

Massachusetts Department of Elementary & Secondary Education

Office for Career/Vocational Technical Education



Vocational Technical Education Framework



Health Services Occupational Cluster

Medical Assisting (VMED)

CIP Code 510801

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Massachusetts Department of Elementary and Secondary Education

Office for Career/Vocational Technical Education

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Table of Contents

Acknowledgements.....	1
Commissioner’s Letter	4
Introduction	5
<i>Health Services Occupational Cluster</i>	14
<i>Medical Assisting Framework (VMED)</i>	14
Strand 1: Safety and Health Knowledge and Skills.....	14
<i>Selected Websites</i>	16
Strand 2: Technical Knowledge and Skills	17
Strand 3: Embedded Academics	26
Strand 4: Employability and Career Readiness	27
<i>Selected Websites</i>	30
Strand 5: Management and Entrepreneurship Knowledge and Skills	32
<i>Selected Websites</i>	34
<i>Glossary</i>	34
Strand 6: Technology Literacy Knowledge and Skills	36
Appendices.....	38
Embedded Academic Crosswalks.....	39
Embedded English Language Arts and Literacy	39
Embedded Mathematics.....	40
Embedded Science and Technology/Engineering.....	42
<i>Life Science (Biology)</i>	42
<i>Physical Science (Chemistry)</i>	43
<i>Physical Science (Physics)</i>	44
DESE Statewide Articulation Agreements.....	45
Industry Recognized Credentials (Licenses and Certifications/Specialty Programs)	46
Other	47
Reference Materials.....	47
Related National, Regional, and State Organizations	47
Professional Organizations	47
Student Organizations	47

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Commissioner's Letter



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Mitchell D. Chester, Ed.D.
Commissioner

July 2014

Dear Colleagues,

I am pleased to present to you the *Massachusetts Vocational Technical Education Frameworks*, adopted by the Department of Elementary and Secondary Education in June 2014. These frameworks, one for each of the 44 vocational technical programs, include standards in multiple strands representing all aspects of the industries that students in the vocational technical education program are preparing to enter.

The frameworks also include a crosswalk between the technical standards and relevant standards in Massachusetts Curriculum Frameworks to support effective integration of academic and technical content.

The comments and suggestions received during revision of the 2007 *Massachusetts Vocational Technical Education Frameworks* have strengthened these frameworks. We will continue to work with schools and districts to implement the 2014 *Massachusetts Vocational Technical Education Frameworks* over the next several years, and we encourage your comments.

I want to thank everyone who worked with us to create challenging learning standards for Massachusetts students. I am proud of the work that has been accomplished.

Sincerely,

Mitchell D. Chester, Ed.D.
Commissioner of Elementary and Secondary Education

Introduction

Overview & Organization and Key Changes

Overview

The Massachusetts Department of Elementary and Secondary Education understands the necessity of maintaining current Vocational Technical Education Frameworks which ensure career/vocational technical education students across the Commonwealth are taught the most rigorous standards aligned to the needs of business and industry.

With the advent of the Massachusetts Teaching & Learning System the Office for Career/Vocational Technical Education (CVTE) recognized the significance of including career/vocational technical education in the system and developed a comprehensive plan for including vocational technical education. The plan was designed in a Two Phase Process. Phase One included the revision of strands two, three, and six, of all of the Vocational Technical Education Frameworks. Phase Two consisted of three major components (projects) all equally crucial;

1. The revision of Strands One, Four, and Five to complete the revision of all six strands of the Vocational Technical Education Frameworks;
2. Statewide Professional Development on all revised strands, with training on strands two, three, and six delivered fall 2013, and training on strands one, four, and five delivered spring 2014;
3. The creation and development of additional Model Curriculum Unit (MCU) Teams.

The Office for Career/Vocational Technical Education Framework Team, with support from consultants, began Phase One in the 2012-2013 school year, to revise three of the six strands contained in all of the Vocational Technical Education (VTE) Frameworks. The state was organized into “Collaborative Partnerships” comprised of teams of project administrators, highly qualified subject matter educators, and business and industry partners, whose task was to revise Strand Two – Technical, Strand Three – Embedded Academics, and Strand Six – Technology Literacy. Each team met with a vocational advisory committee which included business and industry representatives and postsecondary education professionals, whose mission was to review and revise the team’s draft document during the revisionary process. Once strand two was revised, academic teachers (typically one English Language Arts teacher, one Mathematics teacher, and one Science teacher) worked with the technical subject matter teachers to develop a crosswalk between academic curricula standards and the technical standards, and provided examples of embedded academic content.

The Office for Career/Vocational Technical Education solicited statewide input from technical and academic teachers and administrators at the annual Massachusetts Association of Vocational Administrators (MAVA)/Massachusetts Vocational Association (MVA) - Connecting for Success Conference. Each framework team met with their content colleagues and reviewed the draft revisions and obtained

valuable feedback. Additionally, all drafts were reviewed and revised by the Massachusetts Vocational Technical Teacher Testing Program, to ensure appropriate measurable language.

Project consultants designed a new template to ensure all framework teams entered new standards and additional resources in a consistent manner. The framework teams created an “Appendix” listing potential industry recognized credentials attainable by secondary students; lists of professional, student, and relevant government organizations; and useful resources and websites. ** It is important to note that although most Framework Teams provided information for the “Appendix”, not all teams did. Therefore, sub-headings within the “Appendix” without information have been deleted. Disclaimer: Reference in the Appendices Section to any specific commercial products, processes, or services, or the use of any trade, firm or corporation name is for the information and convenience of the public, and does not constitute endorsement or recommendation by the Massachusetts Department of Elementary and Secondary Education.*

The Office for Career/Vocational Technical Education facilitated a comprehensive vetting process throughout the Commonwealth. During the fall of 2012 districts throughout Massachusetts solicited feedback from each Vocational Program’s Advisory Committee members at the Fall Board meetings. Additionally, the Office for Career/Vocational Technical Education met with various licensing boards at the Massachusetts Division of Professional Licensure and provided the applicable draft framework to each board for review. All framework drafts were posted on the CVTE website for public comment. Comments and suggested revisions received were shared with each framework team for response and edits, as appropriate.

The Phase I Process was completed on an accelerated timetable and resulted in all Vocational Technical Education Frameworks; Strand Two and Strand Six, revised with current, rigorous, relevant standards. Strand Three has been redesigned into a crosswalk which directly correlates academic and technical standards. An appendix of useful material for technical teachers recommended by their peers was added to each framework.

Phase II of the Framework Revision Process consisted of three major projects;

1. The Strands One, Four & Five Project, to complete the revision of all six strands of the Vocational Technical Education Frameworks;
2. Statewide Professional Development on all revised strands, with training on strands two, three, and six delivered fall 2013, and training on strands one, four, and five delivered spring 2014;
3. The creation and development of additional Model Curriculum Unit (MCU) Teams.

The Strands One, Four, & Five Project began in the fall of 2013 with the formation of a leadership team and three work groups. Co-Managers led the leadership team comprised of three Strand Coordinators who facilitated work teams and reviewed, researched, and revised these common strands. All skills specific to the vocational technical program have been included into Strand Two Technical.

The Strand One Team revised the safety knowledge and skills that all students need to acquire. The team included relevant issues (i.e., bullying, climate), laws, regulations, guidelines and policies pertaining to safety.

The Strand Four Team revised the Employability Knowledge and Skills that all students need to acquire. Teams considered current research on career readiness, including the work of the College Career Readiness Task Force convened by the Department, changes in workplace, technological changes that impact how people perform their work (i.e., communications methods), and included standards that emphasize the need for lifelong learning and adaptability given the multiple career changes over and an individual's working life. The team recommended this strand be renamed to: Career Readiness.

The Strand Five Team revised the Management & Entrepreneurship Knowledge and Skills that all students need to acquire. All business owners and employees must possess management and financial skills to be productive members of society. Skills included financial knowledge and basic business management skills.

All Strand One, Four and Five Project Teams worked collaboratively with staff from the Department of Elementary and Secondary Education and the Advisors of the Massachusetts Career and Technical Student Organizations to crosswalk standards to national Career & Technical Student Organizations Curricula, as applicable.

The Office for Career/Vocational Technical Education contracted the MAVA Consultant Team to work closely with the office to complete all of the work accomplished during Phase II of the Project.

A remarkable amount of work was accomplished through the efforts of hundreds of professionals who collaborated and diligently supported this work. The Office for Career/Vocational Technical Education is grateful for all the support received from the field, particularly all of the teachers (technical and academic), administrators, advisory committee members, business and industry representatives, the Division of Professional Licensure - boards, the Massachusetts Association of Vocational Administrators, the MAVA Consultants, and the Massachusetts Vocational Association, whose contributions were tremendous.

Special thanks to all staff in the Office for Career/Vocational Technical Education and the CVTE Framework Revision Team who provided guidance and numerous contributions during Phase One of the project.

Organization and Key Changes

This section contains the following:

- Highlights of Changes to the Vocational Technical Education Frameworks; which includes a summary of changes made to each strand.
- Organization of the Frameworks – Strand Two illustrates structure of topic headings, standards and objectives, and performance examples.

Highlights of Changes to the Vocational Technical Education Frameworks:

Strand One:

Safety and Health Knowledge and Skills have been revised to contain the safety standards that are common to all programs. The Strand One Team worked collaboratively with staff from the Department of Elementary and Secondary Education and the Advisors of the Career and Technical Student Organizations (CTSO) to crosswalk standards to national CTSO Curricula, as applicable.

- No objectives were deleted, only modified.
- Language and wording was clarified.
- Additions included a focus on maintaining a safe school and workplace in terms of creating a positive climate/environment.
- Student safety credential program has been revised.
- Safety attire has been revised.
- Emergency equipment and fire safety has been revised.
- Many new Performance Examples have been included.
- Within each strand, standards and objectives were grouped under Topic Headings, which are displayed in bold. Each standard is followed by a performance example. See the section below titled: "Organization of the Frameworks – Strand Two". All strands were organized in that manner, with the exception of the former Strand Three.

Strand Two:

The Technical Standards Knowledge and Skills have been revised to reflect business and industry changes since the adoption of the 2007 Vocational Technical Education Frameworks (VTEF). There are additional changes to Strand Two below:

- The Technical Knowledge and Skills (Strand Two) section contains standards specific to the particular vocational program; suffix "a" (as common to all programs) and suffix "c" (as common within a cluster) have been removed.
- Each VTEF Strand Two begins with safety and health knowledge and skills specific to the particular vocational program.
- Within each strand, standards and objectives were grouped under Topic Headings, which are displayed in bold. Each standard is followed by a performance example. See the section below

titled: “Organization of the Frameworks – Strand Two”. All strands were organized in that manner, with the exception of the former Strand Three.

- Strand Two of the Frameworks for Animal Science, Environmental Science and Technology, and Horticulture, begin with core standards required for all participants in the programs, followed by a series of standards organized in concentrations. See the section below titled: “Organization of the Frameworks – Strand Two” for more information.
- An update to some of the vocational programs framework is the addition of advanced or supplemental standards which are noted in Strand Two by an asterisk (*). *These standards are not required, but are provided as suggestions that districts may choose to use to increase the depth of a particular topic, or add additional topics, particularly for advanced students or for those seniors who do not participate in cooperative education.* See the section below titled: “Organization of the Frameworks – Strand Two” for more information.

Strand Three:

Since the purpose of Strand Three was to correlate academic content that was *embedded* in the knowledge and skills necessary to perform certain technical skills, it was logical to highlight those connections through a crosswalk between the academic curriculum standards and the technical standards (Strand Two). The crosswalk directly correlates the English Language Arts (2011) and Mathematics (2011) Frameworks, incorporating the Common Core Standards and the Science and Technology/Engineering Frameworks. The crosswalk can be found in the appendix of each vocational framework. The crosswalk also includes performance examples which illustrate integrated academic and technical content.

- Embedded Academics has been replaced with a crosswalk between the academic curriculum standards and the technical knowledge and skills standards. The crosswalk is located in the Appendices.

Strand Four:

Employability (and Career Readiness) Knowledge and Skills focused on providing students with general knowledge and skills to be college and career ready. The Strand Four Team worked collaboratively with staff from the Department of Elementary and Secondary Education and the Advisors of the Career and Technical Student Organizations to crosswalk standards to national CTSO Curricula, as applicable.

- Language and wording were clarified.
- Additions included a focus on providing students with skills for employability/career readiness.
- Modifications included Career Exploration & Navigation, Communication in the Workplace, and Work Ethic & Professionalism.
- New Performance Examples have been included.
- Within each strand, standards and objectives were grouped under Topic Headings, which are displayed in bold. Each standard is followed by a performance example. See the section below titled: “Organization of the Frameworks – Strand Two”. All strands were organized in that manner, with the exception of the former Strand Three.

Strand Five:

Strand Five contains Management and Entrepreneurship Knowledge and Skills that are general for all students. The Strand Five Team worked collaboratively with staff from the Department of Elementary and Secondary Education and the Advisors of the Massachusetts Career and Technical Student Organizations to crosswalk standards to national Career & Technical Student Organizations Curricula, as applicable.

- Language and wording were clarified and organized into a logical format.
- The Strand Five Team felt that the 2007 curriculum remained valid.
- Additions included a focus on providing students with skills for management and entrepreneurship applicable to all vocational programs.
- Modifications included Starting and Managing a Business, Marketing, and Financial Concepts & Applications in Business, and Legal/Ethical/Social Responsibilities.
- New Performance Examples have been included.
- Within each strand, standards and objectives were grouped under Topic Headings, which are displayed in bold. Each standard is followed by a performance example. See the section below titled: "Organization of the Frameworks – Strand Two". All strands were organized in that manner, with the exception of the former Strand Three.

Strand Six

Strand Six Technology Literacy Knowledge and Skills has been replaced with the 2008 Massachusetts Technology Literacy Standards and Expectations Framework.

Appendix¹

Each framework contains an “Appendix” section which includes an Embedded Academic Crosswalk, Industry Recognized Credentials, Statewide Articulation Agreements, Professional, Governmental, and Student Organizations, Resources, and relevant websites.

The Appendix² contains:

- Embedded Academic crosswalks for English Language Arts, Mathematics, and Science & Technology/Engineering.
- Statewide Articulations: Current statewide Articulation Agreements and/or Apprenticeship Programs available to the specific vocational program are listed on this page. The development of new statewide articulations continues, and therefore these pages will be revised as new agreements are finalized.
- Industry-Recognized Credentials: Technical Teacher Teams generated lists of credentials for the vocational programs. Program Advisory Committees throughout the state reviewed and provided recommendations through the validation process. *The credential list has been provided as a resource only and districts are not obligated to provide all of the specified credentials for students.*
- Other: These pages provide lists of reference materials, government agencies, professional and student organizations, and useful websites created by each framework team. These are intended as helpful resources for technical teachers, identified by peers. These are not recommended or required by the Department of Elementary & Secondary Education.

¹ *Note: Although most Framework Teams provided information for the “Appendix”, not all teams did. Therefore, sub-headings within the “Appendix” without information have been deleted.*

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Organization of the Frameworks – Strand Two

The Vocational Technical Education Frameworks contain knowledge and skills covering all aspects of industry, reflected in six strands: Safety and Health, Technical, Embedded Academics, Employability, Management and Entrepreneurship, and Technological.

Within each strand, standards and objectives were grouped under topic headings, which are displayed in bold. Each standard is followed by a performance example. In the excerpt below, 2.A is the topic; 2.A.01 is the first standard and 2.A.01.01 and 2.A.01.02 are the objectives under that standard.

2.A Automotive Technology Specific Safety Practices

- 2.A.01 Identify and describe safety procedures when dealing with different types of automotive lifts according to current industry standards.
- 2.A.01.01 Demonstrate procedures for safe lift operations.
 - 2.A.01.02 Demonstrate safe use, placement and storage of floor jacks and jack stands.

2.A.01 Performance Example:

- Student will set up lift using manufacturer’s suggested lift points.

- 2.A.02 Demonstrate and describe safety procedures when dealing with high pressure systems including necessary ventilation according to current industry standards.
- 2.A.02.01 Describe and demonstrate the importance of safety procedures to be used when servicing high pressurized systems (fuel systems, brakes, air conditioning, suspension, hydraulic systems, etc.).
 - 2.A.02.02 Describe and demonstrate safe use of oxygen/acetylene torches and electric welding equipment.
 - 2.A.02.03 Demonstrate ventilation procedures to be followed when working in the lab/shop area.

2.A.02 Performance Example:

- Student will relieve fuel system pressure to perform necessary repairs.

- 2.A.03 Identify and describe safety procedures when dealing with electrical circuits according to current industry standards.
- 2.A.03.01 Describe safety procedures to be followed when servicing supplemental restraint systems.
 - 2.A.03.02 Demonstrate safety awareness of high voltage circuits of electric or hybrid electric vehicles and related safety precautions.

2.A.03 Performance Example:

- Safely disable Supplemental Restraint System (SRS) air bag for repair using manufacturer’s recommendations.

There are additional changes to some of the Frameworks Strand Two (Technical Knowledge and Skills). Specifically, Strand Two of the Frameworks for Animal Science, Environmental Science and Technology and Horticulture begin with core standards required for all participants in the programs, followed by a series of standards organized in concentrations. For example, Strand Two of the Horticulture Framework begins with the core standards required of all Horticulture students

(Topics 2.A through 2.I). These standards are followed by the three concentrations: Arboriculture (Topics 2.J through 2.L), Greenhouse Management and Floriculture (Topics 2.J. through 2.L) and Landscape and Turf Management (Topics 2.M through 2.Q).

Advanced / Supplemental Standards (Not Required)

Another variation that is new to the revised Strand Two Frameworks is the addition of advanced or supplemental standards which are noted with the use of an asterisk (*). *These standards are not required, but are provided as suggestions that districts may choose to use to increase the depth of a particular topic, or add additional topics, particularly for advanced students or for those seniors who do not participate in cooperative education.*

The following is an example from Automotive Technology, where entire topics were added:

Advanced Automotive Technology Technical Knowledge and Skills

Note: The following competencies are optional, supplementary competencies suitable for advanced students. These are not required.

2.CC Demonstrate appropriate engine repair techniques.

2.CC.01 Perform appropriate cylinder Head Repair.

2.CC.01.01* Diagnose, remove and replace cylinder head(s).

2.CC.01.02* Clean and visually inspect a cylinder head for cracks; check gasket surface areas for warpage and surface finish; check passage condition; determine necessary action.

The following is an example from the Strand Two Radio and Television Broadcasting Framework that shows the addition of an advanced objective, 2.B.04.08*:

2.B.04 Explain concepts fundamental to shooting in cinema and video.

- 2.B.04.01 Compare and contrast a single-camera and a multiple-camera production.
- 2.B.04.02 Explain the importance of shooting for the edit (i.e., match on action, sequencing, coverage).
- 2.B.04.03 Explain the importance of continuity.
- 2.B.04.04 Explain the 180° Rule line, and its application in various cinema scenarios.
- 2.B.04.05 Identify and establish a specific point-of-view when shooting from a script.
- 2.B.04.06 Analyze the methods in which specific shots can evoke emotion from an audience.
- 2.B.04.07 Define drop frame and non-drop frame code shooting and explain how to account for both when preparing for an edit.
- 2.B.04.08* Describe various cinematographic methods necessary when shooting scenes that incorporate post-production visual effect

2.B.04 Performance Examples:

- Students will list similarities and differences of single-camera and multiple-camera shoots.
- Students will describe multiple shooting considerations that are useful in streamlining the editing process.

Health Services Occupational Cluster

Medical Assisting Framework (VMED)

Strand 1: Safety and Health Knowledge and Skills

1.A Fundamentals of Health and Safety

- 1.A.01 Describe and apply health and safety regulations.
- 1.A.01.01 Identify, describe and apply health and safety regulations that apply to specific tasks and jobs. Students must complete a safety credential program, e.g., Occupational Safety and Health Administration 10, CareerSafe and ServSafe.
 - 1.A.01.02 Identify, describe and apply Environmental Protection Agency (EPA) and other environmental protection regulations that apply to specific tasks and jobs in the specific occupational area.
 - 1.A.01.03 Identify, describe and apply Right-To-Know (Hazard Communication Policy) and other communicative regulations that apply to specific tasks and jobs in the specific occupational area.
 - 1.A.01.04 Explain procedures for documenting and reporting hazards to appropriate authorities.
 - 1.A.01.05 Identify and describe potential consequences for non-compliance with appropriate health and safety regulations.
 - 1.A.01.06 Identify and list contact information for appropriate health and safety agencies and resources.

1. A.01 Performance Examples:

- List and define OSHA Health and Safety Regulations, EPA and other environmental protection regulations to occupational area.
- List and define Right-to-Know regulations and reporting of hazards and contact information for appropriate health and safety agencies.
- List the laws and rules of regulatory agencies governing sanitation and safety.
- Utilize OSHA as well as health and safety websites for purposes of research.

- 1.A.02 Demonstrate appropriate health and safety practices based on the specific occupational area.
- 1.A.02.01 Identify, describe and demonstrate the effective use of Safety Data Sheets (SDS).
 - 1.A.02.02 Read and interpret chemical, product and equipment labels to determine appropriate health and safety considerations.
 - 1.A.02.03 Identify, describe and demonstrate personal, shop and job site safety practices and procedures.
 - 1.A.02.04 Demonstrate safe dress and use of relevant safety gear, personal protective equipment (PPE) and ergonomics, e.g., wrist rests, adjustable workspaces, equipment, gloves, proper footwear, earplugs, eye protection and breathing apparatus.
 - 1.A.02.05 Demonstrate appropriate safe body mechanics, including appropriate lifting techniques and ergonomics.

- 1.A.02.06 Locate emergency equipment, first aid kit, SDS information directories and emergency action/response plan/escape routes in your lab, shop and classroom, including labels and signage that follow OSHA Hazard Communication Program (HAZCOM), eyewash stations, shower facilities, sinks, fire extinguishers, fire blankets, telephone, master power switches and emergency exits.
- 1.A.02.07 Demonstrate the safe use, storage, and maintenance of every piece of equipment in the lab, shop and classroom, e.g., the OSHA Lockout/Tagout Program (LOTO).
- 1.A.02.08 Describe safety practices and procedures to be followed when working with and around electricity, e.g., ground fault circuit interrupter (GFCI) and frayed wiring.
- 1.A.02.09 Handle, store, dispose of and recycle hazardous, flammable and combustible materials, according to EPA, OSHA and product specifications.
- 1.A.02.10 Demonstrate appropriate workspace cleaning, sanitation, disinfection and sterilization procedures required in specific occupational areas, e.g., Workplace Housekeeping OSHA Regulations.

1. A.02 Performance Examples:

- Identify, describe and demonstrate the use of SDS.
- List and demonstrate shop dress code, safety procedures and location of emergency equipment in labor classroom.
- Define and demonstrate safe storage and maintenance of equipment and proper disposal or recycling of hazardous, flammable and combustible materials.
- Identify, describe and demonstrate the Universal Precautions set of guidelines.

- 1.A.03 Demonstrate appropriate responses to situations that may threaten health and safety.
 - 1.A.03.01 Describe First Aid procedures for potential injuries and other health concerns in the specific occupational area.
 - 1.A.03.02 Describe the importance of emergency preparedness and an emergency action/response plan.
 - 1.A.03.03 Describe procedures used to handle emergency situations, defensive measures and accidents, including identification, reporting, response, evacuation plans and follow-up procedures.
 - 1.A.03.04 Identify, describe and demonstrate safety practices in specific occupational areas used to avoid accidents.
 - 1.A.03.05 Identify and describe fire protection, protection, precautions and response procedures.
 - 1.A.03.06 Discuss the role of the individual and the company/organization in ensuring workplace safety including transportation to and from school, school activities and the workplace.
 - 1.A.03.07 Discuss ways to identify, prevent and report school and workplace violence, discrimination, harassment and bullying.
 - 1.A.03.08 Demonstrate positive and appropriate behavior that contributes to a safe and healthy environment in school and the workplace.

1. A.03 Performance Example:

- Define first aid procedures and protocols used to handle emergency situations and practices used to avoid accidents.
- View safety videos and discuss the role of workplace safety.
- Attend or participate in a human rights alliance organization presentation.
- Observe and/or demonstrate the appropriate use of a fire extinguisher using the (PASS) technique: Pull, Aim, Squeeze, Sweep.
- Review and discuss specific policies, procedures and protocols regarding discrimination, harassment and bullying.
- Discuss and/or role-play proper and respectful behavior that contributes to a positive climate.
- Discuss and/or demonstrate behavior that contributes to a collaborative/teamwork environment.

Selected Websites

- Bullying Prevention and Intervention Resources : www.doe.mass.edu/bullying
- Centers for Disease Control and Prevention: www.cdc.gov
- Environmental Protection Agency : www.epa.gov
- “Lost Youth – Four Stories of Injured Young Workers”– WorkSafeBC:
<http://www2.worksafebc.com/Publications/Multimedia/Videos.asp?reportid=34291>
- Massachusetts Department of Elementary and Secondary Education. (2011). Career/Vocational Technical Education Safety Guide: www.doe.mass.edu/cte
- Massachusetts Department of Elementary and Secondary Education: www.doe.mass.edu
- Massachusetts Emergency Management Agency: www.mass.gov/eopss/agencies/mema
- Massachusetts General Law: www.malegislature.gov
- Massachusetts Health and Human Services: www.mass.gov/dph
- Massachusetts Right to Know Law Summary:
<http://www.mass.gov/lwd/docs/dos/mwshp/hib397.pdf>
- Safety Data Sheet: www.sdsonline.com
- National Fire Protection Association: www.nfpa.org
- Protection of Student Rights: Massachusetts General Law:
<https://malegislature.gov/Laws/GeneralLaws/PartI/TitleXII/Chapter76/Section5>
- Occupational Safety and Health Administration: www.osha.gov
- Readiness and Emergency Management for Schools: www.rems.ed.gov
- Safe and Healthy Learning Environments: www.doe.mass.edu/ssce/safety.html

Strand 2: Technical Knowledge and Skills

2.A Safety in Medical Assisting

- 2.A.01 Demonstrate health and safety practices.
 - 2.A.01.01 Demonstrate medical asepsis hand wash technique.
 - 2.A.01.02 Utilize procedure for client identification according to current industry standards.
 - 2.A.01.03 Identify methods of transmission for microorganisms.
 - 2.A.01.04 Demonstrate transfer techniques according to current industry and OSHA standards.
 - 2.A.01.05 Observe and report signs of infection and utilize isolation techniques as needed.
 - 2.A.01.06 Demonstrate practices while administering patient care activities according to current industry and OSHA standards.
 - 2.A.01.07 Demonstrate barrier protection according to current industry and OSHA standards.
 - 2.A.01.08 Define emergency codes used in office/medical facility.
 - 2.A.01.09 Demonstrate needle safety and sharps disposal.
 - 2.A.01.10 Explain handling and disposal of bio-hazardous materials according to current industry and OSHA standards.
 - 2.A.01.11 Recognize signage in the healthcare environment.
 - 2.A.01.12 Remove and dispose of contaminated gloves according to current industry and OSHA standards.

2.A.01 Performance Example:

- Students will successfully complete a project demonstration on safety in the healthcare setting.

2.B Fundamentals of the Healthcare Industry

- 2.B.01 Identify the types of health care.
 - 2.B.01.01 Identify professional healthcare workers' organizations and credentialing requirements.
 - 2.B.01.02 Identify the organizational structure of the health care team.

2.B.01 Performance Example:

- Students will create a flow chart depicting the organizational structure of healthcare.

- 2.B.02 Demonstrate professional behavior in clinical practice.
 - 2.B.02.01 Demonstrate the standards of a professional appearance.
 - 2.B.02.02 Demonstrate qualities of a healthcare worker.
 - 2.B.02.03 Summarize the patients' Bill of Rights and the Health Insurance Portability and Accountability Act (HIPAA).
 - 2.B.02.04 Describe the role of the mandated reporter.

2.B.02 Performance Example:

- Students will identify situations in which they are obligated to report patient information per mandated reporting and compare and contrast the Patients' Bill of Rights and HIPAA with mandated reporting protocol.

2.C Principles of Communications

- 2.C.01 Demonstrate verbal and nonverbal communication.

- 2.C.01.01 Demonstrate introduction of self to patient and confirm patient identification.
- 2.C.01.02 Adapt communication according to the patient's needs.
- 2.C.01.03 Identify barriers to open communication.
- 2.C.01.04 Provide a verbal patient report.
- 2.C.01.05 Complete a written patient report.

2.C.01 Performance Example:

- Students will demonstrate the reporting out of patient information in both verbal and non-verbal format. Verbal format will be done in a role play situation and non-verbal by using progress notes.

2.C.02 Collect a medical history.

- 2.C.02.01 Identify and record pertinent allergies and current medications.
- 2.C.02.02 Employ the use of appropriate terms and abbreviations.

2.C.02 Performance Example:

- Students will role play a medical office scenario in which they are to take a mock medical history using standard industry forms.

2.C.03 Demonstrate how to respond to patients' needs.

- 2.C.03.01 Explain importance of responding to a patient's needs in a timely, compassionate and professional manner.
- 2.C.03.02 Demonstrate respect for cultural diversity and orientations.
- 2.C.03.03 List strategies used to maintain patient dignity at all times.
- 2.C.03.04 Accommodate patients with special needs.

2.C.03 Performance Example:

- Students will demonstrate the ability to adapt to patient needs and overcoming various barriers of communication by creating a project presentation based on various cultural healthcare beliefs and aligning them with the Patients' Bill of Rights and HIPPA Laws.

2.D Electronic Medical Records

2.D.01 Organize and maintain technical information.

- 2.D.01.01 Manage and locate elements of a patient file.
- 2.D.01.02 Maintain patient contact information records.
- 2.D.01.03 Retrieve patient files.
- 2.D.01.04 Correct an error manually and electronically.
- 2.D.01.05 Electronically file results and/or correspondence.
- 2.D.01.06 Maintain appropriate documentation on each patient chart.
- 2.D.01.07 Document vital signs, including height and weight.
- 2.D.01.08 Process electronic prescriptions.

2.D.01 Performance Example:

- Students will complete a project demonstrating proficiency in accurately maintaining electronic medical records, documentation and in processing electronic prescriptions.

2.E Fundamentals of Administrative Skills.

- 2.E.01 Demonstrate basic computer skills.
 - 2.E.01.01 Maintain an appointment matrix.
 - 2.E.01.02 Generate daily appointment schedule.
 - 2.E.01.03 Create, edit and print memos, reports and outlines.
 - 2.E.01.04 Demonstrate procedures used to register/check in new and established patients.
 - 2.E.01.05 Perform appointment cancellation procedures.
 - 2.E.01.06 Process and check patient referrals.
 - 2.E.01.07 Perform electronic mailing.
 - 2.E.01.08 Demonstrate basic computer skills.

2.E.01 Performance Example:

- Students will utilize a student learning computer program to demonstrate the ability to create and maintain an appointment matrix, as well as register and check out patients.

- 2.E.02 Screen and process mail.
 - 2.E.02.01 Organize incoming and outgoing mail.
 - 2.E.02.02 Prepare packages for shipping.

2.E.02 Performance Example:

- Students will demonstrate proficiency in the following areas: basic administrative skills, data entry and registration.

2.F Techniques in Infection Control

- 2.F.01 Perform medical asepsis.
 - 2.F.01.01 Perform hand wash technique.
 - 2.F.01.02 Identify methods of transmission of microorganisms.
 - 2.F.01.03 Identify and report signs of infection.
 - 2.F.01.04 Demonstrate needle safety and sharps disposal.
 - 2.F.01.05 Explain proper handling and disposal of bio-hazardous materials.
 - 2.F.01.06 Remove and dispose of contaminated gloves according to current industry and OSHA standards.
 - 2.F.01.07 Perform infection control and safety procedures.

2.F.01 Performance Example:

- Students will demonstrate proper medical aseptic technique as per industry protocol and will create a graphic organizer identifying the chain of infection.

- 2.F.02 Perform surgical asepsis.
 - 2.F.02.01 Demonstrate chemical disinfection of instruments according to current industry and OSHA standards.
 - 2.F.02.02 Wrap instruments for sterilization in the autoclave.
 - 2.F.02.03 Perform steam sterilization of instruments (autoclave).
 - 2.F.02.04 Clean and maintain autoclave.
 - 2.F.02.05 Operate ultrasonic cleaner.
 - 2.F.02.06 Prepare and maintain a sterile field.
 - 2.F.02.07 Identify chemical sterilization.
 - 2.F.02.08 Prepare a 1:10 bleach and water solution.

- 2.F.02 Performance Example:
- Students will operate an autoclave and demonstrate prep of a sterile field.

- 2.F.03 Assist with minor surgical procedures.
- 2.F.03.01 Apply sterile gloves.
 - 2.F.03.02 Apply sterile barrier protection.
 - 2.F.03.03 Set up and cover a sterile field.
 - 2.F.03.04 Open sterile packs of instruments and apply to sterile field.
 - 2.F.03.05 Prepare skin for minor surgery.
 - 2.F.03.06 Prepare exam room for minor surgery.
 - 2.F.03.07 Assist in the suturing of a laceration or incision repair.
 - 2.F.03.08 Identify characteristics of sterile dressing change.
 - 2.F.03.09 Identify characteristics of suture removal.
 - 2.F.03.10 Apply sterile adhesive skin closure strips.
 - 2.F.03.11 Assist in incision and drainage of localized infection.

- 2.F.03 Performance Example:
- Student will complete a project demonstrating their knowledge in medical and surgical asepsis by assisting with minor surgical procedures.

2.G Emergency and Triage Procedures

- 2.G.01 List strategies used to obtain the patient's symptoms.
- 2.G.01.01 Obtain the patient's symptoms via telephone
 - 2.G.01.02 Obtain the patient's symptoms via face-to-face triage.

- 2.G.01 Performance Example:
- Students will role play triage situations using mock telephones as well as face to face conversation.

- 2.G.02 Obtain Cardiopulmonary Resuscitation (CPR) certification from the American Heart Association.
- 2.G.02.01 Obtain Basic life support for the healthcare provider.
 - 2.G.02.02 Obtain HeartSaver first aid.
- 2.G.03 Complete incident/variance report.
- 2.G.04 Summarize reporting procedures for an in-office emergency.

- 2.G.02 Performance Example:
- Students will obtain national certification in CPR and First Aid.

2.H Medical Specialty Procedures

- 2.H.01 Assist with a pediatric exam.
- 2.H.01.01 Measure and record an infant's height, weight, head and chest circumference.
 - 2.H.01.02 Calculate Body Mass Index (BMI).
 - 2.H.01.03 Obtain a urine specimen.
 - 2.H.01.04 Measure and record vital signs.

- 2.H.01 Performance Example:
- Students will document infant height, weight, head and chest circumference, vital signs and BMI on a growth chart.

- 2.H.02 Assist with a physical exam.
 - 2.H.02.01 Measure and record vital signs.
 - 2.H.02.02 Measure and record height and weight.
 - 2.H.02.03 Identify common office equipment.
 - 2.H.02.04 Calculate BMI.
 - 2.H.02.05 Prepare patient for various physical examinations.
 - 2.H.02.06 Assist in positioning and draping patients.
 - 2.H.02.07 Assist with positioning or transferring during PE (physical examinations).
 - 2.H.02.08 Perform visual acuity testing.
 - 2.H.02.09 Assist with audiometry.

2.H.02 Performance Example:

- Students will document vital signs, height and weight, BMI, visual acuity and audiometry results on a flow sheet.

- 2.H.03 Provide patient education.
 - 2.H.03.01 Instruct patient for diagnostic tests and/or follow-up tests.
 - 2.H.03.02 Instruct the patient in self-breast exam.
 - 2.H.03.03 Instruct the patient in testicular self-exam.
 - 2.H.03.04 Assist in post-surgical patient discharge.
 - 2.H.03.05 Instruct the patient in use of the metered dose inhaler.

2.H.03 Performance Example:

- Students will create a project presentation on how to educate their patient to perform self-testing such as breast and testicular exams.

- 2.H.04 Assist with specialty procedures.
 - 2.H.04.01 Demonstrate eye drop instillation.
 - 2.H.04.02 Apply an eye patch dressing.
 - 2.H.04.03 Assemble and assist with ear lavage.
 - 2.H.04.04 Perform spirometry testing.

2.H.04 Performance Example:

- Students will complete a project demonstration highlighting common medical procedures and will include patient education for specialty procedures.

2.I Basic Principles of Nutrition

- 2.I.01 List and summarize current dietary guidelines.
 - 2.I.01.01 Identify and explain therapeutic diets.
 - 2.I.01.02 Identify and explain restrictive diets.

2.I Performance Example:

- Student will create a project presentation demonstrating an understanding of the current dietary guidelines.

2.J Rehabilitation and Functional Activities

- 2.J.01 Demonstrate appropriate transfer technique.
 - 2.J.01.01 Demonstrate proper use of a wheelchair.

- 2.J.01 Performance Example:
- Students will explain the use of a wheelchair and will identify how to use a wheelchair safely as well as safety risks involved with having a patient in a wheelchair.

- 2.J.02 Measure, fit and instruct the patient on ambulatory devices.
- 2.J.02.01 Demonstrate use of a walker.
 - 2.J.02.02 Demonstrate use of crutches.
 - 2.J.02.03 Demonstrate use of a cane.

- 2.J.02 Performance Example:
- Students will explain the use of a walker, crutches and cane as well as identify how to use a walker, crutches and cane safely including the safety risks involved with having a patient that using assistive devices.

- 2.J.03 Employ the use of hot and cold therapy.
- 2.J.03.01 Demonstrate application of heat/cold therapy.

- 2.J.03 Performance Example:
- Students will develop a project demonstrating the use of rehabilitation and therapeutic modalities.

2.K Basic Laboratory Skills

- 2.K.01 Obtain specimen collection.
- 2.K.01.01 Draw a blood sample.
 - 2.K.01.02 Collect a urine sample.
 - 2.K.01.03 Obtain a stool sample.
 - 2.K.01.04 Collect a sputum sample.
 - 2.K.01.05 Obtain sterile cultures (urine, throat, wound, vaginal).

- 2.K.01 Performance Example:
- Students will demonstrate how to collect lab specimens as well as document normal and abnormal findings on a lab sheet.

- 2.K.02 Perform basic stool testing.
- 2.K.02.01 Perform Guiac testing.
 - 2.K.02.02 Collect stool for Parasitic testing.

- 2.K.02 Performance Example:
- Students will identify common illnesses associated with the need to perform guiac testing as well as parasitic testing.

- 2.K.03 Operate a compound microscope to perform lab tests.
- 2.K.03.01 Identify characteristics of a gram stain.
 - 2.K.03.02 Identify characteristics of a wet slide and hanging drop slide preparation.
 - 2.K.03.03 Observe urine sediment.

2.K.03 Performance Example:
▪ Students will identify the components of a microscope and prep a slide to observe specimens.

- 2.K.04 Perform a basic urinalysis.
- 2.K.04.01 Assess urinary volume, color and clarity.
 - 2.K.04.02 Perform a urinalysis chemical screen via dipsticks.
 - 2.K.04.03 Perform microscopic urinalysis.

2.K.04 Performance Example:
▪ Students will identify normal and abnormal results of a urinalysis and document findings on a lab sheet.

- 2.K.05 Perform basic hematology procedures.
- 2.K.05.01 Perform a capillary (finger stick) procedure.
 - 2.K.05.02 Measure and record hemoglobin.
 - 2.K.05.03 Measure and record micro-hematocrit.
 - 2.K.05.04 Identify characteristics of an erythrocyte sedimentation rate.

2.K.05 Performance Example:
▪ Students will identify normal and abnormal levels of basic hematology procedures and be able to document their finding on a lab sheet.

- 2.K.06 Perform basic serology procedures.
- 2.K.06.01 Explain and demonstrate how to determine blood type using ABO/Rh system.
 - 2.K.06.02 Measure blood glucose using a glucometer.
 - 2.K.06.03 Perform cholesterol testing.
 - 2.K.06.04 Perform hemoglobin (A1C) testing.

2.K.06 Performance Example:
▪ Students will conduct a lab experiments to test ABO/Rh, CBS and cholesterol levels and will document normal and abnormal findings on a lab sheet.

- 2.K.07 Perform basic immunology procedures.
- 2.K.07.01 Perform rapid strep test.
 - 2.K.07.02 Perform pregnancy tests.

2.K.07 Performance Example:
▪ Students will identify symptoms directly related to the need for a rapid strep test and pregnancy testing.

- 2.K.08 Demonstrate correct specimen process according to the Centers for Disease Control (CDC) guidelines.
- 2.K.08.01 Accurately label specimen.
 - 2.K.08.02 Perform specimen preservation.
 - 2.K.08.03 Recognize specimen contamination.
 - 2.K.08.04 Accurately complete laboratory requisition.
 - 2.K.08.05 Perform specimen documentation and tracking.

2.K.08 Performance Example:

- Students will demonstrate proficiency in the following areas: Specimen collection, specimen processing, operating a microscope, quality control and documentation.

2.K.09 Demonstrate principles of quality control.

2.K.09.01 Inspect expiration dates and dispose of expired reagents.

2.K.09 Performance Example:

- Students will explain the reasoning behind not using expired reagents.

2.L **Electrocardiography (EKG)**

2.L.01 Identify the anatomy of the heart.

2.L.01.01 Trace the flow of blood throughout systemic and pulmonary circulations.

2.L.01.02 Identify the origin of electrical activity in the heart and follow its path.

2.L.01 Performance Example:

- Students will draw a diagram to depict the flow of blood through the heart.

2.L.02 Identify characteristics of a twelve lead EKG, three channel.

2.L.02.01 Demonstrate application of limb and chest electrodes.

2.L.02.02 Identify electrocardiogram (EKG) artifacts/troubleshoot machine failure.

2.L.02.03 Demonstrate application of Holter monitor.

2.L.02.04 Identify basic arrhythmias.

2.L.02 Performance Example:

- Student will demonstrate an understanding of the heart and proficiency in performing an EKG.

2.M **Medications**

2.M.01 Demonstrate an understanding of pharmacology.

2.M.01.01 Differentiate among various drug classifications.

2.M.01.02 Explain the role of governing agencies (e.g., Drug Enforcement Administration (DEA), U.S. Food and Drug Administration (FDA), etc.).

2.M.01.03 Demonstrate the use of the Physician's Desk Reference.

2.M.01.04 Understand principal actions of drugs.

2.M.01 Performance Example:

- Students will develop a spreadsheet to compare and contrast the DEA and FDA.

2.M.02 Prepare medications for administration.

2.M.02.01 Reconstitute medication from a powder.

2.M.02.02 Withdraw medication from a vial.

2.M.02.03 Calculate medication dosage as ordered.

2.M.02.04 Identify the Six Rights of Medication Administration.

2.M.02 Performance Example:

- In a lab setting, students will accurately reconstitute medication from a powder and calculate proper dosage from a mock doctor's order using the proper formula.

2.M.03 Perform and state the common routes of medication administration.

- 2.M.03.01 Perform oral administration.
- 2.M.03.02 Perform intramuscular administration.
- 2.M.03.03 Perform intradermal administration.
- 2.M.03.04 Perform subcutaneous administration.
- 2.M.03.05 Perform transdermal administration.
- 2.M.03.06 Perform inhalation administration.
- 2.M.03.07 Describe rectal administration.

2.M.03 Performance Example:

- Students will create a top down web to differentiate each method of injection and their uses.

2.M.04 Educate patients regarding medication administration.

- 2.M.04.01 List and describe the possible adverse effects of medication.
- 2.M.04.02 Reinforce safety warnings and guidelines.

2.M.04 Performance Example:

- Student will create a project presentation demonstrating an understanding of basic pharmacology and administration of medications to include; routes, rights, documentation,

2.M.05 Describe basic elements of a prescription.

- 2.M.05.01 List and explain the parts of a prescription.
- 2.M.05.02 Order medication to a pharmacy using appropriate telephone protocol.

2.M.05 Performance Example:

- Students will label all parts of a prescription and will role play with other students to call in medications and refills to a pharmacy.

2.M.06 Prepare and maintain a drug inventory.

- 2.M.06.01 Identify outdated medication.

2.M.06 Performance Example:

- Students will create a drug inventory and will demonstrate how to maintain an inventory given various clinical scenarios.

- 2.M.06.02 Arrange for appropriate disposal of outdated medication.

2.M.07 Demonstrate needle safety.

- 2.M.07.01 Follow OSHA guidelines.

2.M.07 Performance Example:

- Students will create a brochure on sharps safety per OSHA protocol.

2.N Venipuncture

2.N.01 Demonstrate correct order of draw according to National Committee for Clinical Laboratory Standards (NCCLS) protocol.

2.N.02 Perform venipuncture by evacuated tube system.

2.N.03 Perform venipuncture by butterfly needle system.

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|-----|--|
| 2.N | Performance Example: <ul style="list-style-type: none">▪ Student will demonstrate order of draw and perform venipuncture in a simulation lab according to current industry and OSHA standards. |
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2.0 Externship

2.0.01 Complete a supervised student practicum.

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|-----|---|
| 2.0 | Performance Example: <ul style="list-style-type: none">▪ Student will successfully complete a supervised student practicum. |
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Strand 3: Embedded Academics

Strand 3: Embedded Academics, a critical piece of a Vocational Technical Education Framework, are presented as Crosswalks between the Massachusetts Vocational Technical Education Frameworks and the Massachusetts Curriculum Frameworks. These Crosswalks are located in the Appendix of this Framework.

Academic Crosswalks

[Appendix A:](#) [English Language Arts](#)

[Appendix B:](#) [Mathematics](#)

[Appendix C:](#) [Science and Technology/Engineering](#)

Earth and Space Science

Life Science (Biology)

Physical Science (Chemistry and Physics)

Technology/Engineering

Strand 4: Employability and Career Readiness

4.A Career Exploration and Navigation

- 4.A.01 Develop a career plan and portfolio.
 - 4.A.01.01 Develop and revise career plan annually based on workplace awareness and skill attainment.
 - 4.A.01.02 Assess personal strengths and interest areas to determine potential careers, career pathways and career ladders.
 - 4.A.01.03 Examine potential career field(s)/discipline(s) and identify criteria to select, secure and keep employment in chosen field(s).
 - 4.A.01.04 Research and evaluate a variety of careers utilizing multiple sources of information and resources to determine potential career(s) and alternatives.
 - 4.A.01.05 Identify training and education requirements that lead to employment in chosen field(s) and demonstrate skills related to evaluating employment opportunities.
 - 4.A.01.06 Explore and evaluate postsecondary educational opportunities including degrees and certifications available, traditional and nontraditional postsecondary pathways, technical school and apprenticeships, cost of education, financing methods including scholarships and loans and the cost of loan repayment.
 - 4.A.01.07 Create a portfolio showcasing academic and career growth including a career plan, safety credential, resume and a competency profile demonstrating the acquisition of the knowledge and skills associated with at least two years of full-time study in the Chapter 74 program.

- 4.A.02 Demonstrate job search skills.
 - 4.A.02.01 Conduct a job search and complete written and electronic job applications, resumes, cover letters and related correspondence for a chosen career path.
 - 4.A.02.02 Explore and evaluate postsecondary job opportunities and career pathways specific to career technical areas.
 - 4.A.02.03 Identify role and use of social media and networking for staying current with career and employment trends as well as networking, job seeking and career development opportunities.
 - 4.A.02.04 Demonstrate ability to use social media and networking to develop useful occupational contacts, job seeking and career development opportunities.

- 4.A.03 Demonstrate all phases of the job interview process.
 - 4.A.03.01 Gather relevant information about potential employer(s) from multiple print and digital sources, assessing the credibility and accuracy of each source.
 - 4.A.03.02 Identify employment eligibility criteria, such as drug/alcohol free status, clean driving record, etc.

- 4.A.03.03 Practice effective interviewing skills: appearance, inquiry and dialogue with interviewer, positive attitude and evidence of work ethic and skills.
- 4.A.03.04 Explore and evaluate employment benefit packages including wages, vacation, health care, union dues, cafeteria plans, tuition reimbursement,

4. A Performance Examples:

- Conduct research to analyze and present on specific careers within a cluster.
- Conduct web-based job search using sites such as Monster.com, CareerBuilder.com, Indeed.com, Snagajob.com, Simplyhired.com and others.
- Create profile on social media/networking site such as LinkedIn and/or LinkedIn University for postsecondary research and employment opportunities.
- Complete online job application.
- Conduct and videotape practice interviews for instructor and student analysis.
- Provide students with sample employment and benefit packages for evaluation.

retirement and 401K.

4.B Communication in the Workplace

- 4.B.01 Demonstrate appropriate oral and written communication skills in the workplace.
 - 4.B.01.01 Communicate effectively using the language and vocabulary appropriate to a variety of audiences within the workplace including coworkers, supervisors and customers.
 - 4.B.01.02 Read technical and work-related documents and demonstrate understanding in oral discussion and written exercise.
 - 4.B.01.03 Demonstrate professional writing skills in work-related materials and communications (e.g., letters, memoranda, instructions and directions, reports, summaries, notes and/or outlines).
 - 4.B.01.04 Use a variety of writing/publishing/presentation applications to create and present information in the workplace.
 - 4.B.01.05 Identify, locate, evaluate and use print and electronic resources to resolve issues or problems in the workplace.
 - 4.B.01.06 Use a variety of financial and data analysis tools to analyze and interpret information in the workplace.
 - 4.B.01.07 Orally present technical and work-related information to a variety of audiences.
 - 4.B.01.08 Identify and demonstrate professional non-verbal communication.
- 4.B.02 Demonstrate active listening skills.
 - 4.B.02.01 Listen attentively and respectfully to others.
 - 4.B.02.02 Focus attentively, make eye contact or other affirming gestures, confirm understanding and follow directions.
 - 4.B.02.03 Show initiative in improving communication skills by asking follow-up questions of speaker in order to confirm understanding.

4. B Performance Examples:
- Read and analyze technical instructions to learn what makes them effective.
 - Read and analyze technical instructions to follow directions and/or solve a problem.
 - Examine a technical document and use it to write a set of instructions for another student to follow and evaluate.
 - Analyze websites for effective technical writing and design.
 - Create brochures and presentations using software and/or Web 2.0 tools to convey technical information.
 - Conduct research using the Internet, print documents, observations and interviews to create a technical guide.

4.C Work Ethic and Professionalism

- 4.C.01 Demonstrate attendance and punctuality.
- 4.C.01.01 Identify and practice professional time-management and attendance behaviors including punctuality, reliability, planning and flexibility.
- 4.C.02 Demonstrate proper workplace appearance.
- 4.C.02.01 Identify and practice professional appearance specific to the workplace.
- 4.C.02.02 Identify and practice personal hygiene appropriate for duties specific to the workplace.
- 4.C.02.03 Identify and wear required safety gear specific to the workplace.
- 4.C.03 Accepts direction and constructive criticism.
- 4.C.03.01 Demonstrate ability (both verbally and non-verbally) to accept direction and constructive criticism and to implement solutions to change behaviors.
- 4.C.03.02 Ask appropriate questions to clarify understanding of feedback.
- 4.C.03.03 Analyze own learning style and seek instructions in a preferred format that works best for their understanding (such as oral, written or visual instruction).
- 4.C.04 Demonstrate motivation and initiative.
- 4.C.04.01 Evaluate assigned tasks for time to completion and prioritization.
- 4.C.04.02 Demonstrate motivation through enthusiasm, engagement, accurate completion of tasks and activities.
- 4.C.04.03 Demonstrate initiative by requesting new assignments and challenges.
- 4.C.04.04 Explain proposed solutions to challenges observed in the workplace.
- 4.C.04.05 Demonstrate the ability to evaluate multiple solutions to problems and challenges using critical reasoning and workplace/industry knowledge and select the best solution to the problem.
- 4.C.04.06 Implement solution(s) to challenges and/or problem(s) observed in the workplace.
- 4.C.04.07 See projects through completion and check work for quality and accuracy.

- 4.C.05 Demonstrate awareness of workplace culture and policy.
 - 4.C.05.01 Display ethical behavior in use of time, resources, computers and information.
 - 4.C.05.02 Identify the mission of the organization and/or department.
 - 4.C.05.03 Explain the benefits of a diverse workplace.
 - 4.C.05.04 Demonstrate a respect for diversity and its benefit to the workplace.

- 4.C.06 Interact appropriately with coworkers.
 - 4.C.06.01 Work productively with individuals and in teams.
 - 4.C.06.02 Develop positive mentoring and collaborative relationships within work environment.
 - 4.C.06.03 Show respect and collegiality, both formally and informally.
 - 4.C.06.04 Explain and follow workplace policy on the use of cell phones and other forms of social media.
 - 4.C.06.05 Maintain focus on tasks and avoid negative topics or excessive personal conversations in the workplace.
 - 4.C.06.06 Negotiate solutions to interpersonal and workplace conflicts.

4. C Performance Examples:

- Complete a learning style analysis tool.
- Develop a rubric to assess work ethic and professionalism as detailed in the standards above.

Student Organizations

Business Professionals of America

www.bpa.org

Selected Websites

- 5 Ways to Ace a Job Interview: http://kidshealth.org/teen/school_jobs/jobs/tips_interview.html
- America's Career Resource Network: <http://acrn.ovae.org/teachers/careerexpclassrm.htm>
- Career Cruiser – Florida Department of Education:
<http://www.fldoe.org/workforce/pdf/cruiser.pdf>
- Career Development Guide and Glossary: <http://www.doe.mass.edu/connect/cde.html>
- Career One Stop: <http://www.careeronestop.org/>
- Career Plan: <http://www.doe.mass.edu/cd/plan/intro.html>
- Career Plan Model: http://www.doe.mass.edu/ccr/epp/samples/cpmodel_11x17.pdf
- Checklist: <http://www.doe.mass.edu/cd/plan/checklist.pdf>
- Career Tech: http://www.okcareertech.org/cac/Pages/resources_products/ethics_web_sites.htm
- Ethics Resource Center: <http://www.ethics.org/>
- Interaction in the Workplace: <http://hrweb.berkeley.edu/guides/managing-hr/interaction/communication>

- Individual Learning Plans: How-to Guide: “Promoting Quality Individualized Learning Plans: A How to Guide on the High School Years” <http://www.ncwd-youth.info/ilp/how-to-guide>
- ILP Fact Sheet: <http://www.ncwd-youth.info/fact-sheet/individualized-learning-plan>
- ILP Policy Brief: <http://www.ncwd-youth.info/ilp/produce-college-and-career-ready-high-school-graduates>
- ILP Resources Home Page: <http://www.ncwd-youth.info/ilp>
- Interview Skills Lesson Plans:
<http://www.amphi.com/media/1220281/interview%20skills%20lesson%20plan.doc>
- Labor and Workforce Development: <http://www.mass.gov/lwd/employment-services/preparing-for-your-job-search/>
- Maine Community College System – Center for Career Development:
http://www.ccd.me.edu/careerprep/CareerPrepCurriculum_LP-6.pdf
- Massachusetts Work-Based Learning: <http://skillspages.com/masswbl>
- North Dakota Association of Agriculture Educators:
http://www.ndaae.org/attachments/File/Preparing_students_for_a_Job_Interview.pptx
- NY CTE Learning Standards—Career Development and Occupational Studies (CDOS) Resource Guide with Core Curriculum: <http://www.p12.nysed.gov/cte/cdlearn/cdosresourceguide.html>
- Occupational Outlook Handbook: <http://www.bls.gov/ooh/>
- Purdue OWL Job Search Resources (for writing resumes, applications, and letters):
<https://owl.english.purdue.edu/engagement/34/>
- Soft Skills to Pay the Bills — Mastering Soft Skills for Workplace Success:
<http://www.dol.gov/odep/topics/youth/softskills/>
- US Department of Labor: <http://www.dol.gov/dol/audience/aud-unemployed.htm>
- Workplace Communication:
<http://www.regionalskillstraining.com/sites/default/files/content/WC%20Book%201.pdf>
- Your Plan For the Future: <http://www.yourplanforthefuture.org>

Strand 5: Management and Entrepreneurship Knowledge and Skills

5.A Starting a Business

- 5.A.01 Demonstrate an understanding of the practices required to start a business.
 - 5.A.01.01 Define entrepreneurship and be able to recognize and describe the characteristics of an entrepreneur.
 - 5.A.01.02 Compare and contrast types of business ownership (i.e., sole proprietorships, franchises, partnerships, corporations).
 - 5.A.01.03 Identify and explain the purpose and contents of a business plan.
 - 5.A.01.04 Demonstrate an understanding of the principles and concepts of a business's supply chain (i.e., suppliers, producers and consumers).

5. A Performance Examples:

- Develop a presentation pertaining to an entrepreneur and their business.
- Communicate with a business owner and discuss the pros and cons of starting and owning a business. Summarize the main points of the discussion.
- Choose a product or service and describe the process leading to distribution.
- Write a business plan for a business in your community.

5.B Managing a Business

- 5.B.01 Demonstrate an understanding of managing a business.
 - 5.B.01.01 Formulate short- and long-term business goals.
 - 5.B.01.02 Demonstrate effective verbal, written and visual communication skills.
 - 5.B.01.03 Utilize a decision-making process to make effective business decisions.
 - 5.B.01.04 Identify a business's chain of command and define its organizational structure.
 - 5.B.01.05 Identify and apply effective customer service skills and practices.
 - 5.B.01.06 Identify, interpret and develop written operating procedures and policies.
 - 5.B.01.07 Track inventory, productivity and labor cost.
 - 5.B.01.08 Demonstrate business meeting skills.
 - 5.B.01.09 Identify professional organizations and explore their benefits.

5. B Performance Examples:

- Working as a team, role-play situations that an entrepreneur might face in dealing with customers or employees.
- Contact a relevant professional organization and request information about its benefits, membership requirements and costs.
- Plan and conduct a business meeting.
- Identify companies that are known for customer service and list the practices that help differentiate themselves from all others in their industry.

5.C Marketing a Business

- 5.C.01 Demonstrate an understanding of marketing and promoting a business.
 - 5.C.01.01 Explain the role of business in the economy.
 - 5.C.01.02 Describe the relationship between business and community.
 - 5.C.01.03 Describe methods of market research and identifying target markets.

- 5.C.01.04 Describe and apply the concepts of a marketing mix (the 4Ps of marketing: product, price, place and promotion).
- 5.C.01.05 Compare and contrast the promotional tools and techniques used to sell products, services, images and ideas.
- 5.C.01.06 Describe the impact of supply and demand on a product or business.
- 5.C.01.07 Identify direct and indirect competition on a business.
- 5.C.01.08 Identify and use sales techniques to meet client needs and wants.
- 5.C.01.09 Discuss strategies to acquire and retain a customer base.

5. C Performance Examples:
- Research reliable sources to identify marketing and industry data related to a business.
 - Conduct market research by developing a survey and presenting the results.
 - Create a promotional campaign using a variety of media.
 - Write a marketing plan for a product.

5.D Financial Concepts and Applications in Business

- 5.D.01 Demonstrate an understanding of financial concepts and applications.
 - 5.D.01.01 Identify essential financial reports and understand their purpose (i.e., budget, balance sheet and income statement).
 - 5.D.01.02 Describe payroll practices (i.e., deductions – federal, FICA and state taxes and insurances).
 - 5.D.01.03 Identify the importance of maintaining accurate records.
 - 5.D.01.04 Apply practices related to pricing, purchasing and billing.
 - 5.D.01.05 Maintain and reconcile a checking account.
 - 5.D.01.06 Identify the options for funding a business.

5. D Performance Examples:
- Given an employee time card and rate of pay, calculate gross pay, taxes, deductions and net pay.
 - Develop a budget for a simulated business or project.
 - Analyze and discuss financial documents from a company.
 - Research various methods of funding a business.

5.E Legal/Ethical/Social Responsibilities

- 5.E.01 Demonstrate an understanding of legal, ethical and social responsibility for businesses.
 - 5.E.01.01 Identify state and federal laws and regulations related to managing a business.
 - 5.E.01.02 Describe and identify ethical business practices.
 - 5.E.01.03 Demonstrate an understanding of business contracts.
 - 5.E.01.04 Explain the role of diversity in the workplace.
 - 5.E.01.05 Explain the role of labor organizations.
 - 5.E.01.06 Identify practices that support clean energy technologies and encourage environmental sustainability.
 - 5.E.01.07 Demonstrate an understanding of how technology advancements impact business practices.

5.E Performance Example:

- Read and interpret a contract.
- Complete an application for a license, permit or certificate.
- Research federal, state and local regulations and laws required for a business.
- Participate in and summarize a discussion with a member of a labor or civil rights organization.

Selected Websites

- CVTE Strand 1, 4, and 5 Resources: <https://sites.google.com/a/mccanntech.org/cvte-strands-1-4-and-5-resources/>
- Entrepreneur: <http://www.entrepreneur.com>
- Inc. Magazine: <http://www.inc.com/>
- Junior Achievement “Be Entrepreneurial Program”: <https://www.juniorachievement.org/web/ja-usa/home>
- Kahn Academy Interviews with Entrepreneurs: <https://www.khanacademy.org/economics-finance-domain/entrepreneurship2/interviews-entrepreneurs>
- Kauffman Founders School: <http://www.entrepreneurship.org/en/founders-school.aspx>
- National Federation of Independent Business: www.nfib.com
- National Foundation for Teaching Entrepreneurship (NFTE): www.nfte.com
- SBA Loans: <http://www.sba.gov>
- SkillsUSA Professional Development Program Competency List: <http://www.skillsusa.org/downloads/PDF/lessons/professional/PDPPreview.pdf>
- Small Business Administration: www.sba.gov

Glossary

Term	Definition
Balance sheet	A statement of the assets, liabilities and capital of a business at a particular point in time.
Budget	An estimate of income and expenditure for a set period of time.
Business Ownership	Types of business ownership refer to the legal structure of an organization. Legal structures include: Sole Proprietorship, Partnerships, Corporations and Limited Liability Companies.
Business Plan	A written document that describes in detail your business goals and how you are going to achieve them from a marketing, operational and financial point of view.

Term

Chain of Command and Organizational Structure

**Definition**

Refers to the management structure of an organization. It identifies lines of authority, lines of communication, and reporting relationships. Organizational structure determines how the roles, power and responsibilities are assigned and coordinated and how information flows between the different levels of management. (A visual representation of this structure is called an org chart).

FICA

Federal Insurance Contributions Act requires taxes deducted from pay for supporting Social Security.

Income Statement

A financial statement providing operating results for a specific time period showing a business's revenues, expenses and profit or loss.

Market Research

- Primary: Surveys, Focus Groups, Observation
- Secondary: Websites, Internet

Marketing Mix

A set of controlled variables that formulate the strategic position of a product or service in the marketplace. These variables are known as the 4 P's of marketing and include product, place, price and promotion.

Methods to Track Inventory, Productivity and Labor Cost

Refers to the processes a business uses to account for: 1) the inflows and outflows of inventory and materials related to inventory; 2) the efficiency of operations and 3) the cost of labor including salary and benefits.

Promotional Tools and Techniques

The six elements of a promotional mix are: advertising, visual merchandising, public relations, publicity, personal selling and sales promotion.

Supply Chain

The supply chain, or channel of distribution, describes how the product is handled and/or distributed from suppliers with materials, to the manufacturer, wholesaler or retailer and finally to the consumer.

Target Market

Those who are most likely to buy your product or service.

Strand 6: Technology Literacy Knowledge and Skills

6.A Technology Literacy Knowledge and Skills (Grades 9 through 12)

- 6.A.01 Demonstrate proficiency in the use of computers and applications, as well as an understanding of the concepts underlying hardware, software, and connectivity.
 - 6.A.01.01 Use online help and other support to learn about features of hardware and software, as well as to assess and resolve problems.
 - 6.A.01.02 Install and uninstall software; compress and expand files (if the district allows it).
 - 6.A.01.03 Explain effective backup and recovery strategies.
 - 6.A.01.04 Apply advanced formatting and page layout features when appropriate (e.g., columns, templates, and styles) to improve the appearance of documents and materials.
 - 6.A.01.05 Use editing features appropriately (e.g., track changes, insert comments).
 - 6.A.01.06 Identify the use of word processing and desktop publishing skills in various careers.
 - 6.A.01.07 Identify the use of database skills in various careers.
 - 6.A.01.08 Define and use functions of a spreadsheet application (e.g., sort, filter, find).
 - 6.A.01.09 Explain how various formatting options are used to convey information in charts or graphs.
 - 6.A.01.10 Identify the use of spreadsheet skills in various careers.
 - 6.A.01.11 Use search engines and online directories.
 - 6.A.01.12 Explain the differences among various search engines and how they rank results.
 - 6.A.01.13 Explain and demonstrate effective search strategies for locating and retrieving electronic information (e.g., using syntax and Boolean logic operators).
 - 6.A.01.14 Describe good practices for password protection and authentication.
- 6.A.02 Demonstrate the responsible use of technology and an understanding of ethics and safety issues in using electronic media at home, in school, and in society.
 - 6.A.02.01 Demonstrate compliance with the school's Acceptable Use Policy.
 - 6.A.02.02 Explain issues related to the responsible use of technology (e.g., privacy, security).
 - 6.A.02.03 Explain laws restricting the use of copyrighted materials.
 - 6.A.02.04 Identify examples of plagiarism, and discuss the possible consequences of plagiarizing the work of others.
- 6.A.03 Design and implement a personal learning plan that includes the use of technology to support lifelong learning goals.
 - 6.A.03.01 Evaluate the authenticity, accuracy, appropriateness, and bias of electronic resources, including Web sites.
 - 6.A.03.02 Analyze the values and points of view that are presented in media messages.
 - 6.A.03.03 Describe devices, applications, and operating system features that offer accessibility for people with disabilities.

- 6.A.03.04 Evaluate school and work environments in terms of ergonomic practices.
- 6.A.03.05 Describe and use safe and appropriate practices when participating in online communities (e.g., discussion groups, blogs, social networking sites).
- 6.A.03.06 Explain and use practices to protect one's personal safety online (e.g., not sharing personal information with strangers, being alert for online predators, reporting suspicious activities).
- 6.A.03.07 Explain ways individuals can protect their technology systems and information from unethical users.
- 6.A.04 Demonstrate the ability to use technology for research, critical thinking, problem solving, decision making, communication, collaboration, creativity, and innovation.
 - 6.A.04.01 Devise and demonstrate strategies for efficiently collecting and organizing information from electronic sources.
 - 6.A.04.02 Compare, evaluate, and select appropriate electronic resources to locate specific information.
 - 6.A.04.03 Select the most appropriate search engines and directories for specific research tasks.
 - 6.A.04.04 Use a variety of media to present information for specific purposes (e.g., reports, research papers, presentations, newsletters, Web sites, podcasts, blogs), citing sources.
 - 6.A.04.05 Demonstrate how the use of various techniques and effects (e.g., editing, music, color, rhetorical devices) can be used to convey meaning in media.
 - 6.A.04.06 Use online communication tools to collaborate with peers, community members, and field experts as appropriate (e.g., bulletin boards, discussion forums, listservs, Web conferencing).
 - 6.A.04.07 Plan and implement a collaborative project with students in other classrooms and schools using telecommunications tools (e.g., e-mail, discussion forums, groupware, interactive Web sites, video conferencing).

Appendices

The framework teams created an “Appendix” listing potential industry recognized credentials attainable by secondary students; lists of professional, student, and relevant government organizations; and useful resources and websites. **** It is important to note that although most Framework Teams provided information for the “Appendix”, not all teams did. Therefore, sub-headings within the “Appendix” without information have been deleted.***

Disclaimer: Reference in the Appendices Section to any specific commercial products, processes, or services, or the use of any trade, firm or corporation name is for the information and convenience of the public, and does not constitute endorsement or recommendation by the Massachusetts Department of Elementary and Secondary Education.

Embedded Academic Crosswalks

Embedded English Language Arts and Literacy

CVTE Learning Standard Number	Strand Coding Designation Grades ELAs Learning Standard Number	Text of English Language Arts Learning Standard
2.B.11, 2.C, 2.K.03, 2.L.05, 2.L.07, 2.M.01	RI4, RI4	<p>Anchor Standard #4 Reading—Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.</p> <p>Anchor Standard for Reading #10—Read and comprehend complex literary and informational texts independently and proficiently.</p>
<p>Performance Examples:</p> <ul style="list-style-type: none"> Utilizing research and education in the classroom students will present their findings about various health care facilities. Examples of presentations include, but are not limited to: PowerPoint and other media presentations. Students will illustrate their knowledge of implementing infection control policies and practices a media presentation, role playing-demonstration. Students will identify, and apply the fundamentals through activities such as matching from two columns, discussing orally in class. Other strategies include GIVE ONE-GET ONE. 		
2.A, 2.B, 2.B.10, 2.B.11, 2.C, 2.D.01.02, 2.E.01.05, 2.F.01, 2.H, 2.I, 2.L.05.01, 2.N	W2.A W2.B W2.D	<p>Anchor Standard #2 Writing –Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.</p>
<p>Performance Examples:</p> <ul style="list-style-type: none"> Students could write an informative/explanatory essay including a well-developed topic using facts, definitions, and concrete details and quotations as examples for clarification. Students could role play scenarios from the medical office such as using a physician, receptionist, patient and a medical assistant on the various ways in which to work with clients such as verbal and non-verbal skills, giving a patient report (oral or written), working in a healthcare office, and basic medical checks such as blood pressure, temperature, weight, and pulse. Students could write an informative/explanatory essay, present using multi-media programs to review various procedures and protocols. Students could create a poster, diorama, or multimedia presentation explaining the protocols of radiation safety, or explaining equipment and practices relating to dental radiography. Students should keep a portfolio that shows learning through externship, co-op, or clinical placements that reflect competencies and real world experiences. 		
2.B.07, 2.B.10, 2.B.11.03, 2.G, 2.H, 2.I, 2.J.06.01, 2.K, 2.L, 2.M.01	SL2, SL3, SL4	<p>Speaking and Listening</p> <p>#2 Comprehension and Collaboration—Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.</p> <p>#3—Evaluate a speaker’s point of view, reasoning, and use of evidence and rhetoric.</p>

		#4—Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
Performance Examples: <ul style="list-style-type: none"> • Students could present to the class, or in expert groups, the responsibilities of the medical assistant. Other strategies include role playing, media, and oral reporting/testing. • Students could also create a tri-fold patient pamphlet for the “client” to understand the role of the medical assistant, another visual could include a patient pamphlet detailing to the patient what to expect in the examination room with the medical assistant. 		
2	L4A, B, C, D	Anchor standard for Language #4—Determine or clarify the meaning of unknown and multiple-meaning words and phrases, by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.
Performance Example: <ul style="list-style-type: none"> • Students could perform activities such as matching words and terminology, creating charts and graphs of vocabulary as well as diagram origins of words and group based on language trees of origin. 		

Embedded Mathematics

CVTE Learning Standard Number	Math Content Conceptual Category and Domain Code Learning Standard Number	Text of Mathematics Learning Standard
2.D.01.01	6.RP.3d	Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. (calculate time available within an appointment calendar)
Performance Example: <ul style="list-style-type: none"> • Maintain an appointment matrix 		
2.E.01 2.E.02 2.F.02	6.RP.1 7.RP.1 9-12.N-Q.1	<p>Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every 1 cup bleach :1 gal water to prepare a chemical solution for cleaning.”</p> <p>Analyze proportional relationships and use them to solve real-world and mathematical problems. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction (1/2)/(1/4) miles per hour, equivalently 2 miles per hour.</p> <p>Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.*</p>
Performance Examples: <ul style="list-style-type: none"> • Students will prepare a certain amount of disinfectant or cleaning solution with the proper ratios. • Students will perform CPR with proper compression and breath ratios based on the clients profile(age). 		

<p>2.G.01.01 2.G.01.02 2.G.04</p>	<p>5.MD.1 9-12.N-Q.1 7.EE.3 7.RP.3 9-12.S.ID.4 9-12.N-Q.3a</p>	<p>Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step real world problems.</p> <p>Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.*</p> <p>Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations as strategies to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.</p> <p>Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.</p> <p>Summarize, represent, and interpret data on a single count or measurement variable. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.*</p> <p>Describe the effects of approximate error in measurement and rounding on measurements and on computed values from measurements. Identify significant figures in recorded measures and computed values based on the context given and the precision of the tools used to measure.*</p>
<p>Performance Example:</p> <ul style="list-style-type: none"> Students will assist in collecting pediatric data and charting data to include the calculation of Body Mass Index (BMI). 		
<p>2.G.02.06 2.I.02</p>	<p>7.G.2</p>	<p>Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. (fit ambulatory devices to body measurements</p>
<p>Performance Example: Students will assist in positioning patients in bed to the appropriate angle.</p>		
<p>2.J.05.02 2.J.05.03 2.J.08</p>	<p>7.SP.1 6.RP.3c</p>	<p>Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.</p> <p>Find a percent of a quantity as a rate per 100; solve problems involving finding the whole given a part and the percent. (e.g., find % of red blood cells carrying oxygen)</p>
<p>Performance Example: Students will measure and record data in hematology procedures.</p>		

2.L.02	7.RP.2 7.RP.3 7.EE.3	<p>Recognize and represent proportional relationships between quantities.</p> <p>Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.</p> <p>Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations as strategies to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.</p>
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Embedded Science and Technology/Engineering

Life Science (Biology)

CVTE Learning Standard Number	Subject Area, Topic Heading and Learning Standard Number	Text of Biology Learning Standard
2.E.01 2.E.02 2.E.03 2.J.02 2.J.07.01	2.2, 2.3	<p>Compare and contrast, at the cellular level, the general structure and degrees of complexity of prokaryotes and eukaryotes.</p> <p>Use cellular evidence (e.g. cell structure, cell number, cell reproduction_ and modes of nutrition to describe the six kingdoms (Archaeobacteria, Eubacteria, Protista, Fungi, Plantae, Animalia).</p>
Performance Example: Students will utilize proper techniques in infection control.		
2.F.02 2.G.01.03 2.G.02.01 2.G.04.04 2.I.02 2.I.03 2.J.01 2.J.04 2.J.05 2.J.06 2.K.01 2.K.02 2.L.03 2.L.04 2.M.02 2.M.03	4.1, 4.2, 4.3, 4.4, 4.5	<p>Explain generally how the digestive system (mouth, pharynx, esophagus, stomach, small and large intestines, rectum) converts macromolecules from food into smaller molecules that can be used by cells for energy and for repair and growth.</p> <p>Explain how the circulatory system (heart, arteries, veins, capillaries, red blood cells) transports nutrients and oxygen to cells and removes cell wastes. Describe how the kidneys and the liver are closely associated with the circulatory system as they perform the excretory function of removing waste from the blood. Recognize that kidneys remove nitrogenous wastes, and the liver removes many toxic compounds from blood.</p> <p>Explain how the respiratory system (nose, pharynx, larynx, trachea, lungs, alveoli) provides exchange of oxygen and carbon dioxide.</p> <p>Explain how the nervous system (brain, spinal cord, sensory neurons, motor neurons) mediates communication among different parts of the body and mediates the body's interactions with the environment. Identify the basic unit for the nervous system, the neuron, and explain generally how it works.</p> <p>Explain how the muscular/skeletal system (skeletal, smooth and</p>

		cardiac muscle, bones, cartilage, ligaments, tendons) works with other systems to support the body and allow for movement. Recognize that bones produce blood cells.
<p>Performance Examples:</p> <ul style="list-style-type: none"> • Students will achieve passing scores on American Heart Association CPR tests as well as demonstrate appropriate CPR technique on dummies. • Students will obtain a urine sample. • Students will measure and record vital signs for a patient such as heart rate. • Students will assist with spirometry. • Students will model and instruct proper use of walkers, crutches, and canes. • Students will analyze an electrocardiogram (EKG) for basic arrhythmias. • Students will create a visual human body chart representing the various routes of medication administration such as oral, rectal, or inhalation. 		
2.H.01 2.H.02 2.J.06.02 2.J.06.03 2.J.07.02 2.L.01	1.2, 1.3	Describe the basic molecular structures and primary functions of the four major categories of organic molecules (carbohydrates, lipids, proteins, nucleic acids). Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature that have an effect on enzymes.
<p>Performance Examples:</p> <ul style="list-style-type: none"> • Students will create a daily journal to give to a patient that categorizes and tracks nutritional needs. • Students will perform various procedures such as urinalysis, basic hematology, basic serology, and immunology. 		
2.J.06.01	3.4, 3.6	Distinguish among observed inheritance patterns caused by several types of genetic traits (dominant, recessive, codominant, sex-linked, polygenic, incomplete dominance, multiple alleles). Use a Punnett Square to determine the probabilities for genotypes and phenotypes combinations in monohybrid crosses.
Performance Example: Students will analyze the inheritance pattern of blood type determination using Mendelian genetics.		
2.L.01 2.L.04	4.7, 4.8	Recognize that communication among cells is required for coordination of body functions. The nerves communicate with electrochemical signals, hormones circulate through the blood, and some cells produce signals to communicate only with nearby cells. Recognize that the body's systems interact to maintain homeostasis. Describe the basic function of a physiological feedback loop.
Performance Example: Students will create an information flier demonstrating the various drug classifications and risks of drug interaction to increase public awareness.		

Physical Science (Chemistry)

CVTE Learning Standard Number	Subject Area, Topic Heading and Learning Standard Number	Text of Chemistry Learning Standard
2.E.02.08 2.J.02 2.J.08 2.L.02	1.2, 7.1, 7.2, 8.2, 8.3	Explain the difference between pure substances (elements and compounds) and mixtures. Differentiate between heterogeneous and homogeneous mixtures. Describe the process by which solutes dissolve in solvents

		<p>Calculate the concentration in terms of molarity. Use molarity to perform solution dilution and solution stoichiometry.</p> <p>Relate hydrogen ion concentrations to the pH scale and to acidic, basic, and neutral solutions. Compare and contrast the strengths of various common acids and bases (e.g. vinegar, baking soda, soap, citrus juice).</p> <p>Explain how a buffer works.</p>
<p>Performance Examples:</p> <ul style="list-style-type: none"> • Students will prepare a 1:10 bleach solution. • Students will summarize the process of collecting and testing a stool sample. 		

Physical Science (Physics)

CVTE Learning Standard Number	Subject Area, Topic Heading and Learning Standard Number	Text of Physics Learning Standard
2.K.02	4.1, 4.2	<p>Describe the measurable properties of waves (velocity, frequency, wavelength, amplitude, period) and explain the relationships among them. Recognize examples of simple harmonic motion.</p> <p>Distinguish between mechanical and electromagnetic waves.</p>
<p>Performance Example: Students will identify characteristics of a twelve lead EKG, three channel.</p>		

DESE Statewide Articulation Agreements

ARTICULATION AGREEMENT

Between

Massachusetts Community Colleges

And

Massachusetts Chapter 74-Approved Secondary
Career/Vocational Technical Medical Assisting Programs

Effective Date: November 13, 2014

for more information, click

<http://www.masscc.org/partnerships-initiatives/voc-schools-articulation-agreements>

Industry Recognized Credentials (Licenses and Certifications/Specialty Programs)

Students successfully completing a Chapter-74 Medical Assisting program will be eligible to sit for the following certification exams:

- Certified Clinical Medical Assistant- 300hrs
- Certified Medical Administrative Assistant-120hrs
- Certified Phlebotomy Technician-80hrs
- Certified Billing and Coding Specialist-120hrs
- Patient Care Technician-300hrs
- EKG Technician-75hrs
- Pharmacy Technician-500hrs
- Certified Electronic Health Record Specialist-80hrs
- Emergency Medical Technician-140hrs
- Medical Lab Assistant-130hrs
- MAP Certification-30hrs
- First Aid-4.5hrs
- CPR-4.5hrs

Other

Reference Materials

Delmar's Comprehensive Medical Assisting Administrative and Clinical Competencies 4th edition.

Clinical Procedures for Medical Assistants

Procedures in Phlebotomy 3rd edition

Dean Vaughn Medical Terminology

Electrocardiography Essentials-Clinical Allied Healthcare Series

American Heart Association

American Association of Medical Assistants

National Healthcare Association

Lindh, Wilburta Q. Delmar's Comprehensive Medical Assisting: Administrative and Clinical Competencies.

Clifton Park, NY: Delmar Cengage Learning, 2010. Print.

Bonewit-West, Kathy. Clinical Procedures for Medical Assistants. Philadelphia: W.B. Saunders, 2008. Print.

Flynn, John C. Procedures in Phlebotomy. St. Louis, MO: Elsevier Saunders, 2005. Print.

Related National, Regional, and State Organizations

American Association of Medical Assistants

National Healthcare Association

Professional Organizations

American Association of Medical Assistants

National Healthcare Association

American Medical Technologists

American Association of Allied Health Professionals, Inc.

American Society of Phlebotomy Technicians

Student Organizations

SkillsUSA

Health Occupations Students of America (HOSA)

Selected Websites

National Healthcare Association - www.nhanow.com

American Association of Medical Assistants - www.aama-ntl.org/

American Registry of Medical Assistants - www.arma-cert.org/

Occupational Outlook Handbook: <http://www.bls.gov/ooh/healthcare/medical-assistants.htm>

Accrediting Bureau of Health Education Schools - www.abhes.org