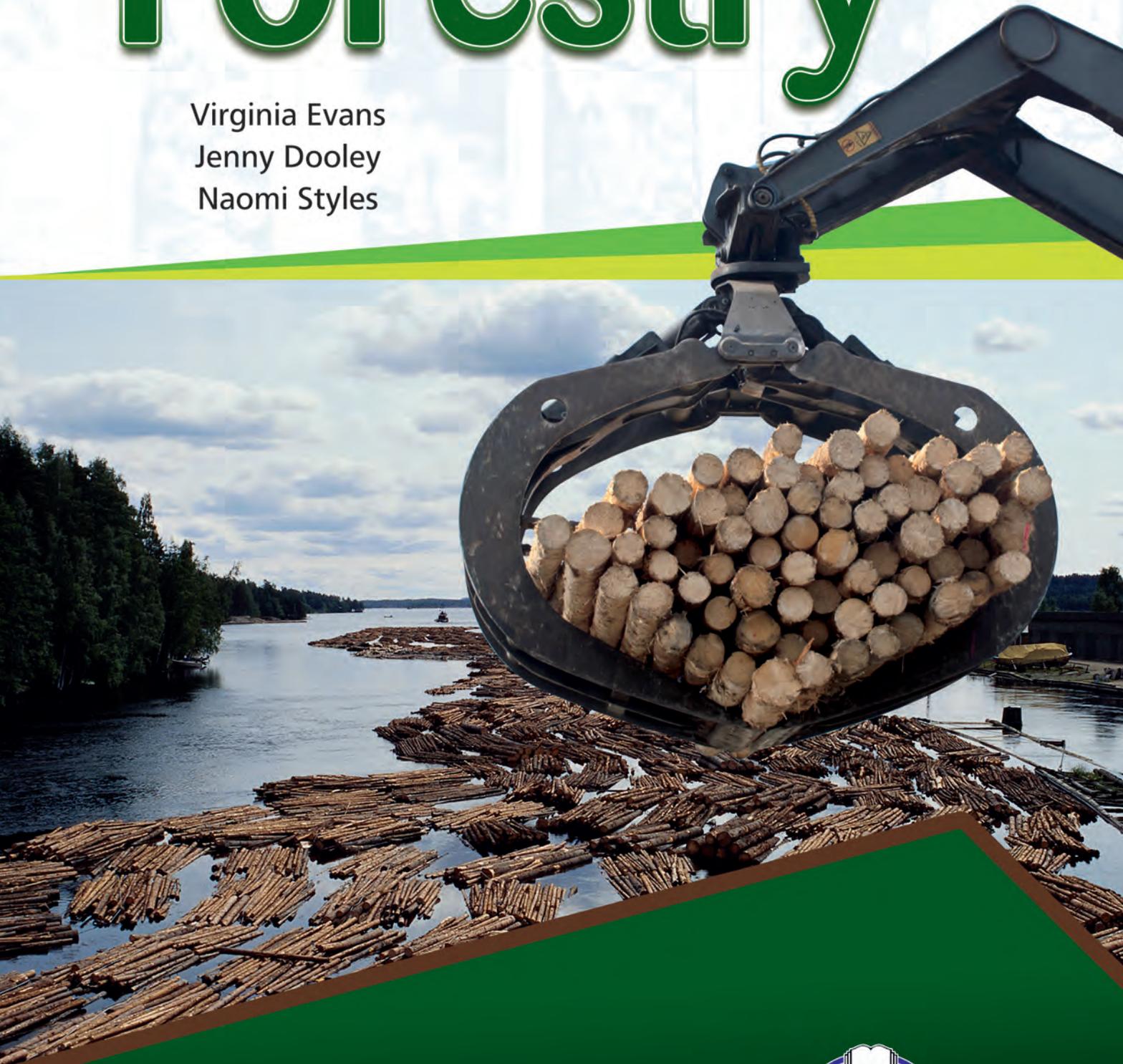


**CAREER  
PATHS**

**NATURAL RESOURCES I**

# Forestry

Virginia Evans  
Jenny Dooley  
Naomi Styles



**Express Publishing**

**CAREER  
PATHS**

**NATURAL RESOURCES I**

# Forestry

**Book**

**1**

Virginia Evans

Jenny Dooley

Naomi Styles



**Express Publishing**

## Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Forestry	Textbook excerpt	conserve, create, forest, forestry, logging, manage, protect, resource, timber, wood	Showing interest
2	Parts of a Tree	Email	bark, branch, crown, leaf, root, seed, shoot, stem, trunk, twig	Reacting to bad news
3	Parts of a Forest	Textbook excerpt	canopy, herb layer, litter, lower tree layer, moss layer, overstory, shrub layer, soil, undergrowth, understory	Giving a suggestion
4	Products	Webpage	charcoal, cork, firewood, fuel, lumber, paper, pellet, plank, raw material, stud	Making a purchase
5	Forestry Equipment 1	Product listing	ax, blade, bucksaw, chainsaw, crosscut saw, cutter, gullet, handsaw, raker, tooth, two-man	Offering advice
6	Forestry Equipment 2	Equipment checklist	Biltmore stick, caliper, choker, clinometer, compass, hypsometer, increment borer, plumb bob, scale stick, wire rope	Sharing opinions
7	Binds	Article	bind, bottom bind, compression, end bind, no bind, pressure, side bind, slabbing, tension, top bind	Asking for clarification
8	Cuts and Notches	Article	compound cut, compression side cut, conventional notch, Humbolt notch, offset cut, open-faced notch, straight cut, tension side cut, tongue and groove cut, wedge cut	Giving advice
9	Safety Equipment	Memo	boots, dBA, earmuffs, earplugs, gloves, goggles, hard hat, mesh screen, PPE, saw chaps	Giving a warning
10	Safety Measures	Manual excerpt	escape path, falling direction, felling hinge, hazard, in the clear, landing zone, lodged tree, snag, spring pole, throwback, windowmaker	Checking for progress
11	First Aid	Guide	bandage, blister, burn, contusion, cut, first-aid kit, fracture, laceration, latex glove, scrape, splint, sprain, wound	Giving advice
12	Basic Actions	Job posting	buck, chip, cut, fell, limb, load, lop, saw, sort, top	Giving instructions
13	Types of Trees 1	Textbook excerpt	angiosperm, conifer, cordwood, crop tree, deciduous, evergreen, foliage, gymnosperm, hardwood, softwood	Introducing opposites
14	Types of Trees 2	Textbook excerpt	ash, beech, cedar, elm, fir, maple, oak, pine, redwood, spruce	Asking about plans
15	Education	Webpage	bachelor's degree, biology, botany, climatology, economics, forest management, genetics, hydrology, master's degree, soil science	Expressing preference

# Table of Contents

<b>Unit 1 – Forestry</b> .....	4
<b>Unit 2 – Parts of a Tree</b> .....	6
<b>Unit 3 – Parts of a Forest</b> .....	8
<b>Unit 4 – Products</b> .....	10
<b>Unit 5 – Forestry Equipment 1</b> .....	12
<b>Unit 6 – Forestry Equipment 2</b> .....	14
<b>Unit 7 – Binds</b> .....	16
<b>Unit 8 – Cuts and Notches</b> .....	18
<b>Unit 9 – Safety Equipment</b> .....	20
<b>Unit 10 – Safety Measures</b> .....	22
<b>Unit 11 – First Aid</b> .....	24
<b>Unit 12 – Basic Actions</b> .....	26
<b>Unit 13 – Types of Trees 1</b> .....	28
<b>Unit 14 – Types of Trees 2</b> .....	30
<b>Unit 15 – Education</b> .....	32
<b>Glossary</b> .....	34

**CAREER  
PATHS**

**NATURAL RESOURCES I**

# Forestry

**Book  
2**

Virginia Evans  
Jenny Dooley  
Naomi Styles



**Express Publishing**

## Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Tree Growth	Textbook excerpt	deadwood, germinate, growth, maturity, old age, pole, pollen, reproductive ability, sapling, seed, seedling, sprout	Expressing hope
2	Forest Inventory	Manual excerpt	angle gauge, fixed radius plot, forest inventory, plot, stand examination, stand density index, stand density management diagram, timber cruise, variable radius plot, volume table, wedge prism	Asking for clarification
3	Timber Metrics	Memo	basal area, cruising rod, diameter tape, Girard form class, log rule, merchantable height, quadratic mean diameter, relascope, site index, site tree, stocking, timber metrics, tree taper	Verifying information
4	Forest Ecosystems	Pamphlet	abiotic, biota, biotic, biodiversity, community, component, ecosystem, genetic diversity, habitat, organism, population, species	Describing progress
5	Forests and Stands	Report	all-aged stand, commercial forest land, even-aged stand, old-growth, overmature, overstocked, residual stand, stand, understocked, virgin forest, well-stocked	Discussing findings
6	Forest Plans	Schedule	annual operational forest plan, collaborative forest management, implement, long term, monthly, objective, operational forest plan, plan of action, prediction, research, strategic forest plan, tactical forest plan	Discussing plans
7	Land Classification 1	Guide	aggregate, analysis, attribute, characteristic, physical characteristics, physiography, potential productivity, stand and spatial land classification, stand-based land classification, socioeconomic characteristic, strata-based land classification	Making a recommendation
8	Land Classification 2	Report	flat, lowland, management history, natural, planted, productive, recreational area, riparian, scenic area, stable, steep, thinned, upland, wilderness area	Talking about plans
9	Surveying	Manual excerpt	chain, GPS, grid, hand compass, line plot survey, pacing, sample, survey, transect, traversing	Making suggestions
10	Silviculture 1	Email	clear-cut, drum chopping, group selection, pollard, prune, shade intolerant, shade tolerant, silviculture, single-tree selection, stump harvest, thin, weed	Talking about plans
11	Silviculture 2	Textbook excerpt	aerial seeding, broadcast seeding, coppice, establishment cut, preparatory cut, removal cut, repopulate, seed tree, shelterwood, treeplanting, variable retention	Talking about choices
12	Harvests	Webpage	cable logging, CTL, forward, haul, heli-logging, high lead logging, rotation, short rotation coppice, short rotation forestry, shovel logging, skid, skyline logging, winch, yard	Asking questions
13	Sawmills 1	Article	board, cant, debark, deck, dry, edge, flitch, gang edger, head saw, kiln, plane, plywood, resaw, scale	Describing progress
14	Sawmills 2	Brochure	Alaskan mill, automated, bandsaw mill, chainsaw mill, cutting capacity, head saw, kerf, minimize, portable sawmill, rail, swingblade mill, waste	Making a purchase
15	Measurements	Field guide	acre, area, centimeter, cm <sup>3</sup> , cord, diameter, FBM, foot, hectare, inch, meter, MFBM, MMFBM, perimeter, stère	Estimating measurements

# Table of Contents

<b>Unit 1 – Tree Growth</b> .....	4
<b>Unit 2 – Forest Inventory</b> .....	6
<b>Unit 3 – Timber Metrics</b> .....	8
<b>Unit 4 – Forest Ecosystems</b> .....	10
<b>Unit 5 – Forests and Stands</b> .....	12
<b>Unit 6 – Forest Plans</b> .....	14
<b>Unit 7 – Land Classification 1</b> .....	16
<b>Unit 8 – Land Classification 2</b> .....	18
<b>Unit 9 – Surveying</b> .....	20
<b>Unit 10 – Silviculture 1</b> .....	22
<b>Unit 11 – Silviculture 2</b> .....	24
<b>Unit 12 – Harvests</b> .....	26
<b>Unit 13 – Sawmills 1</b> .....	28
<b>Unit 14 – Sawmills 2</b> .....	30
<b>Unit 15 – Measurements</b> .....	32
<b>Glossary</b> .....	34

**CAREER  
PATHS**

**NATURAL RESOURCES I**

# Forestry

**Book**

**3**

Virginia Evans

Jenny Dooley

Naomi Styles



**Express Publishing**

## Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Types of Forestry 1	Course handbook	agroforestry, agriculture, biofuel, biomass, dendrology, economically, energy forestry, farming, forest economics, forest hydrology, forest mensuration, resource management	Providing options
2	Types of Forestry 2	Program information	boreal forestry, forest pathology, interaction, pathogen, social forestry, taiga, tropical forestry, tropics, urban forestry, vector, world forestry	Answering questions
3	Evaluating Forest Resources	Report introduction	average, DBH, diameter distribution, estimate, Mai, PAI, pine straw, qualitative, quantitative, site quality, TPA, timber volume	Explaining results
4	Optimizing Levels	Textbook excerpt	biological rotation age, economic rotation age, income generation rotation age, optimization, optimize, optimum stand density, optimum thinning time, optimum timber rotation, physical rotation age, rate of growth, stand-level optimization, silvicultural rotational age, technical rotation age, tree-level optimization, value growth rotation age	Making a suggestion
5	Tree Health and Defects	Field guide	bacteria, fungi, health, insect, mechanical damage, nutrient deficiency, phytoplasm, pollution, primary pest, resistance, toxic, virus, waterlogging, weed	Making observations
6	Geographic Data 1	Email	cartography, fire location, GIS, home site, ownership boundary, raster data, road, stream, trail, vector data, vegetation, water source	Asking for clarification
7	Geographic Data 2	Webpage	buffer, combine, clip, erase, join, map, overlay, proximity analysis, query, select, split	Asking about measurements
8	Topography	Textbook excerpt	altitude, contour interval, contour line, coordinate system, elevation, hill, latitude, longitude, slope, terrain, topography, valley	Expressing unfamiliarity
9	Projections	Advertisement	diameter class model, empirical yield table, expansion factor, gap simulator, growth and yield simulator, normal yield table, per-tree estimate, per unit area, snag and coarse woody debris model, tree list, tree record, volume table, whole-stand model, yield table	Presenting mixed results
10	Firefighting / Burns	Email	back burn, bush fire, controlled burn, drip torch, fire line, fire pack, fire resistant, fire shelter, fire shovel, fuse, McLoed, Pulaski, wildfire	Stressing a point
11	Animal Habitats	Letter	ecology, ecological thinning, endangered, extinction, forest fragmentation, habitat loss, habitat suitability index, habitat quality value, mast, niche, threatened, wolf tree	Asking for advice
12	Heavy Machinery	Product listing	bulldozer, feller buncher, felling device, front-end loader, grader, logging machine, log loader, log stacker, log truck, machinery, self-loading, scraper, skidder, tractor	Describing levels of necessity
13	Environmental Issues	Textbook excerpt	acid rain, carbon sequestration, carbon sink, deforestation, ecoforestry, erosion, forest ecology, forest dieback, high grading, landslide, mitigate, motorized recreation	Discussing results
14	Sustainability	Advertisement	allowable cut, conservation, Environmental Impact Statement, green, illegal, nutrient depletion, production, reforestation, regulate, stewardship, sustainability, tree breeding, tree farm	Talking about results
15	Career Options	Magazine article	arborist, forest ecologist, forester, forest economist, forest engineer, forest ranger, forest technician, fire lookout, hotshot crew, lumberjack, resin extractor, smoke jumper, timber cruiser	Talking about job experiences

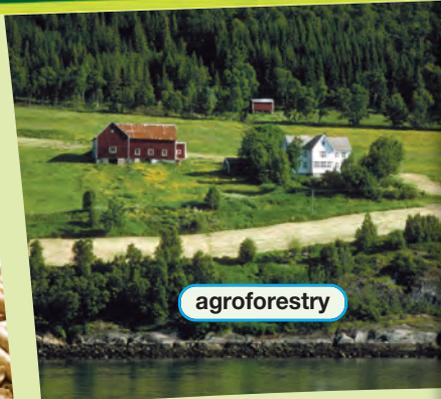
# Table of Contents

<b>Unit 1 – Types of Forestry 1</b> .....	4
<b>Unit 2 – Types of Forestry 2</b> .....	6
<b>Unit 3 – Evaluating Forest Resources</b> .....	8
<b>Unit 4 – Optimizing Levels</b> .....	10
<b>Unit 5 – Tree Health and Defects</b> .....	12
<b>Unit 6 – Geographic Data 1</b> .....	14
<b>Unit 7 – Geographic Data 2</b> .....	16
<b>Unit 8 – Topography</b> .....	18
<b>Unit 9 – Projections</b> .....	20
<b>Unit 10 – Firefighting / Burns</b> .....	22
<b>Unit 11 – Animal Habitats</b> .....	24
<b>Unit 12 – Heavy Machinery</b> .....	26
<b>Unit 13 – Environmental Issues</b> .....	28
<b>Unit 14 – Sustainability</b> .....	30
<b>Unit 15 – Career Options</b> .....	32
<b>Glossary</b> .....	34

# 1 Types of Forestry 1



biomass



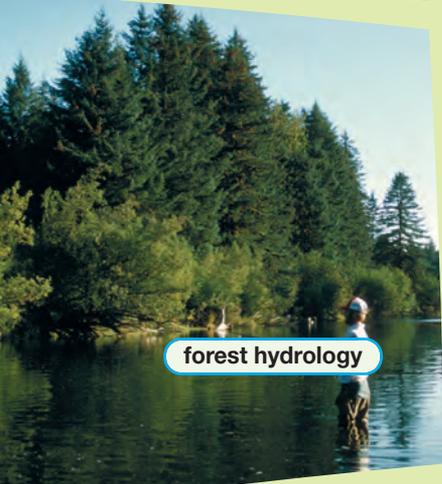
agroforestry



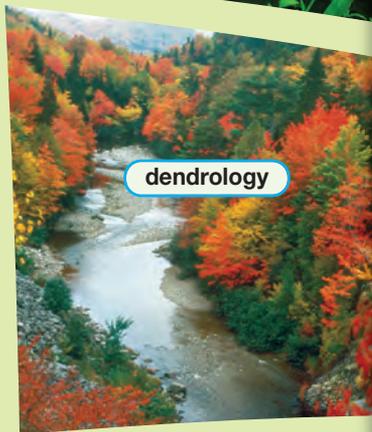
agriculture



biofuel



forest hydrology



dendrology

## Get ready!

1 Before you read the passage, talk about these questions.

- 1 What is the focus of agroforestry?
- 2 What are some uses for biomass and biofuel?

## Reading

2 Read the course handbook. Then, mark the following statements as true (T) or false (F).

- 1  Forestry students must complete a course in chemistry.
- 2  Agroforestry considers forestry economically.
- 3  There are four specialties within resource management.

## Vocabulary

3 Place the correct words from the word bank in the correct box.

### Word BANK

energy forestry farming forest hydrology  
agroforestry biofuel agriculture biomass

Food Production	Fuel Production	Water Use
_____	_____	_____
_____	_____	_____
_____	_____	_____

Forestry students complete undergraduate requirements, continuing on to a specialty track. Course requirements for this major include: mathematics, chemistry, biology, and conservation. Forestry majors specialize in one of three areas. The three tracks are: **agroforestry**, **energy forestry**, and **resource management**.

Each of the three tracks considers forestry **economically** and environmentally. Some of the tracks have common courses.

Agroforestry students focus on **agriculture** in relation to woodlands. They work with industry experts toward integrating environmentally safe **farming** production. They also research best practices for minimizing negative side effects of agriculture.

The energy forestry study course begins with **dendrology**. This field of managed forestry is concerned with rapidly maturing tree species. Students will identify and manage species suitable for the production of **biomass** or **biofuel**.

Within the resource management track, students can choose from several different specializations. This course of study begins with general **forest economics**. Students can choose to continue with advanced coursework in forest economics. An additional specialization track is offered in **forest hydrology**. This track includes field work, researching water movement and use. The third resource management specialization track is **forest mensuration**. Coursework includes discussions of different management objectives. These include: forest pathology, insect control, wildlife management, fires and fuels, and recreation.

**4** Write a word that is similar in meaning to the underlined part.

- The students studied several tree species in the study and identification of tree species based on their economic value course.    \_ e n \_ \_ o \_ \_ g y
- The instructor asked students to consider forests environmentally and in a way that considers economics and finance.    e c \_ \_ \_ m i \_ \_ l l \_
- The field of applying quantitative measurements to determine forest stand timber volume, health, and productivity influences resource management decisions.    \_ o r \_ \_ t    m e \_ \_ \_ r a \_ \_ \_ n
- Forestry professionals are concerned about good stewardship and the process of using an organization's valuable resources in the most efficient way possible.    r e \_ \_ \_ r c \_    m \_ \_ a g \_ \_ \_ n \_
- Students with an interest in finance can specialize in a field of study focused on the influence of economics on forestry management.    f \_ \_ e s \_    e c \_ \_ o \_ \_ c s

**5**  Listen and read the course handbook again. What is the importance of forest hydrology?

## Listening

**6**  Listen to a conversation between a student and an academic advisor. Mark the following statements as true (T) or false (F).

- The woman suggests fields of specialized study.
- The man says he wants to live in a rural area.
- The man wants to specialize in forest hydrology.

**7**  Listen again and complete the conversation.

- Student:** I can't decide which **1** \_\_\_\_\_ is right for me.
- Advisor:** Let's consider the options: agroforestry, energy forestry, and **2** \_\_\_\_\_.
- Student:** Right. I know that I am definitely not interested in **3** \_\_\_\_\_.
- Advisor:** How do you know that?
- Student:** I took an intro to **4** \_\_\_\_\_ course last year, and I had a hard time with chemistry.
- Advisor:** Okay. What about agroforestry?
- Student:** Well, I am interested in **5** \_\_\_\_\_, but I am not sure there are many job opportunities in **6** \_\_\_\_\_.

## Speaking

**8** With a partner, act out the roles below based on Task 7. Then, switch roles.

**USE LANGUAGE SUCH AS:**

*I can't decide which ...*

*I am definitely not interested in ...*

*What I would really like to study is ...*

**Student A:** You are an advisor. Talk to Student B about:

- his/her options for specialized studies
- his/her interests and options
- specialty fields offered by the department

**Student B:** You are a forestry student. Talk to Student A about your interests.

## Writing

**9** Use the course handbook and the conversation from Task 8 to create the advisor's notes about the student's forestry specialization. Include the student's thoughts on agroforestry, energy forestry, and resource management and the student's decision.

## Get ready!

1 Before you read the passage, talk about these questions.

- 1 Which scientific fields are useful for forestry students?
- 2 Why should forestry students study economics?

## Forestry Program

Welcome to the homepage for the Forestry program at Freedom University. Students develop diverse **forest management** skills. Our faculty includes scientific experts and industry professionals.



forest management

## Bachelor's Degree in Forestry

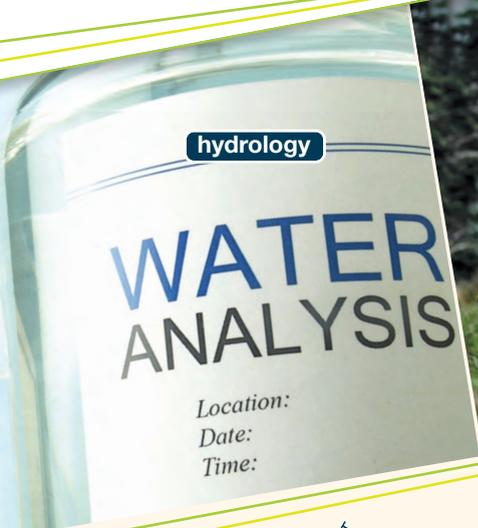
Our bachelor's degree in Forestry program is a four-year degree. Students begin with courses in **biology** and **botany**. Advanced courses are available in these sciences as well. Students are required to fill out coursework in the following:

- Soil Science
- Climatology
- Hydrology

Additionally, advanced courses are offered in the following:

- Genetics
- Economics

Exemplary students are invited to continue their studies. Please review requirements for the Forest Management **master's degree**.



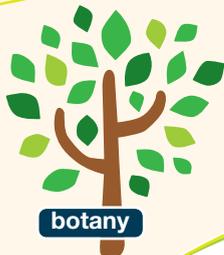
hydrology

**WATER ANALYSIS**

Location:  
Date:  
Time:



soil science



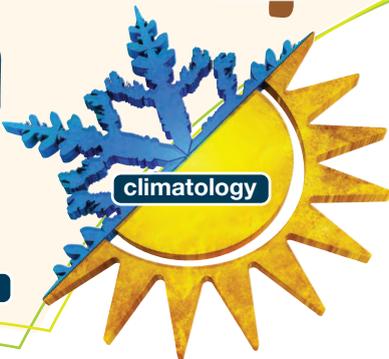
botany



genetics



master's degree



climatology



economics

## Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- 1 \_\_\_ genetics
- 2 \_\_\_ economics
- 3 \_\_\_ soil science
- 4 \_\_\_ climatology
- 5 \_\_\_ bachelor's degree
- 6 \_\_\_ biology

- A the scientific field concerned with the study of climate and weather
- B degree earned by students who have completed undergraduate studies
- C the scientific field concerned with heredity and inherited traits
- D the scientific field concerned with production, consumption and finance
- E the scientific field of study focused on living organisms
- F the scientific field focused on soil formation, ecology and classification

## Reading

2 Read the webpage. Then, mark the following statements as true (T) or false (F).

- 1 \_\_\_ All students are required to fill out botany coursework.
- 2 \_\_\_ Advanced biology courses are available.
- 3 \_\_\_ The school offers a master's degree in genetics.

- 4 Fill in the blanks with the correct words from the word bank.

**word** BANK

forest management    botany  
 master's degree    hydrology

- Peter studied \_\_\_\_\_ because he was interested in forest stewardship and land use.
- Sally's advisor suggested that she should continue her studies, working toward a \_\_\_\_\_.
- The students studied the life cycle of plants in their \_\_\_\_\_ course.
- Forestry students studied \_\_\_\_\_ to learn about the impact of water movement in forests.

- 5 Listen and read the webpage again. What courses are required for a bachelor's degree in forestry?

**Listening**

- 6 Listen to a conversation between two forestry students. Mark the following statements as true (T) or false (F).

- \_\_\_ The speakers are in the same botany class.
- \_\_\_ The man is taking a climatology course.
- \_\_\_ The woman will take a soil science course next semester.

- 7 Listen again and complete the conversation.

**Student 1:** Hi Sara. Did you enjoy our 1 \_\_\_\_\_ today?

**Student 2:** It was great. I really like that class.

**Student 1:** Me too. What else are you taking 2 \_\_\_\_\_ ?

**Student 2:** I'm taking 3 \_\_\_\_\_ and climatology.

**Student 1:** I haven't taken 4 \_\_\_\_\_ yet. I'm looking forward to that course.

**Student 2:** It's an interesting class. Have you taken 5 \_\_\_\_\_ yet?

**Student 1:** Yes. I am taking that now. We're testing 6 \_\_\_\_\_ this afternoon.

**Student 2:** I'm looking forward to having that class next semester.

**Speaking**

- 8 With a partner, act out the roles below based on Task 7. Then, switch roles.

**USE LANGUAGE SUCH AS:**

*Did you enjoy our ... ?*  
*I really like ...*  
*I'm looking forward to ...*

**Student A:** You are a forestry student. Talk to Student B about:

- the course that you enjoy
- the other courses that he or she is taking
- a course that you plan to take in the future

**Student B:** You are a forestry student. Talk to Student A about the courses you are taking.

**Writing**

- 9 Use the conversation from Task 8 to fill out a course request form.

**FREEDOM UNIVERSITY**  
**FORESTRY PROGRAM**  
**COURSE REQUEST FORM**

Degree program: \_\_\_\_\_

Degree courses that you are currently taking: \_\_\_\_\_

Degree courses requested for spring semester: \_\_\_\_\_

# Glossary

- goggles** [N-COUNT-U9] **Goggles** are protective glasses, usually set in rubber or plastic frames, which are worn to protect the eyes from flying debris.
- gullet** [N-COUNT-U5] A **gullet** is the space between the tips of neighboring saw teeth.
- gymnosperm** [N-COUNT-U13] A **gymnosperm** plant bears seeds that are not enclosed in ovaries but are often exposed on cones or similar structures. Examples include conifers and cycads.
- handsaw** [N-COUNT-U5] A **handsaw** is a saw that is used with one hand to cut wood into different shapes. Handsaws have one flat, thin, sharp edge.
- hard hat** [N-COUNT-U9] A **hard hat** is a protective hat made of stiff material, such as metal or fiberglass, that is designed to absorb energy, to alert others to a worker's presence, and to protect the head from falling or flying objects (e.g., branches).
- hardwood** [N-COUNT-U13] A **hardwood** is an angiosperm tree, such as an oak, or ash, as distinguished from a coniferous tree.
- hazard** [N-COUNT-U10] A **hazard** is anything that has the potential to be dangerous or to cause accidents.
- herb layer** [N-COUNT-U3] An **herb layer**, also called an herbaceous layer, is the ground floor located beneath the shrub layer. Grasses, wildflowers, ferns, and other soft-stemmed plants exist in this layer.
- Humbolt notch** [N-COUNT-U8] A **Humbolt notch** is a series of three cuts made to fell a tree, where two of the cuts run in parallel lines and are joined by a further perpendicular cut.
- hydrology** [N-COUNT-U15] **Hydrology** is the scientific field focused on the properties and movement of water.
- hypometer** [N-COUNT-U6] A **hypometer** is a device that measures height or altitude.
- in the clear** [PHRASE-U10] If a person is **in the clear**, he or she is in a safe position within the work area, where the likelihood of hazards is low.
- increment borer** [N-COUNT-U6] An **increment borer** is a tool used to remove cores of wood from trees or timber to determine information such as age, growth rate, and soundness.
- laceration** [N-COUNT-U11] A **laceration** is a tear or jagged wound.
- landing zone** [N-COUNT-U10] A **landing zone** is an area where logs are taken after being felled and before being transported.
- latex glove** [N-COUNT-U11] A **latex glove** is worn by health care professionals and is disposable.
- leaf** [N-COUNT-U2] A **leaf** is a flat, often green, appendage that grows on a tree, performing much of the work in photosynthesis and transpiration.
- limb** [V-T-U12] To **limb** a tree is to cut branches from a tree that has already been cut or to cut branches that have fallen naturally.
- litter** [N-UNCOUNT-U3] **Litter** is the upper layer of decomposing organic matter on the forest floor.
- load** [V-T-U12] To **load** trees or branches is to place them on a bed in a vehicle to be carried from one location to another.
- lodged tree** [N-COUNT-U10] A **lodged tree** is a tree that is resting against another object or tree, which stops it from falling to the ground.
- logging** [N-COUNT-U1] **Logging** is the business of harvesting, managing and transporting trees.
- lop** [V-T-U12] To **lop** a tree is to cut the top of it so that it reaches a maximum specified height above ground after the tree is felled.
- lower tree layer** [N-COUNT-U3] A **lower tree layer** is a well-defined area in a forest with more diverse plant life. This layer receives less space and light than upper layers.
- lumber** [N-UNCOUNT-U4] **Lumber** is hardwood or softwood that is cut into logs and used in construction.
- manage** [V-T-U1] To **manage** something is to be in charge of the ways in which it is handled.
- maple** [N-COUNT-U14] A **maple** is a deciduous tree with lobed leaves and winged double seeds. There are several varieties of maple in different colors and sizes.
- master's degree** [N-COUNT-U15] A **master's degree** is earned by students completing a course of at least one year of study following a bachelor's degree.



NATURAL RESOURCES I

# Forestry

*Career Paths: Natural Resources I - Forestry* is a new educational resource for forestry professionals who want to improve their English communication in a work environment. Incorporating career-specific vocabulary and contexts, each unit offers step-by-step instruction that immerses students in the four key language components: reading, listening, speaking, and writing. *Career Paths: Natural Resources I - Forestry* addresses topics including types of trees, logging equipment, heavy machines, mills, and career options.

The series is organized into three levels of difficulty and offers over 400 vocabulary terms and phrases. Every unit includes a test of reading comprehension, vocabulary, and listening skills, and leads students through written and oral production.

**Included Features:**

- A variety of realistic reading passages
- Career-specific dialogues
- 45 reading and listening comprehension checks
- Over 400 vocabulary terms and phrases
- Guided speaking and writing exercises
- Complete glossary of terms and phrases

The **Teacher's Book** contains a full answer key and audio scripts.

The **audio CDs** contain all recorded material.



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ISBN 978-1-4715-3943-5

