FUTURE Problem Solving

ACTIVITY UNIT

Topic

Invasive Species

Science & Technology

15 Activities

Supports all these programs

INCLUDED INSIDE:

- 10 lesson plans
- 3 practice future scenes
- A variety of tools, research, and metacognition activities
- A variety of specific problem-solving step activities

GRADES 4-12

Practice Problem 1 | 2025-2026

This publication is a compilation of the hard work of many people. Special thanks are extended to our curriculum authors Kathy Frazier and Kori Frazier Morgan.

FUTURE Problem Solving ACTIVITY UNIT

Topic Unit Contents

How will we safeguard the biodiversity of our ecosystems against the rising threat of invasive species in the future?

Activity Focus Areas Icons

Our activity unit on each topic contains a wealth of curricular resources for use with students in a variety of settings, including out-of-school time. The highly engaging activities incorporate best practices and come with step-by-step lesson plans for research-based independent and collaborative work. Each activity is designed to help students gain insight into a specific real world topic and learn the Future Problem Solving 6-step process. For ease of use, we display icons on each lesson plan to indicate the activity focus.

Research
Explore the topic using multimedia research for background and understanding.

Tools
Utilize tools for problem solving, either generating new ideas or focusing existing ideas, in the activity.

Metacognition
Metacognition prompts allow students to explore their thought processes related to the problem-solving process, their teamwork, and their performance.

Future Scene
Practice future scenes allow students to apply the problem-solving process.

Action Plan Presentation
Tips and instructions help students present their Step 6 action plans.

Steps 1 - 6
TIn each activity, students explore specific steps of the Future Problem Solving process for deeper understanding and application of creative and critical thinking skills.

Identify Challenges
Generate challenges or issues related to a specific situation.

Select an Underlying Problem
Analyze possible challenges to determine a single focused area to address.

Produce Solution Ideas
Generate a variety of potential solution ideas to resolve the selected underlying problem.

Select Criteria
Create criteria to measure the merit of solution ideas.

Apply Criteria to Top Solutions
Evaluate solution ideas using student-designed criteria to identify the most promising solution.

Develop an Action Plan
Based on the strongest solution develop a plan of action to explain and implement the best solution.

For more information about Future Problem Solving, our proven 6-step process, and how it connects to a wide variety of education standards, visit resources.futureproblemsolving.org.

FUTURE Problem Solving ACTIVITY UNIT

Education Standards Alignment

We also highlight how each activity lesson plan aligns with English Language Arts and Literacy education standard strands. Our Future Problem Solving process fulfills a wide variety of education standards. We take connecting with these standards into account when developing all our program materials so teachers can easily tailor activities to meet their specific education system and local requirements. Use the legend on the following page to connect lesson plans to specific reading, writing, speaking, and listening standards.

	Education Standard Strands Addressed											
Invasive Species Activity	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**PAGE #**
Set Your Compass	●	●			●		●			●	●	**7**
Invasive Species			●	●	●	●	●	●	●	●	●	**13**
Lights, Camera, Action	●	●	●	●	●				●		●	**14**
Our Invasive Species	●	●		●	●		●		●	●	●	**17**
Invasion Breakdown	●	●	●	●	●	●			●	●	●	**22**
Trouble in Greenwave	●	●	●	●	●		●	●	●	●	●	**31**
An Invasion of Challenges	●	●	●	●	●		●	●		●	●	**37**
Species Spiral	●	●	●	●	●	●	●	●	●	●	●	**42**
Invasive Species Choice Board	●	●				●	●	●	●	●	●	**45**
Become a Solution Architect	●	●	●	●	●		●	●	●	●	●	**47**
Invasive Species Patrol	●	●	●	●		●	●		●	●	●	**61**
The Worst Day Ever!	●	●	●	●	●	●	●	●	●	●	●	**66**
Practice Future Scene			●	●	●	●					●	**73**
The Reflection Clipboard	●	●			●		●	●		●	●	**76**
Create a Portfolio	●	●	●	●	●	●	●	●	●	●	●	**77**

1. Comprehension and Collaboration
2. Presentation of Knowledge and Ideas
3. Reading Key Ideas and Details
4. Literacy Craft and Structure
5. Integration of Knowledge and Ideas
6. Range of Reading and Level of Text Complexity
7. Writing Text Types and Purposes
8. Production and Distribution of Writing
9. Research to Build and Present Knowledge
10. Range of Writing
11. Vocabulary Acquisition and Use

For more information about Future Problem Solving, our proven 6-step process, and how it connects to a wide variety of education standards, visit resources.futureproblemsolving.org.

Topic Activity Unit Lesson Plans Standard Strands Addressed

SPEAKING & LISTENING		**COMPREHENSION AND COLLABORATION**
	1	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
	2	Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
	3	Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.
		PRESENTATION OF KNOWLEDGE AND IDEAS
	4	Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
	5	Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
	6	Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.
READING & LITERACY		**KEY IDEAS AND DETAILS**
	1	Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
	2	Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
	3	Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
		CRAFT AND STRUCTURE
	4	Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
	5	Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
	6	Assess how point of view or purpose shapes the content and style of a text.
		INTEGRATION OF KNOWLEDGE AND IDEAS
	7	Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
	8	Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
	9	Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.
		RANGE OF READING AND LEVEL OF TEXT COMPLEXITY
	10	Read and comprehend complex literary and informational texts independently and proficiently.
WRITING		**TEXT TYPES AND PURPOSES**
	1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
	2	Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
	3	Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.
		PRODUCTION AND DISTRIBUTION OF WRITING
	4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
	5	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
	6	Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
		RESEARCH TO BUILD AND PRESENT KNOWLEDGE
	7	Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
	8	Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
	9	Draw evidence from literary and/or informational texts to support analysis, reflection, and research.
		RANGE OF WRITING
	10	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.
LANGUAGE & VOCABULARY		**VOCABULARY ACQUISITION AND USE**
	1	Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.
	2	Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
	3	Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college- and career-readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.

FUTURE Problem Solving
LESSON PLAN

Guiding Your Course to Success

M

Objectives

- Students will understand the value of setting goals to guide their success in Future Problem Solving this year.
- Students will create a list of team goals for Practice Problem 1, Invasive Species.
- Experienced teams will reflect on areas of success and areas for improvement.
- Students will develop time management skills by creating a timeline and calendar.

Standards Addressed
Speaking & Listening
1, 2, 6
Reading & Literacy
7
Writing
2, 10
Language & Vocabulary
2, 3

Materials

- A compass – hand-held, an app on computer or phone, a picture of one for display, etc.
- **Goal Setting Compass**, replicated and enlarged for a wall display (page 10)
- **Invasive Species Timeline**, replicated and enlarged for a wall display (page 11)
- **Invasive Species Calendar**, 1 per student (page 12)

Preparation

1. Prepare the **Goal Setting Compass**. Add in the due dates for your affiliate. Display it somewhere visible in your meeting space. This will be used to share the goals for Invasive Species.
2. Prepare the **Invasive Species Timeline.** Be ready to display it somewhere visible in your meeting space at the appropriate time. (See Procedures.) This will be used to guide students through the timeline of the Invasive Species unit.

Procedure

1	Hold up a compass and ask the students what a compass is used for and if they have ever had the opportunity to use one. Allow them to share experiences and refer to the wall compass. ◦ Optional: Allow students to get out their phones, find the compass app, and spend a few minutes locating directions in your meeting space.
2	**Say:** *Imagine you're about to embark on a journey through unfamiliar terrain. The path is winding with twists and turns. There is no Internet reception to connect to a GPS, but you hold a real compass in your hand. This small, simple tool has one job: to point you in the right direction. Just like a compass guides travelers, setting goals can guide you on your journey through the Future Problem Solving Program this year (Invasive Species, Invasive Species, Video Games, and Surveillance). Without clear goals, it is easy to get lost or sidetracked.*
3	**Say:** *Today, we will consider goals to guide us through Practice Problem 1, Invasive Species.*
4	Use the procedure that best fits your students. Consider whether your students are new to Global Issues (4A) or have Future Problem Solving experience (4B).

Coaching Tip

Use additional Resource Library tools like the Future Problem Solving 6-step Infographic poster to provide a roadmap for your students as they learn a problem-solving model for any situation.

Guiding Your Course to Success

M

Procedure, 4 continued

	4A. FOR NEW STUDENTS
1	Display and refer to the **Invasive Species Timeline.**
2	***Say**: Here's how our study of Invasive Species will work. These are our goals to work toward.*
3	***Say:** First, we will research the topic to learn what is going on with Invasive Species now. You will be identifying facts that can lead to challenges. Challenges are problems, issues, or concerns. You will be learning topic vocabulary. The goal is that you will be ready to apply what you have learned about the topic to the future scene – a short story about the topic set in the future.*
4	***Say:** We will talk about how to analyze a future scene and identify challenges in the future scene. You will learn the format for writing challenges, and we will practice that.*
5	***Say:** We will talk about how to choose one underlying problem for the challenges you generated. You will learn and practice the format for writing underlying problems.*
6	***Say:** Our next task will be to learn about generating solution ideas to an underlying problem and how to write solution ideas in the correct format.*
7	***Say:** You will practice the first three steps of the Future Problem Solving process, then you will complete the Practice Problem 1 booklet. We will submit that for evaluation.* • *When the evaluation is returned, we will review and learn from your scores and the evaluation feedback. This will help us as we complete Practice Problem 2, Invasive Species. For Practice Problem 2, we will be completing all six steps of the process.* • *Finally, these are not specific steps, but you will be learning about time management, responsibility to your team, and teamwork.*
	4B. FOR STUDENTS WITH PAST EXPERIENCE
1	Before displaying the **Invasive Species Timeline**, lead experienced students in a discussion about the Future Problem Solving competition year.
2	***Say:** Think about beginning this year's Future Problem Solving journey and what you would like to accomplish. What steps will lead to your successful completion of Practice Problem 1?* • *Allow time for responses. If students don't mention all the words underlined above, remind them.* • *Display the Invasive Species Timeline. Compare what they mentioned during discussion to what is on the timeline.*

5	On the **Invasive Species Timeline**, write the date you are beginning the unit and the deadline for submitting the booklet.
6	**Distribute** the **Invasive Species Calendar.**

Standards Addressed
Speaking & Listening
1, 2, 6
Reading & Literacy
7
Writing
2, 10
Language & Vocabulary
2, 3

FUTURE Problem Solving
LESSON PLAN

Guiding Your Course to Success

M

Procedure, continued

7	**Say:** *We are going to use a timeline development strategy called "Begin with the End in Mind" to set a calendar for our work on Invasive Species.*
8	Tell the students to place today's date on their **Invasive Species Calendars** and also the date on which the competition booklet must be submitted. Add those dates to the **Invasive Species Timeline**, too. **Say:** *Between these dates we must accomplish the work that is on the timeline.*
9	Allow students to share ideas about what dates they will need to follow. As they come to a consensus, they write the dates on their calendars and you write the dates on the timeline.
10	**Say:** *What time management challenges do you think we might face and how might we overcome them?* Have students share their ideas and write the ones most important to them on their calendars.

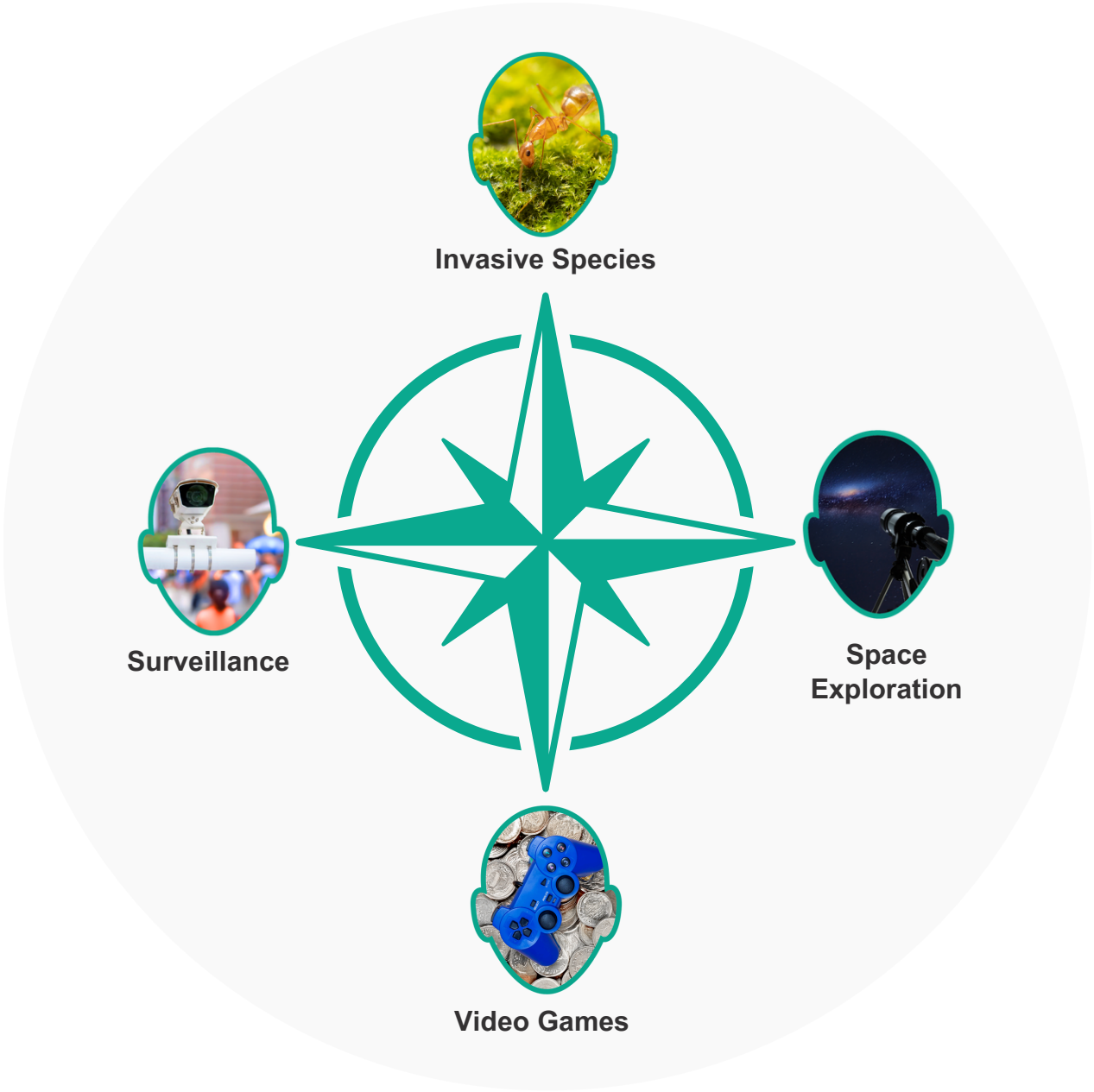
Standards Addressed
Speaking & Listening
1, 2, 6
Reading & Literacy
7
Writing
2, 10
Language & Vocabulary
2, 3

Closure

1. **Ask:** *How will developing goals and a time management chart help us have a successful year with Future Problem Solving?*
2. Have students share their ideas.
3. Optional extension
   - Create a goal-setting cheer.
   - Develop more specific goals for each step if there are areas that your students know they need additional work to improve.

Name _____

Goal Setting Compass



Name _____

Invasive Species Timeline

Today's Date: _____ Due Date: _____

1. **Research the topic.**
   Identify facts, challenges, solutions.
   Understand topic vocabulary.
   Apply what you learn to the practice problem.

2. **Learn or review how to:**
   analyze a future scene
   identify challenges
   write challenges

3. **Learn or review how to:**
   choose an underlying problem
   write underlying problems

4. **Learn or review how to:**
   generate solutions to an underlying problem
   write solutions

5. **Do the practice problem.**
   Submit for evaluation.

6. **Review and learn from evaluation feedback.**

Name _____

Invasive Species Calendar

Today's Date: _____ Due Date: _____

MONTH: _____

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY

My time management challenges

How to overcome them

Name _____

Begin Your Investigation with a KWL

Directions: A KWL chart will help guide your learning experience on Invasive Species. This chart is a simple yet powerful tool to organize what we already know, what we want to know, and what we learn along the way.

Complete this chart individually or collaborate with your team members to create a KWL.

K	W	L
List the facts you already **KNOW** about Invasive Species.	List what you **WANT** to know about Invasive Species.	Record what you have **LEARNED** about Invasive Species.
	List your ideas in a question format.	

FUTURE Problem Solving LESSON PLAN

Invasive Species Movie Day

T R

Objectives

- By watching video footage, students will recognize examples of the impact on ecosystems of invasive species including plants, animals, fish, insects, and microorganisms.
- Students will identify challenges related to Invasive Species.
- Students will investigate current and potential solutions to control or mitigate the spread of invasive species and their impact on the environment.
- Students will demonstrate understanding of invasive species vocabulary.
- Students will develop critical thinking skills through team discussions about challenges, solutions, and ethical decisions related to invasive species.

Standards Addressed
Speaking & Listening
1, 2, 4, 6
Reading & Literacy
2, 4, 7, 8
Writing
9
Language & Vocabulary
1, 2, 3

Materials

- A video projection system and computer
- Digital access to **Invasive Species Movie Day** links (page 15)
- **Invasive Species Movie Day**, 1 per student (page 15)
- **Invasive Species Vocabulary List**, 1 per student; 2 per page (page 16)
- Optional: popcorn

Preparation

1. Preview the videos on **Invasive Species Movie Day.**
   a. Note: Information from these videos will appear in subsequent lessons.
2. Optional: Provide popcorn.

Procedure

1	**Say:** *Welcome to Invasive Species Movie Day! Scientists and photographers have traveled the globe to study and document invasive species, capturing their impact on plants, animals, fish, insects, and microorganisms. We will be watching real-life footage of these invaders in action, exploring the damage they cause to ecosystems around the world, and discovering potential solutions to control their spread.*
2	Distribute the **Invasive Species Vocabulary List.** **Say:** *Be on the lookout for these words as you watch the videos*
3	Distribute **Invasive Species Movie Day**. Review the directions.
4	Present the videos.
5	Provide time for students to answer questions and take notes between videos.

Closure

1. Lead a discussion about the notes taken during the videos, the vocabulary they identified, and the meaning of the words.
2. Discuss the following question: Are we an invasive species?

Name _____

Invasive Species Movie Day

Directions

1. As you watch these videos, take notes on what you learn under each one. Look for the below in each video:
   - examples of invasive species
   - challenges related to the invasive species
   - the damage invasive species cause to ecosystems
   - what might happen if nothing is done to stop invasive species
   - what solutions are presented
   - ethical considerations.
2. Check off the vocabulary words you hear in the videos.

Video #1 Invasive Species: Ecosystem assassins (6:56)

What is meant by non-native species, pests, and invasive species?

Video #2 The threat of invasive species (4:45)

Video #3 Documentary: The looming threat of nature's uninvited guests (14:58)

Video #4: Weird ways we have fought invasive species (9:08)

Name _____

Invasive Species Vocabulary List

Be on the lookout for the following invasive species vocabulary.

VOCABULARY LIST				
alien species	drought	globalization	monocropping	out-compete
biodiversity	ecosystem	habitat	monoculture	pest
biofouling	eradicate	habitat loss	native species	pesticide
biological control	extinction	herbicide	natural range	range shift
biosecurity	feral	lethal	non-lethal	restoration ecology
cull	food web	marine	ornamental plants	pollution clean-up

Name _____

Invasive Species Vocabulary List

Be on the lookout for the following invasive species vocabulary.

VOCABULARY LIST

alien species | drought | globalization | monocropping | out-compete
biodiversity | ecosystem | habitat | monoculture | pest
biofouling | eradicate | habitat loss | native species | pesticide
biological control | extinction | herbicide | natural range | range shift
biosecurity | feral | lethal | non-lethal | restoration ecology
cull | food web | marine | ornamental plants | pollution clean-up

© 2025 FPSPI, Inc. All Rights Reserved. Future Problem Solving (fpspi.org)
Invasive Species - **Lights, Camera, Action** 16

FUTURE Problem Solving LESSON PLAN

A Research-Based Exploration

R

Objectives

- Students will develop an understanding of the concept of invasive species and how it applies to their local area.
- Students will research an invasive species, including origin, introduction method, ecological and societal impact, and possible mitigation strategies.
- Students will apply criteria for determining whether a species is invasive in a creative setting.

Standards Addressed
Speaking & Listening
1, 2, 4, 6
Reading & Literacy
4, 7
Writing
2, 7, 8, 9, 10
Language & Vocabulary
1, 3

Materials

- **Invasive Species Fact Sheet**, 1 per team or student*, 3 pages (pages 19-21)
- Glue
- Optional: Craft supplies (paper, markers, googly eyes, pipe cleaners, etc.)

Preparation

1. Determine if this will be a team or individual activity. Prepare **Invasive Species Fact Sheet** as determined.
2. Find a list of local invasive species by searching the internet for “invasive species in _____ “ (name of your area).
3. Determine if you will assign a specific species to teams/individuals or if you will make the search part of the assignment.
4. Optional: Collect craft supplies.

Procedure

PART ONE	
1	**Say:** *As we study the topic of Invasive Species, let’s review the criteria used to label a plant or animal invasive. We learned this from watching the videos. What are the three criteria that make a species invasive?* • Students may respond with the following answers: ◦ Invasive species are non-native to the ecosystem. ◦ They cause damage or harm to the environment, economy, or humans. ◦ They have the ability to spread rapidly within their new environment.
2	**Say:** *Today, we will apply what we've learned so far to local invasive species. Direct the students as you determined: team or individual; assigned species or internet search for local invasives.*
3	Direct the students as you determined: team or individual; assigned species or internet search for local invasives.
4	Distribute the **Invasive Species Fact Sheet** and review the questions..
5	Provide work time.

Procedure, continued

PART TWO	
1	When finished, have students introduce their invasive species to the class, providing key facts about their species and why it specifically meets the criteria.
2	**Say:** *Did you learn anything about what each of us can do to help control these invasive species in our area?*

Optional Extension

- Provide time for students to create their own new invasive species, using the questions from the Invasive Species Fact Sheet as a guide. Provide craft supplies for construction of their species. Allow them to share their species and display them around your meeting space when finished.

Standards Addressed
Speaking & Listening
1, 2, 4, 6
Reading & Literacy
4, 7
Writing
2, 7, 8, 9, 10
Language & Vocabulary
1, 3

Name _____

Invasive Species Fact Sheet

Directions: What invasive species are in our area? It's your job to conduct research in this field and note the characteristics of this species so it can be easily identified.

Answer these questions about your invasive species.

Name of Species: _____

ORIGIN

What country or region did this species come from?

What type of environment did it originally live in? (forest, desert, ocean, freshwater, etc.)

ARRIVAL

How did this species arrive here? (Was it deliberately introduced by humans, carried in firewood, hitched a ride on a ship, etc.?)

Where was it first discovered here?

What traits does this species have that help it thrive where we live?

Name _____

Invasive Species Fact Sheet

IMPACT ON THE ECOSYSTEM

How does your invasive species affect the native ecosystem? (Does it outcompete native species for food, destroy their habitat, spread diseases, etc.?)

Does it disrupt any food chains? If so, how?

IMPACT ON HUMANS

How does this invasive species affect the lives of people here? (Does it destroy crops, contaminate water, damage property, spread diseases, etc.?)

What economic consequences could it cause? (Job loss, increased costs for control, etc.)

Are there methods of control in use for reducing the impact of this species? What are they?

Name _____

Invasive Species Fact Sheet

APPEARANCE AND IDENTIFYING FEATURES

Find a picture of this species to paste here or draw it yourself. Describe some of its identifying features so we can all recognize it.

FUTURE Problem Solving LESSON PLAN

Invasive Species Mind Map to Challenges

R T STEP 1

Objectives

- Students will analyze research on Invasive Species.
- Students will organize their research by creating a mind map related to identified themes, including What Makes an Invader, Damage and Destruction, Combating Invasive Species, and the Ethics of Management.
- Students will identify challenges related to Invasive Species.
- Students will compose challenges in the correct format.

Standards Addressed
Speaking & Listening
1, 2, 4, 5
Reading & Literacy
1, 2, 4, 7, 10
Writing
7, 8, 9, 10
Language & Vocabulary
1, 2, 3

Materials

- **Invasive Species Mind Map,** 1 for display (page 25)
  - Note: Coach will write on this map to create a whole class version.
- Mind Map options – coach's choice
  - **Invasive Species Mind Map**, 1 per student or
  - Blank paper (1 sheet per student for creating their own Mind Map), or
  - Digital Mind Map templates, such as Canva, Figma, MindMaster, for digitally-created Invasive Species Mind Maps
- **Research Bank**, 1 per student (page 26)
- **Identifying Challenges,** 1 for display plus 1 per student (page 27)
- **Identifying Challenges – ANSWER KEY,** for coach reference (page 28)
- **Challenge Writing Guidelines**, 1 per student (page 29)
- **Challenge Writing Guidelines – ANSWER KEY**, for coach reference (page 30)

Preparation

1. Determine how to display the **Invasive Species Mind Map** and **Identifying Challenges**. (You should be prepared to write on these for students to see.)
2. Determine whether the **Mind Map** students create will be handwritten or digital, or if you will allow students to choose the format.
3. Determine if students will work on teams for any or all of the three activities in this lesson.
4. Determine if you will allow the team to divide the articles in the **Research Bank** among themselves or if you will assign articles to each team or each student.

Procedure

PART ONE	
1	**Say:** *It's time to dive a little deeper into Invasive Species research. One way to understand the topic is to organize your research using a strategy called mind mapping. This strategy can help you when you are reading and analyzing a topic and a future scene and identifying challenges.*
2	Display a copy of the **Mind Map.** **Say:** *A mind map is a diagram that allows you to organize your research visually. It involves writing the central theme – Invasive Species for this map – in the center of the mind map. Extended themes radiate from the center.*

FUTURE Problem Solving LESSON PLAN

Invasive Species Mind Map to Challenges

R T STEP 1

Procedure part one, continued

Standards Addressed
Speaking & Listening
1, 2, 4, 5
Reading & Literacy
1, 2, 4, 7, 10
Writing
7, 8, 9, 10
Language & Vocabulary
1, 2, 3

PART ONE	
3	**Say:** *The themes shown here will be part of your mind map. As you read research articles, you will look for facts, challenges, and solutions. You should take notes on what you read on your own paper, but I also want you to write important ideas under the appropriate theme on your mind map in a list or in rays that extend from the theme. You can also add anything from the notes you took when watching the videos.*
4	Discuss with the students how they will make their **Mind Map** (from template, handwritten, online, etc). Announce whether this will be an individual or a team activity.
5	**Say:** *I encourage you to be creative in developing your mind map!*
6	Distribute the **Research Bank**. Review the directions. Assign articles to students or announce if you will allow the students to divide the articles among themselves.
7	Provide work time.
8	Allow students to share ideas they found for each theme of the **Invasive Species Mind Map.**

PART TWO	
1	**Say:** *After the preliminary work of researching the topic and analyzing the future scene, the first step of the process is identifying challenges in the future scene. We are going to get ready for this step by practicing with challenges from our research.*
2	***Say:*** *We will be using your mind maps. You have written ideas under every theme. Some of the ideas may be challenges, or you may be able to identify challenges based on facts in the research. Challenges are problems, concerns, or issues that you identify from research and from the future scene. A fact you've written on your mind map might also be a challenge but when you are completing a booklet, you have to do more than repeat facts from the future scene or research in order to have your challenge counted. For example, we know that invasive species cause harm; that is a fact. We need to stretch our brains beyond that to identify challenges. One way to do that is to look at causes, effects, and consequences.*
3	Distribute **Identifying Challenges** and display a copy of this student handout so you can lead the activity. (The display **Identifying Challenges** is for you to use as needed.)
4	**Say:** *Let's look at the example. The first column contains a fact from research. How many of you found this one?*
5	Allow time for responses.
6	**Say:** *In the second column, a cause or effect of the fact is identified. You may have read the cause or effect in your research, but you might also be using your brain to project a logical cause or effect of that fact. Is this a cause or an effect?*

FUTURE Problem Solving LESSON PLAN

Invasive Species Mind Map to Challenges

R T STEP 1

PART TWO	
7	Allow time for responses. [This is an effect of the fact about Invasive Species.]
8	**Say:** *The last column shows a problematic consequence of the fact plus the cause or effect. This is not necessarily the only way the second and third columns could be filled out based on the fact in the first column. As we fill in some other examples, all of you may be writing something different. The important thing is that what you write in the second and third columns make logical sense with the fact in the first column.*
9	**Say:** *Let's fill in a couple more rows for examples.* Ask someone to share a fact from the **Mind Map**. Then lead students to fill in the next two columns. Repeat with more rows until you think students understand.
10	**Say:** *I want you to do two more rows on your own.* Announce if they will be working alone or in their teams.
11	Provide enough work time for each student or team to complete 2 or 3 more rows.
12	Allow students to share what they have written in their rows. Discuss whether or not what they've written makes logical sense.

PART THREE	
1	**Say:** *The next way we get ready for Step 1 of the Future Problem Solving process is to learn how to write challenges in the appropriate format. You will be referring to **Identifying Challenges** to help you with this activity.*
2	*Distribute **Challenge Writing Guidelines**. Review the guidelines and the directions.*
3	Provide an example using the first row in **Identifying Challenges**, such as: Because invasive plants could crowd out native plants, native species that rely on those plants for food may not have enough to eat. This may result in the loss of native species which may negatively affect the ecosystem.
4	Provide other examples if needed. (The ideas in **Challenge Writing Guidelines – ANSWER KEY** are for you to use as needed.)
5	Announce if they will be working alone or in their groups.
6	Provide work time. Circulate to answer questions about their writing.
7	Allow students to share their written challenges. Discuss their ideas.
8	**Say:** *There will be more practice with this before you tackle the first booklet of the year.*

Standards Addressed
Speaking & Listening
1, 2, 4, 5
Reading & Literacy
1, 2, 4, 7, 10
Writing
7, 8, 9, 10
Language & Vocabulary
1, 2, 3

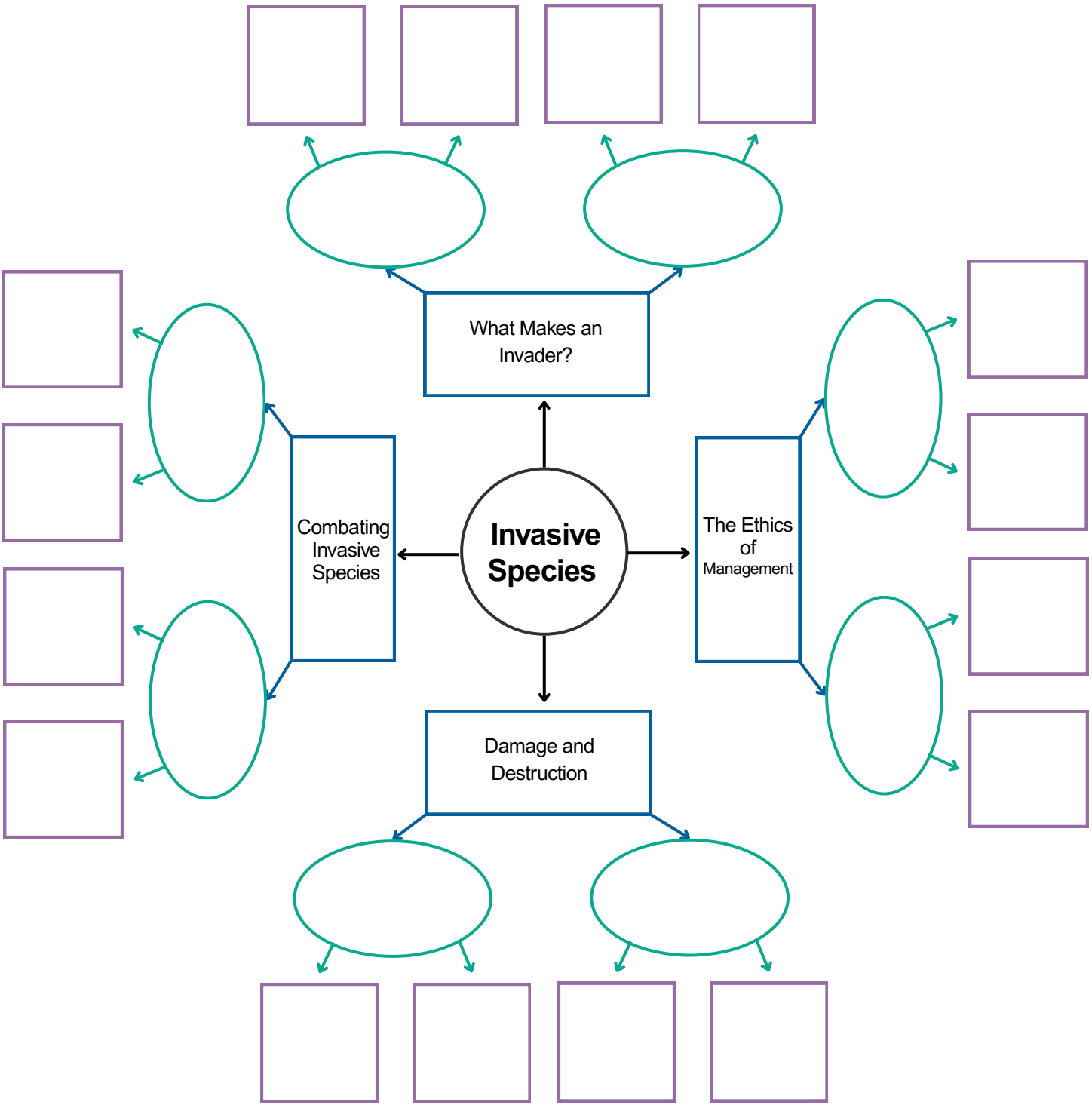
Closure

Optional: Allow students to post their mind maps, their charts, and/or their written challenges around the meeting space.

Name _____

Invasive Species Mind Map

Directions: As you research, break each of the four branches/themes into smaller sub-topics.



Name _____

Research Bank

Directions: Examine the articles in the Research Bank and any others available to find information to add to your **Invasive Species Mind Map**.

The **Research Unit** chapter on Invasive Species can be a great source of additional articles.

Invasive Species Research Bank

Invasive Species | **National Wildlife Federation**

Invasive Species: Finding Solutions to Stop Their Spread | **U.S. Department of the Interior**

Invasive Species: What You Can Do | **Nature Conservancy**

What are invasive species? Are they always bad for our ecosystems? | **Plymouth University**

How Can Local Governments Manage Invasive Species? Everything to Know. | **GovPilot**

Economic Impacts | **Invasive Species Centre**

Invasive plants and the damage they can cause to our environment and economy | **Portland.gov**

Name _____

Identifying Challenges

STEP 1

Directions: Use ideas from the Mind Map or your own notes to complete the chart below.
The first row is an example that show a logical problematic effect and a logical problematic cause.

FACT about Invasive plants	**CAUSE/EFFECT** (of Fact)	**CONSEQUENCE** (of Cause/Effect)
Invasive plants crowd out native plants	Without native plants, some native species lack food they can eat	Native species die out; ecosystem may be negatively affected

FUTURE Problem Solving
ANSWER KEY

Invasive Species Mind Map to Challenges

STEP 1

Possible answers from students are written out in the chart below.

	FACTS	CAUSES/EFFECTS	CONSEQUENCES
1	Invasive plants crowd out native plants	Without native plants, some native species lack food they can eat	Native species die out; ecosystem may be negatively affected
2	Communities face economic threats from invasive species.	Costs of monitoring and managing invasives can cost millions of dollars.	Communities may run out of money to combat invasives.
3	Invasive species lack predators	They spread and consume all the resources needed by native species.	Native species may die; broken food chain
4	There are several ways invasive species arrive in a new location.	There has not been enough understanding or monitoring of entry points which has allowed this to happen.	Invasive species thrive in their new location, negatively impacting native species.
5	Climate change widens survivable ranges for species.	Invasive species enter new areas and compete with native species for resources.	Native species may struggle with new competition; ecosystem may be affected
6	Humans bring new species to be pets or ornamental plants.	Species may expand beyond their new homes.	May displace local species; could change the visuals of the local ecosystem
7	Climate change has made many regions have more extreme weather.	Species that can survive a wide range of climate conditions can live in these changing environments.	Invasive species may outcompete native species
8	Invasive species can damage infrastructure.	Businesses affected by invasive species have to spend money to combat them.	Invasive species might spread more if not managed.
9	Invasive species can hurt humans.	Invasive species may live where humans do recreation.	May force humans to give up their recreation

Name _____

Challenge Writing Guidelines

Present the facts: Choose facts from relevant research (or the future scene*). **Example fact:** Alien species may out-compete native species.
Think about the fact selected: What challenges can be developed from the fact? Think of an important cause of this fact or an important effect that could result from the fact. Add it to the challenge. **Example effect:** This may lead to the extinction of some native species.
Describe WHY it is a challenge: The following are important requirements of a well-written challenge: **Use** "may, might, or could" instead of "will or shall." **Avoid absolutes:** Instead of "all," use "some." **Avoid extremes:** Instead of "death," use" illness." Instead of "riot," use "social unrest." **Example WHY:** Loss of some native species may lead to a broken food web.
Use topic vocabulary: This will improve the quality of your writing and demonstrate research. See the underlined words in the example above.
*Note: When writing challenges from a future scene, it is also important to use words from the future scene to make a clear connection.

Directions: Use your Identifying Challenges chart to help you write challenges in the correct format following the guidelines.

1.

2.

ANSWER KEY

Challenge Writing Guidelines

STEP 1

1	Because invasive plants can crowd out native plants, native species that rely on those plants for food may lack food they can eat. This may result in the death of native species which may negatively affect the ecosystem.
2	Invasive species may pose an economic threat to communities. Because it may cost millions of dollars to monitor and manage invasive species, communities may run out of the money necessary to keep invasives from damaging the ecosystem.
3	Because invasive species may lack predators in their new homes, they may spread easily and eat the food that native species eat, causing the natives to die off. This may result in a broken food chain.
4	Since there are a variety of ways alien species arrive at their new locations, it may be difficult to monitor and slow down their arrival. This may cause invasives to secure their positions in the environment before anything can be done to stop them.
5	Because climate change is widening the livable range for many species, invasive species can enter new areas and compete with native species for resources. This could make the native species struggle with the new competition, affecting the ecosystem.
6	As humans bring new species to their homes as pets or ornamental plants, they may escape into the local environment. This could affect the look of the local community, changing the landscape to a less pretty one.
7	Since climate change has given many regions extreme weather, species that cannot survive wide swings in temperature may not be able to survive. This could leave space for species that can survive many different temperatures to become invasive and outcompete local species.
8	Invasive species can cause damage to infrastructure. If those affected by the invasive species cannot deal with them, the invasive species may continue to spread and affect others.
9	Because invasive species may harm humans, if invasive species live where people usually do outdoor activities, like parks, humans may not do as much recreation.

FUTURE Problem Solving LESSON PLAN

Brainstorming Challenges

T M FS STEP 1

Objectives

- Students will analyze a situation related to Invasive Species.
- Students will apply their Invasive Species research as they identify challenges in the given situation.
- Students will demonstrate understanding of the categories list as a creative thinking tool.
- Students will compose challenges in the correct format.
- Students will develop flexible, creative thinking by generating challenges in a specific context.
- Students will develop their creative thinking skills by producing fluent and flexible challenges related to the topic of Invasive Species.

Standards Addressed
Speaking & Listening
1, 2, 4, 6
Reading & Literacy
1, 2, 3, 4, 5, 7
Writing
1, 2, 4, 5, 7, 8, 9, 10
Language & Vocabulary
1, 2, 3

Materials

- Names of categories from **Categories List** enlarged for taping to whiteboard and wall
- Tape
- **Categories List**, 1 per team (page 35)
- **The City of Greenwave Emergency Brief**, 1 per student (page 36)
- Sticky notes
- Several different colors of writing utensils, available as needed

Preparation

1. Create a **Challenge Gallery** by enlarging the name of each category (photocopied or written on index cards) from the **Categories List**. Attach these on the whiteboard or around the walls in your meeting space. Leave space around the categories for students to add sticky notes with challenges written on them under each category. (Note: Leave the **Challenge Gallery** posted for the next lesson. Also, you may want to save the enlarged names of the categories for use for the rest of the Future Problem Solving season.)
2. Note: Leave the **Challenge Gallery** with the students' written challenges posted for the next lesson.

Procedure

PART ONE	
1	**Say:** *In the last lesson, we learned about using research to help identify challenges and what the requirements are for writing challenges correctly.*
2	**Say:** *In this lesson, we are going to concentrate on two things: A thinking tool called the categories list and pulling in challenge ideas from a practice future scene.*
3	Distribute the **Categories List.**

Coaching Tip

Use additional Resource Library Categories List tools like the poster version of page 35 and one-pager with all the definitions to help students learn and utilize the Future Problem Solving Categories List to generate challenges.

Procedure part one, continued

PART ONE	
4	***Say:*** *The* ***Categories List*** *represents the different areas of society that could be impacted by a challenging situation. This is a thinking tool that can make generating challenges a little easier! When generating challenges for a future scene, we want to get as many challenges as we can in as many different categories as we can. We call that fluency and flexibility. You receive scores on your booklet evaluation for fluency and flexibility. The* ***Categories List*** *will help you look at the future scene from many different angles and perspectives. Look around you: The names of the categories are hanging up around our room just waiting for your great ideas!*
5	**Say:** *We now have a very important task! The mayor of the city of Greenwave emailed us an emergency brief about a situation rapidly unfolding in their community: An invasive species is causing all kinds of problems! The City Council is really overwhelmed, and they need help identifying exactly how much the presence of this species could impact their community.*
6	Distribute the **City of Greenwave Emergency Brief.** Provide a brief amount of time for reading it.
7	**Say:** *The Emergency Brief is like a very short future scene. It has future scene parameters of time, place, and topic. What are those?* Students should respond with: Time: 2045 Place: Greenwave, a town on the US Pacific Northwest coast Topic: Invasive Species
8	**Say:** *Another feature of every future scene is the charge. You can find that in the colored box in the future scene. The charge directs your problem solving. While you can brainstorm challenges related to anything in the future scene, the best challenges will be related to the charge. There will be challenges related to the charge throughout the future scene. In Step 2, paying attention to the charge is vital, because you use it in identifying the one underlying problem you will choose to solve.*
9	Ask a volunteer to read the charge in the **City of Greenwave Emergency Brief.**
10	**Say**: *When you look for challenges in a future scene, use every part of it! Start by identifying challenges that come to you quickly. Then, go paragraph by paragraph, line by line. We'll be using the* ***Categories List*** *to help you find even more challenges.*
11	**Say:** *After you find challenges in the emergency brief, we will be practicing writing them in the correct format. This time when you write a challenge, you can also include words from the future scene in your explanation.*
12	Divide the class into teams.
13	Pass out sticky notes.

Standards Addressed
Speaking & Listening
1, 2, 4, 6
Reading & Literacy
1, 2, 3, 4, 5, 7
Writing
1, 2, 4, 5, 7, 8, 9, 10
Language & Vocabulary
1, 2, 3

Coaching Tip

If possible, complete this lesson and the next lesson one, **Greenwave Underlying Problems** back-to-back.

Procedure part one, continued

PART ONE	
14	***Say:*** *Your first task is to analyze the future scene and try to generate as many challenge ideas as you can. You won't be writing them completely yet, just finding them! Remember to follow the guidelines for generating ideas: say your ideas aloud, accept all ideas, don't criticize, hitchhike off each other's ideas, and go for unique ideas. Think about these three ways to find challenges in the future scene:* • *Look in the future scene for challenges about invasive species or how the community is dealing with invasive species.* • *Think about your research. What parts of your research can you connect to challenges that fit the future scene?* • *Refer to the* ***Categories List*** *and try to find ideas in as many categories as possible.*
15	**Say:** *Here's how this works: Say your idea aloud so that your team can hear you. Then, write the idea briefly – not in complete format, just as an idea – on a sticky note. Grab another sticky note and think of another idea. When your team has a stack of challenges, walk around the room and place the sticky notes under the appropriate category. Sometimes a challenge will fit in more than one category. If that happens, choose the category that has the least ideas with it.*
16	Ask for questions and answer them.
17	Provide work time. Give students 15-20 minutes for brainstorming and posting challenges.

PART TWO	
1	Have students walk around and read everyone's challenge ideas in the **Challenge Gallery**.
2	**Say:** *The next task is to practice writing challenges correctly. Let's review:* • *Start with a fact from topic research or the future scene.* • *Explain a problematic effect related to the fact.* • *Describe why it is a challenge, using may, might, or could, avoiding absolutes and extremes.* • *Use topic vocabulary and words from the future scene in your writing.*
3	**Say:** *You can refer to your* ***Challenge Writing Guidelines*** *while you do this. Now I'm going to distribute the challenge ideas to different teams. Your task is to write the challenges completely on a different sticky note, then post it back on the wall under the appropriate category name.*
4	Randomly pull sticky notes from the wall and hand them to different teams.
5	Provide work time.
6	At the end of the work period, reconvene as a large group and ask for volunteers to come to the wall to read written challenges. Discuss whether or not the challenge meets the **Challenge Writing Guidelines**. Allow students to provide suggestions.

Standards Addressed
Speaking & Listening
1, 2, 4, 6
Reading & Literacy
1, 2, 3, 4, 5, 7
Writing
1, 2, 4, 5, 7, 8, 9, 10
Language & Vocabulary
1, 2, 3

FUTURE Problem Solving LESSON PLAN

Brainstorming Challenges

T M FS STEP 1

Closure

1. Ask the students how using the **Categories List** helped them think of more potential challenges. They might give answers like:
   - We were able to think of more challenges using the **Categories List**.
   - The **Categories List** helps you think past the obvious answers about how something could be a challenge.
   - Some challenges might not be directly stated in the future scene. You might need to brainstorm how the situation might affect more people.
   - It keeps your challenges from being repetitive, so you get more points from the evaluators.
   - The **Categories List** helps you to consider different perspectives and points of view.
2. **Say:** *You did an awesome job helping the people in Greenwave figure out what challenges could come from the lionfish invading their community. As we continue to work through the problem solving process, you'll soon get the chance to write challenges based on a complete future scene.*

Standards Addressed
Speaking & Listening
1, 2, 4, 6
Reading & Literacy
1, 2, 3, 4, 5, 7
Writing
1, 2, 4, 5, 7, 8, 9, 10
Language & Vocabulary
1, 2, 3

Name _____

Categories List

STEP 1 STEP 3

Directions: Refer to the categories list as you generate challenges in any future scene. The categories list can also be used for solution-finding later!

Categories List

Arts & Aesthetics

Basic Needs

Business & Commerce

Communication

Culture & Religion

Defense

Economics

Education

Environment

Ethics & Morality

Government & Politics

Law & Justice

Miscellaneous

Physical Health

Psychological Health

Recreation

Science

Social Relationships

Technology

Transportation

City of Greenwave Emergency Brief

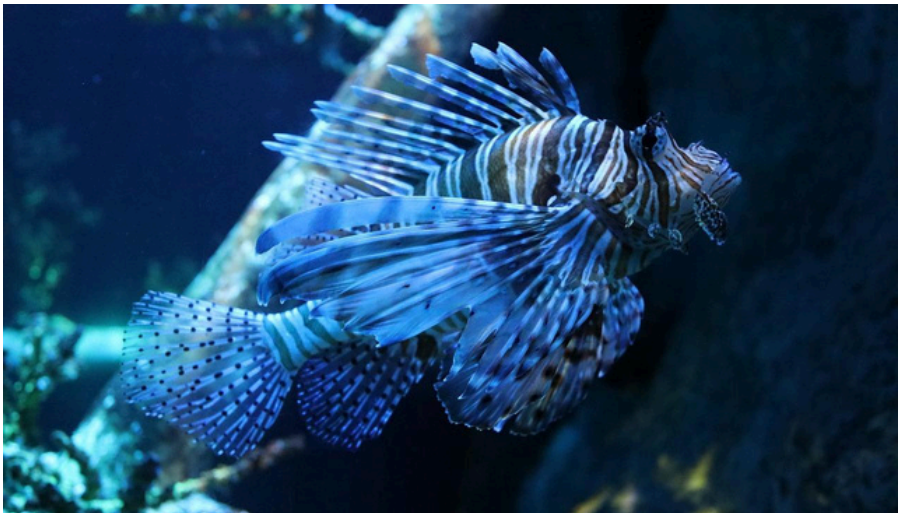
Invasive Species – **Trouble in Greenwave** *(Topic Activity Unit)*

The coastal city of Greenwave, once a small fishing village, has transformed into a thriving eco-city renowned for its floating farms and cutting-edge marine research facilities. Positioned along the Pacific Northwest in the United States, Greenwave is a leader in sustainable aquaculture and a popular tourist destination. The city's artificial reefs and marine parks are a vital part of the local economy, supporting both fishing and conservation efforts.

Now, in 2045, Greenwave has been thrown into turmoil due to the accidental introduction of the invasive lionfish into its waters. This predatory species, which was likely introduced by international ships docking at Greenwave's busy port, has rapidly spread throughout the city's marine environments. The lionfish are wreaking havoc on native fish populations that are crucial for the city's aquaculture industry and its identity as an environmental leader.

As the lionfish population explodes, Greenwave faces a cascade of challenges, from economic impacts on local fisheries and tourism to environmental concerns about the collapse of delicate marine ecosystems. The city's waste treatment facilities, designed to be eco-friendly, are now under strain from the effects of the species.

The Mayor of Greenwave and City Council are calling on you to help us assess the situation. Use the problem solving process to consider the concerns of the community regarding the invasive lionfish and identify an important challenge Greenwave faces in resolving this crisis.



Parameters

Time:

Place:

Topic:

WARNING:
This is not an official future scene. DO NOT USE this future scene for your Practice Problem 1 Invasive Species submission.

FUTURE Problem Solving LESSON PLAN

Greenwave Underlying Problems

T STEP 1 STEP 2

Objectives

- Students will analyze and evaluate challenges to determine which would be important ones to address in mitigating Invasive Species.
- Students will apply a thinking strategy called Hits and Hot Spots for selecting an underlying problem.
- Student will compose an underlying problem in the correct format.

Standards Addressed
Speaking & Listening
1, 2, 4, 6
Reading & Literacy
1, 2, 4, 9
Writing
1, 4, 5, 10
Language & Vocabulary
2, 3

Materials

- Wall Challenge Gallery from **Trouble in Greenwave** lesson
- **City of Greenwave Emergency Brief**, students should use their copy from the last lesson (page 36)
- **Underlying Problem Guidelines**, 1 per student, plus one extra for coach reference (page 40)
- **Underlying Problem Format**, 1 for coach reference (page 41)
- Markers, highlighters, or pens

Preparation

1. Re-attach sticky note written challenges on the wall **Challenge Gallery** if necessary.
2. Determine a way to display the **Underlying Problem Format** in a way that lets you write examples under each part. This will be where you lead practice in writing underlying problems from the **Challenge Gallery**. It might be helpful to display the format on a whiteboard so that you can use it to show several underlying problems and erase the previous one before beginning the next one.

Procedure

PART ONE	
1	**Say:** *Now that you have identified challenges faced by the city of Greenwave, we will move on to Step 2 of the Future Problem Solving process. This is the most important step because the rest of the booklet depends on what happens in Step 2. In Step 2, you will choose one important underlying problem to solve for the city of Greenwave.*
2	**Distribute** the **Underlying Problem Guidelines.**
3	**Say:** *The underlying problem should be smaller than the whole future scene and related to the topic concerns in the future scene, especially those that are based on the future scene charge.*
4	As a reminder, ask a volunteer to read aloud the charge from the **City of Greenwave Emergency Brief.**
5	**Say:** *There are several techniques to help you choose an underlying problem. Today, we will be using a strategy called hits and hot spots.*

Coaching Tip

If possible, complete this lesson soon after finishing the **Trouble in Greenwave** lesson plan.

Greenwave Underlying Problems

Procedure part one, continued

Standards Addressed
Speaking & Listening
1, 2, 4, 6
Reading & Literacy
1, 2, 4, 9
Writing
1, 4, 5, 10
Language & Vocabulary
2, 3

PART ONE	
6	Explain the hits and hot spots technique. **Say:** • *This starts as a silent activity.* • *Everyone in the group examines the identified challenges, keeping in mind what's written in #1 and 2 of the **Underlying Problem Guidelines**.* • *With a pen or marker – and without talking – each person puts a dot beside two or three challenges they think are most important to address the charge.* • *Each dot represents a "hit". The challenges with the most hits are the "hot spots".* • *The hot spots are challenges you should consider for possible underlying problems.* • *After you have identified the hot spots, the group can discuss which hot spot would make the best underlying problem.*
7	**Say:** *Keep the charge in mind. I'm going to give you a few minutes to walk around and examine our **Challenge Gallery**. Put a dot on the sticky note if you think it is important for addressing the charge. Do this for up to 3 challenges. Are there any questions?*
8	Answer questions, then give students time to put dots on the sticky notes. Monitor their talking. They should not be discussing the ideas at this time.
9	Reconvene as a class and lead a discussion about which challenges have become the hot spots. (There can be several.) If there are challenges identified as hot spots that are not connected to Greenwave's trouble with lionfish, explain to students why these would not make good underlying problems. (E.g., with such an underlying problem, the solutions would probably not allow use of Invasive Species research and the solutions might not help the future scene charge.)
10	**Say:** *Now we are going to learn how to write the underlying problem. There is a specific format that should be followed. As I go over each piece of the underlying problem, follow along on your **Underlying Problem Guidelines**. Look at the example underlying problem at the bottom of your guidelines.*
11	Using the example underlying problem, ask the students to identify each piece of that problem. The correct answer is underlined. • Condition Phrase: <u>Because some invasive species are brought in as ornamental plants or pets</u> • Stem: <u>in what ways might we</u> • Key Verb Phrase: <u>reduce consumer introduction of invasive species around the world</u> • Purpose: <u>so that native populations will not be harmed in 2045 and beyond?</u> • Future Scene Parameters: <u>invasive species, around the world, 2045</u>
12	Using the **Underlying Problem Format**, lead the development of several underlying problems using hot spots from the **Challenge Gallery**. Allow students to suggest words for each part. Since the hot spots are from the **Greenwave Emergency Brief**, the parameters are 2045, Greenwave, invasive species/lionfish.

Procedure part one, continued

Standards Addressed
Speaking & Listening
1, 2, 4, 6
Reading & Literacy
1, 2, 4, 9
Writing
1, 4, 5, 10
Language & Vocabulary
2, 3

PART ONE

12

Example underlying problems:
Students may come up with other underlying problems and other wording for the same idea.

- Because the invasive lionfish are wreaking havoc on native fish populations that are used for food in Greenwave and surrounding areas, how might we protect local fish species so that residents will still have a supply of fish to eat in 2045?
- Because Greenwave's waste treatment facilities are now under strain from the effects of the invasive lionfish, how might we strengthen these facilities so that Greenwave's residents will not become unhealthy in 2045 and beyond?
- Because Greenwave's native fish populations are crucial for the city's aquaculture industry, in what ways might we decrease the number of invasive lionfish in 2045 so that the native fish populations can remain strong?
- Since the invasive lionfish was likely introduced by international ships docking at Greenwave's busy port, in what ways might we increase safety procedures that limit the arrival of invasive species in Greenwave so that invasive species have less impact on the Greenwave community in 2045 and beyond?
- Because so many different groups such as government, aquaculture industry, marine scientists, conservationists, tourism industry, are concerned about the invasive lionfish, in what ways might we increase productive communication among all parties so that actions for dealing with lionfish can be carried out cooperatively in 2045 and beyond?
- Since the invasive lionfish has rapidly spread throughout Greenwave's marine environments, wreaking havoc on the native fish populations important to Greenwave's economy and identity as an environmental leader, how might we reduce the lionfish population so that the Greenwave's marine environments will not be destroyed in 2045 and beyond?

Closure

1. When you feel the students have developed an understanding of how to write an underlying problem correctly, divide the students into small groups or partners and ask them to work together to write another underlying problem from any challenge on the Challenge Gallery. (Suggestion: You might pull sticky notes that were hits but not hot spots from the gallery and hand them out randomly.)
2. Provide work time.
3. At the end of the work period, allow students to share their underlying problems. Discuss.
4. **Say:** *Congratulations for being able to identify and write important underlying problems about Invasive Species!*

Name _____

Underlying Problem Guidelines

Selecting the underlying problem

1. The best underlying problems are:
    - based on a significant (important) issue connected to the **future scene** and **topic**, especially the **future scene charge** found in the last paragraph of the future scene
    - smaller than the whole future scene but not so narrow that finding solutions in Step 3 might be difficult.
2. An underlying problem must **not**:
    - restate the future scene
    - broaden the future scene (go beyond the future scene or the topic).

Writing the underlying problem

An underlying problem must:

3. Include these 4 components:
    - **Condition phrase** – a lead-in phrase that tells the reason you selected the challenge that is the focus of your underlying problem, based on research or a fact from the future scene. Usually begins with “because” or “since.”
    - **Stem and key verb phrase** – is the action goal for your solutions. Begins “how might we” or “in what ways might we” plus a verb phrase with a strong action verb
    - **Purpose** – what you want to happen as a result of addressing the key verb phrase. Begins with “so that” or “in order to”
    - **Future scene parameters** – time, place, and topic. Work these into the underlying problem where they make sense. Use the exact words of the topic.
4. Use only one verb in one phrase in the key verb phrase.
5. Use non-absolute, strong action verbs, such as:

Increase	Maximize
Decrease	Minimize
Improve	Reduce
Avoid using absolute verbs such as “stop”, “solve”, or “prevent”	

6. …have only one purpose (avoid “and”, “or”) that logically follows from the key verb phrase and avoids phrases that are difficult to measure (for example, “lead a happy life”).
7. When writing an underlying problems, avoid using extra qualifying descriptors that might make it harder for solutions to address the key verb hrase and support the purpose.

Example of an Invasive Species challenge from a research fact:

Because some invasive species are brought in as ornamental plants or pets, in what ways might we reduce consumer introduction of invasive species around the world so that native populations will not be harmed in 2045 and beyond?

Name _____

Underlying Problem Format

Directions: Once you must master the step 2 structure, there are many things to consider when writing an underlying problem.

Condition phrase – a lead-in phrase that tells the reason you selected the challenge that is the focus of your underlying problem, based on research or a fact from the future scene.
(Usually begins with “because” or “since”)

Stem and key verb phrase – is the action goal for your solutions.
(Begins “how might we” or “in what ways might we” plus a verb phrase with a strong action verb.)

Purpose – what you want to happen as a result of addressing the key verb phrase.
(Begins with “so that” or “in order to”)

Future scene parameters – time, place, and topic.
(Work these into the underlying problem where they make sense. Use the exact words of the topic.)

FUTURE Problem Solving LESSON PLAN

Elements for Writing Underlying Problems

R M STEP 1 STEP 2

Objectives

- Students will analyze a situation related to Invasive Species.
- Students will apply research on invasive species to explore a real-life situation and apply what they have learned about developing an underlying problem.
- Students will identify the components of a correctly written underlying problem.
- Student will compose an underlying problem in the correct FPS format.

Standards Addressed
Speaking & Listening
1, 2, 4, 6
Reading & Literacy
1, 2, 4, 5, 7, 8, 9, 10
Writing
1, 2, 4, 5, 7, 8, 9, 10
Language & Vocabulary
1, 2, 3

Materials

- The article **Problem to plate: Could eating invasive species be a sustainability game changer?**, 1 per student
- **Round Robin Underlying Problems**, 1 per student (page 44)
- Whiteboard
- Writing utensils, highlighters
- Blank writing paper, each sheet cut into strips equal to approximately one-third of a page, 1 strip per student
- Students may use their **Underlying Problem Guidelines.** (page 40)

Preparation

1. Cut the blank writing paper into strips.
2. Write a sample underlying problem on the board.
   - **For example:** Because invasive species can damage a city's infrastructure, in what ways might we manage the spread of invasives around the city this year so that the city's infrastructure can be maintained?

Procedure

PART ONE	
1	**Say:** *Today, you will read an interesting article about Invasive Species and use that as a springboard for practice in writing an underlying problem, a critical part of the Future Problem Solving process. Before I hand out the article, let's review the parts of an underlying problem. Who can name the 4 parts of an underlying problem?* Pause for answers. (condition phrase, stem and key verb phrase, purpose, and the future scene parameters)
2	Ask students to identify each part of the underlying problem on the board. • Condition phrase: Because invasive species can damage a city's infrastructure • Stem and key verb phrase: in what ways might we manage the spread of invasives around the city over the next decade • Purpose: so that the city's infrastructure can be maintained • Parameters: around the city, this year, invasive species
3	**Say:** *Do you have any questions about underlying problems before we begin the activity?*
4	Answer any questions.
5	**Say:** *For today's work, your future scene parameter of time will be this year.*

Elements for Writing Underlying Problems

R M STEP 1 STEP 2

Procedure, continued

PART TWO	
1	Divide the students into teams.
2	Hand out strips of paper, one strip for each person in the group.
3	**Say:** *Now we're going to practice the underlying problem format by playing a game called **Species Spiral**.*
4	Distribute the article **Problem to Plate** and **Round Robin Underlying Problems.**
5	Review the game directions.
6	Allow time for playing the game and writing the underlying problems.

Standards Addressed
Speaking & Listening
1, 2, 4, 6
Reading & Literacy
1, 2, 4, 5, 7, 8, 9, 10
Writing
1, 2, 4, 5, 7, 8, 9, 10
Language & Vocabulary
1, 2, 3

Closure

1. When students have finished the game, have each group read their underlying problems aloud. Discuss how well each underlying problem addresses the specific problem of Asian carp or green crabs in the Great Lakes and how they could be improved.
2. Discuss how the collaborative process made writing each part of the underlying problem easier. Students might give answers like:
   - Working with a group helped me to make sure I didn't accidentally leave out part of the underlying problem.
   - Doing a different part each time helped me remember all of the parts better.
   - I got to see how the different parts work together to create a great underlying problem.
   - I'll do a better job of remembering the different elements after playing the game.
3. **Say:** *Excellent work on your underlying problems! Writing a strong underlying problem is essential, as it helps you focus on solving the most critical issue in the future scene. Today, you not only practiced creating an underlying problem but also learned how specific details from your research can make your underlying problem stronger.*

Name _____

Round Robin Underlying Problems

Game Directions

1. Refer to your **Underlying Problem Guidelines** for this activity.
2. Read the article **Problem to plate: Could eating invasive species be a sustainability game changer?** with your team.
   - As you read, underline or highlight parts of the article that might indicate challenges related to the presence of Asian Carp or green crabs in the Great Lakes.
3. When you finish reading, discuss possible focus areas for an underlying problem. Choose as many focus areas as you have team members.
   - Example: A four-person team would choose 4 areas. Assign each team member one of the chosen focus areas. If you don't have enough focus areas identified, use another challenge you underlined.
4. Play the game. Each member of your group will write one part of the underlying problem they were assigned on their strip of paper as described in each round below.
   - **Round 1:** Each team member writes a condition phrase for their focus area or challenge using a fact from the article.
   - **Round 2:** Pass your in-progress underlying problem to the right. Each team member writes a logical stem & key verb phrase related to the condition phrase they received.
   - **Round 3:** Pass your in-progress underlying problem to the right. Each team member writes a logical purpose related to the condition phrase + stem & key verb phrase they received.
   - **Round 4:** Pass your almost-completed underlying problem to the right. This time the team member checks to make sure the future scene parameters have been included and, if not, writes them in an appropriate place in the underlying problem.
5. Review all of your resulting underlying problems as a team. Ensure that each underlying problem has parts that work together.

Name _____

Choose, Discover, Act

Directions: Select and complete one activity from the Choice Board to demonstrate your understanding and research on invasive species. This activity will allow you to creatively present your findings and insights to others.

1. Review the Choice Board.
2. Select the project that interests you the most.
3. Plan your project. What resources will you need?
4. Work on your project. Make sure you address the **Choice Board Guidelines**.
5. Be prepared to share your project with a specific audience.
6. If you have an alternative idea for a project, discuss it with your teacher.

INVASIVE SPECIES CHOICE BOARD

Choose one of the options below to creatively share your research.

Musical

Transform research on Invasive Species into a song. Make an audio recording to share the song or perform it for an audience. Instruct the audience to identify important vocabulary and challenges in the verses of the song.

Spatial

Create an Infographic or Poster that illustrates the journey of an invasive species from its origin to its new environment. Highlight the impact on local ecosystems.

Linguistic

Write a persuasive essay or speech on the importance of controlling invasive species in your local area. Include research. Create a class blog and invite other FPS teams to read and comment.

Interpersonal

Stage a role playing activity. Students will take the role of different stakeholders such as environmentalists, farmers, government officials, and others identified from the research. Conduct a debate on how to handle the Invasive Species Crisis!

Naturalist

Go on a nature walk and document any signs of Invasive Species in your local area. Create a Field Guide or report to share your findings. Discuss your findings with a local environmental group in your community.

Intrapersonal

In your research, you learned about ethical management related to Invasive Species. Is it ethical to destroy lives because they are in the wrong place at the wrong time?
Create a journal entry or news broadcast conveying your feelings on this moral dilemma.

Name _____

Choice Board Guidelines

Project Guidelines
Use the following criteria to guide you in planning your project.

INVASIVE SPECIES CHOICE BOARD

The following guidelines will guide you in creating your project.

RESEARCH:

Your project is based on your research and reflects an understanding of the challenges faced by invasive species.

ORGANIZATION:

Your project is organized, and the key points are well-communicated and easy to understand.

CREATIVITY AND ENGAGEMENT:

Your project reflects originality and innovative thinking. The content is interesting and engaging.

IMPACT:

The project's message informs, persuades, and influences the audience to think about the challenges related to invasive species.

FUTURE Problem Solving LESSON PLAN

A Blueprint for Solutions

Objectives

- Students will develop an understanding of Step 3 of the problem solving process using the analogy of an architect designing a building with a blueprint.
- Students will construct a **Solutions Blueprint** that identifies the goal of solution-finding, thinking tools that can be used in the process, and the components of a well-written solution.
- Students will apply the components of a well-written solution (including WHO will implement the solution, WHAT the solution is, HOW it works, and WHY it solves the underlying problem) to compose solutions to an Invasive Species underlying problem.

Standards Addressed
Speaking & Listening
1, 2, 3, 4, 6
Reading & Literacy
1, 2, 4, 5, 8
Writing
1, 2, 4, 5, 7, 10
Language & Vocabulary
2, 3

Materials

- A way to post or project:
  - Design Architect definition, see Procedure 1.
  - **Brainstorming Rules** (page 55)
  - **Solution Evaluation**, see Procedures Part Five
  - **Example Underlying Problem and Solutions**, see Procedures Part Five
- A large sheet of bulletin board paper: A blue color is not necessary but it could be used to represent a blueprint.
- Blank writing paper: A blue color is not necessary but it could be used to represent a blueprint (2 sheets per student)
- Two sheets of blank paper with examples of templates for a **Solutions Blueprint**, see below (page 60)
- Writing utensils such as colored pens, pencils, and markers
- **Combating Invasive Species Solution Ideas**, 1 per student (page 56)
- **Combating Invasive Species – Categories List**, 1 per team, 2 pages (pages 57-58)
- **Solution Writing Format**, 1 per student (page 59)
- **Solutions Blueprint Example**, 1 for coach reference (page 60)

Preparation

1. At the top of the bulletin board paper write: **Solutions Blueprint.**
2. Roll the bulletin board paper and fasten it with a rubber band.
3. Determine how you will share the Design Architect definition, **Brainstorming Rules, Solution Evaluation,** and **Example Underlying Problem and Solutions** with students, either as enlarged copies or projected on a screen or whiteboard.
4. Draw the two templates of a **Solutions Blueprint** shown below on two sheets of paper to share with students for examples.

Coaching Tip

Use additional Resource Library tools like the Solutions Writing Blueprint poster version of page 60 to provide additional inspiration for your students and reinforce the components of a well-written solution.

FUTURE Problem Solving LESSON PLAN

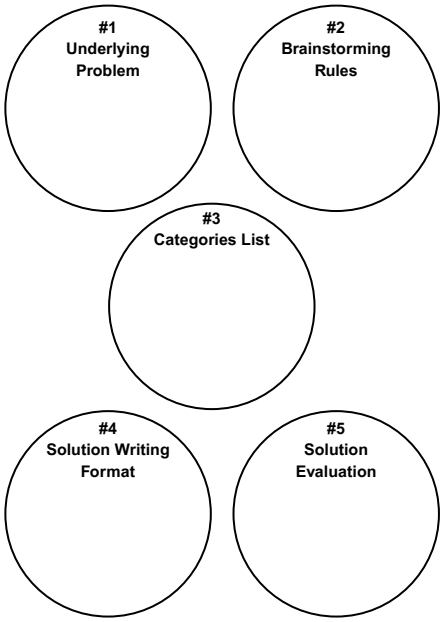
A Blueprint for Solutions

T STEP 3

Solutions Blueprint example templates:

Solutions Blueprint	
#1 Underlying Problem	#2 Brainstorming Rules
#3 Categories List	#4 Solution Writing Format
#5 Solution Evaluation	

Solutions Blueprint



Standards Addressed
Speaking & Listening
1, 2, 3, 4, 6
Reading & Literacy
1, 2, 4, 5, 8
Writing
1, 2, 4, 5, 7, 10
Language & Vocabulary
2, 3

Procedure

PART ZERO – Becoming a Solution Architect	
1	Post or project the definition of a Design Architect: Design Architects are the visionaries who design buildings and structures, crafting unique and innovative spaces that meet the needs of clients and users alike. They combine creative skills with technical knowledge to develop architectural concepts that are both practical and inspiring. Their role encompasses the initial design stages of a project, where they set the tone for the entire development through sketches, plans, and detailed drawings. They have to know the materials that will be used in the building and work with the client to develop and tweak the design. They also work with the engineers and builders to make sure the design is executed.
2	**Say:** *Today, we will become Solution Architects. A solution architect is much like a Design Architect.*
3	Call attention to the definition of a Design Architect.
4	**Say:** *An analogy is a comparison between two things. In Future Problem Solving, you generate and write solutions to your underlying problem, telling WHO will implement the solution, WHAT the solution is, HOW the solution works, and WHY it addresses the underlying problem. Think about how Solution Architects are like Design Architects. Let's see if you can create an analogy using the definition of a Design Architect.*

FUTURE Problem Solving LESSON PLAN

A Blueprint for Solutions

Procedure part zero, continued

	PART ZERO – Becoming a Solution Architect
5	Allow time for responses. Some ideas are listed below: • Design Architects are visionaries: A Solution Architect is a visionary who designs solutions for the underlying problem presented in the future scene. • Design Architects combine creative skills with technical knowledge. Solution Architects do the same thing – using creative thinking to generate solutions and applying their technical knowledge of topic research and the problem solving process. • Design Architects craft unique, innovative spaces that meet clients' needs and are practical and inspiring. A Solution Architect combines research and applies creative thinking skills to develop unique, practical, and inspiring solutions. • The role of the Design Architect is to set the tone for the entire project's development. A Solution Architect develops solutions that address the underlying problem.
6	Dramatically unroll the large sheet of bulletin board paper on which you have written **Solutions Blueprint** at the top.
7	**Say:** *In this lesson, you will create a **Solutions Blueprint** for yourself as a reference guide when doing Step 3 of the problem solving process. When you are finished with your blueprint, we will use some of those ideas to create a large **Solutions Blueprint** to post in our meeting space.*
8	Distribute one sheet of blank paper to each student. **Say:** This is for your draft blueprint. When we have completed the activities and you are satisfied with your design, you can get another sheet for your final version if you want one. You can orient your paper as a portrait or a landscape.
9	Share the example templates. **Say:** *Here are two ways you might construct your blueprint. These are not the only ways. You can be as creative as you want with your design! For now, write Solutions Blueprint at the top of your paper. You will need 5 separate areas on your blueprint with some space under or near each area to add your ideas.*
10	**Say:** *Each area will have a title. Write the titles on your paper now. Spread out the titles so you have room to write around them later.*
11	Share the following titles: • #1 Underlying Problem Review • #2 Brainstorming Rules • #3 Categories List • #4 Solution Writing Format • #5 Solution Evaluation
12	**Say:** *As we go through the lesson, you will be adding ideas to each area that will help you understand and remember the Step 3 process. We will start with Area #1.*

Standards Addressed
Speaking & Listening
1, 2, 3, 4, 6
Reading & Literacy
1, 2, 4, 5, 8
Writing
1, 2, 4, 5, 7, 10
Language & Vocabulary
2, 3

FUTURE Problem Solving LESSON PLAN

A Blueprint for Solutions

Procedure, continued

PART ONE – Underlying Problem Review	
1	**Say:** *As you begin Step 3, the underlying problem in Step 2 sets your goal as a Solution Architect.* Add the following to #1 on your blueprint. • Solutions must address the key verb phrase. • Solutions must support the purpose of the underlying problem.
2	**Say:** *To get points from evaluators, a solution must answer the key verb phrase. Evaluators will judge whether it is or not. If so, they will count the solution relevant and give it a point. It is very important that all team members understand your key verb phrase before you begin brainstorming solution ideas. All your solution ideas should be directed towards the key verb phrase. Also, when you explain your solution in your booklet, it must be clear to evaluators that the solution supports the purpose, whether you state specifically how it does that or just imply it.*

PART TWO – Brainstorming Rules	
1	Post or project the **Brainstorming Rules**. Refer to these as you go over them.
2	**Say:** *When you are all sure each team member understands the key verb phrase and purpose of your underlying problem, it is time to generate solution ideas. You do this by brainstorming as many ideas as you can as quickly as you can. Try to be creative! It is important to follow the **Brainstorming Rules** to ensure a successful brainstorming session.*
3	Review and discuss the **Brainstorming Rules** and the rationale for each one.
4	Conduct a practice brainstorming session, with an easy prompt such as “Think of the many, varied, and unusual ways to get a hippopotamus out of a bathtub”. Give students 3 or 4 minutes to brainstorm. Monitor their adherence to the **Brainstorming Rules**. After 3 or 4 minutes, stop. Count the number of ideas produced (fluency) and the number of different kinds of ideas they have (flexibility). Use the **Categories List** for kinds of ideas or make up your own categories. Re-emphasize the importance of following the rules.
5	Distribute**: Combating Invasive Species** and review the directions.
6	Provide 5 minutes of work time.
7	At the end of 5 minutes, **Say:** *How well did your team follow the Brainstorming Rules?*
8	Allow students to share their reflections.
9	Refer to the **Brainstorming Rules.** **Say:** *What do you need to remember about brainstorming? Add that to your blueprint*.
10	Provide a few minutes of work time. Some responses might be: • Don’t praise or criticize ideas • Think of lots of ideas • Hitchhike/piggyback off of other ideas • Accept wild ideas

Standards Addressed
Speaking & Listening
1, 2, 3, 4, 6
Reading & Literacy
1, 2, 4, 5, 8
Writing
1, 2, 4, 5, 7, 10
Language & Vocabulary
2, 3

A Blueprint for Solutions

Procedure, continued

PART THREE – The Categories List	
1	Distribute **Combating Invasive Species – Categories List** and review the directions.
2	Provide time for students to complete the activity.
3	**Say:** *Count the number of solution ideas that you filled in on your Categories List. How many did you get?* Take responses from each team.
4	**Say:** *In evaluation, the number of solution ideas that evaluators count as relevant to your underlying problem is your fluency score. You will need to write 16 solutions during the booklet competition but it is a good idea to brainstorm more than that to get the best ideas.*
5	**Say:** *In how many categories did you write solution ideas?* Take responses from each team.
6	**Say:** *In evaluation, the number of categories evaluators find for your relevant solutions is your flexibility score. A specific category is only counted once for points, even if you have several solutions in the same category. The more different categories you use, the higher this score. Evaluators choose the categories themselves so they might put a solution in a different category than you expected!*
7	**Say:** *For #3 on the blueprint, what do you need to remember about the Categories List? Write that on your blueprint.*
8	Provide a few minutes of work time. Some responses might be: • Use categories to fill in extra boxes • Each category only counts once • More categories is better

PART FOUR – The Solution Writing Format	
1	**Say:** *Now that you have completed the idea generation phase of becoming a Solution Architect, it is time to learn how to transform solution ideas into elaborate and well-written solutions by using the solution writing format.*
2	Distribute: **Solution Writing Format** and review the directions.
3	Expand on the who, what, how, and why as suggested here: • The WHO should be a group or organization that could logically get the solution going. Sometimes an organization you read about in research could be an excellent choice for a WHO. • The WHAT, of course, is the solution idea itself. • The HOW can be a detail that further explains how the solution will work. • The WHY is your explanation for why the solution addresses the key verb phrase and supports the purpose. You know that is what the solution is supposed to do so you should be able to explain it. Do not just repeat the words of the key verb phrase and the purpose. In fact, the WHY can be one of three things: why it solves the key verb phrase, why it supports the purpose, or why the solution is effective in solving the underlying problem as a whole.

Standards Addressed
Speaking & Listening
1, 2, 3, 4, 6
Reading & Literacy
1, 2, 4, 5, 8
Writing
1, 2, 4, 5, 7, 10
Language & Vocabulary
2, 3

A Blueprint for Solutions

Procedure four, continued

PART FOUR – The Solution Writing Format	
4	Share an example of an elaborated solution. Example: Underlying problem: Because invasive species can have a negative effect on the ecology of local ecosystems, in what ways might we reduce the chance that invasive species will be transported to new regions so that native biodiversity is preserved in 2035 globally? Solution: The governments of port cities will establish a crew of divers with underwater scanners to check the hulls of ships for invasive species before they leave the harbor and when they arrive. The scanners will identify the invasives and action will be taken to collect and dispose of the invasives, such as scraping them off the hull and bringing them to the surface for disposal or zapping them with laser guns to kill them. Since ships will be checked going and coming there will be fewer chances for invasives to be transported to new areas on the hulls of ships.
5	Lead students to analyze the solution. Does it address the key verb phrase and support the purpose? What are the who, what, how, and why in this solution?
6	**Say:** *Now it is time for you to practice writing solutions. When everyone in your group finishes their solution, discuss what you've written with each other.*
7	Provide work time. Circulate among the students to answer questions about writing solutions.
8	When the work period ends, allow time for sharing some of the solutions and making suggestions about how to improve.
9	**Say:** *Add to the **Solution Writing Format** on your blueprint – who, what, how, why. Add the other details if you want to.*
10	**Provide work time. Some responses might be:** • WHO does the solution (must be viable!) • WHAT the solution is • HOW the solution works • WHY it solves the underlying problem

PART FIVE – The Final Step – Solution Evaluation	
1	**Say:** *Here is some information for the fifth area on your blueprint. This is what evaluators check for when they read your solutions. I'll tell you a little more about each one, then give you time to add this to your blueprint.* **Solution Evaluation** **R** - Relevant: addresses key verb phrase and supports purpose. **Category**: For R solutions; each different category counts once. **E** – Elaborate: For R solutions; ALL 4 of who, what, how, why **Clarity**: For R & E solutions; clear, concise, logical explanation **O** – Original: A unique R idea

Standards Addressed
Speaking & Listening
1, 2, 3, 4, 6
Reading & Literacy
1, 2, 4, 5, 8
Writing
1, 2, 4, 5, 7, 10
Language & Vocabulary
2, 3

A Blueprint for Solutions

Procedure five, continued

PART FIVE – The Final Step – Solution Evaluation	
2	Expand on evaluation as suggested here. • Relevant: A solution that addresses the key verb phrase and supports the purpose receives a point. The total number of relevant solutions is the fluency score. • Category: Only relevant solutions are assigned a category by the evaluator. The total number of different categories is the flexibility score. • Elaborate: Evaluators give an elaboration point to a relevant solution that has all 4 of the who, what, how, and why. Be sure to begin your solution with a logical WHO! Think of different WHOs – because the same WHO can count no more than twice. Also, don't just repeat the words of the key verb phrase and purpose in your writing. Try to find other wording that *explains* rather than repeats. • Clarity: If a solution is relevant and elaborate, the evaluator judges how well the solution is written. If it is clear, concise, and logical, it can receive a point for Clarity. • Original: Evaluators may call a relevant idea original if they haven't seen that idea in other booklets or if it represents a jump in thinking among all your other ideas. A solution does not have to be elaborate or clearly written to be counted as original. Always stretch your thinking for creative or futuristic ideas!!!
3	Provide work time for adding this to their blueprint. Some responses might be: • R - Relevant: addresses key verb phrase and supports purpose. • Category: For R solutions; each different category counts once. • E – Elaborate: For R solutions; ALL 4 of who, what, how, why • Clarity: For R & E solutions; clear, concise, logical explanation • O – Original: A unique R idea
4	**Say:** *You'll be using solution evaluation in another lesson, but let's look at an example. Which of these solutions would be relevant to the given underlying problem? Are the relevant solutions elaborate? If not, what part of the elaboration elements are missing?* *Answers:* • *1 is relevant and elaborated* • *2 is not relevant* • *3 is relevant but not elaborated (missing who and why)*

Standards Addressed
Speaking & Listening
1, 2, 3, 4, 6
Reading & Literacy
1, 2, 4, 5, 8
Writing
1, 2, 4, 5, 7, 10
Language & Vocabulary
2, 3

A Blueprint for Solutions

Procedure five, continued

PART FIVE – The Final Step – Solution Evaluation	
5	Project the following: **Example Underlying Problem and Solutions** Since the invasive lionfish has rapidly spread throughout Greenwave's marine environments, how might we reduce the lionfish population so that the Greenwave's marine environments will not be destroyed in 2045 and beyond? **Solution 1**: Recreational fishing organizations will organize groups of fisherman to come to Greenwave to capture lionfish. Each group will stay for several days, fishing every day, then another group will come in. The lionfish will be donated to the fish preparation companies in Greenwave to be prepared for food. This will last for several months until the lionfish population is substantially reduced. **Solution 2**: Greenwave's government will organize a group from government, environmental experts, and the fishing, shipping, tourism, and recreation industries to meet regularly to discuss what should be done about the lionfish. **Solution 3**: Giant nets made from material that can't be harmed by lionfish's spines will be dragged through the Greenwave harbor. Although the net will catch other fish, those will be separated and released back into the ocean.

Standards Addressed
Speaking & Listening
1, 2, 3, 4, 6
Reading & Literacy
1, 2, 4, 5, 8
Writing
1, 2, 4, 5, 7, 10
Language & Vocabulary
2, 3

Closure

1. **Say:** *Now that you have become a Solution Architect and completed your draft blueprint, it is time to produce your final version. You may be satisfied with what you have created so far. If so, just add finishing touches to your draft. I have another sheet of paper for you if you want to improve your design. Markers and colored pencils are available so you can make your final blueprint look just the way you want it to.*
2. **Say:** *Remember we are going to make a large* ***Solution Writing Blueprint*** *using some of your ideas. When you have finished the final version of your own blueprint, walk around the room to see what others are doing. Later we will discuss what is going to go on the large blueprint.*
3. Provide work time.
4. Lead a discussion about what should go on the large **Solution Writing Blueprint**. Ask for volunteers to produce the large blueprint or assign this task to several students.
5. **Say:** *What have you found helpful in becoming a Solution Architect and developing your Solution Blueprint?*
   - Provide time for student responses.
6. Provide work time. Post the large blueprint somewhere in your meeting space or roll it up and save it for the next time students work on Step 3.

Name _____

Brainstorming Rules

Rule #1: Think of LOTS of ideas
The goal of every brainstorming session is to generate as many ideas as possible. The number of ideas your team generates is called “Fluency.”

Rule #2: Hitchhike or piggyback ideas
During the brainstorming session, one idea may lead to another. This is called “hitchhiking or piggybacking.” Remember that imitation is the highest form of flattery. It is a compliment if your idea sparks more ideas from other group members!

Rule #3: Accept wild Ideas
The brainstorming session is a time to let your imaginations go wild. With a bit of tweaking, a wild idea can become the source of an original idea. While wild ideas are encouraged, they should not become the focus of the brainstorming session and take your team off task. Remember, you are looking for solutions that address the underlying problem.

Rule #4: Judgment is out of bounds
Put-downs can cause your teammates to feel that their ideas are inferior or not acceptable compared to those of others on your team. Negative feedback may reduce the desire to contribute to the idea pool. Additionally, praising someone’s idea can cause others to feel their ideas are not good enough because they received no positive comments. Positive or negative feedback during brainstorming can reduce your brainstorming power if someone no longer wants to contribute! Remember: no judgment! The time for evaluation comes after the brainstorming session is complete.

Name _____

Combating Invasive Species – Solution Ideas

Directions

1. Follow the Brainstorming Rules as you generate solutions for this underlying problem.
2. Each team member will try to think of 3 solution ideas that they will write on their own paper.
3. Remember to say your idea out loud so that your teammates can hear and be sure to listen to what they say.

Underlying Problem

As climate change alters weather patterns and temperature ranges, species around the **world** may migrate to new areas, potentially becoming **invasive species**. (condition phrase) How might we ethically reduce migrating invasive species (key verb phrase) so there are fewer disruptions to local ecosystems (purpose) globally in **2035? (parameters in bold)**

My Solution Ideas

SOLUTION IDEA #1

SOLUTION IDEA #2

SOLUTION IDEA #3

Name _____

Combating Invasive Species – Categories List

Directions

1. Working as a team, review the ideas you generated in the brainstorming session.
2. As you share your ideas, one team member should write them beside the appropriate category. You may have several ideas in the same category.
3. Use the **Categories List** to spark new solution ideas and write them in the table.

Arts & Aesthetics

Basic Needs

Business & Commerce

Communication

Culture & Religion

Defense

Economics

Education

Ethics & Morality

Page 1 of 2 ⟶

Combating Invasive Species – Categories List

Government & Politics

Law & Justice

Miscellaneous

Physical Health

Psychological Health

Recreation

Science

Social Relationships

Technology

Transportation

Name _____

The Final Step – Solution Writing Format

Directions

1. Each member of the team will select one of the solution ideas generated in the brainstorming session. Make sure team members do not choose the same solution.
2. Fill out the table with the who, what, how, and why of the chosen solution.

Underlying Problem
As climate change alters weather patterns and temperature ranges, species around the **world** may migrate to new areas, potentially becoming **invasive species.** (condition phrase) How might we ethically reduce migrating invasive species (key verb phrase) so there are fewer disruptions to local ecosystems (purpose) globally in **2035?** (parameters in bold)

Solution Writing Format	
WHO	Identify WHO will create or implement the solution
WHAT	Tell WHAT the solution is
HOW	Describe HOW the solution will work.
WHY	Explain WHY the solution addresses the key verb phrase and supports the purpose.

Develop the solution idea you selected in the spaces below.	
WHO	
WHAT	
HOW	
WHY	
Fully Written Solution	

Name _____

Solution Blueprint Example

The following is an example of a Solution Blueprint that students might design.

Solution Writing Blueprint

1 Underlying Problem Review

Solutions must address the key verb phrase
Solutions must address the purpose

2 Brainstorming Rules

Lots of ideas
Hitchhike/piggyback
Wild ideas
No judgment

3 Categories List

Find solutions in many categories.
Use list to find more!

4 Solution Writing Format

Who
What
How
Why

5 Solution Evaluation

R – Relevant: addresses key verb phrase and supports purpose.
Category: For R solutions; each different category counts once.
E – Elaborate: For R solutions; ALL 4 of who, what, how, why
Clarity: For R & E solutions; clear, concise, logical explanation
O – Original: A unique R idea

Name _____

Investigating Invasives Evaluation Report

Directions

1. Work with your group to carefully analyze and evaluate each solution against the given underlying problem to determine if it meets the solution writing requirements for relevance, elaboration, and originality.
   - **Relevance:** The solution addresses the key verb phrase and supports the purpose of the underlying problem.
   - **Elaboration:** The solution clearly explains who, what, how, and why.
   - **Originality:** A unique, one-of-a-kind solution.
2. If a solution is not relevant, stop there. If a solution is relevant but missing components, rewrite the entire solution if necessary or add sentences for the missing components to make the solution elaborate.
3. When you are finished, ask your teacher for the answer key and check your work.

Underlying Problem

Because invasive species can have a negative effect on the ecology of local ecosystems, in what ways might we reduce the chance that invasive species will be transported to new regions so that native biodiversity is preserved in 2035 globally?

Solution One

The Global Environmental Organization (GEO) will establish an "Invasive Species Monitoring Network." The Network will utilize advanced satellite technology and artificial intelligence to detect and track the movement of potential invasive species across borders and waterways. This Network will reduce the chance that invasive species will be transported to new regions because countries will be alerted, allowing them to implement preventative measures. Biodiversity will be preserved because the invasive species will not have an opportunity to establish themselves in new ecosystems.

☐	**Check the box if this solution is relevant.** (It addresses the key verb phrase and supports the purpose.)
☐	**Check the box if this solution is elaborate.** (It explains who, what, how, and why.)
☐	**Check the box if this solution is original.** (It is a unique idea.)

Rewrite or add to a relevant solution if there are missing components.

Name _____

Investigating Invasives Evaluation Report

Solution Two

"The Invasive Species Educational Program" will be created to teach students about invasive species. They will learn about all the different insects, plants, and animals identified as invasive species. Students will be knowledgeable and able to identify them in their local ecology.

☐	**Check the box if this solution is relevant.** (It addresses the key verb phrase and supports the purpose.)
☐	**Check the box if this solution is elaborate.** (It explains who, what, how, and why.)
☐	**Check the box if this solution is original.** (It is a unique idea.)

Rewrite or add to a relevant solution if there are missing components.

Solution Three

Engineers will attach electrodes to ships' hulls that will send out an electrical pulse to repel invasive species.

☐	**Check the box if this solution is relevant.** (It addresses the key verb phrase and supports the purpose.)
☐	**Check the box if this solution is elaborate.** (It explains who, what, how, and why.)
☐	**Check the box if this solution is original.** (It is a unique idea.)

Rewrite or add to a relevant solution if there are missing components.

Name _____

Investigating Invasives Evaluation Report

Solution Four

The United Nations will create the "Biosecurity Protocol for Trade and Travel." It will mandate inspections and decontaminating ships, airplanes, and trucks that often transport invasive species to new ecological areas. Enforcing this law will remove invasive species from transportation vehicles, reducing the chance that they will negatively affect biodiversity.

☐	**Check the box if this solution is relevant.** (It addresses the key verb phrase and supports the purpose.)
☐	**Check the box if this solution is elaborate.** (It explains who, what, how, and why.)
☐	**Check the box if this solution is original.** (It is a unique idea.)

Rewrite or add to a relevant solution if there are missing components.

Solution Five

Animal Rights Groups will pass the "Invasive Species Ethics Law." It will state that destroying invasive species is morally wrong just because they are in the wrong place at the wrong time. This will end the use of the term "Invasive Species" and support the use of ethical methods to control or remove them so that they do not damage the biodiversity of ecosystems.

☐	**Check the box if this solution is relevant.** (It addresses the key verb phrase and supports the purpose.)
☐	**Check the box if this solution is elaborate.** (It explains who, what, how, and why.)
☐	**Check the box if this solution is original.** (It is a unique idea.)

Rewrite or add to a relevant solution if there are missing components.

FUTURE Problem Solving
ANSWER KEY

Investigating Invasives Evaluation Report

Solution One

The Global Environmental Organization (GEO) will establish an "Invasive Species Monitoring Network." The Network will utilize advanced satellite technology and artificial intelligence to detect and track the movement of potential invasive species across borders and waterways. This Network will reduce the chance that invasive species will be transported to new regions because countries will be alerted, allowing them to implement preventative measures. Biodiversity will be preserved because the invasive species will not have an opportunity to establish themselves in new ecosystems.

✓	**Check the box if this solution is relevant.** (It addresses the key verb phrase and supports the purpose.)
✓	**Check the box if this solution is elaborate.** (It explains who, what, how, and why.)
✓	**Check the box if this solution is original.** (It is a unique idea.)
Meets the solution evaluation criteria	

Solution Two

"The Invasive Species Educational Program" will be created to teach students about invasive species. They will learn about all the different insects, plants, and animals identified as invasive species. Students will be knowledgeable and able to identify them in their local ecology.

	Check the box if this solution is relevant. (It addresses the key verb phrase and supports the purpose.)
	Check the box if this solution is elaborate. (It explains who, what, how, and why.)
	Check the box if this solution is original. (It is a unique idea.)
Not relevant	

Solution Three

Engineers will attach electrodes to ships' hulls that will send out an electrical pulse to repel invasive species.

✓	**Check the box if this solution is relevant.** (It addresses the key verb phrase and supports the purpose.)
	Check the box if this solution is elaborate. (It explains who, what, how, and why.)
	Check the box if this solution is original. (It is a unique idea.)

Suggestion

ADD: This will reduce the chance that invasive species will be transported to new regions because they will be removed before the ship leaves the port. This will protect the biodiversity of ecosystems that are at the ship's destination.

Page 1 of 2 →

FUTURE Problem Solving
ANSWER KEY

Investigating Invasives Evaluation Report

Solution Four

The United Nations will create the "Biosecurity Protocol for Trade and Travel." It will mandate inspections and decontaminating ships, airplanes, and trucks that often transport invasive species to new ecological areas. Enforcing this law will remove invasive species from transportation vehicles, reducing the chance that they will negatively affect biodiversity.

✓	**Check the box if this solution is relevant.** (It addresses the key verb phrase and supports the Purpose.)
✓	**Check the box if this solution is elaborate.** (It explains who, what, how, and why.)
	Check the box if this solution is original. (It is a unique idea.)
Meets the solution writing process criteria	

Solution Five

Animal Rights Groups will pass the "Invasive Species Ethics Law." It will state that destroying invasive species is morally wrong because they are in the wrong place at the wrong time. This will end the use of the term "invasive species" and support the use of ethical methods to control or remove them so that they do not damage the biodiversity of ecosystems.

	Check the box if this solution is relevant. (It addresses the key verb phrase and supports the purpose.)
	Check the box if this solution is elaborate. (It explains who, what, how, and why.)
	Check the box if this solution is original. (It is a unique idea.)
Not relevant	

FUTURE Problem Solving LESSON PLAN

Help Save the Pumpkin Festival

M FS STEP 1 STEP 2 STEP 3

Objectives

- Students will analyze a situation related to Invasive Species.
- Students will apply research on invasive species.
- Students will apply what they've learned about the problem solving process to practice steps 1-3.
- Students will practice critical and creative thinking.

Standards Addressed
Speaking & Listening
1, 2, 3, 4, 6
Reading & Literacy
1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Writing
1, 2, 4, 5, 7, 8, 9, 10
Language & Vocabulary
1, 2, 3

Materials

- **The Worst Day Ever** future scene, 1 per student, 2 pages (pages 67-68)
- **The Worst Day Ever Problem Solving Booklet**, 1 per team, 3 pages (pages 69-71)
- Highlighters for marking the future scene
- The Worst Day Ever Exit Ticket, 1 per student (page 72)

Preparation

1. Create a Global Issues booklet. Include the following pages: Identify challenges, Select an underlying problem, and Produce solution ideas
   - Note: You can create a Google Doc containing each of the pages of the Problem Solving Booklet and share it with each member of the team. They can then complete the practice problem online.

Procedure

1	**Say:** *Before participating in the competition, it is always good to prepare by doing a practice problem. In this practice problem, your team will write only four challenges and four solutions.*
2	You will have one hour to complete the **Problem Solving Booklet**.
3	Distribute the **Problem Solving Booklet**. Students may also have blank paper and highlighters.
4	Distribute the **Practice Future Scene**, set the timer and begin the booklet. When one hour is up, collect the booklets.

Closure

1. Distribute the **Worst Day Ever Exit Ticket.** Students will complete the following questions:
   - What did you do well in completing the three steps of the problem solving process?
   - How did you contribute as a member of your team? Did your team work together well? Give examples.
   - How can your team improve for the upcoming competition booklet?
2. **To the coach:** Evaluate the booklets and provide feedback.

Practice Future Scene

Invasive Species – **The Worst Day Ever!** (*Topic Activity Unit*)

September 10, 2045
Dear Diary,

Today was the worst day ever! At school, Mrs. Johnson told us that the Pumpkin Festival got canceled! It's my favorite part of the year—everyone carves pumpkins, drinks apple cider, and goes on hayrides. These kinds of events don't happen much anymore—most people would rather ride a Hover Harvester than sit in the back of an old truck—but our town isn't called Pumpkin Falls for nothing, I guess.

I shouldn't be surprised. After all, ever since the Super Beetles got out of control, there have been major problems with growing anything. These genetically modified beetles were designed to control an outbreak of this worm that was eating our wheat crops, but something went wrong. They killed the harmful insects, yeah—but they also killed a bunch of the good ones, too.

Since then, everything has been messed up. I hardly see my dad anymore. He's an agricultural scientist, and he's been working around the clock trying to find a breakthrough that will fix the Super Beetle thing. When he is home, he's in a bad mood.

Things could be worse, though. At least my dad has a job. It seems like half the people we know are out of work. Food is so expensive now, and it's affecting the economy. Plus, no one can even agree on how to fix the beetle situation. Some people want to start using drones to spray pesticides, but others think that will harm the environment. There's even a group of activists who think it would be inhumane to kill the Super Beetles, and they're always downtown protesting.

Everything's different at school, too. Lunch is gross. We used to have yummy sandwiches and snacks, but now all we get is this thing that looks like a hot dog bun wrapped in plastic. Mrs. Smith, the lunch lady, says it's because there aren't enough fresh foods to go around.

Parameters

Time:

Place:

Topic:

WARNING:
This is not an official future scene. DO NOT USE this future scene for your Practice Problem 1 Invasive Species submission.

Practice Future Scene

Invasive Species – **The Worst Day Ever!** (*Topic Activity Unit*)

Plus, we can't play outside because people are too worried about us getting bit by the beetles, which are pretty much everywhere. I'm so sick of connecting with my friends on 4D Talk instead of in person. I've played so much Virtual Soccer that I know all the possible game outcomes. I'm so bored.

At school, we learned about something called ecosystems. Mrs. Johnson said that all the creatures in a habitat exist in a balance, and when one thing gets changed, everything else changes, too. I guess that means we're part of the ecosystem, too.

I really hope my dad finds a way to solve the Super Beetle crisis, but I don't think he can do it alone. Maybe the Future Problem Solvers can come up with a way to save our community so we can have a Pumpkin Festival next year!

Your friend,

Lily

WARNING:
This is not an official future scene. DO NOT USE this future scene for your Practice Problem 1 Invasive Species submission.

Name _____

Help Save The Pumpkin Festival – Challenges

STEP 1

Directions

1. Work with your team to brainstorm challenges. Use the **Categories List** as needed to increase fluency and flexibility.
2. Each team member will select a challenge to write in the correct format. Be sure to show a cause and effect and explain why it is a challenge. Refer to your **Challenge Writing Guidelines**.
3. Write your challenges in the boxes below.

1.

2.

3.

4.

Name _____

Help Save The Pumpkin Festival – Underlying Problem

Directions

1. Review your challenges. Think about the charge at the end of the future scene. The charge directs your problem solving and is essential in writing an underlying problem. It is highlighted in the box.
2. Write an underlying problem. Remember to include the following:

Condition phrase (Because...)
Stem **&** **Key verb phrase** (In what ways might we or How might we + one action verb phrase)
Purpose (so that...)
Parameters (Time, Place, Topic)

Write your underlying problem in the box below.
Color code each section and underline your parameters.

Name _____

Help Save The Pumpkin Festival – Solutions

Directions

1. Work with your team to brainstorm solution ideas. Use the **Categories List** as needed to increase fluency and flexibility.
2. Each team member will select one solution to write in the correct format. Refer to the **Solution Writing Format** on your **Solution Blueprint**.
   - Make sure your solution is relevant. It must address the key verb phrase and supports the purpose.
   - Make sure your solution is elaborate. Include who, what, how, and why.

1.

2.

3.

4.

Name _____

Exit Ticket

What did you do well in completing the three steps of the Future Problem Solving process?

How did you contribute as a member of your team?

Did your team work well together? Give an example.

How can your team improve for the upcoming booklet?

Invasive Species

Invasive Species – **Practice Future Scene (***Topic Activity Unit***)**

On November 12, 2045, the shipping vessel MV Voyager departed for Australia along the northern sea route just north of Russia, carrying high-demand electronic products for the holiday season. In decades past, this route would have been inaccessible, but melting ice in the Arctic made it possible to travel, bumping up the ship's arrival time by several hours.

Three months later, a scientist off the coast of Queensland noted a decline in the population of some small fish and marine creatures. Most disturbing, though, was a phenomenon called coral bleaching, where coral expels algae that is necessary for a reef's survival. Research revealed the culprit to be Crustacea exotica, a fast-reproducing and highly adaptable crab species that feeds on the larvae of coral and small fish.

Scientists traced the species back to the MV Voyager, where it had hitched a ride in the non-drinkable water stored to help with the ship’s balance. Once in the waters of Australia, it spread rapidly, outcompeting native marine life and damaging the coral, including the Great Barrier Reef. Before the arrival of Crustacea exotica, the reef was already struggling due to climate change, pollution, and overfishing. Now, the loss of biodiversity has brought it to the brink of collapse, even to the point of losing its status as one of the world's great wonders.

The ramifications are not purely natural but are also devastating to the city of Queensland. With the Great Barrier Reef's decline, tourism is down, and multiple businesses are closed. Even more perilous is the position of the fishing industry, which is responsible for the livelihood of a large portion of the community. Recent statistics show that 70% of the Queensland population is currently unemployed.

In the wake of this economic crisis, the Queensland local government is lobbying for aggressive solutions, including chemical treatments and large-scale removal of the species. Although a vocal majority of citizens are calling for these measures, the Australian government is pushing back, instead advocating for long-term strategies like biosecurity and further research. They argue that more information is needed before taking drastic steps because so little is known about the species. Caught in the middle are the Australian Indigenous communities, who believe that their traditional ties to the reef entitle them to be an important voice in any discussions.

Parameters

Time:

Place:

Topic:

WARNING:
This is not an official future scene. DO NOT USE this future scene for your Practice Problem 1 Invasive Species submission.

Demands are also coming from outside Australia, particularly from nations in Asia and the Pacific that rely on Australia for imports and are concerned about bringing Crustacea exotica back to their own countries. Some have even threatened to impose trade restrictions if Australia does not act decisively.

In the face of Crustacea exotica's impact, Queensland's government and industries that rely on the GBR are under immense pressure to find a solution. Consider how Crustacea exotica has affected Queensland and write an action plan to help Queensland recover.

WARNING:
This is not an official future scene. DO NOT USE this future scene for your Practice Problem 1 Invasive Species submission.

FUTURE Problem Solving LESSON PLAN

Think About Your Progress

M

Objectives

- Students will reflect on their understanding of the first three steps of the Future Problem Solving process.
- Students will reflect on their teamwork skills.

Standards Addressed
Speaking & Listening
1, 2, 4, 6
Reading & Literacy
7
Writing
2, 3, 4, 10
Language & Vocabulary
3

Materials

- **Think About Your Progress,** 1 per student (page 76)

Preparation

1. NOTE: This will be completed after the team has completed the official Invasive Species booklet.

Procedure

1	Display a clipboard.
2	**Say:** *It is important to reflect on our experience in completing Practice Problem 1. Research reveals that reflection is a crucial step in learning because it leads to self-awareness, analyzing actions and decisions, and a deeper understanding of the learning experience.*
3	**Say:** *Reflecting on our preparation, understanding the first three steps of the problem solving process, the official booklet, and our teamwork will help us to set goals for Practice Problem 2: Invasive Species.*
4	Distribute **Think About Your Progress**.
5	**Say:** *It is important to think carefully about each question beginning with introducing the Invasive Species topic and to consider future growth in the steps of the problem solving process.*
6	Provide time for students to complete the reflection.

Closure

1. Ask the team members if they want to share their ideas.
2. Provide time for a team discussion.
3. **Say:** *We will receive important feedback from the evaluators about our work, which will also help us prepare for the next topic, Invasive Species.*
4. **To The Coach:** The reflection and team evaluation results will provide valuable feedback for you in creating lessons for the Invasive Species topic.

Name _____

Think About Your Progress

M

REFLECTION CHECKLIST

PRACTICE PROBLEM ONE

- ☐ **RESEARCH:** I completed the research and identified challenges.
- ☐ STEP 1 **CHALLENGES:** I understand this step and I am able to write challenges that show cause and effect.
- ☐ STEP 2 **UNDERLYING PROBLEM:** I understand the importance of this step and can name the four parts of an underlying problem.
- ☐ STEP 3 **SOLUTIONS:** I can write a Relevant and Elaborate solution.
- ☐ **TEAMWORK:** Rate your group's teamwork on a scale of 1 - 5 (five is the highest).

How do you feel about learning and using the 6-step process?
How do you feel about your contributions to the team's work?

Name _____

Document Your Journey

Book Creator is an excellent and easy-to-use website. Create a digital portfolio of your Future Problem Solving journey this year, beginning with completing your first booklet on Invasive Species. Book Creator allows you to design portfolios, including text, images, audio recordings, and videos. You will be able to review your Portfolios throughout the year to reflect on your growth through each topic.

Be creative in developing your Future Problem Solving Portfolio. Here are some ideas to get your team started.

Meet the Team: Create a video in which each of member of your team shares your individual roles and goals for this year's competition. (Teammates may change throughout the year; that's okay!)

Key Research Findings: Write, record, or sketch and draw interesting facts/challenges you discovered in your research on Invasive Species.

Problem Solving in Action: You might make a video of your team when you begin this activity and then video the team again before and after your next booklets. You can interview each other, highlighting key decisions, challenges you faced, and moments of success during the experience.

Favorite Solutions: You can include your favorite creative solutions in the portfolio. Create an elevator pitch or a commercial to sell your solution.

Teamwork Awards: Create awards for listening, respect, conflict resolution, time management, and decision-making.

FUTURE Problem Solving

Additional curricular resources

We hope you find this edition of our activity unit series to be a valuable resource as your students gather knowledge about Future Problem Solving topics of study.

Invasive Species Research Unit

Our research unit on this topic contains a wealth of curricular resources for use with students in a variety of settings, including out-of-school time. The topic research overview identifies major themes and concepts while the resources section includes vocabulary, discussion topics, learning prompts, and assessments. Also, our curated list of suggested readings and digital resources for the topic contains helpful summaries.

Global Issues Champions Series

This series showcases student written work for the 2024 Global Issues world champion team and individual competitors by division. Their full evaluations are included. To use this publication as a coaching tool, first review the Air Quality future scene with your students. Then ask students to complete a booklet using the future scene. You can do this as a mock competition or step by step as practice. For students looking to deepen their understanding of evaluations, we recommend that you give each team a copy of the student work, step by step. Ask students to identify strengths and weaknesses in the sample work based on their understanding of the scoring rubric. Review the evaluation concepts identified in each step and look at the scores and feedback from evaluators together.

Education Standards

Our Future Problem Solving process fulfills a wide variety of education standards. We take connecting with these standards into account when developing our program materials. Teachers can easily tailor Future Problem Solving content to meet their specific education system and local requirements as needed.

How our topics are selected

Our topics represent important challenges from business, civics, society, science, and technology and serve as the thematic basis for given problem solving situations. Each school year, students get 3-5 opportunities to solve important near-future global issues based on their progress in local and regional competitions. To be considered, a topic must be broad enough to appeal to participants living around the globe, offer a range of themes and issues to explore, and be considerate of a variety of views. Lastly, of course, every topic must be accessible for all, from ages 8 to adult.

We welcome submissions of topic ideas from anyone year round. Our topics committee reviews, refines, and categorizes submissions into our diverse strands. Then options are narrowed down and screened by our regional affiliate leaders. They pre-select top candidates for each of the category strands to present to our entire global community for a vote. The community's input, including students, heavily influences the final selection. We announce topics for the upcoming competition season March 1.

About Future Problem Solving

Future Problem Solving proudly celebrates over 50 years of placing more than a million young people at the core of a dynamic, purposeful learning experience. Each year K-12 students around the world participate in a variety of challenges designed to empower curious youth to become changemakers. Problem solvers learn how to think, not what to think, and gain skills they need to succeed in work and life. Our programs help young people develop their own voices and the confidence to use them.

To learn more about Future Problem Solving, to submit a topic idea, or contact us, visit fpspi.org.