Massachusetts Career Technical Education

Hospitality Management Framework

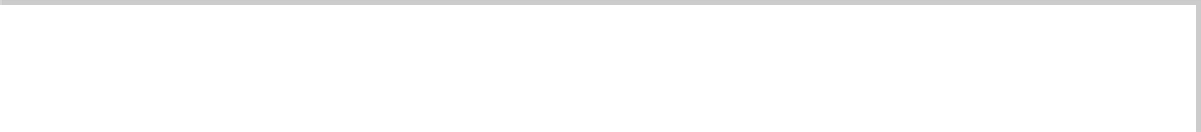
2014

This framework will be updated and included on the [Career-Connected Learning Hub.](http://www.macareerconnectedlearning.org) Visit the CCL Hub to register for an Employer or Educator Summit to provide feedback on the update , see the revision calendar, and access resources for this and other frameworks.

# [Strand 2: Technical Knowledge and Skills](#_bookmark0)

###### Safety in the Hospitality and Tourism Industry

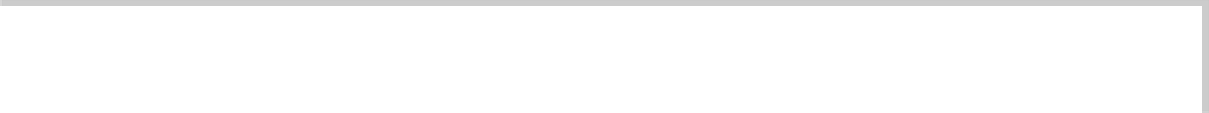
* + 1. Successfully complete and obtain National Restaurant Association ServSafe Food Safety certification.
       1. Complete National Restaurant Association ServSafe Food Safety certification requirements and receive a course completion certificate.



* + 1. Performance Example:
       - Using a form provided, students will conduct a sanitation self-inspection.
       - Students will create a poster listing Right to Know regulations, reporting hazards, and contact information for appropriate health and safety agencies.
    2. Successfully complete and obtain National Restaurant Association Massachusetts Food Allergen certification.
       1. Complete National Restaurant Association Massachusetts Food Allergen certification requirements and receive a course completion certificate.
    3. Successfully complete and obtain a 10-hour General Industry OSHA certification.
       1. Complete the requirements of OSHA 10-hour General Industry certification course and receive a course completion card.
    4. Successfully complete and obtain a CPR, Choke Saver and First Aid Training card.
       1. Complete the requirements of American Red Cross or American Heart Association Heart Saver First Aid, Choke Saver and CPR -AED certification and receive a course completion card.
    5. Successfully complete and obtain Alcohol Server certification.
       1. Complete the requirements of National Restaurant Association’s *ServSafe Alcohol* or Health Communications, Inc.’s *Training for Intervention Procedures (TIPS)* certification or similar program and receive course completion card.
    6. Follow safety and emergency procedures.
       1. Outline common causes of typical accidents and injuries in the hospitality and tourism industry.
       2. Practice work habits that provide personal safety, safety for others, and protect the safety and security of the external environment.
       3. Select and use appropriate personal protective equipment at all times.
       4. Maintain a sanitary and clutter-free work environment, following appropriate procedures in the hospitality and tourism industry.
       5. Monitor, use, store, and dispose of hazardous materials according to established procedures.
       6. Identify, describe and demonstrate the effective use of Safety Data Sheets (SDS).
       7. Demonstrate the proper use of a sanitizing solution, utilizing a test kit to assure safe and effective concentration levels.

###### Fundamentals of the Hospitality and Tourism Industry

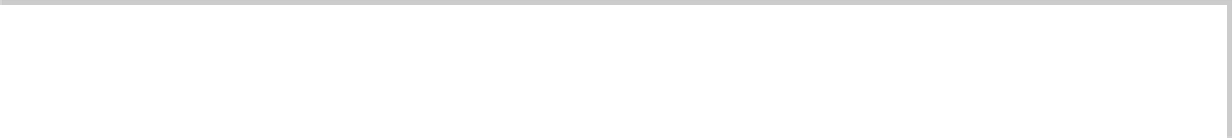
* + 1. Describe the components of the Hospitality and Tourism Industry.
       1. Describe and define the growth and development of the hospitality and tourism industry.
       2. Describe and define the role of lodging as a segment of the hospitality industry.
       3. Describe the role of food and beverage as a segment of the hospitality industry.
       4. Describe the role of recreation as a segment of the hospitality industry.
       5. Describe professional organizations and their contributions to the hospitality industry.
       6. Compare and contrast industry trade periodicals and other industry resources and utilize for information on current trends in industry.



* + 1. Performance Example:
       - Students will create a tri-fold display illustrating the four segments of the hospitality industry.
       - Students will create a list of 12 hospitality industry businesses that they have used or would like to use and organize them into the four segments of the hospitality industry.

###### Fundamentals of Customer/Guest Service

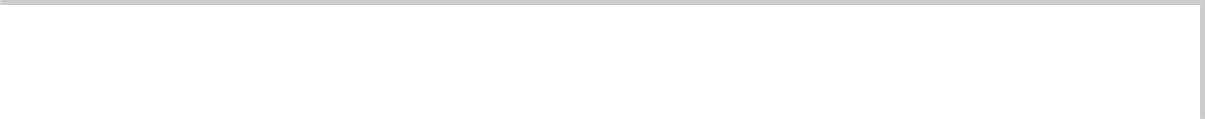
* + 1. Apply quality customer/guest service techniques.
       1. Evaluate the total customer experience and describe its importance to the hospitality and tourism industry.
       2. Discuss the importance of quality customer/guest service.
       3. Compare and contrast the functions of front-of-the-house and back-of-the- house.
       4. Recite and demonstrate characteristics of a customer/guest focused employee.
       5. Identify “Moments of Truth” in the delivery of quality customer/guest service.
       6. Recite and demonstrate key components of good communication skills.
       7. Describe and employ methods of handling customer/guest complaints through resolution.
       8. Differentiate between tangible and intangible products and service skills.
       9. Practice teamwork and identify barriers to the delivery of customer service.
       10. Discuss and formulate methods used to anticipate customer/guest needs including accommodations for the disabled guest.
       11. Demonstrate knowledge of the job as it relates to quality customer/guest service.



* + 1. Performance Example:
       - Students will role-play different scenarios to demonstrate how to handle customer complaints and anticipate customer needs.
       - Students will write an essay explaining the importance of customer service in the hospitality industry.

###### Fundamentals of the Hospitality and Tourism Industry on the Economy

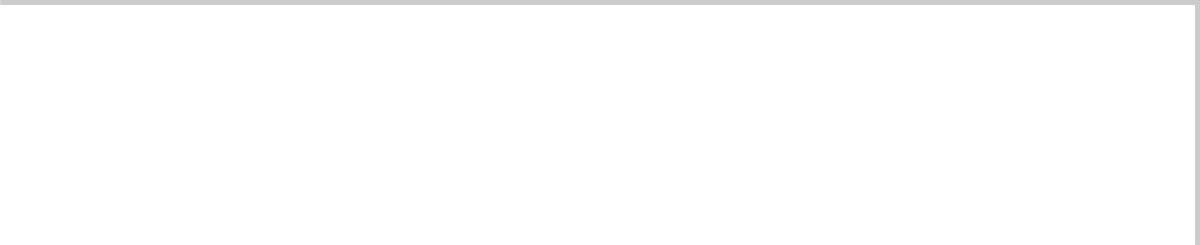
* + 1. Describe the impact of the Hospitality and Tourism Industry on the economy.
       1. Differentiate and classify destination markets.
       2. Interpret how demographics impact a hospitality operation.
       3. Compare and contrast various types of travel.
       4. Identify and locate local, regional, and world geography relating to destination markets.
       5. Define sustainability and the benefits of “going green”, citing examples in the hospitality and tourism industry.



* + 1. Performance Example:
       - Students will select a destination market and assemble a travel proposal for a convention.
       - Students will describe the impact Disney World has on the economy in Orlando and Florida.
       - Students will list examples of “going green” in the hospitality and tourism industry.

###### Fundamentals of Food and Beverage Management

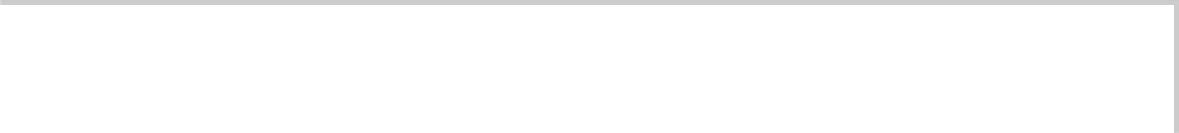
* + 1. Apply the fundamentals of Food and Beverage Service.
       1. Define terminology used in food & beverage service.
       2. Identify equipment in a commercial kitchen.
       3. Demonstrate hand tool and equipment operation, emphasizing technique.
       4. Outline beverage risk management and liability.



* + 1. Performance Example:
       - Students will prepare, operate, and clean a coffee station.
       - Students will demonstrate/illustrate a variety of table settings.
       - Students will set up service and take out stations.
       - Students will prepare a schematic for various banquet/meeting room set-ups.
       - Students will write a short essay in which they compare and contrast two different types of food and beverage businesses.
       - Students will design a menu using the following factors; taste, variety, appearance, nutrition and price.
    2. Demonstrate Dining Room/Room Service Activities.
       1. Perform duties of a dining room attendant/server.
       2. Assemble and maintain restaurant workstations for dining room service.
       3. Describe, demonstrate and differentiate between the types of service and table settings for dining room set-up.
       4. Distinguish and illustrate various types of dining room set-ups.
       5. Demonstrate tray service, coffee carts, special functions and room service.
       6. Apply menu knowledge using suggestive selling technique.
       7. Utilize various procedures for processing guest checks.
       8. Operate a Point of Sales System.
       9. Perform duties of a cashier, following all cash handling procedures.
       10. Perform duties of a host/hostess.
       11. Perform duties of a dining room supervisor.
       12. Organize, arrange and maintain hot and cold buffet service.
       13. Clean and sanitize work areas and stationary equipment.
    3. Demonstrate Quick Service Operations.
       1. Perform duties of a quick service attendant/server.
       2. Assemble, maintain and operate workstations for carryout/delivery service.
    4. Demonstrate Banquet and Catering Service.
       1. Describe the role and responsibilities of banquet/catering and special events personnel.
       2. Describe a banquet event order.
       3. Identify, describe and illustrate various types of banquet room set-ups.
       4. Coordinate and facilitate the efficient functioning of an event from a banquet event order.
       5. Execute duties of a banquet/catering server and special events personnel.
    5. Classify types of Institutional Food Service.
       1. Categorize the various facilities that fall into institutional dining.
       2. Describe the role and responsibilities of institutional food service personnel.
       3. Summarize Contract Management.
    6. Apply the fundamentals of menu planning and cost control.
       1. Analyze portion control as it relates to food cost.
       2. Research various cuisines and describe their relationship to the hospitality and tourism industry.
       3. Critique various types of menus.
       4. Prepare a variety of menus following dietary guidelines.

###### Fundamentals of Career Opportunities in the Food and Beverage Industry

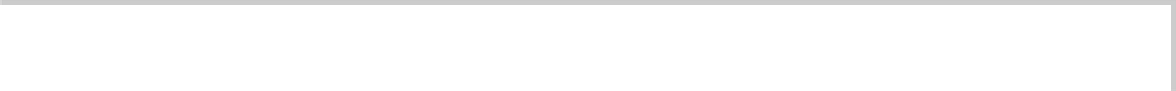
* + 1. Apply standards used in career opportunities, job descriptions and the reporting structure in the food and beverage industry.
       1. Illustrate an organizational chart of departments in a food and beverage property.
       2. Generate a job description defining the role and function of human resource personnel.
       3. Generate a job description defining the role and function of kitchen personnel.
       4. Generate a job description defining the role and function of dining room personnel.
       5. Generate a job description defining the role and function of banquet/catering personnel.
       6. Generate a job description defining the role and function of room service personnel.
       7. Generate a job description defining the role and function of quick serve personnel.
       8. Generate a job description defining the role and function of beverage personnel.



* + 1. Performance Example:
       - Given a list of job positions in a food and beverage organization, students will create a chart demonstrating the “chain of command”.
       - Given a list of personnel, students will create the corresponding job descriptions.

###### Fundamentals of the Lodging Industry

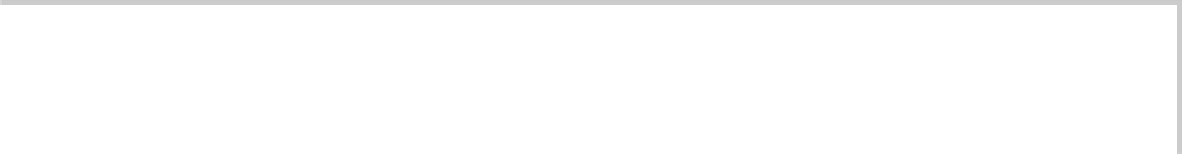
* + 1. Classify types of lodging businesses by category.
       1. Characterize types of full service properties.
       2. Characterize types of limited service properties.
       3. Characterize types of specialty accommodations.
       4. Characterize types of institutional housing.



* + 1. Performance Example:
       - Students will create a Venn diagram to compare and contrast three different lodging property types.

###### Fundamentals of Career Opportunities in the Lodging Industry

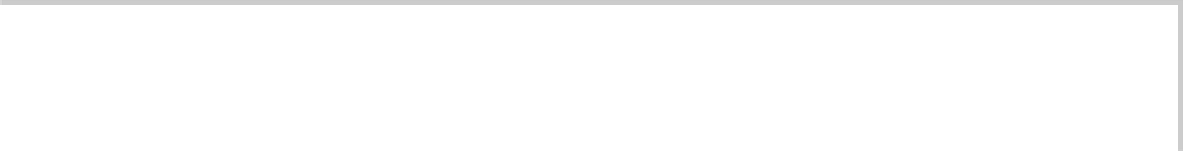
* + 1. Apply standards used in the career opportunities, job descriptions and the reporting structure in a lodging property.
       1. Create and illustrate an organizational chart of departments in a lodging property.
       2. Differentiate among the roles of departments and describe their importance to the entire property.
       3. Generate a job description defining the role and function of human resources personnel.
       4. Generate a job description defining the role and function of front office personnel.
       5. Generate a job description defining the role and function of front desk personnel.
       6. Generate a job description defining the role and function of guest services personnel.
       7. Generate a job description defining the role and function of reservations personnel.
       8. Generate a job description defining the role and function of sales personnel.
       9. Generate a job description defining the role and function of housekeeping personnel.
       10. Generate a job description defining the role and function of laundry personnel.
       11. Generate a job description defining the role and function of engineering/maintenance personnel.
       12. Generate a job description defining the role and function of security personnel.



* + 1. Performance Example:
       - Given a list of job positions in a lodging organization, students will create a chart demonstrating the “chain of command”.
       - Given a list of hospitality industry personnel, students will create the corresponding job descriptions.

###### Fundamentals of Operational Procedures that Support the Hospitality and Tourism Industry

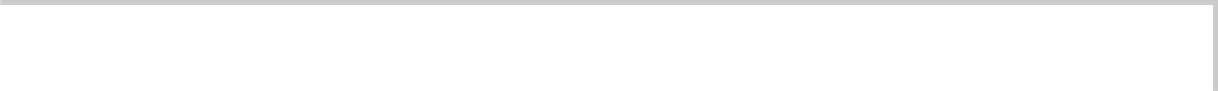
* + 1. Apply standard operating procedures in the Hospitality and Tourism Industry.
       1. State the importance of following the “Generally Accepted Accounting Principles”.
       2. Analyze and formulate the training needs of an organization by department.
       3. Construct an effective schedule based on the needs of an organization by department.
       4. Explain the inter-relationships between co-workers and supervisors, respecting diversity in the workplace.
       5. Identify strategies and techniques to satisfactorily handle internal employee relations.
       6. Explain the process/purpose of preventive maintenance.
       7. Outline the work order/maintenance request process.
       8. Summarize loss prevention and safety procedures for guests and personnel.
       9. Describe how to utilize a property management system to support the needs of the guest.



* + 1. Performance Example:
       - Given a specific event description, students will create a staffing schedule.
       - Given a specific problem scenario, students will complete a work order to remedy the issue.
       - Given a specific scenario, students will role-play solutions to handle internal employee relations/issues.

###### Fundamentals of Revenue and Support Centers

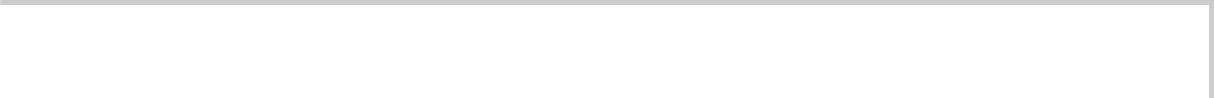
* + 1. Apply standards of revenue and support centers.
       1. Identify, compare and contrast the different types of revenue generating and support centers.
       2. Explain and tabulate labor cost.
       3. Categorize the different types of operating expenses.



* + 1. Performance Example:
       - Given a list of costs, students will identify which are considered fixed and which are considered variable costs and explain why.

###### Fundamentals of Hospitality Sales and Marketing

* + 1. Apply the fundamentals of Hospitality Sales and Marketing.
       1. Identify the basic principles of marketing.
       2. Analyze pricing in the hospitality industry.
       3. Recite the process of function booking.
       4. Evaluate how customer/guest needs influence marketing.
       5. Discuss place and distribution in the industry.
       6. Compare and contrast upgrading and up selling.
       7. Describe packaging and discount programming.
       8. Review marketing strategies including market segmentation and trend analysis.
       9. Develop a marketing plan.
       10. Assess the importance of product development in the hospitality industry.
       11. Demonstrate the basics of telephone sales skills and telemarketing.
       12. Examine promotion advertising including sales, merchandising, public relations and publicity.
       13. Describe and demonstrate social media strategies.



* + 1. Performance Example:
       - Given a specific scenario, students will create examples of package offers.
       - Given a specific scenario, students will design an advertisement for use on social media sites.

# [Embedded Academic Crosswalks](#_bookmark0)

### [Embedded English Language Arts and Literacy](#_bookmark0)

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| CTE  Learning Standard  Number | Strand Coding Designation  Grades ELAs Learning Standard  Number | Text of English Language Arts Learning Standard |
| 2.F. | WHST. 9 – 12.5 | 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  Performance Example:   * Using graphic organizers, students will create an organizational chart on the departments on a food and beverage property.   Students will create a flip chart defining job descriptions in the food industry demonstrating clear, concise, coherent writing. |
| 2.A, 2.D.,  2.E, 2.F. 2.G.,  2.H, 2.I, 2.J. | WHST. 6-12.4  WHST. 9-10.6  W. grades 9 -12.7 | Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.  Performance Example:   * Students will create a poster/collage/scrapbook/bulletin board defining and describing the fundamentals of domain specific information demonstrating command of conventions of standard English grammar and usage. * Students will produce a booklet/brochure for a career area school advertising the courses/workshops for training in various positions in the lodging industry. The product will include job descriptions, roles, and functions of the positions, using accurately domain specific words and phrases. |
| 2.K. |  | 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:   * Given domain specific information, students will write an appropriate advertisement for social media use.   Using technology, students will produce examples of package offers demonstrating concise, clear, coherent writing. |
| 2.D.01.02  2.E.04.04  2.I.01.02  2.J.01 | SL. Grades 6-12.6 | 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  Performance Example:  Given content specific information and scenarios, students will analyze and write a paper in which they articulate understanding of the topic with a clear focus, integrating information from multiple sources. |
| 2.B.01  2.D.04 |  | Adapt speech to a variety of contexts and tasks, demonstrating |
|  |  | command of formal English when indicated or appropriate  Performance Example:   * In a group “customer satisfaction” project, students will role-play satisfactory client consultations and other appropriate customer service skills that demonstrate active and reflective listening paying special   attention to customer preferences. |
| 2.E.04.03 |  | Audience  Performance Example:  Using content specific topics, students will create graphic organizers such as top-down webs and Venn diagrams demonstrating knowledge and understanding of the topic, using domain specific vocabulary. |
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### [Embedded Mathematics](#_bookmark0)

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| CTE  Learning Standard Number | Math Content Conceptual Category and Domain Code Learning Standard Number | Text of Mathematics Learning Standard |
| 2.E.02.05 | Number Sense and Operations 10 | 10.N.4 Use estimations to judge the reasonableness of results of computations and of solutions to problems involving real numbers  Performance Example:  When given several guest checks and the associated tips for service, students will be able to estimate if a fair gratuity (15-20%) was included. |
| 2.E.04.03;  2.E.02.10 | Measurement 10 | 10.M.1 Calculate perimeter, circumference, and area of common geometric figures such as parallelograms, trapezoids, circles, and  triangles.  Performance Example:   * Students will accurately design the layout for a large wedding in a banquet hall. They must include the area of the room, the dance floor, the DJ/band equipment (in the shape of a trapezoid), two buffet lines, beverage service area, small round table for cake; then based on the size of the room, estimate how many 10-foot   round tables would safely fit. |
| 2.C.01.10;  2.K.01.09; | Data Analysis, Statistics, and Probability 10 | 10.D.1 Select, create, and interpret an appropriate graphical representations (e.g., scatterplot, table, stem-and-leaf plots, box-and- whisker plots, circle graph, line graph, and line plot) for a set of data and use appropriate statistics (e.g., mean, median, range, and mode)  to communicate information about the data. Use these notions to compare different sets of data.  Performance Example:   * Students will analyze occupancy rates for a small hotel based on a monthly and weekly basis. Students will further study and look for trends based on weekday vs. weekend occupancy, holiday vs. non-holiday occupancy, and basic vs. deluxe accommodations. Students will graph data and draw conclusions about   peak seasons and suggest promotional ideas to increase occupancy during slower times. |
| 2.I.01.03 | Data Analysis, Statistics, and Probability 10 | 10.D.1 Select, create, and interpret an appropriate graphical representations (e.g., scatterplot, table, stem-and-leaf plots, box-and- whisker plots, circle graph, line graph, and line plot) for a set of data and use appropriate statistics (e.g., mean, median, range, and mode) to communicate information about the data. Use these notions to  compare different sets of data.  Performance Example:  Create and display employee schedule; collect data based on each employee’s individual timeliness and adherence to his/her own work schedule to be used as part of each person’s work review. |
| 2.E.06.01 | Patterns, relations, and algebra 10 | 10.P.6 Solve equations and inequalities including those involving absolute value of linear expressions (e.g., |x-2| > 5) and apply to the  solution of problems.  Performance Example:  Given a simple menu of 10 dinner selections, students will determine the offering that provides the greatest financial return and rate the remaining meals in order of most return to least return. |
| 2.C.01.10;  2.C.01.11 | Data Analysis, Statistics, and Probability | AI.D.3 Describe and explain how the relative sizes of a sample and the population affect the validity of predictions from a set of data Describe, complete, extend, analyze, generalize, and create a wide variety of patterns, including iterative and recursive patterns such as Pascal’s Triangle.   * + 1. Design surveys and apply random sampling techniques to avoid bias in the data collection     2. Select an appropriate graphical representation for a set of data and use appropriate statistics (e.g., quartile or percentile   distribution) to communicate information about the data  Performance Example:  Students will design and the display the results of a customer satisfaction survey based on restaurant, hotel, or other similar establishment. |
| 2.D.1 | Data Analysis, Statistics, and Probability 10 | Select, create, and interpret an appropriate graphical representation (e.g.,, scatter plot, table, stem-and-leaf plots, box-and-whisker plots, circle graph, line graph, and line plot) for a set of data and use appropriate statistics (e.g.,, mean, median, range, and mode) to communicate information about the data. Use these notions to compare different sets of data.  Approximate a line of best fit (trend line) given a set of data (e.g.,, scatterplot). Use technology when appropriate.  Performance Example:   * When given historical information on travel trends and/or energy costs students will be able to graphically represent the data and interpret how these trends relate to effective management in the tourism and   hospitality sector. |
| 2.E.06.01 | Patterns, Relations, and Algebra 10 | Solve everyday problems that can be modeled using systems of linear equations or inequalities. Apply algebraic and graphical  methods to the solution. Use technology when appropriate. Include mixture, rate, and work problems.  Performance Example:  Students will be able to quantify the cost of different menu items and relate the size of individual item portions to profitability using linear functions. |

### [Embedded Science and Technology/Engineering](#_bookmark0)

#### [Earth and Space Science](#_bookmark0)

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| CTE  Learning Standard Number | Subject Area, Topic Heading and Learning Standard Number | Text of Earth and Space Science Learning Standard |
| 2.D.01.04 | Mapping the Earth 1 | Recognize, interpret, and be able to create models of the earth’s  common physical features in various mapping representations, including contour maps.  Performance Example:   * Students will select a destination market and assemble a travel proposal for a convention. The proposal will include accurate, to-scale maps of the specific destination (e.g., Boston, MA) as well as maps with directions to area attractions beyond the convention site that may be of interest to attendees (e.g., Museum   of Fine Arts, U.S.S. Constitution, Union Oyster House). |
| 2.D.01.05 | Energy Resources in the Earth System 2.1 | Recognize, describe, and compare renewable energy resources (e.g.,, solar, wind, water, biomass) and nonrenewable energy resources (e.g., fossil fuels, nuclear energy).  Performance Example:  Students will investigate the return on investment for various types of hotels (e.g., 10 room bed and breakfast, 100 room inn, 2000 room hotel) on the installation of photovoltaic panels for electricity. |
| 2.D.01.05 | Energy Resources in the Earth System 2.2 | Describe the effects on the environment and on the carbon cycle of using both renewable and nonrenewable sources of energy.  Performance Example:   * Students will examine the feasibility of converting hotel airport shuttle vans to run on vegetable oil waste from the kitchen. Students will consider how much diesel fuel is used in a conventional engine, the cost of transitioning to an engine that burns waste oil from a professional/institutional kitchen, and the possible   customer appeal of the sustainable amenity. |

#### [Life Science (Biology)](#_bookmark0)

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| CTE  Learning Standard Number | Subject Area, Topic Heading and Learning Standard Number | Text of Biology Learning Standard |
| 2.A.04.01 | Systems in Living Things 6 | Identify the general functions of the major systems of the human body (digestion, respiration, reproduction, circulation, excretion,  protection from disease, and movement, control, and coordination) and describe ways that these systems interact with each other.  Performance Example:   * Students will study and practice to obtain Choke Saver and CPR certifications. In this process, they will be able to correctly identify aspects of human anatomy (such as various locations to find a person’s pulse) and physiology as well as the interrelated nature of the human system (i.e. explain why the lips and fingertips of   an unconscious person may turn blue and the appropriate first aid response for this scenario). |
| 2.A.04 | Anatomy and Physiology 4.2 | Explai Explain how the circulatory system (heart, arteries, veins, capillaries, red blood cells) transports nutrients and oxygen to cells and removes cell wastes. Describe how the kidneys and the liver are closely associated with the circulatory system as they perform the excretory function of removing waste from the blood. Recognize that kidneys remove nitrogenous wastes, and the liver removes many toxic compounds from blood.  Performance Example:  Students will describe from a specific, anatomical perspective as to why chest compressions are an integral part of CPR for a person suffering from cardiac arrest. |
| 2.A.05 &  2.E.01.04 | Anatomy and Physiology 4.4 | Explain how the nervous system (brain, spinal cord, sensory neurons, motor neurons) mediates communication among different parts of the body and mediates the body’s interactions with the environment. Identify the basic unit of the nervous system, the  neuron, and explain generally how it works.  Performance Example:   * Students will be able to describe the role of alcohol on the human nervous system. They will cite specific attributes an intoxicated person will demonstrate, and explain the physiological reason behind the   behavior (i.e. why is a person’s reaction time slowed?) |
| 2.D.01.05 | Ecology 6.4 | Explain how water, carbon, and nitrogen cycle between abiotic resources and organic matter in an ecosystem, and how oxygen cycles through photosynthesis and respiration.  Performance Example:   * Students will examine the cost savings (water & electricity) of a towel-reuse policy in a hotel, as well as the   implementation of various water saving devices such as rain barrel installation, and the use of gray water to maintain landscaping on a hotel or restaurant property. |
| 2A.01;  2.E.02.12 | Biology 2.3 | Use cellular evidence (e.g., cell structure, cell number, cell reproduction) and modes of nutrition to describe the six kingdoms (Archaebacteria, Eubacteria, Protista, Fungi, Plantae, Animalia).  Performance Example:   * Students will explain how the most common types of food borne illness originate. They will give examples of different types of food borne illnesses, provide the organism type, its cellular structure, and modes of reproduction. Students will then explain how to prevent contamination and methods for eradicating   infestations of various pests and pathogenic microbes. |
| 2.A.02;  2.E.06.04 | Anatomy and Physiology 4.7 | Recognize that communication among cells is required for coordination of body functions. The nerves communicate with electrochemical signals, hormones circulate through the blood, and  some cells produce signals to communicate only with nearby cells.  Performance Example:   * Students will accurately define the term “allergy” versus “food intolerance” and explain how the human body responds to foods in each situation. |

#### [Physical Science (Chemistry)](#_bookmark0)

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| CTE  Learning Standard Number | Subject Area, Topic Heading and Learning Standard Number | Text of Chemistry Learning Standard |
| 1.A.06.06 | Properties of Matter 1.1 | Identify and explain physical properties (i.e. density, melting point, conductivity, malleability) and chemical properties (i.e. the ability to form new substances). Distinguish between chemical and physical  changes.  Performance Example:  Students will correctly read and interpret information on an SDS to best protect themselves, their colleagues, and customers. |
| 2.A.01  2.E.02.13 | Solutions, Rates of Reaction, and Equilibrium 7.1 | Describe the process by which solutes dissolve in solvents.  Performance Example:  Students will accurately create a 10% bleach solution for disinfecting purposes and be able to identify the solute, solvent, and final solution in this endeavor. |
| 2.A.01 | Acids and Bases and  Oxidation- Reduction Reactions 8.2 | Relate hydrogen ion concentrations to the pH scale and to acidic,  basic, and neutral solutions. Compare and contrast various common acids and bases (e.g., vinegar, baking soda, soap, citrus juice).  Performance Example:  Students will explain why bacterial growth is inhibited in acidic environments. |

#### [Physical Science (Physics)](#_bookmark0)

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| CTE  Learning Standard Number | Subject Area, Topic Heading and Learning Standard Number | Text of Physics Learning Standard |
| 2.A.01 | Heat and Heat Transfer 3.1 | 3.1 Explain how heat energy is transferred by convection, conduction, and radiation  Performance Example:   * Students will explain the benefits of convection ovens over traditional ovens and describe various scenarios in which a food service director would need the use of convection ovens versus traditional oven settings. Students will additionally discuss the benefits of microwave ovens and radiation exposure to   minimize food borne illness. |
| 2.A. 01 | Heat and Heat Transfer 3.2 | Explain how heat energy will move from a higher temperature to a lower temperature until equilibrium is reached.  Performance Example:   * Students will accurately demonstrate how to take temperatures of prepared foods to ensure minimal food poisoning risk. Students will explain the rationale behind the criteria for each measurement (e.g., why   thermometers are inserted into the thickest part of meat, poultry, and fish). |

#### [Technology/Engineering](#_bookmark0)

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| CTE  Learning Standard Number | Subject Area, Topic Heading and Learning Standard Number | Text of Technology/Engineering Learning Standard |
| 2.E.01 | Materials, Tools, and Machines 1 | * 1. Given a design task, identify appropriate materials (e.g.,, wood, paper, plastic, aggregates, ceramics, metals, solvents, adhesives) based on specific properties and characteristics (e.g.,, strength, hardness, and flexibility).   2. Identify and explain appropriate measuring tools, hand tools, and power tools used to hold, lift, carry, fasten, and separate, and explain their safe and proper use.   3. Identify and explain the safe and proper use of measuring tools, hand tools, and machines (e.g.,, band saw, drill press, sander, hammer, screwdriver, pliers, tape measure, screws, nails, and other   mechanical fasteners) needed to construct a prototype of an engineering design.  Performance Example:   * Students will prepare, operate, and clean various stations including those for food and beverages; in addition, they will provide schematic designs and sample menus for large-scale events such as   conventions. |
| 2.E.02.04 | Engineering Design 2 | 2.2 Demonstrate methods of representing solutions to a design problem, e.g., sketches, orthographic projections, multiview drawings  Performance Example:   * In a role playing scenario, students will develop several different schematic arrangements for all the   materials needed at a wedding reception including: head table, guest tables, dance floor, buffet food service, beverage station, and area for band/DJ personnel and equipment. |
| 2.G.01 | Construction technologies 5 | 5.1 Describe and explain parts of a structure e.g., foundation, flooring, decking, wall, roofing systems  Performance Example:  Compare and contrast the various needs of each of the lodging business discussed in “2.G Fundamentals of the Lodging Industry” in terms of the structural parts noted above. |
| 2.K.01 | Communication Technologies 3 | 3.3 Identify and compare communications technologies and systems,  i.e. audio, visual, printed, and mass communication  Performance Example:   * Given a set budget, students will work in small groups to design an ad campaign to advertise their new restaurant in town. The goal is to identify their target market based on their business model, and to   advertise to as many of those individuals as possible without running over budget. |

[Industry Recognized Credentials](#_bookmark0) (Licenses and Certifications/Specialty Programs)

American Heart Association *CPR, Choke Saver, AED* and *First Aid*

American Hotel and Lodging Association

*Lodging Management Program* (yr. 1 & yr. 2) Health Communications, Inc. *TIPS*

National Restaurant Association *Pro-Start ®* (yr. 1 & yr. 2) National Restaurant Association *ServSafe Alcohol ®*Training

National Restaurant Association *ServSafe Food Safety Certification® Massachusetts Allergen Training Program Certification* supported by the National Restaurant Association

*OSHA 10-hour General Industry Certification Red Cross CPR, AED, Choke Saver* and *First Aid*