



Fire Science/Emergency Medical Responder **Course Outline**

Course Description

This 519-hour course introduces students to both academic and technical skills related to the fire service industry. This course uses an integrated approach to explore the science of fire with practical applications from the firefighting service industry. Students will work with both laboratory and practical applications from the firefighting field, including the functions of common equipment and methods emphasizing biological and chemical hazards, as well as safety issues, the science behind fire behavior, and working with fire professionals as resources for educating students on fire science and career opportunities. This course provides a scientific foundation for students interested in the field of fire science, integrating chemistry, biology, physics, and environmental science content, with practical applications related to the firefighting service industry. Students use scientific inquiry to not only explore how chemical bonding relates to combustion and fire suppression, but also how thermodynamics of fire has an impact on various materials, the human body, other living organisms, and its role in the natural environment. Throughout the course, students work with practical applications from the firefighting field, exploring the science behind the design and function of common equipment and methods. The combination of scientific inquiry into and practical applications of fire science provides students with a broad introduction to potential fire science concerns and career opportunities, from related technology and research, to wildland firefighting and resource management, to urban planning and urban firefighting. They acquire technical skills, vocabulary, and proficiency in the use of fire safety equipment and other industry standards while developing a deep understanding of the scientific principles that underpin industry methodology.

Course Details

Length of Program and Academic Credits Earned:

Year-long 3 hour course = 519 hours

30 total credits (15 per semester):

- 20 non-a–g elective credits (10 per semester)
- 10 UC “d” Chemistry credits (5 per semester)

Pre-Requisites:

- High School Junior or Senior
- Biology (recommended)
- Chemistry (recommended)
- Algebra 1 or Integrated Math 1 (Required)

CTE Classification:

- **Industry Sector:** Public Services
- **Industry Pathway:** Emergency Response
- **CA Basic Education Data System (CBEDS) Code:** 5810
- SVCTE Certificate of Completion awarded with “C” or better average for both semesters

FEMA Tests:

- S-130 Wildland Firefighter Training
- S-190 Introduction to Wildland Fire Behavior
- Q-543 Emergency Response to Terrorism
- Q-617 Wildland Fire Simulation
- Q-118 Community Service Educator
- Q-0890 Introduction to Emergency Response to Terrorism
- Q-0751 Principles of Building Construction
- Q-462: ICS-100 Intro to ICS for operational First Responders
- Q-463: ICS-200 Basic NIMS, ICS for Operational First Responders

State Certifications:

- First Aid, Basic CPR
- Health Care Provider CPR
- Automatic External Defibrillation (AED)
- Emergency Medical Responder
- Guard Card
- Blood Borne Pathogens
- Emergency Care & Safety Institute

State Tests:

- Confined Space Awareness
- Hazmat Awareness Operations

Community College Articulations

Students completing the Fire Science/First Responder course with a grade of “B” or better may be granted college units at the following community colleges:

- Foothill College – 5.0 units - More info and application form: www.foothill.edu
- Mission College – 9.0 units - More info and application form: www.mission.edu

Possible Education & Career Pathways

For more career information: www.onetonline.org

College & Career Pathways:	Career Opportunities	O*NET Codes
<u>Post-Secondary:</u> Students with a high school diploma and having successfully completed this course have a number of entry-level career opportunities, as well as continuing their education.	<ul style="list-style-type: none"> ● Lifeguard, Ski Patrol, and Other Recreational Protective Service Worker ● Security Guard ● Home Health Aide 	33-9092.00 33-9032.00 31-1011.00
<u>Continuing Education: Including Community College, Training Programs, Certifications, etc:</u> <ul style="list-style-type: none"> ● AA or AS in Paramedic, Chemistry, Public Health, or Fire Technology ● Police Academy ● EMT 	<ul style="list-style-type: none"> ● Emergency Medical Technician and Paramedic ● Firefighter ● Forest Firefighter ● Municipal Firefighter ● Police, Fire, and Ambulance Dispatcher ● Police Patrol Officer 	29-2041.00 33-2011.00 33-2011.02 33-2011.01 43-5031.00 33-3051.01
<u>University Majors & Degrees:</u> <ul style="list-style-type: none"> ● BA or BS in Public Administration, Environmental Sciences, Public Health, Criminal Justice, Chemistry, Park Management, Homeland Security & Public Safety, Emergency Management, Strategic Intelligence Studies, Health Studies Disaster or 	<ul style="list-style-type: none"> ● Fire Inspector ● Forest Fire Fighting and Prevention Supervisor ● Municipal Fire Fighting and Prevention Supervisor ● Forest Fire Inspectors and Prevention Specialist ● Fire Investigator ● Fire-Prevention and Protection Engineer 	33-2021.01 33-1021.02 33-1021.01 33-2022.00 33-2021.02 17-2111.02

Emergency Management	
<u>Post-Baccalaureate Degrees:</u> <ul style="list-style-type: none"> Masters or Doctorate in Public Safety Leadership, Project Management & Public Safety, Emergency Management, Disaster Preparedness, Executive Fire Management, or Emergency Management 	<ul style="list-style-type: none"> Emergency Management Director 11-9161.00

Ongoing Unit: Career Readiness & Professionalism	27 hours
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Students will develop personal and professional skills in the classroom that will transfer to the workplace.

- Time management and organization
- Interpersonal skills
- Work with a variety of technology
- Creative thinking and problem solving
- Job search skills including: resume, job applications and effective interview skills
- Essentials of fire department customer service

Standards Alignments:
CCSS: LS 11-12.1, 11-12.2, 11-12.6; **WS** 11-12.4, 11-12.5, 11-12.6; **WHSST** 11-12.4, 11-12.5, 11-12.6

Key Assignments	Anchor Standards	Pathway Standards
<ul style="list-style-type: none"> Key Assignment: Students will participate in mock interviews with industry professionals, peers and instructors to increase their communication, interpersonal and employability skill-set. Assessment: teacher observation, peer and audience feedback 	1.0, 2.0, 3.0, 5.0	B 1.1, B 1.2, B 1.3
<ul style="list-style-type: none"> Key Assignment: Students will prepare a portfolio including: an industry standard resume, references page, biographical statement and letter of introduction through workshop, self, peer editing, teacher instruction and demonstration. Assessment: teacher observation, written documentation, checklist 	2.0, 3.0, 4.0	B 1.1, B 1.2, B 1.3
<ul style="list-style-type: none"> Key Assignment: Students individually, in pairs and in groups will role play public safety scenarios where customer service is emphasized. Assessment: teacher observation, written documentation, checklist 	2.0, 5.0, 8.0, 9.0	B 1.4, B 3.2, B 6.4
<ul style="list-style-type: none"> Key Assignment: Students will self-assess periodically throughout the year their own 	2.0, 3.0, 5.0	B 1.1, B 1.2, B 1.3, B 1.4

<p>learning styles, character traits and professional behavior through self-discovery prompts, written essay and oral presentation.</p> <p>Assessment: teacher observation, written documentation, checklist</p>		
<p>✓ Key Assignment: After reading the Fire Service Reputation Management White Paper, students will evaluate a variety of inappropriate firefighter behaviors, identifying conflicts with the Firefighter Code of Ethics and suggest corrective action for fire company leadership for each scenario.</p> <p>Assessment: teacher observation, written documentation, peer feedback</p>	1.0, 2.0, 3.0, 5.0, 6.0, 7.0, 8.0	B 1.3, B 1.4, B 1.5

Unit 1: Principles of Firefighting	40 hours
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Students will explore principles of firefighting through theory and hands on training.

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| <ul style="list-style-type: none"> ● History of Fire Service ● Firefighter Safety ● Decision Making ● Personal Protective Equipment & Self-contained breathing apparatus ● Fire Service Communications | <ul style="list-style-type: none"> ● Incident Command Systems ● Fire Behavior ● Firefighter Survival ● Salvage and Overhaul ● Firefighter Rehabilitation | <ul style="list-style-type: none"> ● Fire Suppression ● Forcible Entry ● Ventilation and Water Supply ● Search and Rescue ● Terminology |
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Standards Alignments:

CCSS: LS 11-12.1, 11-12.2, 11-12.6

NGSS: SEP 1, 2, 3, 4, 5, 6, 7, 8; PS 1.A, B; 2.A, C; 3.D; CC 2, 5, 6, 7

Key Assignments	Anchor Standards	Pathway Standards
<p>✓ Lab- PPE: Using industry standard firefighting gear (turnout gear, SCBA bottles and mask, helmet, gloves, boots) students will don and doff gear within the industry standard of 60 seconds. Students will time each other and will demonstrate their skills to instructor for inspection. In addition, students will have the opportunity to participate in SkillsUSA to compete in this area.</p> <p>Assessment: teacher observation, written documentation, checklist</p>	2.0, 4.0, 6.0, 8.0, 10.0, 11.1	B 2.0, B 4.1, B 4.2, B 8.2, B 8.5
<p>✓ Lab- Search and Rescue: Instructor will provide a scenario based activity in the fire training tower which will include search and rescue, forcible entry and fire suppression techniques. In full gear, students will enter the tower, assess the situation and react accordingly to the threat. Students will engage in discussion and offer feedback</p>	2.0, 6.0, 7.0, 8.0, 9.0, 10.0, 11.1	B 2.5, B 3.0, B 4.0, B 8.2, B 8.5

regarding the activity to each other for self-improvement.		
Assessment: teacher observation, oral defense, checklist, discussion, peer feedback		

Unit 2: Fire Behavior/Thermodynamics of Fire	30 hours
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In this unit, students will investigate the physics and chemistry that contribute to the development and intensity of fires.

- Methods of heat transfer
- A, B, C, D, K fires
- Thermal layering
- Flame over
- Flush over
- Chemistry of fire
- 3 stages of matter
- Forms of energy
- Chemistry of combustion
- Characteristics of solid fuel fire
- Products of combustion
- Fire triangle
- Fire tetrahedron
- Backdraft

Standards Alignments:
CCSS: LS 11-12.1, 11-12.2, 11-12.6; **WS** 11-12.4, 11-12.5, 11-12.6, 11-12.7; **WHSST** 11-12.4, 11-12.5, 11-12.6, 11-12.7
NGSS: SEP 1, 2, 3, 4, 5, 6, 7, 8; **PS** 1.A, B; 2.A, C; 3.D; **CC** 2, 5, 6, 7

Key Assignments	Anchor Standards	Pathway Standards
<p>✓ Key Assignment- Heat Transfer: Students observe and record observations in their lab notebooks on demonstration experiments involving convection, conduction and radiation- the three means through which heat is transferred. Students will then apply these concepts to analyze videos of fire behavior, identifying hotspots, fire spread, and other elements of general behavior. Students will apply this understanding of the physical and chemical changes in matter that occur through heat transfer to explain how the physical states of fuel affect the combustion process, including units of measurement for temperature and energy: Joules, calories, and BTUs.</p> <p>Assessment: notebook check, observation, peer feedback</p>	1.0, 4.0, 6.0, 10.0	B 8.3, B 10.1, B 10.2, B 10.3
<p>✓ Key Assignment: Students will work in teams to design and present an airflow demonstration that investigates how venting changes the flow of air, and how it is an essential part of the combustion formula.</p> <p>Assessment: observation, peer feedback, self reflection, critique, public feedback</p>	1.0, 2.0, 5.0, 6.0, 10.0	B 8.3, B 8.6
<p>✓ Key Assignment: Students will analyze related video footage to determine the impact of different streams of water upon various fire sizes and locations. Students</p>	1.0, 2.0, 4.0, 5.0, 6.0, 10.0	B 8.3, B 8.4

<p>will refer to the fire classification system described and will demonstrate competence to instructor using actual fire fighting equipment.</p> <p>Assessment: observation, peer feedback, self reflection, check for compliance</p>		
<p>✓ Lab- Fuelish Choices: Students complete a standard bomb calorimetry lab comparing methanol and isopropanol as fuel test samples. Students compare the energy released by the combustion of a variety of carbon-based fuels, and are introduced to the joule and BTUs as units of energy, as well as heat of reaction and heat of combustion. Students apply these concepts to predict how fire will travel in a range of different settings.</p> <p>Assessment: notebook check, observation, peer feedback</p>	1.0, 2.0, 4.0, 5.0, 10.0	B 4.2, B 4.5, B 8.3, B 8.5, B 10.7
<p>✓ Lab: Students will design and conduct a science experiment that examines the impact of various fire suppressants on a common combustible, using a standard lab report format. Their experiment can include the impact of removing the reactants or adding the products of a reaction to suppress a fire. This experiment will be presented using a poster board that includes: Purpose (question), Hypothesis, Background Research, Materials, Procedures, Variables, Data, Results, Conclusion, Future Research (new question), and Bibliography.</p> <p>Assessment: notebook check, observation, peer feedback, written documentation, quiz, public feedback, discussion</p>	1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 9.0, 10.0	B 4.2, B 4.5, B 7.3, B 8.3, B 8.5
<p>✓ Lab: Students will observe a demonstration where chemical compounds are introduced into flame whereby a specific color is released. After seeing various chemical compounds introduced into flame, the students will then be able to predict the color of other compounds, and identify their components.</p> <p>Assessment: discussion, observation, notebook check, quiz</p>	1.0, 2.0, 4.0, 5.0, 10.0	B 8.3, B 7.1

Unit 3: Hazardous Materials/Fire Chemistry

40 hours

Students explore chemical bonding of elements and the resultant changes by interacting with both text and media resources, and experimenting with and observing various forms of combustion.

- Fire chemistry
- Hazardous material awareness/operations
- Properties and effects
- Boiling point
- Reading smoke
- Recognizing and identifying hazards
- Implementation and response
- Personal and Protective Equipment
- Spontaneous combustion
- Vapor density
- Decontamination procedures
- Specific gravity
- Household hazards
- Flammable limits
- BLEVE
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Standards Alignments:

CCSS: LS 11-12.1, 11-12.2, 11-12.6; **WS** 11-12.4, 11-12.5, 11-12.6; **WHSST** 11-12.4, 11-12.5, 11-12.6; **RSIT** 11-12.1

NGSS: SEP 1, 2, 3, 4, 5, 6, 7, 8; PS 1.A, B, 2.A, C, 3.D; CC 2, 5, 6, 7

Key Assignments	Anchor Standards	Pathway Standards
<p>✓ Key Assignment: Instructor will provide a scenario of a hazardous incident, students will assess the situation using the Emergency Response Guide to analyze the incident, identify the problem and the behavior of hazmat/WMDs and containers present. Students will also plan an initial response, develop an incident action plan and communicate that plan in accordance with standard operating procedures/guidelines (SOPs/SOGs) and available equipment and personnel.</p> <p>Assessment: written exam at 70% or better, skills testing</p>	1.0, 2.0, 3.0, 6.0, 7.0, 10.0	B 1.2, B 2.3, B 2.4, B 3.0, B 4.1, B 4.3, B 4.5, B 7.1
<p>✓ Key Assignment: Utilizing the industry standard numerical and alphabetical classification system, students will identify multiple chemicals and states of matter. Students will then analyze their properties, potential hazards and record them on a teacher provided checklist.</p> <p>Assessment: written exam at 70% or better, skills testing</p>	1.0, 2.0, 5.0, 6.0, 10.0	B 1.2, B 7.0, B 3.10, B 4.5
<p>✓ Key Assignment: Students apply scientific concepts covered in the unit, and refer to the National Institute of Health’s Chemical Hygiene Plan, and the U.S. EPA Household Hazardous Waste site to analyze common chemical storage practices in their own households, and develop a written plan for chemical storage of hazardous materials that addresses the potential dangers of chemical reactions, including a</p>	4.0, 5.0, 10.0	B 4.5, B 7.0

<p>detailed graphic display.</p> <p>Assessment: observation, peer feedback, self reflection, check for compliance, peer critique</p>		
<p>✓ Key Assignment: Working in teams, students analyze scenarios to predict the potential hazards caused by volatile gases interacting with a variety of environmental factors to determine when “spontaneous” combustion is most likely to occur. Each student group will develop an analysis of one scenario to present to the class, by creating a poster that represents their predictions for the development of the fire.</p> <p>Assessment: observation, peer feedback, self reflection, check for compliance, peer critique</p>	5.0, 10.0	B 4.5, B 7.0
<p>✓ Lab-Fired Up: Students will observe demonstrations of various combustible reactants and their products to identify the reactants and how removing the reactants or adding the products of a reaction can suppress a fire.</p> <p>Assessment: observation, discussion, quiz</p>	4.0, 5.0, 7.0, 10.0	B 4.5, B 7.0, B 8.0
<p>✓ Lab-Where’s the Heat: Students change the temperature of water to measure how temperature change affects gas formation and how transformation from a solid to a gaseous state changes chemical characteristics.</p> <p>Assessment: observation, discussion, quiz, notebook check</p>	4.0, 5.0, 10.0	B 8.3
<p>✓ Lab-You’re Fired: Students work in groups of four to discover what types of substances are combustible. Students make predictions about four more substances based on the patterns they have found, then confirm or refute their predictions based on teacher demonstrations. In addition, students measure detectable rates of diffusion on a variety of scented, non-toxic gases to understand how volatile gases travel.</p> <p>Assessment: observation, discussion, quiz, notebook check, discussion</p>	1.0, 2.0, 3.0, 4.0, 5.0, 10.0	B 8.3
<p>✓ Lab-Fire Extinguisher: After observing various fire extinguishers, students analyze how chemical fire extinguishers interrupt combustion and describe the chemical and physical interactions that take place when specific types of chemical extinguishers are utilized for specific types of fires.</p> <p>Assessment: observation, discussion, quiz, notebook check, discussion</p>	4.0, 5.0, 7.0, 10.0	B 8.3, B 8.4

Unit 4: Fire in Nature **30 hours**

In this unit, students will develop their understanding of fire behavior through an environmental science introduction to fire science in wildlands.

- Seed germination
- Wildlife impact
- Forest ecosystem
- Forest management strategies
- Forest understory clearing
- Soil nutrients
- Fire suppressants
- Contributing human actions
- Weather patterns
- Wildlife management
- Climate change

Standards Alignments:

CCSS: LS 11-12.1, 11-12.2, 11-12.6; WS 11-12.4, 11-12.5, 11-12.6, 11-12.7; **WHSST** 11-12.4, 11-12.5, 11-12.6; **RSIT** 11-12.1

NGSS: SEP 1, 2, 3, 4, 5, 6, 7, 8; **PS** 1.A, B, 2.A, C, 3.D; **LS**1.A, B, 2.A, B; **CC** 2, 5, 6, 7

Key Assignments	Anchor Standards	Pathway Standards
<p>✓ Key Assignment: After watching a variety of fires in nature related videos, students will work in groups to create a poster and presentation on fire in nature, including benefits such as seed germination, clearing the understory of the forest, and replenishing nutrients in the soil, as well as drawbacks, such as the impact on wildlife, invasive species and fire suppressants. Students will be assessed on both content and presentation skills using a rubric.</p> <p>Assessment: rubric, written documentation, observation, student/instructor conferencing, self reflection, peer feedback, quiz</p>	1.0, 2.0, 3.0, 4.0, 5.0, 10.0	B 10.1, B 10.2, B 10.7, B 10.9
<p>✓ Key Assignment: After viewing a PowerPoint about fire behavior in wild lands and its impact on the forest ecosystem, students will then conduct a <i>Fireworks</i> lab activity with a matchstick model of a forest (both resources from the US Dept. of Agriculture Forest Service), students will view a videotape of wildland fires burning in three layers of the forest, taking notes on their observations. They will then write a 2-3 page report using their observations, and applying what they have learned about fire behavior and the fire tetrahedron to analyze the differences in fire behavior at each of the three layers.</p> <p>Assessment: rubric, written documentation, observation, student/instructor conferencing, self reflection, peer feedback, quiz</p>	1.0, 2.0, 4.0, 5.0, 10.0	B 10.1, B 10.2, B 10.7, B 10.9
<p>✓ Key Assignment: After working with resources on wildfire management, students will identify the effects of fuel treatment and weather on behavior of a subsequent wildland</p>	1.0, 2.0, 4.0, 5.0, 10.0	B 10.1, B 10.2, B 10.7,

<p>fire using a worksheet from a US Forest Service lesson plan (www.fs.fed.us/rm/fire_game/lessons/lessonplan.pdf). Students will work in groups to research other types of wildfires, such as lodgepole pine forests, whitebark pine forests, or grassland fires that occur in their local area, using resources such as the NPR's five-part documentary on Megafires, the Fire Effects Information System (www.fs.fed.us/database/feis), and research posted on fire research centers website. Interviews with local fire science experts will augment their research, which will be used to create a poster on fire management practices for that specific type of wildland. Using their poster, students will present to their classmates their analysis of the, sources, challenges and extent of natural and human-induced hazards while identifying possible fire management strategies that minimize risks of injury to the environment and to the human population. Their poster will include their hypothesis, the materials and methods involved in their research, data displays, findings, and conclusion.</p> <p>Assessment: rubric, written documentation, observation, gallery walk, self reflection, peer feedback, quiz, critique</p>		B 10.9
<p>✓ Key Assignment: Students will enhance their understandings of the science of fire behavior in both urban and wildlands as they investigate fire behaviors in urban interfaces. After reading a research report on urban interface fires, and excerpts from FEMA's Student Manual on Wildland Urban Interface Firefighting, and after reviewing video examples of wildfires that interface with urban environments, students will research and write a 7 - 10 page paper, create a poster board or develop a presentation using presentation software incorporating and synthesizing fire science applications from both urban and wildland contexts to analyze the impact of a specific urban interface fire on people, watersheds and wildlife; as well as the strategies used in dealing with it, such as prevention, defensible space management, and controlled burns; and issues that impacted strategic decisions, such as access, types of structures, and water sources. This paper will require scholarly formatted references, a bibliography, and the use of data displays to support the written work. Students will submit two drafts of their product. Fire professionals will come to the class to work with specific teams of students to review and provide suggestions.</p> <p>Assessment: observation, peer feedback, self reflection, check for compliance, peer critique</p>	1.0, 2.0, 3.0, 4.0, 5.0, 10.0	B 8.3, B 10.1, B 10.2, B 10.7, B 10.9
<p>✓ Key Assignment: Students will research the impact of climate change on wildfires, such as changes in weather patterns' affect on fuels, and the reciprocal exacerbating impact of wildfires on global warming, as well as contributing human actions, such as slash and</p>	1.0, 2.0, 4.0, 5.0, 10.0	B 10.1, B 10.2, B 10.7, B 10.9

<p>burn agricultural practices that increase greenhouse gases and cloud creation, and poor forest management strategies. Students will then work in groups to produce and present a poster describing these interconnections between climate change and wildfire.</p> <p>Assessment: rubric, written documentation, observation, gallery walk, self reflection, peer feedback, quiz, critique</p>		
<p>✓ Lab-Fire in Wildlands: In this Fire Works lab, students construct and demonstrate principles of fire behavior in wildlands using matches to model trees and a matrix of matches to model a forest. They compare fire behavior on different slopes and with different arrangements of trees.</p> <p>Assessment: quiz</p>	1.0, 2.0, 4.0, 5.0, 10.0	B 10.1, B 10.2, B 10.7, B 10.9
<p>✓ Lab-Smoke Makes Clouds: Students will complete the activity “Cloud in a Bottle” developed by the San Francisco Exploratorium. Students will try to make a cloud in a bottle by using water and changing the air pressure. Then the students will light a match and drop it into the bottle, adding soot and smoke. When the students increase the pressure by squeezing the 2-Liter bottle a cloud will form at the top of the bottle because there is something for the water molecules to attach to. Slash and burn or wildfires can cause a change in the cloud formation and reflection ability of clouds. This can not only cause a local cooling effect in the region, but can affect global warming on a large scale. Students will read a NASA article about fire’s effect on climate change and then make a t-chart of the regional and global impacts of fire and climate change.</p> <p>Assessment: observation, notebook check</p>	1.0, 2.0, 4.0, 5.0, 10.0	B 8.3

Unit 5: Emergency Medical Responder Training	180 hours
<p>Students will receive an Emergency Medical Responder Certificate after successful completion of the course. They will explore legal and ethical issues associated with being a Medical Responder in addition to all necessary protocols and procedures.</p>	
<ul style="list-style-type: none"> ● Medical responder ● Standard of care ● Legal and ethical issues ● Airway management ● Medical emergencies ● Trauma ● Wound management ● Special patient populations ● Certifications/Exam preparations ● Terminology/Acronyms 	

Standards Alignments:

CCSS: LS 11-12.1, 11-12.2, 11-12.6; WS 11-12.4, 11-12.5, 11-12.6; **WHSST** 11-12.4, 11-12.5, 11-12.6; **RSIT** 11-12.1

NGSS: SEP 1, 2, 3, 4, 5, 6, 7, 8; LS 1.B

Key Assignments	Anchor Standards	Pathway Standards
<p>✓ Key Assignment: Individually and in pairs, students will use an instructor provided checklist/skill-sheet to identify and assess patient head, ears, eyes, nose, throat, chest, abdomen, pelvis and extremities on mannequins and real-life patients.</p> <p>Assessment: teacher observation, written documentation, checklist</p>	1.0, 2.0, 5.0, 6.0, 7.0, 10.0	B 1.2, B 2.3, B 2.4, B 9.1, B 9.2, B 9.9
<p>✓ Key Assignment: Using child-birth mannequins, PPE and provided protocol check-list, students will identify the stages of labor, detect crowning and prepare for delivery.</p> <p>Assessment: teacher observation, demonstration, checklist</p>	1.0, 2.0, 5.0, 6.0, 11.0	B 1.1, B 1.2, B 9.1, B 9.4 B 9.6, B 9.7, B 9.9, B 9.10
<p>✓ Key Assignment: Through group collaboration and role playing, students will perform patient management techniques on each other to include: lifting, lashing, c-spine management and patient assessment.</p> <p>Assessment: teacher observation, written documentation, checklist</p>	1.0, 6.0, 7.0, 10.0, 11.0	B 1.2, B 9.1, B 9.3, B 9.6
<p>✓ Key Assignment: Students will identify the characteristics of each type of burns: superficial, partial thickness and full thickness. They will discuss the characteristics and treatments for first-, second-, and third-degree burns then illustrate, label and color the layers and parts of the skin.</p> <p>Assessment: teacher observation, drawing check for accuracy, peer feedback</p>	1.0, 6.0, 7.0, 10.0	B 9.1, B 9.2, B 9.3, B 9.6, B 9.8, B 9.9, B 9.10
<p>✓ Key Assignment: Students will extract a patient from a vehicle demonstrating proper lifting and removal skills using a backboard and Kendrick Extrication Device (KED).</p> <p>Assessment: teacher observation, written documentation, demonstration</p>	1.0, 5.0, 9.0, 10.0	B 1.2, B 9.1, B 9.3, B 9.7, B 9.8, B 9.10

Unit 6: Health Care Provider CPR

15 hours

After completion of this unit, students will be certified in Basic and Healthcare Provider CPR.

- Resuscitation efforts
- Automatic External Defibrillator (AED)
- Choking Relief
- American Heart Association exam prep
- Terminology/Acronyms
- Respiratory system

Standards Alignments:

CCSS: LS 11-12.1, 11-12.2, 11-12.6; WS 11-12.4, 11-12.5, 11-12.6, 11-12.7; WHSST 11-12.4, 11-12.5, 11-12.6, 11-12.7; RSIT 11-12.1
NGSS: SEP1, 2, 3, 4, 5, 6, 7, 8; PS 1.A, 3.D, LS1.A, B; CC 2, 5, 6, 7

Key Assignments	Anchor Standards	Pathway Standards
<p>✓ Key Assignment: Students will participate in the instructor led course for the American Heart Association Basic Life Supports which trains participants to promptly recognize several life-threatening emergencies, give high-quality chest compressions, deliver appropriate ventilations and provide early use of an AED. Upon successful completion of this course, students will receive certification.</p> <p>Assessment: written exam at 84% or better, skills testing</p>	1.0, 2.0, 6.0, 7.0, 9.0, 10.0	B 1.1, B 1.2, B 2.3, B 9.0
<p>✓ Key Assignment: After exploring the respiratory system in depth using online interactive activities, animations, articles, and videos, students will create an art project/poster with pop-up pieces that have flaps for each structure, describing lung anatomy functions.</p> <p>Assessment: rubric, written documentation, observation, gallery walk, self reflection, peer feedback, quiz, critique</p>	1.0, 2.0, 5.0, 10.0	B 9.1, B 9.2, B 9.3
<p>✓ Key Assignment: Using the Environmental Tobacco Smoke and Lung Development Activity. Students will explore toxicology and lung toxicology, then record and analyze data from a simulated lab activity on the impact of second-hand smoke on the lungs,</p> <p>Assessment: quiz, data check</p>	1.0, 2.0, 5.0, 6.0	B 9.1, B 9.3
<p>✓ Key Assignment: After interviewing guest speakers including local firefighters or industry personnel who have suffered disabilities from smoke and toxic gases, students will research long term health effects of smoke and/or toxin exposures for a case study. Students will produce a 3-5 page research paper or info-graphic citing at least three credible sources on a specific fire or hazmat incident and its biological processes affecting/impacting human health.</p> <p>Assessment: rubric, written documentation, observation, self reflection, peer feedback, quiz</p>	1.0, 2.0, 5.0, 6.0	B 9.1, B 9.9, B 9.10

Unit 7: Community Service	18 hours
<p>Students will engage in a variety of public service projects throughout the year.</p> <ul style="list-style-type: none"> ● Professionalism and customer service ● Exposure to the public ● Community service projects ● Public awareness ● Organizational skills ● Collaboration and leadership Skills ● Team building 	

Standards Alignments:		
CCSS: LS 11-12.1, 11-12.2, 11-12.6; WS 11-12.4, 11-12.5, 11-12.6, 11-12.7; WHSST 11-12.4, 11-12.5, 11-12.6; RSIT 11-12.1		
Key Assignments	Anchor Standards	Pathway Standards
<p>✓ Key Assignment: Working collaboratively students will use PowerPoint to present to the class their research on a variety of places to perform community service, their step by step job breakdown, and lesson plan.</p> <p>Assessment: rubric, teacher observation and feedback</p>	2.0, 3.0, 4.0, 8.0	B 1.4, B 1.5, B 3.0, B 8.8
<p>✓ Key Assignment: Students will complete 50 hours of community service based projects within their community to strengthen their ties and enhance their communication skills.</p> <p>Assessment: log book, feedback from event organizer</p>	2.0, 7.8, 8.0, 9.0	B 8.8, B 9.0
<p>✓ Key Assignment: Students will develop writing, digital media, and public speaking skills by creating brochures and delivering presentations for the school and/or general public regarding fire safety, including an explanation of the scientific concepts that underlie the hazards in each situation, such as: how to use a fire extinguisher, safely store chemicals in the home, smoke detector placement and maintenance, create defensible space to protect homes from vegetation fires, ensure adequate egress from windows and doors in a building, and disaster preparedness.</p> <p>Assessment: rubric, written documentation, observation, gallery walk, self reflection, peer feedback, quiz, critique, public feedback</p>	2.0, 4.0, 10.0	B 2.1, B 6.4, B 8.8

Unit 8: EMS Tools & Equipment	17 hours
<p>Students will engage in hands-on experiential learning working with the following:</p> <ul style="list-style-type: none"> • Communication & Documentation Equipment to include: radios, patient contact report form • Airway Management Equipment to include: cannulas, back valve mask, O2 cylinders, OPAs, NPAs, pocket mask, non-rebreather, bag valve mask • Personal Protection Equipment to include: EMS coat, safety glasses, gloves, • Emergency Medical Responder Equipment to include: backboard, cervical collar, strapping, KED sled, gurney, hare traction, blood pressure cuff • Cleaning and Maintenance 	

Standards Alignments:

CCSS: LS 11-12.1, 11-12.2, 11-12.6; **WS** 11-12.4, 11-12.5, 11-12.6; **WHSST** 11-12.4, 11-12.5, 11-12.6; **RSIT** 11-12.1

NGSS: SEP 1, 2, 3, 4, 5, 6, 7, 8; **LS** 1.A, B

Key Assignments	Anchor Standards	Pathway Standards
<p>✓ Key Assignment: Using industry standard practices, students will be provided a variety of scenarios where they will have to demonstrate to the instructor proper donning and doffing of all Personal Protection Equipment.</p> <p>Assessment: teacher observation, peer feedback, scenario based testing</p>	1.0, 6.0, 10.0	B 1.2, B 2.2, B.2.3, B 4.2
<p>✓ Key Assignment: Given a teacher provided scenario of an automobile accident, students will perform a patient assessment, determine the proper medical equipment, proper use of equipment, rescue a peer from a damaged automobile and provide a written report.</p> <p>Assessment: teacher observation, written documentation, checklist</p>	1.0, 6.0, 9.0, 10.0	B 1.4, B 3.7, B 4.2, B 10.0

Unit 9: Fire Fighting Tools & Equipment 32 hours

Students will be introduced to the various tools and equipment essential to the industry.

- Personal Protective Equipment (PPE)
- Self-Contained Breathing Apparatus (SCBA)
- Fire extinguisher
- Ropes and knots
- Forcible entry tools
- Fire service Ladders
- Fire hoses and appliances
- Firm detection systems
- Incident command
- Water fire streams
- Cleaning and maintenance

Standards Alignments:

CCSS: LS 11-12.1, 11-12.2, 11-12.6; **WS** 11-12.4, 11-12.5, 11-12.6; **WHSST** 11-12.4, 11-12.5, 11-12.6; **RSIT** 11-12.1

NGSS: SEP 1, 2, 3, 4, 5, 6, 7, 8; **PS** 1.A, B, 2.A, C, 3.D; **LS** 1.A, B, 2.A,B; **CC** 2, 5, 6, 7

Key Assignments	Anchor Standards	Pathway Standards
<p>✓ Key Assignment: Given a fire engine with fully loaded 5" bed of hose, an engineer, a working hydrant, hydrant bucket with 2 spanner wrenches, a 2 ½" gate valve, 4"</p>	1.0, 5.0, 7.0, 9.0, 10.0	B 1.2, B 1.4, B 2.3,

<p>adapter and hydrant wrench, students (in full turnouts) will take a hydrant and supply water to the fire engine and disconnect the supply hose and hook it to the side inlet following all San Jose Fire Department standard operating procedures.</p> <p>Assessment: completion within 2 minutes and 30 seconds, 80% or better accuracy on all skills from skill sheet</p>		B 4.2, B 8.0, B 8.2, B 8.5
<p>✓ Key Assignment: Given a 24-foot ladder placed on the ground 25 feet away from the structure. Students will be in full turnouts, wearing SCBA, gloves and helmet (mask and goggle do not need to be worn). Firefighter will stand on the middle of ladder. Students will be given an assistant to foot ladder while he or she is on the ladder. The assistant will not offer verbal assistance and will not perform any actions until asked to do so. The assistant will be in full turnouts and wear goggles while footing the ladder (SCBA is not required).</p> <p>Assessment: Complete all aspects of the evolutions within 2 minutes and 30 seconds. 80% or better accuracy on all skills from skill sheet</p>	5.0, 6.0, 7.0, 9.0, 10.0	B 1.0, B 1.4, B 8.0, B 8.2, B 8.5
<p>✓ Key Assignment: Given a SCBA, students, in full turnouts, will don SCBA using either the coat method or over-the-head method method and secure all straps. Students will put facepiece on correctly and will finish securing all PPE in accordance with the department SOP.</p> <p>Assessment: completion within 60 seconds, 80% or better accuracy on all skills</p>	6.0, 7.0, 10.0	B 1.0, B 1.4, B 8.0, B 8.2, B 8.5
<p>✓ Key Assignment: Given a 20' (minimum) piece of rope, pike pole, axe, chainsaw, roof ladder, and one length of uncharged 2 ½" hose line with nozzle, students will tie a Square Knot, Bowline, Becket Bend, Figure Eight Follow Through and will tie off for hoisting a pike pole, axe, roof ladder, chain saw and an uncharged 2 ½" hose line with nozzle</p> <p>Assessment: timed quiz, observation, skills sheet</p>	5.0, 7.0, 10.0	B 1.0, B 1.1, B 1.2, B 1.4, B 8.2
<p>✓ Lab- Personal Safety Equipment (PPE): After viewing a training video by FireRescue.com on tips for conserving SCBA air, students will work with a SCBA. They will learn the different SCBA components, proper handling, storage methods, how to properly don and doff SCBA and manage/operate personal alert safety systems (PASS).</p> <p>Assessment: quiz, observation, demonstration</p>	1.0, 4.0, 6.0, 10.0	B 4.2, B 8.2
<p>✓ Lab: Students will design and conduct a science experiment that examines the</p>	1.0, 2.0, 4.0	B 8.0, B 8.3, B 8.5

<p>impact of various fire suppressants on a common combustible, using a standard lab report format. Their experiment can include the impact of removing the reactants or adding the products of a reaction to suppress a fire. This experiment will be presented using a poster board that includes: Purpose (Question), Hypothesis, Background Research, Materials, Procedures, Variables, Data, Results, Conclusion, Future Research (New Question), and Bibliography</p> <p>Assessment: rubric, written documentation, observation, gallery walk, self reflection, peer feedback, quiz, critique</p>		
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Unit 10: Search & Rescue	18 hours
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Search and rescue is a vital component to the fire science industry. Students will take a hands-on approach to a variety of essential skills and techniques.

- Building construction
- Ventilation
- Search and rescue techniques
- Rescue and removal of victims
- Thermal imaging devices
- Patient carries

Standards Alignments:

CCSS: LS 11-12.1, 11-12.2, 11-12.6; WS 11-12.4, 11-12.5, 11-12.6; **WHSST** 11-12.4, 11-12.5, 11-12.6; **RSIT** 11-12.1
NGSS: SEP 1, 2, 3, 4, 5, 6, 7, 8; PS 1.A, B, 2.A, C, 3.D, LS 1.A, B, 2.A, B, ETS 1; CC 2, 5, 6, 7

Key Assignments	Anchor Standards	Pathway Standards
<p>✓ Key Assignment: Provided with a variety of simulated technical rescue incidents throughout the second semester, PPE, and various types of public barriers, students will identify the type of incident, assess the hazards, secure the scene, call for appropriate assistance, establish public barriers and assist simulated special rescue teams.</p> <p>Assessment: 80% or better accuracy on all skills from skill sheet, instructor observation, self-reflection</p>	2.0, 5.0, 6.0, 9.0, 10.0	B 1.0, B 1.1, B.1.4, B 9.11
<p>✓ Key Assignment: Provided with PPE, SCBA, portable radio, flashlights, hand tools, ladders, and a structure deemed safe to conduct primary search, students will</p>	2.0, 7.0, 10.0	B 2.3, B 3.0, B 3.1, B 3.8

<p>conduct a primary search of a building and rescue any victims as part of a search team. They will assess for hazards, determine tenability of areas within the building, utilize hand tools for forcible entry, set up ladders to assist in rescue, and rescue any victims while conducting a primary search of a structure</p> <p>Assessment: 80% or better accuracy on all skills from skill sheet, instructor observation, self-reflection, peer feedback, knowledge test, written exam</p>		
<p>✓ Key Assignment: After reading about common building materials used in structures, how those materials inhibit or speed up the flow of fire, and previous lab participation, students will apply the information to their pre-incident diagrams to assess building construction materials, building contents, safety features, and impact on the development of a fire. Student teams will analyze how fire would develop in their building in response to variations in combustible materials, implementation of safety features, and ventilation. Each student will write their analysis on one such scenario, including for that scenario an explanation of two or more basic thermodynamic principles at work.</p> <p>Assessment: written documentation, data check, observation, peer and instructor feedback, quiz</p>	1.0, 2.0, 4.0, 10.0	B 8.6

Unit 11: Fire Prevention	11 hours
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Students will learn the essentials of fire prevention including:

- Public education
- Fire protection systems
- Building occupancy types
- Code enforcement
- Fire safety inspections
- Fire cause and determination

Standards Alignments:
CCSS: LS 11-12.1, 11-12.2, 11-12.6; **WS** 11-12.4, 11-12.5, 11-12.6, 11-12.7; **WHSST** 11-12.4, 11-12.5, 11-12.6, 11-12.7; **RSIT** 11-12.1
NGSS: SEP 1, 2, 3, 4, 5, 6, 7, 8

Key Assignments	Anchor Standards	Pathway Standards
<p>✓ Key Assignment: The students will develop and properly conduct a motivational</p>	1.0, 2.0, 6.0, 7.0, 8.0, 10.0	B.1.2, B 6.3, B 6.4, B 8.0,

<p>and well-organized public fire safety education presentation about “Stop, Drop, and Roll,” and smoke detectors to a citizen group such as a school class, scout troop, church group, senior citizen group, or civic organization.</p> <p>Assessment: teacher observation, participant feedback, peer feedback</p>		B 8.3, B 8.8
<p>✓ Key Assignment: Using AHJ’s Standard Operating Procedures for performing a residential fire safety survey, public education materials, their personal residence, appropriate attire, and a checklist. Students will conduct a residential fire safety survey, identify fire and life safety hazards, make recommendations to rectify unsafe conditions, answer or refer questions, and complete a skill-sheet form to submit to instructor.</p> <p>Assessment: skills checklist, parent/guardian feedback</p>	1.0, 2.0, 6.0, 7.0, 8.0, 11.0	B 6.4, B 7.1, B 7.3, B 7.5, B 8.3, B 8.8
<p>✓ Lab-Smoke Detector Testing: Students will compare the effectiveness of an ionizing and o a photoelectric smoke alarm in both flaming and smoldering fire contexts.</p> <p>Assessment: demonstration and oral defense</p>	1.0, 4.0, 5.0, 10.0	B 8.0, B 8.3, B 8.4

Unit 12: Specialized Training	30 hours
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Students will be introduced to low occurrence technical rescue incidents and be taught proper conduct required at the scene.

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| <ul style="list-style-type: none"> ● Confined Space Awareness Training FSTEP & Test Prep ● Hazardous Materials Awareness/Operations, CSTI ● State Fire Marshall Training and certification prep | <ul style="list-style-type: none"> ● Catastrophic Event Planning and incident critiques ● Roles of Federal, State and Local agencies ● National and man-made disasters |
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Standards Alignments:

CCSS: LS 11-12.1, 11-12.2, 11-12.6; **WS** 11-12.4, 11-12.5, 11-12.6; **WHSST** 11-12.4, 11-12.5, 11-12.6; **RSIT** 11-12.1

NGSS: SEP 1, 2, 3, 4, 5, 6, 7, 8; **PS** 1.A, B, 2.A, C, 3.D, **LS** 1.A, B, 2.A,B, **ETS1**

Key Assignments	Anchor Standards	Pathway Standards
<p>✓ Key Assignment: Donning PPE, students will utilize a donated vehicle during a simulated technical rescue incident to demonstrate safe response and proper</p>	1.0, 5.0, 6.0, 7.0, 9.0, 10.0, 11.0	B 1.2, B 1.3, B 1.4, B 8.0, B 8.2, B 9.11

<p>placement of emergency vehicle to protect and secure the scene, call for appropriate assistance, identify and retrieve various types of rescue tools.</p> <p>Assessment: observation, group discussion, peer and instructor feedback</p>		
<p>✓ Key Assignment: After seeing a video on the impact of an earthquake on fire safety, students will research the safety implications of a major earthquake by reading a report on the 1989 Loma Prieta Earthquake. Using that historical data, students will project the potential concerns for a future earthquake centered in their vicinity in a two page report with recommendations for the Community Emergency Response Team. Guest speakers from that team will be asked to present earthquake emergency response plans to the class.</p> <p>Assessment: public review/feedback, observation</p>	1.0, 2.0, 4.0, 6.0, 10.0	B 2.7, B 6.2, B 6.4, B 6.5
<p>✓ Key Assignment: After reading from course textbook and supplemental materials regarding emergency and disaster planning, and receiving a presentation from their Community Emergency Response Team, student will work in teams to evaluate different aspects of their school’s natural disaster emergency response plan, such as whether equipment and supplies are in place, and whether the response team at the school is trained and aware of their duties. Student teams will create a written report along with a poster, checklist, or other tool that could support this plan and create awareness among the school staff and student community</p> <p>Assessment: written documentation, peer/group feedback and discussion, quiz</p>	1.0, 2.0, 4.0, 6.0, 10.0	B 6.0, B 6.1, B 6.2, B 6.4

<h3>Unit 13: Fitness & Nutrition</h3>	9 hours
<p>Students will participate in specific fitness techniques designed to improve their cardiorespiratory endurance, muscular strength and flexibility.</p> <ul style="list-style-type: none"> ● Nutrition ● Fitness ● Strength ● Agility ● Psychological health and well-being <p>Standards Alignments: CCSS: LS 11-12.6, RRSLT 11-12.3</p>	

NGSS: LS 2.D

Key Assignments	Anchor Standards	Pathway Standards
<p>✓ Key Assignment: Individually, students will participate in a variety of Candidate Physical Agility Testing (CPAT) skills related to the job duties: stair climbing, hose pull, ladder carry and raise, tunnel crawl, equipment carry, firefighting techniques in preparation for optional CPAT Certification.</p> <p>Assessment: skills checklist to 100% accuracy on eight separate events. This is a pass/fail test based on a validated maximum total time of 10 minutes and 20 seconds.</p>	1.0, 3.0, 10.0, 11.1	B 1.0, B 1.1, B 1.2, B 5.0, B 5.1, B 5.2, B 5.3, B 5.4, B 5.5, B 8.2
<p>✓ Key Assignment: Firefighting is risky business, a firefighter's most important responsibility is to finish the shift or the call in the same (or better) condition than he or she began it. Coming home safely means knowing one's job, understanding the risks one faces as a firefighter, and taking steps to prevent injuries by reducing or eliminating those risks. To promote awareness, students will collaboratively research and develop a presentation to present to their instructor and peers on a variety of topics related to health, fitness and nutrition including: job safety, proper eating habits, correct lifting techniques, hydration, and mental fitness.</p> <p>Assessment: rubric, peer feedback, instructor observation, written documentation</p>	1.0, 6.0, 7.0, 10.0	B 1.0, B 1.1, B 1.2, B 1.3, B 1.4, B 5.0, B 5.1, B 5.2, B 5.3, B 5.4, B 5.5, B 8.2

Unit 14: Patient Examination

10 hours

Students will use scene information and simple patient information findings to identify and manage immediate life threats and injuries within the scope and practice of the emergency medical responder (EMR).

- Anatomy: planes of the body, anatomic position
- Respiratory system
- Circulatory system
- Skeletal system
- Muscular system
- Nervous system
- Digestive system
- Genitourinary system
- Skin
- Vital signs
- Anatomical terminology/acronyms

Standards Alignments:

CCSS: RLST 11-12.3; RRLST 11-12.3; AD 12.2.5

NGSS: LS 1.A, 2.D

Key Assignments	Anchor Standards	Pathway Standards
<p>✓ Key Assignment: Students role play an emergency medical responder and patient non-trauma examination with the third student coaching and reading instructions for exam protocol. Students will rotate between all roles and complete the examination in the desired timeframe to assist with developing empathy for the patient and HIPAA compliance while learning the proper techniques (this role playing will be used to teach multiple skills).</p> <p>Assessment: teacher observation skills and skills checklist</p>	2.0, 5.0, 6.0, 7.0, 10.0, 11.1	B 3.6, B 3.7, B 4.2, B 4.6, B 8.2, B 9.0, B 9.1, B 9.3, B 9.6, B 9.8, B 9.10
<p>✓ Key Assignment: Students role play an emergency medical responder and patient trauma examination with 3rd student coaching and reading instructions for exam protocol. Students will rotate between all roles and complete the physical examination including trauma assessment, injury management and bleeding control in the desired timeframe to assist while developing empathy for the patient and HIPAA compliance. They will use EMS jump bag, pen light, gloves, stethoscope, goggles, blood pressure cuff (sphygmomanometer) to assist in their assessment.</p> <p>Assessment: skill test to be completed in less than 15 minutes, observation, checklist</p>	5.0, 6.0, 9.0, 10.0	B 3.6, B 3.7, B 4.2, B 4.6, B 8.2, B 9.0, B 9.3, B 9.6, B 9.8, B 9.10

Unit 15: Terrorism

6 hours

Students will complete the introduction to Emergency Response to Terrorism online course and classroom review. This course is designed to provide the basic awareness training to prepare first responders to respond to incidents of terrorism safely and effectively. At successful completion of this course, student will receive a FEMA certificate.

- Domestic and international terrorism
- Chemical, explosive, armed, biological, radiological

Standards Alignments:

CCSS: LS 11-12.1, AD 12-2.4

NGSS: ETS 1

Key Assignments	Anchor Standards	Pathway Standards
<p>✓ Key Assignment: Students will take the online course - Introduction to Emergency Response to Terrorism. This course is designed to provide the basic awareness</p>	1.0, 2.0, 4.0, 5.0, 7.0, 9.0, 10.0, 11.0	B 4.1, B 4.2, B 4.3, B 4.4, B 7.0, B 7.1, B 7.2, B 7.3,

<p>training to prepare first responders to respond to incidents of terrorism safely and effectively. At successful completion of this course, student will receive a FEMA certificate.</p> <p>Assessment: written exam at 70% or better, skills testing</p>		
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Unit 16: Bloodborne Pathogens, CPR, AED and Essential First Aid	6 hours
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Students will complete certification in the areas of Bloodborne Pathogens, CPR, AED and Essential First Aid.

Blood Borne Pathogens

- How to react in an emergency
- Contacting 911
- Legal issues
- What are bloodborne pathogens
- Means of transmission
- Prevention of bloodborne pathogens
- Universal precautions
- Exposure control plan
- The Use of biohazard labels and container color coding
- Hepatitis B vaccine
- Engineering Controls
- Post exposure follow-ups

CPR/AED

- How to react in an Emergency
- Contacting 911
- Overview of the AED and its use
- The Chain of survival
- Medical and legal issues
- The AED/CPR algorithm
- Preparing and managing the AED event
- AED troubleshooting service, and maintenance
- Signs, symptoms, care of heart attack
- Signs, symptoms, care of stroke
- CPR for people age 8 and older
- CPR for people age 1- 8
- CPR for infants up to 1-year old
- Heimlich maneuver for all ages

Essential First Aid

- First aid
- Burn Care (thermal, chemical and electrical)
- Musculoskeletal
- Stroke
- Diabetic emergencies
- Seizures
- Asthma attacks
- Anaphylactic shock
- Heat emergencies

Standards Alignments:

CCSS: RSIT 11-12.7; AD12.2.4

NGSS: LS 2.D

Key Assignments	Anchor Standards	Pathway Standards
<p>✓ Key Assignment: The students will participate in a Blood Borne Pathogen training. After successful completion of this course, students will understand what</p>	<p>1.0, 6.0, 10.0, 11.0</p>	<p>B 1.2, B 1.5, B 4.2, B 4.3, B 4.6, B 9.1, B 9.2, B 9.3</p>

<p>bloodborne pathogens are and how risks of exposure can be reduced for themselves and others. Students will receive a Certification which adheres to the training requirements of the U.S. Department of Labor, OSHA Bloodborne Pathogens Standard (29 CFR 1910.1030).</p> <p>Assessment: written exam at 70% or better, skills testing</p>		<p>B 9.4, B 9.6, B 9.7, B 9.8, B 9.10</p>
<p>✓ Key Assignment: Students will participate in CPR/AED training that satisfies the requirements of the Occupational Safety & Health Administration (OSHA) and leads to certification upon successful completion. The course covers Infant, Child, and Adult CPR. Students will engage in hands on practice with an AED trainer.</p> <p>Assessment: written exam at 70% or better, skills testing</p>	<p>1.0, 4.0, 6.0, 10.0,11.0</p>	<p>B 1.2, B 1.5, B 8.2, B 9.0, B 9.1, B 9.3 B 9.4, B 9.6, B 9.7, B 9.8, B 9.9</p>
<p>✓ Key Assignment: Student will participate in First Aid Training which covers the recognition and treatment for illness and injuries. This class satisfies the requirements of the Occupational Safety & Health Administration (OSHA).Upon successful completion of the course, students will receive a First Aid Certification card.</p> <p>Assessment: written exam at 70% or better, skills testing</p>	<p>1.0, 4.0, 6.0, 10.0</p>	<p>B 1.2, B 1.5, B 8.2, B 9.0, B 9.1, B 9.3 B 9.4, B 9.6, B 9.7, B 9.8, B 9.9</p>
<p>✓ Lab-Balloon Lung: In this lab, students will create a simple model of a lung, using the materials and directions from Physical Central, then they will use Boyle’s Law to explain the phenomenon they observe regarding air pressure.</p> <p>Assessment: demonstration and oral defense</p>	<p>1.0, 2.0, 3.0, 4.0, 6.0, 10.0</p>	<p>B 9.1, B 9.3</p>
<p>✓ Lab-Asthma: In this lab from <i>Newton’s Apple</i>, students will watch a video and read about the impact of asthma on lungs, then use balloons to simulate three conditions: clean, constricted and clogged airways. Students will note the impact on how each affect balloon elasticity. Students will record their observations and measurements in their lab notebooks, then read articles related to the respiratory system, in order to develop a hypothesis and question(s) regarding how their findings from this lab might impact people who work with fire and smoke.</p> <p>Assessment: demonstration and oral defense</p>	<p>1.0, 2.0, 3.0, 6.0, 10.0</p>	<p>B 9.1, B 9.3, B 9.8</p>

Instructional Materials

Textbooks:

- Fundamentals of Firefighting Skills*** 2nd edition
International Association of Fire Chiefs – Jones & Bartlett © 2014
ISBN: 978-1-284-07202-0
- Essentials of Firefighting***
Fire Protection Publications OK State University © 2013
ISBN: 978-0-87939-509-4
- Emergency Medical Responder*** 5th edition
David Schottke – Jones & Bartlett © 2011
ISBN: 978-1-4496-1267-2

Electronic Media/Supplemental Print Materials/Online Resources:

- Emergency Medical Responder 5th edition Teacher Tool Kit
- Fundamentals of Firefighting Skills Teacher Tool Kit
- American Heart Association Healthcare Provider Video
- National Fire Academy Online Course Program
- *Hazardous Materials First Responder Awareness/Operations* Governor's Office of Emergency Services © 2009
- *Emergency Response Guidebook* US Department of Transportation © 2012

Standards Assessed in this Course

CTE Anchor Standards:

- 1.0 Academics: Academics standards are aligned to pathways; see below.
- 2.0 Communications: Acquire and use accurately sector terminology and protocols at the career and college readiness level for communicating effectively in oral, written, and multimedia formats.
- 3.0 Career Planning and Management: Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans.
- 4.0 Technology: Use existing and emerging technology, to investigate, research, and produce products and services, including new information, as required in the sector workplace environment.
- 5.0 Problem Solving and Critical Thinking: Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques.
- 6.0 Health and Safety: Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to the sector workplace environment.
- 7.0 Responsibility and Flexibility: Initiate, and participate in, a range of collaborations demonstrating behaviors that reflect personal and professional responsibility, flexibility, and respect in the sector workplace environment and community settings.
- 8.0 Ethics and Legal Responsibilities: Practice professional, ethical, and legal behavior, responding thoughtfully to diverse perspectives and resolving

contradictions when possible, consistent with applicable laws, regulations, and organizational norms.

- 9.0 Leadership and Teamwork: Work with peers to promote divergent and creative perspectives, effective leadership, group dynamics, team and individual decision making, benefits of workforce diversity, and conflict resolution.
- 10.0 Technical Knowledge and Skills: Apply essential technical knowledge and skills common to all pathways in the sector following procedures when carrying out experiments or performing technical tasks.

Public Services Sector — Emergency Response Pathway Standards:

- B1.0** **Analyze the characteristics of different career fields within the Emergency Response pathway to develop a perspective on the nature of the work, entry-level requirements, career options, and expectations.**
- B1.1 Understand the responsibilities, requirements, and advancement opportunities in emergency response careers.
- B1.2 List the standards for emergency response employee qualifications, training, and certification.
- B1.3 Outline a realistic program of study (education plan) based on career choice, job-entry requirements, and personal commitment.
- B1.4 Describe the roles and responsibilities of emergency response agencies.
- B1.5 Summarize the laws, regulations, and organizational protocols that define the guidelines governing selected emergency agencies and services.
- B2.0** **Understand the processes by which emergency management organizations and emergency managers exert command and control over an emergency response and recovery operation.**
- B2.1 Describe the mechanisms by which emergency management stakeholder agencies and resources are coordinated for mutual aid.
- B2.2 Understand the importance of an organized Command and Control System to provide for interoperability, efficiency, and effectiveness.
- B2.3 Understand the core set of basic concepts, principles, terminology, and technologies of emergency response management.
- B2.4 Recognize multiagency coordination; unified command, training, identification and management of resources; qualification and certification; and the collection, tracking, evaluation, and dissemination of information.
- B2.5 Describe the principles and responsibilities of the Incident Command System (ICS) and the National Incident Management System (NIMS).
- B2.6 Review a simulated local hazard mitigation plan based on a potential hazard to the community, and describe the appropriate response.
- B2.7 Design an emergency plan for an earthquake in a major metropolitan area that has shut off access from all directions.
- B3.0** **Demonstrate necessary leadership qualities, team concepts, and personal integrity for emergency response personnel.**
- B3.1 Identify the characteristics of successful teams, including leadership, cooperation, collaboration, and effective decision-making skills as applied in emergency services.
- B3.2 Understand the characteristics and benefits of teamwork, leadership, and citizenship in community and workplace settings.
- B3.3 Employ active listening, concise reporting, and familiarity with emergency response communication equipment to interact efficiently and effectively.

B3.4	Describe emergency response techniques and methods of active listening to obtain and clarify information in oral communications.
B3.5	Demonstrate a variety of appropriate and effective methods of communicating with the public, including techniques such as professional demeanor, active listening, empathy, projecting a confident tone of voice, paraphrasing, and the proper use of nonverbal body language.
B3.6	Adhere to Health Insurance Portability and Accountability Act (HIPAA) regulations and agency guidelines regarding public and media communications.
B3.7	Use appropriate terminology in clear, concise, and legible report entries when preparing and submitting required reports.
B3.8	Use and maintain a variety of communication equipment, understanding the importance of using current and up-to-date technology and communication equipment.
B3.9	Practice verbal and nonverbal emergency terminology and communication techniques to be used when interacting with emergency response personnel in a variety of emergency situations.
B3.10	Gather information and ideas from primary and secondary sources accurately and coherently.
<u>B4.0</u>	<u>Execute safety procedures and protocols associated with local, state, and federal regulations in order to effectively and safely conduct duties within fire and emergency services.</u>
B4.1	Describe the basic elements of safety and survival for emergency response personnel.
B4.2	Know and use the appropriate personal protective equipment (PPE) required for emergency services duties.
B4.3	Know how to establish situational awareness, identify hazards, and assess personal, team, or environmental risks.
B4.4	Understand and adhere to comprehensive and systematic risk management strategies to reduce injury and fatalities for self, team, and community.
B4.5	Demonstrate strategies to identify and eliminate hazards.
B4.6	Complete certification in emergency care as appropriate—for example, cardiopulmonary resuscitation (CPR), automated external defibrillator (AED), and first aid.
<u>B5.0</u>	<u>Develop the level of nutrition, fitness, strength, agility, and psychological health and wellbeing required for safely working in emergency response career fields.</u>
B5.1	Understand that physical fitness and proper nutrition are needed to perform the duties of emergency response personnel.
B5.2	Recognize the different physical strength and agility assessments required for entrance into emergency response employment.
B5.3	Apply the skills and techniques necessary for success in strength and agility testing.
B5.4	Design and implement a personal plan for achieving and maintaining an acceptable level of nutrition, strength and agility, and a lifetime fitness mindset.
B5.5	Recognize and understand the importance of maintaining psychological health and well-being in emergency response occupations.
<u>B6.0</u>	<u>Understand the roles of federal, state, and local agencies in catastrophic event planning, preparation, response, and recovery.</u>
B6.1	Describe steps for each potential catastrophic event.
B6.2	Analyze the history and outcomes of catastrophic events and the appropriate emergency responses.
B6.3	Review a hazard mitigation plan to reduce death and injury for potential man-made and natural hazards.



- B6.4 Prepare an emergency preparedness and response plan that includes the roles of emergency response personnel for a potential catastrophic event in the community.
- B6.5 Recognize the importance and variety of recovery strategies to support individuals and communities impacted by a catastrophic event.
- B7.0** **Research and define what is considered to be hazardous materials incidents and threats.**
- B7.1 Describe commonly encountered hazardous materials.
- B7.2 Describe the hazardous materials labeling system and identify definitions associated with various hazardous materials.
- B7.3 Describe the type of damage and injury that can occur if hazardous materials are handled improperly.
- B7.4 Explain the steps taken, including appropriate personnel and safety measures, for a hazardous-material release.
- B7.5 Research and report on the most common incidents involving hazardous materials.
- B8.0** **Understand the fundamental mission of fire services occupations and the responsibility to preserve life and property, promote public safety, and reduce fire deaths.**
- B8.1 Understand the history, organization, and operation of fire services.
- B8.2 Describe the skills and knowledge necessary for an entry-level firefighter to safely perform the tasks required of the job.
- B8.3 Explain the fundamentals and scientific principles of fire behavior, combustible materials, extinguishing agents, hazardous and toxic materials, forms of energy, and fire prevention/suppression techniques for all types of fires and conditions.
- B8.4 Demonstrate the operation of fire protection equipment and systems.
- B8.5 Demonstrate the skills necessary to perform fire suppression and basic rescue operations using firefighting techniques and rescue equipment.
- B8.6 Identify structural characteristics of building construction types as they relate to fire protection and suppression, and recognize the signs and causes of potential building collapse and other hazards.
- B8.7 Apply principles of proper body mechanics, including ergonomics, equipment use, and techniques to prevent personal injury.
- B8.8 Participate in public education aimed at reducing loss of life and property, through programs and activities on fire prevention and safety as well as other injury-prevention education.
- B9.0** **Demonstrate the immediate basic life support and interim medical care for a sick, injured, or compromised person until advanced medical care is provided or transport is initiated.**
- B9.1 Understand and use medical terminology and related knowledge of anatomy, physiology, diseases, diagnoses, pharmacology, therapeutics, and common abbreviations necessary for emergency medical services.
- B9.2 Know the common acronyms used in fire and emergency services.
- B9.3 Perform technical skill and equipment use required for emergency response occupations—for example, airway, oxygen, and ventilation procedures; suction; bleeding control; shock management; cardiac arrest management; immobilization techniques; traction; splinting; transport; defibrillation; and wound management.
- B9.4 Follow instructions for immediate care procedure as transmitted by an emergency medical dispatcher during transport.
- B9.5 Demonstrate administration of a limited number of drugs appropriate to the scope of practice.

- B9.6 Manage an incident scene as the first responder, using emergency response skills appropriate to training and certification.
- B9.7 Execute protocols in emergency management response when working with an on-scene accident.
- B9.8 Demonstrate the ability to assess the nature and extent of an illness or injury to establish and prioritize medical response.
- B9.9 Communicate with treatment-center staff to arrange reception of victims and to get instructions for further treatment.
- B9.10 Demonstrate the ability to receive and provide patient-care information to other medical providers.
- B9.11 Describe the function of emergency vehicles, use of medical and communication equipment, and the necessity of maintaining inventory as required for emergency services practices and procedures.

B10.0 Analyze and describe the functions and responsibilities of federal, state, and local wildland services.

- B10.1 Describe wildland firefighter safety and survival preparations.
- B10.2 Explain the role of fire personnel in wildland fires, structure fires, auto accidents, medical aid, swift-water rescue, civil disturbances, search and rescue operations, hazardous material spills, train wrecks, floods, and earthquakes.
- B10.3 Describe fire prevention and planning procedures to save wildland structures during a forest fire.
- B10.4 Assess the value of the resource management program, including the impact on timber, watershed, wildlife, and recreation.
- B10.5 Create a state map showing the locations of wildland lookouts, and describe the lookouts' purpose and staffing.
- B10.6 Evaluate the importance of the fire suppression aviation program.
- B10.7 Recognize factors that influence the start and spread of wildland fires.
- B10.8 Describe and evaluate the importance of the various types of equipment used to control and/or extinguish wildland fires.
- B10.9 Build a plan describing processes and procedures to follow prior to, during, and after a wildfire event.

Common Core State Standards:

Language Standards – LS – (Standard Area, Grade Level, Standard #)

- LS 11-12.1 Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
- LS 11-12.2 Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
- LS 11-12.6 Acquire and accurately use general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Writing Standards – WS – (Standard Area, Grade Level, Standard #)

- WS 11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- WS 11-12.5 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.
- WS 11-12.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

WS 11-12.7 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.

Writing Standards for Literacy in History/Social Studies, Science and Technical Subjects – WHSST – (Standard Area, Grade Level, Standard #)

WHSST 11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

WHSST: 11-12.5 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.

WHSST: 11-12.6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

WHSST: 11-12.7 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.

Reading Standards for Informational Text – RSIT – (Standard Area, Grade Level, Standard #)

RSIT 11-12.1 Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.

RSIT 11-12.7 Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.

Reading Standards for Literacy in Science and Technical Subjects – RRLST – (Standard Area, Grade Level, Standard #)

RRLST 11-12.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

California History/Social Science Standards:

AD 12.2 Students evaluate and take and defend positions on the scope and limits of rights and obligations as democratic citizens, the relationships among them, and how they are secured.

Next Generation State Standards:

Scientific and Engineering Practices

- SEP 1 Asking questions (for science) and defining problems (for engineering)
- SEP 2 Developing and using models
- SEP 3 Planning and carrying out investigations
- SEP 4 Analyzing and interpreting data
- SEP 5 Using mathematics and computational thinking
- SEP 6 Constructing explanations (for science) and designing solutions (for engineering)
- SEP 7 Engaging in argument from evidence
- SEP 8 Obtaining, evaluating, and communicating information

LS 1.A

LS 1.B

LS 2.A

LS 2.B

PS 1.A

PS1.B

PS2.A

PS2.B

PS3.A

ETS1.A:

ETS1.B:

ETS1.C:

Disciplinary Core Idea

- From Molecules to Organisms: Structure and Function
- From Molecules to Organisms: Growth and Development of Organisms
- Interdependent Relationships in Ecosystems
- Cycles of Matter and Energy Transfer in Ecosystems
- Structure and Properties of Matter
- Chemical Reactions
- Forces and Motion
- Chemical Reactions
- Definitions of Energy
- Defining and Delimiting Engineering Problems
- Developing Possible Solutions
- Optimizing the Design Solution

Crosscutting Concepts

- CC 2. Cause and effect: Mechanism and explanation
- CC 5. Energy and matter: Flows, cycles, and conservation. Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.
- CC 6. Structure and function. The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.
- CC 7. Stability and change. For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.