ACTIVITY

IDENTIFYING DEFORESTATION ISSUES THROUGH ARTIFICIAL INTELLIGENCE

Time: 180-200 minutes

Grade Level: Upper Secondary

Days of Implementation: 2-3 days

Designed by: Semih Esendemir

Alignment with STEAM subjects

Science: Understanding the effects of deforestation on ecosystems.
Technology: Using AI and satellite imaging technologies.
Engineering: Processing data and using modeling techniques.
Arts: Visualizing data and practicing presentation skills
Mathematics: Calculating ratios and completing statistical analyses.

Related or achieved SDGs

- SDG13: Climate Action: Builds connections on how climate change affects land degradation.
- SDG 15: Life on Land: Engages students on the importance of protecting terrestrial ecosystems.

Objectives

By the end of the class, students will be able to:

- Explain the causes of deforestation.
- Analyze deforestation using AI tools.
- Understand how satellite images are used to detect forest loss.
- Analyze data and propose solutions.

Materials Needed

- Computers
- Software for accessing satellite images (Google Earth, ArcGIS, etc.)
- AI-based data analysis tools (TensorFlow, OpenCV, etc.)
- Story maps for presentations (ArcGIS StoryMaps builder, MIRO)

Lesson Plan

Introduction

Deforestation happens when a large quantity of trees are purposefully removed. This occurs when a forest is cleared to make space for agriculture, roads, or buildings. Deforestation can harm biodiversity and contribute to climate change. However, by using AI applications, scientists, policymakers and governments can gather accurate data on forests in order to propose solutions to combat land degradation and protect forest ecosystems.

1. Inquiry & Exploration

Text Discussion:

First, have the students read the text by artist Ellie Davies and then discuss it as a group.

“I have been working in UK forests since 2007, making work which explores the complex interrelationship between the landscape and the individual. Our understanding of landscape can be seen as a construction in which layers of meaning that reflect our cultural preoccupations and anxieties obscure the reality of the land, veiling it, and transforming the natural world into an idealisation.

UK forests have been shaped by human processes over thousands of years and include ancient woodlands, timber forestry, wildlife reserves, and protected Areas of Outstanding Natural Beauty. As such, the forest represents the confluence of nature and culture, of natural landscape and human activity. Forests are potent symbols in folklore, fairy tales, and myth, places of enchantment and magic as well as of danger and mystery. In recent history, they have come to be associated with psychological states relating to the unconscious.

Against this cultural backdrop, my work explores the fabricated nature of landscape by making a variety of temporary and non-invasive interventions in the forest, which place the viewer in the gap between reality and fantasy. Creating this space encourages the viewer to re-evaluate the way in which their relationship with the landscape is formed, and the extent to which it is a product of cultural heritage or personal experience.

Throughout my practice small acts of engagement respond to the landscape using a variety of strategies, such as making and building using found materials, creating pools of light on the forest floor, using craft materials such as paint and wool, introducing starscapes taken by the Hubble Telescope or glittering light from the surface of the sea.

These altered landscapes operate on a number of levels. They are a reflection of my personal relationship with the forest, a meditation on universal themes relating to the psyche, and they explore the concept of landscape as a social and cultural construct."

Discussion Questions:

- What is going on in this text?
- What makes you say that?
- What else can you find?
- In your opinion, what do forests represent to humans?

After discussing the text, students explore real-world challenges related to deforestation.

Discussion Questions:

- What is deforestation, and why is it important?
- What is land degradation?
- What do deforestation and land degradation have to do with climate change?

2. Investigation & Research

- Review academic papers and reports on SDG 15, such as:
  - SDG 15 (United Nations).
  - SDG15 (The Global Goals).
  - Deforestation and Forest Loss (Our World in Data).
- Research how AI can help detect forest loss. Some examples:
  - Could AI help deforestation? WWF
- Discuss which parameters are used in satellite image analysis. For example, parameters related to the colors and light captured by the satellites from the surface, spatial factors that indicate the detail level of the images,; the frequency at which the satellites capture forest images (daily, weekly, or monthly), or parameters related to the image's position on the map.
  - NASA. How to Interpret a Satellite Image: Five Tips and Strategies
  - EXATEL. The basics of satellite Earth observation

Investigation Questions:

- In which regions of your country is deforestation most common?
- How can artificial intelligence help detect this issue?
- What information can we obtain by analyzing satellite images?

3. Implementation & Design

- Students create a story map showing deforestation in their country and how AI can prevent the loss of forests. You can use some digital tools like
  - ArcGIS StoryMaps builder
  - MIRO templates
- They can use satellite images or photos in the story map, from Google Earth or Global Forest Watch

4. Testing & Reflection

Reflection Questions:

- Did the data obtained meet our expectations?
- Did AI models tracking forest loss seem to work correctly?
- How can we develop practical solutions to prevent deforestation in the future?
- Can the same analysis be applied to different regions?

5. Presentation & Action

- Groups present their findings to the class.
- Discussions focus on the impacts of deforestation and possible solutions.

Criteria

- Use of research skills.
- Quality of data analysis.
- Quality of presentation skills.
- Ability to propose solutions to combat deforestation.

Reflection

- Did students fully understand?
- What should be improved for next time?
- Was the lesson interesting enough for the students?