Fire Science Supplemental Program Resources



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Introduction

This document provides supplemental information for the Fire Science program of study. It may be updated or revised as the base program of study, or complementary programs, are updated, added, or removed. Please contact the appropriate Education Programs Professional with any questions.

The Program of Study includes the approved courses, complementary courses, alignment(s) to industry, postsecondary options, and additional information.

The Equipment List for the Fire Science program of study is included and, if applicable, additional items used only in the complementary course(s) are noted.

The Crosswalks and Alignments connect and support the Fire Science standards for the Law, Public Safety, Corrections and Security program of study. Complementary course standards are not listed in the crosswalks and alignments.

Program of Study Information

The following program of study information sheet as well as the program structure tables for the courses are provided to be able to print separately for handouts. The information provided is based on the best available information at the time of this document and will be updated as appropriate.

Fire Science

The Fire Science program provides students with an introduction to fire science techniques and processes. The program provides the skills and knowledge affecting wildland fire behavior and suppression, fire investigations, fire prevention, CPR/First Aid, engine companies, and potential hazards and human factors on the fire line.

Law, Public Safety, Corrections, and Security Career Cluster

The Career Cluster is focused on planning, managing, and providing legal, public safety and protective services and homeland security, including professional and technical support services.

Postsecondary Options

Secondary

• Certificate of Skills Attainment CPR/First Aid

Certificate/License

- Fire Science Technology (CSN, TMCC, GBC)
- Fire Instructor (CSN)
- Firefighter 1 (CSN)
- Fire Suppression (TMCC)

Associate's Degree

- Fire Technology Management (CSN)
- Peace Officer (GBC)

Bachelor's Degree

- Forest Management (UNR)
- Environmental Management (CSN)



For additional information on this cluster, please contact:

Jennifer Fisk at jennifer.fisk@doe.nv.gov

Website: https://doe.nv.gov/cte/

Approved Courses

Fire Science I

Fire Science II

Complementary Courses

Fire Science Advanced Studies

CTE Work Experience – Law Public Safety Corrections and Security Industry-Recognized Credential – Fire Science

Work-Based Learning Opportunities

Job Shadowing / Internship / Work Experience / Career Days / Career Fairs / Field Trips / Guest Speakers

Career and Technical Student Organization

HOSA: Future Health Professionals



State Recognized Industry Certifications

Refer to the Governor's Office of Workforce Innovation's <u>Nevada Industry Recognized Credential List</u>

Aligned to Industry						
Occupation	Median	Annual	%			
	Wage	Openings	Growth			
	Per year					
Firefighter	\$50,700.00	2,800	4.0%			
Fire Inspector	\$63,080.00	1,800	6.0%			
Forest Fire Inspectors	\$54,340.00	2,700	2.8%			
Forest and	\$30,500.00	2,300	0.1%			
Conservation Worker						
Hazardous Materials	\$46,300.00	5,700	0.1%			
Removal Workers						

Source U.S. Bureau of Labor Statistics 2022

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Program Structure for Fire Science

The core course sequencing is provided in the following table. Complementary Courses are available and provided later in this document. The following courses provide a completed program of study.

Required/ Complementary	Course Title	Abbreviated Name	CIP Code	SCED Subject Area	SCED Course Identifier	SCED Course Level	SCED Unit Credit	SCED Course Sequence	SCED Course Number
R	Fire Science I	FIRE SCI I	43.0203	15	151	G	1.00	12	15151G1.0012
R	Fire Science II	FIRE SCI II	43.0203	15	151	G	1.00	22	15151G1.0022

Core Course Sequence (R) with Lab Course(s) (C)

The complementary courses are provided in the following table. **The qualifying program of study must be completed prior to enrolling in the complementary course(s)**. A program does not have to utilize the complementary courses for students to complete their program of study.

Required/ Complementary	Course Title	Abbreviated Name	CIP Code	SCED Subject Area	SCED Course Identifier	SCED Course Level	SCED Unit Credit	SCED Course Sequence	SCED Course Number
с	Fire Science Advanced Studies	FIRE SCI AS	43.0203	15	151	E	1.00	11	15151E1.0011
с	Industry-Recognized Credential – Fire Science	IRC- FIRE SCI	43.0203	15	999	E	1.00	11	15999E1.0011
с	CTE Work Experience- Law Public Safety Corrections and Security	WORK EXPER LAW	99.0012	15	998	G	1.00	11	15998G1.0011

CIP Code – Classification of Instructional Programs (CIP) Codes

SCED – School Courses for the Exchange of Data that populates the State Infinite Campus System and the System for Accountability Information in Nevada (SAIN)

Course Descriptions

Fire Science I

Prerequisite: None

Schools must be approved by the governing State Agency in order to offer this course

This course introduces the principles and procedures employed in fire services. Students will practice response procedures in order to respond to small and catastrophic emergency incidents and will study firefighter safety, fire behavior, personal protective equipment, building construction, service equipment, and organizational rules that define guidelines that govern emergency fire management. Students will compare career field and related careers to develop a personal perspective and an institutional professional growth plan to develop team building and leadership skills related to fire science.

Fire Science II

Prerequisite: Fire Science I

Schools must be approved by the governing State Agency in order to offer this course

This course is a continuation of Fire Science I. This course provides fire science students with instruction in advanced techniques and critical thinking. This course provides instruction in the primary factors affecting wildland fire behavior, suppression, ventilation, water supply, loss control, medical care, and awareness of potential hazards and human factors on the fire line. The appropriate use of technology and industry-standard equipment is an integral part of this course.

Fire Science Advanced Studies

Prerequisite: Completion of Fire Science Program of Study

This course is offered to students who have completed all content standards in a program and desire to pursue advanced study through investigation and in-depth research. Students are expected to work independently or in a team and consult with their supervising teacher for guidance. The supervising teacher will give directions, monitor, and evaluate the students' topic of study. Coursework may include various work-based learning experiences such as internships and job shadowing, involvement in a school-based enterprise, completion of a capstone project, and/or portfolio development. This course may be repeated for additional instruction and credit.

Industry-Recognized Credential – Fire Science

Prerequisite: Completion of Fire Science Program of Study

This course is offered to students who have completed all content standards in a program of study and desire to pursue an Industry-Recognized Credential that aligns with the standards and skills associated with the Fire Science Program of Study. This course is designed to expand the students' opportunities to pursue certification aligned with employment standards in the industry aligned with this program of study. The supervising teacher will provide instruction aligned with the certification requirements, monitor progress toward certification, and provide the students with appropriate testing or certification opportunities associated with the intended Industry-Recognized Credential that is the subject of the course. This course may be repeated for additional instruction and credit.

CTE Work Experience – Law, Public Safety, Corrections, and Security

Prerequisite: Completion of Level 2 course in the qualifying program of study

This course is designed to expand the students' opportunities for applied learning. This course provides an in-depth CTE work experience that applies the processes, concepts, and principles as described in the classroom instruction. This course will encourage students to explore and develop advanced skills through work-based learning directly related to the program of study. The course must follow NAC 389.562, 389.564, 389.566 regulations.

Equipment List

This recommended list is based upon a classroom size of 25 students. All costs are estimated and may be adjusted once verified and justified by districts with current quotes. No specific equipment vendor or brand names are endorsed due to various possibilities, but school districts should consult with stakeholders to ensure industry-recognized equipment and software are purchased. The intent of this list is to provide school districts with guidance on the equipment needed to implement the state standards for a Fire Science program.

CTE	CTE Classroom Equipment To		\$830
QTY	ITEM DESCRIPTION	UNIT	TOTAL
2	Storage Cabinets (36" x 12" x 72") (lockable)	\$300	\$600
1	Fire Extinguisher	\$130	\$130
1	Sink with Soap Dispenser	\$100	\$100

Program	Equipment
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Program Equipment		otal:	\$126,500	
QTY	ITEM DESCRIPTION	UNIT	TOTAL	
25	Student Computers	\$1,000	\$25,000	
1	Technology Storage/Charging System (optional)	\$2,000	\$2,000	
10	Self-Contained Breathing Apparatus (SCBA) Sets (harness, facemasks, air cylinder w/ regulator)	\$3,500	\$35,000	
25	Turnout Sets (including helmet and boots)	\$2,500	\$62,500	
1	Positive Ventilation Fan	\$1,500	\$1,500	
1	Ground Stream Appliance	\$500	\$500	

Instructional Materials

Total:

\$3,985

QTY	ITEM DESCRIPTION	UNIT	TOTAL
25	Student Textbooks (Approved by NDE) CTE Instructional Materials list can be found here.	\$100	\$2,500
1	Teacher Textbook Edition and Resources	\$500	\$500
1	Basic Life Support Cardiopulmonary Resuscitation (CPR) Instructor Kit	\$110	\$110
25	Basic Life Support Student Manuals	\$15	\$375
Varies	Instructional Resources (Emergency Response Guidebook, Incident Response Pocket Guide, etc.)	\$500	\$500

Instr	uctional Supplies To	otal:	\$28,585
QTY	ITEM DESCRIPTION	UNIT	TOTAL
1	Chainsaw	\$600	\$600
1	Combination Ladder	\$350	\$350
5	Automated External Defibrillator (AED) Trainers	\$300	\$1,500
1	24' Extension Ladder	\$300	\$300
1	Roof Ladder	\$250	\$250
1	Hose Clamp	\$225	\$225
25	Wildland Gear Sets	\$200	\$5,000
5	Training Fire Shelters	\$180	\$900
9	Adult CPR Manikins with Feedback Devices	\$150	\$1,350
1	Fire Extinguisher Water Can	\$150	\$150
25	Wildland Packs	\$100	\$2,500
9	Infant CPR Manikins	\$90	\$810
25	Flashlights	\$75	\$1,875
1	Air Compressor	\$50	\$50
1	Biohazard Waste Can	\$50	\$50
1	Biohazard Sharps Container	\$25	\$25
5	Adult Bag Value Masks (BVMs)	\$25	\$125
5	Infant BVMs	\$25	\$125
Varies	Gloves (wildland and structure)	\$2,500	\$2,500
Varies	Medical Supplies (splints, bandages, airways, etc.)	\$2,000	\$2,000
Varies	Prying/Forced-Entry Tools (pike poles, flat-head axe, gas tool)	\$1,500	\$1,500
Varies	Nozzles and Appliances	\$1,000	\$1,000
Varies	Personal Protective Equipment (PPE) (disposable gloves, barriers, safety glasses, etc.)	\$1,000	\$1,000
Varies	Radios	\$800	\$800
Varies	Hazardous Materials Awareness Supplies (placards, binoculars, tapes, etc.)	\$750	\$750
Varies	Fire Prevention Training Supplies (sprinkler sets, detectors, and alarms)	\$750	\$750
Varies	Hoses	\$500	\$500
Varies	Sanitary Supplies (hand sanitizer, disinfectant soap, sanitary wipes)	\$500	\$500
Varies	Hydrant Tools and Supplies	\$300	\$300

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QTY	ITEM DESCRIPTION	UNIT	TOTAL
Varies	Ropes and Webbing	\$150	\$150
Varies	Salvage Covers/Tarps	\$150	\$150
Varies	Computer Accessories (cases, covers, etc.) (optional)	\$500	\$500

Other		tal:	\$200
QTY	ITEM DESCRIPTION	UNIT	TOTAL
1	Basic Life Support CPR Instructor Training	\$200	\$200

Category Totals:

Classroom Equipment	\$830
Program Equipment	\$126,500
Instructional Materials	\$3,985
Instructional Supplies	\$28,585
Other	\$200
Estimated Program Total	\$160,100

Crosswalks and Alignments for Program of Study Standards

Crosswalks and alignments are intended to assist the teacher make connections for students between the technical skills within the program and academic standards. The crosswalks and alignments are not intended to teach the academic standards but to assist students in making meaningful connections between their CTE program of study and academic courses. The crosswalks are for the required program of study courses, not the complementary courses.

Crosswalks (Academic Standards)

The crosswalks of the Fire Science Standards show connections with the Nevada Academic Content Standards. The crosswalk identifies the performance indicators in which the learning objectives in the Fire Science program connect with and support academic learning. The performance indicators are grouped according to their content standard and are crosswalked to the Nevada Academic Content Standards in English Language Arts, Mathematics, and Science.

Alignments (Mathematical Practices)

In addition to connections with the Nevada Academic Content Standards for Mathematics, many performance indicators support the Mathematical Practices. The following table illustrates the alignment of the Fire Science Standards Performance Indicators and the Mathematical Practices. This alignment identifies the performance indicators in which the learning objectives in the Fire Science program connect with and support academic learning.

Alignments (Science and Engineering Practices)

In addition to connections with the Nevada Academic Content Standards for Science, many performance indicators support the Science and Engineering Practices. The following table illustrates the alignment of the Fire Science Standards Performance Indicators and the Science and Engineering Practices. This alignment identifies the performance indicators in which the learning objectives in the Fire Science program connect with and support academic learning.

Crosswalks (Common Career Technical Core)

The crosswalks of the Fire Science Standards show connections with the Common Career Technical Core. The crosswalk identifies the performance indicators in which the learning objectives in the Fire Science program connect with and support the Common Career Technical Core. The Common Career Technical Core defines what students should know and be able to do after completing instruction in a program of study. The Fire Science Standards are crosswalked to the Law, Public Safety, Corrections and Security Career Cluster™ and the Emergency and Fire Management Services Career Pathway.

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Crosswalk of Fire Science Program of Study Standards and the Nevada Academic Content Standards

English Language Arts: Language Standards

	Nevada Academic Content Standards	Performance Indicators
L.11-12.6		1.5.2, 2.1.2, 4.2.5, 12.1.4 6.1.4

English Language Arts: Reading Standards for Informational Text

	Nevada Academic Content Standards	Performance Indicators
RI.11-12.3	Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text.	7.1.4

English Language Arts: Reading Standards for Literacy in Science and Technical Subjects

	Nevada Academic Content Standards	Performance Indicators
RST.11-12.2	Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.	2.1.1
RST.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.	6.1.3, 8.1.2
RST.11-12.6	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.	13.1.3
RST.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.	10.1.3, 11.1.3
RST.11-12.8	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.	3.1.1, 7.4.2, 9.1.1, 12.1.1
RST.11-12.9	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.	2.3.7, 3.2.1, 4.1.5, 7.2.3

English Language Arts: Speaking and Listening Standards

	Nevada Academic Content Standards	Performance Indicators
SL.11-12.1a	Come to discussions prepared, having read and researched	1.1.1, 1.1.2, 1.2.1, 1.2.4
	material under study; explicitly draw on that preparation by	1.4.2, 1.5.2, 2.1.2, 4.2.5
	referring to evidence from texts and other research on the topic or	5.3.1, 9.1.2
	issue to stimulate a thoughtful, well-reasoned exchange of ideas.	
SL.11-12.2	Integrate multiple sources of information presented in diverse	1.1.1, 1.1.2, 1.2.1, 1.2.4
	formats and media (e.g., visually, quantitatively, orally) in order to	1.4.2, 4.2.1, 10.2.1

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	Nevada Academic Content Standards	Performance Indicators
	make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.	
SL.11-12.4	Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.	1.1.1, 1.1.2, 1.2.1, 1.2.4 1.4.2, 1.5.2, 2.2.2, 3.1.4 7.4.2, 8.2.3

English Language Arts: Writing Standards for Literacy in Science and Technical Subjects

	Nevada Academic Content Standards	Performance Indicators
WHST.11-12.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	1.2.5, 11.1.2, 1.4.1
WHST.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.	1.4.4
WHST.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.	1.4.5
WHST.11-12.8	digital sources, using advanced searches effectively; assess the	1.1.2, 1.1.3, 1.4.2, 1.4.3 1.5.2, 2.1.1, 3.1.2, 5.2.1 8.2.3, 13.2.8

Math: Algebra – Creating Equations

	Nevada Academic Content Standards	Performance Indicators
ACED.A.1	Create equations and inequalities in one variable and use them to	4.2.5
	solve problems.	

Math: Algebra – Seeing Structure in Expressions

	Nevada Academic Content Standards	Performance Indicators
ASSE.A.1	Interpret expressions that represent a quantity in terms of its	3.1.6
	context.	

Math: Number & Quantity – Qualities

	Nevada Academic Content Standards	Performance Indicators
NQ.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	7.4.1
NQ.A.2	Define appropriate quantities for the purpose of descriptive modeling.	9.1.2

Math: Statistics and Probability – Using Probability to Make Decisions

	Nevada Academic Content Standards	Performance Indicators
SMD.A.1	(+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.	7.4.2

	Nevada Academic Content Standards	Performance Indicators
HS-ESS2-4	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.	13.2.8
HS-ESS2-5	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.	7.4.1

Science HS: Engineering Design

	Nevada Academic Content Standards	Performance Indicators
HS-ETS1-2	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.	

Science HS: From Molecules to Organisms - Structures and Processes

	Nevada Academic Content Standards	Performance Indicators
HS-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.	12.1.3
HS-LS1-6	Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.	3.1.3

Science HS: Ecosystems – Interactions, Energy, and Dynamics

	Nevada Academic Content Standards	Performance Indicators
HS-LS2-1	Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.	13.1.3

Science HS: Heredity – Inheritance and Variation of Traits

	Nevada Academic Content Standards	Performance Indicators
HS-LS3-3	Apply concepts of statistics and probability to explain the variation	2.3.6
	and distribution of expressed traits in a population.	

Alignment of Fire Science Standards and the Mathematical Practices

Mathematical Practices	Fire Science Performance Indicators
1. Make sense of problems and persevere in solving them.	10.1.3, 12.1.1
2. Reason abstractly and quantitatively.	3.1.4, 11.1.1
3. Construct viable arguments and critique the reasoning of others.	2.2.2, 13.1.2
4. Model with mathematics.	7.3.4; 7.4.1, 7.4.2, 9.1.2
5. Use appropriate tools strategically.	4.1.3; 4.2.6, 6.1.3, 10.2.2
6. Attend to precision.	4.2.4, 6.1.4, 13.2.3
7. Look for and make use of structure.	5.2.1, 8.2.2
8. Look for and express regularity in repeated reasoning.	2.3.7, 10.1.2, 13.2.8

Alignment of Fire Science Practices

Science and Engineering Practices	Fire Science Performance Indicators
1. Asking questions (for science) and defining problems (for engineering).	2.3.2, 13.1.2
2. Developing and using models.	3.1.1, 4.2.6, 6.1.3, 8.1.4
3. Planning and carrying out investigations.	7.1.4; 7.4.3, 11.1.3
4. Analyzing and interpreting data.	4.2.5
5. Using mathematics and computational thinking.	5.3.1; 5.4.2, 7.3.2, 9.1.2
6. Constructing explanations (for science) and designing solutions (for engineering).	2.3.6, 12.1.1
7. Engaging in argument from evidence.	8.1.1, 10.1.1, 13.2.8
8. Obtaining, evaluating, and communicating information.	3.1.3, 4.1.2

Crosswalks of Fire Science Standards and the Common Career Technical Core

	Law, Public Safety, Corrections and Security Career Cluster	Performance Indicators
1.	Analyze the nature and scope of the Law, Public Safety, Corrections and Security Career Cluster and the role law, public safety, corrections and security play in society and the economy.	2.1.3
2.	Formulate ideas, proposals, and solutions to ensure effective and efficient delivery of Law, Public Safety, Corrections and/or Security services.	2.2.3
3.	Assess and implement measures to maintain safe and healthy working conditions in a Law, Public Safety, Corrections and/or Security environment.	2.3.2, 13.2.2
4.	Conduct Law, Public Safety, Corrections, and Security work tasks in accordance with employee and employer rights, obligations, and responsibilities, including occupational safety and health requirements.	2.3.3
5.	Analyze the various laws, ordinances, regulations, and organizational rules that apply to careers in Law, Public Safety, Corrections, and Security.	2.2.3
6.	Describe various career opportunities and means to those opportunities in each of the Law, Public Safety, Corrections and Security Career pathways.	2.1.4

	Emergency and Fire Management Services Career Pathway	Performance Indicators
1.	Demonstrate effective communication skills (e.g., writing, speaking, listening and nonverbal communication) while utilizing communications equipment and platforms common to emergency and fire management services	2.1.6
2.	Manage an incident scene as the first responder using emergency response skills.	2.1.5
3.	Utilize up-to-date technology equipment and applications to facilitate the management of emergency and fire management situations.	13.2.9
4.	Demonstrate an understanding of the objectives and a commitment to the mission of emergency and fire management services.	2.3.3
5.	Execute safety procedures and protocols associated with local, state, and federal regulations.	2.3.4, 13.2.7
6.	Develop an organizational professional growth plan including the development of team building and leadership skills within the emergency and fire management environment	2.2.2
7.	Describe the legal, regulatory, and organizational guidelines governing emergency and fire management services.	2.2.1, 2.3.3
8	Compare and contrast the different career fields in fire and emergency management services.	2.1.3; 2.1.4
9.	Execute protocols for handling emergency situations that range from minor medical and fire emergencies to areawide incidents.	2.2.3, 4.2.7, 10.1.3, 10.2.2
10.	Demonstrate the use and various applications of the equipment commonly used in emergency and fire management services.	6.1.3, 7.1.3, 7.2.2, 7.3.3, 8.2.4 9.1.3, 10.2.2
11.	Implement an appropriate Incident Command System to effectively manage an incident scene.	2.2.4
12.	Use common codes and icons to properly handle and transport potentially hazardous substances in fire and medical emergency scenes.	2.2.4
13.	Implement public relations plans to enhance public awareness and safety in fire and emergency situations.	2.1.1, 2.1.2
14.	Describe the elements and issues involved in using the preparedness and response systems available to manage large-scale disasters.	4.2.7, 11.1.3, 11.1.4
15.	Analyze the key functions and techniques of critical infrastructure protection in cases of terrorism and/or natural disasters.	2.1.5, 11.1.3, 11.1.4