Pathfinder Regional Vocational Technical High School

Program of Studies

2011-2012

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Philosophy

Pathfinder Regional Technical High School believes in a dynamic partnership between our school, families, industry and the community that provides our students with rigorous and relevant hands-on technical and academic programs to create life-long learners. Pathfinder Regional Technical High School prepares students to become productive and responsible members of the community. We provide our students with the technical and academic skills required to secure gainful employment, to continue post-secondary studies, to enter military service or to pursue a combination of these. By promoting a culture of learning in a healthy and safe environment, Pathfinder provides students of diverse interests and abilities the opportunity to realize their full potential.

Goals

- Prepare students to achieve the highest academic and technical standards in alignment with evolving state and federal curriculum frameworks and competencies.

- Ensure that all students regardless of race, physical and/or learning disability, language, culture, economic status, gender or sexual orientation are given equal opportunity to develop decision-making, problem-solving, and communication skills for today's complex world.

- Maintain ongoing services for career, personal and adjustment counseling, as well as other services necessary to the individual's immediate and developmental needs and growth.

- Provide an environment for all faculty and staff that encourages and supports the creation of innovative programs and professional development.

- Offer state-of-the-art technology that supports academic and technical learning, and keeps pace with global, industrial and community advancements.

- Optimize our relationships with families, industry and community through cooperative education programs, school advisory boards and real-world employment opportunities.

- Develop a robust program of extracurricular activities that provides students with the opportunity to develop a sense of self-worth, leadership potential, teamwork, school spirit, and to exercise personal talents and interests.

Academic Programs

Business Education

Accounting I *Credits: 2.5*

Accounting I is an elective course offered to students in grade 11 & 12 that introduces double-entry accounting concepts and practices which are used by almost every business. The course is also designed to cover basic business principles since business is the most popular major in colleges across the country. Accounting competencies, skills, and applying more general business skills are also stressed for the student going directly into a career. Students go completely through the accounting cycle for a single proprietorship business, gain a knowledge of banking practices, as well as an improved understanding of business and financial practices. Students are introduced to financial statements and their use and also sharpen their business math skills. Automated methods of accounting are also introduced.

Accounting II *Credits: 2.5*

After successfully completing Accounting I, grade 12 students may continue onto Accounting II. This course goes in-depth into maintaining accounting records, almost exclusively using computer software applications. Topics include special journals, payroll practices, inventory control, plant assets, and more comprehensive financial statement analysis for partnerships and corporations. Sales order processing for merchandising businesses is also covered including discounts, allowances and returns. The student is also introduced to managerial decision-making, budgeting and cost accounting. Software applications used include Microsoft Excel, Automated Accounting 7.0, and Microsoft Project and QuickBooks. **Prerequisite: Successful completion of Accounting I**

Business Management *Credits: 2.5*

Business Management is a grade 12 elective. This class has been designed to cover entry-level business skills and terminology that will benefit students as they enter the work force. Topics that will be discussed in the course include:

- Keyboarding, spreadsheets and desktop publishing
- General business and filing skills
- Manual and computerized checkbook management
- Investments and financial literacy

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Yearbook Journalism ***Credits: 2.5***

The course is an elective course for students in grade 11 and 12. It involves the following concepts: desktop publishing--learning how to design and create pages using InDesign CS3 and Photoshop (the top programs in the newspaper and magazine industries); photography—understanding the basics of taking quality pictures; high school journalism—the process of reporting and writing the news and packaging it as a product for an audience; and marketing and advertising—selling and creating ads. The end result of the class is Pathfinder's yearbook.

This course has to adhere to publishing deadlines that involve financial fines to the school if not met. Therefore students will be selected for this course by filling out an application that shows responsibility to schoolwork based on prior grades and recommendations by teachers.

English

The Pathfinder English curriculum is literature-based. Students are exposed to texts from an array of genres, time periods, and cultures. Critical thinking, written and oral communication are vital components of the program. The curriculum prepares students to achieve proficiency in the English Language Arts Learning Standards as established by the Massachusetts Frameworks. A computer lab dedicated to the English Department offers students opportunities for writing and research.

Basic English — *Credits: 5.0*

Basic English emphasizes life skills. Students will review spelling, vocabulary, and grammar. Students read both fiction and nonfiction, and make oral presentations based on their reading. Students will also be prepared for their MCAS Alternative portfolio.

English I — *Credits: 5.0*

English I introduces students to the writing that will be expected of them throughout their four years. Grammar, spelling and syntax are stressed within the context of both creative and expository writing. Vocabulary development is integrated into all lessons, and is also addressed in dedicated activities. Students also begin analysis of literary texts and poetry. English I begins the preparation for the English Language Arts portion of the Massachusetts Comprehensive Assessment System Test (MCAS) which is administered in the spring of sophomore year. **Prerequisite: Successful completion of 8th Grade English.**

English I Honors — *Credits: 5.0*

This course challenges students to develop their critical thinking abilities as they read and analyze literature with an awareness of symbolism, theme, authorial intent and intertexuality. Key themes include survival, loss of innocence, and the individual in society. Students will develop their speaking voices through a variety of group assignments. Students have the opportunity to develop, use and evaluate their own rubrics and assessments. Vocabulary development consists of both teacher-guided and independent work. **Prerequisite: Grade of B or higher in 8th grade English class.**

English II — *Credits: 5.0*

The sophomore course of study provides students with the necessary preparation to achieve proficiency in all areas of the English Language Arts MCAS exam. Literary

analysis promotes critical thinking and evaluative reasoning through both written and oral communication. MCAS modeled essays are completed throughout the year. Vocabulary development is expanded to ensure students achieve mastery knowledge of literary terms. **Prerequisite: Successful completion of English I.**

ENGLISH II HONORS *CREDITS: 5.0*

Students in this course are expected to fulfill all the requirements of sophomore English, and more. The Honors curriculum for sophomores carries an increased exposure to diverse writing formats and styles. An intensified emphasis on vocabulary and grammar , along with enhanced writing opportunities, is designed with the expectation that Honors students will achieve advanced on their MCAS exam. Students will also pursue independent projects throughout the year, and in the summer preceding the school year. **Prerequisites: Grade of B or higher in English I.**

ENGLISH III *CREDITS: 5.0*

During their junior year, students study American literature from slave narratives and the Native American experience to authors such as Nathaniel Hawthorne and John Steinbeck. Dramatic reading and performance are integrated into the literary studies. Writing assignments include a formal research paper using MLA guidelines. **Prerequisite: Successful completion of English II.**

ENGLISH IV *CREDITS: 5.0*

The senior English curriculum is structured to provide students with the skills and proficiencies necessary for life after high school. Inspired by their study of world literature, students synthesize ideas about family and personal identity in both written and oral discussion. Research papers, often shop-related, are also a part of the senior curriculum as well as resumes and letters of introduction. **Prerequisite: Successful completion of English III.**

Reading/Language Arts

Language Arts *Credits: 2.5*

The main emphasis of the 9th and 10th grade Language Arts curriculum is to help students become better readers and to improve reading comprehension. It also helps students to prepare for the English MCAS test. The Language Arts classroom environment is one that allows students to achieve success, resulting in a desire and willingness to read on a regular basis. Classroom activities are student-centered, emphasizing concrete experiences and active learning. Students are instructed a variety of active learning techniques to develop and improve their reading and writing skills. Study skills are emphasized so that students may apply them to content in other technical and academic coursework. All students have access to computers. An individualized approach is utilized to meet students' demonstrated needs and improve skills, including three computerized reading programs: A+, Star Reading, and Accelerated Reader. Evaluation includes various methods of assessment to adjust to all learning styles. Students will practice for the purpose of mastering and applying the following skills:

- Sustained silent reading
- Reader's response/prediction and connection
- Methods for determining unknown words
- Summarizing information
- Word mapping
- QAR
- Internet research
- Cloze procedures

Read 180 *Credits: 5.0*

This course is a combination of a revised English curriculum with the Read 180 program that is offered to both 9th and 10th grade students that are below grade level in reading. Instruction for students is explicit and systematic using direct explanations (modeling) and systematic practice opportunities (guided instruction) as well as independent practice to ensure mastery. The English component is modified to enable students to improve and still accommodate individual needs. Many of the assignments are focused on MCAS skills. Evaluation includes alternative methods of assessment, including the Read 180 SRI test to show individual growth. Reading, speaking, listening, and writing

competencies are integrated throughout the students' learning experiences. The classroom size is limited to promote an environment that enables all students to meet their potential. All students have access to computers.

DEVELOPMENTAL READING *CREDITS: 2.5*

This is an elective class that students may select in Grade 11 or 12. the individualized instruction, computerized programs and learning techniques utilized in the grade 9/10 Language Arts classes will be continued into Developmental Reading. The main emphasis of the course is to strengthen and improve student skills in reading, as well as writing. The environment of the course is one that allows students to expand on their current reading skills and continue successfully in the future. Reading, listening, and speaking are integrated throughout the student's learning experiences. All students have access to computers. Students will practice for the purpose of mastering and applying the following skills:

Sustained silent reading

- Reader's response
- Methods for determining unknown words
- Reading logs
- Summarizing information
- Word mapping
- QAR
- Internet research
- Self-evaluation

READING STRATEGIES *CREDITS: 2.5*

This program offers academic support to all students at Pathfinder, including students working at grade level as well as individuals on IEP or 504 plans. Individuals work in small cooperatively-engaged groups to develop and apply their English language arts skills. The underlying literary objective is to help students realize effective reading comprehension strategies, apply abstract thinking, develop reflective thinking and utilized effective support options available in the classroom. Our emphasis is on interactive cooperative learning. Along with providing additional support for students' English classes, the Title One classroom provides literacy structure for our challenged readers. Students learn to apply cognitive reasoning to various levels of problem solving by being exposed to a variety of literature genre.

Mathematics

ALGEBRA I *CREDITS: 5.0*

Algebra I is a grade 9 course designed to bridge the gap between near concrete areas of arithmetic and the more abstract area of higher mathematics. Major topic areas included, sign number relationships, equation solving, and graphing.

INTERMEDIATE ALGEBRA *CREDITS: 2.5*

Intermediate Algebra bridges the gap between Algebra I and Algebra II. The first part of the course is an in depth review of the major algebra concepts. The remainder of the course provides a survey of the main topics of the Algebra II curriculum, including systems of equations, matrices and complex numbers.

Prerequisite: Successful completion of Geometry. This course is open only to students who score in the Needs Improvement range on the Math MCAS test.

ALGEBRA II *CREDITS: 5.0*

Algebra II is the second course in the Algebra curriculum. The course will expand the students understanding of previously learned Algebra I concepts as well as introducing matrices, quadratic equations, and complex numbers. The course will be offered to students in grades 11 or 12 with availability to Grade 9 honors Geometry students in Grade 10.

Prerequisite: Successful completion of Geometry.

GEOMETRY *CREDITS: 5.0*

Geometry is a 10th grade course that can be described as the use of a structured form of logic to study basic figures, angles, perpendicular lines, parallel lines, congruent triangles, polygons, and advanced right angles. MCAS preparation will also be included within the course. **Prerequisite: Successful completion of Algebra I.**

HONORS GEOMETRY *CREDITS: 5.0*

Honors Geometry is offered to incoming freshman who has successfully completed Algebra I course in 8th grade. It is also offered to grade ten students who have shown advanced proficiency in Algebra I. The entire Geometry course curriculum will be covered at an accelerated pace progressing into trigonometric functions.

Prerequisite: Grade of B or better in Algebra I.

ADVANCED MATH *CREDITS: 2.5*

Advanced Math is a course for students who have successfully completed Algebra II. It is used as a bridge to Pre-Calculus as well as to prepare students for the SAT's and College Entrance Exams. The course focuses on subject areas in Algebra II that will be needed in more advanced math classes. Matrices, logarithms, and trigonometric functions will be some of the topics covered. **Prerequisite: Successful completion of Algebra II.**

PRE CALCULUS A *CREDITS: 2.5*

This course is designed to cover the topics outlined in the standards set by the Massachusetts Department of Education for Pre-Calculus. This course builds upon skills learned in Algebra II. All students are expected to have a good working knowledge of their Algebra II skills prior to entering this course. **Prerequisite: Grade of B or higher in Algebra II.**

PRE CALCULUS B *CREDITS: 2.5*

This course is designed to cover the topics outlined in the requirements set by the Massachusetts Department of Education for Pre-Calculus. Students will use the knowledge from Pre-Calculus I to further their knowledge in Pre Calculus II. Students will start with chapter seven in the Pre-Calculus textbook and eventually move into regular Calculus; where they will learn the basics of Calculus. Students will independently learn and move at their own pace. Students will be given assignments from the text book to assess their progress. **Prerequisite: Successful completion of Pre Calculus A.**

PRE CALCULUS *CREDITS: 5.0*

This course will cover the precalculus curriculum in one year and is intended for students who plan to take Calculus in their senior year.

Prerequisite: Grade of B or better in Algebra II.

Physical Education & Health

Physical Education 9 *Credits: 1.0*

Physical Education 10-12 *Credits: 2.5*

Physical Education is offered to students in grades 9 -12. At the 9th grade level students participate in PE for one trimester; all other grade levels are full year offerings. The PE program at Pathfinder offers students a wide range of physical activities. The activities are presented in an enjoyable manner that emphasizes the skills for good performance and success. To further address the interests of a variety of students, the PE offerings have been designed to include individual and team sports. Activities in the PE program may include:

- Jogging & aerobic walking
- Volleyball, softball, soccer, basketball, kickball
- Weight training
- Archery

Health Education *Credits: 1.0*

Grade 9 students will be scheduled for one trimester of Health. Students will review pertinent health topics that will influence the choices they make in the near future. The importance of educated decision making will be highlighted. The hazards of tobacco, drugs and alcohol will be reviewed. Nutrition and obesity will also be studied. The endocrine system, sexuality and childbirth will also be discussed. Abstinence and personal responsibility will be emphasized, and contraception will be reviewed.

Social Studies

United States History I & II Sequence

These courses will be offered to:

- Provide students with the knowledge base, research skills, and critical thinking abilities they will need to be informed, involved, and active citizens in a democratic society.

- Encourage students to relate the events, issues, and lessons of America's history to contemporary situations and to their own lives.

- Assist students in achieving proficiency in the American History Learning Standards set forth by the Massachusetts History and Social Science Curriculum Framework.

Prepare our students for the upcoming History and Social Science portion of the Massachusetts Comprehensive Assessment System Test, the content of which is based on the History and Social Science Curriculum Framework. Rather than using a traditional chronological approach to the study of history, these courses are organized around thematic units each of which will trace a topic from its beginnings to the present. This will provide two significant advantages over the traditional presentation including:

- Students will more readily be able to recognize the connections between historical events and important present day issues.
- Coverage of more recent history which is often omitted completely by chronologically organized courses.

Activities such as lectures, class discussions, readings, historical role playing, critical viewing, and group problem solving will be used to help students learn about the following topics:

U.S. History Topics I — Credits: 2.5

- Immigration, diversity the national identity
- The Revolutionary & Constitutional Eras
- Expansion of U.S. territory and influence
- Slavery, racism, and the Civil War
- Reconstruction, segregation, and the continuing struggle for equality

U.S. History Topics I Honors — Credits: 2.5

As the United States History I Honors class is newly instituted, please note that as this course is taught there may be additions as well as subtractions from the current curriculum. Enrichment activities to be included in the Honors History course include, but are not limited to the following:

- Guided research paper
- Academic journal
- Reading: Narrative of the Life of Frederick Douglass an American Slave
- Ellis Island simulation
- Second Amendment simulation

Prerequisite: Grade of B or higher in 8th grade Social Studies.

U.S. History Topics II — Credits: 2.5

- Industrialization and technology
- Workers in the Industrial Age
- The Great War
- Capitalism and the U.S. economy
- The Great Depression and the new deal
- World War II
- Origins of the Cold War
- Korea and Vietnam: Anti-communism and containment
- The U.S. in the new millennium: Global economic and security issues

Law In Action — Credits: 2.5

Law in Action is a practical course in law and our legal system designed to provide useful information and problem solving skills necessary for survival in our law oriented society. The curriculum includes activities such as contemporary case studies, mock trials, classroom simulations and conflict resolution activities. The textbook, Street Law, uses interactive methods and focuses on legal issues relevant to students' lives. Students will learn about:

- Criminal law
- Torts
- Consumer law
- Family law
- Individual rights and freedoms
- Rights and responsibilities in the workplace

HOLOCAUST AND HUMAN BEHAVIOR *CREDITS: 2. 5*

This course explores the consequences of prejudice, discrimination, apathy, and abuse of power in one of the most violent times of the 1930's and 1940's. Students investigate the forces that undermined democracy in Germany, as well as the political and ethical issues raised by the Holocaust. History is linked to individual choices, group behavior, and community participation in our own lives, especially involving such issues as identity, power, violence, tolerance, and social responsibility.
Activities such as lectures, class discussions, readings, historical role playing, critical viewing, and group problem solving are used. Course topics will include:

- Society and the individual
- Dismantling democracy in Germany
- Conformity and obedience
- Targets of oppression
- Incremental Evil: The implementation of genocide
- Who knew? Bystanders and rescuers
- Between revenge and amnesia: How can societies respond to collective violence?
- Choosing to Participate: Defending human rights and freedoms

INTRODUCTION TO PSYCHOLOGY *CREDITS: 2.5*

Psychology is defined as the scientific study of behavior and mental processes. By completing the requirements for this course students will gain a basic knowledge of important topics in human psychology, have a better understanding of their own thought processes and behavior, gain practical information about how to deal with situations in everyday life, and increase their ability to think critically about complex ideas and materials. Topics covered throughout the course include:

- Psychology of learning
- Memory, intelligence, and problem solving
- Motivation and emotion
- Altered states of consciousness
- Infancy, childhood, and adolescence
- Personality
- Psychological disorders I & II and therapy

GLOBAL ISSUES *CREDITS: 2.5*

This grade 12 social studies elective course explores the increasing interaction between diverse societies of the world. Global Issues will examine the role of the student as an individual, as an American, and as a global citizen. Materials will include documentaries, print media, films, and investigative journalism, including the use of Eric Schlosser's Fast Food Nation. This course will provide students with the knowledge base and critical thinking abilities that they will need to be informed, involved, and active citizens both in a democratic society and as citizens of the world. These goals will be accomplished through the exploration of various topics such as:

- Global warming
- Overpopulation
- Human rights
- Consumer responsibility
- American political process & civic responsibilities
- Current events
- Role of the U.S. in world affairs
- The impact of corporations on the global economy

Science

Biology 1 *Credits: 2.5*

This Grade 9 Science course provides a solid foundation for students in biology so that they will gain an understanding and appreciation for the natural world and how it works. Upon completion of Biology 1 students will be prepared to continue their science studies sophomore year in Biology 2 or Biology with Lab in preparation for MCAS. Topics in Biology 1 include:

- Making observations, raising questions and formulating hypotheses
- Developing and using scientific inquiry skills in scientific investigations
- Understanding the role of chemical compounds in cells
- Understanding how cells are structured, and the function, and processes that occur in cells
- Learning how the human body is organized and how homeostasis keeps humans comfortable
- Understanding human anatomy and physiology
- Learning about invertebrate animals and where they live

Biology II *Credits: 2.5*
Biology II with Laboratory *Credits: 5.0*

This Grade 10 Science course continues the curriculum from Biology I. The diversity of life forms and the major themes of Biology as outlined by the Massachusetts Science Frameworks are emphasized and students are prepared for the Grade 10 Science MCAS in Biology. The lab option of this course offers extensive laboratory work that will prepare students who may be considering post-secondary education. Major topics covered in Biology and Biology w/ Lab include:

- Understanding how genetics and heredity influence living organisms
- Understanding evolution and the mechanisms of change and how they influence the natural world
- Introduction to ecology and how humans interact with the natural world
- Learning about viruses, monerans, and protests and where they are found
- Learning about vertebrate animals and where they live

Prerequisites: Successful completion of Biology I. Biology II with Lab requires a grade of B or higher in Biology I.

Engineering Science I *Credits: 2.5*

This grade 9 course will give students an understanding and appreciation for technology and engineering and how science, math, technology, and engineering complement each other. The course is designed to prepare students for the Grade 10 Science MCAS in Technology & Engineering. Students will learn how advances in technology affect human society and how human society determines which new technologies will be developed. The following topics will be covered:

- Gaining proficiency in sketching, drawing, and accurate measurement
- Understanding and applying the design process
- Learning how to apply construction technologies to real world problems
- Understanding the concept of sustainable urban development

Engineering Science II *Credits: 2.5*

A grade 10 course that continues where the curriculum for Engineering Science 1 left off. The following topics are addressed:

- Learning how to apply electrical and electronic technologies to real world problems
- Learning how to apply fluid technology to real world problems
- Learning how to apply energy technology to real world problems
- Learning how to apply communications technology to real world problems

Prerequisite: Engineering Science I

Introduction to Engineering Design (Honors) *Credits: 5.0*

Introduction to Engineering Design is grade 9, foundation course in the engineering field that teaches students problem-solving skills using the design and production process. Hands-on labs and Inventor™ design software are used as learning tools for students to design and produce projects related to industry. Students should take this as the first course in the sequence of courses offered in the engineering program. This course articulates for college credit. The following topics will be covered:

- Introduction to the engineering design process
- Using Inventor™ to develop design solutions
- Reverse engineering
- Solving design problems

Prerequisites: Grade of B or above in Grade 8 Algebra 1

DIGITAL ELECTRONICS (HONORS) *CREDITS: 5.0*

Digital Electronics™ is a grade 10 course where students learn about electronic circuits that are used to process and control digital signals. In contrast to analog electronics, where information is represented by a continuously varying voltage, digital signals are represented by two discreet voltages or logic levels. This distinction allows for greater signal speed and storage capabilities and has revolutionized the world electronics. Digital electronics is the foundation of all modern electronic devices such as cellular phones, MP3 players, laptop computers, digital cameras, high definition televisions, etc. The following topics will be covered:

- Fundamentals of Analog and Digital Electronics
- Combinational Logic
- Sequential Logic
- Microcontrollers

Prerequisites: Grade of B or higher in Algebra I and successful completion of Introduction to Engineering Design

ANATOMY AND PHYSIOLOGY WITH LAB *CREDITS: 5.0*

Anatomy & Physiology is a grade 11 course that is an introduction to the human body; its structure and function. A total of 15 areas of study will be covered, each consisting of 6 parts: 1) basic concepts, 2) assignments, 3) laboratory investigations, 4) definitions, 5) CD- ROM review, and 6)examination. The content areas of study include:

- Structural units
- Chemistry of living things
- Cells, tissues, and membranes
- Integumentary, skeletal, muscular, nervous, endocrine, circulatory, respiratory, excretory,
- and reproductive systems
- Senses
- Nutrition
- Genetics and genetically-linked diseases
- Biotechnology

Prerequisites: Biology II or Biology II with Lab

Principles of Engineering (Honors) *Credits: 5.0*

This is a grade 11 course that helps students understand the field of engineering/engineering technology. This course explores various technology systems and manufacturing processes and helps students to learn how engineers and technicians use math, physics and technology in an engineering problem solving process to benefit people. The course also includes concerns about social and political consequences of technological change. Topics include:

- Overview and Perspectives of Engineering
- Review of and extending the design process
- Communication and Documentation – Students collect and categorize data, produce graphic representations, keep an engineer's notebook and make written and oral presentations.
- Engineering Systems
- Statics – Students learn about measurement, scalars and vectors, equilibrium, structural analysis, and strength of materials
- Materials and Materials Testing
- Thermodynamics – Students learn about units and forms of energy, energy conversion, cycles, efficiency and energy loss, and conservation techniques
- Engineering for Quality and Reliability
- Dynamics – Students are introduced to linear and trajectory motion

Prerequisites: Successful completion of Digital Electronics

Environmental Science *Credits: 2.5*

Environmental Science is offered to students in grade 11 or 12. Students will gain an understanding and appreciation for the environment so that they may become stewards of the land and make informed decisions regarding their own local environment. The course is taught using a variety of approaches, including hands-on projects. Students should expect to achieve competence in the following topics:

- Global perspectives on environmental science
- Ecosystems
- Water and Air conservation
- Atmosphere and climate
- Land and food
- Biodiversity
- Energy conservation
- Population growth
- Waste management

Prerequisite: Biology II or Biology II with Lab

APPLIED PHYSICS 1 *CREDITS: 5.0*

Applied Physics I w/ Lab is a grade 11 or 12 course that will provide insight to students about the physical world all around us and how it works. Physics can be used to explain the actions of a rocket, a roller coaster, or a baseball crashing through a window and also applies to many of the devices that are used in daily life. In the course students will learn about:

- Motion
- Catapult design
- Electricity
- Waves and vibrations
- Bridge engineering
- Flight and rockets

Prerequisites: Successful completion of Engineering Technology 2 and Algebra 1

APPLIED PHYSICS 2 *CREDITS: 5.0*

This grade 12 course is a continuation of the studies started in Applied Physics I w/ Lab. Students must have successfully completed Physics I to select Physics II. Major topics of the course include:

- Advanced mechanics
- Energy/alternative energies
- Gears and pulleys
- Heat
- Magnetism
- Structures
- Amusement park physics

Prerequisites: Successful completion of Applied Physics I

CHEMISTRY WITH LAB *CREDITS: 5.0*

Chemistry w/ Lab is a grade 12 course that involves the basic science of substances, those materials of which the earth and the universe are composed. Specifically, the science of chemistry deals with the properties and structure of substances and their preparation from and interaction with other substances. Topics that will be covered include:

- Science of chemistry
- Matter and energy
- Atomic structure
- Periodicity
- Ionic and covalent compounds
- Chemical equations
- Stoichiometry
- Causes of change
- Gases and condensation
- Solutions
- Chemical equilibrium
- Acids and bases
- Reaction rates

Prerequisites: Biology II or Engineering Science II and Algebra I

Wildlife Management *Credits: 5.0*

Wildlife Management is designed as an introductory class for students interested in wildlife biology, wildlife management, wildlife and fisheries conservation, or environmental studies. The course provides practical applications of field study techniques and includes information about careers in areas of animal science. A community service project may be incorporated into the curriculum where applicable. Major topics of study may include:

- Diversity of wildlife
- Estimating the size of wildlife populations
- Habitat usage, inventory, and improvement
- Wildlife forage and habitat preferences
- Wildlife values
- Responsible stewardship and protection

Prerequisites: Successful completion of Environmental Science

Microbiology/Biotechnology *Credits: 2.5*

This course is designed for students interested in the world of microbes and their various roles in nature and human uses. The second half of this class is devoted to the emerging science of biotechnology. Topics include but may not be limited to:

- Micro-measurements
- Bacteria and viruses
- Fungi and protozoa
- DNA structure and function
- Isolating and manipulating DNA
- Gel electrophoresis

- Biotechnology in forensics

Prerequisites: Biology II and Grade 11 science laboratory course

Engineering Design and Development (Honors)

Credits: 5.0

This is an engineering research course for senior students, in which students work in teams to research, design and construct a solution to an open-ended engineering problem. Students apply principles developed in the four preceding courses and are guided by a community mentor. They must present progress reports, submit a final written report and defend their solutions to a panel of outside reviewers at the end of the school year.

Prerequisites: Successful completion of Principles of Engineering

SPANISH

Spanish I ***Credits: 2.5***

Spanish I is an elective class offered to students in grade 9 -12. Students will be introduced to the language, culture and an array of useful vocabulary used to promote basic communication. An emphasis is placed upon the development of the four basic language skills of listening, speaking, reading and writing. A focus on cognates (words that are similar in both English and Spanish) will help students to create a vocabulary foundation of which they will systematically build upon as they delve into the language. Students will learn to:

- Greet and introduce one another in Spanish
- Count, tell time, identify dates, days, seasons and weather
- Speak about themselves, their friends, and families
- Properly conjugate regular
- Respond to classroom commands
- Conceptualize several differences between American and Spanish cultures

Honors Spanish I ***Credits: 2.5***

Honors Spanish I is an elective class offered to students who have had Spanish in the elementary or middle school grades. Students are introduced **at an accelerated pace** to the language, culture and an array of essential vocabulary used to promote basic communication. As in Spanish I, an emphasis is placed upon the development of the four basic language skills of listening, speaking, reading and writing. Considerations for the reasons and the need for foreign language study will also be explored.

- Greet and introduce one another in Spanish
- Count, tell time, identify dates, days, seasons and weather using complete sentences
- Speak about themselves, their friends, and families using complete sentences
- Properly conjugate regular and irregular verbs
- Respond to classroom commands with ease
- Combine verbs with vocabulary to create sentences and questions

- Ask questions of other students through an “interview” format
- Conceptualize several differences between American and Spanish cultures

Spanish II ***Credits: 2.5***

Spanish II is an elective class offered to students who have successfully completed Spanish I The course begins with a comprehensive review of the vocabulary and skills learned in Spanish I through the development of the four basic language skills of listening, speaking, reading and writing. Additionally, it introduces the students to more verbs and vocabulary with an emphasis on the construction of sentences and questions. Provision is also made for developing and appreciation of the history, culture, and customs of the countries in which the language is spoken. Students will learn to:

- Apply previously learned Spanish I material to newly acquired vocabulary
- Properly conjugate regular and irregular verbs
- Combine verbs with vocabulary to create sentences and questions
- Ask questions of other students through an “interview” format
- Learn specific irregular verbs and expressions useful not only in conversation, but also in acquiring information, talking about how they feel physically, and in discussing plans
- Gain an appreciation for the history, culture and customs of Spanish speaking countries

Prerequisite: Successful completion of Spanish I

Spanish III ***Credits: 2.5***

Spanish III is an elective class offered to students who have successfully completed Spanish I & Spanish II. The course begins with a comprehensive review of the elementary Spanish verbs, vocabulary and skills learned in Spanish I and II through the four basic language skills of listening, speaking, reading and writing. This intermediate Spanish course also introduces vocabulary that will be useful when traveling which will enable students to further explore the many Spanish lands and cultures. Students will learn to:

- Gain a comfortable command of the language in response to oral and written cues
- Accurately conjugate irregular and stem-changing verbs in present and preterite tenses

- Use such conjugations when discussing themselves and other events
- Gain exposure to ways in which they may experience Spanish culture in own community
- Further explore the history, culture and customs of Spanish speaking countries

Prerequisite: Successful completion of Spanish II

VOCATIONAL PROGRAMS

Automotive Technology

Pathfinders Automotive Technology Program provides students with the skills, work ethics, knowledge and theoretical, technical and hands-on experience needed to become a successful entry-level automotive technician. The major focus of our program is in the areas of brakes, steering and suspension, electrical/electronics, engine repair and engine performance systems. Students are also introduced to customer service, parts ordering, and office management skills. Our course of study follows the NATEF (National Automotive Technicians Education Foundation) as well as the Massachusetts Vocational Curriculum Frameworks (COPS). Throughout the program, students are constantly instructed and reminded of all health and safety policies. All of our curriculum may be modified to meet the learning needs and abilities of students.

Grade 9 Exploratory Theory

Credits: 1.25

Safety & theory of basic automotive principals, four-stroke engine cycle, basic tire service, brake systems overview, and vehicle identification.

Grade 9 Exploratory Shop

Credits: 10

Safety, introduction to the automotive industry, four-stroke engine cycle, basic tire service, brake systems overview, and vehicle identification.

Grade 9 Related Theory

Credits: 1.25

Health & safety, hand tool identification, steering and suspension theory, vehicle maintenance theory (oil change, coolant flush, tire rotations, etc.)

Grade 9 Shop *Credits: 10*

Health & safety, hand tool usage, steering and suspension, vehicle maintenance (oil change, coolant flush, tire rotations, etc.)

Grade 10 Related Theory

Credits: 2.5

Building on what has been learned in their freshman year, students will review safety materials including Right to Know laws and a clear understanding of the MSDS (Material Safety Data Sheets). Students will learn the theory of brake systems with a strong emphasis on understanding hydraulic systems, component identification and the different types of brake systems. In addition, students will learn how to use micrometers, sliding calipers, brake drum gauges and feeler gauges. Ohms law is the introduction to the following lessons. Students will obtain a solid understanding of voltage, amperage, resistance and how they relate to each other. Students will then go into general electrical systems theory & diagnosis. The theoretical aspects of starting & charging systems are covered using meters, mockups, and training aids.

GRADE 10 SHOP

CREDITS: 20

Building on what has been learned in their freshman year, students will review all shop and industry safety materials including OSHA, Right to Know laws and a clear understanding of the MSDS (Material Safety Data Sheets). During this year they will be required to take the 10 hour OSHA general industry on-line safety exam. Once a student passes this exam it does not need to be retaken. Students will then learn about the different power tools (air, hydraulic and electrical) that are used in the industry. Diagnosing and repairing disc and drum brake systems is thoroughly covered with a strong emphasis on understanding hydraulic systems, component identification and the different types of brake systems available in the automotive industry. In addition, instruction is given in proper measuring procedures using micrometers, sliding calipers, brake drum gauges and feeler gauges. Ohms law is the introduction to the following lessons. Students will obtain a solid understanding of voltage, amperage, resistance and how they relate to each other. Then students will go into general electrical systems diagnosis and repair and will cover the starting, charging, battery, lighting and horn/wiper vehicle systems.

GRADE 11 RELATED THEORY

CREDITS: 5

During their junior year, students continue to work on the competencies they have experienced in their Freshman and Sophomore years. In addition, they will be introduced to the theory in the following areas: wheel alignment and diagnoses, anti-lock brake and traction control, and general electrical diagnosis and repair. However the main focus in the later part of the school year is to diagnose and repair general engine problems and to obtain a firm understanding of Engine Performance which includes computerized engine controls and its systems (fuel systems, ignition systems, and communication systems).

GRADE 11 SHOP

CREDITS: 20

During their junior year, students continue to work on the competencies they have experienced in their Freshman and Sophomore years. In addition, they will be exposed to the following areas of a vehicle: wheel alignment and diagnoses, anti-lock brake and traction control, and general electrical diagnosis and repair. However the main focus in the later part of the school year is to diagnose and repair general engine problems and to obtain a firm understanding of Engine Performance which includes computerized engine controls and its systems (fuel systems, ignition systems, and communication systems). In the shop area, Junior students are exposed to live customer vehicles as well as exposure to office (estimating, billing and customer relations) and parts (inventory and ordering) management.

Grade 12 Related Theory

Credits: 5

Students will learn the theory and construction of the four cycle engine. Students will measure engine components such as cylinder heads, engine blocks, and crankshafts. They will then go into Advanced Electronics which will include theory and diagnosis on electrical & electronic training boards. Towards the end of the school year, air conditioning, manual and automatic transmissions, and drive train theory are covered. In the related classroom, seniors are required to complete a senior project that involves opening and running a live repair shop.

Grade 12 Shop

Credits: 20

The senior year starts with a recap of what materials have been covered thru the past 3 years. Once this is accomplished, students will go into a more in-depth understanding of engine construction as well as disassembly, diagnosis and repair recommendations. They will then go into Advanced Electronics which will include diagnosis and repair of either bugged shop vehicles and or actual customer complaints. Seniors are also required to continue performing service manager and office management duties on a rotating basis. Towards the end of the students school year and career here at Pathfinder, air conditioning, manual and automatic transmissions, and drive train systems may be covered as long as time permits.

Business Technology

In this four year program students will develop and master skills necessary for obtaining gainful employment in the broad field of Business Technology. These skills include those relating to word processing, spreadsheet, presentation and database software; desktop publishing software; graphics in business; web page design; efficient and ethical use of the Internet as a research tool; accounting concepts and software applications; finance; marketing, management, and entrepreneurship; business negotiations and operations; integrated use of multimedia; general office skills necessary to perform in a business environment; and employability skills (SCANS skills) as they relate to job retention, critical thinking, and business ethics. Operation of the School Store is used throughout the program to provide hands-on, relevant experience in all aspects of the operation of a business. Generation of the School Newspaper is the shared responsibility of all four grade levels of the shop and is used to promote autonomy, problem-solving, interpersonal skills, and an understanding of working with deadlines.

Business Technology Exploratory

The focus of the exploratory course is to introduce students to the basic operations of a business and the skills necessary to succeed in the Business Technology Program. Students receive instruction through a wide range of hands-on business simulation activities designed to give them exposure to the many areas of business, including the use of computers to facilitate marketing, advertising, correspondence, and financial operations.

Grade 9 Business Technology Shop *Credits: 10*

At the ninth grade level, the curriculum focuses on introducing students to the most essential computer applications and office equipment, communication skills, business functions, and ethical as well as professional conduct expectations. Integrated projects with other shops within the school as well as groups outside the school are used to introduce students to the basics of business, while demonstrating practical and relevant application of the skills.

Grade 9 Business Technology Related Theory

Credits: 1.25

The related course focuses primarily on taking students through the basics necessary for IC3 certification, which encompasses computing fundamentals, key applications, and the role of technology in society. Basic concepts of entrepreneurship, economics and our role in the world economy are introduced, while giving students an understanding of the purpose and scope of business as it applies to Business Technology. Related is taught as a class separate from shop only during the ninth grade year. In grades 10 through 12, related concepts are integrated throughout the shop curriculum.

Grade 10 Business Technology Shop *Credits: 20*

The tenth grade curriculum utilizes a wide variety of computer applications, textbook work, and relevant research projects that are all centered around a theme of career exploration and planning for life after high school. Students receive basic instruction in web page design, accounting concepts, and marketing and promotion in connection with operation of the School Store. Upon completion of an online course, students receive their OSHA General Industry Safety and Health card.

Grade 11 Business Technology Shop *Credits: 20*

The eleventh grade curriculum builds on skills learned in the prior two years, and takes them to an intermediate level through additional textbook instruction and relevant projects. New computer applications are introduced to expand the students' area of knowledge and marketability in the job market. Concepts and procedures for management and entrepreneurship are introduced and developed at this level. Graphic design concepts are emphasized in connection with the success of a business's marketing strategy. These concepts are also integrated into higher level instruction in web page design, emphasizing the use of a web site as an essential and effective marketing tool in today's business world.

Grade 12 Business Technology Shop *Credits:20*

The twelfth grade curriculum concentrates on refining and building on skills that have already been learned, and putting them to use in practical, real world situations. Co-op positions are encouraged for those who qualify. Students who remain in the shop are expected to function as available staff for the school, fulfilling the various business technology needs that may arise within the school environment. Twelfth grade students function as administrative support to the faculty and professional staff within the school for the duration of the school year. Financial, marketing, and economic concepts are developed and refined during the senior year.

Students who remain within the shop, as opposed to being out on Co-op, create a digital portfolio structured in the form of a web site, which is burned to a CD or DVD for students to take with them upon graduation. Students are encouraged to use the portfolio for application to colleges and for pursuing job opportunities. IC3 and Microsoft Office User Certifications are encouraged for all students. Plans for transitioning out of high school are developed throughout the four-year program, with the most concentration in senior year.

CARPENTRY

GRADE 9 EXPLORATORY THEORY
CREDITS: 1.25

This one-week course provides students with the basic knowledge and relevance of safety and career paths in the field of carpentry. Students receive instruction in both hand and various power tools and their applications and general shop safety. Students will put in to practice what they have learned by building an assigned project. Critical thinking skills are emphasized throughout the course. Students are evaluated using the "school-wide" exploratory sheet.

GRADE 9 SHOP *CREDITS: 10*

This is a half year course, providing carpentry students with basic knowledge and relevance of shop safety. Students are introduced to blueprint reading , creating drawings, and working from them. Students receive instruction in hand tools and power tools. Critical thinking skills are emphasized throughout the course. Students learn various jointery by completing several shop supervised projects. Each of these projects shall be slightly more difficult so-as to increase the student's knowledge.

GRADE 9 RELATED THEORY *CREDITS: 1.25*

This half year course, meeting one period per day provides students with the basic knowledge of estimating and relevance of safety as well as state and local building codes. Students are introduced to interpreting blueprints and measured drawings. Reading, writing and math assignments related to carpentry theory are an integral part of this class. Throughout every phase of instruction, deliberate effort is made to acquaint students with working conditions they can expect to find on an actual job.

GRADE 10 SHOP *CREDITS: 20*

This course builds on the skills students have acquired as freshmen. We start off the year with required cabinetry projects then progress to personal / community

based projects on an individual basis according to each student's ability.

GRADE 10 RELATED THEORY *CREDITS: 2.5*

This full year course meets one period per day during the shop cycle. Students receive instruction in blueprint reading and interpreting "to scale" drawings. Tool and shop safety includes the use of portable power tools, and an introduction to state and local building codes, including 10 hours of Career Safe (an online course involving 65 tests). Reading, writing, and math assignments related to the carpentry/Cabintry profession are integrated with academic frameworks during this class.

GRADE 11 SHOP *CREDITS: 20*

This course provides the carpentry student with advanced knowledge in the area of worksite safety, estimating, and state and local building codes. Students will have the opportunity to work on off-campus sites in which they will be engaged in community service construction projects within the district's 9 sending towns. Projects include rough framing to finish work.

GRADE 11 RELATED THEORY *CREDITS: 5*

This full year course, meeting one period per day during the shop cycle, and two periods a day during the academic cycle provides the carpentry student with advanced knowledge in the area of safety, estimating, and state and local building codes. The main concentration for instruction includes residential and commercial construction. There is a strong emphasis on interpreting blueprints as well as state and local building codes. Reading, writing, and math assignments related to the carpentry professions are integrated with academic frameworks during this class.

GRADE12 SHOP *CREDITS: 20*

This course provides the carpentry student with advanced knowledge in the areas of safety, estimating, and state and local building codes. The goal of this course is to provide each student with the technical knowledge and experiences essential to secure employment as a carpenter and
or transition to a post-secondary institution. Projects include rough framing to finish work. Students also have the option to participate in the co-op and work-study programs.

GRADE 12 RELATED THEORY *CREDITS: 5*

This full year course, meeting one period per day during the shop cycle and two periods a day during the academic cycle provides carpentry students with advanced knowledge of relevance of safety and estimating, blueprint reading, as well as state and local building codes. Instruction in house planning is emphasized. Research, which includes reading, writing and math assignments related to carpentry professions, is integrated with academic frameworks during this class.

Collision Repair

Grade 9 Exploratory Theory
Credits: 1.25

The first half of the year is an ongoing basic knowledge of the Collision Repair trade and opportunities of employment taught through the exploratory program. Students are required to review shop safety and pass a safety test. Students are also required to complete a math test directly related to math skills associated with the collision repair trade.

Grade 9 Exploratory Shop *Credits: 10*

The first half of the year is focused on exploratory. Students are given an introduction to hands on activity that would be done in a Collision Repair shop. Utilizing training vehicles, students will experience repair of a small dent, feather edging, masking and surface preparation. They will also use a M.I.G. welder and the plasma cutter. Students will also experience removal and reinstallation of bolt on parts and proper labeling and storage of hardware.

Grade 9 Related Theory *Credits: 1.25*

Upon final choice, students will be taught shop safety, shop types and layout with career opportunities, hand tools, power tools and basic vehicle construction. Shop safety will include the Right to Know law as well as understanding the MSDS (Material Safety Data Sheets) information. This will be followed up with a safety knowledge test for both areas. Students are required to maintain a notebook compiled of trade related information including handouts, notes, tests/quizzes and homework. This instruction will be delivered with the use of textbooks, oral presentations, Smart board, videos and demonstrations.

Grade 9 Shop *Credits: 10*

9th Grade Shop: Upon final shop placement students will be given a course management plan as well as a shop grading policy and shop dress code.

Students will learn the proper surface preparation and repairing steps on a training vehicle. This will include proper washing of a vehicle with soap and water and solvents, removal and reinstallation of components and hardware, dent repair methods and applying/ shaping body fillers, proper masking techniques and mixing and application of primers and primer surfacers. Students will be taught proper requirements for personal safety protection regarding eyes, hearing and respiratory needs. Students will learn proper surface preparation and basic refinishing skills.

GRADE 10 RELATED THEORY *CREDITS: 2.5*

The sophomore year is a strong basic skills learning year. Shop safety is ongoing and will include reviewing the Right to Know law as well as understanding the MSDS (Material Safety Data Sheets) information. This will be followed up with a safety knowledge test for both areas. During this year students will learn in depth surface preparation. Included in this will be corrosion protection, the use and knowledge of undercoats, paint knowledge, paint code locations and vehicle I.D., spray equipment knowledge and application of products. Welding methods used in the collision repair industry with covered in depth as well as welding equipment knowledge and terminology. Automotive fastener knowledge will also be covered. This instruction will be delivered with the use of textbooks, oral presentations, Smart board, videos and demonstrations.

GRADE 10 SHOP *CREDITS: 20*

As the Auto Body Shop is modeled after a real repair shop we take a variety of customer's jobs for our students to repair. We try to insure that every student gets to perform the different tasks that make up our curriculum. We use the national standard NATEF curriculum and align the tasks with the Massachusetts State Vocational Frameworks. As sophomores, we strive to not only give each student their turn at different jobs but to challenge those who aim to excel. The following tasks would be accomplished in the sophomore year:

- Demonstrate the use of hand tools
- Demonstrate the use of power tools
- Weld and cut metals
- Prepare and execute a repair plan
- Repair and adjust outer panels
- Vehicle surface preparation
- Paint and refinish automotive bodies following current industry trends.
- Complete OSHA 10hour course utilizing CareerSafeOnline

GRADE 11 RELATED THEORY *CREDITS: 5*

Shop safety is ongoing and will include reviewing the Right to Know law as well as understanding the MSDS (Material Safety Data Sheets) information. This will be followed up with a safety knowledge test for both areas. During this year students will learn more in depth procedures for collision repair. Welding basics learned previously in the sophomore year lead to structural welding and repairing. Students will learn plastic repair procedures as well as the refinishing of plastic parts. Mechanical component knowledge and terms are taught including steering, suspensions, alignment, air conditioning, brake systems and frame repair. Automotive glass repair, replacement and identification will also be covered. This instruction will be delivered with the use of textbooks, oral presentations, Smart board, videos and demonstrations.

GRADE 11 SHOP *CREDITS: 20*

Students will continue to work on live customer vehicles. Students will be assigned tasks that follow the Massachusetts State Vocational Frameworks utilizing the I-CAR curriculum and National NATEF standards. Students will experience the replacement and alignment of bolted and welded panels, straightening of damaged metal parts, application and shaping of plastic body fillers, sanding and featheredging operations, removal and installation of interior trim, application of primer coats and sanding to eliminate imperfections, application of color coats and clear coats, inspection and service of suspension and exhaust components, introduction to estimating damage (computer based), and introduction to frame and unibody measuring and repair.

GRADE 12 RELATED THEORY *CREDITS: 5*

Shop safety is ongoing and will include reviewing the Right to Know law as well as understanding the MSDS (Material Safety Data Sheets) information. This will be followed up with a safety knowledge test for both areas. During this year students will learn electrical repairs and restraint systems. Frame damage identification and repair methods will be covered. Damage estimating will be taught in depth along with parts terminology. Advanced refinishing procedures will include blending, paint application problem solving and custom painting techniques. Vehicle problem solving will be covered including panel alignment, wind and water leaks and component failures. The final phase taught is the readiness to pursue the collision repair trade and various career opportunities including employer and customer expectations. This instruction will be delivered with the use of textbooks, oral presentations, Smart board, videos and demonstrations.

Grade 12 Shop *Credits: 20*

Students will continue to work on live customer vehicles. Students will be assigned tasks that follow the Massachusetts State Vocational Frameworks utilizing the I-CAR curriculum and National NATEF standards. Students will continue to develop all of the skills and tasks previously covered in subsequent years aiming towards achieving mastery. In addition, students will experience the use of a diagnostic scan tool to interpret vehicle trouble codes, use wiring diagrams and a multimeter to diagnose electrical problems, remove and install restraint system components, use knowledge database to diagnose/determine the repair sequence for engine management problems, application of vehicle graphics, estimating damage and introduction to aluminum welding and repair.

Computer-Assisted Drafting

Upon successful completion of the 3 ½ year program the student will receive a certificate. The skills they have acquired will prepare them for entry level employment or further education in the field of engineering. Through articulation agreements, students may be entitled to receive college credits.

Grade 9 Basic 2D Drafting/CAD 1 *Credits: 10*

This half year module (270 hours) will focus on general drafting applications and uses 2D AutoCAD software. Students will create detail drawings to an industry standard. The emphasis in this course is towards developing strong CAD skills through creating both one view and multi-view drawings complete with dimensions. Manual drafting applications will also be explored. This course requires no previous knowledge of CAD or drafting.

Grade 9 CAD Related Theory *Credits: 1.25*

This half year module (270 hours), which only takes place during the student's freshman year, will focus on developing drafting skills and blueprint reading. Some of the curriculum content includes the following: alphabet of lines, blueprint reading, dimensioning, free hand sketching, scaling, measuring tools, and orthographic projection of drawing views. Manual drafting applications will also be explored. This course requires no previous knowledge of CAD or drafting.

Grade 10 Architectural Drafting/CAD Credits: 20

This one year module (540 hours) will focus on wood-framed residential architecture. Students will use AutoCAD software to create construction drawings to an industry standard. In addition, students will be exposed to terminology, elements of design, construction techniques, and materials of residential design. Hand sketching techniques will continue to be strengthened. All students will design and build a 3D house model of a residential structure. This course requires knowledge of basic 2D drafting/CAD.

Grade 11 Advanced 2D Drafting/CAD Credits: 20

This one year module (540 hours) focuses on mechanical applications and uses the 2D AutoCAD software, but will also introduce the students to 3D solid modeling with software called Inventor. Students will create drawings, perform calculations, and use technical manuals to complete their projects to an industry standard. Projects include: section view drawings, auxiliary views, screws and fasteners, a variety of assemblies, sheet metal fabrication, fit tolerance, and geometric tolerance. This course builds on the previous skills taught in the Basic 2D Drafting/CAD module.

Grade 12 3D Solids & Modeling Credits: 20

This full year module (540 hours) will focus on using two software packages, Autodesk Inventor for creating 3D solid models, and CatalystEX for creating prototype models of actual parts designed by the students.

In solid modeling, the students will use the software to create a variety of component models, assemblies, and drawings. After creating the solid models in Inventor, the students will use CatalystEX to program the parts to be printed on a rapid prototype 3D printer. The students will also complete a senior design project in which they design, and then create, a model of an assembly of either a mechanical or architectural product of their choice.

Students will see their designs come to life with a real 3D models made of ABS plastic. Designs and calculations of engineered components can now be tested for fit and function. During this process, the students will gain reinforcement in manufacturing methods.

Cosmetology

Grade 9 Exploratory

This one week introduction provides the ninth-grade student with an introduction to the Cosmetology program. The student is introduced to safety, sanitation, professional image and personal hygiene as well as career opportunities within the industry. Practical instruction includes wet hair styling, thermal styling, basic manicures, facials, and hair treatments.

Grade 9 Cosmetology Shop *Credits: 10*

When students enter permanent placement, this course provides the student with basic knowledge and skill training necessary for success in the Cosmetology industry. Students receive practical instruction on equipment safety and sanitation. Practical work on mannequins includes draping, shampooing, rinsing, manicuring, wet and thermal hairstyling, and proper make-up applications. Students are graded daily on a rubric comprised of attendance, dress code, practical skills, and participation.

Grade 9 Cosmetology Related Theory *Credits: 1.25*

Related instruction for the ninth grade student includes basic technical instruction and studies, including the history of Cosmetology, life skills, infection control, principles of hair design, shampooing, rinsing, and conditioning.

Grade 10 Cosmetology Shop *Credits: 20*

This course is designed to further develop the basic skills and knowledge needed to success in the Cosmetology field. Instruction includes introduction to pedicuring, hair removal, basic perm winding, basic haircutting.

Grade 10 Cosmetology Related Theory *Credits: 2.5*

This course is designed further develop the comprehension of basic Cosmetology theories and technical instruction. Students receive instruction in communicating for success, properties of hair and scalp, basics of electricity, wet styling, thermal styling, manicuring, and pedicuring.

Grade 11 Cosmetology Shop *Credits: 20*

This course is designed to give students the opportunity advance their knowledge and technical skills in the Cosmetology program. Students advanced instruction in facials, make-up applications, manicures, pedicures, wet and thermal styling, and haircutting. They receive an introduction to chemical permanent waving, hair coloring, chemical use and precautions, braiding and extensions, foil and cap highlighting, and sanitation practices. Upper level students meeting state board hour requirements will have an opportunity to provide services on customers entering the shop. Students are graded daily on a rubric comprised of attendance, dress code, practical tasks, and participation.

Grade 11 Cosmetology Related Theory *Credits: 5*

This course is designed to provide students with the opportunity to master their knowledge and technical skills in the Cosmetology program. Students receive instruction in chemical texture services, hair coloring, the level system, corrective hair coloring, skin structure and growth, nail structure and growth, skin disease and disorders, and nail disease and disorders. Instruction includes demonstrations, hands-on practice, writing assignments, weekly quizzes, and tests to determine competency levels.

Grade 12 Cosmetology Shop *Credits: 20*

This course is designed to give students the opportunity advance their technical skills and comprehension level in the Cosmetology program. Qualified seniors who are in good standing vocationally and academically and have passed the state board exam can participate in the Cooperative Education program. Students may be offered the opportunity to serve as an apprentice in a paid off-campus position. Qualified seniors will gain industry experience and an opportunity to master their knowledge and skills in a professional workplace.

Grade 12 Cosmetology Related Theory *Credits: 5*

This course is designed to prepare students for state licensure and the professional workplace. Students receive instruction on the salon business, seeking employment, on-the-job training, resume writing, managing money, management and entrepreneurship, and familiarizing students with all aspects of the industry. Specific instruction is provided in braiding and extensions, wigs and hair enhancements, nail tips, acrylics, and UV gels.

Culinary Arts

Grade 9 Exploratory Theory
Credits: 1.25

During 9th grade Exploratory Related, students will learn the basics of kitchen equipment safety and safe food handling techniques needed to prevent food borne-illness. Students will discover the number of career opportunities that are available in the foodservice industry. They will also be introduced to the math needed to convert recipes, as well as being taught how to read and understand recipe procedures.

Grade 9 Exploratory Shop
Credits: 10

During 9th grade exploratory shop, the students will rotate through the three main shop areas, production baking, tea room, and quantity foods, on a daily basis. They will be assigned light duties and will work alongside upperclassmen. The students will be taught introductory knife skills and safety. Freshmen will also be

shown basic cooking and baking techniques, and will participate in dining room service in the school restaurant.

GRADE 9 RELATED THEORY *CREDITS: 1.25*

Students will learn about kitchen equipment safety, and the identification and mapping of safety hazards, in addition to equipment location in the kitchen and safe food handling techniques needed to prevent food borne-illness. Students will receive instruction on how to sharpen and maintain a knife, cutting techniques and how to safely handle a knife to prevent injury. Students will learn the math needed to convert recipes, as well as how to read and understand recipe procedures.

GRADE 9 SHOP *CREDITS: 10*

The students will refine their knife skills and learn the basic skills required for each area of the shop. They will continue to work with upperclassmen in the kitchen and bakery areas, and will be involved in food preparation for tea room. Freshmen will work the “front of the house”, including setting tables, waiting on customers, and breaking down tables in the dining room. They will work at the bake cart, completing small preparations and baking, cleaning all food preparation areas and performing dishwashing duties. In addition, freshmen will learn about quantity food production used in large hotels, hospitals and other large facilities. Students will also learn about food purchasing, inventory and sanitation in the kitchen.

GRADE 10 RELATED THEORY *CREDITS: 2.5*

The students will learn about stock, sauce and soup making techniques, and the equipment necessary to make all three. Sophomores will be introduced to a variety of table service styles, how they are performed, when to use the different styles and be introduced to hospitality management. The students will learn all dry and moist cooking methods, when to use each method and how each method is performed. Sophomores will also be introduced to a variety of fruits and vegetables, how they are grown, stored, prepared, and the cooking methods suitable to the particular fruit or vegetable. Students will also have the opportunity to taste several fruits and vegetables throughout the unit. The students will learn about different cuts of meat from beef, veal, lamb, pork and poultry. They will study about where the meat comes from, cooking methods, how the animals are raised and fed, in addition to the grading and inspection of all meats.

GRADE 10 SHOP *CREDITS: 20*

During their sophomore year, students will improve and refine the skills acquired during their freshman year. They will continue to work along side upperclassmen in each area of the shop. They will be introduced to using heavier equipment and more advanced techniques and methods of food preparation. Upon completion of their sophomore year, they should understand and practice ServSafe policies concerning food sanitation. They will improve on their “front of the house” and “back of the house” skills.

GRADE 11 RELATED THEORY *CREDITS: 5*

In their junior year, the students will learn about seafood, including identification, cooking methods, environment, and allergens. They will also have the opportunity to taste a variety of seafood. The juniors will study baking and pastry, cakes, cake decorating, custards, chocolate, pies, and the function of ingredients used in baking. The students will learn about garde manger, the different types of forcemeats, and the equipment and procedures used to make forcemeats. The juniors will have the opportunity to take the ServSafe exam to receive a national certification, which is good for five years. Students will be introduced to basic nutrition, and creating and designing menus. Finally, the juniors will learn about food items used in making a variety of salads, as well as the use of specific oils and vinegars in salad making.

GRADE 11 SHOP *CREDITS: 20*

The junior year in shop has students expanding their managerial skills, and they will serve as role models for underclassmen. They will learn how to organize, set up and run the kitchen, bake shop, dining room and bake cart, implementing responsibility and team effort. They will continue to improve and refine the skills acquired the in previous years. They will also be responsible for food storage and sanitation.

GRADE 12 RELATED THEORY *CREDITS: 5*

Seniors will learn about numerous international cuisines, as well as regional cuisines from throughout the United States. Students will receive instruction in food costing, cost control, recipe conversions, and purchasing and terms related to profit and loss statements. Students in their senior year will learn how to develop higher levels of flavor in foods, as well as current plating of dishes. The entire third trimester, the seniors will work on a restaurant project. The project will have the students create their own restaurant or bakery step by step throughout the trimester. The project will include developing a floor plan, creating a menu, planning for payroll, scheduling, and marketing, determining a location, assessing competitors and demographics, selecting a name and more.

Grade 12 Shop *Credits: 20*

The students will refine all the skills acquired over the previous years and continue to expand their leadership role in the kitchen and the dining room, in an atmosphere of teamwork. They will learn more advance techniques in the kitchen and baking areas to provide them with the right knowledge needed to pursue a college education or a career in the food and beverage industry.

Electrical

Grade 9 Exploratory Shop

Credits: 10

Upon successful completion of the freshmen curriculum student will have been exposed to a daily safety program that will demonstrate safe hand tool and shop use. This program focuses on the proper use of various electrical meters, and how the different quantities relate to each other. Student will also research and

learn about methods of how electricity is produced, as well as how to wire line voltage devices and circuits to applicable codes and standards.

Grade 9 Exploratory Related Theory
Credits: 1.25

Students are given an introduction to the trade including licensing laws, job opportunities and conclude with an interview of a working electrical person. General safety, OSHA, Right to Know and Basic First Aid is covered in depth. Electrical fundamentals and Electrical Safety are then emphasized along with tool identification, use and safety. Employability skills such as critical thinking, relationship and workplace issues are explored.

Grade 10 Shop *Credits: 20*

Upon successful completion of the sophomore curriculum, students will have an OSHA 10 certification, and have been exposed to a daily safety program that outlines power tool safety, and safety on residential job sites. The National Electrical Code will be referenced and observed, as students will practice wiring typical residential circuits, residential services, and proper grounding. They will learn how to read, interpret, and build to basic residential blueprints. Students will build an understanding for the importance of proper wire sizing and over current protection. Student will also continue working on different circuit fundamentals to build on how the different electrical variables affect one another at the DC level.

Grade 10 Related Theory *Credits: 2.5*

Students focus on learning about DC circuits, Ohm's Law, Watt's Law, sources of electricity, electrical components, understanding the use of test and measuring equipment, schematic symbols, and industry safety standards are emphasized throughout. Students are trained to mathematically analyze and troubleshoot DC circuits with resistances in series. Residential wiring, including general requirements, symbols and outlets with blueprint reading skills is practiced. Introduction and use of the National Electrical Code along with reading, writing and technical math assignments in electrical theory are highlighted.

Grade 11 Shop
Credits: 20

Upon successful completion of the junior year, students will be exposed to a daily safety program that covers commercial installations, equipment and jobsite

safety. The course of study will focus on the different types of wiring methods used in different commercial applications including conduit-bending techniques. Students also will start working with relays, motors and motor control concepts. They will also start working with advanced electrical AC theories and their effects on a circuit. The junior class also further practices previously learned applications outside the school in our surrounding communities.

Grade 11 Related Theory

Credits: 5

Students continue to expand their skills in residential wiring to include determining required outlets, conductor sizes and types, voltage drop and wiring methods. Instruction in DC theory and troubleshooting that now includes resistances in parallel and series-parallel is practiced. The theory of the art of bending conduit is introduced. Motor wiring according to the NEC such as sizing conductors, overload and short circuit protection along with sizing disconnects is emphasized.

Grade 12 Shop

Credits: 20

Upon successful completion of the senior year, students will be exposed to a daily safety program that covers industrial and specialized installations. The course of study will be open to the students interest and desired future directions allowing for study in such fields as industrial application and controls, Telecommunications and Data wiring, Fire and burglar alarms, Cable TV and cctv systems, audio and video cabling. Students will also be able to further their residential and commercial wiring skills in the lab as well as in the community.

Grade 12 Related Theory

Credits: 5

Residential wiring competencies such as temporary and permanent services, over-current devices, grounding theory and special purpose outlets will be covered in detail. Continued study and use of Code Articles and Tables is practiced. Students will receive an introduction to AC theory principles that include inductance and capacitance reactance as well as power factor. As a final project, seniors will develop a portfolio that will include samples of academic and vocational achievement, an autobiography, references and future plans.

Electronics

Grade 9 Shop *Credits: 10*

Each student, upon successful completion of the 1.5 trimester (half year) Freshman curriculum, should have an understanding of the nature and sources of electricity, the components of a basic electrical circuit, Ohm's Law, DC circuit analysis for series, parallel and combination circuits, the use of basic diagrams and schematics, Watt's Law, common circuit devices, and the manipulation of a hand held digital multi-meter for circuit measurements of voltage, current and resistance. Soldering/de-soldering skills will be developed and students will also be introduced to all the various shop hand/power tools. Also, throughout the year, safety and employability standards will be emphasized and expected.

Grade 9 Related Theory *Credits: 2.5*

This program introduces the theoretical aspects of the science and industry of electronics and builds upon the skills acquired during Exploratory. Students focus on learning about DC circuits, Ohm's Law, Watt's Law, sources of electricity, electronic components, understanding the use of test and measuring equipment, schematic symbols, and industry safety standards are emphasized throughout. All Related work is closely integrated with shop work and applied in the laboratory. Students are trained to mathematically analyze and troubleshoot DC circuits with resistances in series, parallel, and series-parallel configurations. Reading, writing, and math assignments related to electronics theory is an integral part of this class.

Grade 10 Shop *Credits: 20*

Each student, upon completion of the three trimester sophomore curriculum, will have a thorough exposure to AC and DC electronic basics including series, parallel, and combination resistive circuits; capacitance, inductance, transformers, electric motors, rectification, and power supply basics. Also covered will be the theory and use of oscilloscopes, function generators, and analog multimeters. Diode, transistor, voltage regulator, SCR basics and ESD awareness will also be covered. In addition to these topics, all previous topics covered in grade 9 will be reviewed and emphasized as needed.

Robotics technology will be introduced in Shop, and throughout the year will be used as a foundation to help students utilize and reinforce many of the basic electronic concepts learned in shop. This exposure will teach workplace skills such as teamwork, problem solving, brainstorming, project management and the meeting of deadlines. Only those students who ***consistently*** *demonstrate good performance and aptitude* in shop, and who possess the desire to compete in Pathfinder's F.I.R.S.T. Tech Challenge will be considered for direct involvement in final robot construction and programming for competition. The remaining teammates will be expected to assist with the many detailed preparations needed to organize and run the event.

Also throughout the year, safety and employability standards will be emphasized and expected. Sophomores will complete a basic OSHA training course and receive a certificate upon successful completion.

GRADE 10 RELATED THEORY *CREDITS: 2.5*

This program involves the theoretical aspects of the science and industry of AC electronics and builds upon the skills acquired during the freshman year. Students receive instruction in AC circuit analysis, the use of grade appropriate intermediate diagrams and schematics, the circuit devices and stages common to power supplies, introductory level exposure to semiconductor devices. Industry safety standards are emphasized throughout. Related work is closely integrated with shop work and is applied in the laboratory. Reading, writing, and math assignments related to the electronics industry are integral to this class.

GRADE 11 SHOP *CREDITS: 20*

Students will acquire a solid understanding of analog circuits, digital circuits, schematics, and various engineering/electronic software packages. Course topics will be taught using several methods including breadboard lab exercises, robotics, and individual design projects. Students will be exposed to the components that are used in microprocessors and microcontrollers. Software programming will help to integrate code writing with hardware design.

A strong emphasis will be placed on the correct use of electronic measuring equipment and computer software. All lab experiments will require documentation in either technical memorandum format or lab report format. It will be required that all work submitted is typed using Microsoft Word. All tables and graphs will be developed using Microsoft Excel. Several programs will be available for the drawing and designing of schematics. Computational software

packages will be used to emphasize and help in the understanding of important concepts.

GRADE 11 RELATED THEORY *CREDITS: 5*

Each student, upon successful completion of the three trimester Junior curriculum, should have an understanding of grade appropriate diagrams and schematics, the circuit devices and stages common to radio circuits, as well as a basic comprehension of consumer electronics, fiber optics, oscillators, and electronic communication and data systems. Industry safety standards are emphasized throughout. Digital electronics topics will also be introduced during trimesters II and III, setting the stage for more in-depth training on digital logic and systems applications in Grade 12.

GRADE 12 SHOP *CREDITS: 20*

Students should become more proficient in the use of electronic tools, meters, logic analyzers, DC/AC circuits, and function generators. A firm understanding of circuit design and computer based schematic design will be obtained. Computer code will be developed and implemented using RobotC. The use of software simulation packages for troubleshooting will be thoroughly explained. Course topics will be taught using several methods including breadboard lab exercises, robotics, and individual design projects. Students will develop and build microprocessors and microcontrollers. An in depth knowledge of logic gates, RAM, ROM, EPROM, latches, system buses, address buses, and control buses will be acquired (sequential and combinational logic).

Most lab experiments will require documentation in either technical memorandum format or lab report format. It will be required that all work submitted (exception: student logbook) is typed using Microsoft Word. All tables and graphs will be developed using Microsoft Excel. Daily engineering format logbooks will be maintained by each student. The Multisim schematic design software package will be available for the drawing and designing of schematics. Computational software packages will be used to emphasize and help in the understanding of important concepts.

The senior year will conclude with an individual senior design project. This project will confront a real world problem with a solution. The knowledge gained over the four year course will be presented in the delivery of this capstone project. The project will be complete with a detailed logbook, schematic, lab report, tables/graphs, data sheets, and a PowerPoint presentation.

Grade 12 Related Theory *Credits: 5*

This program emphasizes the theoretical aspects of the science and industry of electronics and builds upon the skills acquired during the junior year. Each student, upon successful completion of the three trimester senior curriculum, should have an understanding of the use of grade appropriate diagrams and schematics, more advanced circuit development and interpretation, semiconductor devices and their related theory. Students receive instruction on digital circuits and will also have a basic comprehension of programmable logic controllers, electronic communication and data systems, including the fundamentals of computer operation. Industry safety standards are emphasized throughout the curriculum.

Heating, Ventilation, and Air Conditioning (HVAC)

Grade 9 Theory *Credits: 2.5*

After studying general safety procedures and tool use, ninth grade students in HVAC study the operation of oil fired warm air furnaces. The study of basic electricity is incorporated into studying the electrical circuits of furnaces. The use of computer simulation programs help strengthen the students' understanding of how to use electrical meters when performing system evaluation and troubleshooting on furnaces. Soldering and brazing theory is covered along with the study of proper combustion analysis prior to beginning basic air conditioning theory. In the spring, students focus on the theory of the basic air conditioning cycle. In addition they study how to recover, evacuate, and charge window air conditioning units.

Grade 9 Shop *Credits: 10*

Ninth grade students apply electrical theory as they measure amperage and voltage behavior in series and parallel circuits that they build. Written labs are used to reinforce the transition of theory to practical applications. Diagrams are required to be drawn by the students for every circuit they work on. Tubing and piping skills are developed when students produce projects in which soldering and brazing skills are used. A steel pipe cutting and threading project is also included. Oil fired furnaces are studied as students disassemble and rebuild oil

burners and furnaces. In the spring students work on window air conditioners while practicing recovery and evacuation procedures. They also work on written labs that require students to identify temperature pressure relationships of the compression cycle as they document readings taken from pressure gauges and thermometers.

GRADE 10 RELATED THEORY — CREDITS: 2.5

Sophomore students use previous gained knowledge to begin troubleshooting skill development. Using simulation software with computerized fault-insertion and built-in test instruments, students learn how to properly troubleshoot and repair air conditioning systems. Instructors are provided with numerous reports to help track student's progress. Similar instruction is utilized in addition to textbook study methods when sophomores learn about gas fired equipment. During the year students complete a basic OSHA training course and also study refrigerant recovery requirements to enable them to test for recovery certification.

GRADE 10 SHOP — CREDITS: 20

Students continue working on window air conditioners to further identify compression cycle readings as they change according to various factors that can affect and otherwise reduce the efficiency of a working unit. Labs require students to document system readings as problems are placed on a system. Problems include overcharging and undercharging a system, as well as air flow restrictions to the indoor and outdoor coils. Students utilize brazing and soldering skills when performing mechanical service labs. The electric systems of the units are analyzed and students must create proper schematics of all components individually and then together to prove knowledge of sequence of operation between all components. In the colder months students work on typical gas fired forced warm air systems. Students use tools to measure gas pressure, air flow, temperature, as well as voltage and amperage in the gas furnace electrical circuits.

GRADE 11 RELATED THEORY — CREDITS: 5

Students begin the year with the study of central air conditioning systems. Before cooler months arrive they begin studying residential hot water heating systems. Components including circulators, zone valves, air removing devices, directional valves, expansion tanks among other components are studied and selected during hydronic system design. Steam systems are covered as they exist in typical one and two pipe residential systems. Going into the spring studies begin on heat pump systems with the use of the simu-tech software simulation program

adding the benefit of challenging students to properly diagnose and repair various heat pump problems. All systems studied during the year include examination of multiple electrical diagrams.

GRADE 11 SHOP — CREDITS:20

Since the HVAC program integrates outside jobs with typical shop exercises, students work on a variety of projects that can include installation of systems from previous years study as well as the current studies taking place in the related theory classroom. Outside job work can include hot water system installations or forced warm air systems that use gas or oil as a fuel. Warm air systems often include the addition of central air conditioning components. Students also work with freshmen students in the shop as peer educators which is a strong learning experience for younger students and juniors alike. During the second half of the junior year in shop, qualified students may gain employment with area contractors in a co-op experience where the students goes to work directly with the HVAC contractors during the shop week cycle.

GRADE12 RELATED THEORY — CREDITS: 5

Senior HVAC students begin the year with the study of typical commercial refrigeration systems and their design. Various components particular to the refrigeration industry are studied individually and then together as they can be used as accessories to typical refrigeration systems . Heat gain on freezers and coolers are covered as well as compressor selection, pipe sizing and electrical component selection.
Duct system design is included in the senior year as well as supermarket refrigeration systems and ice machines. Prior to graduation, students study the mass oil burner code in preparation for the mass oil license test which is not mandatory but is available as a test for any senior upon graduation and who is at least 18 years of age.

GRADE12 SHOP — CREDITS: 20

Students who are not on a co-op job during shop week will typically go out and perform installation and servicing tasks on HVAC systems during outside job experiences in the local community. The variety of these tasks is similar to those which are experienced by junior students with the addition of qualifying to perform work on refrigeration and air conditioning systems inside and throughout the physical building at Pathfinder.

Health Assisting

Overview: Health Assisting exposes students to a wide variety if career opportunities in the health care field. It also provides students with skills to allow them to enter into the health care field directly from high school as well as provide a solid academic foundation and skills base to further their education at the college level. All students are given CPR, AED and First Aid training and are certified if they meet the American Red Cross criteria. Nursing Assistant, Home Health, Care of the Alzheimer's Patient and Medication Administration Program certifications are available to those students who meet the requirements of each governing agency.

Grade 9 Exploratory Related Theory

Credits: 1.25

Students are given a brief introduction to the various careers in health as well as a comprehensive overview of the educational experiences and opportunities in the Health Assisting Program at Pathfinder. Through learning and using medical terminology, experiencing some hands on activities and an introduction to some of the theory behind the skills we perform, students are able to evaluate whether a career in health care is for them.

GRADE 9 RELATED THEORY *CREDITS: 1.25*

Students will become acquainted with standard medical abbreviations which will prepare them for their sophomore health career exploratory in the acute care setting. The students will also complete a research paper and will be able to determine valid versus invalid data and sources. The students will produce a three to five page paper about a childhood infectious disease following the MLA format. The students will learn nutritional requirements from birth to preschool and produce a healthy menu following the food pyramid guidelines. This project is part of their child care entrepreneurship project

GRADE 9 SHOP *CREDITS: 10*

Classroom: Students are introduced to the health care field by learning about infection control, childhood illnesses, abuse and neglect, nutrition, safety, communication and growth and development. Medical math has been added to grade nine to provide additional reinforcement of basic math concepts and the use of critical thinking through solving word problems. Students complete an entrepreneurship project which allows them to develop mastery of the skills in the Management and Entrepreneurship Strand of the Vocational Frameworks. Students also strengthen their computer skills and use of technology.

Clinical: Students spend one day a week at a child development center and observe children from infants to school age. Here they are able to observe the different developmental milestones, infection control practices, nutrition, the value of play, and to understand the importance of being a positive role model. Students also spend an additional day during the week at an assisted living facility assisting with activities. At this site their goal is to become more comfortable interacting and communicating with the elderly.

GRADE 10 SHOP *CREDITS: 20*

Classroom: Sophomore students will explore the ten systems of the human body, diseases related to these systems and learn how these systems interrelate to maintain our body's delicate balance. Students are required to complete a five page research paper related to a body system and a second three to five page research paper related to medical ethics. In addition to anatomy and physiology students also cover curriculum to complete their pre-requisite for "pre-care hours" necessary to participate in their clinical experiences. Students complete an on-

line OSHA 10- hour card through Career Safe which fulfills a safety requirement for vocational education.

Clinical: Students job shadow in a variety of departments at two local acute care facilities. During this experience students will gain knowledge of employability skills, job readiness and explore first hand what career opportunities are available in the health care field. Students are responsible for learning career paths, educational requirements and job descriptions of each area that they shadow. Students will incorporate knowledge gained during class into hands-on practice within the health care facility. These hands-on practices include communication skills with patients and health care personnel, bed making, maintaining confidentiality and infection control practices within the facility.

GRADE 11 SHOP *CREDITS: 20*

The junior curriculum focuses on DPH (Department of Public Health) approved nurse aide curriculum. Students will develop their clinical skills at a long term care facility (LTCF) three days per week. Upon successful completion of the curriculum the student will become eligible to take the DPH nurse aide exam. Students will also be introduced to sub acute and acute care, and will have the opportunity to receive a certification in the care of the Alzheimer resident. At the end of their junior year students will produce a resume and cover letter for their portfolio.

GRADE 12 SHOP *CREDITS: 20*

Students may choose to go out on co-op (obtain employment in the health care field) or they will remain in shop and receive training in four main areas: home health, medical terminology, medical records and medication administration.

In home health training they take the skills and training they learned as CNA's (certified nursing assistants) and apply that knowledge to the home care setting. They will add home management skills such as laundry, meal preparation, and household cleaning. SAMM (Self Administered Medication Management) will be taught in class and observed during clinical. They will gain practical experience at an assisted living facility. They will obtain certification upon successful completion of the home health curriculum.

Students receive a full college level course in Medical Terminology. Learning the language of medicine will help prepare them for entering any health career as well as to expand their vocabulary and understanding of body systems and diseases.

The third area is an introduction to medical records. During this course they will become more familiar with establishing and maintaining patient medical records, filing, simple bookkeeping and front office skills as well as simple medical screenings typically performed in a medical office setting. Clinical time is spent at an acute care facility and/ or clinic setting.

The final area is a MAP (Medication Administration Program) training course. Those desiring certification will be eligible to take the state exam upon successful completion of the state requirements. Having this certification will allow them to obtain employment with the Department of Developmental Services or the Department of Mental Health in group home settings. This training will also be valuable in any health field where medication is administered.

HORTICULTURE

The Pathfinder Vocational Horticulture program prepares students for careers in the "green industry". The program covers instruction, work experiences, and exposure in the following specialty areas: greenhouse management, floriculture, landscaping, turf management, and arboriculture. The program is supported with many FFA (agriculture youth organization) competitions and personal growth activities. The students in the Horticulture program will gain competencies, as set forth, by the Massachusetts curriculum frameworks.

GRADE 9 RELATED THEORY *CREDITS: 1.25*

First year Horticulture students study and participate in the FFA agriculture student organization. They participate in State FFA competitions in order to expand their Horticulture knowledge and develop quality personal character. Success at the FFA State level competition is motivated by the opportunities to compete at the National FFA level the following years. Plant Science and Botany are also presented to first year Horticulture students in the related theory classes.

GRADE 9 SHOP — CREDITS: 10

The Horticulture student's first year in shop is spent identifying the tools and machinery used in the Horticulture industry. Safety and proper use of these tools is emphasized to all of the Horticulture students. Grade 9 Horticulture students learn Greenhouse management techniques; pest and disease identification, bedding plant production, and plant identification. The First year horticulture student also learns the basics of floral design. Bud vases, small centerpieces, fresh and dried floral projects are assembled by the student, demonstrating the principles of floral design. Plant and floral arrangement sales are sold to the public. This opportunity allows students to practice the basics of customer service and sales.

GRADE 10 RELATED THEORY — CREDITS: 2.5

The Sophomore Horticulture student studies the units of Floriculture, Greenhouse production, Soils, and Plant Propagation.

- The Floriculture unit presents career options, safety issues, the principles of floral design, and pricing procedures.
- The Greenhouse Production unit introduces types of greenhouse structures, growing media, plant nutrition, and plant processes.
- The Soils unit identifies various soil textures and how various soil types impact our ecosystem and plant life.
- The Propagation unit continues to expand on methods of starting new plants from existing plants; such as scarification and grafting techniques, in addition to taking cuttings and starting plants from seeds.

GRADE 10 SHOP — CREDITS: 20

The second year Horticulture student continues to expand his/her plant identification knowledge. The Plant propagation techniques of seeding, taking cuttings, and air layering are incorporated into the greenhouse management daily tasks. Greenhouse crop production is studied in more depth; fertilizing, media

characteristics, irrigation, greenhouse repairs, and marketing strategies. The seasonal demand for poinsettias in December and bedding plants in the spring enables the students to put into practice customer and sales skills while selling the plants that were grown in the school greenhouses. The holiday demand for centerpieces, wreaths, and flowering plants gives students the opportunity to hone their wreath making and floral design skills. All sophomores are required to complete the 10 hour OSHA safety course, create a "business plan", and have an understanding of the "Right to Know" laws, along with the ability to interpret and locate the Material Safety Data Sheets (MSDS). Environmental awareness is nurtured thru current events issues on a regular basis. The FFA competitions encourage students to continue to develop their Horticulture skills.

GRADE 11 RELATED THEORY *CREDITS: 5*

Junior Horticulture students switch their study focus to the outside areas of turf management, landscaping, and arboriculture. Plant Identification will continue throughout the year.

- Landscaping: The students will develop an understanding and ability to read landscape plans. They will use appropriate design criteria and plants to create viable landscapes. Students will price out materials and labor costs of landscape plans and then present them to the class.
- Arboriculture: The students will learn the botanical processes of a healthy tree. They will properly plant, maintain, and prune various ornamentals and trees. Arbor safety relating to personal equipment and climbing safety is emphasized.
- Turf management: The students will learn basic turf anatomy along with weed, insect, and disease identification and solutions. Proper seeding techniques and the maintenance needs of turf are introduced.

GRADE 11 SHOP *CREDITS: 20*

Students in the eleventh grade Horticulture shop will start experiencing real life projects in equipment use, tree work and landscaping. The term "real life" is used because the students will be working on school grounds and in the community.
Training is given in small engine maintenance and use. The students learn the safe operation of zero turn mowers, tractors, backhoes and trailers. Landscaping will incorporate plant identification, design work, pricing and installation. The winter months consist of tree identification, forestry practices and chain saw use. Students learn the safe use of equipment to produce firewood and timber boards. Throughout the year students will be actively involved in the FFA. Participation in contest and personal growth activities is encouraged. The year ends with students being introduced to soils and turf management.

GRADE 12 RELATED THEORY *CREDITS: 5*

Senior horticulture students continue to expand their plant ID skills throughout the year. September begins with the entomology (study of insects) unit; Insect orders, the biology, and identification of harmful and beneficial insects. The Pesticide unit uses the Massachusetts manual for pesticide licensing to teach the safe use of pesticides. A unit on plant pathology (diseases) includes the causes, diagnosing, and control methods of plant diseases. The year concludes with the study of the requirements for acquiring a commercial driver license (using the commercial driver manual as text) and the requirements for acquiring a "hoisters" license in Massachusetts.

GRADE 12 SHOP *CREDITS: 20*

The last shop year for Horticulture students start off by designing and assembling a landscape exhibit to be displayed (competitively) at the Big E. Turf management practices continue on the school grounds; fertilizing, liming, lawn renovations, and lawn installations.

Late fall has students studying arboriculture; working in and around trees, chipping, climbing, knots, tree problems and cures, pruning, limbing, and felling.
The senior Horticulture student's final months conclude with specialty projects: hardscaping, irrigation design and installation, or a unique landscape install.
As the Horticulture student progresses through their junior and senior years they are shown that secondary education and entrepreneurship are viable options upon graduation.

MACHINE TOOL TECHNOLOGY

Grade 9 Exploratory Related Theory
Credits: 1.25

Students will learn the definition of 'machinist' and the role a machinist plays in the manufacturing process. Career opportunities and salary potential as a machinist will also be discussed. The students will be instructed in personal and shop safety, reading the micrometer, reading the scale, major parts of the manual lathe, basic hand tools, buffing and polishing, basic fractions and decimals.

Grade 9 Exploratory Shop
Credits: 10

The students will be given instruction in basic skills and knowledge of the Manufacturing Technologies program. The students will be instructed in shop safety, basic use of hand tools, lathe and milling machine basic operation, polishing, sandblasting, basic use of fractions and decimals as they apply to a machinist, reading and the use of micrometer and scale, as well as basic blueprint reading. The students will be exposed to with some practice in CNC equipment and CAM software. Instruction will be delivered through a combination of presentations, demonstrations, and hands-on performance.

Grade 9 Related Theory *Credits: 1.25*

The students will be given instruction in basic skills and knowledge for their continued success in the Manufacturing Technologies program. The students will be instructed in personal and shop safety, career opportunities, 'Right to Know' OSHA (Occupational Safety & Health Administration) and MSDS (Material Safety Data Sheets) training, introduction to Machine Technologies, shop rules and procedures, hand tools, lathe and milling machine theory, basic use of fractions and decimals as they apply to machining, reading and the use of micrometer, scale and vernier measuring instruments, Gaging and blueprint reading. This instruction will be delivered with the use of textbooks, work books, oral presentations, Smart board, power point presentations and demonstrations.

Grade 9 Shop *Credits: 10*

The students will be given instruction in the primary skills and knowledge of the Manufacturing Technologies program. The students will be instructed in personal and shop safety, introduction to Machine Technologies, career opportunities, shop rules and procedures, primary use of the manual lathe and manual milling machine operation, fundamentals of hand tools, use of fractions and decimals as

they apply to machining, primary use of the micrometer, scale and vernier measuring instruments, as well as fundamental blueprint reading. This instruction will be delivered through a combination of presentations, demonstrations, and hands-on performance. Time clock punching (accountability), reading and technical writing related to the manufacturing field are utilized by daily entries written in their agenda.

GRADE 10 RELATED THEORY *CREDITS 2.5*

The students will complement their knowledge learned in the prior year of training with more detailed instruction on basic and intermediate skills and knowledge for their continued success in the Manufacturing Technologies program. The students will review personal and shop safety, 'Right to Know' OSHA (Occupational Safety & Health Administration) and MSDS (Material Safety Data Sheets) training, 'Career Safe Online' training to earn a 10 hr. OSHA work place safety card, measurement, lathe operations, milling machine operations, fasteners, precision grinding, drilling, sawing, how to solve machining formulas, and intro to solid modeling and blueprint reading. Reading writing and basic shop math assignments related to manufacturing technology will be experienced. This instruction will be delivered with the use of textbooks, work books, oral presentations, Tooling 'U' online training system, Smart board technology, solid modeling software, power point presentations and demonstrations.

GRADE 10 SHOP *CREDITS: 20*

This course provides students with learning experiences while completing grade appropriate projects to advance their skills in the Machine Technologies program. The students will learn skills and task completion through a series of instructional techniques including hands on demonstration, group lecture, related theory lessons and technical handouts. The first half of the year, the students will practice skills at a more difficult level than previously achieved on manual operations such as surface grinding, heat treatment, drilling, milling, turning on a lathe, usage of hand tools, measuring tools, saws and metal finishing. The second half of the year, students will be introduced to Trak style equipment in both lathe and milling. The knowledge of automated programmable machining will consist of classroom lessons, practice on a simulator, group lectures and hands on skills. Projects using the Trak equipment will be required to reinforce the learning process. Time clock punching (accountability), reading and technical writing related to the manufacturing field are utilized by daily entries written in their agenda.

GRADE 11 RELATED THEORY *CREDITS: 2.5*

The students will complement their knowledge learned in the prior year of training with more detailed instruction on intermediate to advanced skills and knowledge for their continued success in the Manufacturing Technologies program. The students will review personal and shop safety, 'Right to Know' OSHA (Occupational Safety & Health Administration) and MSDS (Material Safety Data Sheets) training, CNC (Computer Numerical Control) theory, CNC milling 'G' code Programming, CNC turning 'G' code programming, shop math to include how to solve machining formulas, and intro to right angle trigonometry, CAM (Computer aided Manufacturing), CNC cutter verification, and Haas control simulator instruction. This instruction will be delivered with the use of textbooks, work books, oral presentations, Vericut software, smartcam software, Hass control simulators, Smart board, power point presentations and demonstrations. Reading, writing and basic shop math assignments related to manufacturing technology will also be experienced.

GRADE 11 SHOP *CREDITS: 20*

This course provides students with learning experience. The training is centered on CNC equipment that will advance their skills in the Machine Technologies program. The students will learn skills and task completion through a series of instructional techniques including hands on demonstration, group lecture, related theory lessons and technical handouts. For the first half of the year, the students will learn skills needed for basic set-up and operation of a CNC milling machine in addition to grade level manual machining projects. During this time the students will be required to do multiple set-ups along with running off batches of machined parts. The students will use the programming skills they have learned in the related classroom to create and edit a g-code programs on the CNC mill. Projects designed to allow each student the opportunity to make and run off their own program are used. The second half of the year, the students will learn skills needed for basic set-up and operation of a CNC turning center in addition to grade level manual machining projects. Use of CAM software to manufacture parts will be practiced during this time. Time clock punching (accountability), reading and technical writing related to the manufacturing field are utilized by daily entries written in their agenda.

GRADE 12 RELATED THEORY *CREDITS: 2.5*

The students will complement their knowledge learned in the prior years of training with more detailed instruction on advanced skills and knowledge for there continued success in the Manufacturing Technologies program. The students will

review personal and shop safety, 'Right to Know' OSHA (Occupational Safety & Health Administration) and MSDS (Material Safety Data Sheets) training, quality control, metallurgy and heat treatment of metals, GD&T (Geometric Dimensioning and Tolerancing), how to solve advanced machining formulas, job searching and resume building skills. This instruction will be delivered with the use of textbooks, work books, oral presentations, power point presentations and demonstrations. Reading, writing and basic shop math assignments related to manufacturing technology will also be experienced.

GRADE 12 SHOP *CREDITS: 20*

This course provides students with a continued learning experience. This more advanced level of training is centered on CNC milling and turning. The students will complete advanced set-up and operation of CNC milling and turning machines in addition to grade level manual machining projects. During this time the students will be required to do multiple set-ups along with running off batches of machined parts. The students will use the programming skills they have learned to create and edit g-code programs on both CNC milling and turning centers. Projects are designed to allow each student the opportunity to make and run off their own part program. Advanced use of CAM software to manufacture parts will be practiced during this time. Time clock punching (accountability), reading and technical writing related to the manufacturing field are utilized by daily entries written in their agenda. Instruction will be given in group lecture, demonstrations and well as one on one training at both the CNC milling and turning centers.

Programming and Web Development

This program is designed to enable students to be successful in a highly technical world. Instruction is based on the study of procedures, methods, tools, and operations, which are specific and unique to the computer programming industry. Skills learned include those relating to programming in Visual Basic, Web Page design, JavaScript, HTML, XML, DHTML, CSS, Adobe Flash, Dreamweaver, Photoshop, Premiere, and Illustrator. The students participate in designing and maintaining websites for our school and acting as project managers for outside customers.

Grade 9 Exploratory Theory

Credits: 1.25

This one week introduction is designed to promote and attract students to the Programming and Web Development Technology pathway. Specifically, curriculum will be delivered in order to meet and align with the technical content strand of the vocational curriculum frameworks. Related theory and shop are designed primarily to create student awareness of the trade and assess general interest and ability levels. The curriculum consists of introductions to general computing principles, programming, digital imaging and web design.

Grade 9 Exploratory Shop

Credits: 10

Each student, upon completion of the half year freshmen program, should have an understanding of the fundamental theory of programming and web development. Students will be introduced to Visual Basic programming software, Adobe Dreamweaver and Photoshop. Also, throughout the year, safety (OSHA) and employability standards will be studied.

The students will be introduced to the theoretical aspects of the science of computers and the student will build upon the skills acquired during Exploratory.

The related theory course focuses on IC^3 which stands for Internet and Computing Core Certification program, a global training and certification program. Completing this program and earning IC^3 certification shows that you have the necessary computer skills to excel in a digital world, and are capable of using a wide range of computer technology.

GRADE 10 SHOP *CREDITS: 20*

Each student, upon completion of the sophomore program, will have a thorough understanding of programming concepts, multimedia and graphic tool utilization, and web site development. Students will be introduced to Visual Basic programming software, Adobe Dreamweaver, JavaScript, and Photoshop. Also, throughout the year, safety and employability standards will be studied.

GRADE 11 SHOP *CREDITS: 20*

Each student, upon completion of the junior program, will have acquired a solid understanding of programming concepts, multimedia and graphic tools, design and create web pages, basic network technologies, project management skills, and install computer hardware. A strong emphasis will be placed on managing web site project, prepare and present documentation, test and follow a Quality Assurance process, and interfacing with customers. Students will be introduced to the college application process.

GRADE 12 SHOP *CREDITS: 20*

Each student, upon completion of the senior program, will continue to build on skills that will be used in real life work situations. Responsibility for managing websites with outside customers prove to be an excellent vehicle for learning the Quality Assurance process and to understand why it's important to make raving fans out of customers.