

AP[®] Biology

IMPACT OF INVASIVE SPECIES

Teaching Module



AP[®] with WE Service

College Board

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AP® Equity and Access Policy Statement

College Board strongly encourages educators to make equitable access a guiding principle for their AP programs by giving all willing and academically prepared students the opportunity to participate in AP. We encourage the elimination of barriers that restrict access to AP for students from ethnic, racial and socioeconomic groups that have been traditionally underrepresented. Schools should make every effort to ensure their AP classes reflect the diversity of their student population. College Board also believes that all students should have access to academically challenging coursework before they enroll in AP classes, which can prepare them for AP success. It is only through a commitment to equitable preparation and access that true equity and excellence can be achieved.

WE

WE is a movement that empowers people to change the world through a charitable foundation and a social enterprise. Our service learning program, WE Schools, supports teachers' efforts to help students become compassionate leaders and active citizens, empowering them to take action on the issues that matter most to them. Currently partnered with 18,400 schools and groups, and backed by a movement of 5.3 million youth, we are engaging a new generation of service leaders and providing resources for a growing network of educators.

Our free and comprehensive library of lesson plans is designed to be adapted to meet the needs of any partner school, regardless of students' grades, socioeconomic backgrounds or learning challenges. Skills development through the program also increases academic engagement and improves college and workplace readiness. Third-party impact studies show that alumni of the program are more likely to vote, volunteer and be socially engaged. Learn more at [WE.org](https://we.org).

About the Partnership

College Board and WE share a passion for enriching students' learning experiences and developing well-rounded citizens. By combining the academic challenge and rigor of AP with WE's Learning Framework, AP with WE Service creates an opportunity for students to consider their classroom work and how it applies to real-world issues, while working closely with their peers to address relevant needs in their local and global communities.

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Using This Module

AP with WE Service provides a collection of resources to support your planning and implementation of the program. This teaching module, *Impact of Invasive Species*, is a sample lesson guide for AP Biology. As you read through this module, refer to the AP with WE Service Program Guide for additional activities that will support your students' learning throughout the program.

Program Guide

The AP with WE Service Program Guide contains a robust collection of service oriented activities and resources that support the WE Learning Framework. Use these case studies, news articles, and student activities to supplement and strengthen your students' understanding and application of core service learning skills.

<https://apcentral.collegeboard.org/pdf/program-guide.pdf>

WE Schools Resources

WE Schools offers a library of resources to support you in delivering content on social topics and issues, as well as the tools and the inspiration for your students to take social action, empower others, and transform lives—including their own. Access our resources at [WE.org/weschoolsresources](https://we.org/weschoolsresources).

AP with WE Service Digital Portfolio

Report your students' performance through the AP with WE Service digital portfolio. Step-by-step directions for using the digital portfolio are available in the Teacher User Guide: <https://apcentral.collegeboard.org/media/pdf/digital-portfolio-ap-we-teacher-user-guide.pdf>.

Teaching AP with WE Service: Ready-made Resources

Also available on the program website are outreach resources, an implementation toolkit and the recognition rubric. Further, you'll find how-to videos that explain how to connect the actionable topic to your course, review frequently asked questions and showcase a collection of videos from experienced AP with WE teachers sharing their best practices: <https://apcentral.collegeboard.org/about-ap/outreach-and-collaborations/ap-we-service/teacher-resources/teacher-videos>.

Module Sections

THE PLAN SECTION contains information to help you decide how and when you will fit this module into your AP curriculum.

PART 1: INVESTIGATE AND LEARN defines and explores the module topic at local and global levels, and within the context of your AP course curriculum. This will be the majority of your required in-class instruction hours and it is where your students will start to make connections between your AP course content and the module topic.

PART 2: ACTION PLAN guides students as they form teams and begin developing their plan for achieving one local and one global action.

PART 3: TAKE ACTION is where students put their plans into action. As they work, they should keep track of what they do and collect artifacts that capture their efforts. During this part, you may need to guide students as they encounter obstacles or help them maintain their motivation.

PART 4: REPORT AND CELEBRATE describes how students can showcase their projects and share their accomplishments. Presentations and celebrations may be in your class or in the community.

PLAN

TEACH: PART 1

TEACH: PART 2

TEACH: PART 3

TEACH: PART 4

Teaching Module

Impact of Invasive Species

"Species have the potential to sink or save the ecosystem, depending on the circumstances. Knowing that we must preserve ecosystems with as many of their interacting species as possible defines our challenge in no uncertain terms."

– DOUGLAS W. TALLAMY, AMERICAN ENTOMOLOGIST AND ECOLOGIST



Getting to Know the Topic

Impact of Invasive Species: Globally

When species live in their natural habitats, there is a natural balance that puts reasonable limits on all species within that habitat, such as predators or climate. When relocated out of those habitats, however, these limitations may no longer exist and species may thrive in a way that is detrimental to their new environment. For example, in its natural habitat, the European rabbit has predators and a controlled mating season due to the colder climate. When introduced to Australia, however, the combination of having no predators and the year-round warm climate allowed these rabbits to multiply to such great numbers that they have wiped out vegetation that is part of their diet, as well as the diet of other animals. Therefore, they are an invasive species to Australia.

Fast Facts

- ▶ About 42% of endangered species are at risk because of invasive species.
- ▶ Invasive species threaten human health and devastate ecosystems, which costs an estimated \$1.4 trillion dollars on the world economy each year.
- ▶ The introduction of even one invasive animal, bacteria, fungi or plant is enough to devastatingly disrupt the balance of an entire ecosystem.

Taking Action Globally

The best way to take action on the global spread of invasive species is prevention. As many of the invasive species introduced across the globe were caused by human spread, the more we learn and spread awareness about the human spread of invasive species, the more we can help. Here's how you can take action:

- ▶ Conduct research or work with global organizations to learn how humans spread invasive species and how you can help prevent the spread.
- ▶ Hold a fundraiser and contribute funds to a global invasive species organization.
- ▶ Create a social media campaign to spread awareness to others about the importance of preventing the global spread of invasive species.

Getting to Know the Topic

Impact of Invasive Species: Locally

Invasive species can be found across the country. From decorative plants that thrive too well in warm climates, to released pets with big appetites and few predators, many of the country's invasive species have been spread unintentionally by humans in the past decades and even centuries. While the spread may have been unintentional, these invasive species are causing damage to our ecosystems. Learning from our past mistakes in transporting and releasing invasive species can help prevent unintentional human spread of invasive species in the future.

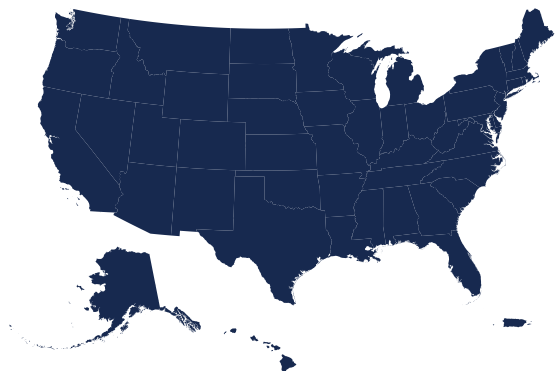
Fast Facts

- ▶ One of the most infamous invasive species in the United States is the zebra mussel. Traveling on the bottoms of boats, the zebra mussel clogs pipes and invades the beaches of the Great Lakes.
- ▶ The Burmese python faces disease, parasites and predators in its native Asia, however these threats do not exist in the Florida Everglades. The Burmese python preys on many animals, even alligators, causing a declining native species populations of the Everglades.
- ▶ The kudzu vine is native to Asia, where it is fed on by insects and wiped out during the cold winter months. When introduced to the year-round warmth of the southern United States, however, it grew out of control and became known as the plant that ate the south.

Taking Action Locally

You can help take action against the local spread of invasive species through gaining knowledge of what invasive species are living in your area. Some ways you can act are:

- ▶ Work with local organizations to request guest speakers to educate your peers about invasive species in your area.
- ▶ Organize an event to remove identified invasive plants in your area and replace with native plants.
- ▶ Create an awareness campaign informing the public of ways to prevent the local spread of invasive species.



An estimated 5,000 non-native plant species have been introduced, established and exist in US ecosystems.

Taking Action

Global and Local Service Projects

WE Villages

For more than two decades, WE Villages has been engineering an international development model to end poverty. It works. It's proven. It's scalable. We partner with developing communities around the world and collaborate on projects and programs that equip families with the tools they need to break the cycle of poverty through our five Pillars of Impact: Education, Water, Health, Food Security and Opportunity. These pillars address the five primary causes of poverty with holistic and sustainable solutions that work in tandem to transform communities.

Why Take Action on Invasive Species?

Developing communities are often the first to be affected by climate change and environmental upheaval. Invasive species have the ability to destroy livelihoods, cause hunger, threaten or reduce economic prosperities of entire regions and counties, as well as increase biodiversity loss. In many developing communities, local economies are based on agriculture yet lack the ability and capacity to detect and implement invasive species management tactics. This can lead to the collapse of livelihoods, families going hungry and leave behind few other natural resources to depend on to rebuild.

Global and Local Service Projects

As students develop their service projects with one local and one global action in their plan, they will look to local and global organizations and initiatives for their research and even as potential beneficiaries for their service actions. When selecting an organization—whether local or global—it is important for students to consider its credibility.

Students may choose to partner with:

- ▶ Charitable or non-profit organizations
- ▶ State, national or governmental departments or organizations (which may not be a traditional charity)
- ▶ Social enterprises
- ▶ Or a combination of the above

Five Pillars of Impact



Education



Water



Health



Food
Security



Opportunity

Planning Your Instruction

Impact of Invasive Species

Purpose

In this module, students will learn ways that invasive species are introduced into the environment and affect native species' ability to survive and thrive. They will investigate how the release of invasive species can be controlled or halted and then analyze how educational efforts can lessen or stop the introduction of invasive species into the wild. Students will connect AP Biology skills to develop a service project on an issue related to invasive species today, both local and global.

Ensure students are collecting evidence of their work as they go along.

The following list includes pieces of work you may want to collect throughout the year:

- ▶ Photos
- ▶ Interviews
- ▶ Scripts
- ▶ Screenshots
- ▶ Posters
- ▶ Maps
- ▶ Reflections
- ▶ Thank you notes

Overview

As presented in the Introduction, this teaching module contains four parts. The parts within the module may be implemented at a variety of different times based on the preferences and needs of schools, teachers and administrators.

These are also the four rubric topics you will assess your students on in the digital portfolio:

Part 1: Investigate and Learn: Investigate the ways invasive species are introduced into the environment and affect native species ability to survive and thrive.

Part 2: Action Plan: Guide students as they form teams, develop their action plans and reflect on their ideas.

Part 3: Take Action: Provide students with suggestions for how to demonstrate effective teamwork, overcome conflicts, record actions and reflect on their work.

Part 4: Report and Celebrate: Support students as they create portfolios, celebrate their actions and complete a final reflection on their experiences.

Throughout Parts 1–4, activities that are required for the Recognition Rubric are labeled with an icon (see Icon Legend on page 18). Optional activities that will help students design and complete their service projects, but are not required by the program, are listed in tables throughout each part. These optional activities are available in the AP with WE Service Program Guide or on the WE website, as indicated in the tables.

Enhance Your Instruction with WE Resources

Throughout the module, you will also see tables of optional activities and resources you can pull into your instruction.

Alignment to Course Framework

Based on the 2019–20 AP® Biology Course and Exam Description, these are the curriculum components addressed in these lessons:

AP® BIOLOGY ALIGNMENT	
SCIENCE PRACTICES AND SKILLS	<ul style="list-style-type: none"> • SP1.C: Explain biological concepts, processes and/or models in applied context. • SP3.A: Identify or post a testable question based on an observation, data or a model. • SP3.C: Identify experimental procedures including independent and dependent variables, and controls. Justify use of appropriate controls. • SP3.E: Propose a new/next investigation. • SP5.A: Perform mathematical calculations. • SP5.D: Use data to evaluate a hypothesis/prediction. • SP6: Argumentation (all skills within Science Practice 6 are utilized in this AP with WE) <ul style="list-style-type: none"> - 6.A: Make a claim. - 6.B: Support a claim with evidence. - 6.C: Provide reasoning to justify a claim. - 6.D: Explain the relationship between experimental results and larger biological concepts. - 6.E: Predict the causes or effects of a change/disruption to one or more biological components in a system.
BIG IDEAS	<ul style="list-style-type: none"> • Systems Interactions (SYI): Biological systems interact and these systems and their interactions exhibit complex properties. • Evolution (EVO): The process of evolution drives the diversity and unity of life. • Energetics (ENE): Biological systems use energy and molecular building blocks to grow, reproduce and maintain dynamic homeostasis. • Information storage and transmission (IST): Living systems store, retrieve, transmit and respond to information essential to life processes.
ENDURING UNDERSTANDINGS	<ul style="list-style-type: none"> • SYI-1: Living systems are organized in a hierarchy of structural levels that interact. • SYI-2: Competition and cooperation are important aspects of biological systems. • SYI-3: Naturally occurring diversity among and between components within biological systems affects interactions with the environment. • EVO-1: Evolution is characterized by change in the genetic make-up of a population over time and is supported by multiple lines of evidence. • ENE-3: Timing and coordination of biological mechanisms involved in growth, reproduction and homeostasis depend on organisms responding to environmental cues. • ENE-4: Communities and ecosystems change on the basis of interactions among populations and disruptions to the environment. • IST-5: Transmission of information results in changes within and between biological systems.
LEARNING OBJECTIVES	<ul style="list-style-type: none"> • SYI-1.G: Describe factors that influence growth dynamics of populations. • SYI-2.A: Explain how invasive species affect ecosystem dynamics. • SYI-2.B: Describe human activities that lead to changes in ecosystem structure and/or dynamics. • SYI-3.F: Describe the relationship between ecosystem diversity and its resilience to changes in the environment. • EVO-1.O: Explain the interaction between the environment and random or preexisting variations in populations. • ENE-3.D: Explain how the behavioral and/or physiological response of an organism is related to changes in internal or external environment. • ENE-4.A: Describe the structure of a community according to its species composition and diversity. • ENE-4.B: Explain how interactions within and among populations influence community structure. • IST-5.A: Explain how the behavioral responses of organisms affect their overall fitness and may contribute to the success of the population.

<p>ESSENTIAL KNOWLEDGE</p>	<p>Introduction of Invasive Species</p> <ul style="list-style-type: none"> • SYI-2.B.2: Human impact accelerates change at local and global levels. • EVO-1.O.1: An adaptation is a genetic variation that is favored by selection and is manifested as a trait that provides an advantage to an organism in a particular environment. • SYI-2.A.1: The intentional or unintentional introduction of an invasive species can allow the species to exploit a new niche free of predators or competitors or to outcompete other organisms for resources. • SYI-3.F.1: Natural and artificial ecosystems with fewer component parts and with little diversity among the parts are often less resilient to changes in the environment. <p>How Populations Can Be Disrupted by Invasive Species</p> <ul style="list-style-type: none"> • SYI-1.G.1: Populations comprise individual organisms that interact with one another and with the environment in complex ways. • ENE-4.A.1: The structure of a community is measured and described in terms of species composition and species diversity (please note this EK includes the formula for Simpson's Diversity Index). • ENE-4.B.2: Interactions among populations determine how they access energy and matter within a community. • ENE-4.B.1: Communities change over time depending on interactions between populations. <p>Why Invasive Species Left Unchecked have Long-term Effects on Ecosystems</p> <ul style="list-style-type: none"> • ENE-3.D.1: Organisms respond to changes in their environment through behavioral and physiological mechanisms. • SYI-1.G.2: Many adaptations in organisms are related to obtaining and using energy and matter in a particular environment, including population growth dynamics depend on a number of factors (please note this EK includes the formula for Population Growth). • IST-5.A.2: Communication occurs through various mechanisms (a) Organisms have a variety of signaling behaviors that produce changes in the behavior of other organisms and can result in differential reproductive success. (b) Animals use visual, audible, tactile, electrical and chemical signals to indicate dominance, find food, establish territory and ensure reproductive success. • IST-5.A.3.b: Responses to information and communication of information are vital to natural selection and evolution. (b) Cooperative behavior tends to increase the fitness of the individual and the survival of the population.
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The course content and skills students will practice in these lessons stretch across all four Big Ideas and many of the Enduring Understandings of the course. To learn more about the course skills, learning objectives and essential knowledge statements listed above, refer to the Course Skills table in the [AP Biology Course and Exam Description](#), (pp. 14-15) and the Unit Guides, Units 7 and 8 (pp. 123-163).

AP[®] Biology Areas of Focus

The activities in this module support student learning in areas identified in the AP Biology Chief Reader Reports as areas for improvement. While engaged in these activities, students can gain expertise in Science Practices by taking part in these various opportunities and experiences.

- ▶ Teachers should create lessons that provide students with opportunities to explore the content in an applied context.
- ▶ Create opportunities for students to propose testable questions and design investigations to answer the questions they propose.
- ▶ Teachers should create learning experiences for students that require mathematical calculations related to species diversity, including hypothesis testing. Allow for the opportunity to evaluate hypotheses based on given data.
- ▶ Provide students with the opportunity to explain and analyze a claim and make predictions related to experimental outcomes based on those claims.
- ▶ Give students the experience of justifying claims using reasoning and evidence from multiple sources of evidence and data.
- ▶ Teachers should provide experiences for students to learn from experimental error.

WE Service Concepts

Based on the WE Learning Framework, here are the particular WE Service concepts addressed in this module.

STUDENTS WILL UNDERSTAND THAT...	STUDENTS WILL BE SKILLED AT...	STUDENTS WILL KNOW THAT...
<ul style="list-style-type: none"> • Social issues are complex, and, therefore, research is essential to understanding them • Oftentimes, local and global issues can be interconnected • Understanding the role of cultural, social and economic factors is vital to the development of solutions • People have a civic identity, which provides opportunities for public action • Serving the greater community can be meaningful for the individual and the community • Creating social change happens through a set of skills, including creating action plans • Carrying out an action plan requires personal and group resilience • Individual behavior and decisions toward a social issue impact the larger global context of that issue 	<ul style="list-style-type: none"> • Working collaboratively in teams • Working collaboratively with community partners (where applicable) • Researching an identified social issue on local and global levels • Creating an action plan • Successfully implementing an action plan • Educating others (classmates, community partners, school, etc.) about a social issue • Presenting actions and results to wider audiences • Applying critical thinking • Thinking entrepreneurially • Demonstrating leadership • Reflecting on learning about the social issue • Reflecting on working to create social change 	<ul style="list-style-type: none"> • AP® course content is relevant to addressing social issues and topics, and provides knowledge toward creating working solutions • There are organizations working for social change on the social issue • They have an important role to play as students, employees, volunteers and as citizens to have a positive impact on their local and global community

See full WE Learning Framework and details at [WE.org/we-schools/program/learning-framework](https://we.org/we-schools/program/learning-framework).

Icon Legend

As described in the AP with WE Service Program Guide, the WE Learning Framework identifies the most relevant core skills students will develop as they progress through this module.



ARGUMENT
FORMATION



INFORMATION
LITERACY



LEADERSHIP
SKILLS



ORGANIZATION



ACTION
PLANNING



RESEARCH AND
WRITING



CRITICAL
THINKING



REFLECTION

Throughout each part of this module, look for these additional icons to identify the following opportunities and notes:



Teacher Tip:

Suggestions for ways to implement or modify the activities with students.



Focus Area Alert:

Opportunities for students to practice content and skills that are pivotal for improving student performance in the AP[®] course and on the AP[®] Exam.



Check for Understanding:

Recommendations for ways to formatively assess student progress and mastery of the content and skills practiced in the activities.

Pay particular attention to activities labeled with the red checkmark icon:



Recognition Checkmark:

Identifies activities that are required in the Recognition Rubric. We encourage you to use the most effective instructional approaches to meet your students' needs. You may use alternative activities if they achieve the same outcomes as the required activities and align with the Recognition Rubric. Review the rubric here: <https://apcentral.collegeboard.org/media/pdf/apwe-recognition-rubric.pdf>.

Part 1: Investigate and Learn

Investigate and Learn is divided into the following lessons:

- ▶ Lesson 1: Invasive Species: Why is the introduction of an invasive species a problem?
- ▶ Lesson 2: Environmental, Economic and Health Impacts of Invasive Species
- ▶ Lesson 3: Investigate and Learn: Species-specific Mitigation Methods

Every student in every AP with WE Service course will do the following as part of their learning and investigation:

- ▶ Learn about the issue locally and globally within your course context
- ▶ Explore causes and effects locally and globally
- ▶ Assess impacts for the future on the local community and the world

WE Service Framework



Overview for Part 1: Investigate and Learn

In this module, students will investigate the impacts of invasive species on local, regional and global ecosystems, the local and global economy, and human health and safety. Students will learn best practices for stopping the introduction and controlling the spread of invasive species into their local environments. They will do an evaluation of current practices and the agencies (both public and private) that are responsible for mitigation of the spread of invasive species. They will use these learning experiences to develop their own action plan, which must include one local or national action and one global action.

The activities listed below are examples of classroom-ready activities that can be used to develop student awareness and understanding of the impact of invasive species. Other activities that achieve the same objectives may be substituted. **Teachers should select activities that they think will most benefit their students' understanding and will be achievable given the availability of classroom and laboratory resources, as well as access to outdoor environments.**

Key Takeaways

- ▶ Invasive species are any organism that are both non-native and do harm to a local ecosystem.
- ▶ Not all non-native species become invasive species.
- ▶ The introduction of an invasive species into an environment rarely has a positive outcome for native species, which are organisms that are found in/indigenous to the ecosystem because of natural selection.
- ▶ Invasive species do more than just outcompete native species. They can cause habitat destruction, affect local agriculture and cause or exacerbate health problems in other animals, including humans.
- ▶ There are many methods, both at the local and global levels, to stop the introduction and control the spread of invasive species.

ACTIVITY	PG #
LESSON 1: INVASIVE SPECIES: WHY IS THE INTRODUCTION OF AN INVASIVE SPECIES A PROBLEM?	
Activity 1: What makes a species invasive?	21
Activity 2: Why are invasive species a problem?	21
Activity 3: Who/what do invasive species affect?	22
LESSON 2: ENVIRONMENTAL, ECONOMIC AND HEALTH IMPACTS OF INVASIVE SPECIES	
Activity 1: Problem Tree	24
Activity 2: HHMI Lionfish Invasion: Density-Dependent Populations Dynamics, the Case Studies	25
Activity 3: What are the short- and long-term impacts of not controlling the spread of invasive species?	25
Activity 4: Where do we go from here?	27
LESSON 3: SPECIES-SPECIFIC MITIGATION METHODS	
Activity 1: Making Connections to Students' Lives	30
Activity 2: Summarizing the Investigation	30
Activity 3: Working Independently	31

Lesson 1: Invasive Species: Why is the introduction of an invasive species a problem?

Activity 1: What makes a species invasive?



As a primer for this module, have students read through The National Wildlife Federation article [Invasive Species](#).

Guiding Questions

What makes a species invasive? What are some mechanisms used by invasive species to outcompete native species? What are some invasive species in your area?

Real World Application

Have students watch [Invasive Species 101: National Geographic](#) or [TED-Ed: The threat of invasive species](#). Either video describes invasive species and their effects on local ecosystems.

After students view the video, lead a discussion about what students learned from the video.

- ▶ What kinds of species are invasive?
- ▶ What are some ways invasive species are released into non-native environments?
- ▶ What are some of the effects invasive species have on native species?
- ▶ What are some of the effects of invasive species on humans?
- ▶ What geographical areas are most susceptible to invasive species?
- ▶ What are some human behaviors that may have contributed to the spread of invasive species?
- ▶ In what ways can the spread of invasive species be slowed?

Activity 2: Why are invasive species a problem?



Guiding Questions

What are some invasive species in your area? What common behaviors cause the spread of invasive species?

Real World Application

Have students spend some time either in or outside of class researching local/regionally invasive species having effects on students' environment. This is a great place to start: [USDA National Invasive Species Information Center](#). Students should gather the following information related to their region:

1. Species examples: plants and/or animals
2. Possible reason species were released in the region
3. Current environmental, health and economic impact on the region

This information can be presented in a variety of ways, including group discussion, short paper, poster talk, PowerPoint/Google slide deck, etc.

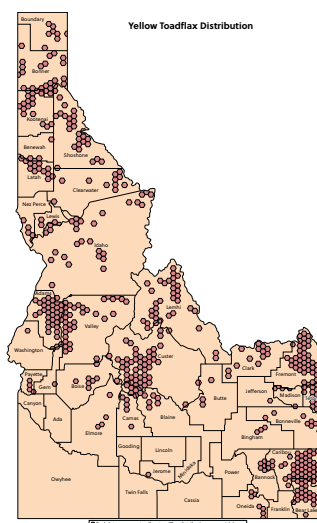


Check for Understanding:

- ▶ Ask students to provide answers to the following questions. Answers may vary and are dependent on the particular food web scenario with which the students were working.
 - What was the species diversity like prior to the arrival of the invasive species?
 - How was diversity impacted by the invasion of the new species?
 - What happens to an ecosystem when species diversity declines?

Independent Student Research Activity

- ▶ To encourage a deeper understanding of how widespread invasive species can be, students can create a map of the distribution of a single invasive species in their area or region. Below is an example of a [map of the distribution of yellow toadflax](#) in the state of Idaho from the Idaho Department of Agriculture.



- ▶ You can have students choose the species they wish to track or provide them with a specific species.
- ▶ Students can explore how the invasive species affects their school campus grounds, neighborhood, town or city, state or other defined area (e.g., local parks or other public spaces, a students' residential location or other locations available to gather such data).
- ▶ Students can work individually or in groups.
- ▶ While the intent of this activity is to have students outside tracking an invasive species in their area, it can certainly be done as a web-based search. When deciding how best to conduct this activity with students, consider weather, access to open spaces and available time.
- ▶ To help with collaboration and to expand the scope of distribution, a larger map can be created with class data from the individual student maps submitted.
- ▶ Alternatively, assign both of the following articles to read which will help with preparation for the next activity:
 - [Invasive Plant Profile: Japanese Knotweed](#)
 - [The Burmese Python: An Invasive Species Who Eats to Its Heart's Content](#)



Focus Area Alert:

The Invasive Species activity is a good place to require students to make and support the claim that a particular species is invasive.



Teacher Tip:

If time is limited, videos can be viewed outside of class time.

Lesson 2: Environmental, Economic and Health Impacts of Invasive Species



NAME: _____

TEAM MEMBERS: _____

Activity 1: Problem Tree

In your Problem Tree graphic organizer, start by writing the problem in the trunk of the tree, and then look at the causes and effects of an issue. Keep digging to go deeper on the issue to find its supporting and root causes.

Leaves/branches: Effects

These are the results created by the problem. At first, this part of the issue appears easy to tackle, but when leaves and branches are trimmed, they grow back quickly. Consider the multi-layered effects, or “effects of effects,” that can arise when a problem goes unaddressed. Always ask: “Then what happens?”

Ex. Decline of native species population

Trunk: Problem

This is the key issue that is being studied. Because it is not as apparent as the leaves, the core problem itself sometimes takes a little longer to identify.

Ex. Introduction of Burmese python

Roots: Causes

These are the situations or factors that have led to the problem. When exploring the root causes of a problem, ask yourself “Why does this problem exist?” Dig deeper to consider the “causes of causes”—the multiple layers of factors that contribute to a problem.

Ex. Destruction of python breeding facility that release snakes into nearby swamps

Activity 2: HHMI Lionfish Invasion: Density-Dependent Populations Dynamics, the Case Studies



In the **Lionfish Invasion: Density-Dependent Population Dynamics** module, HHMI provides a case study related to lionfish, and also gives other case studies that present various species and are related to density-dependent population dynamics from around the globe. The lionfish case study presents models of how the lionfish are tracked and populations are calculated. Each of the [other case studies](#) come with a small data set and two to four questions related to the data presented. The species highlighted in these case studies are a wide variety of organisms meant to illustrate that any kind of living thing can be affected by population density dynamics in the right conditions. These case studies can be used as a supplement with the [HHMI Lionfish Invasion](#) module or throughout the learning process of this AP with WE module.

Activity 3: What are the short- and long-term impacts of not controlling the spread of invasive species?



Guiding Question

What are the impacts of invasive species in our geographical area?

Provide students with the article [The Evolutionary Impact of Invasive Species](#). This article can be assigned to read individually or as a [jigsaw reading activity](#) (from the Minnesota Literacy Council) with groups or students. From the information contained in this article, have students make some claims relative to invasive species they've been researching lately. Claims can center on adaptive and evolutionary change, health impacts or economic impacts.

Real World Application

Students should now have the content and skill preparation needed to make arguments relative to the short- and long-term impacts from not controlling the spread of invasive species. Students can work in pairs if that suits the classroom dynamic.

Have students develop a Policy Brief for their “local” county/city elected officials. The invasive species of their choice does not have to actually be local, as this will allow there to be a variety of species researched. Provide students with the outline below to inform them of the content that their brief should include:

1. Preparation

- ▶ Identify audience
- ▶ Decide on messaging approach
- ▶ Identify the strengths and weaknesses of your argument

2. Executive Summary

- ▶ Write one to two sentences in overview of the issue that will encourage your audience to continue reading

3. Introduction

- ▶ Why is the topic important?
- ▶ Why should people care?
- ▶ What are the goals of your research?

4. Approach and Results

- ▶ Summarize your facts into useful context
- ▶ Reduce details to relevant information
- ▶ Provide concrete examples that illustrate the impact of the issue

5. Conclusion

- ▶ Restate facts in conclusive ways
- ▶ Make all statements concrete

6. Implications and Recommendations

- ▶ What should happen next?
- ▶ Be clear and factual
- ▶ Make recommendations plausible and possible

Consider providing students with a simple template so that the task does not get overwhelming. Here is one example of a simple Policy Brief Template:

POLICY BRIEF TEMPLATE (NO MORE THAN 4 PAGES)

Preparation

- Identify audience
- Decide on messaging approach
- Identify the strengths and weaknesses of your argument

Executive Summary

- Write one to two sentences in overview of the issue that will encourage your audience to continue reading

Introduction

- Why is the topic important? Why should people care?
- What are the goals of your research?

Approach and Results

- Summarize your facts into useful context
- Reduce details to relevant information
- Provide concrete examples that illustrate the impact of the issue

Conclusion

- Restate facts in conclusive ways
- Make all statements concrete

Implications and Recommendations

- What should happen next?
- Be clear and factual
- Make recommendations plausible and possible



Focus Area Alert:

Argumentation is the main skill of this activity. Ensure students are making and justifying claims from evidence and data. Students can also make predictions of outcomes and justify those predictions based on their research.



Teacher Tip:

In-class time may be given for research and group discussion. Students may work alone or in groups depending on their work style.

Activity 4: Where do we go from here?



Needs Assessment and Solution Tree

Have students watch either or both of the following videos: [Utility Within the Unwanted: Upcycling Invasive Species](#) and [IDNR changes Asian Carp's name to Copi to encourage harvesting and consumption to block their expansion to the Great Lakes](#) to get students thinking about developing solutions to address the issue of invasive species and the strategies for mitigation methods.

Have students carry out research to begin developing an understanding of specific issues and topics related to their broader issue. For example, invasive species outbreaks are a big umbrella issue with many sub-issues including health and economic implications, as well as habitat destruction and ecosystem collapse.

This is best done by having student groups carry out research on organizations that are working to combat this issue. Students should use the Needs Assessment Worksheet to carry out an analysis.

Have students use the solutions graphic organizer to keep track of current solutions that are in use to address the spread of invasive species. Model how to go from the center of the proposed solution graphic organizer to the more specific details of the key elements to the solution and the possible outcomes of the solution.

Encourage students to revisit and work in parallel with their Problem Tree cause-and-effect graphic organizer, which can help to ensure that their solutions are addressing actual problems. Students should develop four solutions and their accompanying key elements and possible outcomes. They should keep track of any sources they used to fill out the graphic organizer.

Walk students through the Solution Tree, starting in the middle.

Goal: This is the problem from their Problem Tree but re-framed as a goal. Then go to the roots, which is the investigation of the solutions.

Solutions: These are the actions needed to solve the problem and achieve the goal stated at the center of the solution tree. When exploring solutions, students should ask “How will this solve the problem?” Have them dig deeper to think holistically, so that they are looking beyond the short-term and addressing not only the symptoms of the problem but the root causes as well.

And finally to the leaves, which explore the outcomes.

Outcomes: These are the results created by the solution. Results may appear as straightforward as having achieved goals, but when students consider the ripple effect and outcomes of sustainable results, the impact is far-reaching and long-lasting. Always ask, “Then what happens?”



Teacher Tip:

When completing the Solution Tree, have students evaluate advantages, disadvantages and unintended consequences of each solution. Be sure to emphasize how biology can be part of the solution for addressing invasive species.



Check for Understanding:

As students work, check to be sure that they are accurately analyzing each organization and determining ongoing needs to address the issue.



NAME: _____

TEAM MEMBERS: _____

Needs Assessment

The following series of questions helps you to analyze and identify ongoing areas of need within organizations addressing your issue.

1. Identify 3-5 organizations working on issues related to the issue your team is working on.

2. What does each organization do well in response to the issue and/or related issues?

3. What could each organization do better in its response?

4. What areas of need related to access to your issue have you learned about that each organization is NOT addressing?

5. Considering all 3-5 organizations, where are there ongoing needs that are not being adequately addressed?

6. Considering all 3-5 organizations, where are there ongoing needs that are being addressed successfully, and to which you can add further efforts to support the issue?



NAME: _____

TEAM MEMBERS: _____

Solution Tree

In your Solution Tree graphic organizer, start by rewriting the problem from your Problem Tree, and reframing it as a goal at the trunk of the tree. Then consider the different solutions (the roots) and possible outcomes of the solutions (the branches).

Leaves/branches: Outcomes

These are the results created by the solution. Results may appear as straightforward as having achieved goals, but when you consider the ripple effects and outcomes of sustainable results, the impact is far-reaching and long-lasting. Always ask: “Then what happens?”

Trunk: Problem

Trunk: Goal

Roots: Solutions

These are the actions needed to solve the problem and achieve the goal stated at the center of the Solution Tree. When exploring solutions, ask yourself “How will this solve the problem?” Dig deeper to think holistically, so that you are looking beyond the short-term and addressing not only the symptoms of the problem but the root causes as well.

Solution Tree Worksheet: Copyright © 2018 WE. All rights reserved.

Lesson 3: Species-specific Mitigation Methods

Activity 1: Making Connections to Students' Lives



Provide opportunities for students to think about and record their individual and collective learning as they progress through the activities. Students should answer the following reflection question to prepare for Part 2: Action Plan: How can what you are learning in your AP[®] Biology class support solutions that stop the introduction or control the spread of invasive species?

As they write, the following questions can help students shape their reflections:

- ▶ What are the environmental impacts of unmitigated invasive species?
- ▶ As you investigated existing programs addressing invasive species mitigation, what did you feel these programs do well and what did you feel they could do better?
- ▶ Who should be responsible for mitigating invasive species, both locally and globally?
- ▶ What role do you think you could play in invasive species mitigation, both locally and globally?
- ▶ Based on what you learned about your local and global issue and the actions others are already taking, what are five areas of need that you could address?
- ▶ What attracts you to these areas?
- ▶ What are some actions that you could take to address this issue?
- ▶ What excites you about these actions and the impact you can have?
- ▶ How can what you are learning in your AP Biology class support solutions that stop the introduction or control the spread of invasive species?

Activity 2: Summarizing the Investigation



As part of their service project, students should summarize their learning to educate their classmates on the issue they have identified and investigated related to the topic of invasive species mitigation. Select an appropriate format for students to complete their summary. For example, students may make class presentations, design posters to hang in the classroom, write blog posts to share with the class, etc. Summaries may be supported by multimedia or print materials that synthesize and analyze the topic and issue on local and global levels.

When summarizing their investigation, students should keep in mind the following:

- ▶ What are the key takeaways from your investigation of the issue of invasive species mitigation?
- ▶ How are the problems you investigated similar at local and global levels? How are they different?
- ▶ How are the solutions you investigated similar at local and global levels? How are they different?
- ▶ Why may your investigation be important to other AP[®] Biology students?

Activity 3: Working Independently



Now have students independently complete an adaption of Free Response Question #2 from the 2006 AP® Biology exam, which addresses the content in this module. The question, shown below, is available as a student handout in the Appendix of this module. Use the scoring guidelines also found in the Appendix of this module to assess student performance and provide feedback on any misconceptions or misunderstandings.

Independent Practice

Check individual student understanding of the content and skills from the lesson.

2006 Free Response #2

According to fossil records and recent published observations, two species of leaf-eating beetles (species A and B) have existed on an isolated island in the Pacific Ocean for over 100,000 years. In 1964 a third species of leaf-eating beetle (species C) was accidentally introduced on the island. The population size of each species has been regularly monitored as shown in the graph below.

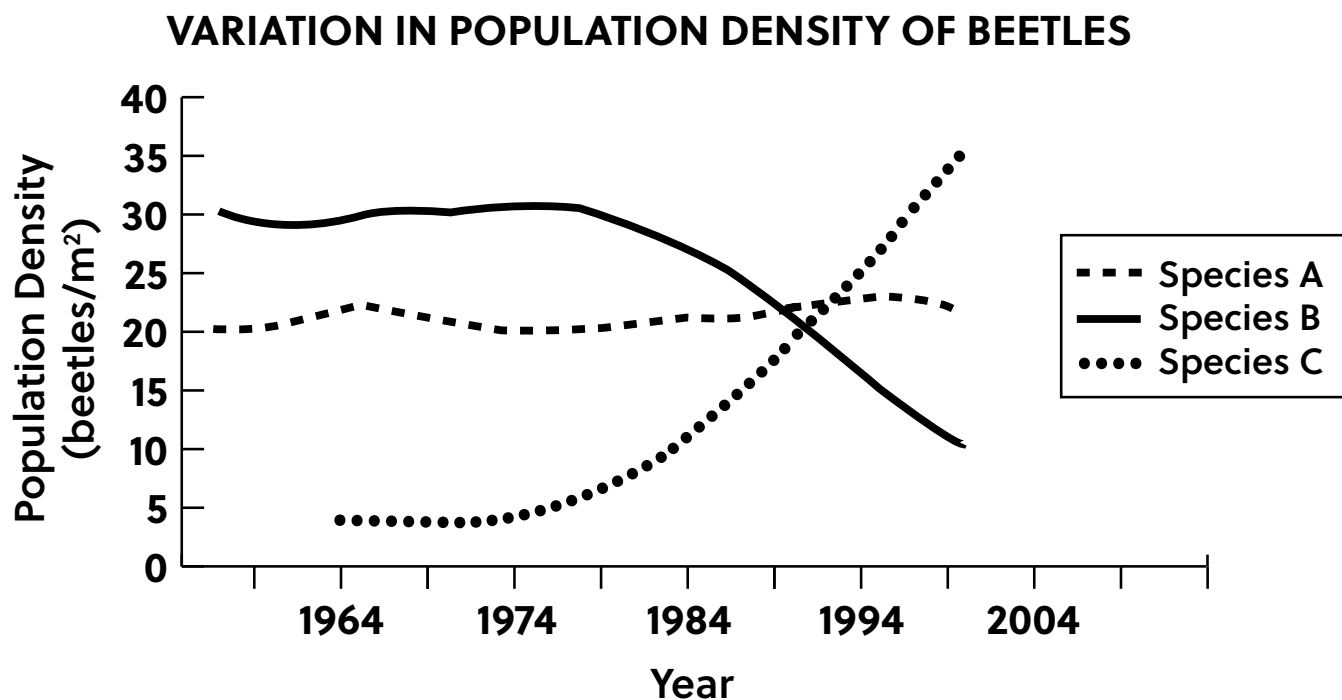
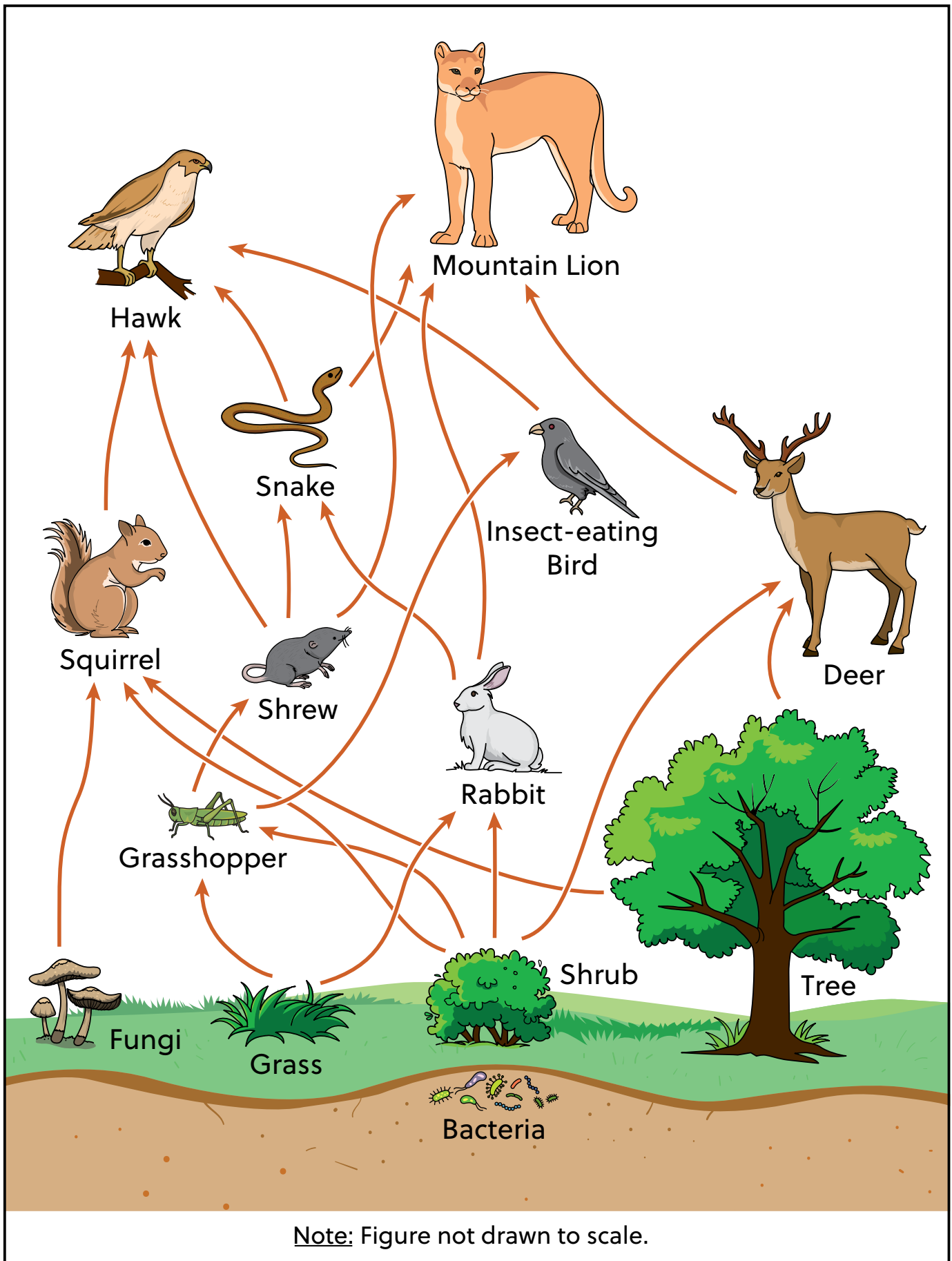


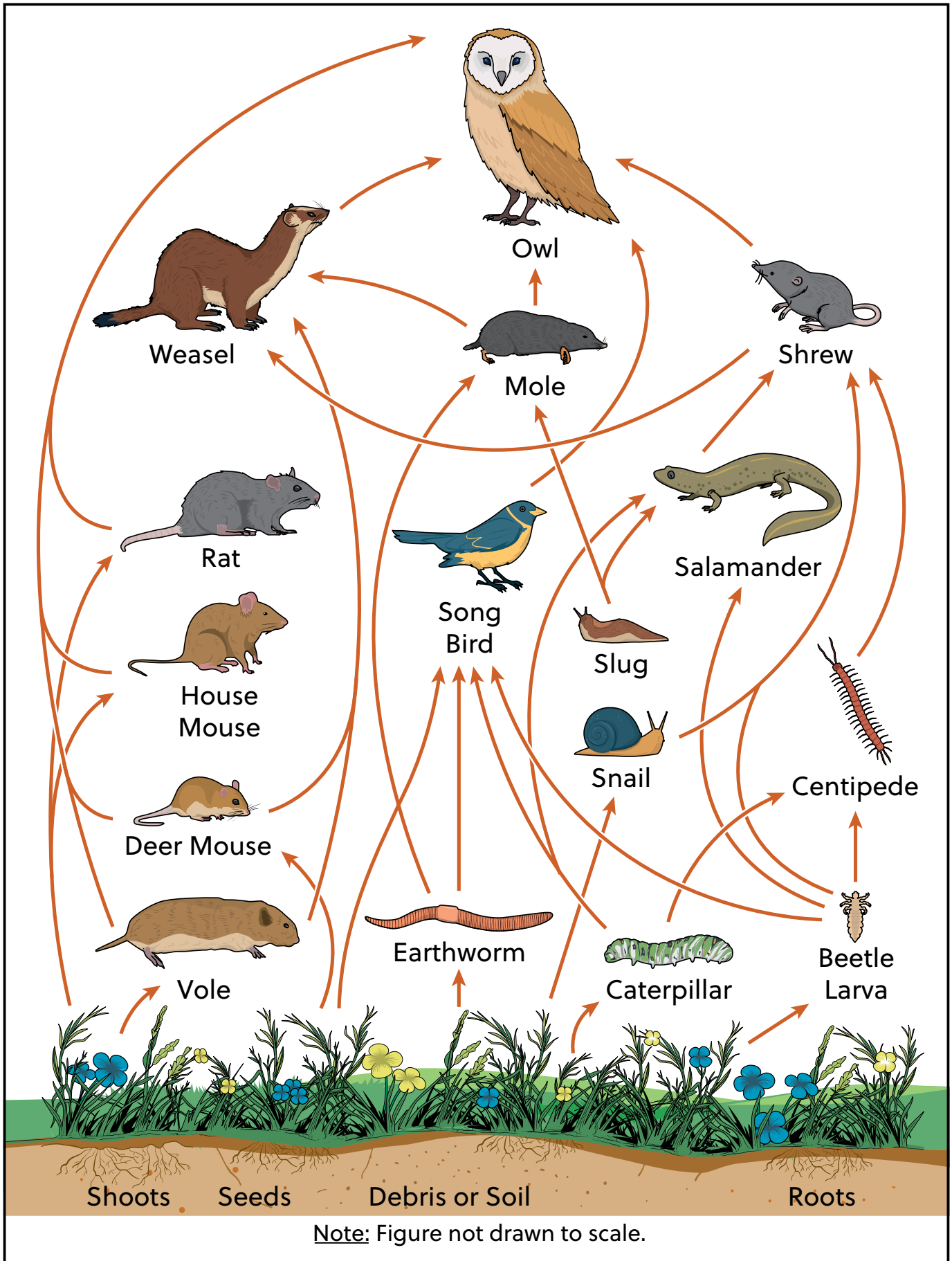
Figure 1. Population Density (beetles/m²) of three species, A, B and C, measured every 10 years for 50 years

- Describe the effect that the introduction of beetle species C has had on the population density of species A and species B.
- Explain the pattern of population density observed in species C. Explain why invasive species are often successful in colonizing new habitats.
- Explain the patterns of population density observed in species A and in species B.
- Predict the population density of species C in 2014. Justify your prediction.

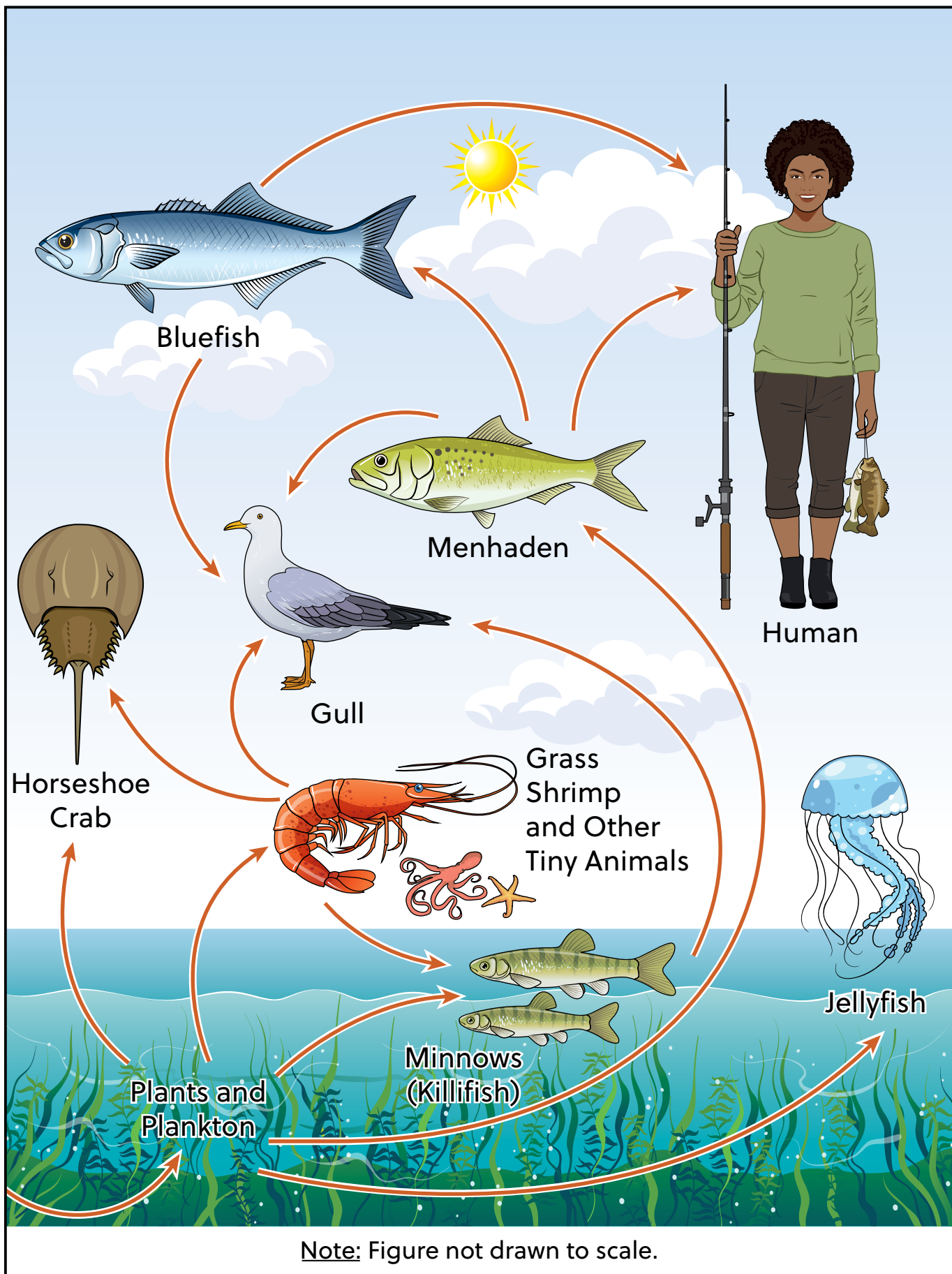
Appendix A: Food Web Example Handouts



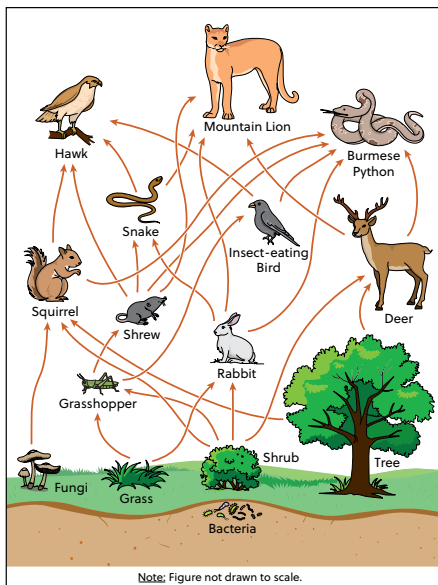
Appendix A: Food Web Example Handouts (continued)



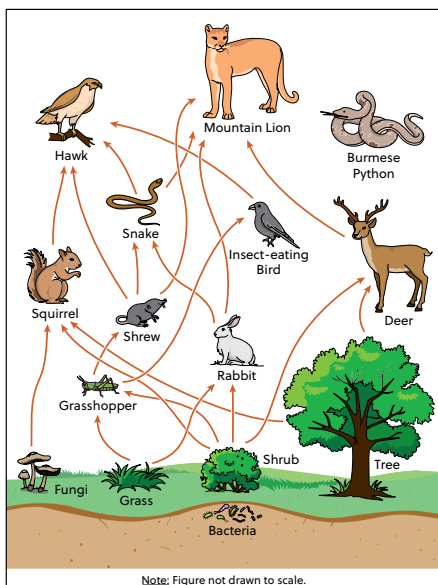
Appendix A: Food Web Example Handouts (continued)



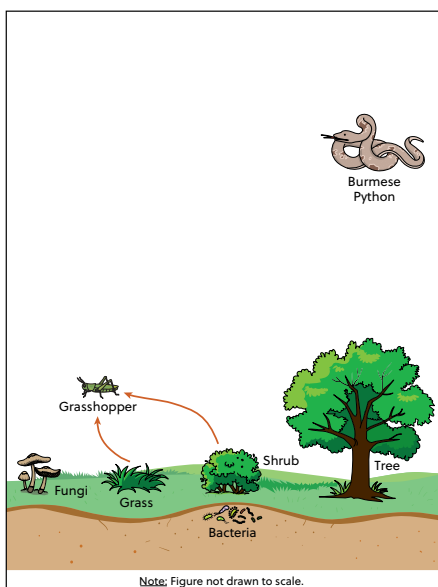
Appendix A: Food Web Example Handouts (continued), Student Sample



Original Food Web:

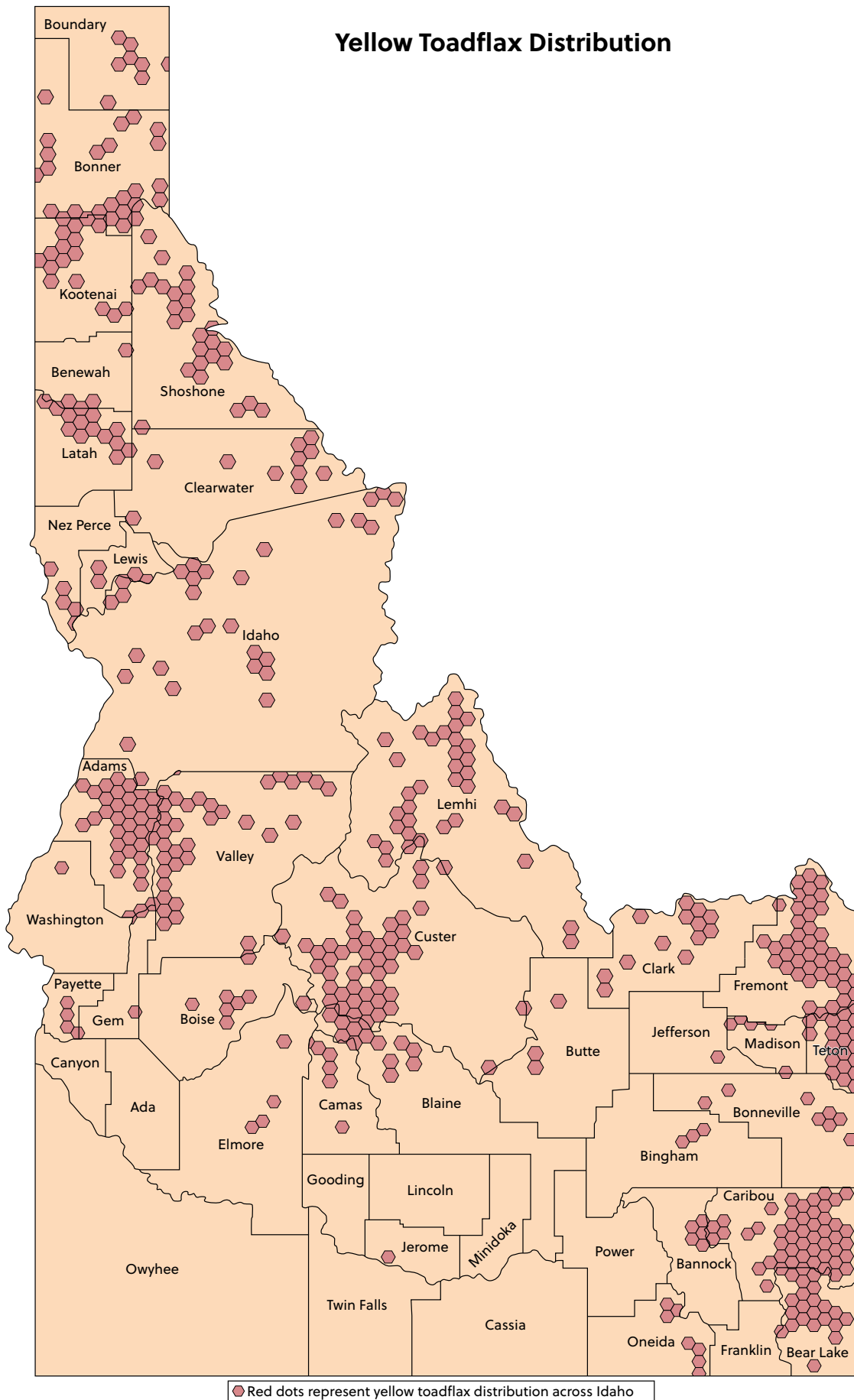


Introduction of the Burmese python:



After several years of Burmese python invasion:

Appendix B: Example of a Distribution Map



Appendix C: Policy Brief Template

POLICY BRIEF TEMPLATE (NO MORE THAN 4 PAGES)

Preparation

- Identify audience
- Decide on messaging approach
- Identify the strengths and weaknesses of your argument

Executive Summary

- Write one to two sentences in overview of the issue that will encourage your audience to continue reading

Introduction

- Why is the topic important? Why should people care?
- What are the goals of your research?

Approach and Results

- Summarize your facts into useful context
- Reduce details to relevant information
- Provide concrete examples that illustrate the impact of the issue

Conclusion

- Restate facts in conclusive ways
- Make all statements concrete

Implications and Recommendations

- What should happen next?
- Be clear and factual
- Make recommendations plausible and possible

Appendix C: Policy Brief Template (continued), Student Sample

POLICY BRIEF TEMPLATE COUNTY FUNDED EDUCATION CAMPAIGN TO STOP THE SPREAD OF YELLOW TOADFLAX

Preparation

- Township County Commissioners
- Presentation at County Commissioner's Meeting
- Strengths of argument
- Loss of income to farmers
 - Loss of pasture lands
 - Reducing ecosystem biodiversity
- Weaknesses of argument
 - Cost
 - Lack of public concern

Executive Summary

- Yellow toadflax is an invasive plant native to Europe and Asia. Brought to the US because of its ornamental plant quality, it quickly became invasive in cultivated areas of the Midwest. Now, it is outcompeting crops and other native vegetation.

Introduction

- Without healthy pasture lands, farmers cannot have space to feed and house livestock. Invasion of the yellow toadflax is causing soil erosion and surface runoff. It is also aiding in the spread of cucumber mosaic virus.
- The goal of this presentation is to inform the City Commission about yellow toadflax in hopes they will fund a campaign to encourage prevention of spread of this plant.

Approach and Results

- In the words of the Idaho State Department of Agriculture: Know What You Grow.

Conclusion

- Yellow toadflax is an invasive species in our community and invading our farms.
- Learn to identify yellow toadflax and remove it when possible.

Implications and Recommendations

- If successful, a budget will be obtained to create and distribute a digital and paper version of a flyer that can be distributed throughout the community to inform citizens about the effects of yellow toadflax on our town.

Appendix D: Adapted Free-Response Question

2006 Free Response #2

According to fossil records and recent published observations, two species of leaf-eating beetles (species A and B) have existed on an isolated island in the Pacific Ocean for over 100,000 years. In 1964 a third species of leaf-eating beetle (species C) was accidentally introduced on the island. The population size of each species has been regularly monitored as shown in the graph below.

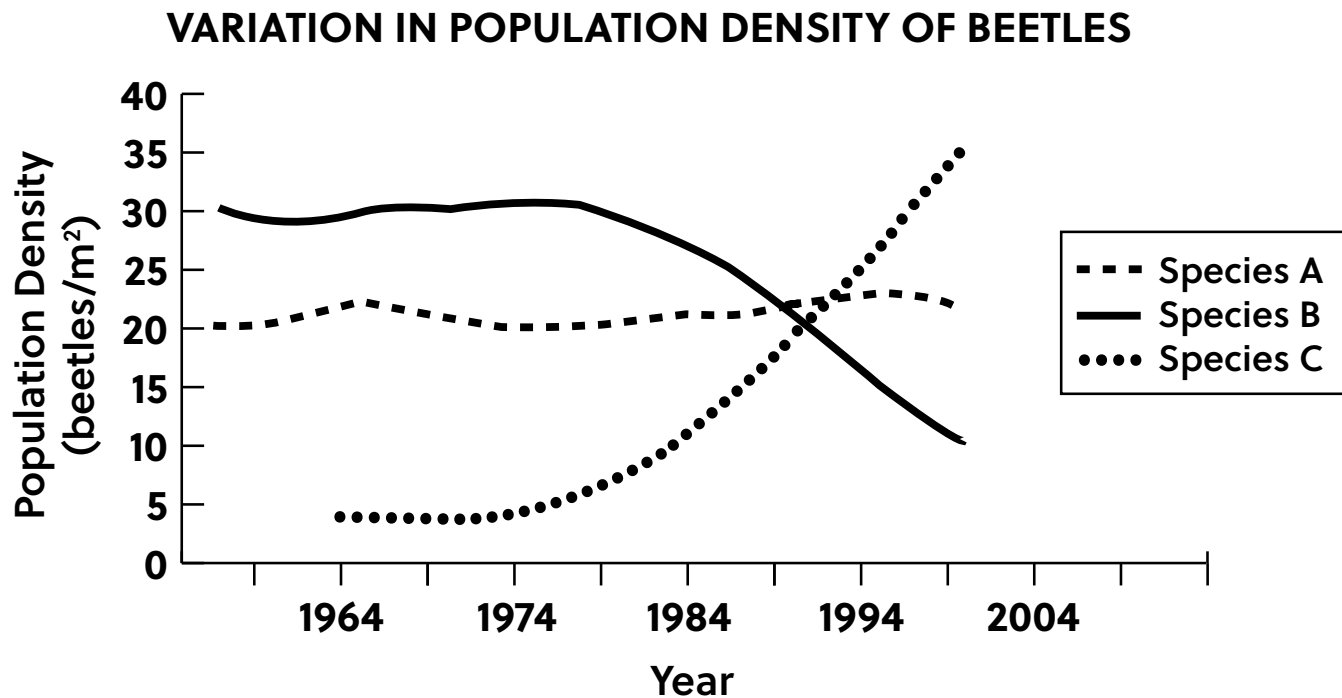


Figure 1. Population Density (beetles/m²) of three species, A, B and C, measured every 10 years for 50 years

- Describe** the effect that the introduction of beetle species C has had on the population density of species A and species B.
- Explain** the pattern of population density observed in species C. **Explain** why invasive species are often successful in colonizing new habitats.
- Explain** the patterns of population density observed in species A and in species B.
- Predict** the population density of species C in 2014. **Justify** your prediction.

Appendix E: Adapted Free-Response Question Scoring Guidelines

2006 Free Response #2

According to fossil records and recent published observations, two species of leaf-eating beetles (species A and B) have existed on an isolated island in the Pacific Ocean for over 100,000 years. In 1964 a third species of leaf-eating beetle (species C) was accidentally introduced on the island. The population size of each species has been regularly monitored as shown in the graph below.

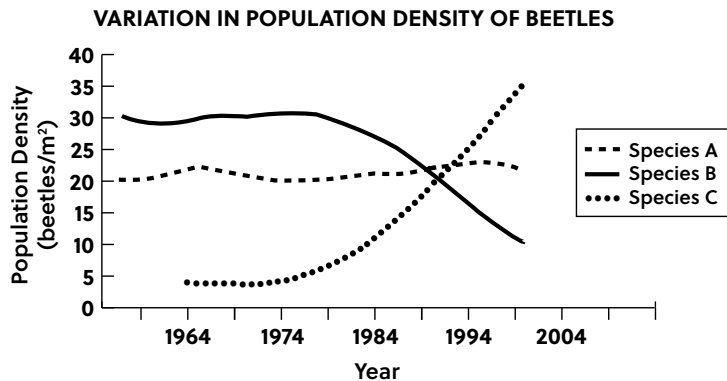


Figure 1. Population Density (beetles/m²) of three species, A, B and C, measured every 10 years for 50 years

Scoring Guidelines

(a)	<p>Describe the effect that the introduction of beetle species C has had on the population density of species A and species B.</p> <ul style="list-style-type: none"> Species C has had little or no effect on species A; however, as species C increases, B decreases. 	1 point
(b)	<p>Explain the pattern of population density observed in species C.</p> <ul style="list-style-type: none"> Because of a lack of limiting factors, species C experiences (exponential) growth in population. 	1 point
	<p>Explain why invasive species are often successful in colonizing new habitats.</p> <ul style="list-style-type: none"> Invasive species (generally) do not experience competition, predation or other limiting factors that native species have. This allows for exponential growth. Invasive species have an evolutionary advantage that native species do not have, allowing the invasive species to outcompete native species. 	1 point
(c)	<p>Explain the patterns of population density observed in species A and in species B.</p> <ul style="list-style-type: none"> Species A has <u>reached carrying capacity/enough resources</u> while species B is experiencing <u>limited resources/competition</u>. 	1 point
(d)	<p>Predict the population density of species C in 2014. Accept one of the following:</p> <ul style="list-style-type: none"> (option 1) Population will increase. (option 2) Population will decrease. (option 3) Population will stabilize/level off. 	1 point
	<p>Justify your prediction.</p> <ul style="list-style-type: none"> (justification for prediction option 1) (Species C's population density will increase because) they will experience an abundant resources and freedom from competition. (justification for prediction option 2) (Species C's population density will decrease because) they will experience loss of resources. (justification for prediction option 3) (Species C's population density will stabilize because) they will reach carrying capacity or a limiting resource. 	1 point
Total for question 1		6 points



Part 2: Action Plan

The Action Plan section is divided into four parts:

- ▶ Connect Learning
- ▶ Form Teams
- ▶ Develop Action Plan
 - Goal Setting
 - Understanding Approaches to Taking Action
 - Determining Clarity and Relevance of Goals
 - Measuring Success
 - Setting S.M.A.R.T. Goals
 - Identifying Resources and Creating a Network
 - Developing a Timeline
- ▶ Reflect

WE Service Framework

INVESTIGATE AND LEARN ▶ ACTION PLAN ▶ TAKE ACTION ▶ REPORT AND CELEBRATE

RECORD AND REFLECT

Overview for Part 2: Action Plan

Students apply the knowledge they acquired through the Investigate and Learn lessons to develop a plan through which they will address one local and one global service action.

Key Takeaways

- ▶ Completing a service action requires a set of skills, including working as a team and creating action plans.
- ▶ Action plans involve setting goals, identifying measurements of success, creating a timeline for each task, assigning specific responsibilities to each team member and preparing to network with others to complete tasks.
- ▶ Three approaches to completing a service action are direct service, indirect service and advocacy.

This Section Contains:

- ▶ Optional activities that you may choose to use with your class to deepen student understanding of particular elements of action planning.
- ▶ Templates that all students should complete to help them successfully meet the recognition criteria.

Connect Learning

Activity: Determining Interests

As a class, discuss the following:

- ▶ What issues related to your topic do you hear about on the news or read in newspapers and online articles? Why do you think these stories are covered by the media?
- ▶ What issues related to your topic do you think the general public is not aware of? Why do you think they are unaware?
- ▶ What issues related to your topic really bother you, even if you do not know a lot about them? Why are you bothered by these issues?
- ▶ If you were a world leader, what kinds of problems related to your topic would you tackle?



Teacher Tip:

Support students in determining their personal interests by incorporating an activity in which they think back to the problems and solutions they identified in Part 1: Investigate and Learn. Have students brainstorm the global and local issues they feel are most important and personally interesting to them.

Form Teams



It is recommended that students work in teams of four to six to plan and carry out their AP with WE Service projects. However, students may work individually or in any size group as approved by their teacher. Each team will decide on one local and one global action, and then create a plan that details how the actions will be achieved. Since each team will focus on a particular action, encourage students to form teams based on their interest in working on similar local and global issues. The more inspired and passionate students are about the issue they identify, the more creative they will be with the actions they develop. In order for students to pick teams, have students present the local and global issues they are interested in, then join forces with other students who are addressing similar issues.



Teacher Tips:

- ▶ When students first meet with their team, encourage them to create a contract so all members have a clear understanding of their own role and responsibilities, as well as those of the other members of the team. This will help to identify and establish group norms, including a plan and process for conflict resolution.
- ▶ Create a spreadsheet that the teacher can fill in with group members, including module (of choice), columns for check-ins, numbers and agencies worked with. Teacher can also add a column to grade as each piece is completed.
- ▶ Instead of emphasizing skills and talents, ensure students are grouped based on the issue that is most important to them.
- ▶ If a big group forms around one issue, have students break into two groups and ensure they design different action plans on the same topic.

Resources to Support Forming and Working in Teams

Resources are available in the AP with WE Service Program Guide:

<https://apcentral.collegeboard.org/pdf/program-guide.pdf>.

RESOURCE AND DESCRIPTION	HOW TO USE THIS RESOURCE
<p>Gift + Issue = Change This activity helps students discover how they can use their talents and interests to carry out a service action.</p>	Use this activity to help students think about how they might individually contribute to an action that they feel passionate about.
<p>Finding Passion with the Issue Compass This activity helps students to brainstorm a list of local and global issues and to share their thoughts, opinions, and analyses about the topics. Students then choose one issue about which they are most excited to learn more and take action.</p>	This interactive activity can be used to align students into action teams according to their interests and talents.
<p>Exploring the Four Leadership Styles Every student can be a leader within their action team. This activity helps students to understand and value different kinds of leadership styles, and to discover their own strengths and challenges as a leader.</p>	Use this activity to help students better understand their individual strengths and the strengths of their teammates. By giving each person the power to be a leader, no one person will feel the burden of being responsible for the entire project.

Resources to Support Collaborating as a Team

Resources are available in the AP with WE Service Program Guide:

<https://apcentral.collegeboard.org/pdf/program-guide.pdf>.

RESOURCE AND DESCRIPTION	HOW TO USE THIS RESOURCE
<p>Creating a Safe Space It is important for each team to create a space in which everyone feels comfortable voicing their opinions. This activity asks team members to think individually and then as a group about what they will need in order to thrive within their team.</p>	Use this activity to help teams create guidelines around the way they interact and make decisions as a team.
<p>Drafting a Team Contract This activity walks students through how to create a contract so all members have a clear understanding of their own role and responsibilities, as well as those of the other members of the team.</p>	Use the contract to help students identify and establish group norms, including a plan and process for conflict resolution. This is both a key skill that students will learn and a proactive approach to problem-solving within a team environment. Use the results from the Exploring the Four Leadership Styles activity to help determine roles and responsibilities of each student in the group.
<p>Establishing Roles and Responsibilities Teamwork is a success when project tasks are divided equally and based on individual strengths.</p>	Use this activity to share with students how they can divide and conquer major areas of responsibility, and the roles they can each assume to make their service project both personally fulfilling and an overall success.

Develop Action Plan



After students have formed their teams, the next step is for teams to build out an action plan that:

- ▶ Identifies team goal(s)
- ▶ Establishes their metrics of success
- ▶ Identifies their network and required resources
- ▶ Creates a timeline for completing their actions by sequencing necessary tasks and identifying individual roles and responsibilities



Teacher Tip:

Be sure teams create goals that are specific and measurable. In addition to meeting the Recognition Rubric requirements, this will allow students to report on the impact of their project in Part 4: Report and Celebrate.

Activity: Goal Setting

Each team must create a goal for the team's action. This goal will need to:

- ▶ Be clear, measurable and informed by the team member's needs assessment
- ▶ Incorporate one global and one local action
- ▶ Achieve direct service, indirect service or advocacy

Help students generate and decide on a team action goal using the following activities:

Activity: Understanding Approaches to Taking Action

Every great plan begins with establishing clear goals. But first, help students understand the types of actions their team might take through their action project. There are three approaches, generally speaking, to taking action:

- ▶ **Direct service:** Personally engaging with and providing hands-on services to those in need (usually in conjunction with an organization).
- ▶ **Indirect service:** Channeling resources to the needs of a community—locally, nationally or internationally.
- ▶ **Advocacy:** Educating others about an issue to increase visibility and follow up with an action that focuses on enacting change.

Resources and Ideas to Support Selecting a Type of Service

Resources are available in the AP with WE Service Program Guide:

<https://apcentral.collegeboard.org/pdf/program-guide.pdf>.

RESOURCE AND DESCRIPTION	HOW TO USE THIS RESOURCE
<p>Tips on Developing Direct Service Action Ideas</p> <p>Get ideas and resources on how to personally engage with and provide hands-on services to those in need (usually in conjunction with an organization).</p>	<p>Use the following resources to show students how to create their own ideas or connect with existing ones that they can expand on:</p> <ul style="list-style-type: none"> • Tips on Developing Direct Service Action Ideas • WE Volunteer Now Campaign
<p>Tips on Developing Indirect Service Action Ideas</p> <p>Get ideas and support on how to channel resources to the needs of a community—locally, nationally or internationally.</p>	<p>Use the following resources to show students how to create their own ideas or connect with existing ones that they can expand on:</p> <ul style="list-style-type: none"> • Tips on Developing Indirect Service Action Ideas • WE Go Green campaign • WE Scare Hunger campaign • WE Are Rafikis campaign
<p>Tips on Developing Advocacy Action Ideas</p> <p>Get ideas and resources on how to educate others about an issue to increase visibility and how to follow up with an action that focuses on enacting change.</p>	<p>Use the following resources to show students how to create their own ideas or connect with existing ones that they can expand on:</p> <ul style="list-style-type: none"> • Tips on Developing Advocacy Action Ideas • Developing a Deep Understanding of Your Issue and Messaging Your Message • Ensuring Message Credibility • Spreading the Word (Communications Strategies and Communications Plan Worksheets and Templates) • Practice, Practice, Practice • WE Are Silent campaign



Approaches to Taking Action Information Sheet

DIRECT SERVICE		
WHAT IS IT?	Personally engaging with and providing hands-on service to those in need (usually in conjunction with an organization).	
EXAMPLE GOAL	By the end of the semester, we will support a local food bank and shelter by packing and serving food to people in the community. We will also visit our neighboring elementary school and teach a lesson on food insecurity in our community.	
ACTIONS	<ul style="list-style-type: none"> Reach out to local shelters and food banks to arrange a day for the class to visit and provide hands-on support Once a date has been decided, make sure students all have permission to travel to the food bank (if during school hours) 	<ul style="list-style-type: none"> Connect with teachers/administration at local elementary school and arrange to visit a classroom to teach a lesson to young students on food insecurity Create and print worksheets to use with younger students
INDIRECT SERVICE		
WHAT IS IT?	Channeling resources to the needs of a community—locally, nationally or internationally.	
EXAMPLE GOAL	By the end of the year, we will create a storage and donation system for local families in need, where they can access furniture and other household items. We will develop a system for donations, pick-ups and inventory.	
ACTIONS	<ul style="list-style-type: none"> Conduct research into which items are most needed by community members (e.g., bed frames, dining tables, household goods, etc.) Reach out to local businesses to try to get a storage space donated Connect with school social workers/administration to gain their support Put up flyers around school and in the community, asking for donations (list specific items needed), including instructions on how/where to donate 	<ul style="list-style-type: none"> Develop an online database for tracking donations and pick-ups, and maintaining inventory Share pick-up information with local shelters, churches, community centers, etc. Share the donation system with school social workers, so that they can maintain the project in future years
ADVOCACY		
WHAT IS IT?	Educating others about an issue to increase visibility and following up with an action that focuses on enacting change. Actions around advocacy often look like raising awareness, but without a strong call to action within the initiative as a whole. Educating others is not considered service in and of itself.	
EXAMPLE GOAL	Through an informative art piece, we will educate our school community about the waste created by single-use plastic water bottles and the impact they have on the environment. Then, we will sell reusable water bottles at school and the proceeds from the sale will go toward clean water projects in developing countries.	
ACTIONS	<ul style="list-style-type: none"> Research the impact of single-use plastic water bottles around the school and in the local community Plan out and create a 3D sculpture that incorporates informative text on the issue of single-use plastics Seek permission from school administration to display the piece in a common area of the school 	<ul style="list-style-type: none"> Design and order water bottles to sell at school Research and select an international organization that focuses on clean water projects Organize a selling schedule for the water bottles, donate profits

Activity: Determining Clarity and Relevance of Goals

In their teams, students should now begin to develop their goal(s) for their action plan. Setting effective goals is a more difficult skill than most people imagine, but once students learn to employ one or more techniques for developing clear goals, it will serve them in all endeavors. Have students split up into their action teams and instruct them to brainstorm actions they would like to take, sharing from their personal reflections from the previous section, and drawing from their previous investigation and research, along with the needs assessment and reflections. Encourage students to use the 5Ws (what, where, when, why, who and how) to express their overarching goal(s) and to be as clear and specific as they can.

As they write drafts of their goal(s), they should ask themselves the following questions to assess the clarity and effectiveness of their goal:

- ▶ Is this goal specific enough so that we know exactly what our team will accomplish?
- ▶ Can we measure whether or not this goal was fully accomplished?
- ▶ Is it achievable within our project period?
- ▶ Is it relevant to the social issue we are aiming to address?
- ▶ Do we know the deadline by which it will be accomplished?

Activity: Measuring Success

As part of goal setting, establishing Measurements for Success is an important way of knowing if the goal has been achieved. Take time to discuss measurement in a bit more detail. Measurement is an aspect of the goal-setting exercise that students should understand before they begin executing an action plan. Students will need to understand how they will measure positive outcomes so that they understand what success looks like and how they will know they have achieved their goal. Is it based on the number of people they have reached through their actions? This will require teams to keep track of numbers. Or are they also looking at how the individuals reached have been affected? A survey with written answers (or multiple choice options) could do the trick. Share with students that measuring success can take two forms:

- ▶ Qualitative data is usually descriptive data that provides insights into what/how people think or feel. Qualitative data is harder to analyze than quantitative data.
- ▶ Quantitative data usually provides a numbers-based measurement (with associated units) such as quantity, amount or range.



Teacher Tip:

Have teams define quantitative and qualitative data sets for their action plan; then brainstorm a list of each that applies to their action project. Remind students that establishing their criteria for success and the corresponding metrics is an ongoing process. As they dive deeper into their action planning and execution, it will become clearer for students what kind of data they will need and how they will obtain it. The information may be collected by multiple team members. However, it is good to designate at least one person to any (and each) of the methods on their list.

Activity: Setting S.M.A.R.T. Goals

A S.M.A.R.T. goal is Specific, Measurable, Attainable, Relevant and Time-bound.

Before your group starts their campaigns or actions, you're going to need a good plan. By having a plan, you will have the means to establish a defined goal and a reliable way to reach that goal. Brainstorming ideas will allow you to determine clarity and relevance for your service project. Your criteria will serve as a guideline to ensure that you have a way to evaluate your outcome and see whether or not you've achieved what you set out to do. So whether your group is trying to hit a particular fundraising total, organize a huge event with a certain number of attendees, or reach a target audience with awareness-raising speeches, you'll want to start with a goal and a plan. The surest way to do this? Build a S.M.A.R.T. goal.

Resources on Goal Setting

Resources are available in the AP with WE Service Program Guide:

<https://apcentral.collegeboard.org/pdf/program-guide.pdf>.

RESOURCE AND DESCRIPTION	HOW TO USE THIS RESOURCE
Determining Clarity and Relevance of Goals This is a brainstorming activity that guides students through big picture ideas and critical thinking as they begin to plan their service project goal.	Use this activity to help students sort through all the ideas they will come up with before they decide on the goal around which they will develop their action plan.
Establishing S.M.A.R.T. Goals This activity guides students through key steps of S.M.A.R.T. (Specific, Measurable, Attainable, Relevant, Time-bound) goals.	S.M.A.R.T. goals help students ensure that their team sets a "right-sized" and relevant goal to guide their action planning throughout this experience. This skill set, once learned, is one that students can apply to a myriad of other challenges and settings.

Resources and Ideas to Support Measurements of Success

Resources are available in the AP with WE Service Program Guide:

<https://apcentral.collegeboard.org/pdf/program-guide.pdf>.

RESOURCE AND DESCRIPTION	HOW TO USE THIS RESOURCE
Creating Measurements of Success Reporting success comes down to students' ability to collect the right data and information. This activity helps students think about the outcomes of their project as part of their goal-setting and action-planning work.	Help students understand the difference between qualitative and quantitative data, and how to go about creating and establishing the right measures of success for each team's project.
Collecting Evidence and Artifacts This activity supports students with gathering the information they will need to help report on the outcomes of their service projects.	Use this resource to help students determine the type of data they need to collect, and then how they can go about gathering the info they need. The data and information students gather will feed into their team executive summary at the end of the overall module.
Creating Surveys and Feedback Forms Creating a survey and/or a feedback form means identifying the criteria on which you want to collect data and report the outcomes.	Use this resource to show students how they can create their own surveys and feedback forms by considering all the relevant data and information they will need. Sample surveys and forms will provide further guidance.

Excerpted from Determining Clarity and Relevance of Goals and Creating Measurements of Success: Copyright © 2018 WE. All rights reserved.

Activity: Identifying Resources and Creating a Network

As students develop their goals and measures of success, they will start to identify what they need to execute their action plans. This will include creating connections with people, such as within (but not limited to) the school, your community, different organizations and businesses, topic experts and speakers, media outlets, the blogging/social media community, etc. These people will serve as supporters and amplifiers, as well as providers of information and resources.

For this latter part, students will need to identify the resources they need to accomplish their goals. This can include (but is not limited to):

- ▶ Facts and statistics (found through research or materials from other organizations)
- ▶ Tools and supplies (this list can be endless, but may include things like card stock, paint, tables, chairs, microphones, water buckets and sponges, labeled boxes to collect items, collection jars, etc.)
- ▶ Stories of individuals who benefit from the services of the organization
- ▶ Access to space and/or venues
- ▶ Methods and resources for producing necessary materials or media

Activity: Developing a Timeline

A key to success in action planning is developing a careful timeline. Not only will it help students allot the appropriate time to each task and keep them on track, but breaking up a large task or action into smaller, more manageable tasks will help them address all the necessary details in a timely fashion.

Resources to Support Identifying Resources and Creating a Timeline

Resources are available in the AP with WE Service Program Guide:

<https://apcentral.collegeboard.org/pdf/program-guide.pdf>.



Teacher Tip:

Emphasize to students that timelines are meant for them to have a date to work toward. When they begin working with organizations the timelines will need to be flexible.

RESOURCE AND DESCRIPTION	HOW TO USE THIS RESOURCE
<p>Creating a Timeline Creating careful timelines is a key to success in action planning.</p>	<p>This activity will help students allot the appropriate time to each task and keep them on track. It will also help them break up a large task or action into smaller, more manageable tasks to effectively help them address all the necessary details in a timely fashion.</p>
<p>Identifying and Sequencing Tasks Creating timelines means thinking through the details and plotting the relevant tasks that get students from point A to B and onward on a project.</p>	<p>This activity will help students think about each step of their action project and how to plot each step as an actionable task in a timeline.</p>
<p>Identifying Task Owners This activity shows the difference between roles and responsibilities set out at the beginning of a project with that of an owner of an individual task.</p>	<p>Use this activity to show students how to effectively divide tasks amongst team members. Some tasks will be a part of each individual's overall role and responsibilities, and some will be based on personal interests, skills and strengths.</p>
<p>Identifying Resources and Creating a Network This activity highlights that through the process of planning and taking action, students will meet and be in touch with many people. This network of people will grow quickly and may be valuable beyond their projects.</p>	<p>Use this activity to help students create a networking map to help them keep track of the people they will be working with through their action plan. They can also document the resources they will need to access, either through their network or as an item they will need to source separately.</p>



Activity: Creating the Action Plan

After working as a team to identify team goals, establish metrics of success, determine their network and required resources, create a timeline for completing their actions and identify individual roles and responsibilities, students are ready to put all their ideas in writing. By creating an action plan, all team members are committing to support their team in carrying out the proposed project(s).



Teacher Tip:

Have students create the local action plan first, complete the hours and then have them complete a separate plan for their global hours.

Please keep in mind that there are no hours requirement that you need to meet, but this step will help students understand the time they invested in their projects.



- ▶ Have students use the Avoiding the Five Action Planning Pitfalls Tip Sheet, found in the Student Workbook, to review common mistakes made during action planning and to ensure these have been avoided.
- ▶ Have students use the Creating an Action Plan worksheet, found in the Student Workbook, to help build out their action plan.

Reflect



After completing their action plan, students should individually reflect on their teamwork and action planning thus far. Teams should then share their plan, describe how the project addresses the issue at local and global levels, and make connections to the AP course.

Activity: Reflecting on Action Plan

Provide students with questions to help them reflect on their experiences working as a member of a team and creating an action plan.

- ▶ What is the issue that your team is taking action on? Why is this issue important to you? Why is this issue important to your team?
- ▶ What action is your team planning to take? How does this action fulfill an opportunity identified in your needs assessment?
- ▶ What are you most passionate and excited about in your action plan?
- ▶ Why is goal setting so important, and how can you imagine using goal-setting techniques in your life, future action plans, or other activities? How does your action goal relate to your AP course?
- ▶ What kinds of leadership qualities do you hope to develop as you continue to take action?
- ▶ Why is teamwork so essential to carrying out effective service projects to address local and global issues?
- ▶ Having planned to make a difference on local and global issues, what have you learned about your ability to create social change?



Check for Understanding:

Through this reflection, students should highlight why the issue is important to them, how they can make a contribution, why certain aspects of action planning (such as goal setting) are important life and academic skills, what connections they have made to their AP course, and what they have learned so far.



Teacher Tips:

- ▶ As part of their AP with WE Service project, students will need to track their work. Look ahead to Part 4 to review and share expectations with students so that they are keeping records, taking photos, collecting documents and tracking data.
- ▶ Educating others about their local and global issue is a great way for students to share their learning. Invite teams to hold an educational event or campaign to raise awareness about the social issue they have studied, which hopefully will have the power to compel their class (or community) to action. Students should consider what format they would like to use, based on their action. It may be a public speech at their school or in their community, a newspaper article, a website, a social media campaign, a short story, an artistic display, etc. It is also a great way to share the ideas they have developed in their action plan and how they will take action on the issue. This is not the action in itself but rather the education on the issue and the action plan.

Resources to Support Deeper Reflection and Educating Others

Resources are available in the AP with WE Service Program Guide:

<https://apcentral.collegeboard.org/pdf/program-guide.pdf>.

RESOURCE AND DESCRIPTION	HOW TO USE THIS RESOURCE
Perfecting the Elevator Pitch This activity helps students understand that what they say about their actions has the potential to do several things, including inform, appeal to emotions, persuade and compel others to take action themselves.	Use this activity to help students create the proper “elevator pitch” for their project as they think about how to create a compelling message about what they have learned about their issue and what they will do about it.
Developing a Deep Understanding of Your Issue and Massaging Your Message This activity highlights how educating others about an issue means students must be knowledgeable about it.	Use this activity and case study to show students how to think critically about their issue as they learn to ask informed and thoughtful questions, and assess the gaps in their knowledge and the information they need to know.
Ensuring Message Credibility In order to gain support, every team’s message should be able to stand up to the critics they may face. This activity will help students ensure the credibility of their message.	Use this activity to have students run three checks on the credibility of their message: creating an annotated bibliography, fact checking their message and presenting to the class for a peer-review and question period.
Spreading the Word A message is only powerful if it reaches the right people. This activity, along with accompanying worksheets and templates, guides in developing effective communications strategies and a communications plan.	Use this activity to have students brainstorm various communications methods and assess each one’s effectiveness. Then, they will develop a communications plan around their selected method to detail who their message is intended for, how the message will be communicated and when it will be delivered.
Practice, Practice, Practice This activity highlights how public speaking is a powerful force that can break the silence and raise awareness of difficult issues.	Use this activity and case study to have students read, listen to, or watch some examples of famous speeches to identify how the speaker uses the three I’s—Influence, Involve and Inspire—with their audience.

Use the Reflect: Action Plan worksheet in the Student Workbook to reflect on what you have learned.



Part 3: Take Action

The Take Action section is divided into two parts:

- ▶ Connect Learning
- ▶ Re-Inspire and Reflect

WE Service Framework



Overview for Part 3: Take Action

As students take action, they will be equipped with tools to navigate obstacles, mitigate conflicts, collect evidence, and record their actions, while also learning how to maintain their drive and inspiration.

Key Takeaways

- ▶ Effective teamwork is strengthened through abilities to navigate obstacles and overcome conflicts.
- ▶ The impact of an action can be measured by the collection of evidence and recording actions.
- ▶ Re-inspiration is important when caught up in the details.

This Section Contains:

- ▶ Templates that all students should complete to help them successfully meet the recognition criteria.
- ▶ Optional activities that you may choose to use with your class to deepen student understanding of particular elements of taking action, effective teamwork and recording actions.

Resources on Determining Effective Teamwork, Navigating Obstacles and Overcoming Conflicts

In Part 3: Take Action, you will use these resources to help students with practicing positive teamwork, navigating obstacles and planning for contingencies as they begin to take action.

Resources are available in the AP with WE Service Program Guide:

<https://apcentral.collegeboard.org/pdf/program-guide.pdf>.

RESOURCE AND DESCRIPTION	HOW TO USE THIS RESOURCE
<p>Ezra Frech's Story Ezra Frech loves to play guitar and a ton of sports. Born with one finger on his left hand and a lower leg that was curved, he had surgery at age two to remove the lower part of his leg and transplant the big toe onto his left hand.</p>	<p>Ezra's story (available at https://www.youtube.com/watch?v=KUqmJzoQQYQ) highlights perseverance and tenacity. On losing his leg and gaining a transplanted thumb, he says, "And this hasn't slowed me down at all!" He is his school's starting quarterback and can shoot hoops for days.</p>
<p>Practicing Positive Teamwork and Conflict Mediation Maintaining a positive and enthusiastic team can be difficult in the midst of long sessions of work and preparation. Conflicts are likely to arise, and understanding techniques for conflict resolution is an important lifelong skill to have.</p>	<p>Use this tip sheet and worksheet to help students understand conflict-mediation techniques and the power of constructive feedback to keep team dynamics positive and ensure their teammates feel supported and appreciated.</p>
<p>Navigating Obstacles No matter how much work and preparation goes into an event, obstacles may arise at any point, acting as a roadblock to success.</p>	<p>Help students gain a better understanding of how others have successfully navigated and overcome obstacles using this case study on Spencer West, a motivational speaker and author of <i>Standing Tall: My Journey</i>, which underscores teamwork and focus on goals.</p>
<p>Planning for Contingencies This means students are thinking ahead by looking at possible issues that might come up and planning for possible solutions accordingly.</p>	<p>This activity helps students work through the process of proactively identifying potential issues and considering practical solutions so that they can plan ahead.</p>

Connect Learning

Activity: Student Log Sheet

In addition to the information, artifacts, analyses and reflection pieces that you collect and complete, you will need to keep track of time spent on your action projects, reflect on your experiences and collect the appropriate verification where needed. As you reflect, some of the things you may think about include:

- ▶ What did you accomplish today?
- ▶ What (if any) were the major successes or big wins?
- ▶ How can you build on these successes?
- ▶ What (if any) were the setbacks, minor or major?
- ▶ What is your plan to mitigate or resolve these issues?
- ▶ What do you plan to accomplish tomorrow/next class/next meeting?
- ▶ How are you feeling about the progress of the action so far?
- ▶ Did you collect the qualitative data you set out in your action plan? What are the testimonials telling you so far (if applicable)? Are there any tweaks or changes you need to make with your action plan?
- ▶ Did you collect the quantitative data you set out in your action plan? What are the numbers telling you so far (if applicable)? Are there any tweaks or changes you need to make with your action plan?
- ▶ What is still missing and how will you get the information you need?
- ▶ How did your team pull together? What were your teamwork successes? What conflicts or obstacles did you resolve or overcome? How can you be stronger as a team?



Have students use the Student Log Sheet, found in the Student Workbook, to help record and keep track of their activities and reflections.

Re-Inspire and Reflect



In the process of carrying out an action, team members will often lose inspiration or momentum. Help students reconnect with their original motivation for taking action to empower them as change-makers.

Individually, ask students to reflect on their own story as someone who is interested in changing the world through action. Provide them with the following questions to reflect on their story as an agent of change.

Activity: Reflecting on Take Action

Provide students with questions to help them reflect on their experiences of taking action as a team.

- ▶ How will you continue the work that you and your team started with this project?
- ▶ Changing the world is hard work, and a lot of fun too! What are the top three lessons you have learned during your service project?
- ▶ What is your story as an agent of change?

Resources on Re-Inspiration

Resources are available in the AP with WE Service Program Guide:

<https://apcentral.collegeboard.org/pdf/program-guide.pdf>.

RESOURCE AND DESCRIPTION	HOW TO USE THIS RESOURCE
<p>Craig Kielburger's Story When Craig first learned about child labor at the age of 12, there was no way for him to get involved and make real change as a kid. So he set out on his own to free children from poverty and exploitation, but freed his peers at home from the idea that they had to wait to change the world.</p>	<p>Use the various resources—including videos, articles and books Craig has written—to inspire students with the knowledge that passion and determination can truly change the world. Access the resources here: https://www.we.org/en-US/about-we/our-founders/craig-kielburger.</p>
<p>Ally Del Monte's Story Every year, 3.2 million kids are bullied. Sixteen year-old Ally Del Monte was one of them, but she decided to fight back by motivating others to be proud, be strong and, most of all, be brave.</p>	<p>Use Ally's story (available at https://www.youtube.com/watch?v=QhHLekYrrp8) to inspire students and spark a conversation. Ally talks about bullying and its terrifying impact, but she also talks about overcoming the bullying and leading by example.</p>
<p>Razia Hutchins and Maurice Young's Story The I Am For Peace movement started as a neighborhood march against violence in the south side of Chicago. Now an annual event, it has gone global thanks to champion youth Razia Hutchins and her partner in peace, Maurice Young.</p>	<p>Use Razia and Maurice's story (available at https://www.therenewalproject.com/fighting-against-chicagos-gun-violence-with-peace/) to inspire students about how a passion-driven initiative can make a life-altering impact—on those who lead the initiative as well as those who will be inspired to join.</p>

Part 4: Report & Celebrate

The Report and Celebrate section is divided into three parts:

- ▶ Connect Learning
- ▶ Celebrate
- ▶ Complete Final Summary and Reflection

WE Service Framework



Overview for Part 4: Report and Celebrate

Students will compile and showcase their work. They will then celebrate their accomplishments and look ahead at ways to continue to sustain their actions.

Key Takeaways

- ▶ Devoting time to serving the greater community can positively affect the individual and the community.
- ▶ Service learning enables students to make local and global connections to AP course content.

This Section Contains:

- ▶ Templates that all students should complete to help them successfully meet the recognition criteria.
- ▶ Tables containing optional activities that you may choose to use with your class to deepen student understanding of particular elements of Report and Celebrate.



Connect Learning

Activity: Understanding the Purpose of Showcasing Work

Discuss the following:

- ▶ Why is it important to put together evidence of your service project?
- ▶ What is the value of showcasing your work?
- ▶ What are the different ways in which portfolios can be presented?
Are some ways more effective than others? How and why?
- ▶ How can a portfolio be used to educate, inform and guide other students in creating their portfolios?

Activity: Collect Artifacts



To showcase their work, instruct students to consider including elements they would find interesting and helpful to have if they were just beginning their action. What would they include to help students who are only beginning their action planning?

Putting Together a Portfolio of Artifacts

A portfolio is a collection of work, material and achievements that you believe best explain and represent your AP with WE Service work. It can take one or more forms:

- ▶ An online presentation through Prezi or PowerPoint
- ▶ A blog, website or any other online tool that you may choose
- ▶ Video presentation
- ▶ Physical portfolio displayed on a presentation board, in a binder or scrapbook, etc.

Celebrate



Optional Activity

Amazing actions, incredible impacts and outstanding student leadership deserve to be celebrated. It is important to honor the work students have done and recognize the impact they have had on their communities, the nation and the world. As a class (or perhaps a school, if other AP with WE Service courses exist in the school), organize a celebration that fits the actions that the students have taken. A few celebration ideas include:

- ▶ A school-wide assembly
- ▶ A project fair for the whole school to visit
- ▶ An outdoor cinema-style documentary screening
- ▶ Poster exhibition
- ▶ School newsletter, newspaper or special-edition magazine

Don't forget to share and celebrate over social media using the hashtag [#APWEServe](#)



Teacher Tip:

Students have seen what they can accomplish as small groups, so put together all of their numbers so they can see the change they affected as a whole group.

Resources on Celebrating

Resources are available in the AP with WE Service Program Guide: <https://apcentral.collegeboard.org/pdf/program-guide.pdf>.

RESOURCE AND DESCRIPTION	HOW TO USE THIS RESOURCE
... At a School-Wide Assembly	School assemblies are a popular way to showcase and celebrate collective achievements. Use the sample road map in this tip sheet to organize a memorable school assembly.
... Through Social Media	Social media is a great way to celebrate all of the amazing work your class is doing. Join the conversation online and create fun, engaging content to share your big ideas.
... Through a Project Fair	A project fair allows for intimate and meaningful interaction between teams and the rest of the student body, allowing other students to explore and understand the different service actions at their own pace. This tip sheet will provide thoughts and ideas on organizing a project fair.
... With a Documentary Screening	Why not make a final documentary of the different action projects and hold a school-wide screening? This tip sheet will help you get started.
... With a Poster Exhibition	Posters can convey a lot of information and emotion through art and concise copy. It is a great team exercise as part of their portfolios and a terrific way to share and celebrate their successes within the school and even the community.
... With a Special Publication	Put together a class publication that shares the highlights, learning and successes of the teams through individual and/or team articles, photo essays and editorials. This tip sheet will get you started.

Celebrate with Social Media

Social media is a great tool to show all the amazing work your students are doing!

Join the online conversation and create fun, engaging content to share your big ideas.

Whether you will be running your group's accounts or teaching your students how to run social media in a fun, safe, responsible and effective way, these tips will provide creative ways to amplify your projects in the digital space!

Get connected. This is the best place to get started. Make it a team effort and tell your school that you'll be posting all about the amazing work they'll be doing. Grow your network by adding group members and students on all of your social media accounts. Stay digitally active and keep up the conversation online! Engage with posts using likes and motivate each other with comments.

Take great photos. Eye-catching visuals are an absolute necessity when it comes to social media! Bright backgrounds, daylight and big smiles are the best combination for an awesome picture. Mix it up by changing up settings. (One photo can be in a classroom; another can be outside.) This will add variety to your feed and make it much more interesting.

Share in a timely fashion. Want to know a fact about social media? It only thrives if people see it. Post at times that will guarantee views. Sharing during lunch break and right after school will ensure your content gets the most visibility.

Updates! Does your latest project include a goal you're trying to reach? Keep your school updated on how close you are! Provide updates as soon as you get them, to keep your students and teachers in the know. That post might be the extra push you need to achieve your goal.

Use hashtags. Craving inspiration to spice up your campaign? See what others are doing by looking up the hashtag.

Gifs! Take your feed to the next level with these short animations. Download a GIF maker from your preferred app store and fuse your photos together to liven up your newsfeed.

Tag—you're it! Here's a fun way to get your school involved: play a game of digital tag. Once you've posted, have students tag five friends and challenge those friends to tag and share with five others. You'd be surprised how fast word gets around! (PS: This works even better if you all use the same hashtags in your captions.)

Share with us. We love seeing how your projects are going! Tag your posts with [#APWEServe](#). They might just get featured.

Complete Final Summary and Reflection



Activity: Complete Final Executive Summary

Once students have completed their action, submitted their evidence and celebrated their work, students may complete an executive summary as a team. The executive summaries offer a snapshot of the team's outcomes based on:

- ▶ Summary of the team's work and individual contributions
- ▶ Analysis and highlights of evidence collected
- ▶ Explanation of the project impact and its significance within a larger context
- ▶ Summary of what they learned about their AP course through the service project

Activity: Reflect on the Overall Service Experience

Individually, students complete a final reflection that describes their overall service experience. Students reflect on their thoughts at the start of the project and how they feel they have grown over the course of their service work. What do they now understand about the role of service and active citizenship, especially as an application of their learning?

Activity: Record and Reflect

Using the following questions to guide your writing, reflect on the overall action project, which will inform the development and assembly of your portfolio.

Overall, in this action project:

- ▶ What were your most important successes as a team, and what were the important factors that helped you accomplish those successes?
- ▶ What obstacles did your team overcome and what strategies were important in navigating those challenges?
- ▶ What was your favorite moment in carrying out your action?
- ▶ What are you most proud of?
- ▶ If you could go back to the start, what advice would you give yourself or your team? Is there anything you would do differently?
- ▶ How is your community/the nation/the world a better place because of your action?
- ▶ How have you developed as a global citizen in taking action? What plans do you have to continue your work as a change-maker?

A photograph of two young Black women smiling and hugging outdoors. The woman on the left has curly hair and is wearing a black jacket over a white t-shirt. The woman on the right has braided hair, wears glasses, and a bright orange jacket. They are standing on a set of stairs.

Additional WE Schools Resources Available!

Visit the [WE Virtual Learning Center](#) to access issues-based lesson plans, campaign guides, grants and on-demand programming to help students address local and global issues while building skills like resilience, empathy and problem-solving.

AP Biology Module Resources

Local and Global Issues Bibliography

- Species Lists* | National Invasive Species Information Center. (n.d.-b). <https://www.invasivespeciesinfo.gov/subject/lists>
- TED-Ed. (May 3, 2016). *The threat of invasive species - Jennifer Klos* [Video]. https://www.youtube.com/watch?v=spTWwqVP_2s
- Invasive Species 101: National Geographic*. Retrieved February 24, 2023, from <https://www.youtube.com/watch?v=gYNAtw1c7hI>
- Invasive Species | National Wildlife Federation. (n.d.). *National Wildlife Federation*. <https://www.nwf.org/Educational-Resources/Wildlife-Guide/Threats-to-Wildlife/Invasive-Species>
- The Burmese Python: An Invasive Species Who Eats to Its Heart's Content. (February 28, 2018). *www.Lakeforest.Edu*. Retrieved February 21, 2023, from <https://www.lakeforest.edu/news/the-burmese-python-an-invasive-species-who-eats-to-its-hearts-content>
- Invasive Species 101. (June 5, 2019). *National Geographic Website*. Retrieved April 11, 2023, from <https://www.nationalgeographic.com/environment/article/invasive-species?loggedin=true&rnd=1681254689122>

Lessons 1-3 Bibliography

- Becoming Global Citizens @ Charlottesville High School*. (January 8, 2014). Retrieved February 21, 2023, from <https://globalcitizenschs.wordpress.com/2014/01/08/policy-brief-template-and-powerpoint/>
- Cameron S. C. and Wheeler J. W. (September 9, 2020). Invasive Plant Profile: Japanese Knotweed (U.S. National Park Service). *National Park Service Website*. Retrieved March 9, 2023, from <https://www.nps.gov/articles/000/japanese-knotweed-acadia.htm>
- Claisse J. and Nielsen M. (Eds.). (n.d.). *Case Study 1 | Lionfish Invasion: Density-Dependent Population Dynamics*. <https://media.hhmi.org/biointeractive/click/lionfish-invasion/index.html>
- Invasive Species Case Studies. *HHMI*. <https://media.hhmi.org/biointeractive/click/lionfish-invasion/case-study-1.html>
- Invasive Species | National Wildlife Federation. (n.d.). *National Wildlife Federation*. <https://www.nwf.org/Educational-Resources/Wildlife-Guide/Threats-to-Wildlife/Invasive-Species>
- Jeffords B. (July 26, 2022). *IDNR changes Asian Carp's name to Copi to encourage harvesting and consumption to block their expansion to the Great Lakes* [Video]. NPR Illinois. <https://www.nprillinois.org/illinois/2022-07-26/idnr-changes-asian-carps-name-to-copi-to-encourage-harvesting-and-consumption-to-block-their-expansion-to-the-great-lakes>
- Jigsaw Reading. (n.d.). *Teaching Tools*. Retrieved February 21, 2023, from https://www.literacymn.org/sites/default/files/jigsaw_reading.pdf
- Mooney H. A. and Cleland E. E. (2001). The evolutionary impact of invasive species. *Proceedings of the National Academy of Sciences of the United States of America*, 98 (10), 5446–5451. <https://doi.org/10.1073/pnas.091093398>
- Species Lists* | National Invasive Species Information Center. (n.d.-b). <https://www.invasivespeciesinfo.gov/subject/lists>
- TED-Ed. (May 3, 2016). *The threat of invasive species - Jennifer Klos* [Video]. https://www.youtube.com/watch?v=spTWwqVP_2s
- The Burmese Python: An Invasive Species Who Eats to Its Heart's Content. (2018, February 28). *www.Lakeforest.Edu*. Retrieved February 21, 2023, from <https://www.lakeforest.edu/news/the-burmese-python-an-invasive-species-who-eats-to-its-hearts-content>
- Vogel W. (n.d.). *Utility Within the Unwanted: Upcycling Invasive Species* [Video]. TED Talks. https://www.ted.com/talks/wren_vogel_utility_within_the_unwanted_upcycling_invasive_species
- Yellow Toadflax Factsheet — Invasive Species of Idaho*. (n.d.). Invasive Species of Idaho. <https://invasivespecies.idaho.gov/yellow-toadflax-factsheet>
- Invasive Species 101: National Geographic*. Retrieved February 24, 2023, <https://www.youtube.com/watch?v=gYNAtw1c7hI>

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