

A View from Above:

Saving Ecosystems from Invasive Species

Learning Activity – Celebrating Diversity from Space Association of Space Explorers

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NOTE: See also Student Handout – View From Above

Description

Students view Earth's incredible biodiversity from the cupola of the International Space Station. Students work in teams to research the impact of invasive species on biodiversity in ecosystems. Student teams will research, design and build a model that provides a solution for an invasive species.

Grade Level

Grades 6-9

Duration

2-3 weeks

Learning Goals

- Students should be able to explain the impact of invasive species on biodiversity in ecosystems using evidence from research.
- Students should be able to apply their research to design and build a model that addresses a specific invasive species problem.

NGSS Standards:

MS-LS2-4: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

MS-LS2-5: Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

MS- ETS1.A: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

Materials

- Video: <https://www.earthmusictheater.org/Your-Playlist>
- A View From Above Student Handout
- Access to the internet for research and design of visual presentation.
- Access to apps like canva or powerpoint.
- Makerspace materials (construction paper, cardboard, hot glue guns, markers, paint)

Lesson Activities

Day 1 & 2

Start by showing clips from the video [55 Minutes of Glorious Earth](#). Students make observations about the video and reflect in their journal on the question:

How can the views from the International Space Station help ecologists study the impact of invasive species on Earth?

Students are introduced to their mission objective: After viewing Earth's incredible biodiversity from the cupola of the International Space Station, your team of ecologists will research, design and build a model that provides a solution for an invasive species.

Students will be placed in groups of 3-4, assigned an invasive species, decide on group roles and begin research using page 1, 2 & 3 in the A View from Above handout.

Day 3:

Students complete the 'quick draw' on page 4 of their A View from Above handout individually. They will have 5 minutes to sketch their quick draw model. They will then have 1 minute a piece to share their model with their group. While listening to their group members share, students will reflect on what they love and what clarifications they need on page 4. Students can then begin pages 5 & 6 of the A View from Above handout where they complete a group draft and decide on materials.

Days 4-7:

Students begin planning and building their model in Makerspace. Materials suggestions:

Cardboard, electric scissors, construction paper, markers, colored pencils, paint, paint brushes, hot glue guns

Days 8-10:

Introduce presentation and mission patch on page 7 & 8 of A View from Above handout. Student groups will continue working on their presentation and mission patches.

Day 11-12:

Student presentations and/or gallery walk.

Possible Extensions:

Host a 'day at the museum' event where you invite community members and/or students to see student learning. Partner with a local museum to have your student projects displayed.

Reflection for Teacher

This project has been an incredible experience with students! We have partnered with a local science museum and they have offered to host student projects in a glass case over the winter break. This has really elevated the excitement level for students. Reflecting on this project, I would introduce it earlier in the Ecology unit so that students can brainstorm ideas and materials throughout the unit. I would also share news clips of what is currently being done around the country to help combat invasive species.

A View from Above: Saving Ecosystems from Invasive Species

Mission Objective: After viewing Earth’s incredible biodiversity from the cupola of the International Space Station, your team of ecologists will research, design and build a model that provides a solution for an invasive species.

1. After viewing the Earth from the cupola of the International Space Station, reflect on the views of Earth’s ecosystems from space. How can ecologists use these views to monitor biodiversity and ecosystem balance?

Mission Instructions:

1. You will be assigned one invasive species.

Species Assigned:

Group Roles (all group members will help with each part of model and presentation)

Builder (designing and building a solution)	
Communications (create descriptions to share groups ideas)	
Researcher (making sure research is accurate and complete)	
Artistic Director (make sure presentation and prototype is professional)	

Name(s):

Project Title:

Invasive/Introduced Species Research

Part 1: Invasive Species Introduction

1. What is an invasive species?

2. Why are invasive species a problem for ecosystems? (Things to consider- the food web and economy).

3. Invasive species you are focusing on:.

- Name of species: _____

- Where is it invasive?

- What problems does it cause (or what problems is it predicted to cause if not controlled)?

Part 2: Research and Observation

1. Where is this invasive species native range?

2. How was this species introduced (accidental or intentional).

3. How do ecologists identify this invasive species? Are there signs that this species is in the environment?

4. What are the methods of control that ecologists are using to control or prevent this species from spreading?

Sources:

Part 3: Developing Model

Quick Draw of: Solution for your invasive species that helps to educate, prevent and/or solve the problems being caused by this invasive species.

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Ideas I Love	Clarifications

Part IV: Project Planning Sheet

Name(s):

Project Title:

1. Identify the Problem that you are trying to solve.

2. Criteria and Constraints

- **Criteria (What must the solution do?):**
 - Model must be able to identify, monitor and control an invasive species.
 - Model should not have a negative impact on other species and/or the environment.
- **Constraints (What limitations must you work within?):**
 - Model must be no larger than 20 inches on any side.
 - Materials are safe and easy to handle and easily accessible.
 - Model should be completed within the time limit provided.

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Group Draft:

3. Draw a color-coded, neatly labeled diagram of your model. Use a whiteboard for your rough draft.



Materials Needed	Source

A View From Above: Saving Ecosystems from Invasive Species

Goal:

Create a visual presentation using an app like canva or powerpoint. Your presentation will showcase the model your team built to help solve a problem caused by an invasive species.

Presentation Requirements:

- **Project Title (creative, related to problem you are solving)**
- **What is the problem you are trying to solve?**
 - Why is it important to address invasive species?
- **Name of your invasive species**
 - Where is this invasive species found?
 - How does this species impact ecosystems?
 - Key characteristics of this species (how is it identified).
 - Why is this species considered invasive?
- **Your Solution**
 - Include a digital model of your solution and how it will be used in the ecosystem your species is invasive in.
 - Why is your model important?
- **Reflection: What Did You Learn?**
 - What challenges did your group face while designing your prototype?
 - How did your group overcome these challenges?
- **Group Mission Patch**
 - Requirements below.

Presentation is professional and includes the following:

1. **Images:**
 - *Include pictures of your invasive species and your model.*
 - *Neat, professional and organized*
2. **Color and Fonts:**
 - *Use bright, easy-to-read fonts and colors.*
3. **Sources:**
 - *Include a list of at least 3 sources you used for your research and presentation.*

A View from Above Mission Patch

Mission Patch Instructions:

As part of your project, your team will create a **Mission Patch**. A mission patch is a symbol that represents an important mission. This mission patch will be displayed with your group's final project.

Reflecting on how the images from the International Space Station can be used to monitor the impact of invasive species on biodiversity, your team will create a digital or hand drawn mission patch that highlights your group's goals.

What to Include:

1. **Theme:** Your patch should represent the fight against invasive species.
2. **Symbols:** Choose images or symbols that represent your invasive species, their impact on the ecosystem and/or your solution. Include at least three symbols/images.
3. **Mission Name:** 'A View From Above'
4. **Colors:** Pick colors that reflect your mission to preserve Earth's biodiversity. For example, blue for water. Your mission patch should be colorful and professional.