

**Maine Department of Education  
Career and Technical Education**

**Culinary Arts/Chef Training; Food Preparation (CIP: 12.0503; 12.0505)  
National Restaurant Association Education Foundation (NRAEF)  
Intersections with  
Maine College and Career Readiness Standards - Mathematics**

<p style="text-align: center;"><b>National Restaurant Association Education Foundation (NRAEF) Duties, Skills, and Tasks</b></p>	<p style="text-align: center;"><b>Math Content Standards And The Eight Mathematical Practices (CCSS)</b></p>	<p style="text-align: center;"><b>Demonstration of Proficiency</b> (Possible evidence, project, performance assessment, etc.)</p>	<p style="text-align: center;"><b>Maine Learning Results- Guiding Principles &amp; Career and Education Development</b> <i>(optional)</i></p>
<p><b>1. Overview of the Restaurant and Foodservice Industry</b></p>			
<p>a. Identify the two segments of the restaurant and foodservice industry, and give examples of businesses in each of them.</p> <p>b. Categorize the types of businesses that make up the travel and tourism industry.</p> <p>c. Outline the growth of the hospitality industry throughout the history of the world, emphasizing growth in the United States.</p> <p>d. List chefs who have made significant culinary contributions, and note their major accomplishments.</p> <p>e. List entrepreneurs who have influenced foodservice in the United States.</p> <p>f. Identify foodservice opportunities provided by the travel and tourism</p>	<p>c, f, k</p> <p><b>Math.HSS-IC</b> Understand and evaluate random processes underlying statistical experiments</p> <p><b>Math.HSS-ID</b> Interpret linear models</p> <p><b>Math Practice 2</b> Reason abstractly and quantitatively.</p> <p><b>Math Practice 3</b> Construct viable arguments and critique the reasoning of others.</p> <p><b>Math Practice 4</b> Model with mathematics.</p> <p><b>Math Practice 5</b> Use appropriate tools strategically.</p>	<p>Looking at data to help determine the growth of the hospitality industry and make inferences as to future growth. Using bar graphs to determine how many times you travel &lt;50 miles and the reasons you travel/how you travel and use the information to make future decisions.</p> <p>Attach values to factors that help determine ratings of food service establishments and use them to determine the rating</p>	

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<p>industry.</p> <p>g. Identify career opportunities offered by the travel and tourism industry.</p> <p>h. Identify the two major categories of jobs in the restaurant and foodservice industry.</p> <p>i. Name reasons why people travel.</p> <p>j. Describe the differences between leisure and business travelers.</p> <p>k. Identify national organizations that rate commercial lodging and foodservice establishments, and list factors used in making their rating judgments.</p> <p>l. List and describe the characteristic types of lodging operations.</p> <p>m. List and describe activities associated with front-desk operations.</p>			
<b>2. Keeping Food Safe</b>			
<p>a. Define what a foodborne-illness outbreak is, and list the costs associated with one</p> <p>b. Recognize risks associated with high-risk populations.</p> <p>c. Identify factors that affect the growth of pathogens (FAT TOM).</p> <p>d. Identify characteristics of TCS food and list examples.</p> <p>e. Identify methods for preventing biological contamination.</p> <p>f. List guidelines for storing chemicals safely.</p> <p>g. Recognize the need for food defense</p>	<p>a.</p> <p><b>Math.HSF-LE.A.3</b> Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.</p> <p><b>Math.HSF-LE.A.4</b> For exponential models, express as a logarithm the solution to <math>ab^{ct} = d</math> where <math>a</math>, <math>c</math>, and <math>d</math> are numbers and the base <math>b</math> is 2, 10 or <math>e</math>; evaluate the logarithm using technology.</p>	<p>a. Identifying bacteria growth (exponential growth) and when it reaches a certain level. Making a decision if the food is still safe.</p>	

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<p>systems. h. Identify the most common allergens and methods for preventing allergic reactions.</p> <p>i. Identify government agencies that regulate the restaurant and foodservice industry.</p> <p>j. List personal behaviors that can contaminate food.</p> <p>k. List the steps to proper handwashing, and identify when hands should be washed.</p> <p>l. Identify proper personal cleanliness practices and appropriate work attire.</p> <p>m. Identify ways to handle ready-to-eat food safely.</p> <p>n. Identify when food handlers should be prevented from working around food or from working in the operation.</p> <p>o. Identify ways to prevent cross-contamination.</p> <p>p. Identify ways to prevent time-temperature abuse.</p> <p>q. List different temperature-measuring devices and their uses.</p> <p>r. Identify characteristics of an approved food source.</p> <p>s. Identify criteria for accepting or rejecting food during receiving.</p> <p>t. Outline proper procedures for storing food.</p> <p>u. Identify the minimum internal temperature requirements for cooking various TCS food.</p> <p>v. Outline proper procedures for</p>	<p><b>Math.HSF-LE.B.5</b> Interpret the parameters in a linear or exponential function in terms of a context.</p> <p><b>Math.HSS-MD</b> Calculate expected values and use them to solve problems</p> <p><b>Math Practice 3</b> Construct viable arguments and critique the reasoning of others.</p> <p><b>Math Practice 4</b> Model with mathematics.</p>		

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<p>holding, cooling, and reheating TCS food.</p> <p>w. Identify ways to handle food ready for service.</p> <p>x. Outline proper procedures for preparing and serving food for off-site service.</p> <p>y. List the HACCP principles and explain their importance to food safety.</p> <p>z. Explain the difference between cleaning and sanitizing.</p> <p>aa. Outline proper procedures for cleaning and sanitizing tools and equipment.</p> <p>bb. Identify factors that affect the effectiveness of sanitizers.</p> <p>cc. List the elements of a master cleaning schedule.</p> <p>dd. Identify organizations that certify that equipment meets sanitation standards.</p> <p>ee. Outline proper procedures for managing pests.</p>			
<b>3. Workplace Safety</b>			
<p>a. State who is legally responsible for providing a safe environment and ensuring safe practices.</p> <p>b. Define the role of Occupational Safety and Health Administration regulations.</p> <p>c. State the Hazard Communication Standard requirements for employers.</p> <p>d. List the requirements for storing</p>			

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<p>hazardous chemicals in an operation.</p> <p>e. Explain the importance of general safety audits and safety training.</p> <p>f. Explain the importance of completing accident reports.</p> <p>g. Describe the purpose of an emergency plan.</p> <p>h. List ways to use protective clothing and equipment to prevent injuries.</p> <p>i. Identify electrical hazards that contribute to accidental fires.</p> <p>j. Classify different types of fires and fire extinguishers.</p> <p>k. Identify the cleaning frequency for equipment as a way to prevent fires.</p> <p>l. Outline the actions to take in the event of a fire at a restaurant or foodservice operation.</p> <p>m. Identify procedures for preventing slips, trips, and fall in a foodservice operation.</p> <p>n. Outline the procedure for cleaning up spills on floors.</p> <p>o. Demonstrate how to use ladders safely.</p> <p>p. Demonstrate proper lifting and carrying procedures to avoid injury.</p> <p>q. Demonstrate correct and safe use of knives.</p> <p>r. Outline basic first aid concepts and procedures.</p> <p>s. Recognize the importance of locking doors.</p>			

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<b>4. Kitchen Essentials 1</b>			
<p>a. Define professionalism, and explain what it means to culinary professionals.</p> <p>b. List the stations and positions in the kitchen brigade and the dining brigade.</p> <p>c. Perform basic math calculations using numbers or fractions.</p> <p>d. Identify the components and functions of a standardized recipe.</p> <p>e. Convert recipes to yield smaller and larger quantities based on operational needs.</p> <p>f. Explain the difference between customary and metric measurement units, and convert units between the two systems.</p> <p>g. Demonstrate measuring and portioning using the appropriate small wares and utensils.</p> <p>h. Given a problem, calculate as purchased (AP) and edible portion (EP) amounts.</p> <p>i. Calculate the total cost and portion costs of a standardized recipe.</p>	<p>e.</p> <p><b>Math Practice 4</b> Model with mathematics.</p> <p><b>Math Practice 6</b> Attend to precision.</p> <p><b>Math.HSN-RN</b> Extend the properties of exponents to rational exponents.</p> <p><b>Math.HSN-Q</b> Reason quantitatively and use units to solve problems</p> <p>h, i.</p> <p><b>Math Practice 8</b> Look for and express regularity in repeated reasoning.</p> <p><b>Math.HSA-CED</b> Create equations that describe numbers or relationships</p>	<p>e. Creating equations to scale up/down recipes (attending to precision)</p> <p>h, i. Calculating portion cost/creating a menu/Revenue</p>	
<b>5. Kitchen Essentials 2</b>			
<p>a. Identify the equipment needed for receiving and storing food and supplies.</p> <p>b. Identify the equipment needed for pre-preparation.</p> <p>c. List the different types of knives used in the foodservice kitchen and give examples of their uses.</p> <p>d. Identify basic types of pots and pans</p>			

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<p>and their common uses.</p> <p>e. List the different types of preparation equipment used in the foodservice kitchen and give examples of their uses.</p> <p>f. Identify the kitchen equipment needed for holding and serving food and beverages.</p> <p>g. Apply effective mise en place through practice.</p> <p>h. Explain how to care for knives properly.</p> <p>i. Demonstrate the proper use of knives.</p> <p>j. Explain the difference between seasoning and flavoring.</p> <p>k. Describe and demonstration basic pre-preparation techniques.</p> <p>l. List and explain how the three types of cooking work.</p> <p>m. Describe dry-heat cooking methods and list the foods to which they are suited.</p> <p>n. Describe moist-heat cooking methods and list the foods to which they are suited.</p> <p>o. Describe combination-heat cooking methods and list the foods to which they are suited.</p> <p>p. Identify ways to determine if a food is done cooking.</p> <p>q. List guidelines for plating or storing food that has finished cooking.</p> <p>r. Describe a healthy diet.</p>			

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s. Use the Dietary Guidelines for Americans and MyPyramid to plan meals. t. Interpret information on a nutrition label. u. Define obesity and explain how it can be prevented.	u. Look at Health standards		
<b>6. Stocks, Sauces and Soups</b>			
a. Identify the four essential parts of stock and the proper ingredients for each. b. List and explain the various types of stock and their ingredients. c. Demonstrate three methods for preparing bones for stock. d. Prepare the ingredients for and cook several kinds of stocks. e. Explain how and why to degrease stock. f. List the ways to cool stock properly. g. Identify the grand sauces and describe other sauces made from them. h. List the proper ingredients for sauces. i. Prepare several kinds of sauces. j. Match sauces to appropriate food. k. Identify the two basic kinds of soups and give examples of each. l. Explain the preparation of the basic ingredients for broth, consommé, purée, clear, and cream soups. m. Prepare several kinds of soups.			
<b>7. Communication</b>			



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a. Describe the communication process. b. Identify obstacles to effective communication and explain how to prevent them. c. Explain how personal characteristics can affect communication. d. List and demonstrate effective listening skills. e. List and demonstrate effective speaking skills. f. Identify and use business-appropriate telephone skills. g. List and demonstrate effective writing skills. h. Define organizational communication and give examples of when it might be used. i. Describe interpersonal communication. j. List ways to build relationships through interpersonal communication.			
<b>8. Management Essentials</b>			
a. State the difference between school and workplace environments. b. Explain how stereotypes and prejudices can negatively affect working together. c. Identify the benefits of diversity to a workplace. d. List ways to promote diversity in the workplace. e. Describe what a harassment-free environment and mutually respectful			

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<p>workplace is.</p> <p>f. List guidelines for handling harassment claims.</p> <p>g. Explain the concept of teamwork.</p> <p>h. Describe ethics, and explain their importance to the restaurant and foodservice industry.</p> <p>i. Identify the behaviors of a leader.</p> <p>j. Identify common expectations that employees have about managers.</p> <p>k. Define motivation, and explain a leader’s responsibility to motivate employees.</p> <p>l. Define organizational goal, and explain why this type of goal should be SMART.</p> <p>m. Explain the purpose of vision statements and mission statements.</p> <p>n. Identify how employees’ roles and jobs impact a mission and goals.</p> <p>o. List the steps for solving a problem and explain how each step contributes to finding a solution.</p> <p>p. Explain the importance of individual development to your restaurant or foodservice career.</p> <p>q. Explain what is included in a job description and explain the importance of these documents to a business.</p> <p>r. Identify the difference between exempt and non-exempt employees.</p> <p>s. Explain a manager’s responsibility for maintaining labor law knowledge.</p>	<p>o. Math Practice 1 Make sense of problems and persevere in solving them.</p>	<p>o. It is the standard</p>	

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<p>t. Identify discriminatory language and practices in the hiring process.</p> <p>u. Identify methods for ensuring a fair and consistent hiring process.</p> <p>v. Describe the typical phases of onboarding and explain its importance to a business.</p> <p>w. Explain what employees can expect during orientation.</p> <p>x. List items that employees receive during orientation.</p> <p>y. Identify the typical topics addressed in orientation sessions and employee manuals.</p> <p>z. Identify the benefits of training.</p> <p>aa. List skills that a trainer should have.</p> <p>bb. Identify the key points of effective employee training.</p> <p>cc. List the benefits of cross-training.</p> <p>dd. Summarize and discuss effective group training and on-the-job training.</p> <p>ee. Describe the employee evaluation process</p>			
<p><b>9. Fruits and Vegetables</b></p>			
<p>a. Identify and describe different types of fruit.</p> <p>b. List and explain the USDA quality grades for produce.</p> <p>c. List factors that affect produce purchasing decisions.</p> <p>d. Identify procedures for storing fruit.</p> <p>e. Explain how to prevent enzymatic browning of fruit.</p>			

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f. Match and cook fruit to appropriate methods. g. Identify and describe different types of vegetables. h. Describe hydroponic farming. i. Identify procedures for storing vegetables. j. Match and cook vegetables to appropriate methods. k. List ways to hold vegetables that maintain their quality.	h. See Science Standards		
<b>10. Serving Your Guests</b>			
a. Explain the importance of customer service to the restaurant and foodservice industry. b. List the reasons for making a good first impression and give examples of how to make one. c. Describe the types of customers that may have special needs. d. Identify ways to identify customer needs. e. Outline the process for receiving and recording reservations and special requests. f. Outline the process for taking orders at the table, beginning with the greeting.  g. Define suggestive selling, and give examples of how to do it. h. List methods for processing payment.			

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<p>i. List ways to obtain feedback from guests and determine their satisfaction. j. Explain how customer complaints should be resolved. k. Describe the four traditional styles of service: American, French, English, and Russian. l. Identify contemporary styles of service. m. Demonstrate setting and clearing items properly. n. Describe traditional service staff roles, and list the duties and responsibilities of each. o. Identify various server tools and the correct way to stock a service station.</p>	<p>i, j. <b>Math.HSS-IC</b> Understand and evaluate random processes underlying statistical experiments</p>	<p>i, j. Developing ways to sample guests to determine if changes need to be made based on the results.</p>	
<p><b>11. Potatoes and Grains</b></p>			
<p>a. Identify and describe different types of potatoes. b. Outline methods to select, receive, and store potatoes. c. Using a variety of recipes and cooking methods, prepare potatoes. d. Identify and describe different types of grains and legumes. e. Using a variety of recipes and cooking methods, prepare grains and legumes.  f. Outline methods to select, receive, and store grains. g. Identify and describe different types of pasta.</p>			

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h. Using a variety of recipes and cooking methods, prepare pasta. i. Describe and prepare dumplings.			
<b>12. Building a Career in the Industry</b>			
a. Identify skills needed by foodservice professionals. b. Outline a plan for an effective job search. c. Write a resume that lists your experience, skills, and achievements. d. Write an effective cover letter. e. Compile the best examples of your work into a portfolio. f. Read and complete a job application form. g. Outline the steps to choosing a college or trade school and identify resources for answering those questions. h. Read and complete college and scholarship application forms. i. List ways to find and apply for scholarships. j. List the steps to an effective job interview. k. Identify the differences between closed- and open-ended questions in interviews.  l. Explain the follow-up steps for a job interview. m. List factors for maintaining health and wellness throughout a restaurant			

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<p>or foodservice career.</p> <p>n. Describe the relationship between time and stress.</p> <p>o. List ways to manage time and stress.</p> <p>p. Outline the steps to resigning a job</p> <p>q. Explain the importance of professional development and list ways to achieve it.</p> <p>r. Identify career opportunities in the restaurant and foodservice industry.</p> <p>s. Identify career opportunities in the lodging industry.</p> <p>t. Identify career opportunities in the travel industry.</p> <p>u. Identify career opportunities in the tourism industry.</p>			