



**CAREER PATHWAY
FORESTRY
CIP Code 03.0511**

**Pennsylvania's Targeted Industry Cluster:
Agriculture, Food & Natural Resources**



Potential Careers

19-4093	Forest & Conservation Technicians	45-4022	Logging Equipment Operators
45-4011	Forest & Conservation Workers	45-4023	Log Graders & Scalers
45-4021	Fallers		

National and State Occupational Outlook Trends (Based on Department of Labor and Industry Reports)

United States	Employment		Percent Change	¹ Job Openings	2011 Median Annual Wage
	2010	2020			
Forest and Conservation Technicians	36,500	36,100	-1%	1,540	\$34,900
Pennsylvania	Employment		Percent Change	¹ Job Openings	2011 Median Annual Wage
	2008	2018			
Forest and Conservation Technicians	100	100	N/A	N/A	\$40,100

¹Job Openings refers to the average annual job openings due to growth and net replacement

Forest and Conservation Technicians

- Keep records of the amount and condition of logs taken to mills.
- Manage forest protection activities, including fire control, fire crew training, and coordination of fire detection and public education programs.
- Train and lead forest and conservation workers in seasonal activities, such as planting tree seedlings, putting out forest fires and maintaining recreational facilities.
- Survey, measure, and map access roads and forest areas such as burns, cut-over areas, experimental plots, and timber sales sections.
- Select and mark trees for thinning or logging, drawing detailed plans that include access roads.
- Provide information about, and enforce, regulations such as those concerning environmental protection, resource utilization, fire safety and accident prevention.
- Supervise forest nursery operations, timber harvesting, land use activities such as livestock grazing, and disease or insect control programs.
- Monitor activities of logging companies and contractors.
- Patrol park or forest areas to protect resources and prevent damage.
- Thin and space trees and control weeds and undergrowth, using manual tools and chemicals, or supervise workers performing these tasks.

Skills and Abilities

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Character Traits for Workplace Success

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Somerset County Technology Center - Program of Study/Units of Instruction (3-Year Program)

Unit Number & Title

100 – Leadership Development	900 – Forest Ecology
200 – Forest Measurement	1000 – Forest Mechanics
300 – Forest Surveying	1100 – Planning, Supervision, and Cooperation
400 – Forest Dendrology	1200 – Urban Forestry and Outdoor Recreation
500 – Forest Protection	1300 – Managing Wildlife, Water, and Fish
600 - Silviculture	1400 – Computers in Forestry
700 – Forest Soils	1500 – History of Forestry
800 – Forest Products	1600 S – Professional Development Program

High School Courses Recommended For Career And Technical Education Students

9th Grade	10th Grade	11th Grade	12th Grade
English I	English II	English III	English IV
Algebra I or Geometry	Geometry or Algebra II	Algebra II, Trigonometry or Pre-Calculus	Pre-Calculus, Trigonometry or Calculus
Biology I	Chemistry I	Physics	AP Science
Geography/State History	World History	American History	Economics/Government
Required Electives: PE, Art/Music, Foreign Language, Computer Technology	Required Electives: PE, Foreign Language, Computer Technology	Required Electives: PE	Required Electives: PE
	Career and Technology Scope and Sequence	Career and Technology Scope and Sequence	Career and Technology Scope and Sequence

Program's Math Skill Level

- Students must be able to complete math curriculum (10th – 12th) that incorporates a basic understanding of Numbers and Operations, Algebra, Geometry, Trigonometry, Measurement, and Data Analysis that applies to Forestry applications.

Certifications/Licensures

Pennsylvania Skills Certificate (NOCTI)

Forest Fire Fighter Training

PA Pesticide Applicator Certification

Hazardous Occupations Safety Training in Agriculture/ National Safe Tractor and Machinery Operation Program Certification- 30 Hours

Continuing Education/College Options

Articulation Agreements

- Allegany College of Maryland
- Pennsylvania College of Technology

Additional College/Continuing Education Options



Students who complete the Forestry curriculum can earn college credit. SCTC's Forestry program has articulation agreements with colleges across Pennsylvania through the SOAR program. For more information on the SOAR program, please visit: <http://www.techlinkpa.com>

Prerequisites, Safety, and Equipment Requirements

- Working knowledge of how to use, maintain, and operate forestry equipment, including but not limited to: tractors, sawmill, chainsaws, and other hand held tools following safety guidelines.
- Ability to work with knowledge of basic safety awareness, independent decision making skills, and ability to use problem solving skills.
- Physical strength and fitness (must be able to lift a minimum of 25 lbs.).
- Must have basic knowledge of computer functions

Program Details

- Theory Structure
 - Instructor lecture – approximately 4-5 hours per week
 - Large group, small group, and individual tasks weekly
 - Read, write, and speak in a professional manner in written assignments and speeches.
- Textbook and Supplemental Reading Materials
 - Introduction to Forestry Science Textbook/Lab Manual (10th-12th grade reading level)
 - Pennsylvania Pesticide Manual
 - Pa DCNR Forest Firefighting Training Manual)
- Lab Experience
 - All students will have the opportunity to participate in 6-8 hours a week in the clinical area
 - Most clinical work is done outside in all weather conditions.
 - Most maintenance work is done inside the lab.
- Homework
 - Students are expected to complete tasks within the set completion dates. At times this requires students to complete tasks outside of the school day.
 - Projects and some clinical experience preparation work are also required outside of the school day.
- Co-op Requirements (Grades 11-12)
 - Satisfactory attendance records.
 - "C" average
 - Instructor's recommendation.
 - Transportation



Job Ready Assessment Blueprint

Forest Products and Processing



Test Code: 3037 / Version: 01

“Measuring What Matters”

Specific Competencies and Skills Tested in this Assessment:

Safety

- Apply knowledge of personal safety practices, including use of PPEs
- Evaluate geographic and environmental factors related to safety
- Demonstrate safe use of forestry equipment and machinery including appropriate hand signals
- Select correct fire extinguisher for fire type and demonstrate proper use
- Explain the significance of OSHA as it relates to forestry

Logging, Harvesting

- Define harvesting terminology
- Inspect and study harvest area
- Describe correct procedures for operating skidders and loaders, including proper choker setter's technique and dislodging snags
- Identify the parts of a choker
- Demonstrate proper techniques for manually felling a tree
- Determine legal load weight for over-the-road vehicles, including calculating cord volume and securing product for transport



Tree Identification

- Identify tree types using leaves, bark, and buds
- Identify species representative to geographic area

Specific Competencies and Skills continued:

Sawmill Operation

- Explain sawmill procedures, processes, and terms
- Identify various types of saws and their uses
- Scale logs, identify log scale, and explain relationship of log volume to lumber volume
- Identify wood according to species
- Size and dimension rough-cut lumber and grade dimensional lumber
- Identify lumber defects, causes, and effects
- Explain methods of drying lumber

Diesels and Hydraulics

- Identify the parts and functions of a hydraulic system
- Inspect, service, and troubleshoot hydraulic systems, including procedures for checking hydraulic leaks
- Identify engine, hydraulic, and gear oils
- Explain basic diesel engine operation, including fuel types, and troubleshooting

Chain Saws

- Identify parts of a chain saw
- Demonstrate safe transportation, use, and operation of chain saws
- Identify types of chains and explain uses
- Adjust, sharpen, and identify features of a chain saw
- Diagnose and troubleshoot chain saw problems



Specific Competencies and Skills continued:

Silviculture and Forest Management

- Define silviculture and forest management terms
- Describe the various types of forests and their potential uses
- Identify methods of timber harvesting based on forest type
- Explain stand density and stocking
- Estimate cutting ratio to determine and achieve sustained yield

Forest Ecology and Protection

- Identify environmental factors important to a forest community
- Determine tree maturity (biological and economical)
- Identify leaf diseases and their causes
- Explain how plant genetics alters tree performance
- Describe formation of forest soils
- Identify insects detrimental to forests
- Specify integrated pest management strategies
- Explain causes of deformed trees
- Identify firefighting tools and explain principles of forest fire management



Surveying

- Define surveying terminology
- Use maps, GPS, and GIS to locate boundaries and topographical information
- Identify methods of calculating elevation and slope
- Identify and use measuring devices
- Calculate acreage using common forest/surveying measuring techniques

Specific Competencies and Skills continued:

Timber Cruising

- Select and use correct timber measuring tools
- Define common forest measurement units
- Calculate basal area
- Determine board feet
- Apply techniques of timber cruising to determine stand volume
- Apply techniques of log scaling to determine log volume

Wildlife

- Identify types of wildlife commonly found in forest habitats
- Explain animal and human interaction and the impact on forest habitats
- Identify seasonal food sources
- Determine population density based on scientific data



Business Management and Employability Skills

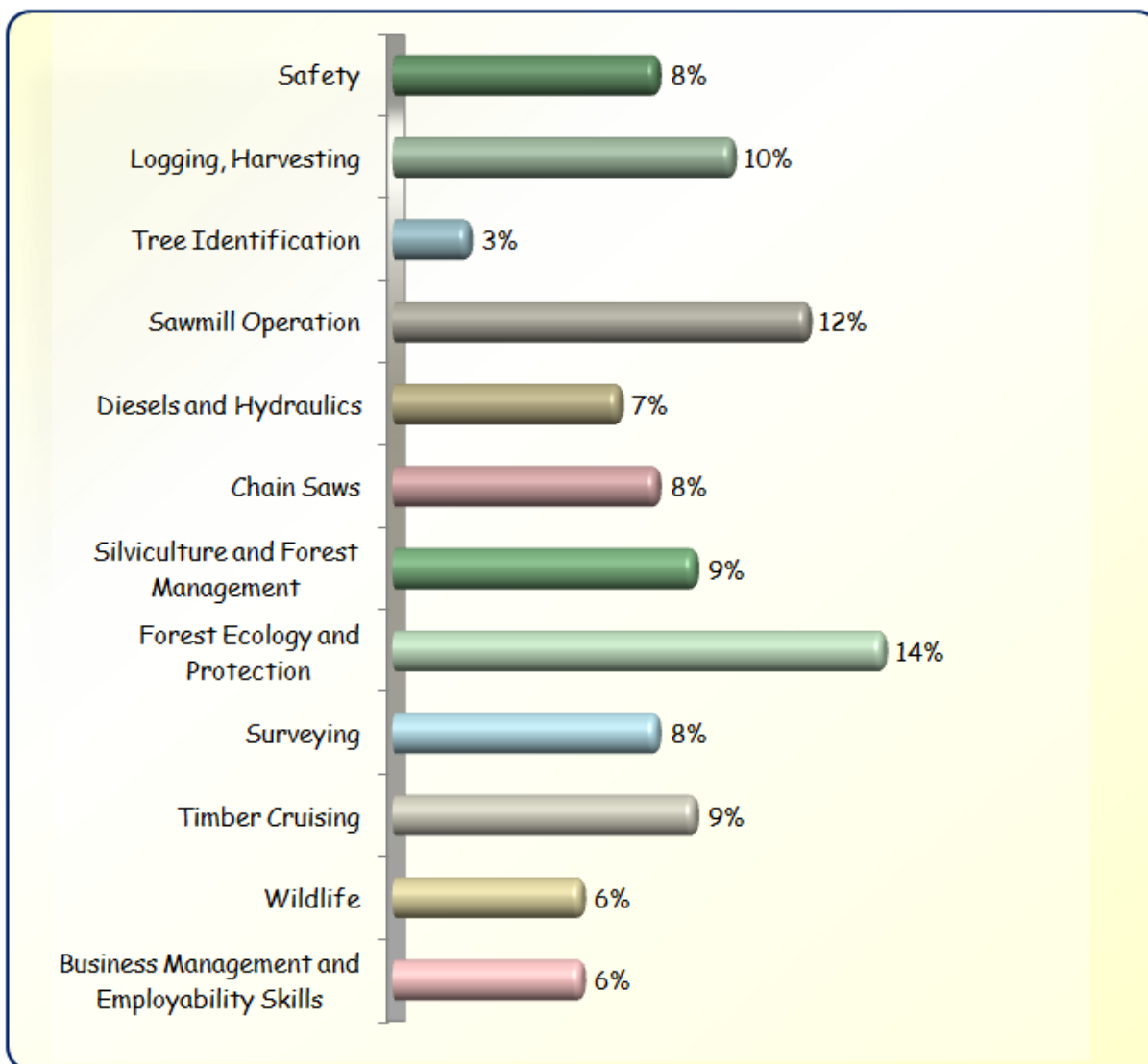
- Define business terms used to successfully operate a forest enterprise
- Explain characteristics of different types of business ownership
- Identify strategies, practices, and issues involved in successful forest enterprises

Written Assessment:

Administration Time: 3 hours

Number of Questions: 189

Areas Covered:



Sample Questions:

Trees that produce cones are called

- A. broadleaf
- B. deciduous
- C. conifers
- D. hardwoods



After processing, hardwood lumber should be

- A. stickered
- B. bundled
- C. covered
- D. waxed

To safely start a chain saw, the saw should be

- A. on the ground
- B. on the tailgate of the truck
- C. drop-started
- D. on the log

The demand by forest trees for more growing space is called

- A. survival
- B. variation
- C. diversity
- D. competition

In forestry, a common unit of linear measurement is the chain which is equal to

- A. 33 feet
- B. 66 feet
- C. 100 feet
- D. 120 feet

Performance Assessment:

Administration Time: 2 hours and 50 minutes

Number of Jobs: 7

Areas Covered:

15% **Manually Fell a Tree**

Prepare the site, use proper felling and safety procedures, and time to complete job 1.

11% **Identify Leaf, Bud, and Bark Specimens**

Identify different types of leaves, buds and bark, identify various specimens of each, and time to complete job 2.

11% **Grade Hardwood or Pine Lumber**

Identify boards by common name, grade the boards, and time to complete job 3.

11% **Scale Hardwood or Pine Logs**

Identify logs by common name, calculate volume in board feet, and time to complete job 4.

12% **Sharpen and Adjust Chain Saw**

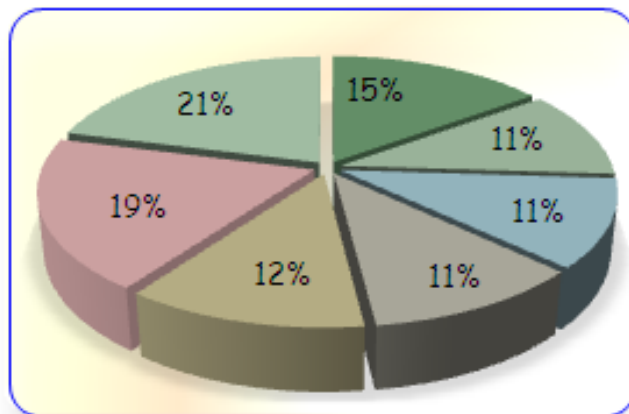
Sharpen and adjust chain saw, safety, and time to complete job 5.

19% **Calculate Acreage**

Locate bearings, pace perimeter, plot acreage on paper, compute acreage, and time to complete job 6.

21% **Plot and Analyze 1/5 Acre**

Calculate saw logs, demonstrate conversion process, identify trees, record correct volume on a per acre basis, and time to complete job 7.



Sample Job: Identify Leaf, Bud, and Bark Specimens

Maximum Time: 20 minutes

Participant Activity: The participant will identify the common names of 30 leaf, bud and/or bark specimens.



The Association for Career and Technical Education (ACTE), the leading professional organization for career and technical educators, commends all students who participate in career and technical education programs and choose to validate their educational attainment through rigorous technical assessments. In taking this assessment you demonstrate to your school, your parents and guardians, your future employers and yourself that you understand the concepts and knowledge needed to succeed in the workplace. Good Luck!

