Painting * (Forensic Artist)	Fitness Training * **Internship**	**Internship** (At least 1 semester)	

SPECIAL NOTES: *All students are required to do 40 hours of Community Service.*

Required Courses to receive Pathway Certificate of completion are notated in bold letters.

Recommended Courses notated by (*).

RS = Running Start College Credit available through the NH Community Technical College System.

For more information on how to implement this pathway in your school, call Judy King at (603) 882-6923 ext. 1807

Geographic Information Systems Career Focus

What is the Geographic Information Systems Career Focus?

The Geographic Information Systems Career Pathway focuses on preparing students for careers in the continually evolving and expanding Spatial Information Technology Industry. GIS is a powerful computer-based technology that allows trained users to create, map, merge, analyze and manipulate spatial information as well as other types of data. This data is represented as different layers on maps. GIS uses technologies such as Global Positioning Systems (GPS) and Remote Sensing (RS), to gather information all over the world. This is a highly skilled computer based field. Students in the Pathway will learn the basics of GIS, related software and its applications.

Why get involved with Hospitality and Tourism?

Nationally, GIS is a rapidly growing fields with applications in many areas of business and industry. A GIS user in natural resources will utilize one or more data layers for a given study area in order to answer a particular question, such as where are there contiguous tracts of protected lands, or what type of wildlife habitat exists at a given location? A GIS user in health care may use data layers and information to analyze the spread of a disease, or to analyze population statistics to locate a new health clinic. A GIS user in transportation may use data to strategize truck delivery routes or recommend road construction based upon accident sites. GIS is used in forestry applications on a daily basis. The limits to GIS applications are endless. GIS Professionals are appearing on the staff of a variety of companies ranging from advertising, health care, governmental agencies, law enforcement, engineering firms, and colleges and universities. There are many GIS applications in the newly emerging area of Homeland Security. Typical careers in GIS would be, Cartographer, GIS Technician, Civil Engineer, Community Planner, or Forester.

What are the connections to Business and Industry?

Many towns and cities have GIS projects that would be excellent work-based learning projects for a community or school partnership. Trail mapping, 911 mapping, water supply projects, and conservation and land protection projects are all a part of providing and creating GIS database information. Businesses are willing to create internships for students with GIS Technology skills. Much of the work that goes on in Conservation and Natural Resource Inventories, Forestry, and municipal and private planning is based on and utilizes GIS technology.

Who are our Business and Industry Partners?

A wide range of groups and agencies throughout the state are involved with Geographic Information Systems school programs. Some of the groups involved are NH Office of State Planning, NH GRANIT Project at UNH, UNH County Extension, NH Fish and Game Department, US Forest Service, Appalachian Mountain Club, and the US Geodetic Survey. Many municipal and regional planning agencies are involved on a local basis. Private corporations such as Geographic Data Technology in Lebanon, serve clients globally and nationally whom are interested in helping schools develop their GIS expertise. Environmental Systems Research Institute and Trimble Engineering, both nationally recognized GIS developers, give exceptional discounts to K-12 schools.

What is the role of postsecondary education?

Continuing education in a two-year or four-year program leading to an Associates or Bachelors degree is critical to a student's credentials and future advancement. Articulation Agreements between NH High Schools and The NH Community Technical Colleges in Berlin will allow students to transfer credits from their High School courses, or will carry transferable credit with the NHCTC Running Start Program, to their GIS-based degree programs. Several other schools in the state, including Plymouth State, Keene State, and UNH offer Bachelors degrees in GIS-based fields of study. Nationally, advanced degrees are also available in GIS based fields.

How many programs are available that are Geographic Information Systems Related related?

Many schools in NH are developing project based learning programs. We currently have one Spatial Information Technology Program and are developing a second Geographic Information Systems Program.

What resources are available to help schools implement the Geographic Information Systems pathway?

Professional Development Training programs for educators in a variety of GIS-related fields, as well as technical assistance are available through our partnership with the University of NH Cooperative Extension in Durham and at many locations throughout the State. Technical assistance is also available from the Staff at the GIS program at the NHCTC Berlin Campus. Various statewide GIS-based groups such as the NH Arc View Users Group, are interested in working with schools to develop programs. Additionally the NH GIS Database, GRANIT, provides data and information to schools and municipal groups free of charge. Environmental Systems Research Institute, a nationally known developer of GIS software, has special discounts, and K–12 lesson plans curriculum and software for schools interested in implementing GIS programs. The North Country Region also has a private GIS Educator Consultant that is available to schools in the state.

For More Information

Kevin J. Shyne
Tech Prep Consultant for GIS
39 Chandler Ledges Road
Milan, NH 03588

Tel: (603) 449-3406
Fax: (603) 449-3406
E-mail: kshyne@ncia.net
www.ncia.net/schools/stc

Geographic Information Systems
High School Career Planning Outline

Career Pathways in: Geographic Information Systems

Career Focus: Natural Resource and Environmental Management, City and Regional Planning, Governmental Operations, Real Estate Development and Planning,

What is it? A computer based method to display, analyze and manipulate spatial data. GIS uses large databases to display information as maps ant other visuals.

Salary Range: Technical / Field Staff: $30,000 - $50,000, Technical / Government Management: $45,000 - $75,000, Executive / Director, Consultant: $70,000 +

College and Career Planning

JOB TITLES	CERTIFICATE PROGRAMS	ASSOCIATE DEGREES	BACHELOR DEGREES	POST GRADUATE DEGREES
1. Field Technician 2. GIS Specialist 3. Cartographer 4. Natural Resources Specialist 5. City / Regional Planner 6. Forester / Surveyor / Environmentalist 7. Public Utilities Planner 8. Earth Research Scientist 9. Data / Information Mgt 10. University Research / Professor	**NH Community Technical College Berlin** Geographic Information Systems Environmental Studies Forest Information Technology	**NH Community Technical College Berlin** Geographic Information Systems Environmental Studies Forest Information Technology **University of New Hampshire** Forestry and Surveying Natural Resources **Lyndon State College** Geographic Information Systems	**University of New Hampshire** Forestry and Surveying Natural Resources Management Geographic Information Systems **Plymouth State College** Geographic Information Systems **Keene State College** Geographic Information Systems	**University of New Hampshire** Natural Resources Management

NOTE: *The level to which an advanced degree is required will vary from one employer to the next and one position to the next.*

High School Course Planning

	9TH GRADE	10TH GRADE	11TH GRADE	12TH GRADE	SCHOOL-TO-CAREER CONNECTIONS
English	English 9 Technical English	English 10	English 11	English 12 and or College Composition I*	• Informational Interview with a local employer • Industry Tour • Postsecondary Tour • Paid or unpaid Internship • Project Based Learning • Community Service or Service Learning Project
Math	Algebra I	Geometry	Algebra II	Advanced Math	
Science	Earth Sciences	Biology	Chemistry	Physics	
Social Studies	World History or Geography	Government and or Ethics	United States History	Historical Research or Economics	
Foreign Language	Foreign Language I	Foreign Language II	Foreign Language III	Foreign Language IV	
Technology	IT & ME	Introduction to Programming	Database Design & Management	Ob. Oriented Prog. w Visual Basic	
Electives	Introduction to Business	Ethics & Society	Spatial Information Systems Technology 1	Spatial Information Systems Technology 2	

For more information on how to implement this pathway in your school, call Kevin Shyne at (603) 449-3406.

Hospitality and Tourism Career Focus

What is the Hospitality and Tourism Career Focus?

The Hospitality and Tourism Career Pathway focuses on preparing students for careers in the continually expanding Hospitality and Tourism Industry. An important aspect of Hospitality and Tourism is the diversity of career pathways represented including Culinary Arts, Travel and Tourism, Lodging Management, Convention Bureau/Conference Planning and Recreation, and Amusements and Attractions.

Why get involved with Hospitality and Tourism?

This is a major source of revenue for the state of NH, as well as one of the fastest growing industries in the United States and the World. Currently over 63,000 people in the state are employed in this field in both full and part time positions. Projections show the growth of Hospitality and Tourism in NH to be in the area of 5% per year. Nationally, it is the second-largest private employer generating hundreds of billions of dollars in payroll, receipts and taxes. There is an increased demand within the industry for professional certification and increased education.

What are the connections to Business and Industry?

The industry realizes that to meet its future employee needs, it must make the connection with schools and their career-based programs. Many industry employers are excited about the prospect of employing students and graduates with strong basic skill sets as well as a knowledge and interest in joining an industry that can take them anywhere in the world. Many businesses are interested in working with Pathway schools to create paid internship programs for their students.

Business and Industry Partners

Some very important partners in this are the New Hampshire Travel Council, New Hampshire Lodging and Restaurant Association, the New Hampshire Office of Travel and Tourism, The Mount Washington Valley Chamber of Commerce, The Balsams Grand Resort, the Mount Washington Hotel and The Red Jacket Inn.

What is the role of postsecondary education?

Continuing education in a two-year or four-year program leading to an associates or Bachelors degree is very important to a student's credentials. Articulation agreements exist between NH High Schools and The NH Community Technical Colleges in Berlin and Laconia, The NH Technical Institute in Concord, Hesser College, and Johnson and Wales University. These agreements allow students to transfer credits from their High School courses, or will carry transferable credit with the NHCTC Running Start Program.

Apprenticeships

Several resorts also have Apprenticeship programs, which combine on-the-job training with college study, leading to an associate's degree or a certification by the American Culinary Foundation.

How many programs are available that are Hospitality and Tourism related?

We currently have 19 Culinary Arts/Food Service Management Programs, one Lodging Management Program, and five Hospitality and Tourism Programs.

What resources are available to help schools implement the Hospitality and Tourism pathway?

The Introduction to the Hospitality Industry Curriculum Guide, developed by the North Country School-to-Career Regional Partnership, is available to NH high schools. It was designed to provide an introductory course to students who might be interested in any of the Hospitality career fields.

For More Information

Kevin J. Shyne
Tech Prep Consultant for
Hospitality and Tourism
39 Chandler Ledges Road
Milan, NH 03588

Tel: (603) 449-3406
Fax: (603) 449-3406
E-mail: kshyne@ncia.net
www.ncia.net/schools/stc

Hospitality and Tourism
High School Career Planning Outline

Career Pathways in: Hospitality and Tourism

Career Focus: Resort Mgt / Operation, Property Management, Food Service and Production, Sports and Recreation Management.

What is it? Focuses on the diverse and rapidly growing field of Hospitality and Tourism, nationally and worldwide.

Salary Range: Operations: $20,000 - $40,000, Property Management: $40,000 - $70,000, Resort Management/Entrepreneurship $50,000 and up.

College and Career Planning

JOB TITLES	CERTIFICATE PROGRAMS	POST SECONDARY ASSOCIATE DEGREES	BACHELOR DEGREES
Hotel/Resort Management Food Service Management Chef/Culinary Arts Recreational Management Ski Resort Management Travel Tourism Marketing / Advertising Adventure Based Recreation	**NH Community Technical College System** Travel and Tourism Hospitality management Culinary Arts **McIntosh College** Culinary Arts Travel and Tourism **Johnson and Wales** Culinary Arts Travel and Tourism	**NH Community Technical College System** Travel and Tourism Hospitality management Culinary Arts **McIntosh College** Culinary Arts Travel and Tourism **Johnson and Wales** Culinary Arts Travel and Tourism	**University of New Hampshire** Tourism /Hospitality Management Rest. and Food Service Management **Southern NH Univ.** Hotel Mgt / Hospitality Admin Rest. and Food Service Management **Johnson and Wales University** Culinary Arts Rest. and Food Service Management

NOTE: *The level to which an advanced degree is required will vary from one employer to the next and one position to the next.*

High School Course Planning

	9TH GRADE	10TH GRADE	11TH GRADE	12TH GRADE	SCHOOL-TO-CAREER CONNECTIONS
English	English 9	English 10	English 11	English 12 and or College Composition I*	• Informational Interview with a local employer
Math	Algebra I	Geometry	Algebra II		• Industry Tour
Science	Earth Science	Biology	General Chemistry	Physics	• Postsecondary Property/ Resort Tour
Social Studies	Modern World History	United States History	United States History	Economics / Psychology	• Paid or unpaid Internship
Foreign Language	Foreign Language I	Foreign Language II	Foreign Language III	Foreign Language IV	• Project Based Learning
Technology	IT & ME	Information Processing	Information Technology Mgt		• Community Service or Service Learning Project
Electives	Culinary Arts 1 Intro to Business	Culinary Arts 2 Marketing	Culinary Arts 3 Intro to Hospitality and Tourism	Baking /Catering Property Management	

NOTE: *Check with your guidance counselor to identify the comparable courses offered at your high school or vocational center.*

For more information on how to implement this pathway in your school, call Kevin Shyne at (603) 449-3406.

Surgical Technology
High School Career Planning Outline

Career Pathways in: Health Sciences

Career Focus: Surgical Technology

What is it? Focuses on technology utilized in surgical procedures in operating rooms, delivery rooms and sterile processing.

Salary Range: Technicians: $25,000, - $35,000, Nurses & Surgeon's Assistant: $35,000 – $75,000, Anesthesiologists and Surgeons: $120,000 - $150,000

College and Career Planning

JOB TITLES	CERTIFICATE PROGRAMS	ASSOCIATE DEGREES	BACHELOR DEGREES	POST GRADUATE DEGREES
1. Surgical Technologist 2. Medical Sales Representative 3. Tissue/Organ Procurement & Transplantation Technician 4. Laser/Endoscopic Technician 5. Materials Manager 6. Anesthesia Technician 7. Educator 8. Surgical First Assistant 9. Surgical Nurse 10. Surgeon's (Physician's) Assistant 11. Anesthesiologist/Surgeon	**Concord Hospital**	**NH Community Technical College Stratham** Surgical Technology **Berlin, Concord, Claremont, Manchester, Nashua, Stratham,** Nursing	**Colby-Sawyer College** Nursing, Biology **Dartmouth College,** Biology **Keene State College,** Biology **Plymouth State College,** Biology **Rivier College,** Nursing **St. Anselm College,** Nursing, Biology **University of New Hampshire** Biochemistry, Molecular Biology, Nursing	**Dartmouth Medical School** Anesthesiology, Obstetrics and Gynecology **Rivier Collge** Nurse Practiioner

NOTE: *The level to which an advanced degree is required will vary from one employer to the next and one position to the next.*

High School Course Planning

	9TH GRADE	10TH GRADE	11TH GRADE	12TH GRADE	SCHOOL-TO-CAREER CONNECTIONS
English	English 9	English 10	English 11	English 12 and or College Composition I*	• Informational Interview with a local employer • Hospital Tour • Postsecondary Laboratory Tour • Paid or unpaid Internship • Project Based Learning • Community Service or Service Learning Project
Math	Algebra I	Geometry	Algebra II	Pre-Calculus or Calculus	
Science	Introduction to Life Sciences	Biology	Chemistry, Medical Terminology* Anatomy & Physiology*	Microbiology* AP or General Biology I* AP or General Chemistry I* Physics	
Social Students	World History	Government and or Ethics	United States History	Economics	
Foreign Language	Foreign Language I	Foreign Language II	Foreign Language III	Foreign Language IV	
Technology	IT & ME	Computer Applications	Programming Logic* Database Design & Management*	Programming I* Introduction to C++*	
Electives	Introduction to Business	Ethics and Society	Communication for the Workplace Medical Law and Ethics*	Human Relations & the Organization Marketing*	

**College Credit Courses through NH Community Technical College Project Running Start Program*

NOTE: *Check with your guidance counselor to identify the comparable courses offered at your high school or technical center.*

For more information on how to implement this pathway in your school, call Kathleen Totten at (603) 433-1964.

PLEASE NOTE: The recommended sequence of courses includes the curriculum offered through Health Sciences & Technologies and Health Occupations Programs.

The Information Technology Career Pathway

"Preparing students to live, learn and work in the knowledge economy"

What is Information Technology?

Information Technology (IT) is the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware.

Is there a need for IT workers?

The need for a technically literate workforce cuts across all industries as the largest manufacturer to the smallest store relies on IT to run its business and compete in a global economy. In the most recent survey by the Information Technology Association of America, it was found that ninety-two percent of IT workers are employed by non-IT companies.

What skills are taught in the IT Career Pathway?

Students learn industry skills and standards that align with four occupational strands; multimedia, programming, network systems, and business information studies.

Are there core courses?

Yes, in order to live, learn and work in a global economy, students must be technically literate. The purpose of the core courses — IT & ME and IT & ME Works — is to prepare all students to do the following:(a) read, understand and communicate technical information, (b) apply technical concepts to solve problems and make decisions, (c) perform basic functions in multimedia, programming, network systems, and business information studies.

Who developed the core courses?

Since the summer of 2001, twenty-eight teachers have worked with the Western NH Business & Education Partnership to design, develop and implement IT & Me and IT & ME Works. All participating teachers who assisted in the development of these curriculums felt that the resources developed will be invaluable to educating the youth of New Hampshire. One such teacher notes, "My students will have new projects that will make their computer work more relevant."

Which schools are involved in developing the IT Pathway?

Thirteen High Schools: Alvirne, Berlin, ConVal Regional, Exeter, Goffstown, John Stark Regional, Lisbon, Londonderry, Mascenic Regional, Milford, Oyster River, Pinkerton Academy, and Raymond.

Five Vocational Centers: Dover Technical Center, Cheshire Career Center, Creteau Technical Center, Seacoast School of Technology, and Sugar River Valley Technical Center.

What has been the role of industry?

As a "Center of Excellence" for the National Techforce Initiative - which is spearheaded by the National Alliance of Business, the Information Technology Association of America and the Education Development Center, Inc. - the Western NH Business & Education Partnership has participated in, and presented at, six workforce development convocations across the country. Nationally, New Hampshire's IT Career Pathway has been recognized as a "best practice" for addressing the IT skills gap and is being modeled by other states.

What has been the role of postsecondary partners?

The IT faculty from New Hampshire Community-Technical College (NHCTC) at Stratham/ Pease and McIntosh College have been involved in developing the curriculum. Each occupational strand has an articulation agreement that serves as the model for other schools/ vocational centers. All of the seventeen schools offering the Cisco Networking Program have a system-wide articulation agreement with NHCTC's four regional campuses that offer this advanced program. Other schools with articulation agreements include:

- The Seacoast School of Technology and NHCTC-Stratham for Programming
- The Sugar River Valley Technical Center and NHCTC-Claremont for Network Systems
- Alvirne High School and NHCTC-Stratham for Multimedia
- Goffstown High School and NHCTC-Stratham for Business Information Studies

What resources are available to help schools implement the IT Career Pathway?

The IT Resource Guide, prepared by the Western NH Business & Education Partnership, is available at no charge to New Hampshire schools. It includes the following information:

- student outcomes, skills, standards and sequence of courses
- the teacher's course outline and lesson plans
- the employment outlook, earnings and career planning forms
- the postsecondary connections and agreements.

In addition, schools can access this information through the State Department of Education's website – New Hampshire Educators Online (NHEON).

What is the first step in implementing the IT Career Pathway?

Call the Western Region's Tech Prep Consultant for IT, who will arrange an on-site visit to discuss local implementation needs and objectives.

For More Information

"Preparing students to live, learn and work in the knowledge economy"

Marsha A. Miller
Tech Prep Consultant for IT
7 Harding Street
Rochester, NH 03867

Tel: (603) 332-0925
Fax: (603) 335-7365
E-mail: mamiller@ttlc.net

Information Technology: Network Systems – Cisco
High School Career Planning Outline

Career Pathways In: Information Technology

Career Focus: Network Systems - Cisco

What is it? Network analysis, planning and implementation; includes design, installation, maintenance and management of network systems.

Salary Range: $30,000 - $80,000

College and Employment Planning:

[illegible]	[illegible]	ASSOCIATE DEGREE	BACHELOR DEGREE
1. LAN Technician 2. Communications Analyst 3. Hardware Installations Coordinator 4. Customer Service Coordinator 5. Telecommunications Technician 6. Network Administrator 7. Network Analyst 8. Wide Area Network Technician	**NHTI – Concord** Computer Information Systems Computer Technology / Programming **McIntosh College-Dover** Computer Systems Management Web & Graphic Design / Net+ (CompTIA) **NHCTC – Nashua** Computer Networking / Web Site Design Internet Server Administration Internet Developer **NHCTC – Claremont** CAD / Computer Networking & Web Site Design **NHCTC – Stratham/Pease** Multimedia Production / Office Technologies Web Development **Franklin Pierce College** Information Technology Graphic Design / Computer Science	**Computer Science** Franklin Pierce, Hesser College, McIntosh College **Information Science and Systems** Daniel Webster College, NHCTC at Berlin, Laconia, Manchester, Pease, Nashua, Claremont, Hesser and McIntosh **Data Processing Tech/Technician** NHCTC at Nashua, Claremont **Computer Programming** Hesser College **Computer & Information Sciences** NHCTC Concord, Claremont, Nashua **Computer Systems Analysis** McIntosh College	**Computer Science** Daniel Webster, Dartmouth, Franklin Pierce, Keene State, Plymouth State, UNH, Saint Anselm, Rivier College **Information Science and Systems** Daniel Webster **Computer Programming** Daniel Webster, Franklin Pierce **Computer and Information Science** New Hampshire College Plymouth State **Management and Information Technology** Daniel Webster College

NOTE: *The level to which an advanced degree is required will vary from one employer to the next and one position to the next.*

High School Course Planning:

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SCHOOL-TO-CAREER CONNECTIONS
English	English 9 with emphasis on Business/Technical Writing	English 10	English 11	English 12 with emphasis on oral presentation	• Informational Interview with a local employer
Math	Algebra I	Geometry	Algebra II	Personal Finance	• Industry Tour
Social Studies	World History	United States History I with unit on Technology and Society	United States History II or American Studies	Human Relations & the Organization	• Apprenticeship or Internship
Science	Introduction to Science	Biology	General Chemistry		• School-Based Enterprise such as maintaining/ repairing computers, installing new network systems and staffing technical help desk
Foreign Language	Foreign Language I	Foreign Language II			
Technical Core	IT & ME IT & ME Works	Programming Logic Introduction to Computer Networking	Cisco Level I/II LAN Technologies	Cisco Level III/IV WAN Technologies	
Elective Core	Introduction to Business	Consumer Behavior	Oral Communication	Network Systems Internship	

NOTE: *Check with your guidance counselor to identify the comparable courses offered at your high school or vocational center. Sample course descriptions are listed on the back.*

For more information on how to implement this pathway in your school, call Marsha Miller at (603) 332-0925

Information Technology: Network Systems – Cisco

NHCTC – Stratham Course Descriptions

IT & ME	As a foundation course to learning how to operate a personal computer, students will explore the three major theory topics of - hardware, software, and communication. Using a fully integrated, hands-on approach, students will learn the fundamental elements of the most current version of Microsoft Office- Word, Excel, Access, and PowerPoint. Students are required to have basic keyboarding skills before taking this course. Recommended for non-computer majors and students needing basic computer skills.
IT & ME Works	In this course, students will gain knowledge, skills and experience in four career strands; Business Information Studies, Network Systems, Programming, and Multimedia. They will learn the principles of marketing, eCommerce and the challenge of securing on-line transactions; they will use advanced skills to customize documents, using graphics, tables, charts, multimedia clips. Students will learn programming logic and build databases and web pages. They will explore the inner workings of a computer network and acquire the proficiency to build and repair a computer. Through this in-depth exploration of the technical and employability skills required for each of the four career stands, students will be prepared to enroll in the upper level courses. Prerequisite: IT & ME
BUS 110 – Intro to Business	This is an introductory course designed to provide students with a basic understanding of the structures and operations of business and an awareness of social and ethical responsibility as it relates to the environment, consumers, employees, and investors. An appreciation of the global economy will also be explored.
MKTG 135 – Consumer Behavior	An in-depth analysis of the internal and external forces in the consumer decision-making process as it relates to Marketing. Areas of study include consumer reaction, personal selling, product positioning, brand loyalty and image management. Applications in non-profit and government areas also discussed.
ENGL113 – Oral Communication	This course is designed to give a student confidence and poise in a public speaking situation through practice in speech preparation and presentation or equivalent and/or permission of the instructor.
CIS 112 – Programming Logic	This course will emphasize systems thinking as an approach to solving computer problems and understanding formal logic. Programming theory and logic will be presented with hands-on practice in model environments, while students are provided with essential problem-solving methods, techniques and disciplines. Control flow, data manipulation and planning methods will be emphasized. Students will develop confidence in applying programming solutions, will be exposed to pertinent terminology, and will learn the effective use of reference materials.
CIS 116 – Introduction to Computer Networking	This course introduces students to the fundamentals of computer connectivity. Students will compare peer-to-peer versus client-server configurations, Windows, Unix, Linux and Mac Network Operating System Environments, local and wide-area networks in addition to relevant network communication protocols. Co-requisite: CIS111.
IST 118 – LAN Technologies	This course covers the first two of the four modules of the Cisco Academy Certified Cisco Network Associate (CCNA) certification preparation program (the last two modules are covered in IST121 WAN Technologies). This course covers the characteristics and implementation details of Local Area Network technologies, primarily focusing on Ethernet LANS. Networking devices including hubs, switches, and routers are investigated in theory and practice through both discussion and extensive laboratory experiences. Horizontal layer and vertical backbone networking implementation are explored, implemented, and analyzed.
IST 121 – WAN Technologies	This course covers the last two modules in the Cisco Academy Cisco Certified Network Associate (CCNA) certification preparation program. The primary foci of these modules are WAN technologies including Frame Relay, ISDN, and ATM. In addition, advanced switching and encapsulation protocols such as VLAN and PPP are addressed. Pre-requisite: IST118.

Information Technology: Programming and Software
High School Career Planning Outline

Career Pathways in: Information Technology

Career Focus: Programming and Software

What is it? The design, development, implementation and maintenance of computer systems and software, requiring knowledge of computer operating systems, programming languages and software development.

Salary Range: $35,000 - $90,000

College and Employment Planning:

JOB TITLES	CERTIFICATE PROGRAMS	ASSOCIATE DEGREES	BACHELOR DEGREES
1. Systems Analyst 2. Test Specialist 3. Programmer Analyst 4. Operating Systems Specialist 5. Senior Level Programmer 6. Software/Application Support 7. Software Designer 8. Database Software Technician	**NHTI – Concord** Computer Information Systems Computer Technology / Programming **McIntosh College-Dover** Computer Systems Management Web & Graphic Design / Net+ (CompTIA) **NHCTC – Nashua** Computer Networking / Web Site Design Internet Server Administration Internet Developer **NHCTC – Claremont** CAD / Computer Networking & Web Site Design **NHCTC – Stratham/Pease** Multimedia Production / Office Technologies Web Development **Franklin Pierce College** Information Technology Graphic Design / Computer Science	**Computer Science** Franklin Pierce, Hesser College, McIntosh College **Information Science and Systems** Daniel Webster College, NHCTC at Berlin, Laconia, Manchester, Pease, Nashua, Claremont, Hesser and McIntosh **Data Processing Tech/Technician** NHCTC at Nashua, Claremont Computer Programming Hesser College **Computer &Information Sciences** NHCTC Concord, Claremont, Nashua **Computer Systems Analysis** McIntosh College	**Computer Science** Daniel Webster, Dartmouth, Franklin Pierce, Keene State, Plymouth State, UNH, Saint Anselm, Rivier College **Information Science and Systems** Daniel Webster **Computer Programming** Daniel Webster, Franklin Pierce **Computer and Information Science** New Hampshire College Plymouth State **Management and Information Technology** Daniel Webster College

NOTE: *The level to which an advanced degree is required will vary from one employer to the next and one position to the next.*

High School Course Planning:

	9th GRADE	10th GRADE	11th GRADE	12th GRADE	SCHOOL-TO-CAREER CONNECTIONS
English	English 9 with emphasis on Business/Technical Writing	English 10	English 11	CP Composition and Speech	• Informational Interview with a local employer
Math	Algebra I	Geometry	Algebra II	Applied Logic	• Industry Tour
Social Studies	World History	United States History I with unit on Technology and Society	United States History II	Human Relations & the Organization	• Community Service Project with Non Profit Agency
Science	Introduction to Science	Biology	General Chemistry	Physics	• School-Based Enterprise such as designing, developing and maintaining a school-based or community-based website
Foreign Language	Foreign Language I	Foreign Language II	Foreign Language III	Advanced Foreign Language	
Technical Core	IT & ME IT & ME Works	Programming Logic Database Design & Management	Programming I Web Programming I	Java Script Intro to C++	
Elective Core	Introduction to Business	Consumer Behavior	Oral Communication	Programming Internship	

NOTE: *Check with your guidance counselor to identify the comparable courses offered at your high school or vocational center. Sample course descriptions are listed on the back.*

For more information on how to implement this pathway in your school, call Marsha Miller at (603) 332-0925

Information Technology: Programming and Software

NHCTC – Stratham Course Descriptions

IT & ME	As a foundation course to learning how to operate a personal computer, students will explore the three major theory topics of - hardware, software, and communication. Using a fully integrated, hands-on approach, students will learn the fundamental elements of the most current version of Microsoft Office- Word, Excel, Access, and PowerPoint. Students are required to have basic keyboarding skills before taking this course. Recommended for non-computer majors and students needing basic computer skills.
IT & ME Works	In this course, students will gain knowledge, skills and experience in four career strands; Business Information Studies, Network Systems, Programming, and Multimedia. They will learn the principles of marketing, eCommerce and the challenge of securing on-line transactions; they will use advanced skills to customize documents, using graphics, tables, charts, multimedia clips. Students will learn programming logic and build databases and web pages. They will explore the inner workings of a computer network and acquire the proficiency to build and repair a computer. Through this in-depth exploration of the technical and employability skills required for each of the four career stands, students will be prepared to enroll in the upper level courses. Prerequisite: IT & ME
BUS 110 - Intro to Business	This is an introductory course designed to provide students with a basic understanding of the structures and operations of business and an awareness of social and ethical responsibility as it relates to the environment, consumers, employees, and investors. An appreciation of the global economy will also be explored.
CIS112 Programming Logic	This course will emphasize systems thinking as an approach to solving computer problems and understanding formal logic. Programming theory and logic will be presented with hands-on practice in model environments, while students are provided with essential problem-solving methods, techniques and disciplines. Control flow, data manipulation and planning methods will be emphasized. Students will develop confidence in applying programming solutions, will be exposed to pertinent terminology, and will learn the effective use of reference materials.
CIS113 Database and Design Management	This course is an introduction to database analysis, planning, designing, and implementation with emphasis on the relational model. Students will study the theory behind relational databases, relational database nomenclature, and relational concepts. The course will include sections studying Structured Query Language (SQL) and optimizing databases through normalization. Students will apply their knowledge with hands-on exercises designed to teach the intricacies of database design methodology. Prerequisite and co-requisite: CIS111. Technical core course requirement.
MKTG 135 Consumer Behavior	An in-depth analysis of the internal and external forces in the consumer decision-making process as it relates to Marketing. Areas of study include consumer reaction, personal selling, product positioning, brand loyalty and image management. Applications in non-profit and government areas also discussed.
CIS118 Programming I	This course will provide the students with an understanding of structured, procedural, and event-driven programming. The students will develop techniques for problem solving through the application of programming methods and will gain experience in the nuts-and-bolts of program design as they complete lab-work and assignments. Students will learn to use the Visual Basic language and programming environment. Prerequisite: CIS112, CIS111. CIS098 recommended as a prerequisite for students with minimal or no programming experience.
CIS124 Web Programming I	This course covers all introductory web page development syntax. Students will study in detail the required tags, semantics, and idioms of HTML (hypertext markup language) as defined by the current version of the W3 Consortium standard. The course will cover all HTML tags and attributes, rules, images, links, and document layout, with and an emphasis on cascading style sheets. CIS111 and CIS114 are prerequisite courses.
ENGL113 Oral Communication	This course is designed to give a student confidence and poise in a public speaking situation through practice in speech preparation and presentation or equivalent and/or permission of the instructor.
CIS148 Introduction to Java Programming	The purpose of this course is to provide a solid foundation in the Java programming language. Program planning, object oriented design, and Java language syntax will be emphasized. This course will prepare students for advanced study of the Java language as well as introduce students in other fields of computer study to general object programming. Prerequisites: CIS112.
CIS158 Introduction to C++	This course introduces students to the fundamentals of structured programming and to the procedural aspects of the C++ programming language. Students will create programs to demonstrate the topics of program control, functions, arrays, and pointers. Microsoft's Visual C++ will be used as the primary development tool; however, other environments may also be utilized. Emphasis will be placed on the creation of platform-independent applications in order to allow students to become familiar with the core features of the C++ language. If students do not have any previous programming experience, CIS111 and CIS112 are prerequisites.

Information Technology: Business Information Studies
High School Career Planning Outline

Career Pathways In: Information Technology

Career Focus: Business Information Studies

What Is It? Planning, managing, and providing administrative support, information processing, accounting, and human resource management services and related management support services.

Salary Range: $28,000 - $75,000

College and Employment Planning:

JOB TITLES	CERTIFICATE/TECH PREP	ASSOCIATE DEGREES	BACHELOR DEGREES
1. Accountants 2. Auditors 3. Database Managers 4. Information Processing Specialist 5. Info Management Systems Managers 6. Hotel/Motel Managers 7. Restaurant Managers 8. Retail Managers 9. Manufacturing Managers 10. Small Business Entrepreneurs 11. Human Resource Managers	**NHTI – Concord** Computer Information Systems Computer Technology / Programming **McIntosh College-Dover** Computer Systems Management Web & Graphic Design / Net+ (CompTIA) **NHCTC – Nashua** Computer Networking / Web Site Design Internet Server Administration Internet Developer **NHCTC – Claremont** CAD / Computer Networking & Web Site Design **NHCTC – Stratham/Pease** Multimedia Production / Office Technologies Web Development **Franklin Pierce College** Information Technology Graphic Design / Computer Science	**Computer Science** Franklin Pierce, Hesser College, McIntosh College **Information Science and Systems** Daniel Webster College, NHCTC at Berlin, Laconia, Manchester, Pease, Nashua, Claremont, Hesser and McIntosh **Data Processing Tech/Technician** NHCTC at Nashua, Claremont **Computer Programming** Hesser College **Computer & Information Sciences** NHCTC Concord, Claremont, Nashua **Computer Systems Analysis** McIntosh College	**Computer Science** Daniel Webster, Dartmouth, Franklin Pierce, Keene State, Plymouth State, UNH, Saint Anselm, Rivier College **Information Science and Systems** Daniel Webster **Computer Programming** Daniel Webster, Franklin Pierce **Computer and Information Science** New Hampshire College Plymouth State **Management and Information Technology** Daniel Webster College

NOTE: *The level to which an advanced degree is required will vary from one employer to the next and one position to the next.*

High School Course Planning:

	9TH GRADE	10TH GRADE	11TH GRADE	12TH GRADE	SCHOOL-TO-CAREER CONNECTIONS
English	English 9 with emphasis on Business/Technical Writing	English 10	English 11	English 12	• Informational Interview with a local employer
Math	Business Math	Math Applications	Consumer Math	Personal Finance	• Industry Tour
Social Studies	World History I	United States History I with unit on Technology and Society	United States History II or American Studies	Human Relations & the Organization	• Paid or unpaid Internship
Science	Introduction to Science	Biology	General Chemistry		• Community Service Project
Foreign Language	Foreign Language I	Foreign Language II			• School-Based Enterprise such as a school store
Technical Core	IT & ME IT & ME Works	Database Design and Management Management	Accounting Principles of Marketing	Introduction to eCommerce Intro Computer Info Assurance	
Elective Core	Introduction to Business	Consumer Behavior	Oral Communication	BIS Internship	

NOTE: *Check with your guidance counselor to identify the comparable courses offered at your high school or vocational center. Sample course descriptions are listed on the back.*

For more information on how to implement this pathway in your school, call Marsha Miller at (603) 332-0925

Information Technology: Business Information Studies

NHCTC – Stratham Course Descriptions

IT & ME	As a foundation course to learning how to operate a personal computer, students will explore the three major theory topics of - hardware, software, and communication. Using a fully integrated, hands-on approach, students will learn the fundamental elements of the most current version of Microsoft Office- Word, Excel, Access, and PowerPoint. Students are required to have basic keyboarding skills before taking this course. Recommended for non-computer majors and students needing basic computer skills.
IT & ME Works	In this course, students will gain knowledge, skills and experience in four career strands; Business Information Studies, Network Systems, Programming, and Multimedia. They will learn the principles of marketing, eCommerce and the challenge of securing on-line transactions; they will use advanced skills to customize documents, using graphics, tables, charts, multimedia clips. Students will learn programming logic and build databases and web pages. They will explore the inner workings of a computer network and acquire the proficiency to build and repair a computer. Through this in-depth exploration of the technical and employability skills required for each of the four career stands, students will be prepared to enroll in the upper level courses. Prerequisite: IT & ME
BUS 110 - Intro to Business	This is an introductory course designed to provide students with a basic understanding of the structures and operations of business and an awareness of social and ethical responsibility as it relates to the environment, consumers, employees, and investors. An appreciation of the global economy will also be explored.
ENGL113 Oral Communication	This course is designed to give a student confidence and poise in a public speaking situation through practice in speech preparation and presentation or equivalent and/or permission of the instructor.
MKTG 135 Consumer Behavior	An in-depth analysis of the internal and external forces in the consumer decision-making process as it relates to Marketing. Areas of study include consumer reaction, personal selling, product positioning, brand loyalty and image management. Applications in non-profit and government areas also discussed.
CIS113 Database and Design Management	This course is an introduction to database analysis, planning, designing, and implementation with emphasis on the relational model. Students will study the theory behind relational databases, relational database nomenclature, and relational concepts. The course will include sections studying Structured Query Language (SQL) and optimizing databases through normalization. Students will apply their knowledge with hands-on exercises designed to teach the intricacies of database design methodology. Prerequisite and co-requisite: CIS111. Technical core course requirement.
ACCT 113 - Accounting I	An introduction to accounting as the language of business. The student will be introduced to accounting procedures necessary to prepare financial statements utilizing current concepts and principles. This includes journalizing transactions, trial balance, adjustments, closing entries, accounts receivable and payable, special journals, payroll, cash receipts, disbursements and banking procedures.
BUS 114 – Management	The principles and techniques underlying the successful organization and management of business activities. This course combines the traditional analysis of management principles with the behavioral approach to case studies. The study includes the management functions of planning, organization, leadership, staffing control, and the decision-making process.
MKTG 125 - Principles of Marketing	An introduction to basic concepts with primary application to public and non-profit organizations, national and global, including marketing objectives, strategies, segmentation and promotion.
IST 161 - Intro to Information Assurance	Provide information systems and users with the basic know- ledge of their role and responsibilities towards protecting information systems resources. Discussion will include workstation and office security, types of malicious programs such as viruses, access control schemes and management. This will provide a foundation for further study of systems security and protection issues such as terminology, threats to information resources, computer abuse, and system vulnerabilities.
INT 171 - Introduction to eCommerce	Electronic commerce clearly crowns the list of technology- related media topics, as evidenced by the abundance of technical and legal literature. The Economics of Electronic Commerce applies standard microeconomic analysis to an entirely new industry, laying the foundation for the development of radically new business models. With detailed analysis to those involved in the actual production, marketing, and distribution of digital information products as well as professionals doing business in the electronic marketplace, this valuable reference demonstrates that businesses that achieve early success from applying these theories will enjoy a distinct competitive advantage in this newly defined world of business.

Information Technology: Network Systems
High School Career Planning Outline

Career Pathways in: Information Technology

Career Focus: Network Systems

What is it? Network analysis, planning and implementation; includes design, installation, maintenance and management of network systems.

Salary Range: $30,000 - $80,000

College and Employment Planning:

[illegible]	[illegible]	[illegible]	BACHELOR'S DEGREE
1. LAN Technician 2. Communications Analyst 3. Hardware Installations Coordinator 4. Customer Service Coordinator 5. Telecommunications Technician 6. Network Administrator 7. Network Analyst 8. Wide Area Network Technician	**NHTI – Concord** Computer Information Systems Computer Technology / Programming **McIntosh College-Dover** Computer Systems Management Web & Graphic Design / Net+ (CompTIA) **NHCTC – Nashua** Computer Networking / Web Site Design Internet Server Administration Internet Developer **NHCTC – Claremont** CAD / Computer Networking & Web Site Design **NHCTC – Stratham/Pease** Multimedia Production / Office Technologies Web Development **Franklin Pierce College** Information Technology Graphic Design / Computer Science	**Computer Science** Franklin Pierce, Hesser College, McIntosh College **Information Science and Systems** Daniel Webster College, NHCTC at Berlin, Laconia, Manchester, Pease, Nashua, Claremont, Hesser and McIntosh **Data Processing Tech/Technician** NHCTC at Nashua, Claremont **Computer Programming** Hesser College **Computer & Information Sciences** NHCTC Concord, Claremont, Nashua **Computer Systems Analysis** McIntosh College	**Computer Science** Daniel Webster, Dartmouth, Franklin Pierce, Keene State, Plymouth State, UNH, Saint Anselm, Rivier College **Information Science and Systems** Daniel Webster **Computer Programming** Daniel Webster, Franklin Pierce **Computer and Information Science** New Hampshire College Plymouth State **Management and Information Technology** Daniel Webster College

NOTE: *The level to which an advanced degree is required will vary from one employer to the next and one position to the next.*

High School Course Planning:

[illegible]	[illegible] GRADE	[illegible]	[illegible]	[illegible] GRADE	SCHOOL-TO-CAREER CONNECTIONS
English	English 9 with emphasis on Business/Technical Writing	English 10	English 11	English 12	• Informational Interview with a local employer
Math	Algebra I	Geometry	Algebra II	Personal Finance	• Industry Tour
Social Studies	World History	United States History I with unit on Technology and Society	United States History II or American Studies	Human Relations & the Organization	• Apprenticeship or Internship
Science	Introduction to Science	Biology	General Chemistry		• School-Based Enterprise such as maintaining/ repairing computers, installing new network systems and staffing technical help desk
Foreign Language	Foreign Language I	Foreign Language II			
Technical Core	IT & ME IT & ME Works	Computer Networking Technology I Computer Networking II	PC Installation and Repair Hardware PC Installation and Repair Software	LAN Management I LAN Management II	
Elective Core	Introduction to Business	Consumer Behavior	Oral Communication	Network Systems Internship	

NOTE: *Check with your guidance counselor to identify the comparable courses offered at your high school or vocational center. Sample course descriptions are listed on the back.*

For more information on how to implement this pathway in your school, call Marsha Miller at (603) 332-0925

Information Technology: Network Systems

NHCTC – Stratham Course Descriptions

IT & ME	As a foundation course to learning how to operate a personal computer, students will explore the three major theory topics of - hardware, software, and communication. Using a fully integrated, hands-on approach, students will learn the fundamental elements of the most current version of Microsoft Office- Word, Excel, Access, and PowerPoint. Students are required to have basic keyboarding skills before taking this course. Recommended for non-computer majors and students needing basic computer skills.
IT & ME Works	In this course, students will gain knowledge, skills and experience in four career strands; Business Information Studies, Network Systems, Programming, and Multimedia. They will learn the principles of marketing, eCommerce and the challenge of securing on-line transactions; they will use advanced skills to customize documents, using graphics, tables, charts, multimedia clips. Students will learn programming logic and build databases and web pages. They will explore the inner workings of a computer network and acquire the proficiency to build and repair a computer. Through this in-depth exploration of the technical and employability skills required for each of the four career stands, students will be prepared to enroll in the upper level courses. Prerequisite: IT & ME
BUS 110 - Intro to Business	This is an introductory course designed to provide students with a basic understanding of the structures and operations of business and an awareness of social and ethical responsibility as it relates to the environment, consumers, employees, and investors. An appreciation of the global economy will also be explored.
MKTG 135 Consumer Behavior	An in-depth analysis of the internal and external forces in the consumer decision-making process as it relates to Marketing. Areas of study include consumer reaction, personal selling, product positioning, brand loyalty and image management. Applications in non-profit and government areas also discussed.
ENGL113 Oral Communication	This course is designed to give a student confidence and poise in a public speaking situation through practice in speech preparation and presentation or equivalent and/or permission of the instructor.
Computer Networking Technology (SRVTC)	This course will utilize a hands-on approach to the fundamentals of PC-class computer maintenance and repair as well as the theory of computer network design. Course Technology text materials will provide the basis for instruction along with instructor designed activities. The focus of the networking curriculum will be the design and configuration of Ethernet LAN network using Enterasys (Cabletron) equipment and technology. Additionally, students will learn the fundamentals of marketing with an emphasis on the organization and operation of a computer related business. Interested students will also be given the opportunity to participate in business related competitive events at the annual DECA conference. An integral part of the program will be the computer maintenance/networking lab component through which students will experience hands-on exposure to the fundamentals of computer maintenance and network technology.
Computer Networking II (SRVTC)	This sequential component of the computer networking curriculum will provide the opportunity for students who successfully completed the first course to further refine the skills in computer repair and networking technology through additional lab activities and projects. The activities will focus on troubleshooting, eliminating network problems, and using Windows NT/2000 software to administer a functioning network. Network diagnostic hardware and software will be used to gauge network performance as a variety of variables are introduced into the network. WAN network technology will be introduced through the linking of two or more networks, including token ring and Ethernet topologies, using Cisco Systems routing technology.
CSM 160 PC Installation and Repair Hardware	This hands-on course covers a broad range of hardware and technologies. The PC installation and repair hardware course contains situational, traditional and identification types that will prepare the students for the A+ certification exam. A+ certification is a COMPTIA-program that prepares the students and measures competency of entry-level computer service technicians.
CSM 165 PC Installation and Repair Software	This hands-on course covers a broad range of operating systems: Win 9X, Win NT, Win Pro and technologies. The PC installation and repair software course contains situational, traditional and identification types that will prepare the students for at the A+ certification exam. A+ certification is a COMPTIA-program that prepares the student and measures competency of entry-level computer service technicians. Prerequisite: CSM 160.
CSM 250 LAN Management I	This course will introduce the student to the concepts of networking, including its history, standards, protocols, media types and their application, hardware and architecture and topologies. This course should bring the major networking elements to life through the use of the Text and the Internet. We will approach means and methods used in troubleshooting network problems and investigate the proper methods to maintaining a network. Students will gain understanding and basic skills to start pursuing a career in Network Administration. Prerequisite: CSM 165.
CSM 251 LAN Management II	Students will continue to learn the different types of technology of Local Area Networking (LANS), Wide Area Networks (WANS) and the Internet. The focus will be given to various software installation and administering tools, students will complete a number of network scenarios in a variety of utilization settings. Students will learn the concepts administering and maintaining an interoperable network platform (Novell Netware, Linux/Unix and Window 9X/NT/Pro 2000). The student will be introduced to Fault Tolerance, Disaster Recovery, and backup consideration. Troubleshooting, encryption and network security are also explored.

Information Technology: Multimedia
High School Career Planning Outline

Career Pathways In: Information Technology

Career Focus: Multimedia

What is it? The creation, design, and production of interactive multimedia products and services, the development of digitally generated or computer enhanced media used in business, training, entertainment, communications and marketing.

Salary Range: $35,000 - $85,000

College and Employment Planning:

JOB TITLES	CERTIFICATE PROGRAMS	ASSOCIATE DEGREES	BACHELOR DEGREES
1. Imaging Specialist 2. Interactive Digital Media Specialist 3. Web Designer 4. Graphic Designer 5. Animator 6. Media Designer 7. Multimedia Technician 8. Visual Design Consultant	**NHTI – Concord** Computer Information Systems Computer Technology / Programming **McIntosh College-Dover** Computer Systems Management Web & Graphic Design / Net+ (CompTIA) **NHCTC – Nashua** Computer Networking / Web Site Design Internet Server Administration Internet Developer **NHCTC – Claremont** CAD / Computer Networking & Web Site Design **NHCTC – Stratham/Pease** Multimedia Production / Office Technologies Web Development **Franklin Pierce College** Information Technology Graphic Design / Computer Science	**Computer Science** Franklin Pierce, Hesser College, McIntosh College **Information Science and Systems** Daniel Webster College, NHCTC at Berlin, Laconia, Manchester, Pease, Nashua, Claremont, Hesser and McIntosh **Data Processing Tech/Technician** NHCTC at Nashua, Claremont **Computer Programming** Hesser College **Computer & Information Sciences** NHCTC Concord, Claremont, Nashua **Computer Systems Analysis** McIntosh College	**Computer Science** Daniel Webster, Dartmouth, Franklin Pierce, Keene State, Plymouth State, UNH, Saint Anselm, Rivier College **Information Science and Systems** Daniel Webster **Computer Programming** Daniel Webster, Franklin Pierce **Computer and Information Science** New Hampshire College Plymouth State **Management and Information Technology** Daniel Webster College

NOTE: *The level to which an advanced degree is required will vary from one employer to the next and one position to the next.*

High School Course Planning:

	9TH GRADE	10TH GRADE	11TH GRADE	12TH GRADE	SCHOOL-TO-CAREER CONNECTIONS
English	English 9 with emphasis on Business/Technical Writing	English 10	English 11	CP Composition and Speech	• Informational Interview with a local employer
Math	Algebra I	Geometry	Algebra II	Applied Logic	• Industry Tour
Social Studies	World History I	United States History I with unit on Technology and Society	United States History II or American Studies	Human Relations & the Organization	• Paid or unpaid Internship
Science	Introduction to Science	Biology	General Chemistry		• Community Service Project with Non Profit Agency
Foreign Language	Spanish, French, German or Latin I	Spanish, French, German or Latin II	Foreign Language III		• School-Based Enterprise such as a yearbook and/or school newspaper
Technical Core	IT & ME IT & ME Works	Introduction to Graphic Design Principles of Marketing	Introduction to Multimedia Introduction to 3D Animation	Sound Editing Video Production	
Elective Core	Introduction to Business	Consumer Behavior	Oral Communication	Multimedia Internship	

NOTE: *Check with your guidance counselor to identify the comparable courses offered at your high school or vocational center. Sample course descriptions are listed on the back.*

For more information on how to implement this pathway in your school, call Marsha Miller at (603) 332-0925

Information Technology: Multimedia

NHCTC – Stratham Course Descriptions

IT & ME	As a foundation course to learning how to operate a personal computer, students will explore the three major theory topics of - hardware, software, and communication. Using a fully integrated, hands-on approach, students will learn the fundamental elements of the most current version of Microsoft Office- Word, Excel, Access, and PowerPoint. Students are required to have basic keyboarding skills before taking this course. Recommended for non-computer majors and students needing basic computer skills.
IT & ME Works	In this course, students will gain knowledge, skills and experience in four career strands; Business Information Studies, Network Systems, Programming, and Multimedia. They will learn the principles of marketing, eCommerce and the challenge of securing on-line transactions; they will use advanced skills to customize documents, using graphics, tables, charts, multimedia clips. Students will learn programming logic and build databases and web pages. They will explore the inner workings of a computer network and acquire the proficiency to build and repair a computer. Through this in-depth exploration of the technical and employability skills required for each of the four career stands, students will be prepared to enroll in the upper level courses. Prerequisite: IT & ME
BUS 110 - Intro to Business	This is an introductory course designed to provide students with a basic understanding of the structures and operations of business and an awareness of social and ethical responsibility as it relates to the environment, consumers, employees, and investors. An appreciation of the global economy will also be explored.
ENGL113 Oral Communication	This course is designed to give a student confidence and poise in a public speaking situation through practice in speech preparation and presentation or equivalent and/or permission of the instructor.
MKTG 125 - Principles of Marketing	An introduction to basic concepts with primary application to public and non-profit organizations, national and global, including marketing objectives, strategies, segmentation and promotion.
MKTG 135 Consumer Behavior	An in-depth analysis of the internal and external forces in the consumer decision-making process as it relates to Marketing. Areas of study include consumer reaction, personal selling, product positioning, brand loyalty and image management. Applications in non-profit and government areas also discussed.
CIS115 Introduction to Graphic Design	This design course will explore design and layout considerations for various production media. Students will study principles of design including color theory, line, texture, pattern, balance, space, and movement. Students will be introduced to computer graphics creation using industry standard software packages such as Macromedia Freehand and Adobe PhotoShop. Students will also experience hands on drawing and design lessons to develop their own senses, learn how to use paths, manipulate basic shapes and text, apply color and gradients implement styles, work in multiple layers, trace, and scale. Students will be able to use these design applications for future study in Web Design and Multimedia Production. Co-requisite: CIS111.
CIS125 Introduction to 3D	Students will explore 3D concepts including camera, lighting, timelines, tweening, movement, form, morphing, nurbs, splines, motion paths and special effects. Students will focus on techniques and visual aesthetics and design. Hands-on experience using the most current applications which may include Rhino, Bryce, Poser, Flash, and Carrerra. Prerequisites: CIS111, CIS115
CIS145 Introduction to Multimedia	This project-based course introduces students to multimedia concepts through a production environment. Students will learn how to create and manipulate objects, develop screen designs, and begin to build computer applications to incorporate graphics, animation, audio, and video. Students will be introduced to current industry standards using Macromedia Director. Prerequisites: CIS111. CIS115 recommended.
CIS155 Sound Editing	This course will introduce students to essential audio components and techniques. Use of sound in media will be examined with emphasis on technical skills in recording, mixing, and editing of analog and digital sounds. This is a studio course with a concentration on use of audio equipment. Little or no computer work will be required. Class evaluation will be based heavily on both group and individual projects.
CIS165 Video Production	The fundamentals of video production and pre-production will be studied in detail through individual or team productions. Students will learn script writing, story boarding, and production planning as a necessary precursor to successful video production. A technical foundation will be established regarding rudimentary aspects of video engineering. All aspects of the production process including camera functions, lighting, shooting techniques (studio and location), audio-for-video, and voice over acquisition will be presented. Functioning as the first class in a two-part series, CIS165 will culminate in the acquisition of video footage to be used in the second class, CIS275 Video Post Production. Prerequisites: CIS111, CIS115.

New Hampshire's
Information Technology Career Pathway
An Implementation Guide and Two 8th/9th grade IT Core Courses

The Information Technology Career Pathway is a recommended guide for middle/high schools and vocational centers. The Pathway is built on industry standards, which define Information Technology (IT) *as the study, design, development, implementation, support or management of computer-based systems, particularly software applications and computer hardware.*

The focus of the Information Technology Career Pathway is on skills, standards and learner outcomes. The first step to implementation is an audit of existing courses to insure compliance with industry standards. In some schools, especially in the network systems strand, a decision has been made to use a vendor-specific curriculum (The Cisco Networking Academy) while, other schools, have used the IT Model to develop their courses.

The IT Pathway includes core technical, academic and employability skills in four occupational strands:

Business information studies
Multimedia
Network systems
Programming and Software Development

The learner outcomes are grounded in industry-specific skills and competencies, integrating classroom theory with hands-on application and are aligned to the New Hampshire State Standards for Computer Techology.

To support local schools in adopting the IT Pathway, a comprehensive implementation guide has been produced for grades 8/9 through 14. The publication is entitled:

New Hampshire's Information Technology Career Pathway Implementation Guide

Within the guide are two core courses – I.T. & ME and I.T. & ME Works. We recommend each course for all eighth/ninth graders for three reasons; (1) as a way to measure their proficiency in computer literacy, (2) attain the ½ Carnegie unit credit for graduation and (3) as an

introduction to the career opportunities that exist within the IT industry.

Working in partnership with five national organizations and the postsecondary departments of Computer Technologies, Business Studies, and Information Systems Technology at NH Community-Technical College/Stratham-Pease, a team of twenty-nine New Hampshire Business/Technology teachers wrote the curriculum. Each course includes a complete set of lesson plans that have been classroom tested and peer-evaluated.

I.T. & ME is an introductory course that teaches the basic fundamentals of each of the four strands; Business Information Studies, Multimedia, Network Systems, Programming and Software Development with a heavy emphasis on Word Processing/Keyboarding skill development.

I.T. & ME Works is built on the same skills, standards and learner outcomes as the first course. However, the educators, who designed this course, wrote six weeks of lesson plans for each strand totaling 24 weeks so that the teacher, depending upon his/her school's program of studies, could teach each strand as a "stand-alone" course or in conjunction with the other strands.

Contained within New Hampshire's Information Technology Career Pathway Implementation Guide are also a number of suggestions on how the high school can expand their IT course offerings into the junior and senior years and tie them into the IT offerings of the post secondary institution in their area. The high school can mix and match courses depending upon its own IT goals by using The IT Pathway model as a guide.

For online information, go to:www.nheon.org, Click on NH Project
Scroll down to IT Career Pathway & Click!
For technical assistance at your location, contact:
Marsha A. Miller, IT Project Director
mamiller@ttlc.net or (603) 332-0925

The Western NH Business and Education Partnership developed the New Hampshire's Information Technology Career Pathway over the last three years.(1999-2002) Funding was provided by the New Hampshire State Department of Education, Concord, NH under the Carl D. Perkins Vocational and Technical Act of 1998.

IN APPRECIATION

It is with deep appreciation and sincere gratitude that the outstanding work of the following teachers is acknowledged. Through the courses that they have developed - IT & ME and IT & ME Works - New Hampshire students will have the skills and knowledge to live, learn and work in the 21st century.

IT & ME Authors - 2001	IT & ME Works Authors - 2002
Debra Coyne, ConVal Regional High School, Peterborough	Cheryl Allen, Creteau Technology Center at Spaulding High School, Rochester
Linda Crosby, Creteau Technology Center at Spaulding High School, Rochester	Ellen Bell, ConVal Regional High School, Peterborough
John Dotski, Lisbon Regional High School, Lisbon	Virginia Bruno, Berlin High School, Berlin
Pam Fowler, Cheshire Career Center at Keene High School, Keene	Marlise Bryant, Mascenic Regional High School, New Ipswich
David Kennedy, Exeter Sr. High School, Exeter	Vivian Chartrain, Pinkerton Academy, Derry
Paul Landry, Exeter Sr. High School, Exeter	Jeanne Chevalier, Exeter Sr. High School, Exeter
Beverly Lannan, Pinkerton Academy, Derry	John Dotski, Lisbon Regional High School, Lisbon
Gary McKenney, Sugar River Valley Tech. Center, Claremont	Scott Duprat, Dover Career & Technical Center at Dover High School, Dover
Carol MacDonald, Stevens High School, Claremont	Pam Fowler, Cheshire Career Center at Keene High School, Keene
Annmarie Merrill, Wilbur H. Palmer Vocational Center at Alvirne High School, Hudson	Kathy Hill, Mascenic Regional High School, New Ipswich
Linda Merrill, Cheshire Career Center at Keene High School, Keene	Sean Kenney, Creteau Technology Center at Spaulding High School, Rochester
Karen Olmstead, Raymond High School, Raymond	Paul Landry, Exeter Sr. High School, Exeter
Barbara Richards, Sugar River Valley Tech. Center, Claremont	Judy Lavery, Alvirne High School, Hudson
Kay Yeagley, Newport Middle High School, Newport	Gary McKenney, Sugar River Valley Tech. Center, Claremont
Postsecondary Partners and Curriculum Advisors for IT & ME and IT & ME Works	Linda Merrill, Cheshire Career Center at Keene High School, Keene
April Bellafiore, Chair Computer Technologies New Hampshire Community-Technical College Stratham/Pease	Karen Olmstead, Raymond High School, Raymond
John Burtt, Chair Business Studies New Hampshire Community-Technical College Stratham/Pease	Jeanne Roy, Goffstown Sr. High School, Goffstown
David E. Johnson, Chair Information Systems Technology New Hampshire Community-Technical College Stratham/Pease	Debbie Sheldon, Oyster River High School, Durham
	Karen Swanson, John Stark Regional High School, Weare

Western NH Business & Education Partnership
New Hampshire's Information Technology Career Pathway



IT Career Pathway Model

- ✓ Includes a core set of standards that are broad and introductory.
- ✓ Includes a pathway that is more defined leading to specialties within the career cluster. *(IT Career Cluster Strands)*
- ✓ Involves specialization that may include certification, degrees or licenses. *(IT Career Technical Standards)*
- ✓ Includes course descriptions that will earn college credit through NHCTC Running Start Program. *(IT Career Cluster Courses and Skills)*

IT Career Cluster Strands

Business Information Studies
Multimedia
Network Systems
Programming and Software Development

IT Career Technical Standards

Data Design and Management, Accounting, Management
Principles of Marketing, Introduction to eCommerce
Introduction to Computer Information Assurance
Introduction to Graphic Design, Introduction to 3D Animation
Introduction to Multimedia, Sound Editing, Video Production
Computer Networking Technology I & II, Installation and Repair Hardware
Installation and Repair Software, LAN Management I & II
Programming Logic, Introduction to Computer Networking, LAN Technologies
WAN Technologies, Programming I, Web Programming I
Introduction to Java Script, Introduction to C++

IT Career Cluster Courses

IT & ME
IT & ME Works
Introduction to Business
Human Relations and the Organization
Oral Communication
Consumer Behavior

Learning Outcomes

- ✓ Students will be able to identify, define, and explain terms and equipment associated with Core Technical Standards.
- ✓ Students will demonstrate knowledge and skills in the use of technology.
- ✓ Students will use multiple technology resources to access, interpret, analyze, synthesize, apply and communicate information.
- ✓ Students will understand important issues of a technology-based society and will exhibit ethical behavior in the use of technology.

New Hampshire's IT Career Pathway
Sixteen Benchmark I. T. Skill and Knowledge Goals
With 124 Learner Outcomes for Grades 4,8,10, and12

IT Skill and Knowledge	IT Literacy – Grade 4 *Career awareness and IT skills for learning*	Rating	Skill Gap	IT Fluency – Grade 8 *Career exploration and transition for IT skills for learning to IT skills for working*	Rating	Skill Gap	IT For All Work – Grade 10 *Core IT employability for all work*	Rating	Skill Gap	IT Employability – Grade 12 *Initial specialized technical* job skills *for the IT industry*	Rating	Skill Gap
Technology and Society	• Understands and uses computers as a tool for living and learning • Respects the work of others (copyright, acceptable use, responsible use) • Understands impact of technology on individuals and communities	•	•	• Understands, explains and provides examples of how computers are used as tools for working	•	•	• Understands, explains and provides examples of how computers are used to carry out business • Understands past and current trends in computer technology	•	•	• Understands and explains how IT impacts society and the operation and management of business	•	•
Information Literacy	• Appreciates that information can be useful to life and pursues information close to own interests	•	•	• Accesses information efficiently and effectively • Evaluates information critically and uses information accurately and creatively	•	•	• Strives for excellence in information seeking and generation • Applies basic principles of visual communication to transferring data into graphics form	•	•	• Generates and pursues information and practices ethical behavior in regard to information and information technologies	•	•
PC Principles and Operation	• Determines when technology is useful and selects appropriate technology tools and resources • Installs and uses programs (disc, CD, download) and uses new simple learning programs • Uses computer independently	•	•	• Uses PC and MAC computers independently • Can teach others to operate computers (turn on, use mouse, call up programs, save and locate files)	•	•	• Performs basic personal computer operations	•	•	• Understands issues affecting system purchase and upgrade decisions	•	•
World Wide Web	• Locates information from web sites • Uses search engines • Demonstrates responsible behavior while on-line	•	•	• Locates and organizes information from internet resources • Differentiates between more useful and less useful information	•	•	• Uses internet as a research and business tool in a highly effective manner	•	•	• Understands and demonstrates use of internet for e-commerce	•	•
Word Processing to Desktop Publishing	• Uses word processing for documents, letters and reports (edit, format, spell check)	•	•	• Creates complex word processed letters, memos and reports which include tables and footnotes / endnotes in teams	•	•	• Creates complex desktop published documents and reports using multiple applications in teams (PhotoShop, PageMaker, Excel, Access)	•	•	• Selects, integrates and uses appropriate technologies to create complex professional publications (e.g., yearbook, brochure, multifold flyers)	•	•

Graphics and Image Processing To Multimedia Publishing	• Creates simple graphics using drawing and painting software programs • Uses scanner and digital camera and images from the web • Creates thematic slide shows	•	•	• Creates composite imagery integrating photos, drawings and text using drawing or painting software programs • Creates a hypermedia presentation	•	•	• Creates original audio, video and animation elements • Incorporates and edits sound and images from various sources of input • Creates interactive multimedia presentations	•	•	• Selects, integrates and uses appropriate media for complex interactive multimedia presentations such as web presentation with music, video, and animation, CD-ROM, or video game	•	•
Keyboarding	• Familiar with keyboard functions • Keyboards with minimal frustration	•	•	• Keyboards to 20 words per minute	•	•	• Keyboarding to 35 words per minute including numbers and symbols	•	•	• Proficient in keyboarding skill (accuracy and speed)	•	•
E-Mail	• Corresponds with an e-mail partner	•	•	• Requests and sends information globally (with attachments) concerning research topics • Uses a listserv	•	•	• Understands e-mail system components and organization • Uses appropriate e-mail writing style and protocols for various purposes (personal/business)	•	•	• Moderates listserv • Manages e-mail address books and listservs • Uses e-mail effectively and appropriately	•	•
Software and Systems Integration	• Recognizes that files/software/hardware have different formats (file types, extensions, operating systems) • Selects and uses software appropriate to task (e.g., KidPix, Word)	•	•	• Integrates various pieces of software (word processing, images from Illustrator, photos from PhotoShop) into one product/project	•	•	• Works with and integrates items into project work from multiple operating systems	•	•	• Coordinates communication between different operating environments (e.g., facilitating data exchange and communication between Unix and Windows NT networks)	•	•
Database Software: Use to Management	• Searches and sorts prepared databases • Defines parts of a database • Develops simple databases and enters information	•	•	• Uses database to manage personal information (music collections, phone numbers) • Creates, modifies and prints database reports • Applies search and sort strategies • Accesses local, national, regional databases (e.g., DOL, occupation information) for project work	•	•	• Applies database to actual situations and real word (business) problems (college scholarships) • Uses, modifies, designs and creates relational databases, including queries, forms and reports	•	•	• Critically analyzes and evaluates databases and their complex interaction • Accesses and applies/uses large scale databases for project work (e.g., GIS, census, corporate reports)	•	•
Spreadsheet	• Creates graphs and charts • Defines spreadsheet terms • Enters data into prepared spreadsheet • Performs simple mathematical calculations and notices changes	•	•	• Uses spreadsheets for managing finances, addresses, purchases	•	•	• Applies spreadsheet principles to real-life situations and business problems	•	•	• Designs, creates, modifies and troubleshoots spreadsheets • Uses databases functions to perform "What If Analysis" or decision models	•	•
Operating Systems	• Uses both CD-ROMS and 3.5" disks • Obtains and transfers information from each • Maintains files	•	•	• Maintains files and folders in more than one platform • Uses multiple operating systems (MacIntosh, Windows, Unix, DOS)	•	•	• Installs software programs and performs basic configuration operations • Understands compatibility issues	•	•	• Troubleshoots basic configuration problems • Customizes operating system environments	•	•
Programming	• Follows a simple structured program (e.g., Lego LOGO, Basic)	•	•	• Creates simple structured programs (e.g., Lego Mindstorms, HTML)	•	•	• Creates simple object oriented programs using already developed source code (e.g., Java Script, Macros)	•	•	• Creates programs developing own source code (e.g., web applications, free/shareware)	•	•

Hardware Installation and Configuration	• Demonstrates knowledge of individual parts that make up a stand-alone PC computer system and the relationship between components	•	•	• Installs and configures hardware in a PC Computer system (e.g., printers)	•	•	• Troubleshoots minor problems and can articulate problems to technicians	•	•	• Demonstrates basic knowledge of PC hardware troubleshooting and maintenance	•	•
Network Technologies	• Can manage one's own electronic portfolio in a networked environment	•	•	• Understands overall design and components of a LAN and WAN system	•	•	• Performs basic set up and configuration of network hardware and software	•	•	• Monitors overall network operations • Troubleshoots basic problems • Implements administrative functions	• • •	• • •
Self-Management, Teamwork and Communication (Soft Skills)	• Works in teams • Values diversity • Develops basic skills in literacy and numeracy • Listens actively and communicates own ideas	• • • •	• • • •	• Solves problems • Makes decisions • Integrates learning • Writes clearly and concisely • Calculates accurately • Navigates systems • Adapts to changing environments • Demonstrates integrity, honesty and ethical behavior	• • • • • • • •	• • • • • • • •	• Speaks effectively and persuasively • Analyzes, interprets information, and draws conclusions • Manages resources • Generates ideas • Coaches others • Monitors and corrects systems	• • • • • •	• • • • • •	• Leads teams • Negotiates effectively • Continuously improves quality of work • Teaches others • Generates designs • Creates and manages projects	• • • • • •	• • • • • •

**The Western NH Business and Education Partnership, as a Center of Excellence for the National Tech Force Initiative, participated in the Design and Development of the Pathway/Pipeline Model Benchmark Chart.*

Ratings

NO	Not Offered
1	Basic Level
2	Intermediate Level
3	Advanced Level



Prepared by
Learning Quest
on 08/20/2002

LoTi℠ Technology Use Profile

State of New Hampshire

Introduction

- During the 2001-02 school year, a technology use profile was conducted in the State of New Hampshire to create baseline data as to the current level of technology implementation in schools statewide. Such information will enable all stakeholders to target funding sources and provide professional development opportunities directed at moving New Hampshire 's educators to a higher level of technology implementation in the classroom, and in doing so, better prepare students for the challenges facing them in a highly competitive,technology-oriented society.
- The challenge is not merely to use technology to achieve isolated tasks (e.g.,word processing a research paper, creating a multimedia slide show, browsing the Internet), but rather to integrate technology in an exemplary manner that supports purposeful problem-solving,performance-based assessment practices,and experiential learning –all vital characteristics of the National Education Technology Standards (NETS) as established by the International Society for Technology in Education (ISTE).
- A 50 item survey referred to as the Level of Technology Implementation (LoTi) Questionnaire was administered to 6,285 New Hampshire educators in 85 school districts. The questionnaire generated a profile for each respondent in three domains: Level of Technology Implementation (LoTi), Personal Computer Use (PCU), and Current Instructional Practices (CIP). A separate version of the LoTi Questionnaire was administered to four different groups in the state: Inservice Teacher, Instructional Specialist, Media Specialist, and Building Administrator.
- The LoTi Technology Use Profile focused on the use of technology as an interactive learning medium because this particular component has the greatest and lasting impact on classroom pedagogy and is the most difficult to implement and assess. The questionnaire generated a profile for each respondent in three domains: Level of Technology Implementation (LoTi), Personal Computer Use (PCU), and Current Instructional Practices (CIP). The Level of Technology Implementation (LoTi) profile approximated the degree to which each respondent was either implementing technology (i.e., computers) into the curriculum (i.e., inservice teacher, instructional specialist) or modeling/supporting the implementation of technology (e.g., building administrator, media specialist). The Personal Computer Use (PCU) profile either addressed each respondent's comfort and proficiency levels with using computers. The Current Instructional Practices (CIP) profile revealed each respondent's inclination toward instructional practices consistent with either a subject-matter or learner-based curriculum design.

Introduction

- The creation of the LoTi Questionnaire and the identification of a LoTi profile for individual teachers, instructional specialists, media specialists, and building administrators were based primarily on the work of Moersch (1995) and his identification of specific levels of technology implementation (see Table 1). These levels range from Nonuse (Level 0) to Refinement (Level 6). As a classroom teacher progresses from one level to the next (Level 3 to Level 4) of the LoTi framework, a corresponding series of changes to the instructional curriculum is observed. The instructional focus shifts from a teacher-centered to a learner-centered orientation while the use of computers shifts from an emphasis on isolated uses (e.g., drill & practice applications) to an expanded view of technology as a process, product, and tool to augment and enhance students' critical thinking and help them find viable solutions to real world problems. (see Table 2)

Introduction

Table 1: The Levels of Technology Implementation (LoTi) Framework

Level 0 - Nonuse
Technology-based tools (e.g., computers) are either (1) completely unavailable in the classroom, (2) not easily accessible by the classroom teacher, or (3) there is a lack of time to pursue electronic technology implementation. Existing technology is predominately text-based (e.g., ditto sheets, chalkboard, overhead projector).

Level 1 - Awareness
The use of technology-based tools is either (1) used almost exclusively by the classroom teacher for classroom and/or curriculum management tasks (e.g., taking attendance, using grade book programs, accessing email), (2) used to embellish or enhance teacher-directed lessons or lectures (e.g., multimedia presentations) and/or (3) is one step removed from the classroom teacher (e.g., integrated learning system labs, special computer lab pull-out programs, central word processing labs).

Level 2 - Exploration
Technology-based tools supplement the existing instructional program (e.g., tutorials, educational games, basic skill applications) or complement selected multimedia and/or web-based projects (e.g., internet-based research papers, informational multimedia presentations) at the knowledge/comprehension level. The electronic technology is employed either as extension activities, enrichment exercises, or technology-based tools and generally reinforces the content under investigation.

Level 3 - Infusion
Technology-based tools including spreadsheet and graphing packages; multimedia and desktop publishing applications; and the internet complement selected instructional events or multimedia/web-based projects at the analysis, synthesis, and evaluation levels. Though the learning activity may or may not be perceived as authentic by students, emphasis is placed on using a variety of thinking skill strategies (e.g., problem-solving, decision-making, experimentation, scientific inquiry) to address the content under investigation.

Level 4a - Integration (Mechanical)
Technology-based tools are integrated in a mechanical manner that places heavy reliance on prepackaged materials, outside resources, and/or interventions that aid the teacher in the daily management of their operational curriculum. Technology is perceived as a tool to identify and solve authentic problems as perceived by the students relating to an overall theme/concept. Emphasis is placed on student action and/or on issues resolution that requires higher levels of cognitive processing and in-depth examination of the content.

Level 4b - Integration (Routine)
Technology-based tools are integrated in a routine manner whereby teachers can readily design and implement learning experiences (e.g., units of instruction) that empower students to identify and solve authentic problems relating to an overall theme/concept using the school's available technology with little or no outside assistance. Emphasis is placed on student action and/or on issues resolution that requires higher levels of student cognitive processing and in-depth examination of the content.

Level 5 - Expansion
Technology access is extended beyond the classroom. Teachers actively elicit technology applications and networking from outside sources to expand student experiences directed at problem-solving, issues resolution, and student activism. The complexity and sophistication of the technology-based tools used are now commensurate with (1) the diversity, inventiveness, and spontaneity of the teacher's experiential-based approach and (2) the students' level of complex thinking and in-depth understanding of the content at hand.

Level 6 - Refinement
Technology is perceived as a process, product, and/or tool for students to find solutions related to an identified "real-world" problem or issue of significance to them. Technology provides a seamless medium for information queries, problem-solving, and/or product development. The classroom content emerges based on the needs of the learner according to his/her interests, needs, and/or aspirations and is supported by unlimited access to the most current computer applications and infrastructure available.

Table 2: Stages of Instructional Practices

Element	***Stage 1***	***Stage 2***	***Stage 3***
Content	Content organized and delivered by traditional scope & sequence; Focus on teacher-based questions	Concepts and processes organized and presented based on the interests of the teacher and/or the learner	Concepts and processes emerge based on the needs of the learner; Focus on learner-based questions
Learning Materials	Organized by the content; heavy reliance on sequential instructional materials	Emphasis on hands-on investigations and predefined problem solving strategies	Determined by the problem areas under study, extensive and diversified resources
Learning Activities	Traditional verbal activities; problem solving activities (e.g., worksheets; story problems)	Emphasis on student's active role; problem solving strategies with little or no connection to a broad concept or theme (e.g., verification lab from a science kit)	Emphasis on student activism and issues investigations and resolutions; authentic hands-on inquiry related to a problem under investigation; focus on experiential learning
Teaching Strategies	Expository approach	Facilitator; resource person	Co-learner/facilitator
Evaluation	Traditional evaluation practices including multiple-choice, short answer, and true/false questions	Uses multiple assessment strategies including performance tasks, and open-ended and problem-based questions	Multiple assessment strategies integrated authentically throughout the unit and linked to the problem/concept; use of portfolios, open-ended questions, performance tasks, self-analysis, and peer review
Technology	Drill & practice computer-based programs (e.g., integrated learning systems); computer games; little connection between technology use and overall concept/topic	Technology integrated into isolated hands-on experiences (e.g., tabulating and graphing data to analyze a survey or experiment; information searches using the Internet/CD-ROM)	Expanded view of technonlgy as a process, product, and tool to find solutions to authentic problems, communicate results, and retrieve information (e.g., spreadsheets, graphs, probes, databases, CD-ROM-based simulations, Web page development)

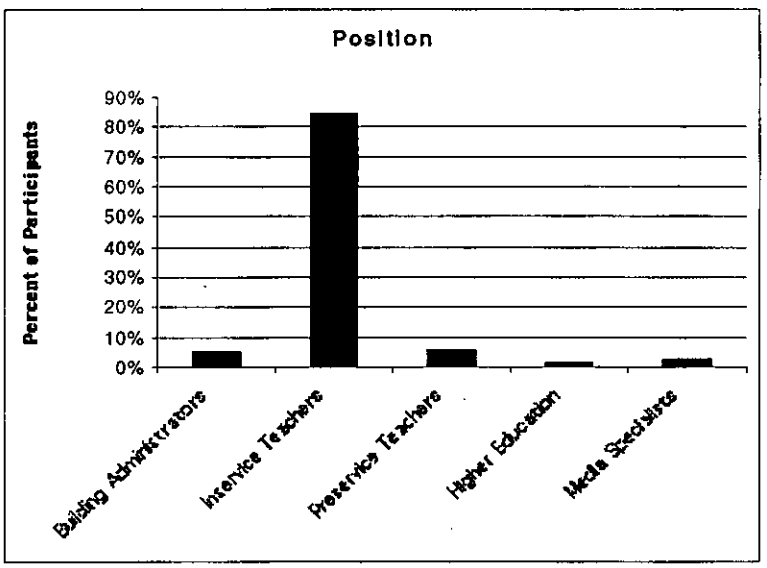
Introduction

- Current research has found strong links between student academic achievement and the manner in which technology is used in the classroom. According to the National Assessment of Educational Progress (NAEP) study (1998), eighth grade students whose teachers used computers primarily for higher order thinking performed better on NAEP than students whose teachers did not. Conversely, eighth grade students whose teachers used computers primarily for "drill and practice"– generally associated with lower order thinking skills – performed worse. Still, the majority of the research findings point to the teacher's role in the instructional planning process as the most important element in promoting student higher order thinking. Many of these studies investigating technology use practices and student performance (e.g., Flescher, 1997; Alvarez, 1998; Oliver, 1999; and Wiburg and Carter, 1994) discuss the importance of emergent curricula that engage students in meaningful ways as essential factors tied to student demonstration of higher order thinking.
- The LoTi Questionaire was created for the purpose of assessing classroom practices tied to higher order thinking skills and relevant, engaging curricula. Specifically, the LoTi Questionaire enables decision-makers to determine how all stakeholders at the school building level (e.g., inservice teachers, building administrators, media specialists, instructional specialists) are either implementing or supporting the use of technology tied to powerful teaching and learning opportunities directed at student achievement.
- Though the term, technology, embraces a variety of hardware applications used in the classroom including calculators, video cameras, and scanners, this questionnaire focused exclusively on the instructional uses of the computer. The information provided in this report was based exclusively on the perceptions of the staff who participated in the survey. A total of 6,285 educators from the State of New Hampshire completed the Level of Technology Implementation (LoTi) survey. The subsequent data analysis including all findings, goals,and recommendations are based on these returns.

LoTi Profile

- Figure 1 compares the number of participants who completed the LoTi survey by Position in the State of New Hampshire. Based on their responses, 85% of participants were inservice teachers compared to 6% preservice teachers, 3% media specialists, 1% higher education teachers, and 5% building administrators.

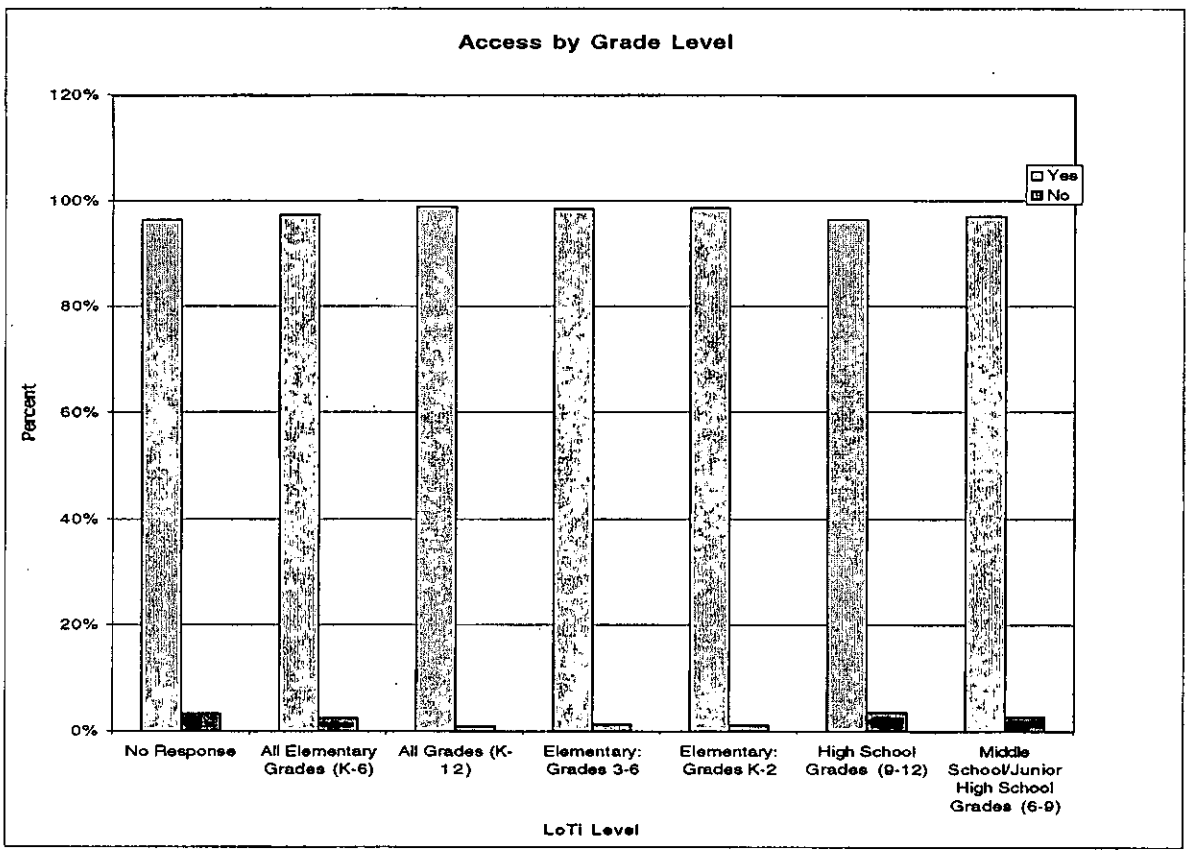
Figure 1



LoTi Profile

- Figure 2 compares the availability of computer access versus no computer access across the State of New Hampshire. Respondents were asked whether or not they had computer access in their classroom(s). Computer access implied that staff or students can use or borrow a computer within the school building for instructional purposes; including computers in the classroom, computer labs, computers on carts, general access computers in the Library or something similar. In the State of New Hampshire, the "no computer access" response ranged from 0% to 2%.

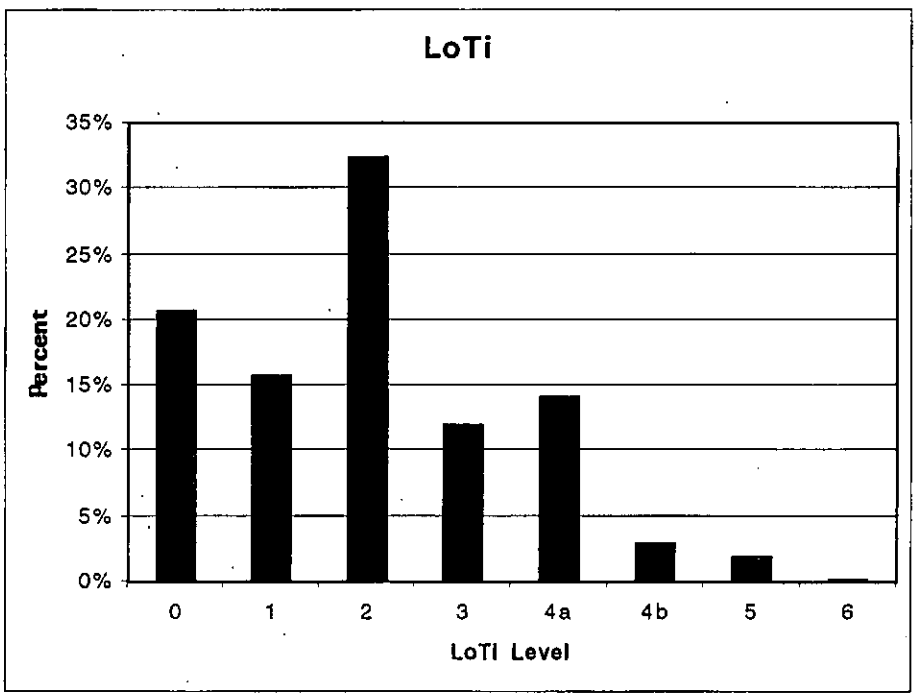
Figure 2



LoTi Profile

- Figure 3 compares the 2001-02 Level of Technology Implementation (LoTi) ranking for the 6,285 participants in the State of New Hampshire. The LoTi profile approximates the degree to which each participant is implementing or supporting the implementation of computers into the curriculum. Based on their responses, the predominate level of technology implementation was at a Level 2 (Exploration) in the State of New Hampshire.
- A Level 2 implies technology-based tools supplement the existing instructional program (e.g., tutorials, educational games, basic skill applications) or complement selected multimedia and/or web-based projects (e.g., internet-based research papers, informational multimedia presentations) at the knowledge/comprehension level. The electronic technology is employed either as extension activities, enrichment exercises, or technology-based tools and generally reinforces the content under investigation.

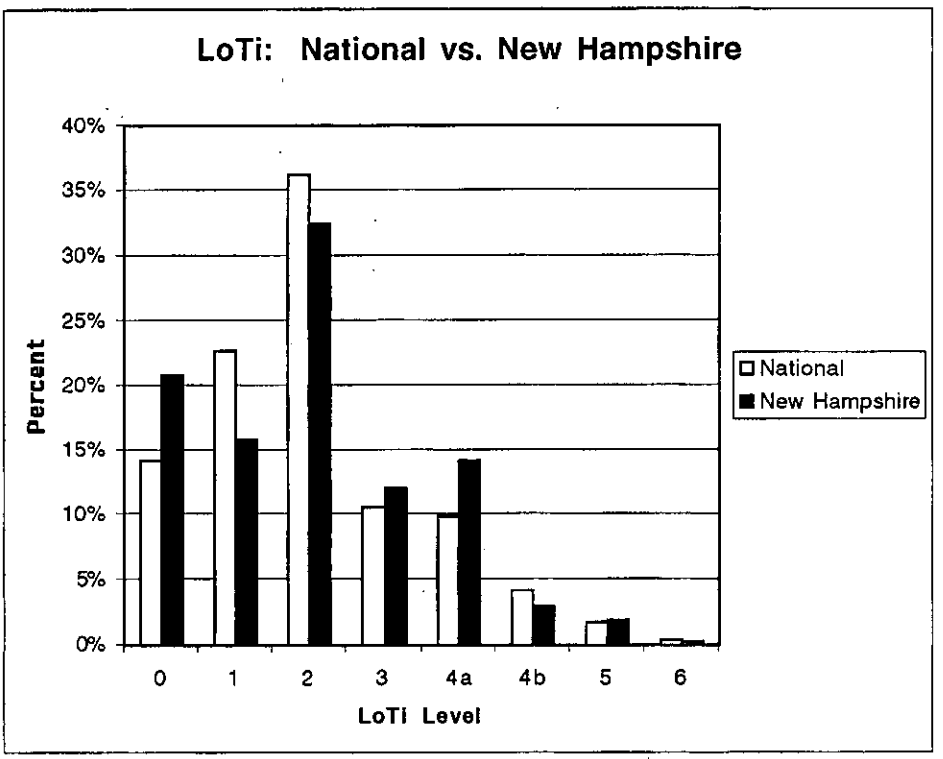
Figure 3



LoTi Profile

- Figure 4 compares the 2001-02 Level of Technology Implementation (LoTi) percentage ranking for the 6,285 participants in the State of New Hampshire with the percentage ranking of the 34,268 national LoTi participants from the 2001-2002 school year.
- During the 2001-02 school year, the predominate level of technology implementation in the State of New Hampshire and nationally was at Level 2 (Exploration) based on the responses from 6,285 State of New Hampshire and 34,268 national LoTi participants. Overall, the State of New Hampshire had a lower percentage of respondents at Levels 1 and 2, but a higher percentage level of participants at Levels 0, 3, and 4a.

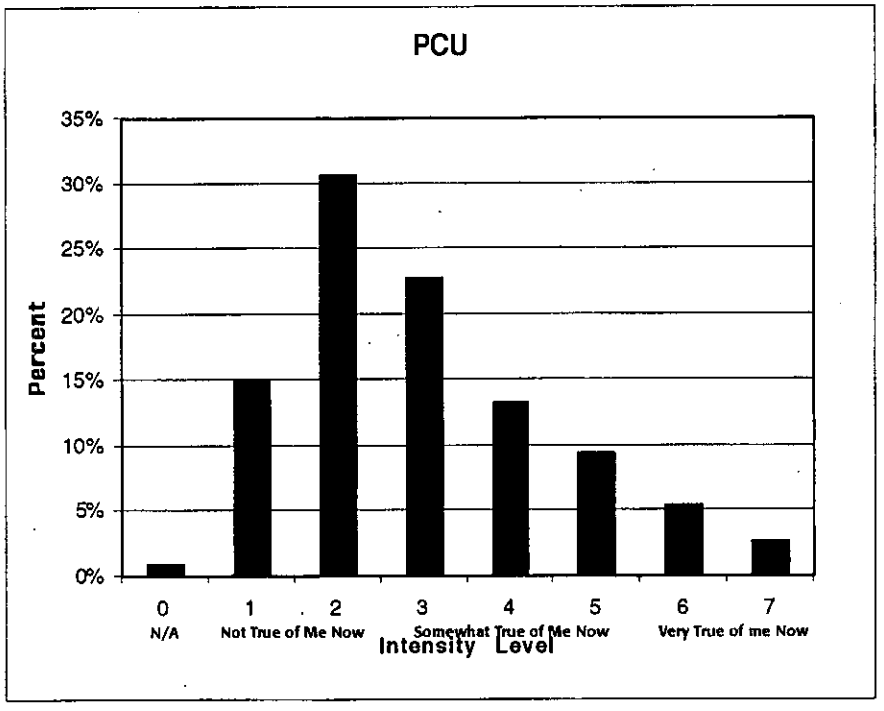
Figure 4



LoTi Profile

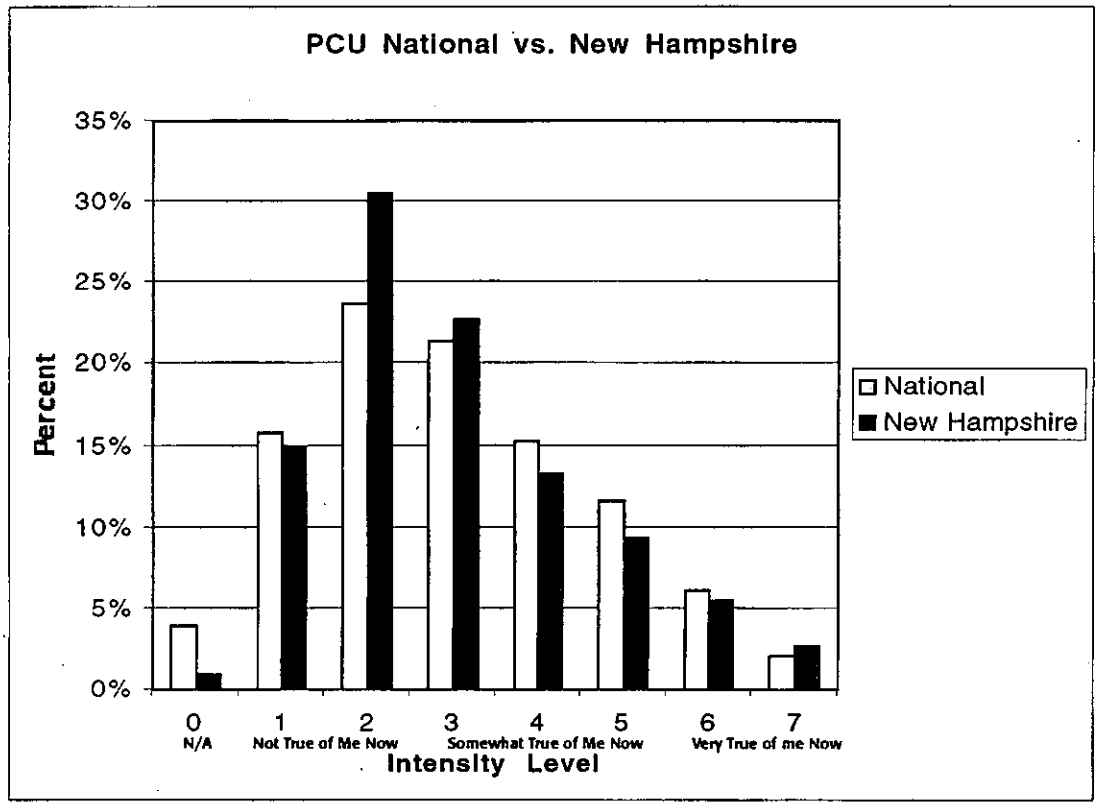
- Figure 5 displays the Personal Computer User (PCU) profile for the 6,285 respondents in the State of New Hampshire during the 2001-02. The PCU profile addresses an individual's comfort and proficiency level with using computers (e.g., troubleshooting simple hardware problems, using multimedia applications). During the 2001-02 school year, the predominate intensity level for the 6,285 respondents in the State of New Hampshire was in the "Not True of Me Now" range (Intensity Level 2) regarding their ability to either use basic software applications, troubleshoot routine computer problems, or use computers routinely in the workplace.

Figure 5



- Figure 6 compares the percentage of respondents positioned at each of the PCU intensity levels for the State of New Hampshire during the 2001-02 school year with the national respondents for the 2001-2002 school year. The State of New Hampshire respondents had a slightly higher percentage of teachers in the "Not True of Me Now" range and in the "Very True of Me Now" range compared to their national counterparts involving Personal Computer Use (PCU).

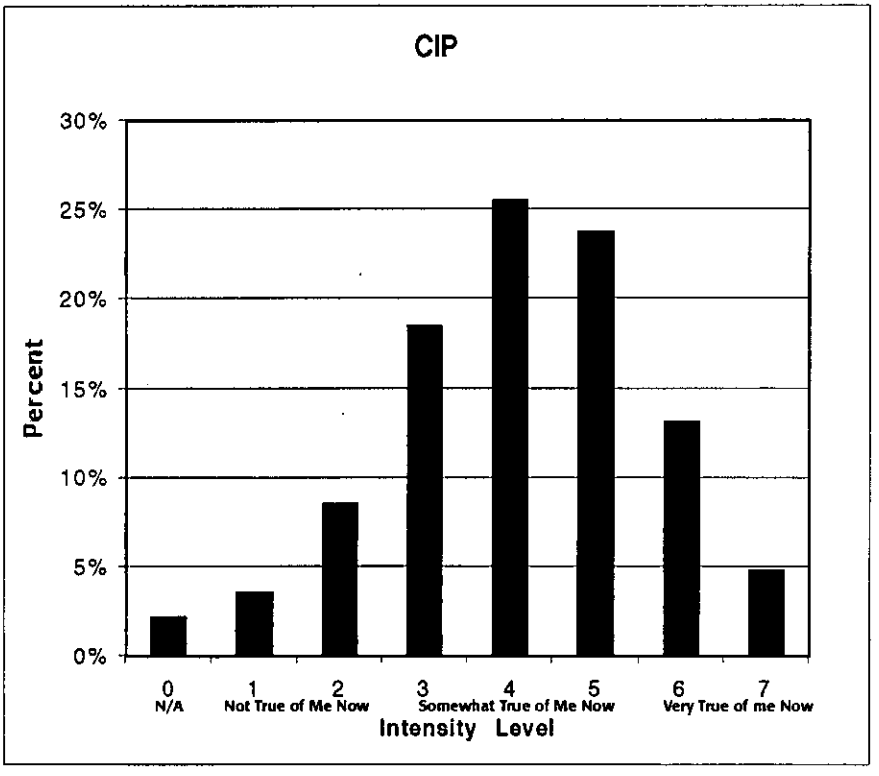
Figure 6



LoTi Profile

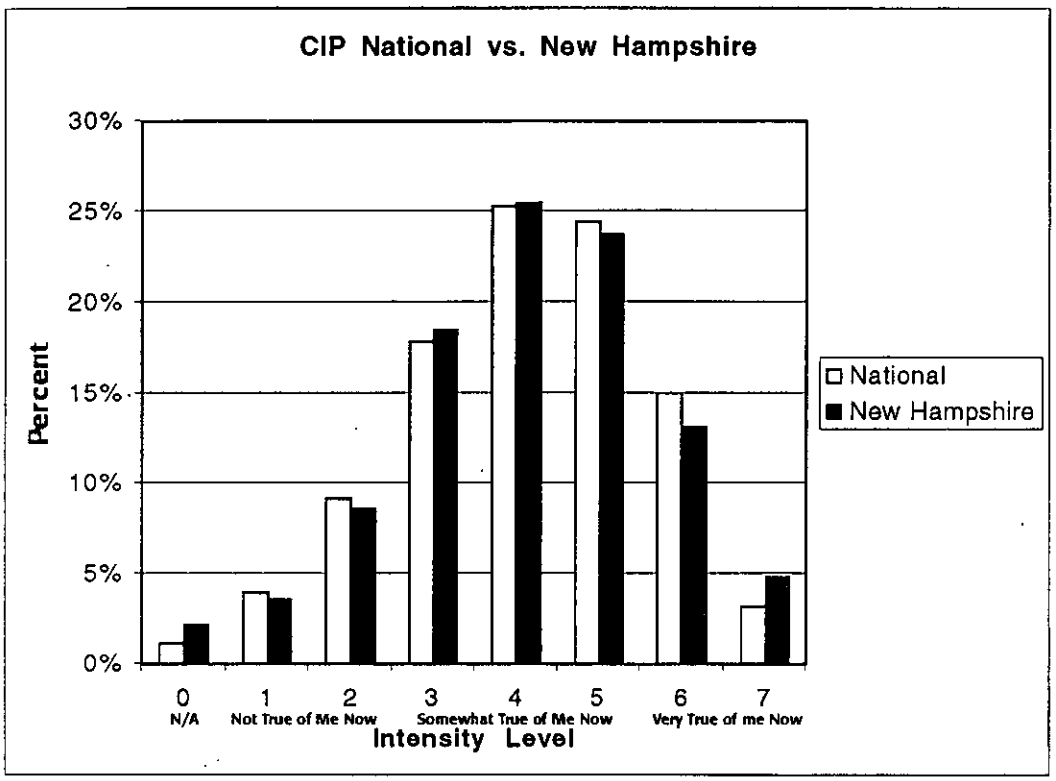
- Figure 7 displays the Current Instructional Practices (CIP) profile for the 6,285 respondents in the State of New Hampshire during the 2001-02 school year. The CIP profile reveals the participant's inclination toward instructional practices consistent with a learner-based curriculum design (e.g., learning materials determined by the problem areas under investigation, multiple assessment strategies integrated authentically throughout the curriculum, teacher as co-learner/facilitator, focus on learner-based questions). During the 2001-02 school year, the predominate intensity level for the 6,285 participating staff members in the State of New Hampshire was in the "Somewhat True of Me Now" range (Intensity Level 4) regarding their use of a learner-based versus a subject-matter based curriculum approach.

Figure 7



- Figure 8 compares the percentage of respondents positioned at each of the CIP Intensity levels for the 6,285 respondents in the State of New Hampshire during the 2001-02 school year compared to the CIP intensity levels of the national LoTi participants from the 2001-02 school year. As mentioned above, the predominate intensity level for the 6,285 participating staff members in the State of New Hampshire was in the "Somewhat True of Me Now" range (Intensity Level 4) regarding their use of a learner-based versus a subject-matter based curriculum approach. Nationally, the predominate CIP intensity level was in the "Somewhat True of Me Now" range (Intensity Level 4) based on the 34,268 national LoTi participants from the 2001-02 school year.

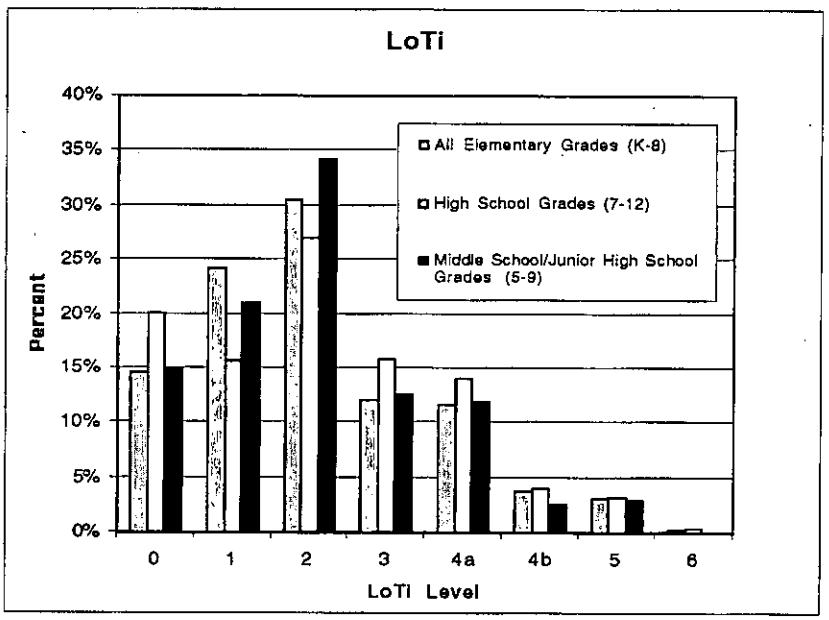
Figure 8



LoTi Profile

- Figure 9 compares the percentage of respondents positioned at each of the LoTi Levels for the State of New Hampshire during the 2001-02 school year according to Grade Level. The graph shows that all three grade level categories (i.e., elementary, middle/junior high, high school) exhibited a Level 2 implementation of technology in the State of New Hampshire.

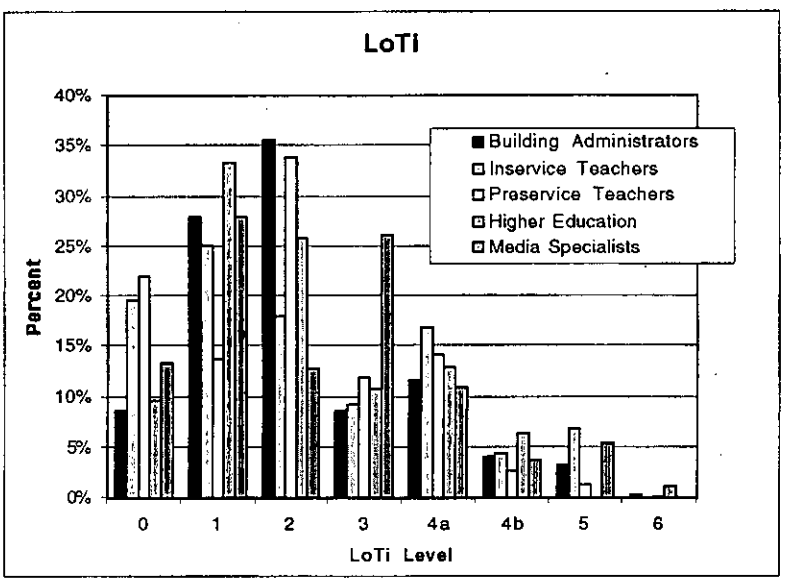
Figure 9



LoTi Profile

- Figure 10 compares the percentage of respondents positioned at each of the LoTi Levels for the State of New Hampshire during the 2001-02 school year according to Position. The graph shows that Building Administrators and Pre-service Teachers exhibited a higher level of technology implementation than either Inservice Teachers, Media Specialists, or Higher Education Faculty in the State of New Hampshire. Building Administrators and Pre-service Teachers were more likely to be positioned at a Level 2 whereas Inservice Teachers, Media Specialists, and Higher Education Faculty were more likely to be positioned at a Level 1.
- A Level 1 implies that the use of technology-based tools is either (1) used almost exclusively by the classroom teacher for classroom and/or curriculum management tasks (e.g., taking attendence, using grade book programs, accessing email), (2) used to embellish or enhance teacher-directed lessons or lectures (e.g., multimedia presentations) and/or (3) is one step removed from the classroom teacher (e.g., integrated learning system labs, special computer lab pull-out program, central word processing labs).

Figure 10





LoTi Findings

- Approximately 5% of the participants completing the Level of Technology Implementation (LoTi) Questionnaire self-assessed themselves at the Target Technology Level as defined by the CEO Forum on Education and Technology and the National Education Technology Standards (NETS). This level is characterized by technology use embedded in challenging and engaging learning experiences that promote problem-solving, critical thinking, and self-directed learning. This percentage closely mirrored the national Target Technology Level percentage of 6% based on a national sample of 34,268 participants.
- Approximately 69% of the 6,285 participants were clustered in Levels 0 through 2. These levels represent the lower portion of the LoTi Framework (see page 2) and focus primarily on teacher's use of productivity tools, student use of tutorial programs, and "project-based" learning opportunities at the knowledge/comprehension level.
- Approximately 97% of the participants reported having instructional access to computers for teacher and student use.
- Approximately 31% of New Hampshire educators who participated in this study felt comfortable using computers at home and in the workplace (e.g., accessing email, creating multimedia products, troubleshooting computer problems). This percentage was less than the national PCU (Personal Computer Use) percentage of 35% for this same item based on a national sample of 34,268 participants.
- Approximately 71% of New Hampshire educators indicated that they either supported or implemented one or more attributes of a learner-centered curriculum with or without a computer. This percentage was higher than the national CIP (Current Instructional Practices) percentage of 69% based on a national sample of 34,268 participants. A learner-centered curriculum includes attributes such as a focus on multiple assessment strategies, an emphasis on higher order thinking skills, and the creation of a problem-based learning environment. Research has found strong links between computers used in conjunction with these attributes and higher student achievement based on standardized test scores.
- Building Administrators and Pre-service Teachers exhibited a higher level of technology implementation than media specialists, inservice teachers, or higher education faculty.

LoTi Findings

Percent of staff at LoTi Level 0 There is no visible evidence of computer access or instructional use of computers in the classroom.	21%
Percent of staff at LoTi Level 1 Available classroom computer(s) are used primarily for teacher productivity (e.g., email, word processing, grading programs).	16%
Percent of staff at LoTi Level 2 Student technology projects (e.g., designing web pages, research via the internet, creating multimedia presentations) focus on the content under investigation.	32%
Percent of staff at LoTi Level 3 Tool-based applications (e.g., graphing, concept-mapping) are primarily used by students for analyzing data, making inferences, and drawing conclusions.	12%
Percent of staff at LoTi Level 4a The use of outside resources and/or interventions aid the teacher in developing challenging learning experiences using available classroom computers.	14%
Percent of staff at LoTi Level 4b (Target Technology Level) Teachers can readily design learning experiences with no outside assistance that empower students to identify and solve authentic problems using technology.	3%
Percent of staff at LoTi Level 5 Teachers actively elicit technology from outside entities to expand student experiences directed at problem-solving, issues resolution, and student action.	2%
Percent of staff at LoTi Level 6 Computers provide a seamless and almost transparent medium for information queries, problem-solving, and/or product development.	0%
Percent of staff indicating they HAVE access to computers for instructional purposes	97%

Recommendations for the Current School Year

One could argue that a "Digital Divide" does exist in classrooms throughout the State of New Hampshire, but not as it relates to access to or the availablity of hardware and software. The digital divide resulting from this study focuses on the manner in which technology is not being used in the state to address specific content standards. The fact that approximately 69% of the respondents "self-assessed" themselves at Levels 0-2 while only 5% self assessed themselves at the Target Technology Level should signal a concern as well as a need to reassess existing statewide professional development practices, mentoring opportunities, and methods of evaluating acceptable use of technology in the classroom. Provided below are recommendations consistent with this study's findings.

- Provide staff development that models specific strategies and techniques for integrating higher-order thinking skills with the available classroom computers using tool-based applications (e.g., spreadsheets, graphs, multimedia, databases, concept-mapping, internet tools). This recommendation is targeted at moving participants to Level 3 relating to their level of technology implementation.

- Provide staff development that increases participants confidence and competence with designing Level 4b (Target Technology) instructional modules using a constructivist, experiential-based approach to curriculum development. This recommendation is targeted at (1) moving participants to a Level 4a implementation of technology, (2) improving the perceptions of Level 4a participants regarding their ability to support or integrate technology at a Level 4a, and (3) moving participants to a Level 4b relating to their level of technology implementation.

- Review existing statewide professional development programs in light of the results from this study. Approximately 69% of the survey participants self-assessed themselves at Levels 0-2, yet close to 71% of these same participants indicated that they were implementing one or more of the attributes of a learnercentered curriculum. It is respectfully recommended that stakeholders consider new approaches and/or modify existing approaches to statewide professional development so that educators can make better connections between technology use and student authentic problem-solving in the classroom. This recommendation is targeted at moving Level 1 and 2 survey participants to Level 3.

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Wiburg, Karin M. and Carter, Bruce (Sept. 1994). Thinking with computers. Computing Teacher, 22, 7-10.



Inquiries

- For any further inquiries, please contact Learning Quest by any means listed below:

Mail:

Learning Quest, Inc.

P. O. Box 61

Corvallis, OR 97339

Phone:

541-753-3011

Fax:

541-753-6461

Email:

info@learning-quest.com

Web:

www.learning-quest.com

Wednesday, February 19, 2003. Concord, NH

Testimony in support of HB 528 sponsored by Rep. Sharon M. Carson.

Good Morning:

My name is Marsha Miller and I am the Regional Director of the Western NH Business & Education Partnership. I am also the tech prep consultant for two of New Hampshire's career pathways: Information Technology and Education.

The Career Pathways Project is being funded by a federal grant under the Carl D. Perkins Vocational and Technical Act. At the present time, with strong roots in school-to-work, there are five regional consortia that are developing these pathways.

Today, I am here to share information about the IT Pathway and, further, to support Rep. Carson's bill to establish a commission to study NH computer standards in use in public schools. My objective is to focus attention on the teaching/learning opportunities provided through the IT Pathway as well as to raise awareness concerning a perceived obstacle to statewide implementation.

First, the key objectives:

- ✓ Objective #1: Computer Literacy

From balancing your checkbook, to making travel arrangements, to working an entry-level job, computer literacy is a required skill. To insure that all students are prepared to live, learn and work in the knowledge economy, the IT Pathway begins with two core courses – I.T. & ME and I.T. & Me Works. It is important to note that these courses are not a canned curriculum from out-of-state. Rather, over the last two years, a team of thirty NH teachers have developed and field-tested these courses. On-line access to the course outlines, skills and standards, and the 100+ lesson plans can be obtained through the Department of Education's website. In summary, IT & ME and IT & ME Works were developed by NH teachers for NH classrooms.

- ✓ Objective #2: Career Development

Once students acquire the basic skills, the IT Pathway provides a sequence of recommended courses in four broad areas of focus: business information studies with a focus on eCommerce; multimedia from desktop publishing to digital imaging; network systems from installing and

repairing a computer to systems configuration and maintenance; programming & software development from both the software and hardware perspective.

- ✓ Objective #3: Postsecondary Enrollment

To insure a seamless transition from secondary to postsecondary, the IT Pathway has – from its inception – included representatives from New Hampshire's Community-Technical College System. This alignment of competencies and learner outcomes insures that students are prepared for postsecondary enrollment. In fact, because these courses are built on postsecondary outcomes, high school students can get a head start on their future education by earning college credit as well as high school credit.

- ✓ Objective #4: Alignment with the State of New Hampshire's Technology Plan

To assist local districts in complying with the State of New Hampshire's Technology Plan that requires all districts to identify the way in which technical literacy will be measured by the end of 8th grade, the Western NH Business & Education Partnership will sponsor its third IT Summer Institute. The intended outcome will be an assessment tool for the IT core courses so that local schools, should they choose to do so, can offer I.T. & ME as an 8th grade course and use the assessment tool to document proficiency. This evidence could also serve as a placement tool so that entering ninth graders are appropriately placed in challenging courses. The two-day workshop will be held on the Pease Campus of NHCTC on June 24 and 25. To date, eighteen teachers are enrolled.

- ✓ Objective #5: Statewide Implementation & Sustainability

The IT Pathway is a tool. The teachers and students, at all levels, are the users. However, in our attempt to deliver the Pathway statewide, the teachers have identified the computer standard as an obstacle.
For reference sake, the standard reads as follows:

The ½ unit requirement in computer education shall be met by successfully completing a ½ unit course at the high school level, passing a locally-developed computer competency test, or successfully completing a computer education program prior to grade 9. Their question, and the one that needs to be addressed by the proposed commission is:

"If a student achieves the credit prior to high school enrollment and, as a result, does not enroll in any computer course at the high school level --

how do we – as educators – insure that the emerging workforce is computer literate?"

In a recent discussion with Dr. Steven Bolander, Dean of the Whittemore School at UNH, he noted that his school's computer requirement has been shifted from the junior year to the freshman year due, in part, to the entering students' deficiency in computer literacy. After reviewing the IT Skills and Standards that serve as the foundation of the Pathway, his question was: "Can we assume that all schools are using the IT skills and standards as 12th grade outcomes?" Unfortunately, the answer depends upon when the student enrolled in the course. If it was in middle school, how do we insure that the lessons learned are still relevant?

In conclusion, I leave you with the bottom-line question:
"Does the existing computer standard that was written in the era of Commodore 64, Apple II and 16 credits to graduate, serve the needs of our emerging workforce?" How can we not – at the minimum – establish a commission to study computer standards in use in public schools?

At this point, I'd like to introduce Gary McKenney, the networking teacher at Sugar River Valley Technical Center in Claremont, NH. Gary has been an integral member of the IT Pathway team. With an incredible amount of support from business & industry, he has built a lab that other, more affluent schools – envy. He has entertained visitors from across the state and has served as an online mentor to a sister school in Atlanta.
The opportunities afforded his students are ones that I believe should be available to all.

Thank you for your consideration.

Submitted by:

Marsha A. Miller, Regional Director
Western NH Business & Education Partnership
Tech Prep Consultant for IT & Education
7 Harding St., Rochester, NH 03867
mamiller@ttlc.net

Background Information on the IT Project:

New Hampshire's Information Technology Pathway is grounded in core academic, technical and employability skills. In its formative stage, the IT Project was chosen by the National Techforce Initiative as an "aspiring center of excellence." This engagement in a national project led by the National Alliance of Business, the Information Technology Association of America, and EDC* in Newton, Massachusetts provided the funding for participation – first as an attendee and – later as a presenter – at five national convocations on workforce development. Further, to study model programs, onsite visits were conducted at Hi-Tech High School in San Diego, California, the Northwest Center for Emerging Technologies in Bellevue, Washington and Central and South High Schools in Omaha, Nebraska.

On January 31, 2003 an NSF grant proposal was submitted by EDC, whose genesis is Harvard's School of Education. This proposal is to establish an ITEST Learning Resource Center (Information Technology Experiences for Students and Teachers). The State of New Hampshire is named as a qualified partner because of the teaching/learning opportunities provided through the IT Pathway.

Closer to home, the Western NH Business & Education Partnership is an active member of the Greater Portsmouth Chamber of Commerce's eCoast Technology Roundtable. The focus of the roundtable is the training, recruitment and retention of IT professionals.

In conclusion, the ongoing engagement of national, regional and local partners insures that the IT Pathway will maintain rigorous and relevant standards.

*The Educational Development Center is most commonly known as EDC and is one of America's foremost curriculum development centers.

Nicholas C. Donohue
COMMISSIONER
Tel. 603-271-3144

STATE OF NEW HAMPSHIRE
DEPARTMENT OF EDUCATION
101 Pleasant Street
Concord, N.H. 03301
FAX 603-271-1953
Citizens Services Line 1-800-339-9900

TO: SUPERINTENDENTS/AGENCY DIRECTORS

FROM: ARTHUR BROWN (603-271-3874)

SUBJECT: COMPUTER TECHNOLOGY EDUCATION

I. Attached are the materials needed to develop an Alternative IV Computer Technology Education Plan:

A. A copy of the candidate's Statement of Eligibility
B. Instructions detailing the planning process
C. An official Superintendent/Agency Directors Signature sheet
D. An Individualized Professional Development Plan (IPDP)
E. Assessment of Candidate's Strengths and Professional Development Needs for Computer Technology Education.
F. Assessment for Professional Education Core Requirements.

OR

II. The following are the only New Hampshire approved Art Education Programs currently accepting applications:

Keene State College	603-352-1310
Plymouth State College	603-535-2285
Southern New Hampshire University	603-644-1379

III. If you choose the process outlined in I above, please complete the following forms and return them to the Bureau of Credentialing:

A. Superintendents/Agency Directors Signature Sheet
B. Assessment of Candidate's Strength's and Professional Developments Needs for Computer Technology Education and Assessment for Professional Education Core Requirements.
C. Individualized Professional Development Plan (IPDP)
D. Enclose the appropriate fee ($80.00 for the Intern License) (Official Passing Praxis I scores must be received by this office before the intern license will be issued)

IV. If you choose process II outlined above, please provide the following forms to the Bureau of Credentialing.

A. Superintendents signature sheet
B. Written verification, on college letterhead, that you are enrolled in an approved New Hampshire teacher preparation program for Computer Technology Educator.
C. Written verification, on college letterhead, of the courses you are scheduled to complete with course names, course numbers, and the expected completion date.
D. Enclose the appropriate fee ($80.00 for an Intern License) (Official Passing Praxis I scores must be received by this office before the intern license will be issued)

Once the candidate has a copy of the materials, feel free to have him/her call me for further assistance with this process.

ASSESSMENT OF CANDIDATE'S STRENGTHS AND PROFESSIONAL DEVELOPMENT NEEDS
For
COMPUTER TECHNOLOGY EDUCATION

	COMPETENCY	*ASSESSMENT*
1.	**KNOWLEDGE OF TECHNOLOGY TOOLS AND RESOURCES:** the following shall apply to the area of proficient computer and technology operations and concepts across platforms:	
	a. Ability to operate multimedia computer system, related hardware and display devices	
	b. Ability to select, install, manage and maintain technology tools.	
	c. Ability to access and use telecommunication tools, and resources, including email, list serves, and software resources.	
	d. Ability to practice responsible, ethical, legal and equitable access to technology, information and software resources.	
	e. Ability to practice responsible, ethical, legal and equitable use of technology, information, and software resources.	
	f. Ability to develop plans to organize computer and technology systems and related peripherals in a variety of settings.	
	g. Ability to identify strategies for troubleshooting and maintaining various hardware, software and network configurations.	
	h. Ability to make recommendations for developing policies relative to technology purchases, procedures, configurations and security.	
2.	**INTEGRATION OF TECHNOLOGY ACROSS INSTRUCTIONAL SETTINGS:** The following shall apply to the area of general teaching strategies	
	a. Ability to evaluate and use computer and technology resources, including applications, tools, educational software and associated documentation.	
	b. Ability to design and implement integrated technology classroom activities that involve a variety of student grouping strategies, curricular populations.	
	c. Ability to design and practice methods and strategies for teaching computer and technology literacy concepts and skills.	
	d. Ability to design and practice methods and strategies for teaching concepts and skills for applying keyboarding, productivity, and information access tools, including word processing, spreadsheet, database, presentation, classroom management software.	

ASSESSMENT OF CANDIDATE'S STRENGTHS AND PROFESSIONAL DEVELOPMENT NEEDS
For
COMPUTER TECHNOLOGY EDUCATION

	COMPETENCY	*ASSESSMENT*
3.	**INTEGRATION OF TECHNOLOGY ACROSS INSTRUCTIONAL SETTINGS:** the following shall apply to the area of curriculum design:	
	a. Ability to apply basic principles of instructional design associated with the development and use of multimedia and hypermedia learning materials.	
	b. Ability to develop instructional units that involve using technology to support critical thinking skills of:	
	1. Researching	
	2. Compiling	
	3. Organizing	
	4. Synthesizing	
	5. Problem solving	
	c. Ability to identify and support implementation and revision of curriculum to reflect on-going changes in technology.	
	d. Ability to identify and support implementation and revision of curriculum to reflect on-going changes in technology.	
	e. Ability to integrate computer and related technology resources to facilitate lifelong learning and emerging roles of the learner and the educator.	
4.	**APPLICATION OF TECHNOLOGY IN INSTRUCTIONAL SETTINGS:** the candidate shall have the ability to provide professional support related to the instructional integration of technology into the curriculum in accordance with the following:	
	a. Ability to apply computer and technology applications and use technology to support other content areas.	
	b. Ability to integrate advanced features of technology tools to support instruction in collaboration with content teachers.	
	c. Ability to assist staff in the integration of adaptive hardware and software for students with special needs.	

5.	**EVAULATION OF TECHNOLOGY IN INSTRUCTIONAL SETTINGS:** the following shall apply to the area of student evaluation:	
	a. Ability to design a set of evaluation strategies and methods to assess student learning.	
	b. Ability to evaluate, select and use appropriate measures to assess student's computer knowledge and skills and compare to district, state and national standards.	
6.	**EVALUATION OF TECHNOLOGY IN INSTRUCTIONAL SETTING:** the following shall apply to the area of process and product evaluation:	
	a. Ability to evaluate the process and criteria for selection of technology systems.	
	b. Ability to evaluate the process and criteria for selection of technology related materials.	
7.	**EVALUATION OF TECHNOLOGY IN INSTRUCTIONAL SETTING:** the following shall apply to the area of program evaluation.	
	a. Ability to evaluate the use of technology in terms of meeting district instructional goals and national trends.	
	b. Ability to collaborate with staff to design research strategies evaluating the use of technology in the classroom.	

Ed 507.22 Computer Technology Educator. The following requirements shall apply to the certification of a computer technology educator:

(a) To be certified as a computer technology educator, the candidate shall have at least a bachelors degree;

(b) The candidates for certification as a computer technology educator shall have the following skills, competencies, and knowledge:

(1) Relative to the knowledge of technology tools and resources, the following shall apply to the area of proficient computer and technology operations and concepts across platforms:

a. Ability to operate multimedia computer system, related hardware, and display devices;

b. Ability to select, install, manage and maintain technology tools;

c. Ability to access and use telecommunications tools and resources, including email, listserves, and other distance learning tools;

d. Ability to practice responsible, ethical, legal, and equitable access to technology, information, and software resources;

e. Ability to practice responsible, ethical, legal, and equitable use of technology, information, and software resources;

f Ability to develop plans to organize computer and technology systems and related peripherals in a variety of settings;

g. Ability to identify strategies for troubleshooting and maintaining various hardware, software and network configurations; and

h. Ability to make recommendations for developing policies relative to technology purchases, procedures, configurations and security;

(2) Relative to the integration of technology across instructional settings, the following shall apply to the area of general teaching strategies:

a. Ability to evaluate, and use computer and technology resources including applications, tools, educational software and associated documentation;

b. Ability to design and implement integrated technology classroom activities that involve a variety of student grouping strategies, curricular areas, and diverse student populations;

c. Ability to design and practice methods and strategies for teaching computer and technology literacy concepts and skills; and

d. Ability to design and practice methods and strategies for teaching concepts and skills for applying keyboarding, productivity and information access tools,

including word processing, spreadsheet, database, presentation, classroom management software;

(3) Relative to the integration of technology across instructional settings, the following shall apply to the area of curriculum design:

a. Ability to apply basic principles of instructional design associated with the development and use of multimedia and hypermedia learning materials;

b. Ability to develop instructional units that involve using technology to support critical thinking skills of:

1. Researching;

2. Compiling;

3. Organizing;

4. Analyzing;

5. Synthesizing; and

6. Problem solving;

c. Ability to research and evaluate on-line and other sources of information that support and enhance the curriculum, including distance education;

d. Ability to identify and support implementation and revision of curriculum to reflect on-going changes in technology; and

e. Ability to integrate computer and related technology resources to facilitate lifelong learning and emerging roles of the learner and the educator;

(4) Relative to the application of technology in instructional settings, the candidate shall have the ability to provide professional support related to the instructional integration of technology into the curriculum in accordance with the following:

a. Ability to apply computer and technology applications and use technology to support other content areas;

b. Ability to integrate advanced features of technology tools to support instruction in collaboration with content teachers; and

c. Ability to assist staff in the integration of adaptive assistive hardware and software for students with special needs;

(5) Relative to the evaluation of technology in instructional settings, the following shall apply to the area of student evaluation:

a. Ability to design a set of evaluation strategies and methods to assess student learning; and

b. Ability to evaluate, select, and use appropriate measures to assess students' computer knowledge and skills and compare to district, state and national standards;

(6) Relative to the evaluation of technology in instructional settings, the following shall apply to the area of process and product evaluation:

a. Ability to evaluate the process and criteria for selection of technology systems; and

b. Ability to evaluate the process and criteria for selection of technology related materials; and

(7) Relative to the evaluation of technology in instructional settings, the following shall apply to the area of program evaluation:

a. Ability to evaluate the use of technology in terms of meeting district instructional goals and national trends; and

b. Ability to collaborate with staff to design research strategies evaluating the use of technology in the classroom.

(c) As an alternative to meeting the requirements of paragraph (b), the candidate may elect to qualify either under Ed 505.03, Alternative 3: Demonstrated Competencies and Equivalent Experiences, or, if the candidate is currently employed, under Ed 505.04, Alternative 4: Individualized Professional Development Plan, excluding paragraph (a).

Source. #7042, eff 8-1-99

Good Morning honorable members of the education committee. For the record, I am Representative Sharon M. Carson, representing district 75 comprising the towns of Londonderry and Auburn.

I am here to speak on behalf of HB 528 which is to establish a commission to study New Hampshire Computer Standards in use in public schools.

This bill is the result of a conversation I had with Marsha Miller, who is with us today. Ms. Miller is the Test Prep Consultant for the Information Technology Career Pathway program. I was very surprised to discover that under current statute, New Hampshire public school students are required to successfully complete a 1/2 unit course in computer standards at the high school level, passing a locally-developed computer competency test, or successfully completing a computer education program prior to grade 9. I find this requirement to be wholly inadequate in meeting the needs of today's rapidly advancing technology-based society. Students need to know more than how to use an e-mail system, the internet or perhaps a word processing program. Students need to understand the design, development, implementation, support and management of computer-based

information systems, particularly software applications and computer hardware.

This type of knowledge students can utilize throughout their lifetimes. They can use it in college and in the workforce. A program like this might open doors for students who have given up on school and their education.

I sit on the Economic Workforce commission where we evaluate grants from New Hampshire companies applying for funds for educating their workers. The requests usually fall into two catagories (A) lean manufacturing Technology and (B) Computer based skills. Both of these catagories compose computer-based technology. I'd like the committee to consider this," How attractive do you think it would be to have a ~~be~~ computer literate ~~(work)~~ workforce available in New Hampshire for companies seeking to start up or relocate?

This commission is responsible for
(A) Evaluating the New Hampshire I.T. Program and to see if it would be appropriate to adopt this program.
(B) To determine if the N.H.I.T. program meets the requirements of the No Child left Behind Act.

(c) To Study increasing The number of credit hours required for computer education.

Ms Miller is here today to discuss The I.T program and can answer the more technical questions.

Thank You for your time and consideration and I'll be more than happy to answer any questions

Voting Sheets

HOUSE COMMITTEE ON EDUCATION

EXECUTIVE SESSION on HB 528

BILL TITLE: **establishing a commission to study computer standards used in public schools in New Hampshire.**

DATE: March 6, 2003

LOB ROOM: 207

Amendments:

Sponsor: Rep. Carson	OLS Document #:	2003	0485h
Sponsor: Rep.	OLS Document #:		
Sponsor: Rep.	OLS Document #:		

Motions: (OTP), OTP/A, ITL, Interim Study (Please circle one.)

Moved by Rep. Carson

Seconded by Rep. Alger

Vote: 17-0 (Please attach record of roll call vote.)

Motions: OTP, (OTP/A), ITL, Interim Study (Please circle one.)

Moved by Rep. Carson

Seconded by Rep. Scovner

Vote: 16-1 (Please attach record of roll call vote.)

CONSENT CALENDAR VOTE:

(Vote to place on Consent Calendar must be unanimous.)

Statement of Intent: Refer to Committee Report

Respectfully submitted,

Rep. Sharon M. Carson, Clerk

HOUSE COMMITTEE ON EDUCATION

EXECUTIVE SESSION on HB 528

BILL TITLE: **establishing a commission to study computer standards used in public schools in New Hampshire.**

DATE: 03/06/03

LOB ROOM: 207

Amendments:

Sponsor: Rep. Carson — OLS Document #: 2003-0485h

Sponsor: Rep. — OLS Document #:

Sponsor: Rep. — OLS Document #:

Motions: (OTP) OTP/A, ITL, Interim Study (Please circle one.)

Moved by Rep. Carson

Seconded by Rep. Algeo

Vote: 17/0 (Please attach record of roll call vote.)

Motions: OTP, (OTP/A,) ITL, Interim Study (Please circle one.) ? OTP/A

Moved by Rep. Carson

Seconded by Rep. Scovner

Vote: 16/1 (Please attach record of roll call vote.)

CONSENT CALENDAR VOTE:

(Vote to place on Consent Calendar must be unanimous.)

Statement of Intent: Refer to Committee Report

Respectfully submitted,
Sharon M. Carson
Rep. Sharon M. Carson, Clerk

OFFICE OF THE HOUSE CLERK 2003 SESSION

EDUCATION

Bill #: 528 Title: Establishing a commission to study computer Standards

PH Date: 2/19/03 Exec Session Date: 3/6/03

Motion: OTP Amendment #: 2003-0485h

MEMBER	YEAS	NAYS
L'Heureux. Stephen R. Chairman		
Alger. John R M. V Chairman	✓	
Dearborn. Bruce L	✓	
Flint. Gordon B		
Carson. Sharon M	✓	
Colcord. J D	✓	
Balboni. Michael A		
Leone. Richard C	✓	
McHugh. Claire B		
Naro. Debra A	✓	
Laurent. John J	✓	
Tufts. J Arthur	✓	
Carter. Mark S	✓	
Hagan. Barbara J	✓	
Ingbretson. Paul	✓	
Snyder. Clair A	✓	
Jean. Claudette R	✓	
Clarke. Claire D	✓	
Rush. Deanna P	✓	
Scovner. Nancy M	✓	
Dunn. James T	✓	
	17Y	0

TOTAL VOTE:
Printed: 1/6/2003

OFFICE OF THE HOUSE CLERK 2003 SESSION

EDUCATION

Bill #: 528 Title: Establishing a commission to study computer Standard

PH Date: 2/19/03 Exec Session Date: 3/6/03

Motion: OTP/A Amendment #:

MEMBER	YEAS	NAYS
L'Heureux. Stephen R. Chairman		
Alger. John R M. V Chairman	✓	
Dearborn. Bruce L	✓	
Flint. Gordon B		
Carson. Sharon M	✓	
Colcord. J D	✓	
Balboni. Michael A		
Leone. Richard C	✓	
McHugh. Claire B		
Naro. Debra A	✓	
Laurent. John J	✓	
Tufts. J Arthur	✓	
Carter. Mark S	✓	
Hagan. Barbara J	✓	
Ingbretson. Paul	✓	
Snyder. Clair A	✓	
Jean. Claudette R	✓	
Clarke. Claire D	✓	
Rush. Deanna P		✓
Scovner. Nancy M	✓	
Dunn. James T	✓	
	16 Y	1 N

TOTAL VOTE:
Printed: 1/6/2003

Committee Report

COMMITTEE REPORT

COMMITTEE: **Education**

BILL NUMBER: **HB 528**

TITLE: establishing a commission to study computer standards used in public schools in New Hampshire.

DATE: March 6, 2003 CONSENT CALENDAR YES ☒ NO ☐

☐ OUGHT TO PASS

☒ OUGHT TO PASS WITH AMENDMENT

☐ INEXPEDIENT TO LEGISLATE

☐ REFER TO COMMITTEE FOR INTERIM STUDY
(Available only in second year of biennium.)

STATEMENT OF INTENT
(Include Committee Vote)

This bill seeks to establish a commission to study computer standards currently in use in New Hampshire public schools. In today's rapidly changing technology based society, we need to make sure that our schools keep pace with these changes. According to the testimony presented to the committee, the Department of Education has not changed the existing minimum standards for over ten years. The Department of Education was a partner in the creation of this Information Technology program and this program is currently in place in a number of High Schools across the State with positive results. The commission created by this bill will also assess this Information Technology program to see if it meets the required technology standards under No Child Left Behind Statute and accept grants, both federal and private, along with donations.

Vote 16-1.

Rep. Sharon M. Carson
FOR THE COMMITTEE

Original: House Clerk
cc: Committee Bill file

CONSENT CALENDAR

Education

HB 528, establishing a commission to study computer standards used in public schools in New Hampshire. **OUGHT TO PASS WITH AMENDMENT**

Rep. Sharon M. Carson for Education: This bill seeks to establish a commission to study computer standards currently in use in New Hampshire public schools. In today's rapidly changing technology based society, we need to make sure that our schools keep pace with these changes. According to the testimony presented to the committee, the Department of Education has not changed the existing minimum standards for over ten years. The Department of Education was a partner in the creation of this Information Technology program and this program is currently in place in a number of High Schools across the State with positive results. The commission created by this bill will also assess this Information Technology program to see if it meets the required technology standards under No Child Left Behind Statute and accept grants, both federal and private, along with donations. **Vote 16-1.**

Transmit to Lily

COMMITTEE REPORT

DRAFT

COMMITTEE: **Education**

BILL NUMBER: **HB 528**

TITLE: establishing a commission to study computer standards used in public schools in New Hampshire.

DATE: March 6, 2003 CONSENT CALENDAR YES ☒ NO ☐

☐ OUGHT TO PASS

☒ OUGHT TO PASS WITH AMENDMENT

☐ INEXPEDIENT TO LEGISLATE

☐ REFER TO COMMITTEE FOR INTERIM STUDY
(Available only in second year of biennium.)

STATEMENT OF INTENT
(Include Committee Vote)

This bill seeks to establish a commission to study computer standards currently in use in New Hampshire public schools. In today's rapidly changing technology based society, we need to make sure that our schools keep pace with these changes. According to the testimony presented to the committee, the Department of Education has not changed the existing minimum standards for over ten years. The Department of Education was a partner in the creation of this Information Technology program and this program is currently in place in a number of High Schools across the State with positive results. The commission created by this bill will also assess this Information Technology program to see if it meets the required technology standards under No Child Left Behind Statute and accept grants, both federal and private, along with donations.

Vote 16-1.

Rep. Sharon M. Carson
FOR THE COMMITTEE

Original: House Clerk
cc: Committee Bill file

USE ANOTHER REPORT FOR MINORITY REPORT

COMMITTEE REPORT

COMMITTEE: **Education**

BILL NUMBER: **HB 528**

TITLE: establishing a commission to study computer standards used in public schools in New Hampshire.

DATE: CONSENT CALENDAR YES ☑ NO ☐

☐ OUGHT TO PASS

☑ OUGHT TO PASS WITH AMENDMENT

☐ INEXPEDIENT TO LEGISLATE

☐ REFER TO COMMITTEE FOR INTERIM STUDY
(Available only in second year of biennium.)

STATEMENT OF INTENT
(Include Committee Vote)

Vote 16-1

Sharon M. Carson
Rep.
FOR THE COMMITTEE

Original: House Clerk
cc: Committee Bill file

USE ANOTHER REPORT FOR MINORITY REPORT

This bill seeks to establish a commission to study computer standards currently in use in New Hampshire public schools. In todays rapidly changing technology based society, we need to make sure that our schools keep pace with these changes. According to the Testimony presented to the committee, the Department of Education has not changed the existing minimum standards for over Ten Years. The Department of Education was a partner in the creation of this program and this program is currently in place in a number of High Schools across the State with positive results. The commission