



Vocational Technical Education Framework



Business & Consumer Services Occupational Cluster

Business Technology (VBUS)

CIP Code 520407

June 2014

Massachusetts Department of Elementary and Secondary Education

Office for Career/Vocational Technical Education

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Acknowledgements

The Massachusetts Department of Elementary and Secondary Education, Office for Career/ Vocational Technical Education, launched the Vocational Technical Education Framework Revision Project in April 2012. This Framework is the result of that effort and of the contributions of many educators across the state. The Department of Elementary and Secondary Education wishes to thank all of the Massachusetts groups that contributed to the development of these standards and all the individual teachers, administrators, and private sector advisory committee members who provided valuable employer validation of the standards for Business Technology Framework of the Business & Consumer Services Occupational Cluster.

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Commissioner's Letter



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Mitchell D. Chester, Ed.D.
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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.*

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.

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.

Business & Consumer Services Occupational Cluster

Business Technology Framework (VBUS)

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 Business Technology Health and Safety Skills

- 2.A.01.01 Demonstrate an understanding of Business Technology health skills.
- 2.A.01.02 Describe and demonstrate office and business health practices.
- 2.A.01.03 Illustrate proper body mechanics for the workplace including ergonomics.
- 2.A.01.04 Explain various ways to reduce stress for employees and customers.
- 2.A.01.05 Explain various safety issues with office and business technologies.

2.A.01 Performance Examples:

- Students will demonstrate proper body mechanics and posture.
- Students will spend five minutes each day focusing on safety concerns.

- 2.A.02 Demonstrate an understanding of Business Technology safety skills.
- 2.A.02.01 Describe and demonstrate office and business safety practices.
- 2.A.02.02 Explain and discuss the issues relating to cyber bullying in society.
- 2.A.02.03 Explain and discuss concerns relating to electronic mail privacy.
- 2.A.02.04 Explain and discuss the issues relating to Internet and social media.

2.A.02 Performance Examples:

- Students will write a paper on the importance of safety in the workplace.
- Students will build a presentation on the negative effects of cyber bullying.

2.B Essentials of Business Technology

- 2.B.01 Demonstrate an understanding of customer service skills and practices.
- 2.B.01.01 Define and describe methods of effective customer service.
- 2.B.01.02 Apply effective listening, written, verbal and nonverbal communication.
- 2.B.01.03 Demonstrate appropriate etiquette in communication.
- 2.B.01.04 List ways a company can improve the quality of customer service.
- 2.B.01.05 Identify proper procedures when dealing with colleagues and customers.
- 2.B.01.06 Describe and demonstrate ways to resolve difficult customer situations.

2.B.01 Performance Examples:

- Students will conduct mock situations demonstrating various customer experiences.
- Students will conduct mock customer service calls for a simulated business.

- 2.B.02 Demonstrate an understanding of business skills and practices.
- 2.B.02.01 Demonstrate filing procedures according to current industry standards.
- 2.B.02.02 Identify and plan various types of business meetings.
- 2.B.02.03 Describe and plan different types of business travel.
- 2.B.02.04 Describe and demonstrate effective time management skills.
- 2.B.02.05 Acquire employability skills to secure and maintain employment.

2.B.02 Performance Examples:

- Students will create a poster demonstrating healthy and safety business practices.
- Students will conduct a conference call for a simulated business meeting.
- Students will plan and prepare a complete itinerary for a five day business trip.

- 2.B.03 Demonstrate an understanding of technological skills and practices.

- 2.B.03.01 Apply keyboarding techniques according to current industry standards.
- 2.B.03.02 Utilize appropriate technology to solve a problem or complete a task.
- 2.B.03.03 Demonstrate an understanding for managing electronic files.
- 2.B.03.04 Conduct business meetings using various office and business technologies.
- 2.B.03.05 Describe and demonstrate resolutions to hardware and software issues.
- 2.B.03.06 Explain and utilize different computer technologies and platforms.
- 2.B.03.07 Utilize different types of mobile technologies and media devices.

2.B.03 Performance Examples:

- Students will use an application to conduct audio or video conferencing with another school.
- Students will correspond electronically with another school in a foreign country.
- Students will utilize mobile devices and mobile applications to research a school project.

2.C Essentials of Entrepreneurship and Business Management

- 2.C.01 Demonstrate an understanding of starting a business.
 - 2.C.01.01 Define entrepreneurship and describe entrepreneurial characteristics.
 - 2.C.01.02 Compare and contrast the different forms of business ownership.
 - 2.C.01.03 Identify the different types of industries and markets.
 - 2.C.01.04 Identify and explain the elements of a business plan.
 - 2.C.01.05 Identify federal, state, and local licenses, permits and regulations required to start a business.
 - 2.C.01.06 Describe options needed to obtain capital to start a business.
 - 2.C.01.07 Explain and identify staffing needs required to start a business.

2.C.01 Performance Examples:

- Students will call a local town hall to get information on local business regulations.
- Students will start a simulated business and research various funding methods.
- Students will write a business plan for a simulated service or merchandising business.

- 2.C.02 Demonstrate an understanding of managing a business.
 - 2.C.02.01 Describe and demonstrate effective leadership and teamwork skills.
 - 2.C.02.02 Describe and demonstrate the decision making process.
 - 2.C.02.03 Identify challenges of a growing business.
 - 2.C.02.04 Explain advantages and disadvantages of a global marketplace.
 - 2.C.02.05 Identify laws and regulations related to managing a business.
 - 2.C.02.06 Identify and explain staffing needs and issues when managing a business.
 - 2.C.02.07 Describe and demonstrate business ethics.
 - 2.C.02.08 Identify ways to dissolve, transfer or sell a business.

2.C.02 Performance Examples:

- Students will write a job description for a potential job opening.
- Students will prepare and develop a customer services policy manual.
- Students will conduct mock interviews on prospective employees.

- 2.C.03 Demonstrate an understanding of marketing a business.
 - 2.C.03.01 Describe and demonstrate effective marketing and promotion skills.
 - 2.C.03.02 Explain basic marketing strategies including product, place, price and promotion.
 - 2.C.03.03 Identify and explain the various steps of product development.

- 2.C.03.04 Compare and contrast the various tools and techniques used to promote a business.
- 2.C.03.05 Use a desktop publishing program to create published media and promotional items.
- 2.C.03.06 Explain and discuss the effects of advertising and social media on a business.
- 2.C.03.07 Prepare an advertisement message incorporating multimedia, print, and audio.

- 2.C.03 Performance Examples:
- Students will conduct market research on a product or service.
 - Students will create a brochure on business customs in a foreign country.
 - Create an audio or video advertisement promoting your technical program or school event

2.D Essentials of Accounting Concepts and Practices

- 2.D.01 Analyze and complete the accounting cycle for a service business.
 - 2.D.01.01 Illustrate ways to prepare and create a chart of accounts.
 - 2.D.01.02 Classify business transactions into debits and credits.
 - 2.D.01.03 Analyze and record business transactions into a general journal.
 - 2.D.01.04 Illustrate ways to post information to a general ledger.
 - 2.D.01.05 Describe and demonstrate how to prove cash and make correcting entries.
 - 2.D.01.06 Analyze and record adjusting entries into a general journal.
 - 2.D.01.07 Describe and demonstrate how to complete an accounting worksheet.
 - 2.D.01.08 Differentiate between temporary and permanent accounts.
 - 2.D.01.09 Analyze and record closing entries into a general journal.
 - 2.D.01.10 Complete the accounting cycle and generate financial statements.

- 2.D.01 Performance Examples:
- Students will develop a poster denoting the various steps of the accounting cycle.
 - Students will create an accounting game or flash cards to reinforce accounting terminology.
 - Students will complete the accounting cycle, including financial statements, for a simulated business.

- 2.D.02 Demonstrate an understanding of payroll concepts and applications.
 - 2.D.02.01 Compare and contrast gross and net pay.
 - 2.D.02.02 Distinguish between the various types of payroll withholdings.
 - 2.D.02.03 Explain and prepare employment forms for payroll withholding.
 - 2.D.02.04 Distinguish between the various types of tax liabilities.
 - 2.D.02.05 Extrapolate data from a pay stub and financial work related documents.

- 2.D.02 Performance Examples:
- Students will download, print and complete various employment forms.
 - Students will calculate a payroll register and tax liabilities for different employee work simulations.

- 2.D.03 Analyze and complete the accounting cycle using automated accounting.
 - 2.D.03.01 Perform account maintenance for charts of accounts, vendors and customers.
 - 2.D.03.02 Describe ways to create purchase orders and process a payment to a vendor.
 - 2.D.03.03 List ways to create invoices and post a payment from a customer.

2.D.03.04 Describe and demonstrate how to create customer statements.

2.D.03 Performance Examples:

- Students will create a simulated business with a chart of accounts, vendors, customers and products.
- Students will complete the accounting cycle, including financial statements, for a simulated business.

2.D.03.05 Complete the accounting cycle and generate financial statements.

2.E Essentials of Financial Concepts and Practices

2.E.01 Demonstrate an understanding of financial concepts and applications.

2.E.01.01 Use decimals, percentages and fractions in calculations.

2.E.01.02 Identify the various types of financial institutions, accounts, and securities.

2.E.01.03 Explain the forms and the purposes of life, property, health and auto insurances.

2.E.01.04 Describe and demonstrate the process of opening and maintaining a checking account.

2.E.01.05 Analyze and record entries in a checkbook register.

2.E.01.06 Describe and demonstrate how to perform a bank reconciliation.

2.E.01.07 Explain the process of acquiring, managing, and extending credit.

2.E.01.08 Explain the purposes and circumstances for filing bankruptcy.

2.E.01 Performance Examples:

- Students will record checks in a checkbook register and perform a bank reconciliation.
- Students will prepare a personal budget to record income and expense items for the future.
- Students will calculate the costs involved in using a credit card or an installment plan purchase.

2.E.02 Demonstrate an understanding of economic concepts and applications.

2.E.02.01 Describe and distinguish between an economic want and need.

2.E.02.02 Describe the impact of supply and demand.

2.E.02.03 Describe and explain the function of the stock market.

2.E.02.04 Distinguish between the various methods of investment tracking.

2.E.02.05 Explain the purpose of an initial public stock offering.

2.E.02 Performance Examples:

- Students will track and record information for a publicly traded stock using spreadsheet software.
- Students will research companies and create a table to record and compare financial information.
- Students will research and enroll in an online stock market simulation program.

2.E.03 Demonstrate an understanding of taxation concepts and applications.

2.E.03.01 Identify and explain the purposes for filing income tax returns.

2.E.03.02 Describe and analyze different types of income and expense items.

2.E.03.03 Differentiate between the various types of filing status classifications.

2.E.03.04 Differentiate between standard deductions and itemized deductions.

2.E.03.05 Differentiate between deductions and credits on an income tax return.

2.E.03 Performance Examples:

- Students will download and print the various tax forms needed.
- Students will prepare a federal and state tax return for an individual or a family.

2.F Essentials of Electronic Mail and Messaging

- 2.F.01 Demonstrate an understanding of developing and sending electronic mail.
- 2.F.01.01 Explain and describe concerns relating to electronic mail privacy.
 - 2.F.01.02 Create, edit, format, and send electronic mail to a recipient.
 - 2.F.01.03 Create, edit, format, and send personal and business contacts.
 - 2.F.01.04 Create, edit, and manage tasks and notes for project management.
 - 2.F.01.05 Attach files and other items when sending electronic mail.
 - 2.F.01.06 Differentiate between the various ways to print electronic mail.

2.F.01 Performance Examples:

- Students will write a message that they would send to a fictitious manager.
- Students will demonstrate an understanding for attaching files to messages.

- 2.F.02 Utilize advanced electronic mail and communication features.
- 2.F.02.01 Create, edit, and manage distribution lists or contact groups.
 - 2.F.02.02 Prepare and manage folders for message storage and archiving.
 - 2.F.02.03 Differentiate between the various options for sending electronic mail.
 - 2.F.02.04 List and demonstrate ways to create, edit, and format a signature for electronic mail.
 - 2.F.02.05 Describe and demonstrate inviting recipients to an appointment or meeting.
 - 2.F.02.06 Describe and demonstrate formatting, sharing, and sending a calendar.

2.F.02 Performance Examples:

- Students will create a distribution list or contact group for purposes of sending out messages.
- Students will create an event using a calendar and invite attendees with an attached agenda.
- Students will create folders for purposes of managing incoming and outgoing messages.

2.G Essentials of Social Media and Website Design

- 2.G.01 Plan, create, edit, and manage a social media site.
- 2.G.01.01 Describe the purpose of social media sites.
 - 2.G.01.02 Explain concerns relating to privacy and security.
 - 2.G.01.03 Describe and develop a social media strategy for a business.
 - 2.G.01.04 Illustrate ways to utilize and manage social media sites according to current industry, legal, and ethical professional standards.

2.G.01 Performance Examples:

- Students will develop and maintain a classroom blog for a specific situation or activity.
- Students will interview a business person to discern how social media is used to market a business.

- 2.G.02 Plan, create, edit, and manage a website.
- 2.G.02.01 Describe how to obtain a domain name and host a website.
 - 2.G.02.02 Define the target audience and identify the primary purpose of the site.
 - 2.G.02.03 Describe and demonstrate basic website design concepts.
 - 2.G.02.04 Distinguish between the various methods of developing a website.
 - 2.G.02.05 List and describe ways to create a storyboard to plan for a website.
 - 2.G.02.06 Create both internal and external hyperlinks.
 - 2.G.02.07 Insert graphics, tables, audio, and video in a website.
 - 2.G.02.08 Upload a web page to a web server.
 - 2.G.02.09 Identify and explain the laws restricting use of copyrighted material.
 - 2.G.02.10 Manage and update a website.

2.G.02 Performance Examples:

- Students will utilize Hypertext Markup Language (HTML) code to create or recreate a basic website.
- Students will plan, create and manage a website for a simulated business.
- Students will design a website for an event or activity taking place in school or in the community.

2.H Essentials of Database Administration

2.H.01 Create, edit, format, and print information in a database.

- 2.H.01.01 Create, edit, format and tables.
- 2.H.01.02 Enter, manipulate, and delete information in datasheet and design view.
- 2.H.01.03 Modify field properties and set a primary key.
- 2.H.01.04 Join and establish relationships between tables.
- 2.H.01.05 Create, edit, format and customize a form.
- 2.H.01.06 Enter, manipulate and delete information in datasheet and form view.
- 2.H.01.07 Create, edit, format and customize a query.
- 2.H.01.08 Utilize a parameter and a crosstab query in a database.
- 2.H.01.09 Create, edit, format and customize a report.

2.H.01 Performance Examples:

- Students will create a database to store names and addresses of contacts.
- Student will build a query to run a search on their contacts, for specific criteria.

2.H.02 Utilize advanced database management features.

- 2.H.02.01 Create and use wildcards in specifying criteria.
- 2.H.02.02 Describe and demonstrate the advanced use of multiple data types.
- 2.H.02.03 Apply a sort and filter to a table, form, report and query.
- 2.H.02.04 Use function tools to perform calculations in a table.
- 2.H.02.05 Utilize calculated fields in a form, query and report.
- 2.H.02.06 Differentiate between the various ways to print information in a database.

2.H.02 Performance Examples:

- Students will create a database for a mail merge.
- Students will design and implement a database for a simulated business.
- Students will utilize forms, queries and reports to enter and extract specific business information.

- 2.H.02.07 Integrate a database with other applications.

2.I Essentials of Spreadsheet Development

2.I.01 Create, edit, format and print a spreadsheet.

- 2.I.01.01 Enter, edit, format and proofread data in rows and columns.
- 2.I.01.02 Differentiate between the various ways to view a spreadsheet.
- 2.I.01.03 Describe and demonstrate the use of page orientation and setting margins.
- 2.I.01.04 Format a spreadsheet using borders, shading, headers and footers.
- 2.I.01.05 Apply conditional formatting to data in a spreadsheet.
- 2.I.01.06 Demonstrate how to link information on a spreadsheet.
- 2.I.01.07 Differentiate between the various ways to print a spreadsheet.

2.I.01 Performance Examples:

- Students will build a spreadsheet to store names and addresses of contacts.
- Student will filter information in a spreadsheet, to show specific information.

- 2.I.02 Insert elements and other items into a spreadsheet.
 - 2.I.02.01 Create, insert and format graphics and pictures in a spreadsheet.
 - 2.I.02.02 Create, insert and format a chart and a pivot table in a spreadsheet.
 - 2.I.02.03 Insert internal and external hyperlinks.

- 2.I.02 Performance Examples:
 - Students will create data for a fictitious company, and then generate a pivot table.
 - Students will utilize hyperlinks in a spreadsheet to link to outside information.

- 2.I.03 Utilize advanced spreadsheet development features.
 - 2.I.03.01 Utilize the comments feature to review and collaborate on a spreadsheet.
 - 2.I.03.02 Create, insert and format a simple and custom sort.
 - 2.I.03.03 Create, insert and format a basic, advanced and custom filter.
 - 2.I.03.04 Utilize advanced features to automate, integrate and share information.
 - 2.I.03.05 Create, insert and format simple and complex formulas.
 - 2.I.03.06 Create, insert and format simple and nested functions.
 - 2.I.03.07 Describe and use relative and absolute referencing.
 - 2.I.03.08 Build formulas or functions that link to other worksheets.
 - 2.I.03.09 Utilize named ranges for data management, formulas and functions.
 - 2.I.03.10 Differentiate between the various ways to protect a spreadsheet.

- 2.I.03 Performance Examples:
 - Students will create a customer list for a simulated business and apply sorts and filters.
 - Students will develop a budget for a simulated business, business project, or personal scenario.
 - Students will create quarterly sales spreadsheets and charts linking to annual data in other locations.

2.J Essentials of Document Processing

- 2.J.01 Create, edit, format and print a document.
 - 2.J.01.01 Enter, edit, format and proofread text in a document.
 - 2.J.01.02 Differentiate between the various ways to view a document.
 - 2.J.01.03 Describe and demonstrate the use of page orientation and setting margins.
 - 2.J.01.04 Format documents using columns, borders and shading.
 - 2.J.01.05 Format documents using bullets, numbering and multilevel lists.
 - 2.J.01.06 Describe and demonstrate the use of page breaks and section breaks.
 - 2.J.01.07 Apply and edit headers, footers and page numbering in a document.
 - 2.J.01.08 Describe and demonstrate the use of tabs and setting tab stops.
 - 2.J.01.09 Create, save and utilize a document template.
 - 2.J.01.10 Differentiate between the various ways to print a document.

- 2.J.01 Performance Examples:
 - Students will type out a ten page document, and then number the pages accordingly.
 - Students will generate a form for a business and then save it as a template.

- 2.J.02 Insert elements into a document.
 - 2.J.02.01 Create, edit and format a table and information in a table.
 - 2.J.02.02 Illustrate ways to enter, edit and sort information in a table.
 - 2.J.02.03 Perform basic mathematical calculations in a table.
 - 2.J.02.04 Create, insert and format charts, graphics and pictures in a document.
 - 2.J.02.05 Illustrate ways to insert internal and external hyperlinks.

- 2.J.02 Performance Examples:
 - Students will add a table into a document, and then insert a formula.
 - Students will add a chart into a document, displaying information visually.

- 2.J.03 Utilize advanced document processing features.
- 2.J.03.01 Utilize track changes and comments to review and collaborate on a document.
 - 2.J.03.02 Describe and demonstrate the various ways to perform a mail merge.
 - 2.J.03.03 Create, edit and format reference features in a document.
 - 2.J.03.04 Differentiate between the various ways to protect a document.
 - 2.J.03.05 Create, edit and format forms and protect a document accordingly.

2.J.03 Performance Examples:

- Students will design, implement and maintain a brochure and monthly newsletter for their school.
- Students will create business letters, memorandums, and reports with tables, for a simulated business.
- Prepare conference materials, registration forms, and evaluation forms for an event.

2.K Essentials of Presentation Management

- 2.K.01 Create, edit, format and print a presentation.
- 2.K.01.01 Describe the ways to create, edit, format and proofread slides in a presentation.
 - 2.K.01.02 Differentiate between the various ways to view a presentation.
 - 2.K.01.03 Describe and demonstrate the use of page orientation and setting margins.
 - 2.K.01.04 Format a presentation using bullets, slide layouts, headers and footers.
 - 2.K.01.05 Format a presentation using templates and themes.
 - 2.K.01.06 Differentiate between the various ways to print a presentation.

2.K.01 Performance Examples:

- Students will insert a custom footer into a presentation, displaying the title.
- Students will create their own unique design theme for a presentation.

- 2.K.02 Insert elements and other items into a presentation.
- 2.K.02.01 Create, edit and format information in a table.
 - 2.K.02.02 Create, insert and format charts, graphics and pictures in a presentation.
 - 2.K.02.03 Insert internal and external links.

2.K.02 Performance Examples:

- Students will create a presentation for a simulated school club they would like to develop.
- Students will create a presentation to compare and review similar products for purchasing.
- Students will create a training presentation for an audience of students in which a skill is taught.

- 2.K.03 Utilize advanced presentation management features.
- 2.K.03.01 Utilize the comments feature to review and collaborate on a presentation.
 - 2.K.03.02 Apply animation and slide transition tools on a presentation.
 - 2.K.03.03 Convert a presentation to be viewed on all types of technology and media.
 - 2.K.03.04 Differentiate between the various devices used in delivering a presentation.
 - 2.K.03.05 List and demonstrate ways to effectively present and communicate a presentation.

2.K.03 Performance Example:

- Students will collaborate with another student on their presentation, making comments.
- Students will format a presentation to be displayed on a projector in class.

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.C.01.02 2.C.01.04 2.C.02.06.	W1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
2.C.01.02 2.C.01.04 2.C.02.06	W2	Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
2.C.01.02 2.C.01.04 2.C.02.06	W4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
2.C.01.02 2.C.01.04 2.C.02.06	W5	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
2.C.01.02 2.C.01.04 2.C.02.06	W6	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
2.C.01.02 2.C.01.04 2.C.02.06	W7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
2.C.01.02 2.C.01.04 2.C.02.06	W8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
<p>Performance Example(s): Students will create a business plan, which will be a long term project (a suggested resource for this project is the Small Business Administration's website).</p>		
2.C.03.05 2.C.03.07	L3	Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.
2.C.03.05 2.C.03.07	L6	Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
<p>Performance Example(s): Students will be assigned a business name, and each student will create informational material, such as brochures, business cards, flyers, etc., for said business.</p>		

2.C.03.05 2.C.03.07	RH7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the <u>subject under investigation</u> .
2.C.03.05 2.C.03.07	RST7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
<p>Performance Example(s): Students will be assigned to a team, and each team will develop promotional materials for a business, in which at the end of the project each team will present their findings.</p>		
2.E.01.02 2.E.01.03 2.E.02.01 2.E.02.02 2.E.02.03 2.E.03.02	W1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
2.E.01.02 2.E.01.03 2.E.02.01 2.E.02.02 2.E.02.03 2.E.03.02	W2	Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
2.E.01.02 2.E.01.03 2.E.02.01 2.E.02.02 2.E.02.03 2.E.03.02	W9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
2.E.01.02 2.E.01.03 2.E.02.01 2.E.02.02 2.E.02.03 2.E.03.02	W10	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.
2.E.01.02 2.E.01.03 2.E.02.01 2.E.02.02 2.E.02.03 2.E.03.02	RI2	Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.
2.E.01.02 2.E.01.03 2.E.02.01 2.E.02.02 2.E.02.03 2.E.03.02	RI4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper).
<p>Performance Example(s): After receiving a listing of ten types of financial institutions, accounts and securities, students will choose five to research, and then create informational brochures using their desktop publishing skills. Students will maintain for thirty calendar days, a listing of all their personal purchases and at the end of the month students will place their purchases in columns deemed WANT and NEEDS and summarize the results in a brief essay.</p>		

Select a consumer item from the past fifty years that was in high demand, and research how the item has fared since, developing a presentation on the findings.		
2.G.01.02	W8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
Performance Example(s): Students will report on three major concerns relating to Internet security and privacy. Students will procure an article on each concern and share this information with the class.		
2.G.01 2.G.02 2.G.02.02 2.G.02.03	WHST4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
2.G.01 2.G.02 2.G.02.02 2.G.02.03	WHST5	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
2.G.01 2.G.02 2.G.02.02 2.G.02.03	WHST6	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
Performance Example(s): Students will create, edit and manage a newly created social media site for their Office and Business Technology class, and also will develop, edit and manage a website for a particular niche.		
2.G.02.09	W7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
2.G.02.09	W8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation
Performance Example(s): Students will work with their history classes and will research a unique Supreme Court cases that deal with copyrighted material and intellectual property, and then the students will develop an essay that explains that particular case about the decision.		
2.J.01.01	L1	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
2.J.01.01	L2	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
Performance Example(s): Students will write three drafts of a cover letter, resume, and a letter of recommendation for a classmate.		
2.J.02.04	WHST2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
Performance Example(s): Students will create a survey that they will administer to their classmates. They will report on the results to their classmates by creating a PowerPoint with one chart, three graphics and four pictures inserted.		

2.K.01.01 2.K.02.01 2.K.02.02	WHST4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
2.K.01.01 2.K.02.01 2.K.02.02	WHST5	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
2.K.01.01 2.K.02.01 2.K.02.02	WHST6	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
Performance Example(s): Students will work in a team to build and peer edit slides in a presentation.		
2.K.01.01 2.K.02.01 2.K.02.02	SL5	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
Performance Example(s): Students will create, peer edit and format information in a table within a presentation.		
2.K.02.02	RH7	Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text.
Performance Example(s): Students will create a multiple slide presentation on an historical event from history, which will consist of a chart, several graphical elements and multimedia.		
2.K.03.05	SL2	Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.
2.K.03.05	SL4	Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.
2.K.03.05	SL5	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
Performance Example(s): Over the course of the school year students will do at least one presentation each term, in which students will be assigned the topic, but must select an application used to create the work.		
2.F.01.02	WHST4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
2.F.01.02	WHST5	With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.
2.F.01.02	WHST6	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
Performance Example(s): Students will peer edit a memorandum to be sent by email, analyzing tone, effective format.		

Embedded Mathematics

CVTE Learning Standard Number	Math Content Conceptual Category and Domain Code Learning Standard Number	Text of Mathematics Learning Standard
2.B.02.03 2.C.03.02 2.D.03.01 2.E.01.01 2.E.01.04 2.E.01.05 2.J.02.03	7.NS.A.3 5.MD.A.1 5.MD.B.2 9-12.MD.B.5	<p>Solve real-world and mathematical problems involving the four operations with rational numbers.</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>Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Use operations on fractions for this grade to solve problems involving information presented in line plots</p> <p>Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.</p>
<p>Performance Example(s):</p> <p>Students will demonstrate the ability to use mathematical operations to plan a business trip.</p> <p>Students will accurately use decimals, percents and fractions in making financial calculations.</p> <p>Students will prepare a personal budget to record income and use aspects probability to predict expense items for the future.</p> <p>Students will use proper number sense skills when working on accounting tasks.</p>		
2.D.01.02 2.E.01.05 2.E.03.02 2.E.03.05	6.NS.C.5 7.EE.B.3	<p>Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.</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.</p> <p>Apply properties of operations 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>Performance Example(s):</p> <p>Students will properly learn how to use negative and positive numbers to maintain, analyze and record entries into a checkbook.</p> <p>Students will be able to represent financial information in multi-types of graphs, such as line graphs, bar graphs etc.</p> <p>Students will use integers to represent real-life situations, such as credits and debits.</p>		
2.D.02.02	6.NS.C.7b 6.NS.C.7c 6.NS.C.7d 5.MD.A.1 5.MD.B.2 6.EE.B.8 9-12.MD.B.5	<p>Write, interpret, and explain statements of order for rational numbers in real-world contexts. <i>For example, write $-3^{\circ}\text{C} > -7^{\circ}\text{C}$ to express the fact that -3°C is warmer than -7°C.</i></p> <p>Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. <i>For example, for an account balance of -30 dollars, write $-30 = 30$ to describe the size of the debt in dollars.</i></p> <p>Distinguish comparisons of absolute value from statements about order. <i>For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars.</i></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</p>

		<p>these conversions in solving multi-step, real world problems.</p> <p>Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Use operations on fractions for this grade to solve problems involving information presented in line plots.</p> <p>Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.</p> <p>Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.</p>
<p>Performance Example(s):</p> <p>Students will be able to utilize inequalities to compare data.</p> <p>Students will be able to make comparisons of numerical data using absolute value.</p> <p>Students will determine the possible outcomes of a decision using probabilities of data and finding expected values.</p>		
<p>2.E.02</p> <p>2.H.01.01</p> <p>2.H.01.02</p> <p>2.H.01.04</p> <p>2.I.03.05</p> <p>2.I.03.09</p> <p>2.J.02.03</p> <p>2.K.02.02</p>	<p>5.MD.A.1</p> <p>5.MD.B.2</p> <p>6.EE.C.9</p> <p>8.EE.B.5</p> <p>9-12.MD.A.1</p> <p>9-12.MD.B.5</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>Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Use operations on fractions for this grade to solve problems involving information presented in line plots</p> <p>Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation</p> <p>Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.</p> <p>Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.</p> <p>Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.</p>
<p>Performance Example:</p> <p>Students will be able to compare financial information in multi-types of graphs, such as line graphs, bar graphs etc.</p> <p>Students will create, use and format simple and complex algebraic and geometric formulas.</p> <p>Students will understand mathematical functions and how they can be used to determine financial data.</p> <p>Students will be able to make a draft using patterns of symmetry, ratios, proportions, and measurements when creating different types of presentations.</p> <p>Students will be able to construct and design a sketch of a basic work piece that has measurements that are mathematically accurate.</p> <p>Using knowledge of geometric figures, such as computing actual lengths and areas from a scale drawing, students will apply it to a particular work project.</p>		

Embedded Science and Technology/Engineering

Earth and Space Science

CVTE Learning Standard Number	Subject Area, Topic Heading and Learning Standard Number	Text of Earth and Space Science Learning Standard
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Life Science (Biology)

CVTE Learning Standard Number	Subject Area, Topic Heading and Learning Standard Number	Text of Biology Learning Standard
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Physical Science (Chemistry)

CVTE Learning Standard Number	Subject Area, Topic Heading and Learning Standard Number	Text of Chemistry Learning Standard
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Physical Science (Physics)

CVTE Learning Standard Number	Subject Area, Topic Heading and Learning Standard Number	Text of Physics Learning Standard
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Technology/Engineering

CVTE Learning Standard Number	Subject Area, Topic Heading and Learning Standard Number	Text of Technology/Engineering Learning Standard
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CVTE Learning Standard Number	Subject Area, Topic Heading and Learning Standard Number	Text of Scientific Inquiry Skills Standard Science Frameworks not separated
2.A.01.04	TECH/ENG 2.6	The purposes of zoning laws and building codes in the design and use of structures.
Performance Examples: With a partner, students will identify some concerns that a homeowner may have about a small business		

<p>opening in the neighborhood. Students will interview area business owners about the impact of local, state, and federal laws on their business decisions.</p>		
2.A.02.02	SIS1	Describe and demonstrate the decision making process Make observations, raise questions, and formulate hypotheses. Observe the world from a scientific perspective. Pose questions and form hypotheses based on personal observations, scientific articles, experiments, and knowledge.
<p>Performance Examples: Given a problem or issue at school, students will use the decision making process to find a solution. Given a choice between two different positions, the students will utilize the decision making process to analyze the positives and negatives associated with each choice before making a decision.</p>		
2.A.03.01	BIO 6.1 BIO 6.2	Describe and demonstrate effective marketing and promotion skills. Birth, death, immigration, and emigration influence population size. Changes in population size and biodiversity result from a variety of influences.
<p>Performance Example: Students will find the percentage of the population that would represent the target market for their business plan. Students will discuss how target market might be influenced by changes in a variety of conditions.</p>		
2.A.03.03	SIS2 SIS4 TECH/ENG 1.1 TECH/ENG 7.1	Identify the steps of product development. Design and conduct scientific investigations. Select required materials, equipment, and conditions for conducting an experiment. Communicate and apply the results of scientific investigations. Use language and vocabulary appropriately, speak clearly and logically, and use appropriate technology (e.g., presentation software) and other tools to present findings. Steps of the engineering design process.
<p>Performance Examples: Given miscellaneous objects, a team of students will create a new product giving the product a name, purpose and present new product to the class. Students will identify the want or need that satisfies a list of inventions. Students will invent a new product or service that satisfies a consumer want or need.</p>		
2.B.01.01	SIS3	Illustrate ways to prepare and create a chart of accounts. Analyze and interpret results of scientific investigations. Represent data and relationships between and among variables in charts and graphs. Use appropriate technology (e.g., graphing software) and other tools.
<p>Performance Example: Students will create a chart of accounts for a service business.</p>		
2.B.02.05	SIS3 SIS4	Analyze and interpret results of scientific investigations. Represent data and relationships between and among variables in charts and graphs. Use appropriate technology (e.g., graphing software) and other tools. Communicate and apply the results of scientific investigations. Explain diagrams and charts that represent relationships of variables.
<p>Performance Examples: Given net salary amounts, students will calculate federal, state, and Medicare taxes. Students will prepare a spreadsheet for payroll including all formulas for withholding taxes for a small business with at least twelve employees.</p>		
2.C.01.01	CHEM 5.6 SIS3	Percent yield in a chemical reaction. Analyze and interpret results of scientific investigations. Use mathematical operations to analyze and interpret data results.
<p>Performance Example: Students will conduct a market research survey and analyze results using a graph to represent results and using decimals, percentages and fractions.</p>		
2.D.01.01	TECH/ENG 6.1	Information travels through various media.

Performance Examples: Students will be able to describe how companies use social media to advertise. Students will create an advertisement to be used on a social media site.		
2.D.02.05	TECH/ENG 1.3	Multi-view drawings and pictorial drawings are produced using various techniques.
Performance Example: Given a topic to research, students will design a storyboard to organize information for presentation.		
2.D.02.07	SIS3	Analyze and interpret results of scientific investigations. Use appropriate technology (e.g., graphing software) and other tools.
Performance Example: Students will create a website to present their business using graphics, tables, audio and video tools.		
2.E.01.07	SIS3	Analyze and interpret results of scientific investigations. Represent data and relationships between and among variables in charts and graphs. Assess the reliability of data and identify reasons for inconsistent results, such as sources of error or uncontrolled conditions.
Performance Example: Using a database, students will create a query that will extrapolate the necessary information to make an informed business decision.		
2.E.02.04	SIS3 SIS4	Analyze and interpret results of scientific investigations. Use appropriate technology (e.g., graphing software) and other tools. Use mathematical operations to analyze and interpret data results. Communicate and apply the results of scientific investigations. Review information, explain statistical analysis, and summarize data collected and analyzed as the result of an investigation.
Performance Examples: Students will prepare a spreadsheet to calculate the annual total and average sales for a business. Students will create a graph that compares sales to the previous year and interpret the results.		
2.F.02.02	PHYS 1.3	Graphs of 1-dimensional motion.
Performance Examples: Students will prepare a spreadsheet to calculate the annual total and average sales for a business. Students will create a graph that compares sales to the previous year and interpret the results.		
2.J.01.02	SIS4	Communicate and apply the results of scientific investigations. Use language and vocabulary appropriately, speak clearly and logically, and use appropriate technology (e.g., presentation software) and other tools to present findings.
Performance Examples: Students will create a customer satisfaction survey for their business. Students will role play an interaction with a difficult customer, both on the phone and in person. Students will respond appropriately to an email from a dissatisfied customer.		
2.J.01.11	BIO 4.5 SIS2	The muscular/skeletal system supports the body and allows for movement. Bones produce blood cells. Design and conduct scientific investigations. Follow all of the safety guidelines.
Performance Examples: Students will complete CareerSafe training and Illustrate proper body mechanics for the workplace including ergonomics. Students will research the effects of various ailments caused by improper body mechanics and ways to prevent these problems.		
2.J.01.16	CHEM 6.5	There is a natural tendency for systems to move in a direction of disorder or randomness (entropy).
Performance Examples: Students will prioritize a set of tasks and set a schedule to complete the tasks.		

Students will adhere to assigned project deadlines.		
2.J.01.20	SIS3 TECH/ENG 1.2	Analyze and interpret results of scientific investigations. Use appropriate technology (e.g., graphing software) and other tools. The engineering design process is used to solve problems, advance society, and modify technologies, objects, and processes.
Performance Example: Given a problem, students will utilize the proper technology tools to present a visual clear and concise solution to the problem for the staff.		
2.J.01.22	SIS2 ES 2.1	Design and conduct scientific investigations, and follow of the safety guidelines. Renewable energy resources and nonrenewable energy resources.
Performance Examples: Students will develop policies to make a business more energy efficient and eco-friendly. Students will create guidelines for safe and proper use of technology in the workplace.		

DESE Statewide Articulation Agreements

ARTICULATION AGREEMENT

Between

Massachusetts Community Colleges

And

Massachusetts Chapter 74-Approved Secondary
Career/Vocational Technical Business Technology 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)

1. Microsoft Office Specialist:
 - Microsoft PowerPoint (during Freshmen year)
 - Microsoft Word (during Sophomore year)
 - Microsoft Excel (during Junior year)
 - Microsoft Access (during Senior year)
 - Microsoft Outlook (optional certification)
 - Microsoft Office 365 (optional certification)
2. Microsoft Office Expert:
 - Microsoft Word Expert (during Sophomore year)
 - Microsoft Excel Expert (during Junior year)
3. Microsoft Office Master:
 - This certification is obtained by completing all of the following listed above.
4. Intuit QuickBooks Certified User, which involves taking and passing the Intuit QuickBooks Certification Test (during senior year).
5. Adobe Certified Associate, which involves taking and passing the Adobe Photoshop Certification Test (optional certification).
6. National Professional Certification in Customer Service (optional certification).

NOTE: There are multiple companies that provide these exams, and keep in mind as time progresses the versions of the software mentioned above will advance.

Other

Reference Materials

- “Leading With Character,” by Farmer, Farmer and Burrows, Thompson Publishing, 2008
- “Personal Financial Literacy,” by Joan S. Ryan, South-Western Publishing, 2012
- “Entrepreneurship Ideas in Action,” by Cynthia L. Greene, South-Western Publishing, 2012
- “Managing Personal Finances,” by Joan S. Ryan, South-Western Publishing, 2010
- “Business Math Using Excel,” by Burton & Shelton, South-Western Publishing, 2005
- “Century 21 Accounting, by Gilbertson & Lenman, South-Western Publishing, 2009
- “Automated Accounting,” by Allen & Klooster, Thompson Publishing, 2003
- “Intro to Business,” by Dlabay, Burrow & Kleinal, South-Western Publishing, 2009
- “Personal Financial Literacy,” by Joan S. Ryan, South-Western Publishing, 2012
- “Entrepreneurship Ideas in Action,” by Cynthia L. Greene, South-Western Publishing, 2012
- “Managing Personal Finances,” by Joan S. Ryan, South-Western Publishing, 2010
- “Century 21 Accounting, by Gilbertson & Lenman, South-Western Publishing, 2009
- “Intro to Business,” by Dlabay, Burrow & Kleinal, South-Western Publishing, 2009

Related National, Regional, and State Professional Organizations

- Small Business Association

Student Organizations

- SkillsUSA: www.SkillsUSA.org
- State Chapter of SkillsUSA: www.MASkillsUSA.org
- DECA: www.DECA.org
- State Chapter of DECA: www.MassDECA.org
- Business Professionals of America: www.BPA.org
- State Chapter of Business Professionals of America: www.MABPA.org

Selected Websites

- Small Business Administration: www.SBA.gov
- Entrepreneur and Business: www.Entrepreneur.com
- Entrepreneurship Online: www.Entrepreneurship.org
- Certification Information: www.CertiPort.com
- Microsoft Learning: www.microsoft.com/learning/en/us/default.aspx
- Customer Service: www.nrffoundation.com/content/certification-customer-service