Appendix J

SCIENCE, TECHNOLOGY, ENGINEERING, AND MATH (STEM)
YOUTH APPRENTICESHIP

REQUIRED SKILLS CURRICULUM
UNITS 1-2

Unit 1: Required Skills
Core Skills

Competency
1. Apply academic knowledge

Performance Standard Condition
> **Competence will be demonstrated**
> - at the worksite and classroom

Performance Standard Criteria
> **Performance will be successful when the learner:**
> - Reads and comprehends work related materials
> - Applies mathematical operations involving whole numbers, fractions, decimals, percentages, formulas and methods of measurement accurately when necessary
> - Interprets charts, tables, and graphs

Learning Objectives
MATH
- Add, subtract, multiply, and divide whole numbers, fractions, decimals and percents
- Calculate averages, ratios, proportions, and rates
- Convert decimals to fractions, fractions to percents and vice versa
- Measure and accurately report measurements of time, temperature, length, width, height, width, perimeter, area, volume, and weight
- Use appropriate formulas
- Convert measurements correctly (e.g., English (standard) to metric)
- Interpret meaning from data
- Correspond the correct number of significant figures in given values to the measuring device

ENGLISH
- Use standard English to compile information and prepare written reports
- Apply English language correctly (spelling, grammar, structure)
- Derive meaning from text through summarizing
- Discern meaning from written word
- Use acceptable language
- Write legibly

SCIENCE
- Explain the key elements of the scientific process
- Define the differences in qualitative and quantitative measurements
- Compare and contrast subjective and objective information
- Discriminate between fact and opinion

Comments:

Unit 1: Required Skills
Core Skills

Competency
2. Apply career knowledge

Performance Standard Condition
> **Competence will be demonstrated**
> - at the worksite and classroom

Performance Standard Criteria
> **Performance will be successful when the learner:**
> - Demonstrates understanding of career development in the STEM industry
> - Obtains necessary skills and knowledge to meet position requirements

Learning Objectives
- Explain the process for seeking employment
- Describe the major functions and duties of the career pathways within the STEM career cluster
- Discuss educational, training, and credentialing requirements for a selected job
- Research job requirements and characteristics of a selected job
- Contrast "positive" and "less positive" aspects of a selected job
- Describe opportunities for advanced training in STEM careers

Comments:

Unit 1: Required Skills
Core Skills

Competency
3. Communicate effectively

Performance Standard Condition
Competence will be demonstrated
- at the worksite and classroom

Performance Standard Criteria
Performance will be successful when the learner:
- Delivers coherent verbal messages in words that can be understood
- Uses appropriate and bias-free language
- Uses appropriate body language
- Listens actively to others
- Demonstrates courtesy with self-introduction
- Responds to inquiries or statements within the scope of current responsibilities and understanding
- Does not provide confidential information without appropriate authorization
- Does not overreact in response to anger
- Records information in a timely manner
- Records written information legibly and accurately
- Organizes and compiles messages, technical information, and summaries accurately
- Uses email, the Internet, printer, copier, scanner, and fax machine equipment appropriately as applicable
- Is sensitive to special, multicultural, and/or multilingual needs

Learning Objectives
GENERAL
- Compare verbal and nonverbal behaviors
- Explain how empathy and bias can be communicated verbally & non-verbally
LISTEN
- Discuss effective and active listening skills
- Differentiate between hearing and listening
WRITTEN
- Discern meaning from written instructions
- Write clearly to communicate written ideas
- Discuss common recording errors and how to avoid them
CUSTOMER
- Identify internal and external customers at your facility
- Discuss steps to assess customer understanding
- Describe the steps to follow when dealing with complaints
PHONE
- Describe the proper telephone answering procedure
- Emphasize the importance of accuracy in taking telephone messages
- Describe the use of telephone documentation/logs required by some departments/facilities
TOOLS

- Describe technology used in communicating such as, telephone, texting, instant messaging (IM), computers, fax, intercom, beepers, tube systems, etc.
- Explain the proper use and etiquette required for these forms of communication technology
- Review the policies and procedures for using written communication tools in your company such as email, Internet, printer, copier, scanner, and/or fax

Comments:

Unit 1: Required Skills
Core Skills

Competency
4. Act professionally

Performance Standard Condition
Competence will be demonstrated
- at the worksite and classroom

Performance Standard Criteria
Performance will be successful when the learner:
- Follows oral and written instructions
- Is pleasant, courteous, and professional with coworkers and internal and external customers
- Appearance and dress are appropriate according to the requirements of the employer
- Takes personal responsibility for attendance
- Is punctual
- Begins work promptly
- Organizes and prioritizes tasks efficiently
- Exhibits positive attitude and commitment to task at hand
- Completes assigned tasks accurately and in a timely manner
- Takes responsibility for actions and decisions
- Recognizes lack of knowledge and seeks help from information sources
- Evaluates work goals periodically with worksite professional
- Accepts constructive criticism and applies suggestions
- Communicates safety, training, and job-specific needs
- Adheres to safety rules and regulations

Learning Objectives
- Locate and explain written organizational policies, rules and procedures to help employees perform their jobs
- Locate and explain your company's employee manual for policies on Appearance, Breaks, Time Off, Cell Phone Use, Weather, Personal Issues, etc.
- List qualities of successful STEM employees
- Describe how you can demonstrate enthusiasm and commitment at the worksite
- Define initiative
- Explain ways that you can show initiative at a worksite
- Explain methods to evaluate work assignments and prioritize them
- Describe how to effectively receive feedback

Comments:

Unit 1: Required Skills
Core Skills

Competency
5. Demonstrate customer service skills

Performance Standard Condition
Competence will be demonstrated
- at the worksite and classroom

Performance Standard Criteria
Performance will be successful when the learner:
- Is knowledgeable about products and services
- Addresses the customer, either in person, by telephone, e-mail or other means
- Gathers information about customer's needs, and customer's knowledge of products or services
- Responds to customer's comments and questions
- Solicits supervisor or co-worker support and advice when necessary to meet customer needs
- Coordinates as needed with other services to expedite delivery of service or product
- Handles complaints tactfully without insult or conflict

Learning Objectives
- Define customer service
- Identify internal and external customers at your facility
- Describe how customer service affects a company's "bottom line"
- Describe standards of service
- Evaluate customer service scenarios
- Determine appropriate customer service solutions
- List strategies for maximizing customer satisfaction
- Describe the functions of other departments or units to serve the customer
- Describe the steps to follow when dealing with complaints
- Identify customer service methods to use when encountering an angry customer
- Review material pertaining to products and services produced by your department or company

Comments:

Unit 1: Required Skills
Core Skills

Competency
6. Cooperate with others in a team setting

Performance Standard Condition
> **Competence will be demonstrated**
> - at the worksite and classroom

Performance Standard Criteria
> **Performance will be successful when the learner:**
> - Demonstrates respect relating to people
> - Contributes to a group with ideas, suggestions, and effort
> - Listens and responds appropriately to team member contributions
> - Works collaboratively with people from other backgrounds/cultures
> - Resolves differences for the benefit of the team
> - Completes their share of tasks necessary to complete a project

Learning Objectives
- Explain the functions of each department or unit within the larger organization
- Identify roles found in teams such as leader, facilitator, recorder, etc.
- List effective meeting management skills
- Demonstrate techniques which show respect for others
- Describe how to effectively give and receive feedback
- Discuss effective and active listening skills
- Describe conflict resolution methods
- Discuss ways to participate within a team setting
- Explain how to interact appropriately with diverse ethnic, age, cultural, religious, and economic groups in different situations
- Describe how work teams coordinate work flow and help manage resources

Comments:

Unit 1: Required Skills
Core Skills

Competency
7. Think critically

Performance Standard Condition
> **Competence will be demonstrated**
> - at the worksite and classroom

Performance Standard Criteria
> **Performance will be successful when the learner:**
> - Recognizes the existence of a problem
> - Applies problem-solving steps
> - Differentiates between fact and opinion
> - Considers other viewpoints and perspectives
> - Applies the principles and strategies of organized thinking
> - Evaluates information, ideas, and problems
> - Collects information through probing questions and research
> - Defines the problem
> - Uses techniques such as brainstorming to acquire alternative solutions
> - Demonstrates comparison skills
> - Makes decisions based on analysis
> - Presents ideas for critical evaluation
> - Supports viewpoints with evidence

Learning Objectives
- Describe how to break a problem down in order to brainstorm, evaluate, and analyze possible solutions
- Discuss the difference between fact and opinion
- Discuss data collection techniques for the problem solving process
- Describe how to present a solution with evidence
- Explain ways to reach a decision by consensus
- Discuss methods to evaluate a solution that has been implemented

Comments:

Unit 1: Required Skills
Core Skills

Competency
8. Exhibit regulatory and ethical responsibilities

Performance Standard Condition
> **Competence will be demonstrated**
> * at the worksite and classroom

Performance Standard Criteria
> **Performance will be successful when the learner:**
> * Follows all safety and worksite standards and regulations including those required by the Occupational Safety & Health Administration (OSHA) and the Environmental Protection Agency (EPA)
> * Performs legally and ethically by all local, state, and national standards
> * Uses email, the Internet, printer, copier, scanner, and fax machine equipment appropriately and correctly as applicable
> * Operates within scope of authority adhering to company rules, regulations, and policies as established in employee handbook/procedures
> * Complies with legal requirements for documentation
> * Documents work processes as required
> * Records and files appropriate documents in timely manner
> * Maintains confidentiality of company, customer, and co-worker information
> * Documents reportable incidents to worksite professional immediately, if applicable
> * Receives, handles, packages, and ships materials and product according to shipping laws and regulations if applicable

Learning Objectives
GENERAL
* Explain the role of the government in regulating and managing the Engineering **or** Bioscience Lab industry
* Compare national, state and local regulators that oversee the Engineering **or** Bioscience Lab industry such as: Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), Food and Drug Administration (FDA), Nuclear Regulatory Commission (NRC), U.S. Department of Agriculture (USDA), National Institutes of Health (NIH), National Research Council (NRC), Department of Transportation (DOT), Center for Disease Control and Prevention (CDC), Clinical Laboratory Improvement Amendments (CLIA), etc. **as applicable**
* Identify the management structure and employees' roles within your organization
* Describe common legal requirements that must be met in Engineering **or** Bioscience Lab facilities
* Describe your legal responsibilities, limitations, and implications for action in your job role
* Identify the rules and regulations of the company as they relate to the employee
* Identify penalties for regulation non-compliance
* Compare and contrast behaviors and practices that could result in liability or negligence
* Explain legal issues faced by Engineering **or** Bioscience Lab professionals
* Summarize the rights and responsibilities **of** Engineering or Bioscience Lab workers

- Explain what situations are reportable in Engineering **or** Bioscience Lab facilities
- Explain the importance of Good Manufacturing Processes (GMPs) or Good Laboratory Practices in Engineering **or** Bioscience Lab facilities

ETHICAL
- Explain the difference between an ethical practice and a legal responsibility
- Identify current ethical issues common to the Engineering **or** Bioscience Lab field
- Describe ethical work values such as confidentiality, productivity during the day, following safety standards
- Define and discuss the concept of intellectual property
- Explain fundamentals of patents, trademarks, copyrights, and proprietary information

SAFETY
- Define legal and ethical responsibilities for safety procedures
- Describe the certification/license requirements to operate specific equipment or perform specific functions

RECORDS
- Identify the main functions of documents and documentation
- Identify the guidelines for retaining common documents
- Describe the patent process and its importance in Engineering or Bioscience Lab work

Comments:

Unit 1: Required Skills
Core Skills

Competency
9. Use basic technology

Performance Standard Condition
> **Competence will be demonstrated**
> - at the worksite and classroom

Performance Standard Criteria
> **Performance will be successful when the learner:**
> - Uses communication technology (such as pagers, radios, phone, fax, email, Internet) to access and distribute data and other information within the scope of the job
> - Follows rules for proper computer and communication technology usage
> - Uses calculating tools such as a computer, calculator, and adding machine correctly
> - Enters, edits, and stores data on computerized equipment according to worksite guidelines
> - Verifies data entry prior to data storage or equipment operation
> - Use computer applications to solve problems

Learning Objectives
- Identify the parts and functions of a computer system using correct terminology including the keyboard, monitor, mouse, printer
- Point out the storage device locations on the computer such as the Hard drive, Floppy drive, CD-ROM drive, and Portable File Storage drive, etc
- Show the appropriate connections and positioning of peripheral devices such as a mouse, keyboard, monitor, and printer
- Discuss the importance of backing up computerized files
- Compare different forms of communications technology including email, texting, word processing, spreadsheets, database, presentation software, and use of the internet to communicate, search and display information
- Describe how to evaluate internet web sites and information for validity and reliability
- Explain appropriate and inappropriate uses of email and internet while at work
- Describe how to develop effective presentations using appropriate technologies (e.g., tables, charts, and visual graphics)
- Explain the use of writing/publishing/presentation applications
- Describe how database and spreadsheet technology is used at your worksite to manage worksite operations

Comments:

Unit 1: Required Skills
Core Skills

Competency
10.   Use resources wisely

Performance Standard Condition
> **Competence will be demonstrated**
> - at the worksite and classroom

Performance Standard Criteria
> **Performance will be successful when the learner:**
> - Follows the facility pollution/waste prevention plan
> - Recycles whenever possible
> - Disposes of materials appropriately
> - Disposes of hazards legally and with regard to environmental impact

Learning Objectives
- Identify current environmental issues affecting the Engineering or Bioscience Lab industry
- Determine effects of environmental issues on the Engineering or Bioscience Lab industry
- Define what is meant by making "green" choices
- Compare renewable and nonrenewable natural resources
- Explain the meaning of sustainable resources use
- Identify practices that contribute to sustainability
- Describe why wise use of resources at the worksite is important
- Give examples of wasteful uses of resources (unnecessary waste and duplication) at the worksite
- Explain how your choices of resources impact your department, your facility, and the environment
- List materials that can be recycled
- Describe materials that require special disposal
- Explain purpose of pollution control systems
- Relate power generation to energy sources
- Compare environmental impact of energy sources (e.g., fuel cells, chemical, wind, hydro, nuclear, electric, mechanical, solar, biological)

Comments:

Unit 2: Required Skills
Safety

Competency
1. Follow personal safety requirements

Performance Standard Condition
Competence will be demonstrated
- at the worksite and classroom

Performance Standard Criteria
Performance will be successful when the learner:
- Participates in all required safety training
- Follows all worksite guidelines for personal safety
- Applies principles of proper body mechanics when necessary
- Reports any exposures, injuries, or accidents, personal or to others, immediately, if applicable
- Locates and can find key information on Material Safety Data Sheets (MSDS)
- Handles and disposes of any hazardous materials appropriately, if applicable
- Operates only equipment that he/she is trained on
- Adheres to equipment safety standards
- Visually inspects equipment to ensure safety compliance and function before operation
- Wears the required Personal Protective Equipment (PPE) at all times as required by the worksite for specific tasks

Learning Objectives
- Discuss the regulatory purpose and responsibility of the Occupational Safety and Health Administration (OSHA)
- List your rights as a worker according to OSHA
- Explain the procedure to follow in case of an exposure, injury, or accident to self or to another
- Explain ways your company prevents accidents
- List engineering controls that are taken to protect workers from accidents
- Describe safe and unsafe work habits and their implications
- List safety hazards common in your facility
- Explain potential hazards associated with blood borne pathogens
- Explain the ergonomic impact of work techniques
- Describe proper techniques for lifting loads
- Describe the Material Safety Data Sheet (MSDS) and its purpose
- Discuss the procedures of handling & disposing of hazardous material
- List mechanical, chemical, electrical, compressed air, and equipment safety hazards at your facility
- Explain how Lock Out/Tag Out procedures prevent accidents
- Define the Personal Protective Equipment (PPE) required for specific tasks in your facility
- Explain the safe use of ladders
- Describe ways to prevent burns
  Demonstrate safe use of equipment you will commonly use
Comments:

Unit 2: Required Skills
Safety

Competency
2. Maintain a safe work environment

Performance Standard Condition
> **Competence will be demonstrated**
> - at the worksite and classroom

Performance Standard Criteria
> **Performance will be successful when the learner:**
> - Complies with posted safety warnings and symbols
> - Identifies unsafe conditions and/or work habits and reports them to the worksite professional immediately, if applicable
> - Helps maintain a clean and safe working environment free of debris and obstacles
> - Cleans, organizes, puts away items in the work area
> - Safely identifies, handles, stores, and uses hazardous materials according to company procedure, if applicable
> - Reports any indications of insects or pests

Learning Objectives
- List the major components of a facility safety program
- List the different state and federal agencies that provide regulatory oversight at your facility for personal safety, environmental safety, and equipment safety
- List accident and fire prevention techniques
- Describe posted safety warnings and symbols and what they mean
- Describe safe and unsafe work habits and their implications
- Discuss the importance of keeping the work area and tools/equipment clean
- List mechanical, electrical, and equipment safety hazards at your facility
- Discuss how to identify and report unsafe conditions in your facility
- Discuss safety procedures to prevent accidents
- Describe the requirements at your facility for safety training and auditing
- Assess need for good housekeeping practices
- List accident and fire prevention techniques
- List hazards that contribute to injury due to slips, trips, or falls
- Outline compliance requirements of sanitation and health inspections

Comments:

Unit 2: Required Skills
Safety

Competency
3. Demonstrate professional role to be used in an emergency

Performance Standard Condition
Competence will be demonstrated
- at the worksite and classroom

Performance Standard Criteria
Performance will be successful when the learner:
- Participates in emergency safety simulations and drills
- Outlines the company's policy and procedure for worksite incidents, accidents, electrical, fire, tornado, bomb threats, robbery, hostage situations, and other emergency situations
- Identifies the closest fire alarms and emergency exits in the assigned worksite area
- Identifies the fire extinguishers in the assigned worksite area
- Identifies appropriate alarms and procedures for using alarms
- Contacts emergency personnel according to company requirements in the event of an emergency
- Documents any emergency incidents according to company requirements

Learning Objectives
- Describe the procedures in your company to report an emergency
- Review your company procedures for responding to exposures, injuries, accidents, spills, fire, tornado, bomb threat, robbery, hostage situations, etc.
- Demonstrate how to use the fire blanket and/or fire extinguisher
- Explain the evacuation plan for the worksite
- Indicate the demeanor necessary during an emergency
- Identify methods to cope with emergency situations
- Name the resources for assistance in crimes or accidents
- Locate and explain use of first aid emergency care kits
- Detail steps to use in medical emergencies requiring First Aid, CPR, and/or Heimlich maneuver
- Locate and explain use of spill kits, if applicable to worksite
- Explain who in your facility can give first aid care in the event of an emergency
- Explain the local protocols in place with local law enforcement
- Explain the role of the Hazardous Materials (HAZMAT) team
- Detail how to access help in a robbery or terrorist situation
Explain the use of safety equipment such as eyeball washers and chemical safety showers and when you would use them

Comments: