Tree Equity Curriculum

Exploring Green STEAM Careers

American Forests™

Weyerhaeuser

PROJECT LEARNING TREE®
An initiative of SFI

ACKNOWLEDGEMENTS

Weyerhaeuser's partnership with American Forests is unique in that it brings the issue of Tree Equity beyond cities and into smaller communities that also need support for climate resilience and equity. Thanks to Weyerhaeuser's support to fund this work, American Forests will be able to bring state of the art data analysis — identifying and tackling disparities in tree canopy cover by showcasing where trees are needed most — to smaller communities and create a replicable project-based educational experience for high school students. This curriculum introduces students to a range of green career pathways in urban and community forestry. It all comes together by implementing urban forestry projects guided by Tree Equity Score and the students walking through the new curriculum.

This work supports climate change solutions, more sustainable homes for everyone and helping rural communities remain thriving places to live and work through investment in education, technology and the planet. Trees also create jobs through a variety of careers in urban forestry. Too often, people who need jobs most are unaware these positions are available. With Weyerhauser's support, this partnership will raise awareness of the wide range of green jobs one can explore in the field of urban and community forestry to students while also highlighting the environmental and health benefits of supporting our planet.

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About American Forests

American Forests creates healthy and resilient forests, from cities to large natural landscapes, that deliver essential benefits for climate, people, water and wildlife. We advance our mission through forestry innovation, place-based partnerships to plant and restore forests, and movement building. We envision a world in which the significant environmental, societal and economic benefits of forests are fully realized and equitably available to all people. A key to American Forests' mission is through youth education and awareness.

Two ways we achieve our mission in academia is through a new initiative called Career Exploration and our groundbreaking Tree Equity Program, which aims to address the serious lack of tree cover in urban areas, especially in neighborhoods with more low-income families and people of color. American Forests recently announced a partnership with Weyerhaeuser to expand Tree Equity into rural communities and educate youth on careers in urban and community forestry. The partnership aims to identify and tackle disparities in tree canopy cover. Students will learn about green jobs and use the Tree Equity tool to design a greening project that gives them a window into the field of forestry.

Learn more at www.americanforests.org.

About Weyerhaeuser

Weyerhaeuser Company, one of the world's largest private owners of timberlands, began operations in 1900. The company owns or controls approximately 11 million acres of timberlands in the U.S. and manages additional timberlands under long-term licenses in Canada. Weyerhaeuser manages these timberlands on a sustainable basis in compliance with internationally recognized forestry standards. The company is also one of the largest manufacturers of wood products in America and is a real estate investment trust. In 2021, Weyerhaeuser generated $10.2 billion in net sales and employed approximately 9,200 people who serve customers worldwide. Weyerhaeuser common stock trades on the New York Stock Exchange under the symbol WY.

Learn more at www.weyerhaeuser.com.

About Project Learning Tree

Project Learning Tree® (PLT) uses trees and forests as windows on the world to help students learn how to think, not what to think, about complex environmental issues. Through PLT, students gain useful skills, a greater capacity to make informed decisions, and a sense of personal responsibility for conserving the environment. Since 1976, PLT has reached more than 145 million students and trained over 800,000 educators. PLT is an initiative of the Sustainable Forestry Initiative®, whose mission is to advance sustainability through forest-focused collaboration.

Learn more at www.plt.org.

Overview

Choosing a career is one of life's most important decisions. Urban forestry is often overlooked as a career option due to a general lack of knowledge about the profession, even among students majoring in an environmental science. But, it is an interdisciplinary field that plays a major role in science, technology, engineering, the arts and mathematics (STEAM). American Forests coined the term Urban ForeSTEAM as part of an effort to drive change in how students learn about urban forestry through experiential education and exploring green careers.

Tree Equity Curriculum: Exploring Green STEAM Careers is a modular curriculum intended to engage high school students (9th-12th grade) in inquiry-based learning processes. The activities encourage students to make real-world connections of career exploration through the lens of professionals in green careers. These lessons utilize the most current resources and tools to identify green careers and their relationship to factors such as ecosystem services, employment, health and access to green space.

Tree Equity Curriculum: Exploring Green STEAM Careers provides educators and students guidance with regard to environmental literacy by reimagining career readiness education. The lessons facilitate how students can apply scientific knowledge they've acquired in STEAM courses to real world, practical problems, generate solutions and solve such problems. This curriculum offers students the opportunity to learn about green careers in urban and community forestry and how to customize their career path so it fulfills their interests, talents, skills and strengths.

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Next Generation Science Standards (NGSS) and Common Core State Standards (CCSS)

In response to the transformation in both the nature and the number of current jobs and projected job growth in the U.S., NGSS recognizes the importance of rigorous content for college and career readiness. Although there currently are no national standards or NGSS that align with college and career readiness, developing college and career readiness standards is a goal of NGSS. Some states are implementing Career and Technical Education (CTE) and college and career readiness standards into all content areas of their CCSS.

Lesson 1

Which Green Job Is Right for Me?

Activity Time | 45 minutes

5 minutes	Trailblazer Activity
15 minutes	Background and Guided Instruction
20 minutes	Independent Practice
5 minutes	Reflection Activity

KEY TERMS

- Job
- Career
- Climate-forward economy
- Green job
- Green career
- Interest
- Talents
- Skill
- Strength
- Sustainability

STEAM Application

Transitioning to a climate-forward economy, aimed at reducing environmental risks without degrading the environment, will help support millions of jobs with the right policies in place. Encourage students to be attentive learners through discovery-based processes that identify their interests, talents, skills and strengths and how they can be applied to green jobs/careers. Exploring green jobs allows students to critically think through solutions to real and relevant social, economic and environmental problems.

Instructional Resources

- **A computer with Internet access for each student**
- **Writing utensils**
- **Journal/notebook**
- **Worksheet**
- **Green Jobs Skills (Part I)**
- **Website**
  + The U.S. Population Clock

Intended Learning Outcomes

Students will be able to:

- **Implement research and critical thinking skills to explore interests, talents, skills and strengths needed for a green job/career.**
- **Identify skills and requirements for potential green jobs/careers.**
- **Explain why green jobs/careers are critical for a sustainable and climate-focused future.**

5 minutes

1 Trailblazer Activity

Before beginning the lesson, direct students to the U.S. and World Population Clock website. Ask students to write down the current U.S. and world population and respond in their journal to the question, "What jobs will be necessary to meet the needs of a growing U.S. and global population and why?" This activity will be revisited in the reflection activity.

15 minutes

2 Background Knowledge and Guided Instruction

The U.S. and global populations continue to rise. More people means a higher demand for resources that increase carbon emissions into the atmosphere, and green jobs that meet the needs of a growing population are needed now and even more so for the future. Explain to students that human beings have four basic needs for survival — food, water, air and shelter. But a growing population and climatic impacts are shifting the way we sustain basic human needs.

A green career path prepares students for green jobs that produce the food we eat, purify the water we drink, clean the air we breathe, utilize the wood products that provide shelter, and manufacture the clothes we wear in a way that benefits the environment and conserves natural resources. Discuss the basic needs of humans and allow students to share their responses with the class.

Frame the lesson by asking students if they know what a green job is, and what knowledge and skills they would need to obtain to be successful in a green career.

Conduct a discussion with students about the difference between a job and a career. Discuss with students how they will have to apply knowledge gained in the classroom to real world experiences by developing skills that are applicable in the workplace. Doing so will assist with strategizing their desired career path. Frame the lesson by asking students if they know what a green job is, and what knowledge and skills they would need to obtain to be successful in a green career.

Explain to students that they may have an idea about what they want to do, but there are various paths that they can follow after high school to get there. This is why it is important to properly plan and conduct the necessary preliminary research to gain insight on what skills, trainings, certifications and educational level are required for a particular green job. Conduct a discussion with students about similarities and differences between interests, talents, skills and strengths and why they are valuable when students are considering jobs and their career path. Refer to the **Green Jobs Skills** worksheet (Part I). Walk students through the activity and give an example, if necessary.

20 minutes

3 Independent Practice

Distribute the **Green Jobs Skills** worksheet (Part I). Instruct students to work independently to complete the activity. Explain that students may use the Internet to search for information related to the job/career they are exploring. Express that students should explore their top three green jobs that are most relevant to their interests, talents, skills and strengths. Instruct students to begin working on the activities, and encourage them to ask questions as they navigate the activities from the worksheets.

5 minutes

4 Reflection Activity

Instruct students to revisit the U.S. and World Population Clock website to observe how population growth has changed since the beginning of class. Allow students to express, through discussion and/or in their journal, how the growing population is influencing green jobs. Ask students how their interests, talents, skills and strengths could contribute to new green jobs as a result of population growth, what kind of jobs from the **Green Jobs Skills** Worksheet stood out to them and how can they apply their skills to green jobs?

Encourage students to be attentive learners through discovery-based processes that identify their interests, talents, skills and strengths.

Green Jobs Skills (Part I)

Directions: Working individually, identify at least one skill needed for each green job listed below. You may use the Internet to conduct research. Once a skill is listed, it cannot be used again.

Urban Forester _____

Arborist _____

Natural Resource Economist _____

Logger _____

Hydrologist _____

Wood Scientist _____

Marketing Director _____

Sociologist _____

Environmental Lawyer _____

Social Media Manager _____

Wildland Firefighter _____

Policy Advisor _____

Environmental Educator _____

Financial Forecaster _____

Packaging Technologist _____

Lumber Mill Worker _____

Media Coordinator _____

Business Manager _____

Logistics Specialist _____

Carbon Modeler _____

Forestry Engineer _____

Nature Photographer _____

Sustainability Manager _____

Millwright _____

Graphic Designer _____

Wildlife Biologist _____

Forestry Technician _____

GIS Specialist _____

Safety Inspector _____

Filmmaker _____

Public Relations Associate _____

Forester _____

Architect _____

Nature Tour Guide _____

Soil Scientist _____

Park Ranger _____

Lesson 2

A Career That's Right for Me

Activity Time | 60 minutes

5 minutes	Trailblazer Activity
15 minutes	Background and Guided Practice
30 minutes	Independent Practice
5 minutes	Find Your Green Jobs Quiz
5 minutes	Reflection Activity

KEY TERMS

- Artistic
- Career assessment
- Conventional
- Enneagrams
- Enterprising
- Investigative
- Personality types
- Realistic
- Social

STEAM Application

Activities in this lesson explore approaches in increasing student awareness of STEAM-related fields and motivating them to pursue STEAM jobs/careers. This type of exposure to STEAM careers advances student knowledge on how best to prepare for sustainable careers of the future. This lesson engages students in experiences that: 1) increase student awareness of STEAM and urban forestry related careers, 2) enlighten students of the education and skills necessary to pursue those careers and 3) provide students with research and critical thinking skills that deepen their knowledge of related content and skills needed for success in the STEAM workforce.

Instructional Resources

- **A computer with Internet access for each student**
- **Writing utensils**
- **Journal/notebook**
- **Worksheets**
  - Green Jobs Skills (Part II)
  - A Career That's Right for Me
  - Project Learning Tree's Your Personality and Green Jobs
- **Websites**
  - American Forests' Urban Forestry Career Exploration Diagram
  - U.S. Bureau of Labor Statistics Occupational Outlook Handbook
  - Project Learning Tree Find Your Green Jobs Quiz
  - Career Pathways Exploration Guide
- **Workbook**
  - Project Learning Tree's Green Jobs: Exploring Forest Careers

Intended Learning Outcomes

Students will be able to:

- **Identify their career personality type and the green job that aligns with it.**
- **Describe how their interests, talents, skills and strengths relate to their Find Your Green Jobs Quiz results.**
- **Identify job requirements, skills, credentials and educational background relevant to urban forestry and related careers.**

5 minutes

1 Trailblazer Activity

Instruct students to work independently using American Forests' Urban Forestry Career Exploration Diagram to identify one of the six personality types that closely relates to them, based on the brief description of each personality type on the diagram. Then, have students write in their journal about an urban forestry job that is of most interest to them and why.

15 minutes

2 Background Knowledge and Guided Instruction

Continue with the discussion and ideas from Lesson 1, Which Green Job Is Right for Me? Explain to the class that they will continue the planning process of exploring a career that is right for them. Conduct a class discussion by asking students "what makes a job/career appealing (i.e., salary, personal time off, benefits, etc.)?". Allow students to share and expound upon their desired salary, work-life balance, health benefits, job perks, etc. Navigate to the U.S. Bureau of Labor Statistics Occupational Outlook Handbook and select "epidemiologist" as an example occupation. Guide students through the basic requirements for pursuing a career as an epidemiologist.

Describe to students that depending on what type of career they want to pursue, there are various paths for them to choose after graduating from high school. That's why it is important for students to research the skills and education required for different careers to give students an idea of which jobs/careers align with their interests, talents, skills and strengths. Refer to the **Green Jobs Skills** worksheet (Part II) and **A Career That's Right for Me** worksheet. Walk students through the activities and give examples, if necessary.

Explain to students how and why everyone has different interests, talents, skills and strengths. A lot of it has to do with an individual's personality. Personality types have been used for decades as an indicator of learning styles and leadership skills — from John Holland's Theory of Career Choice to Enneagrams to the DISC assessment. Although you can practice certain skills to improve them, others are naturally a part of one's personality. Explain to students that they may develop new interests as they research careers.

Describe how students will use **Project Learning Tree's (PLT) Your Personality and Green Jobs** worksheet followed by the Find Your Green Jobs Quiz to identify their personality type and a green job that supports it. These activities are based on the six personality types identified by Holland's Personality Theory. Students will explore green jobs/careers that best fit their interests, talents, skills and strengths.

30 minutes

3 Independent Practice

Distribute the **Green Jobs Skills** worksheet (Part II) and the **PLT Your Personality and Green Jobs** worksheet to students. Instruct students to work independently to complete the activity. Explain that students may use the Internet to search for information related to the job/career they are exploring. Express that students should explore their top three green jobs that are most relevant to their interests, talents, skills and strengths. Instruct students to begin working on the activities, and encourage them to ask questions as they navigate the activities from the worksheets.

Direct students to the PLT Find Your Green Jobs Quiz. Explain to students that they will take the quiz to identify their dominant personality type and select one of the six green jobs that best relates to their interests, talents, skills and strengths. If a student does not identify with one of the six green jobs listed under their personality type, encourage students to select a career listed under their dominant personality type from American Forests' Urban Forestry Career Exploration Diagram or suggest their own, within reason.

5 minutes

4 Reflection Activity

Have students refer back to their **PLT Your Personality and Green Jobs** worksheet and their Find Your Green Jobs Quiz results. Direct students to write in their journals whether or not the personality trait they selected from the **Your Personality and Green Jobs** worksheet (page 32 in the PLT Green Jobs: Exploring Forest Careers workbook) and the one recommended by the Find Your Green Jobs Quiz were the same. Instruct students to explain why they think the results were the same or different.

Conduct a class discussion by asking students "what makes a job/career appealing (i.e., salary, personal time off, benefits, etc.)?".

Green Jobs Skills (Part II)

Directions: Using the list of skills that you compiled from the **Green Jobs Skills** worksheet (Part I), select the top three green jobs that are most relevant to you. Write down any interests, talents, skills and strengths that you have, and provide any challenges you may face in your top three green jobs.

GREEN JOB #1 _____

Interests _____

Talents _____

Skills _____

Strengths _____

Challenges _____

GREEN JOB #2 _____

Interests _____

Talents _____

Skills _____

Strengths _____

Challenges _____

GREEN JOB #3 _____

Interests _____

Talents _____

Skills _____

Strengths _____

Challenges _____

A Career That's Right for Me

Directions: Working individually, use your results from the Project Learning Tree Find Your Green Jobs Quiz to answer the questions below. You may use the Internet to conduct research and determine the job requirements for the career that appeals most to you from your results.

Dominant personality type: _____

Green job based on personality type: _____

Education level/areas of study: _____

_____

Knowledge/courses: _____

_____

_____

Licenses, certifications, exams, credentials, etc.: _____

_____

_____

Skills needed: _____

_____

_____

What do they do (tasks/duties): _____

_____

_____

_____

_____

Personality traits: _____

Salary range: _____

Projected job outlook (growth): _____

Lesson 3

Green Jobs That Protect and Enhance Ecosystem Services

Activity Time | 120 minutes

10 minutes	Trailblazer Activity
20 minutes	Background and Guided Practice
20 minutes	Independent Practice
60 minutes	Extended Learning
10 minutes	Reflection Activity

KEY TERMS

- Abiotic
- Anthropocene
- Anthropogenic
- Biotic
- Climate
- Climate crisis
- Green economy
- Green job
- Ecosystem
- Ecosystem disservice
- Ecosystem service
- Environment
- Renewable energy (turbine, solar and hydro)
- Sector
- STEAM
- STEM
- Weather
- Workforce

Next Generation Science Standards (NGSS)

HS-LS2-6. Evaluate claims, evidence and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

STEAM Application

There are several green careers with a STEAM focus that are dedicated to sustaining and improving the environment and the services it provides in response to the climate crisis. To prepare future generations of students to meet the needs of green job demands, they need to actively practice problem-solving, critical thinking and communication skills. Students are able to understand the importance of green jobs by generating, synthesizing and assessing information from a variety of subjects taught to students from various STEAM disciplines.

Instructional Resources

- **A computer with Internet access for each student**
- **Writing utensils**
- **Ecosystem Services Worksheet**
- **Journal/notebook**
- **Videos:**
  - "Ecosystem Services and Why They are Vital for Humans"
  - "Anthropocene – video 1"
  - "Anthropocene: The Age of Human Impact on Earth"
- **Websites:**
  - EPA in Your State
  - Career Pathways Exploration Guide
  - Discovery Education STEM Careers Portal
  - Vibrant Cities Lab

Additional resources for extended learning

- **Construction paper or typing paper**
- **Markers or colored pencils**
- **Poster boards**
- **Camera with recording feature** *(optional)*

Intended Learning Outcomes

Students will be able to:

- **Describe the role that ecosystem services play in their lives and the value of healthy ecosystems.**
- **Define the four major categories of ecosystem services: provisioning, regulating, supporting and cultural services.**
- **Explain how green jobs contribute to increasing the sustainable use of the natural environment as the climate changes.**

10 minutes

1 Trailblazer Activity

Play the video "Ecosystem Services and Why They are Vital for Humans." Encourage students to take notes in their journals. After watching the video, instruct students to answer the following questions:

1. What is an ecosystem service?
2. Why should you care about sustaining the environment and the ecosystem services it provides?
3. What does a healthy ecosystem mean to you and why do we need healthy ecosystems?
4. How can green jobs protect and enhance ecosystem services as climate changes?

20 minutes

2 Background Knowledge and Guided Instruction

Ecosystem services are the benefits that the natural environment provides and contributes to human well-being. There are four main categories of ecosystem services: provisioning services, regulating services, supporting services and cultural services. **Supporting services** are the foundational processes that all other ecosystem services rely on. **Provisioning services** are the products that are provided or supplied to humans by the natural environment for use and consumption. **Regulating services** are a set of benefits we receive when ecosystem processes are controlled and maintained in the natural environment. **Cultural services** are the non-material benefits people gain from interacting with the natural environment.

Ecosystem services are the benefits that the natural environment provides and contributes to human well-being. There are four main categories of ecosystem services: provisioning services, regulating services, supporting services and cultural services.

Supporting Services	Provisioning Services	Regulating Services	Cultural Services
Species habitat	Food	Carbon sequestration	Recreation and tourism
Nutrient cycling	Fresh water	Water conservation and purification	Forest bathing or forest therapy
Biodiversity	Timber/wood	Waste-water treatment	Physical therapy /exercise
Primary production	Medicinal plants and resources	Soil management and erosion control	Spiritual connection
Soil formation	Fibers/clothing	Air pollution removal	Aesthetics and creative inspiration

There are several ecosystem disservices around the world that affect people and resources and pose critical societal challenges. Define ecosystem disservice (ecosystem functions that negatively affect human well-being), and give a few examples to compare and contrast how ecosystem services (food, clean air and water, pollination and recreation) and disservices (e.g., pest/insect infestations, disease outbreaks, pollution and soil erosion) impact our quality of life. The actions we take today will influence how we adapt to and respond to changes in ecosystem services. Educating the next generation of leaders about the vulnerability of people and places in response to the climate crisis is imperative since developing and implementing solutions depends on a skilled workforce that is aware of its causes and effects.

According to the Urban Forestry 2020 study of over 1,000 U.S. college students enrolled in courses focused on the environment, 33% were not aware of urban forestry as a career option. There are several types of green job opportunities that have various levels of education and experience requirements. But, understanding how climate change is influencing the natural environment is necessary regardless of a person's background. Begin by asking students, "what is the difference between weather and climate?". Allow students to reply and explain that the main difference is time. Weather is the short-term state of atmospheric conditions, such as temperature, precipitation, wind speed, etc., in a particular area at a given time. Climate, on the other hand, measures and compares the long-term state of weather patterns spanning from months to multiple years.

Earth is warming. How do we know? Because climate data has been recorded for hundreds of years, with most of the warmest years on record occurring over the past 20 years. Scientists argue that we are living in a geologic time period — termed the Anthropocene — that is influenced by human-induced activity (anthropogenic), evidenced by earth system processes being directly and indirectly altered by humans. Play "Anthropocene – video 1" or the "Anthropocene: The Age of Human Impact on Earth" video (based on grade level), and ask students to take notes in their journals.

The actions we take today will influence how we adapt to and respond to changes in ecosystem services.

2 Background Knowledge and Guided Instruction (cont.)

Ask students, "what might happen if we don't take action to fight climate change?". Allow students to share their responses aloud with the class. Answers may include higher temperatures, drought, insect outbreaks, increased wildfires, declining water supplies, reduced agricultural yields, health impacts, flooding and erosion. Ask students how green jobs can help restore the quality of the environment. Allow students to share their responses. Now, ask if they would like to pursue a green career after being exposed to various types of green career opportunities and why. Allow students to share if and why they would like to pursue a green career with the class.

Hold a discussion with students about how green jobs can protect and enhance ecosystem services and lead to a green economy. Students may use their responses from the trailblazer activity. Now, ask students what healthy ecosystems mean to them, and why should they care about living in a healthy ecosystem. Encourage students to share their answers. Discuss how different sectors can contribute to a green economy and protect ecosystem services (e.g., fashion using less water to produce clothes; tech developing advanced materials for making automobiles and buildings more efficient; corporate services reducing paper use and increasing energy-efficient products and utilities using electricity produced from renewable sources such as wind (turbine), the sun (solar) and water (hydro)).

Ask students what types of green activities companies like McDonald's, Nike, Disney, etc., can incorporate to protect and enhance ecosystem services? Allow students to share their answers. Be sure to highlight how companies can go a step further by creating environmental sustainability positions such as Energy Services, Facilities Director, Environmental Policy Analyst and Technology Regulatory Coordinator as a strategy to invest in their sustainability efforts.

To prepare future generations of students to meet the needs of green job demands, they need to actively practice problem-solving, critical thinking and communication skills.

20 minutes

3 Independent Practice

Distribute the **Ecosystem Services** worksheet. Allow students to work independently or with a partner.

60 minutes

4 Extended Learning

Have students refer back to the ecosystem service they selected for the trailblazer activity. Instruct students to illustrate a story (a book, social media post/video, collage, etc.) and write a narrative (250 words max) explaining how their green job (from the PLT Find Your Green Jobs Quiz) can provide that ecosystem service. Inform students that they can use the links under instructional resources as a starting point.

10 minutes

5 Reflection Activity

Ask students to write their response to the questions below in their journals:

1. What is the most significant ecosystem service available to you?
2. Identify an ecosystem service or disservice that is influencing your local community.
3. In three sentences, describe what you would do to address ecosystem disservices that are impacting your local community.

Ecosystem Services

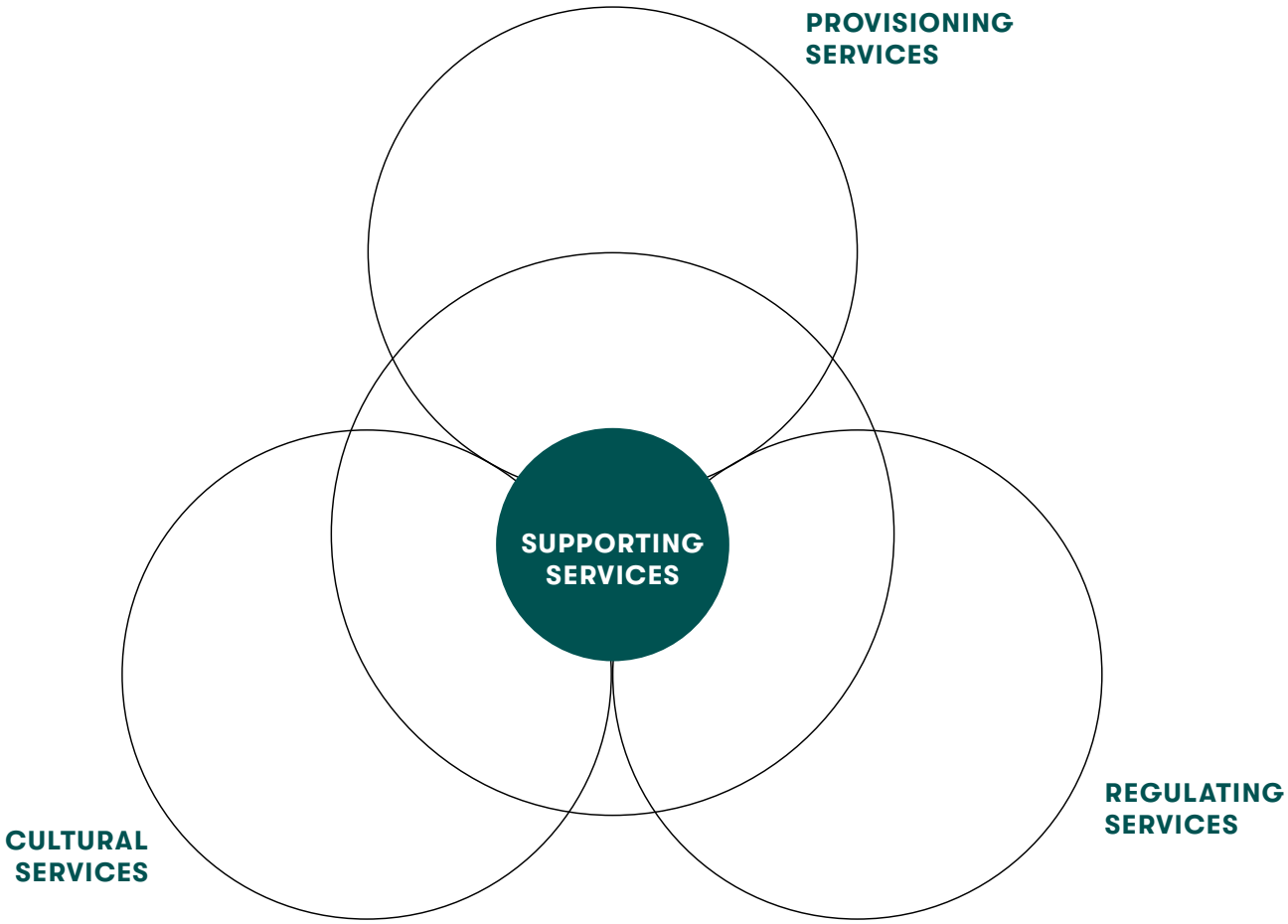
1: Observe the photo by Jeff P. below. Write a paragraph (three to five sentences) to describe the ecological community and how the organisms in the photo might interact. Although you may not be able to see some abiotic and biotic factors in the photo, you may reasonably assume that they are present.

2: Write a paragraph (three to five sentences) to describe the photo in terms of the value the ecological community offers to living organisms, specifically humans. For example, recreation, timber, minerals, food, etc. Be as specific as possible when explaining the value each service provides.

3: List a green job that can protect and enhance an ecosystem service.
You must give two examples for each ecosystem service category. The first row is an example.

ECOSYSTEM SERVICE CATEGORY	ECOSYSTEM SERVICE	GREEN JOB
Provisioning	***Food***	***Food Safety Inspector***
Provisioning		
Provisioning		
Supporting		
Supporting		
Regulating		
Regulating		
Cultural		
Cultural		

4: List as many ecosystem services as you can in the diagram below. Write supporting services that overlap with other ecosystem services within the shared portions of the circle.



5: How can green jobs help protect or enhance ecosystem services that are affected by the climate crisis? How can negative impacts of the climate crisis affect the availability and types of green jobs?

Lesson 4

How Can Green Jobs Improve Tree Equity Scores?

Activity Time | Varies

10 minutes	Trailblazer Activity
60 minutes	Background and Guided Instruction
1-2 weeks	Independent Practice (greening project)

KEY TERMS

- Atmosphere
- Carbon dioxide equivalent
- Census block group
- Conservation
- District
- Ecosystem service
- Emissions
- Erosion
- Geographic Information Systems (GIS)
- Greenhouse gases
- Heat island effect
- Mitigation
- Municipality
- Natural regeneration
- Redlining
- Stakeholder
- Stormwater runoff
- Tree canopy
- Tree canopy gap
- Tree Equity
- Tree Equity Score
- Urban
- Urban cluster

Next Generation Science Standards (NGSS)

HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

STEAM Application

Tree Equity Score (TES) is a tool that utilizes data from geographic information systems (GIS) to measure how equitably tree canopy is distributed within communities, and how different communities experience the benefits of trees. The great thing about GIS is that it provides an experience for every personality type. It doesn't matter if you are artistic, an analyzer, an influencer, an educator or like to work with your hands; GIS offers something that will interest scientists, programmers, engineers, artists and/or mathematicians. Geographic information system is a STEAM application, and learning about GIS directly supports STEAM-based careers and a more competitive workforce.

- **Science, technology, engineering and math (STEM) workers who majored in a STEM field in college typically make higher salaries than those who did not *(Day and Martinez, 2021)*.**
- **At all levels of educational attainment, STEM jobholders earn more than 13% higher wages compared with their same-degree counterparts in other jobs (on average $101,100 vs. $87,600) *(Day and Martinez, 2021)*.**
- **Between 2005 and 2015, STEM employment grew by nearly 25% — over five times faster than non-STEM employment *(Logan et al., 2021)*.**
- **STEM occupations are projected to grow by 10.5% between 2020–2030, faster than the average for non-STEM occupations (7.7%) *(Machovec, 2022)*.**
- **Career exploration of STEAM fields creatively and collaboratively engages students with real data and exposes students to real world problems that are multidisciplinary and foster critical and computationally driven thinking skills *(Li et al., 2020)*.**

Instructional Resources

- **A computer with Internet access for each student**
- **Writing utensils**
- **Journal/notebook**
- **Video**
  - "What 'Tree Equity' Has To Do With Our Climate Crisis"
- **Worksheets**
  - Introduction to Tree Equity Score
  - Greening Project Outline
  - Run of Show Template
- **Websites**
  - Tree Equity Score National Explorer
  - Redlining—and Greening—of Cities. What's the Connection?
  - EPA Greenhouse Gas Equivalencies Calculator
  - Climate and Health Action Guide
  - A Guide to Prewriting Techniques
  - The Beginner's Guide to Writing an Essay
  - Writing Manual and Style Guide
  - Guide to Essay Writing
  - American Forests' Urban Forestry Career Exploration Diagram

Intended Learning Outcomes

Students will be able to:

- **Use TES to quantify the many benefits trees provide their community and explain their importance.**
- **Design and complete a greening project to help enhance and protect the benefits trees provide to their community.**
- **Identify a process to engage key stakeholders in a project.**
- **Describe how green jobs address Tree Equity.**
- **Explain and exemplify concrete actions that promote Tree Equity.**

10 minutes

1 Trailblazer Activity

Explain to students that they are about to watch a video on Tree Equity ("What 'Tree Equity' Has To Do With Our Climate Crisis" video). Instruct students to take notes as they watch the video. After watching the video, have students define Tree Equity in their own words, explain at least three benefits of achieving Tree Equity nationwide and provide an example of each in their journal/notebook (e.g., planting trees provides shade or creates jobs and mitigating CO_2 improves air quality).

60 minutes

2 Background Knowledge and Guided Instruction

As we create Tree Equity, we are taking action to combat the climate crisis by planting millions of trees annually in communities that need them most. Planting trees and increasing green spaces provides many benefits including reducing energy costs, emissions, heat-related illnesses and deaths, stormwater runoff, erosion and the amount of air pollution and greenhouse gases in the atmosphere. All of these mitigation strategies enhance the economy by creating job opportunities.

The '3-30-300 rule' is a concept proposed by internationally recognized urban forestry expert, Cecil Konijnendijk. It states that everyone should be able to see at least three trees from their home, there should be 30% tree canopy cover in each neighborhood and the maximum distance a person should have to travel to the nearest high-quality public green space should be 300 meters. Several studies have shown that access to trees and green spaces encourages physical activity, provides recreational opportunities, reduces stress, lowers blood pressure and improves mood. Ask students to share some of their responses to the trailblazer activity and discuss how planting trees in areas that lack tree canopy will improve the community.

Unfortunately, the story is the same in nearly every city across the U.S. — a map of tree cover is too often a map of income and race. Due to decades of redlining and other discriminatory policies dating back to the 1930s, trees are often sparse in communities where more low-income families and people of color reside.

American Forests created TES because there is tremendous opportunity for greening all communities. Well-maintained trees are essential infrastructure for communities, much like streetlights, schools and sewer lines. Tree Equity is about ensuring that all people experience the benefits of trees. But, how do we know if there are enough trees in a neighborhood for everyone to reap those benefits? American Forests' TES tool answers this question.

Each score helps identify neighborhoods with sparse tree cover. A 0- to-100-point system makes it easy to understand how every urbanized neighborhood across America fares. With the knowledge the score provides, community leaders, tree advocates and residents alike can address climate change and public health through the lens of social equity, attract new resources, factor the scores into technical decisions and track progress toward achieving Tree Equity. A score of 100 represents Tree Equity.

Tree Equity Score uses eight layers of data to create scores: 1) tree canopy, 2) population density, 3) income, 4) employment, 5) race, 6) age, 7) health and 8) surface temperatures (*the U.S. Census Bureau, U.S. Department of Agriculture, U.S. Geological Survey and EarthDefine were among the sources for data that contributed to the scores.)

Tree Equity Score calculates scores based on how much tree canopy and surface temperature align with income, employment, race, age and health factors in the U.S. Scores are currently available for 155,000+ neighborhoods. More than 70% of the U.S. population live in one of these places. Each score indicates whether there are enough trees in specific neighborhoods or municipalities for everyone to experience the health, economic and climate benefits that trees provide.

Your students will complete the greening project through the lens of a professional based on their career personality type indicated by the **Your Personality and Green Jobs** worksheet in Lesson 1. Students will explore, through project-based learning, green careers such as GIS specialists, foresters, environmental scientists, communications managers, coordinators and advocates from American Forests' Urban Forestry Career Exploration Diagram. They will conduct research, map their urban forest to understand its benefits and develop a greening project that contributes to achieving Tree Equity in their community. Invite professionals and experts from related fields to conduct activities such as presentations, demonstrations, simulations, etc. You can also plan a field trip to places such as a wastewater treatment plant, tree nursery or an environmental education center.

NOTE

For guided instruction, see Introduction to Tree Equity Score worksheet on the following pages.
Direct students to the TES explorer website and instruct them to mirror your prompts. Please feel free to share the worksheet with students so they may use it as they complete the greening project.
Tree Equity Score may not be available for your area. If not, advise students to explore a nearby neighborhood.

OPTION 1

Each group contains all of the same career personality types, as indicated by the ***Your Personality and Green Jobs*** worksheet in Lesson 1:

Group 1 Conventional

Take the lead on organizing the project, developing the timeline, setting the goals of the project, categorizing the details of the project, formatting and editing the written report, etc.

Group 2 Realistic

Take the lead on identifying actionable tasks and day-of implementation (working with the local tree planting partner gathering tools for the planting event, implementing the day-of activities for the Run of Show, etc.). Create a maintenance and monitoring plan to care for the newly planted trees.

Group 3 Investigative

Take the lead on collecting necessary data and researching a local environmental issue, previous land use, climate-resilient tree species selection, number of trees to plant, opportunities for site restoration, location for project implementation, etc.

Group 4 Artistic

Take lead on designing the report, capturing photos, creating and identifying maps, creating graphs, communicating with stakeholders, designing a press release, social media posts, etc.

Group 5 Social

Take on a supporting role for their team when needed and educate stakeholders, participants and decision-makers about Tree Equity, collecting data to include in report, annual service benefits, ecosystems services, impact measures, the goals of the project, etc.

Group 6 Enterprising

Take on the leadership role and be responsible for the overall flow (ensuring management of the timeline and writing the report, delegating tasks, resolving issues, identifying stakeholders, creating the Run of Show, etc.) and success of the project. Develop a budget and a plan to source funding for the project.

Option 1 requires collaborative work across the entire class and amongst all groups. If groups are uneven, consider allowing students who may perform better in another group (i.e., if you are aware that a student has leadership qualities or creative abilities) to work in the Enterprising or Artistic group, respectively.

> At least three trees in view from every home. Every neighborhood should have 30% tree canopy (or vegetation cover). Nobody should live more than 300 meters from a larger park or greenspace.
>
> **—Cecil Konijnendijk,** Urban Forestry Expert

OPTION 2

Each group has one of the six career personality types, as indicated by the PLT ***Your Personality and Green Jobs*** worksheet in Lesson 1:

Conventional

Take the lead on organizing the project, developing the timeline, setting the goals of the project, categorizing the details of the project, formatting and editing the written report, etc.

Realistic

Take the lead on identifying actionable tasks and day-of implementation (working with the local tree planting partner gathering tools for the planting event, implementing the day-of activities for the Run of Show, etc.). Create a maintenance and monitoring plan to care for the newly planted trees.

Investigative

Take the lead on collecting necessary data and researching a local environmental issue, previous land use, climate-resilient tree species selection, number of trees to plant, opportunities for site restoration, location for project implementation, etc.

Artistic

Take lead on designing the report, capturing photos, creating and identifying maps, creating graphs, communicating with stakeholders, designing a press release, social media posts, etc.

Social

Take on a supporting role for their team when needed and educate stakeholders, participants and decision-makers about Tree Equity, collecting data to include in report, annual service benefits, ecosystems services, impact measures, the goals of the project, etc.

Enterprising

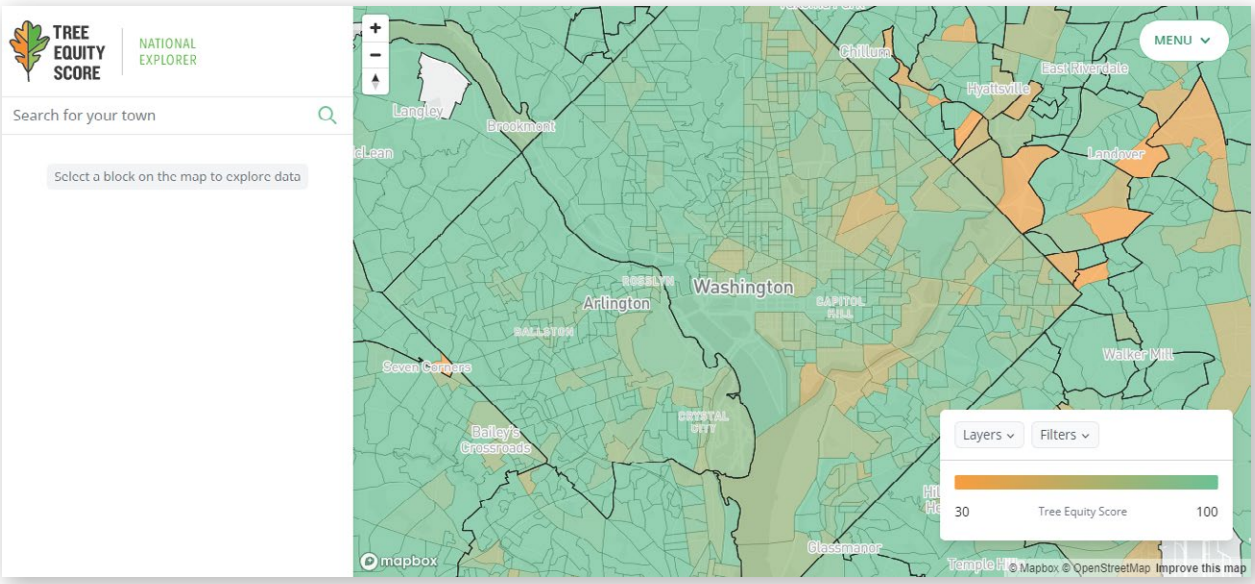
Take on the leadership role and be responsible for the overall flow (ensuring management of the timeline and writing the report, delegating tasks, resolving issues, identifying stakeholders, creating the Run of Show, etc.) and success of the project. Develop a budget and a plan to source funding for the project.

Option 2 requires collaborative work between students working in the same group. If groups are uneven, consider allowing students who may perform better in another group (i.e., if you are aware that a student has leadership qualities or creative abilities) to work in the Enterprising or Artistic group, respectively.

Introduction to Tree Equity Score

Step 1:

- Go to the **Tree Equity Score website**: https://www.treeequityscore.org/.
- Select a city/town in the search box that reads, "Search for your town."
- An image similar to the one below should appear, but it should be of the city/town you entered. Locate the layers tab in the box at the bottom right-hand corner.

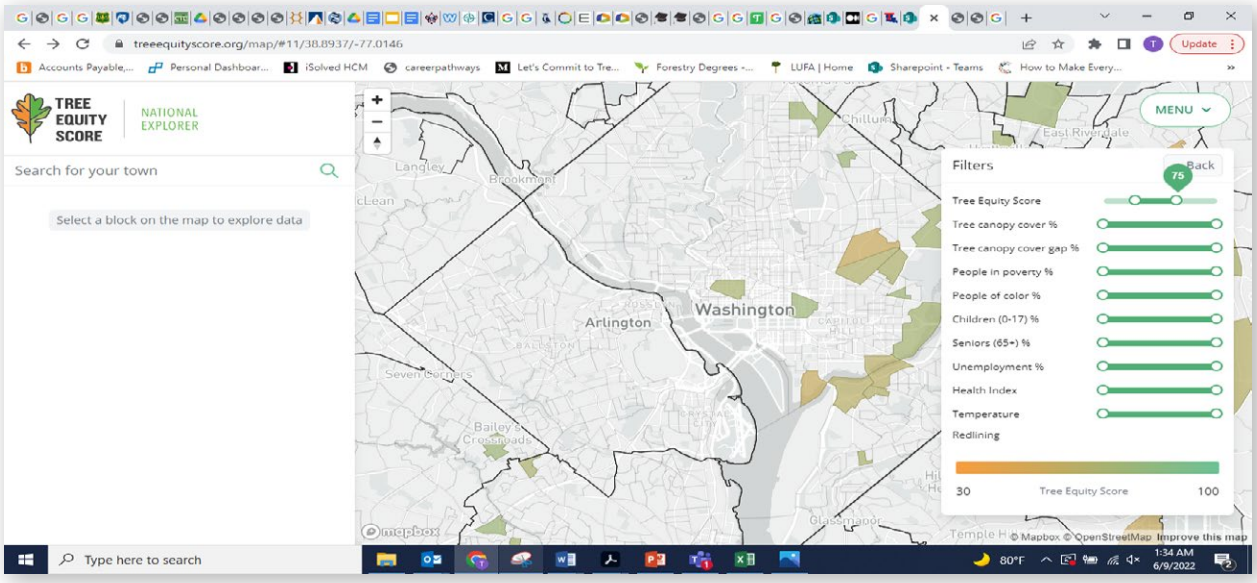


- Click on the layers tab and explore the layers under Tree Canopy and Priority Indicators.
- For each layer, hover your mouse or arrow over various locations within the city/town. Take a moment to observe how the values change and where there are differences in canopy cover, temperature and available demographics.

WHAT IS TREE EQUITY SCORE?

Tree Equity Score is a tool that utilizes data from geographic information systems to measure how equitably tree canopy is distributed within communities, and how different communities experience the benefits of trees.

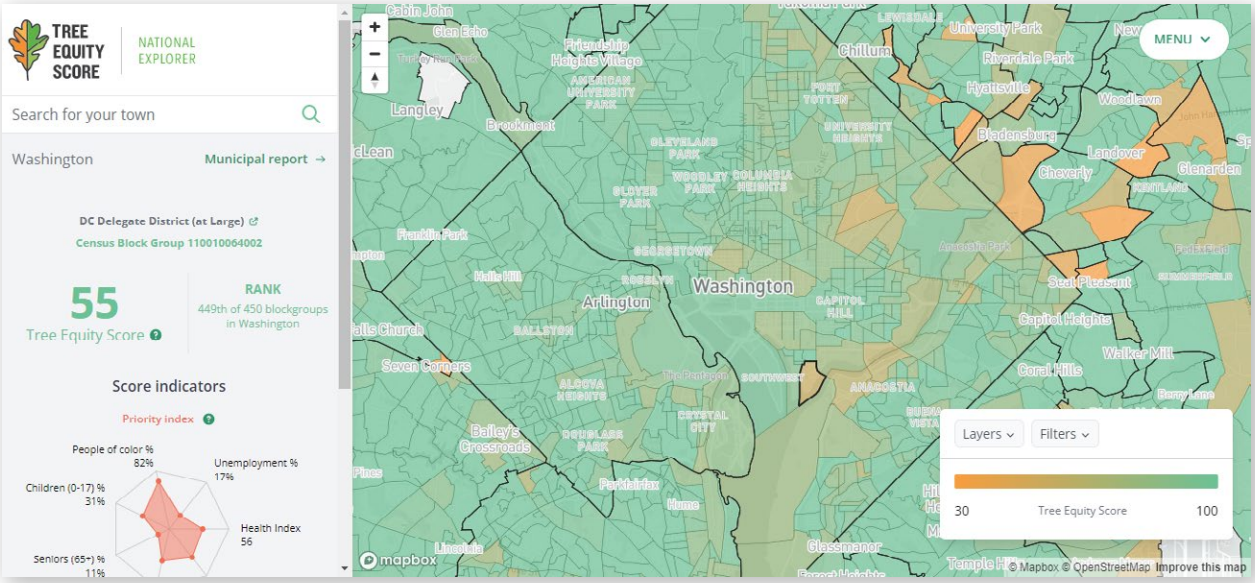
Step 2:

- Click on the filters tab and explore the layers listed by sliding the open circles on the scale to the left or right to identify the block groups within that range. For example, to identify which block groups have a TES between 50-75, move the circles to 50 and 75 on the scale (see below). To identify which block groups have a TES between 0-30, move the circles to 0 and 30 on the scale. If 0 is not an option, move the left circle all the way to the left of the scale with a range of 30 between the right circle.
- Click on or hover over the shaded areas to determine the value of that block group.
- 

- For each layer, adjust the values on the scale and hover your mouse or arrow over the shaded locations within the city/town. Take a moment to observe how the values change and where there are differences within each layer.

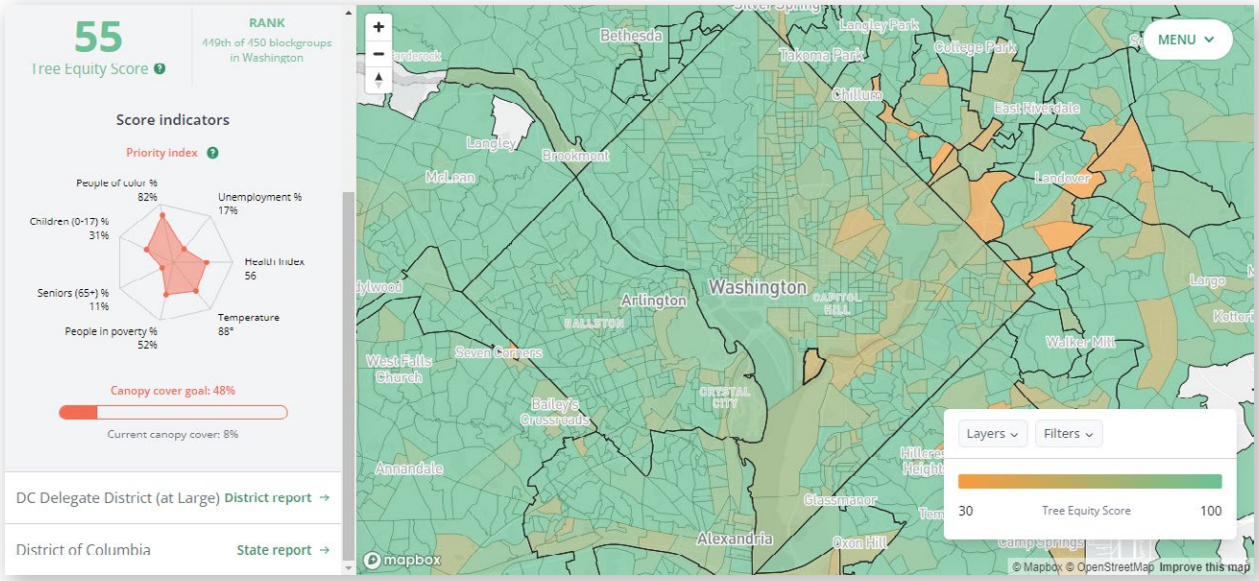
Step 3

- Select a block group on the map to explore data.
- An image similar to the one below should appear. Scroll down on the left frame to review the score indicators listed in the radar chart used to create the score for the selected block group (current canopy cover, people in poverty, unemployment, people of color, children and seniors, health index and temperatures, rank, etc.).



- Find the lowest scoring block group for the city/town you have selected (you might have to hover over a few to determine the lowest scoring neighborhood).
  - **Instruct students to write down the score.**
  - **Observe data for that block group for each of the seven score indicators listed in the radar chart.**
  - **Now, find and select a block group with a score of 100 in the same city/town (if a score of 100 does not exist, find the block group with the highest score).**
  - **Again, record the score and all the data for the new block group for each of the seven score indicators listed in the radar chart.**

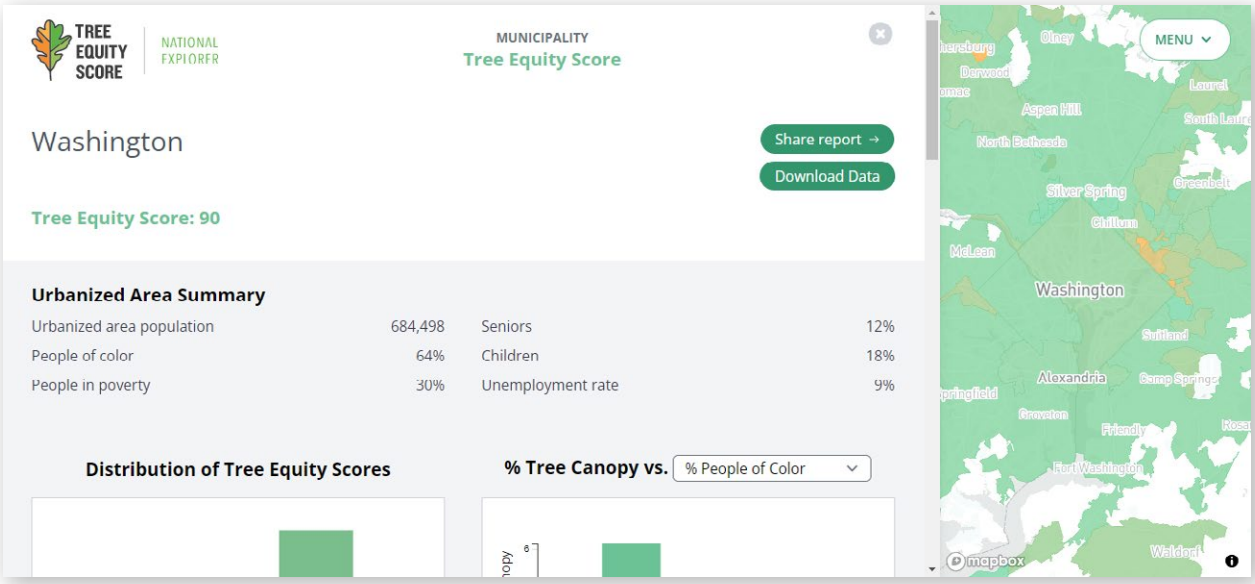
- Compare and discuss the data for the two block groups. Why does the lower scoring neighborhood have greater need, based on looking at the data? Which score indicators are the most different? Mark those data points with a star. Write a sentence using the starred data points to make the case for why the neighborhood with the lower score has greater need.
- Scroll down on the left frame to the District Report and the State Report. Click on each one and observe the data at each level (municipal, district and state). You must have a block group selected to access the reports.



About two-thirds of existing urban trees grow as a result of natural regeneration, and approximately one-third of existing trees are planted.

Step 4

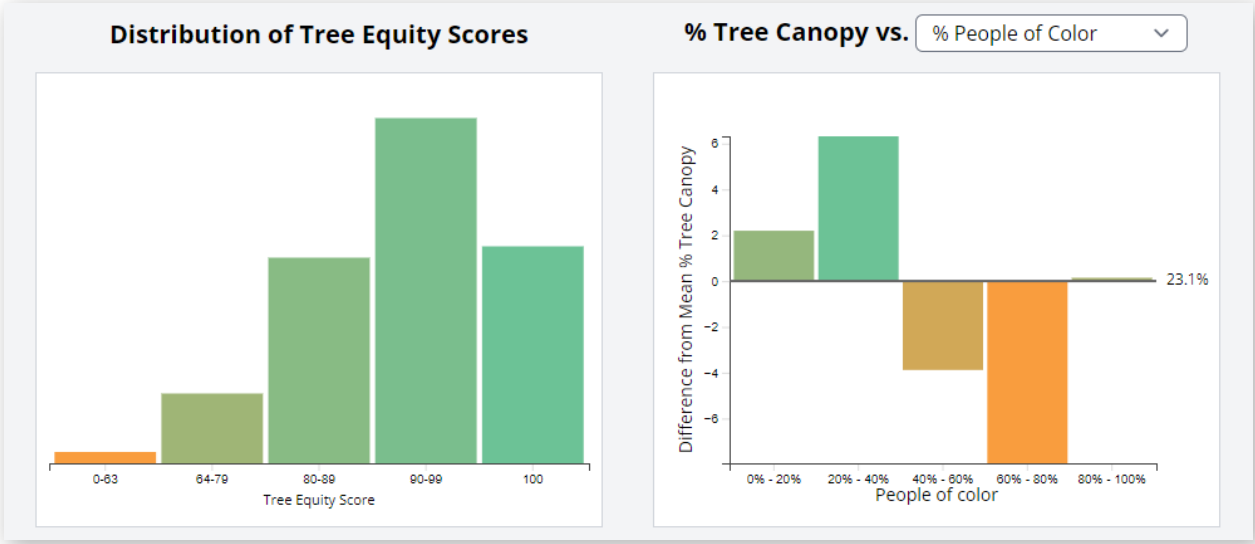
- Click on the Municipal Report tab. An image similar to the one below should appear. Scroll down on the left frame. The municipality TES appears under the city/town you searched.



- Scroll down on the left frame. An image similar to the one above should appear. Go to the graph labeled "Distribution of Tree Equity Scores." This graph displays the count of block groups with different TES for the city/town (municipality) you have selected.
  - **Which score range is the most common in the location you selected? (Hint: read the x-axis score range for the largest bar with the most block groups).**
  - **How many block groups are in the lowest score range? (Hint: hover over the orange-colored bar. A tooltip will appear with the number of neighborhoods).**
- Go to the graph labeled "% Tree Canopy vs." This graph also displays all block groups in the selected location.

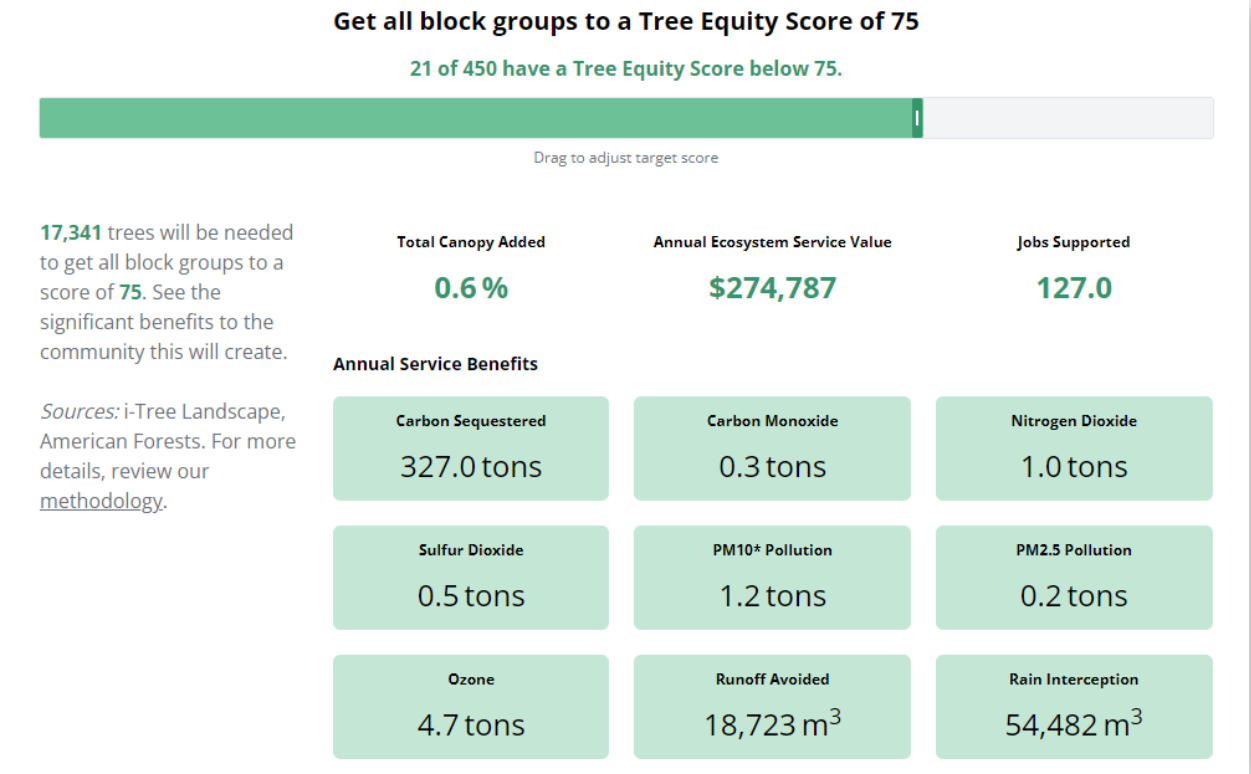
The Census Bureau identifies two types of urban areas: Urbanized Areas of 50,000 or more people and Urban Clusters of at least 2,500 and less than 50,000 people. Rural is described as any incorporated place or census designated place with fewer than 2,500 inhabitants that is located outside of an urban area.

- Each bar represents the difference from the mean tree canopy percentage for block groups within the specified range for people of color, people in poverty and average surface temperature. The amount above or below the thick horizontal line indicates the difference from the area-wide mean canopy percentage. For this example, the mean tree canopy is 23.1%. For the 35 block groups where 0-20% people of color reside, the tree canopy is about 25% (2.19% + 23.1%). For the 65 block groups where 60-80% people of color reside, the tree canopy is about 15% (23.1% - 7.95%). If you place your arrow over each bar, the difference from the mean percentage tree canopy and the number of block groups within that percentile will appear.
  - **Now, select % Tree Canopy vs. Average Temperature: What is the difference in tree cover for the hottest neighborhoods (80-100 percentile) compared to the coolest neighborhoods (0-20 percentile)? (Answer using the block group shown in the example: (23.1% + 43.34%) - (23.1% - 11.15%) = the coolest neighborhoods have an additional 32.19% of tree cover compared to the hottest neighborhoods.**



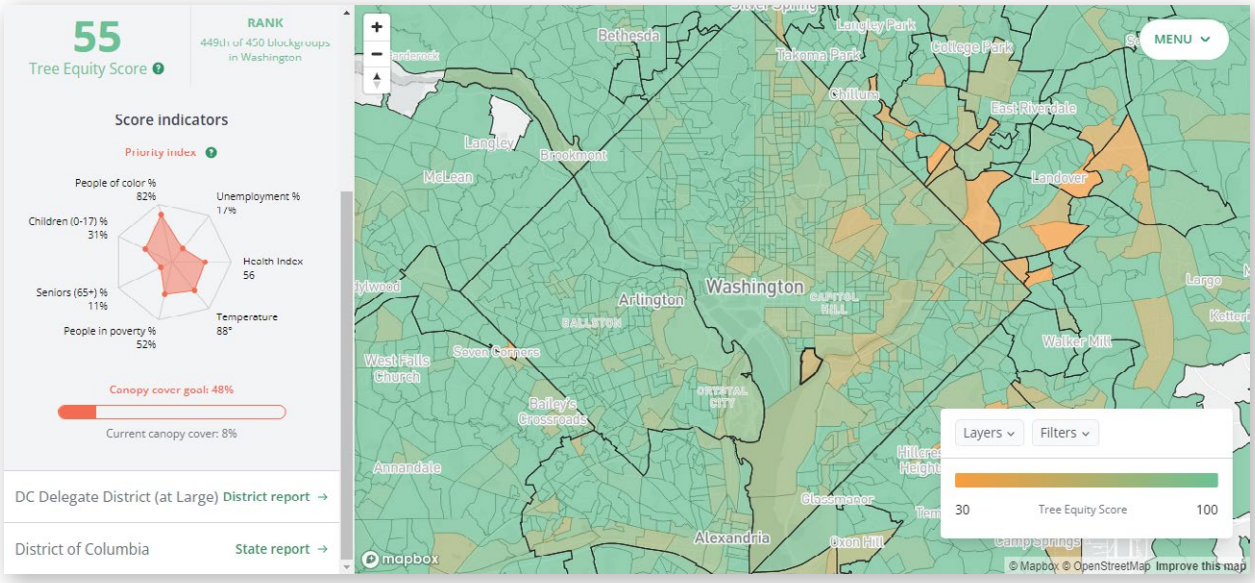
Step 5

- Scroll down on the left frame. An image similar to the one below should appear. Go to the scroll bar and slide the bar from left to right with your cursor to adjust the target TES. Observe the changes in the number of trees that will be needed (this includes trees that are established through new tree plantings and natural regeneration), percent tree canopy added, annual ecosystem services value, jobs supported and annual service benefits.
  - **How many trees are needed in the selected location to get all block groups to a score of 85? To a score of 100?**
  - **What would the total ecosystem service value be in 30 years if you achieved each target today? (Hint: multiply the annual ecosystem service value by 30 for each target.)**



Step 6

- Scroll down on the left frame to the District Report and the State Report. Click on each one and observe the data at each level (municipal, district and state). You must have a block group selected to access the reports.



- Direct students to the two other reports, if they want to focus on a city/town, a district or a state. Student should pick the report based on that decision and follow the steps under Step 4.

NOTE

- About two-thirds of existing urban trees grow as a result of natural regeneration, and approximately one-third of existing trees are planted (e.g., for the 17,341 that needed to get all block groups to a score of 75 in this example would require ~5,780 new trees to be planted and ~11,561 trees be established through natural regeneration).
- The Census Bureau identifies two types of urban areas: Urbanized Areas of 50,000 or more people and Urban Clusters of at least 2,500 and less than 50,000 people. Rural is described as any incorporated place or census designated place with fewer than 2,500 inhabitants that is located outside of an urban area.

1-2 weeks

3 Independent Practice

How to use TES? Tree Equity Scores can be used by a variety of professions, such as an urban forester, artist, journalist, researcher and/or a public health practitioner to:

ASSESS and EVALUATE

A TES is a metric that helps cities assess how well they are delivering equitable tree canopy cover to all residents. The score combines measures of tree canopy cover need and priority for trees in urban neighborhoods (defined as Census Block Groups). Explore and evaluate the Census Block Groups within the community. Consider the eight layers of data used to create scores (tree canopy, population density, income, employment, race, age, health and surface temperatures) when prioritizing communities.

PLAN and DESIGN

Individuals, organizations, agencies and companies can use the scores to determine where and how to invest in forestry and infrastructure. This can be achieved by establishing the best project (i.e., tree planting event, restoration project, beautification project, comprehensive plan, management plan, etc.) that will contribute to achieving Tree Equity in that area. Design the project to conserve and preserve existing trees and encourage new tree plantings to enhance people's health, well-being and quality of life.

Example: The Tucson City Council and Tucson Mayor Regina Romero agreed, in April 2021, to adopt the Tucson TES as the primary tool to prioritize investments for the city's urban forestry initiative and infrastructure projects related to stormwater runoff. The Tucson tool is based on the American Forests TES methodology.

ADVOCATE and EDUCATE

Use the scores to make the case for federal, state and local policies, programs and funding related to protecting existing trees and planting new trees. Scores can influence tree canopy cover, impact ecosystem services provided, affect greenhouse gas and pollution mitigation and dictate stormwater runoff. When steps are taken to increase scores, the economy is

supported as jobs are created — particularly STEM occupations, which contribute to higher scores and are projected to grow by 10.5% between 2020 and 2030.

Example: Scores were used to help convince the Phoenix City Council to pledge to create Tree Equity — a first for any city in the U.S. — in April 2021 in Arizona. Scores were also used to educate congressional leaders about the Climate Stewardship Act. This legislation supports the planting of 100 million new trees in urban areas across the U.S. by 2030, with an emphasis on trees in underserved neighborhoods.

ANALYZE and IMPROVE

Scores can help track progress related to urban forestry programs and initiatives. Use the scores to take a fresh look at any existing urban forestry initiatives. Does the community prioritize planting trees in low-scoring neighborhoods? Does the community prioritize health outcomes? Identify key stakeholders who are willing to collaborate and address inequities in low-scoring neighborhoods.

COMMUNICATE and INSPIRE

We must rethink the way we communicate how the climate crisis is affecting our everyday lives. The TES tool can also be used to tell the story of communities that have the power to transform this complex subject matter into a movement that feels local, relatable, measurable and achievable. Quantify and qualify how everyone can experience the health, economic and climate benefits that trees provide with TES. Use your knowledge to inspire action in your community and encourage rational decisions from leaders.

ASSIGN and EXECUTE

Put your design into action. Create tasks and assign them to your team based on their skills, strengths, interests and talents. Develop a timeline to achieve certain milestones and your goals. Meet and communicate with your team to track your progress over time to complete the project by the deadline.

Greening Project Outline

Directions: Get into the group assigned by your teacher based on your results from the PLT Find Your Green Jobs Quiz. Specify what professional role you are playing in your group from American Forests' Urban Forestry Career Exploration Diagram. Type a double-spaced paper in Times New Roman 12-point font. You may use all of the resources you have been provided in previous lessons. At minimum, your written narrative should include the responsibilities for your career personality type and include the following:

I. Environmental issues/ecosystem services

a. Identify a local environmental issue that is occurring, has occurred or could potentially occur in your town, city, state or region; or an ecosystem service that has been degraded in the past.
b. Describe the environmental issue and where it occurred.

II. Tree Equity Score of your selected location

a. Determine the current TES of your selected location.
b. Write down the current TES of your selected location.
c. Set a block group TES goal, and ensure the canopy target is:
    i. Equitable
    ii. Aspirational
    iii. Achievable
d. As a baseline, consider:
    i. Areas where there are canopy gaps
    ii. Population density
    iii. Available planting locations
    iv. Impervious surfaces

III. Prioritize blocks/neighborhoods to achieve Tree Equity using Tree Equity Score Explorer

a. Give explanations (e.g., unemployment rate below 30%) to prioritize areas based on:
    i. Income
    ii. Employment
    iii. Race
    iv. Age
    v. Climate
    vi. Health

IV. Identify stakeholders

a. Identify the groups of people both involved in and affected by decision-making that contribute to the equitable distribution of green space and ecosystem services.
b. Provide information to help increase public awareness and governmental support to conserve green spaces and ecosystem services.

V. Impact measures specific to the area by achieving Tree Equity

a. Target TES. Explain why the target TES was selected.
b. Number of trees needed to get all block groups to target TES (through planting and natural regeneration). See note below.
c. Percent tree canopy added
d. Annual ecosystem services value — generate economic, cultural and social arguments for the conservation of important sites for biodiversity.
e. Jobs supported — inform strategies to maintain and improve economic sustainability and human well-being.
f. Annual service benefits — inform strategies to maintain and improve human well-being.

VI. Annual service benefits

a. Go to the EPA Greenhouse Gas Equivalencies Calculator website: https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator
b. Under "Step 1 Enter and convert data," select Emissions data.
c. Enter the value for carbon sequestered under annual service benefits (refer to image in Step 5 under "Introduction to Tree Equity Score) in the box next to Carbon.
d. Click on the box labeled "Convert data." Under "Step 2 - View Results," utilize any information that will be valuable to your report.

VII. Organize and plan a greening event, in this case a tree planting event, to contribute to achieving Tree Equity

a. Use data from TES to guide decision-making to support conservation and the continued protection and enhancement of green spaces and ecosystem services.
b. Use the Run of Show template to plan the day-of event.

NOTE

- Group title page should include: title, group career personality type, group member names with professional role(s) and date.
- About two-thirds of existing urban trees grow as a result of natural regeneration, and approximately one-third of existing trees are planted (e.g., for the 17,341 that needed to get all block groups to a score of 75 in this example would require ~5,780 new trees to be planted and ~11,561 trees be established through natural regeneration).
- The Census Bureau identifies two types of urban areas: Urbanized Areas of 50,000 or more people; Urban Clusters of at least 2,500 and less than 50,000 people. Rural is described as any incorporated place or census designated place with fewer than 2,500 inhabitants that is located outside of an urban area.

Responsibilities for career personality types:

- **Conventional:** Take the lead on organizing the project, developing the timeline, set the goals of the project, categorizing the details of the project, formatting and editing the written report, etc.
- **Realistic:** Take the lead on identifying actionable tasks and day-of implementation (working with the local tree planting partner to recommend tree species, planting locations, number of trees, gathering tools for the planting event, implementing the day-of activities for the Run of Show, etc.).
- **Investigative:** Take the lead on collecting necessary data and researching a local environmental issue, previous land use, opportunities for site restoration, location for project implementation, etc.
- **Artistic:** Take lead on designing the report, capturing photos, communicating with stakeholders, designing a press release, etc.
- **Social:** Take on a supporting role for their team when needed and educate stakeholders, participants and decision-makers about Tree Equity, ecosystems services, impact measures, the goals of the project, etc.
- **Enterprising:** Take on the leadership role and is responsible for the overall flow (ensuring management of the timeline, delegating tasks, resolving issues, identifying stakeholders, creating the Run of Show, etc.) and success of the project.

Run of Show

Event Date and Time

[Your School's Name]
Tree Equity Greening Event

Hosted in Partnership with
[Local Partner Name]

Sponsored by
[Corporate Partner Name]

Thank you for your interest in volunteering!

Thank you for volunteering with [Corporate Partner Name, Your School's Name and Local Partner Name]! We will be planting X trees at X location. [One to two sentences about why this planting is important to Tree Equity and your group.] This Run of Show (ROS) will provide you with pertinent schedule and volunteer information about this event.

[Your School's Name]
Staff Attending:
First and Last Name, Title: Cell Number

[Local Partner Name]
Staff Attending:
First and Last Name, Title: Cell Number

[Corporate Partner Name]
Leadership Attending:
First and Last Name, Title: Cell Number

Photographers and Media Outlets
First and Last Name, Name of media outlet this person represents

EVENT AGENDA

7:00 AM *(Change the times stamps as needed)*
[Local Partner Name] arrives to set up the following:

- Trees
- Tools and materials
- 1 table, 1 tent
- Waivers
- Pens
- Clipboards
- Name tags
- Light breakfast provided by X

8:00 AM *(Change the times stamps as needed)*
[Local Partner Name] arrives to set up

- School, local partners and organizations bring print materials or giveaways such as
  - Magazines
  - Swag

8:30 AM [Corporate Partner Name] volunteers arrive

- Sign waivers or turn in signed waivers
- Obtain safety equipment – gloves and safety vests *(if applicable)*
- Grab a light breakfast
- Mingle

9:00 AM Opening remarks

- VIPs speak
- Corporate partner speaks
- Local partner(s) speak

9:15 AM Tool safety and tree planting demo

9:30 AM Planting begins

12:00 PM Work wraps up

- Return tools, materials and debris to designated location
- Return gloves and safety vests (if applicable)
- Celebratory lunch or snacks provided by X

VOLUNTEER EVENT INFORMATION

Event Type: List type of event, for example, tree planting

Date and Time: List date and time of event

Address: List address or closest intersection

[Paste Google satellite map of planting location with locations for parking, registration and bathrooms listed.]

Parking & Meet-Up Location: Explain where parking is located. Please see the map above. We will meet at X location for registration.

What to Bring: Comfortable, weather-appropriate clothes that can get dirty, including long pants, closed-toed shoes, rain jacket, hat and sunglasses. Dress in layers that can be removed should it get too hot. Also, bring a water bottle and a volunteer waiver.

What Is Provided for Volunteers: Tools, gloves, tree planting equipment, light breakfast (or whatever meal or snacks are provided), water refill station, etc.

Weather: We will work rain or shine, except with lightning or other dangerous situations. Bring a rain jacket if there is a chance of rain.

Details: We will meet at the tent and get everyone registered starting at X time. At X time, volunteers will be welcomed by the X persons or organizations. At X time, there will be a safety and tree-planting demo in. There will be trained urban forestry volunteers available to provide guidance and instruction. Working in teams, participants will plant trees, which will require some heavy lifting, bending, shoveling, and watering.

FREQUENTLY ASKED QUESTIONS

Will I receive instructions on how to properly plant a tree?
Yes, tree-planting experts and trained urban forestry volunteers will provide novice volunteers with a tree-planting and safety demonstration, and will work with all volunteers to ensure proper tree planting occurs. There will also be trained volunteers and experts floating around the planting area to assist teams during the event and answer any questions.

Are there bathroom facilities?
[List the location of bathroom facilities.]

Medical Issues
If you have a medical condition that you think might be impacted, please contact [Your School's Name] before attending the planting. We want everyone to have a fun and safe day.

If you or someone in your household is experiencing COVID-like systems or recently tested positive for COVID-19, please do not attend this event.

Release Forms
[Briefly explain the volunteer waiver process. For example, will there be paper waivers or electronic or both.] Registration includes a liability and video/photography waiver. Due to legal reasons, all participants are required to complete the registration and waivers.

Lesson 5

Green Jobs Reflection Activity and Resources

Activity Time | Varies

10 minutes	Trailblazer Activity
10 minutes	Background Knowledge and Guided Instruction

All of the activities in this lesson are optional:

45 minutes	Career Exploration Reflection Worksheet
45 minutes	Career Portfolio
10 minutes	Survey of Interests, Talents, Skills and Strengths Gained and/or Utilized Worksheet
45 minutes	Building a Career Path Worksheet

KEY TERMS

Career path
Financial literacy
Occupation
Mentor
Reflection

STEAM Application

Time for reflection in STEAM is essential for students to make necessary real-world connections in the classroom and check the understanding of their learning. As students process what they have learned, they are able to think critically about their role and how it does or doesn't align with their interests, talents, strengths and skills. Reflection also allows teachers to determine if students gained a deeper understanding of the content by making connections to previous learning. After reflection, students are able to better navigate resources that will assist them on their career path.

Instructional Resources

- **A computer with Internet access for each student**
- **Writing utensils**
- **Journal/notebook**
- **Worksheets**
  - Resources for Success (post-secondary education)
  - Career Exploration Reflection
  - Career Portfolio
  - Survey of Interests, Talents, Skills and Strengths Gained and/or Utilized
  - Building a Career Path
- **Book**
  - "Journeys of Black Professionals in Green Careers"
- **Websites**
  - Project Learning Tree's Green Jobs: Exploring Forest Careers
  - American Forests' Urban Forestry Career Exploration Diagram
  - Career Pathways Exploration Guide
  - Bank of America Better Money Habits
  - Types of Mentors

Intended Learning Outcomes

Students will be able to reflect on what they learned in the previous lessons and utilize resources to plan their career path.

10 minutes

1 Trailblazer Activity

Instruct students to answer the following questions in their journal/notebook:

1. Based on your knowledge of green jobs, does your result from the PLT Find Your Green Jobs Quiz align with your interests, talents, skills and strengths to address environmental problems? Why or why not?

2. If not, what green job would most interest you in addressing environmental issues and why? It doesn't have to be a green job that was previously discussed.

3. If you are not interested in a green job, what kind of career do you want to pursue and why?

10 minutes

2 Background Knowledge and Guided Instruction

Reflection is important because it creates meaning, which informs the mindset and actions of students. It encourages deeper thought, and understanding contributes to our intuitive knowledge. As you help students reflect on what they've learned and think through preparing for their future, start a discussion by asking students what were their key takeaways from these lessons. Allow students to share their responses.

Ultimately, students should understand that careers are built on a lifetime of learning. The more knowledge and understanding that students gain and experiences they are exposed to inevitably leads them to acquiring new interests, talents, skills and strengths, even if they don't fit perfectly into one career path. There are always opportunities to pivot or forge new directions as students grow into themselves and discover how they can uniquely contribute to the workforce, which might involve a career change.

Inform students that they are about to complete activities that will permit them to be completely honest with their learning experience with the previous lessons. Students will convey if and how they adjusted their learning and how they will use what they learned in connection to future experiences. Emphasize that there are no wrong answers because students are gaining clarity of how the material relates to oneself, others and their surrounding environment.

All of the activities in this lesson are optional. You can choose which activities to use. **The Career Exploration Reflection** worksheet will allow students to reflect on how they learned through the lens of a professional working in a green job and how they will apply that knowledge to navigating their career path. Student responses from the worksheet will also inform the narrative for the career portfolio. Students can present their slide to the class to share. There is a **Survey of Interests, Talents, Skills and Strengths Gained and/or Utilized** worksheet to gauge the existing skills of students and those they acquired. Finally, the **Building a Career Path** worksheet enables students to visualize salary, education requirements, job titles and work experience required for each level throughout their career.

RESOURCES FOR SUCCESS

Job boards: Encourage students to visit jobs boards. They are beneficial because students can explore several job postings on one website and identify job requirements and skills necessary for their green job.

Host	Website
International Society of Arboriculture	https://www.isa-arbor.com/Careers/Career-Center
Tree Care Industry Association	https://jobs.tcia.org/
Forestry Jobs in America	https://www.forestryusa.com/jobs.html
Society of American Foresters	https://careercenter.eforester.org/jobs/
Conservation Job Board	https://www.conservationjobboard.com/category/forestry-jobs
ECOJOBS	https://www.ecojobs.com/
The Federal Government	https://www.usajobs.gov/
Government Jobs (public sector)	https://www.governmentjobs.com/
Black in Environment	https://climatebase.org/board/blackinenviron
Green Latinos	https://www.greenlatinos.org/jobs
Environmental Sustainability Jobs	https://sustainability-jobs.org/
Green Jobs Network (global)	https://greenjobs.net/
Green Jobs Network	https://greenjobs.greenjobsearch.org/
Green Dream Jobs	https://www.sustainablebusiness.com/
American Water Resources Association	https://careers.awra.org/jobs/

- **Be honest with yourself.** College is not for everyone, and you don't have to have a degree to be successful. If you enroll in a post-secondary institution, be sure you are doing it for yourself and that the return on the investment is worth it. There are many people who graduate with student loans and other debts associated with pursuing a post-secondary degree. Utilize resources such as Bank of America's Better Money Habits website to build your financial literacy.
- **Explore.** Research colleges and universities, majors, job training programs (pre-apprenticeship and apprenticeship programs), certifications/certificates and job requirements that will build on your interests, talents, skills and strengths to lead to a successful career. Identify ways to fund your education and career development.
- **Get involved.** Be active with clubs, organizations and volunteering opportunities related to your desired career.
- **Find mentors.** You need people who have already navigated the landscape you are entering to provide guidance and advice when you need it most. There are several types of mentors. Make sure you have the right mentors in your life. Sometimes it's as easy as simply asking the person to serve as your mentor.
- **Gain experience.** Work at and with companies and organizations whose mission aligns with your core values and interests, even if it's volunteer hours.

Career Exploration Reflection

Directions: In your journal/notebook, answer the following questions or explain how you will approach each level of reflection.

Define your goals.	Identify your goals. Do they align with who you want to be?
Realize your capabilities.	What did you accomplish and learn by completing these lessons?
Understand your interests, talents, strengths and skills.	What did you learn about yourself by completing these lessons?
Connect what you learned.	How can you apply what you learned to what you already know? What do you still want to know?
Evaluate how you responded to the activities.	How would you grade your performance and contribution to the group? Was there room for improvement?
Extend what you learned to your future.	How can you use the knowledge you gained and apply it to your goals?
Create a career path that's right for you.	Explore colleges/universities, majors, job training programs, certifications/certificates and job requirements that will build on your skills and strengths to lead to a career.

Career Portfolio

Directions: Use the PowerPoint template below to complete your career portfolio. Be as creative as you would like and change fonts as necessary. Be sure to use colors, styles and fonts that will be visually pleasing and legible.

Survey of Interests, Talents, Skills and Strengths Gained and/or Utilized

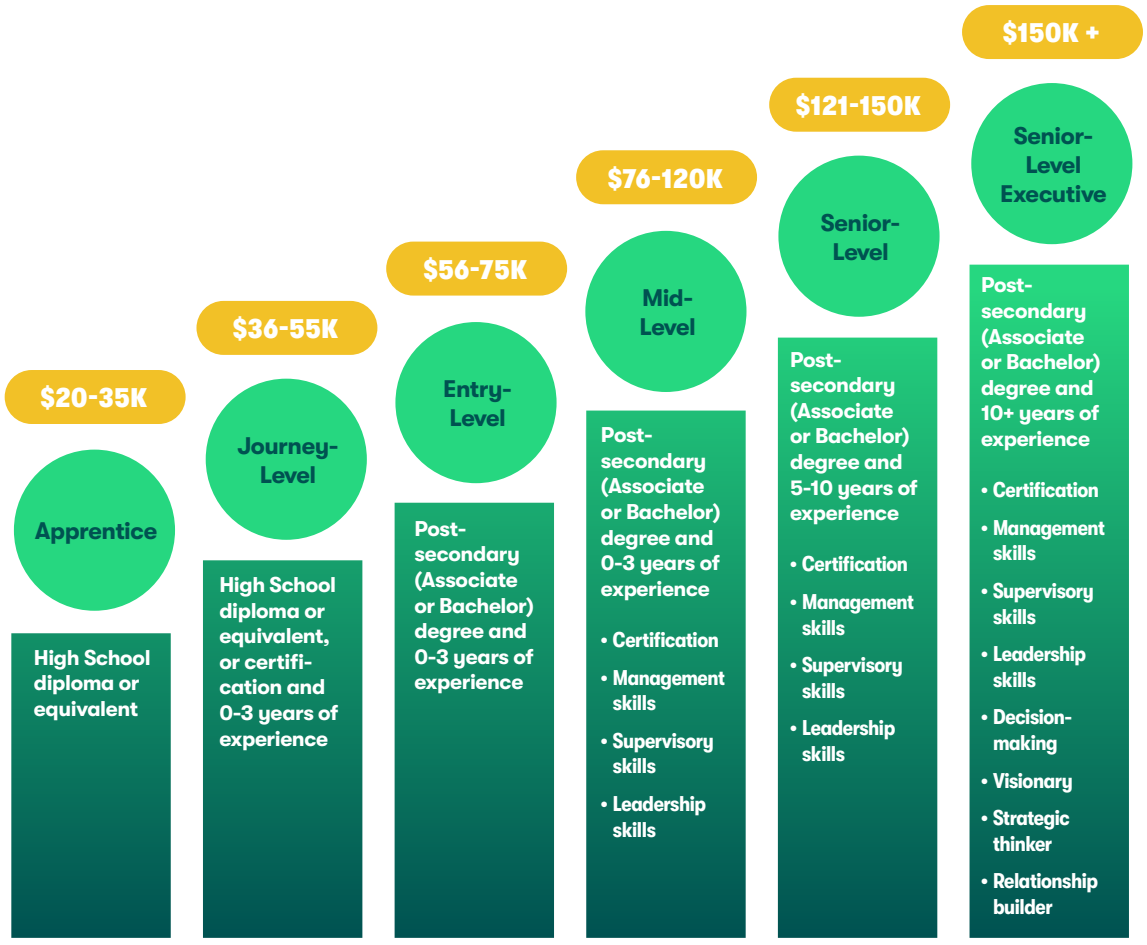
Directions: Place an "X" in the box next to the interest, talent, skill or strength that you gained and/or utilized while completing the activities in the previous lessons.

SKILL GAINED		SKILL UTILIZED	
Critical thinking/problem solving		Critical thinking/problem solving	
Teamwork/collaboration		Teamwork/collaboration	
Technology application		Technology application	
Leadership		Leadership	
Professionalism/work ethic		Professionalism/work ethic	
Conflict resolution		Conflict resolution	
Positive attitude		Positive attitude	
Teamwork		Teamwork	
Active listening		Active listening	
Decision making		Decision making	
Creativity		Creativity	
Integrity		Integrity	
Initiative		Initiative	
Time management		Time management	
Goal setting		Goal setting	
Planning		Planning	
Organizational		Organizational	
Adaptability		Adaptability	
Attention to detail		Attention to detail	
Oral communication		Oral communication	
Written communication		Written communication	
Other:		Other:	
Other:		Other:	
Other:		Other:	
Other:		Other:	

Building a Career Path

Directions: Identify the highest level of education you would like to achieve from the list below. In your journal/notebook, create a career path using the example below. Provide the salary range and a job title for each level and list any skills, certifications, experience, etc., required.

- High school diploma or equivalent
- Certificate/Certification
- Associate's degree
- Bachelor's degree
- Master's degree
- Doctor of Philosophy
- Professional degree *(Juris Doctorate, Doctor of Medicine, Doctor of Public Health, etc.)*



WEB RESOURCES

Lesson 1

The U.S. Population Clock
https://www.census.gov/popclock/

Lesson 2

Project Learning Tree's Your Personality and Green Jobs
https://www.plt.org/wp-content/uploads/pdf/PLTGreenJobs_Activity-1_Who-Works-in-this-Forest_Worksheet_Your-Personality-and-Green-Jobs.pdf

American Forests' Urban Forestry Career Exploration Diagram
https://www.vibrantcitieslab.com/wordpress/wp-content/uploads/2022/09/Hollands-Occupational-Personality-Types-diagram.pdf

U.S. Bureau of Labor Statistics Occupational Outlook Handbook
https://www.bls.gov/ooh/

Project Learning Tree Find Your Green Jobs Quiz
https://www.plt.org/find-your-green-job-quiz/

Career Pathways Exploration Guide
https://www.vibrantcitieslab.com/guides/career-pathways-exploration-guide/

Project Learning Tree's Green Jobs: Exploring Forest Careers
https://www.plt.org/curriculum/green-jobs-forest-careers/

Lesson 3

"Ecosystem Services and Why They are Vital for Humans"
https://www.youtube.com/watch?v=vAjuYBzu4TI

"Anthropocene – video 1"
https://www.youtube.com/watch?v=yS5v1whmt90

"Anthropocene: The Age of Human Impact on Earth"
https://www.youtube.com/watch?v=q0VRB-PltrE

EPA in Your State
https://www.epa.gov/environmental-topics/location-specific-environmental-information

Career Pathways Exploration Guide
https://www.vibrantcitieslab.com/guides/career-pathways-exploration-guide/

Discovery Education STEM Careers Portal
https://stemcareerscoalition.org/educators/career-profiles

Vibrant Cities Lab
https://www.vibrantcitieslab.com/

Lesson 4

"What 'Tree Equity' Has To Do With Our Climate Crisis"
https://www.youtube.com/watch?v=QFrJT8d7V_w&t=85s

Tree Equity Score National Explorer
https://www.treeequityscore.org/

Redlining—and Greening—of Cities. What's the Connection?
https://www.americanforests.org/article/redlining-and-greening-of-cities-whats-the-connection/

EPA Greenhouse Gas Equivalencies Calculator
https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

Climate and Health Action Guide
https://www.vibrantcitieslab.com/guides/climate-health-action-guide/

A Guide to Prewriting Techniques
https://slc.berkeley.edu/writing-worksheets-and-other-writing-resources/you-start-writing-paper

The Beginner's Guide to Writing an Essay
https://www.scribbr.com/category/academic-essay/

Writing Manual and Style Guide
https://www.hcpss.org/f/newlanguages/docs/writingmanual2013_hs.pdf

Guide to Essay Writing
https://www.grammarly.com/blog/essay-writing/

American Forests' Urban Forestry Career Exploration Diagram
https://www.vibrantcitieslab.com/wordpress/wp-content/uploads/2022/09/Hollands-Occupational-Personality-Types-diagram.pdf

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Li, Yeping, et al. "On Computational Thinking and STEM Education." August 19, 2020. Journal for STEM Educ Res 3, 147–166. https://doi.org/10.1007/s41979-020-00044-w

Logan, Gregg, et al. "2021 STEM Job Growth Index." October 25, 2021. RCLCo Design. https://www.rclco.com/publication/2021-stem-job-growth-index/. Accessed on May 15, 2022.

Machovec, Christine. "Women and Girls in Growing STEM Jobs." February 10, 2022. U.S. Department of Labor Blog. https://blog.dol.gov/2022/02/10/women-and-girls-in-growing-stem-jobs#:~:text=As%20a%20group%2C%20STEM%20occupations,for%20all%20occupations%20of%20%2441%2C950. Accessed on May 10, 2022.

Lesson 5

Project Learning Tree's Green Jobs: Exploring Forest Careers
https://www.plt.org/curriculum/green-jobs-forest-careers/

American Forests' Urban Forestry Career Exploration Diagram
https://www.vibrantcitieslab.com/wordpress/wp-content/uploads/2022/09/Hollands-Occupational-Personality-Types-diagram.pdf

Career Pathways Exploration Guide
https://www.vibrantcitieslab.com/guides/career-pathways-exploration-guide/

Bank of America Better Money Habits
https://bettermoneyhabits.bankofamerica.com/en

Types of Mentors
https://ideas.ted.com/the-5-types-of-mentors-you-need-in-your-life/

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