

PROGRAM CONCENTRATION: Public Safety
CAREER PATHWAY: Firefighting
COURSE TITLE: Applications of Firefighting

Course Description: Upon successful completion of this course, students will have received orientation and preparation for entry level positions in the fire service, including the opportunity to sit for the Firefighter 1 National Professional Qualifications certification test. The use of the following equipment is required for effective learning: computer and live fire simulation, firefighting and personal protective equipment, and standard industry apparatus. Mastery of standards through project-based learning, technical skills practice, leadership development activities and Skills USA participation will provide students with a competitive edge for entry into fire and emergency services. In addition, the procedures and protocols used in this class are the most current recommendations of the International Association of Fire Chiefs and the National Fire Protection Association (NFPA).

The Applications of Firefighting course requires strenuous physical activity. Students, parents, and school officials are encouraged to review and discuss the physical requirements prior to the student's enrollment in the course. Schools may choose to recommend that a student obtain a sports physical prior to the start of course activities.

This course meets the requirements NFPA1001 – Standard Fire Fighter Professional Qualifications and all other state, local and provincial health and safety regulatory requirements.

BASIC THEORY AND APPLICATION

PS-AFF-1. Acquire knowledge in relation to the history and orientation of the fire service. Students will:

- a. List and discuss the five guidelines for firefighter training.
- b. Define and differentiate between the roles and responsibilities of Firefighter I and Firefighter II.
- c. Describe the roles of firefighters within a fire department.
- d. Summarize the procedures for working with other organizations.
- e. Describe the four basic principles of organization of the fire department.
- f. Discuss and contrast the fire department governance procedures, hierarchy and how they apply to the firefighter with the organization of the procedures, hierarchy of the fire service and how they apply to the firefighter.
- g. Locate information in departmental documents and standard operating procedures.
- h. List and describe the different fire department companies, describe their functions, and define the chain of command as it applies to a fire department.
- i. Describe and contrast the history and changes in the fire department from colonial times to the present.

Academic Standards:

ELA9RC4: The student establishes a context for information acquired by reading across curriculum.

- a. *Explores life experiences related to subject area content.*

ELA9W1: The student produces writing that establishes an appropriate organizational structure, sets a context and engages the reader, maintains a coherent focus throughout, and signals closure. The student

- e. *Writes texts of a length appropriate to address the topic and effect, similarity and difference, and posing and answering a question).*

ELA9LSV1: The student participates in student-to-teacher, student-to-student, and group verbal interactions. The student

- a. *Initiates new topics and responds to adult-initiated topics.*
- b. *Asks relevant questions.*

SCSh9: Students will enhance reading in all curriculum areas by:

- a. *Read technical texts related to various subject areas.*

PS-AFF-2. Demonstrate knowledge and skill associated with firefighter safety including: personal safety, safety and health, safety equipment, respiratory protection, the ensemble. Students will:

- a. List safety precautions needed to be taken during training, during emergency responses, at emergency incidents, at the fire station, and outside the workplace.
- b. Explain and describe the importance, limitations, and proper maintenance provided by personal protective equipment (PPE).
- c. Describe the hazards of smoke and other toxic environments.
- d. Explain why respiratory protection is needed for the fire service.
- e. Analyze the limitations and list the components of self-contained breathing apparatus (SCBA) to include: the differences between open circuit breathing and closed circuit breathing apparatus and the emergency bypass mode.
- f. Demonstrate the skip-breathing technique.
- g. Apply and perform concepts of SCBA safety to include: operation, inspections, and procedures used to refill cylinders.
- h. Demonstrate the steps for donning a complete PPE ensemble.

Academic Standards:

ELA9W3: The student uses research and technology to support writing.

- a. *Uses supporting evidence from multiple sources to develop the main ideas within the body of an essay, composition, or technical document.*

PS-AFF-3. Describe types of fire service communications and the operation of the equipment, according to protocol. Students will:

- a. Explain the role of the telecommunicator and the process to receiving an emergency call and initiating a response.
- b. Identify the fire department radio communications and radio codes.
- c. Describe and transmit signals to include routine, emergency traffic, and evacuation signals.
- d. Define the content requirements for a basic incident report to include procedures for obtaining necessary information, coding, and the consequences of incomplete and inaccurate reports.
- e. Outline fire department procedures for answering non-emergency and personal phone calls.
- f. Create an accurate and complete incident report based on a given scenario.

Academic Standards:

ELA9C1: The student demonstrates understanding and control of the rules of the English language, realizing that usage involves the appropriate application of conventions and grammar in both written and spoken formats.

- a. *Demonstrates an understanding of proper English usage and control of grammar, sentence and paragraph structure, diction, and syntax.*
- c. *Demonstrates an understanding of sentence construction (i.e., subordination, proper placement of modifiers) and proper English usage (i.e., consistency of verb tenses).*

ELA9LSV1: The student participates in student-to-teacher, student-to-student, and group verbal interactions. The student

- b. *Asks relevant questions.*
- c. *Responds to questions with appropriate information.*
- d. *Actively solicits another person's comments or opinions.*

SCSh8: Students will understand important features of the process of scientific inquiry.

- a. *Scientific investigators control the conditions of their experiments in order to produce valuable data.*
- b. *Scientific researchers are expected to critically assess the quality of data including possible sources of bias in their investigations.*
- c. *Scientists use practices such as peer review and publication to reinforce the integrity of scientific activity and reporting.*

PS-AFF-4. Communicate the importance of pre-incident planning and the incident command system to ensure the safe and efficient response to an emergency scene.

- a. Recognize the importance of pre-incident planning to include creating a plan, conducting a pre-incident survey, gathering tactical information on occupancy, construction, specific hazards, and locale.
- b. Describe the characteristics and explain the organization of the incident command system.

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- c. Identify the roles and responsibilities within the incident command system.
- d. Function in an assigned role to include arrival, size-up, development and implementation of an incident action plan.
- e. Describe and demonstrate riding an emergency vehicle safely to include mounting and dismounting the vehicle.

Academic Standards:

MM1P1: Students will solve problems (using appropriate technology).

- b. Solve problems that arise in mathematics and in other contexts.*
- c. Apply and adapt a variety of appropriate strategies to solve problems.*

MM1P3: Students will communicate mathematically.

- a. Organize and consolidate their mathematical thinking through communication.*
- d. Use the language of mathematics to express mathematical ideas precisely.*

MM1P4: Students will make connections among mathematical ideas and to other disciplines.

- a. Recognize and use connections among mathematical ideas.*
- b. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.*
- c. Recognize and apply mathematics in contexts outside of mathematics.*

MM1P5: Students will represent mathematics in multiple ways.

- a. Create and use representations to organize, record, and communicate mathematical ideas.*
- b. Select, apply, and translate among mathematical representations to solve problems.*
- c. Use representations to model and interpret physical, social, and mathematical phenomena.*

MM3D3: Students will understand the differences between experimental and observational studies by posing questions and collecting, analyzing, and interpreting data.

PS-AFF-5. Classify fire behavior in terms of chemistry, characteristics, and methods of extinguishment. Students will:

- a. Describe the chemistry of fire using the tetrahedron model.
- b. Identify the three states of matter.
- c. Explain how fires can spread by conduction, convection and radiation.
- d. Analyze the stages of fire progression to include ignition, growth, fully developed and decay.
- e. Compare and contrast the causes and characteristics of flameover, flashover, thermal layering and backdraft.
- f. Describe the process of reading smoke.
- g. Distinguish characteristics of solid-fuel, liquid-fuel, and gas-fuel fires.
- h. Demonstrate proper extinguishment procedures for solid-fuel, liquid-fuel, and gas-fuel fires.
- i. Assess the causes and effects of a boiling liquid, expanding vapor explosion (BLEVE).

- j. Given a scenario, analyze the characteristics of a room-and-contents fire through each of the four phases.

Academic Standards:

ELA9W1: The student produces writing that establishes an appropriate organizational structure, sets a context and engages the reader, maintains a coherent focus throughout, and signals closure. The student

- a. Establishes a clear, distinctive, and coherent thesis or perspective and maintains a consistent tone and focus throughout.*
- b. Selects a focus, structure, and point of view relevant to the purpose, genre expectations, audience, length, and format requirements.*

ELA9W3: The student uses research and technology to support writing.

- a. Formulates clear research questions and utilizes appropriate research venues (i.e. library, electronic media, personal interview, survey) to locate and incorporate evidence from primary and secondary sources.*

SC1: Students will analyze the nature of matter and its classifications.

- a. Relate the role of nuclear fusion in producing essentially all elements heavier than helium.*
- b. Identify substances based on chemical and physical properties.*
- c. Predict formulas for stable ionic compounds based on balance of charges.*

SC6: Students will understand the effects of motions of atoms and molecules in physical and chemical processes.

- a. Compare and contrast atomic/molecular motion in solids, liquids, gases, and plasmas.*
- b. Collect data and calculate the amount of heat given off or taken in by chemical or physical processes.*
- c. Analyze change of energy during change of state.*

MM2P1: Students will solve problems (using appropriate technology).

- b. Solve problems that arise in mathematics and in other contexts.*
- c. Apply and adapt a variety of appropriate strategies to solve problems.*

MM2P4: Students will make connections among mathematical ideas and to other disciplines.

- a. Recognize and use connections among mathematical ideas.*
- b. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.*
- c. Recognize and apply mathematics in contexts outside of mathematics.*

MM3A2: Students will explore logarithmic functions as inverses of exponential functions.

- d. Understand and use properties of logarithms by extending laws of exponents.*
- g. Explore real phenomena related to exponential and logarithmic functions including half-life and doubling time.*

MM4A3: Students will investigate and use the graphs of the six trigonometric functions.

- a. Understand and apply the six basic trigonometric functions as functions of real numbers.*
- d. Apply graphs of trigonometric functions in realistic contexts involving periodic phenomena.*

PS-AFF-6. Gain knowledge of how fires react to building construction types and materials. Students will:

- a. Describe the characteristics of building materials to include masonry, concrete, glass, steel, gypsum board and wood.
- b. List and describe each of the following types of building construction to include fire-resistant, noncombustible, ordinary, heavy timber and wood frame.
- c. Describe the inter-relationship of the following building components when exposed to fire to include foundations, floors, ceilings, roofs, trusses, walls, doors, windows, interior finish and floor coverings.
- d. Given a scenario on a simulator, formulate a method of fire attack to control and confine fire with in each of the five types of building construction.

Academic Standards:

ELA9LSV2: The student formulates reasoned judgments about written and oral communication in various media genres. The student delivers focused, coherent, and polished presentations that convey a clear and distinct perspective, demonstrate solid reasoning, and combine traditional rhetorical strategies of narration, exposition, persuasion, and description.

When responding to written and oral texts and media (i.e., television, radio, film productions, and electronic media), the student:

- c. *Uses props, visual aids, graphs, or electronic media to enhance the appeal and accuracy of presentations.*

SC2: Students will relate how the Law of Conservation of Matter is used to determine chemical composition in compounds and chemical reactions.

- a. *Identify and balance equations.*
- b. *Experimentally determine indicators of a chemical reaction.*
- c. *Identify and solve different types of stoichiometry problems, specifically relating mass.*

PS-AFF-7. Extinguish incipient fires given a selection of portable fire extinguishers. Students will:

- a. Define the primary purposes of fire extinguishers for Class A, Class B, Class C, Class D and Class K fires.
- b. Explain the classification, types of agents, operating and rating systems for fire extinguishers.
- c. Demonstrate the proper steps for fire extinguisher operation.
- d. Apply the basic steps of inspecting, maintaining, recharging, hydrostatic testing of fire extinguishers.

Academic Standards:

SC6: Students will understand the effects of motions of atoms and molecules in physical and chemical processes.

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- a. *Compare and contrast atomic/molecular motion in solids, liquids, gases, and plasmas.*
- b. *Collect data and calculate the amount of heat given off or taken in by chemical or physical processes.*
- c. *Analyze change of energy during change of state.*

PS-AFF-8. Develop skills to use and maintain firefighter tools and equipment. Students will:

- a. Describe the general purpose and safety consideration for all tools and equipment.
- b. List tools and equipment that are used for firefighting and describe which are used for rotating, pulling, pushing, prying, spreading and cutting.
- c. Describe and employ tools used in response and size-up activities, forcible entry, interior attack, search, rescue, ventilation, and overhaul.
- d. Inspect, clean, and maintain hand and power tools.

PS-AFF-9. Develop skills to use and maintain fire service ropes and equipment. Students will:

- a. Compare and contrast the differences between life safety rope and utility rope.
- b. List and describe the most common synthetic fiber ropes used in the fire service.
- c. Describe the construction of the kernmantle rope.
- d. Demonstrate how rope is used to support response activities.
- e. Demonstrate cleaning, checking, and recording maintenance of ropes.
- f. Analyze the reasons for placing a life safety rope out of service.
- g. Demonstrate tying the following knots and describe their usage in the fire service to include safety, half hitch, clove hitch, figure eight, figure eight on a bight, figure eight with a follow-through, bowline, sheet bend, Becket bend knots.
- h. Describe the types of knots used to hoist tools and equipment.

Academic Standards:

SPS8: Students will determine relationships among force, mass, and motion.

- a. *Calculate velocity and acceleration.*
- b. *Apply Newton's three laws to everyday situations by explaining inertia, force, mass, and acceleration, and equal and opposite forces.*
- c. *Relate falling objects to gravitational force.*
- d. *Explain the difference in mass and weight.*

TACTICAL SKILL DEVELOPMENT

PS-AFF-10. Learn skills and methods associated with forcing entry into various types of structures. Students will:

- a. Recognize the association between specific tools and special forcible entry needs.

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- b. Describe and demonstrate knowledge of basic construction and the dangers associated with forced entry into typical locks, doors, windows and walls.
- c. Assess when to use forcible entry as it relates to salvage.

PS-AFF-11. Learn skills and methods associated with deployment and utilization of fire service ladders. Students will:

- a. Describe general safety rules and hazards associated with ladders.
- b. List and describe parts of a ladder.
- c. Describe the different types of ladders.
- d. Describe and demonstrate procedures for cleaning, inspecting and storing ladders.
- e. Describe and demonstrate procedures for deployment and accomplishing work while on ladders.

PS-AFF-12. Plan and conduct interior search and rescue operations. Students will:

- a. Define search and rescue.
- b. Describe and analyze the importance of scene size-up, risk-benefit analysis, search techniques, primary search, search patterns, thermal imaging cameras, and secondary search.
- c. Demonstrate ladder rescue techniques.
- d. Apply search and rescue concepts to ensure firefighter safety.

Academic Standards:

SCSh9: Students will enhance reading in all curriculum areas by:

- a. Read technical texts related to various subject areas.*

SCSh3: Students will identify and investigate problems scientifically.

- a. Suggest reasonable hypothesis for identified problems.*
- b. Develop procedures for solving scientific problems.*
- c. Collect, organize and record appropriate data.*

PS-AFF-13. Learn skills and methods associated with fire service ventilation. Students will:

- a. Define ventilation as it relates to fire suppression activities.
- b. List the effects of properly performed ventilation on fire and fire suppression activities.
- c. Critique how fire behavior principles and building construction features affect ventilation.
- d. List the principles, advantages, limitations, and effects of ventilation types to include horizontal, natural, mechanical, negative-pressure, positive-pressure, hydraulic, and vertical.
- e. Explain safety precautions and basic indicators of roof collapse for ventilating roofs.
- f. Summarize the role of ventilation in the prevention of backdraft and flashover.

Academic Standards:

ELA9RC3: The student acquires new vocabulary in each content area and uses it correctly.

- a. *Demonstrates an understanding of contextual vocabulary in various subjects.*
- b. *Uses content vocabulary in writing and speaking.*

SCSh2: Students will use standard safety practices for all classroom laboratory and field investigations.

- a. *Follow correct procedures for use of scientific apparatus.*
- b. *Demonstrate appropriate techniques in all laboratory situations.*
- c. *Follow correct protocol for identifying and reporting safety problems and violations.*

SPS5: Students will compare and contrast the phases of matter as they relate to atomic and molecular motion.

- a. *Compare and contrast the atomic/molecular motion of solids, liquids, gases, and plasmas.*
- b. *Relate temperature, pressure, and volume of gases to the behavior of gases.*

PS-AFF-14. Learn skills and methods associated with water supply in the fire service. Students will:

- a. Describe the ways in which rural water supplies, portable tanks, and municipal water supply systems are utilized in firefighting.
- b. Explain the purpose of the water treatment facility.
- c. Describe the major features of the municipal distribution system.
- d. Compare and contrast dry-barrel and wet-barrel fire hydrants to include maintenance and testing.
- e. Define types of pressure to include static, residual, and flow.

Academic Standards:

ELA9RC3: The student acquires new vocabulary in each content area and uses it correctly.

- a. *Demonstrates an understanding of contextual vocabulary in various subjects.*
- b. *Uses content vocabulary in writing and speaking.*

SEV1: Students will demonstrate an understanding that the earth is one interconnected system.

- a. *Describe how abiotic components (water, air, and energy) affect the biosphere.*
- b. *Recognize and give examples of the hierarchy of the biological entities of the biosphere.*

PS-AFF-15. Learn skills and methods associated with fire hoses, nozzles, appliances, streams, and foam in the fire service. Students will:

- a. Define fire hydraulics.
- b. Demonstrate how to prevent water hammer.
- c. Describe hose construction, inspection, cleaning, and maintenance.
- d. Demonstrate the process used to roll, lay, and load hose.

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- e. Demonstrate procedures for connecting, carrying, and advancing hose.
- f. Compare types, designs, pressure effects, and flow capabilities of nozzles and appliances.
- g. Investigate how foam works in firefighting.
- h. Compare types and the procedures for making and applying foam.

PS-AFF-16. Learn skills and methods associated with firefighter survival. Students will:

- a. List the procedures for conducting an appropriate risk-benefit analysis.
- b. Identify hazard indicators, safe operating procedures, and the personnel accountability system.
- c. Describe how to initiate emergency communications and the role of the rapid intervention crew.
- d. Demonstrate firefighter survival procedures and how to maintain orientation.
- e. Scrutinize safe havens and air management procedures.
- f. Apply concepts necessary to construct the critical incident stress management process.

Academic Standards:

ELA9RC3: The student acquires new vocabulary in each content area and uses it correctly.

- a. *Demonstrates an understanding of contextual vocabulary in various subjects.*
- b. *Uses content vocabulary in writing and speaking.*

PS-AFF-17. Learn skills and methods associated with salvage and overhaul. Students will:

- a. Describe the importance of adequate lighting and safety precautions when performing salvage and overhaul operations.
- b. List the tools for salvage and overhaul.
- c. Discuss the relationship of overhaul to the safety of firefighters and preserving structural integrity.
- d. Assess the steps needed to limit the damage from smoke, heat and water.
- e. Apply all skills related to safely conducting salvage and overhaul operations.

PS-AFF-18. Learn skills and methods associated with firefighter rehabilitation. Students will:

- a. Define emergency incident rehabilitation.
- b. Define the process of CISM (Critical Incident Stress Management).
- c. Develop a logical argument justifying incident rehabilitation is good preventative medicine.
- d. Construct a meal plan to facilitate peak performance.
- e. Classify four parts of revitalization.

Academic Standards:

ELA9LSV2: The student formulates reasoned judgments about written and oral communication in various media genres. The student delivers focused, coherent, and polished presentations that convey a clear and distinct perspective, demonstrate solid reasoning, and combine traditional rhetorical strategies of narration, exposition, persuasion, and description.

When responding to written and oral texts and media (i.e., television, radio, film productions and electronic media), the student:

- c. Formulates judgments about ideas under discussion and supports those judgments with convincing evidence.*

PS-AFF-19. Learn skills and methods associated with wildland and ground fires. Students will:

- a. Discuss the differences between wildland and ground fires.
- b. Classify the types of fuels related to wildland and ground fires.
- c. Compare and contrast fire suppression, personal protective equipment, hazards, and component parts for wildland and ground fires.
- d. Cite evidence of how weather influences wildland fires.
- e. Analyze the problems created by the wildland-urban interface.
- f. Demonstrate techniques used to suppress a ground cover fire using hand tools, a backpack pump extinguisher, and a hose line.

Academic standards:

ELA9LSV2 The student formulates reasoned judgments about written and oral communication in various media genres. The student delivers focused, coherent, and polished presentations that convey a clear and distinct perspective, demonstrate solid reasoning, and combine traditional rhetorical strategies of narration, exposition, persuasion, and description.

When delivering and responding to presentations, the student:

- a. Delivers narrative, expository, or persuasive presentations that incorporate the same elements found in that mode or genre of writing.*
- c. Uses props, visual aids, graphs, or electronic media to enhance the appeal and accuracy of presentations.*

SEC3: Students will explore and analyze community interactions.

- a. Compare and contrast species interactions and adaptations that have evolved in response to interspecific selective pressures.*
- b. Explore ecological niches and resource partitioning.*
- c. Analyze species diversity as it relates to the stability of ecosystems and communities.*
- d. Evaluate ecological succession in terms of changes in communities over time and the impact of disturbance on community composition.*

PS-AFF-20. Learn skills and methods associated with fire suppression. Students will:

- a. Describe offensive operations versus defensive operations.
- b. Compare direct and indirect fire attack.
- c. Formulate an interior fire attack.
- d. Discuss the process for attacking fires involving electricity.
- e. Differentiate between a flammable-liquid fire and a flammable-gas cylinder fire.

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- f. Operate hose lines and appliances to extinguish vehicle, structure, and flammable-gas cylinder fires.
- g. Control electric and gas utility systems in simulation.

Academic Standards:

SPS7: Students will relate transformations and flow of energy within a system.

- a. *Identify energy transformations within a system.*
- b. *Investigate molecular motion as it relates to thermal energy changes in terms of conduction, convection, and radiation.*
- c. *Determine the heat capacity of a substance using mass, specific heat, and temperature.*
- d. *Explain the flow of energy in phase changes through the use of a phase diagram.*

PS-AFF-21. Learn skills and methods associated with vehicle rescue and extrication. Students will:

- a. Discuss types of vehicles.
- b. Describe the anatomy of a vehicle.
- c. List the hazards involved in responding to an emergency scene.
- d. Perform size up and hazard mitigation upon arrival at the scene of a vehicle extrication incident.
- e. Identify and use extrication tools used for stabilizing, bending, cutting, and disassembling.
- f. Assess and implement the process of gaining access, disentangling and removing a victim from a motor vehicle collision.

PS-AFF-22. Learn skills and methods associated with special rescue teams. Students will:

- a. Identify and describe the types of special rescues encountered by fire fighters.
- b. List rescue tools.
- c. Demonstrate how to safely approach and assist at the following types of special rescue incidents: rope, trench and excavation, structural collapse, water or ice, wilderness search, hazardous materials, elevator or escalator, and energized electrical lines.

Academic Standards:

ELA9RC3: The student acquires new vocabulary in each content area and uses it correctly.

- a. *Demonstrates an understanding of contextual vocabulary in various subjects.*
- b. *Uses content vocabulary in writing and speaking.*

ELA9LSV1: The student participates in student-to-teacher, student-to-student, and group verbal interactions. The student

- a. *Initiates new topics and responds to adult-initiated topics.*
- b. *Asks relevant questions.*
- c. *Responds to questions with appropriate information.*
- d. *Actively solicits another person's comments or opinions.*
- e. *Offers own opinion forcefully without domineering.*

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- f. *Volunteers contributions and responds when directly solicited by teacher or discussion leader.*
- g. *Gives reasons in support of opinions expressed.*
- h. *Clarifies, illustrates, or expands on a response when asked to do so; asks classmates for similar expansions.*
- i. *Employs group decision-making techniques such as brainstorming or a problem-solving sequence (i.e., recognizes problem, defines problem, identifies possible solutions, selects optimal solution, implements solution, and evaluates solution).*
- j. *Divides labor to achieve the overall group goal efficiently.*

PS-AFF-23. Learn skills and methods associated with the hazardous material properties, identification, and regulation. Students will:

- a. Define the characteristics of hazardous materials.
- b. Describe the different levels of hazardous materials training: awareness, operations, technician, and specialist.
- c. Discuss the laws, regulations, and regulatory agencies that govern hazardous material response activities.
- d. Compare and contrast the difference between hazardous materials incidents and other emergencies.
- e. List and categorize the chemical properties of hazardous materials according to NFPA 472.
- f. Demonstrate the ability to use the current edition of the DOT (Department of Transportation) Emergency Response Guidebook.
- g. Plan a response to an incident involving hazardous materials utilizing the Emergency Response Guidebook Planning.
- h. List and define the dangers associated with exposure to hazardous materials.
- i. Identify and describe specific occupancies, containers, container shapes, tanks, transport, and apparatus that are indications of hazardous materials.
- j. Describe how to identify a placard and a label.
- k. Describe and identify the location for MSDS (Material Safety Data Sheet) and shipping papers.
- l. Given a scenario, utilize CHEMTREC and NFPA 704 to mitigate a hazardous material incident.
- m. Compare and contrast biological, chemical and radiological incidents.
- n. Cite evidence of possible criminal or terrorist activities involving explosives and secondary devices.

Academic Standards:

ELA9RC3: The student acquires new vocabulary in each content area and uses it correctly.

- a. *Demonstrates an understanding of contextual vocabulary in various subjects.*
- b. *Uses content vocabulary in writing and speaking.*

PS-AFF-24. Learn skills and methods associated with the hazardous material response and mitigation. Students will:

- a. Describe how to plan an initial response to a hazardous material incident to include risk/benefit assessment, defensive control activities, decision to withdraw, contact of proper authorities, available and required resources, and size and scope.
- b. Discuss search and rescue missions, exposure protection and defensive control activities for a variety of emergencies.
- c. Demonstrate proper use of an Incident Command System.
- d. Implement the use of personal protective equipment (PPE) for hazardous materials incidents to include structural firefighting, high temperature, chemical, liquid splash, and vapor-protective clothing.
- e. Classify the levels of hazardous materials equipment and respiratory equipment.
- f. Apprise safety precautions to be observed when approaching and working at a hazardous materials incident to include heat and cold stress, physical capabilities and limitations, and the buddy system.
- g. Apply the ability to don and doff all levels of chemical protective clothing.

PS-AFF-25. Learn skills and methods associated with the hazardous decontamination. Students will:

- a. Define decontamination.
- b. Identify the types of decontamination types and procedures.
- c. Construct an emergency plan for mass decontamination including recovery.

Academic Standards:

ELA9RC3: The student acquires new vocabulary in each content area and uses it correctly.

- a. *Demonstrates an understanding of contextual vocabulary in various subjects.*
- b. *Uses content vocabulary in writing and speaking.*

PS-AFF-26. Acquire knowledge in relation to terrorism awareness. Students will:

- a. Describe the threat posed by terrorism.
- b. Identify potential terrorist targets.
- c. Summarize the dangers posed by radiological incidents.

PS-AFF-27. Learn skills and methods associated with fire prevention and public education. Students will:

- a. Complete a residential fire safety survey.
- b. Perform a public fire safety education presentation on stop, drop, and roll.
- c. Execute a public fire safety education presentation on exit drills in the home.
- d. Present a public fire safety education program on smoke alarms.
- e. Plan a public education tour of a fire station.

PS-AFF-28. Acquire knowledge associated with fire detection, protection and suppression systems. Students will:

- a. Describe the basic components, functions, and types of a basic fire alarm system.
- b. Discuss the fire departments role in resetting fire alarms.
- c. Explain different ways in which fire alarms may be transmitted.
- d. Identify four types of sprinkler heads.
- e. Identify the different styles of indicating valves.
- f. Describe the following types of automatic sprinkler systems: wet-pipe, dry-pipe, preaction, and deluge.
- g. Demonstrate the ability to stop water at a single sprinkler head.
- h. Compare and contrast commercial and residential sprinkler systems.
- i. Analyze the three types of standpipes and state their differences.
- j. Identify hazards that specialized extinguishing systems can pose to responding firefighters.

PS-AFF-29. Develop an understanding of fire cause determination. Students will:

- a. Describe the role of the firefighter in the fire-cause determination process.
- b. Define the chain of custody.
- c. Differentiate accidental fires from incendiary fires.
- d. Analyze the point of origin.
- e. Describe demonstrative, direct, and circumstantial evidence.
- f. Compare techniques for preserving evidence.
- g. Identify the observations that firefighters should make during fire-ground operations.
- h. Explain the importance of securing property and protecting a fire scene.

Reading Across the Curriculum

Reading Standard Comment

After the elementary years, students engage in reading for learning. This process sweeps across all disciplinary domains, extending even to the area of personal they experience text in all genres and modes of discourse. In the study of various disciplines of learning (language arts, mathematics, science, social studies), students must learn through reading the communities of discourse of each of those disciplines. Each subject has its own specific vocabulary, and for students to excel in all subjects, they must learn the specific vocabulary of those subject areas in context.

Beginning with the middle grades years, students begin to self-select reading materials based on personal interests established through classroom learning. Students become curious about

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science, mathematics, history, and literature as they form contexts for those subjects related to their personal and classroom experiences. As students explore academic areas through reading, they develop favorite subjects and become confident in their verbal discourse about those subjects.

Reading across curriculum content develops both academic and personal interests in students. As students read, they develop both content and contextual vocabulary. They also build good habits for reading, researching, and learning. The Reading Across the Curriculum standard focuses on the academic and personal skills students acquire as they read in all areas of learning.

Students will enhance reading in all curriculum areas by:

- a. Reading in all curriculum areas
 - Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas.
 - Read both informational and fictional texts in a variety of genres and modes of discourse.
 - Read technical texts related to various subject areas.
- b. Discussing books
 - Discuss messages and themes from books in all subject areas.
 - Respond to a variety of texts in multiple modes of discourse.
 - Relate messages and themes from one subject area to messages and themes in another area.
 - Evaluate the merit of texts in every subject discipline.
 - Examine author's purpose in writing.
 - Recognize the features of disciplinary texts.
- c. Building vocabulary knowledge
 - Demonstrate an understanding of contextual vocabulary in various subjects.
 - Use content vocabulary in writing and speaking.
 - Explore understanding of new words found in subject area texts.
- d. Establishing context
 - Explore life experiences related to subject area content.
 - Discuss in both writing and speaking how certain words are subject area related.
 - Determine strategies for finding content and contextual meaning for unknown words.

CTAE Foundation Skills

The Foundation Skills for Career, Technical and Agricultural Education (CTAE) are critical competencies that students pursuing any career pathway should exhibit to be successful. As core standards for all career pathways in all program concentrations, these skills link career, technical and agricultural education to the state's academic performance standards.

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The CTAE Foundation Skills are aligned to the foundation of the U. S. Department of Education's 16 Career Clusters. Endorsed by the National Career Technical Education Foundation (NCTEF) and the National Association of State Directors of Career Technical Education Consortium (NASDCTEc), the foundation skills were developed from an analysis of all pathways in the sixteen occupational areas. These standards were identified and validated by a national advisory group of employers, secondary and postsecondary educators, labor associations, and other stakeholders. The Knowledge and Skills provide learners a broad foundation for managing lifelong learning and career transitions in a rapidly changing economy.

CTAE-FS-1 Technical Skills: Learners achieve technical content skills necessary to pursue the full range of careers for all pathways in the program concentration.

CTAE-FS-2 Academic Foundations: Learners achieve state academic standards at or above grade level.

CTAE-FS-3 Communications: Learners use various communication skills in expressing and interpreting information.

CTAE-FS-4 Problem Solving and Critical Thinking: Learners define and solve problems, and use problem-solving and improvement methods and tools.

CTAE-FS-5 Information Technology Applications: Learners use multiple information technology devices to access, organize, process, transmit, and communicate information.

CTAE-FS-6 Systems: Learners understand a variety of organizational structures and functions.

CTAE-FS-7 Safety, Health and Environment: Learners employ safety, health and environmental management systems in corporations and comprehend their importance to organizational performance and regulatory compliance.

CTAE-FS-8 Leadership and Teamwork: Learners apply leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.

CTAE-FS-9 Ethics and Legal Responsibilities: Learners commit to work ethics, behavior, and legal responsibilities in the workplace.

CTAE-FS-10 Career Development: Learners plan and manage academic-career plans and employment relations.

CTAE-FS-11 Entrepreneurship: Learners demonstrate understanding of concepts, processes, and behaviors associated with successful entrepreneurial performance.