E-module 2: Recycling of plastic containers for ecological products (1º Primaria)

Objectives

- Knowledge:
  - Understand the importance of recycling plastic containers.
  - Learn about eco-friendly products made in greenhouses.
  - Discover how artificial intelligence (AI) can help with recycling. •

  Skills:
  - Sort and classify different types of plastic.
  - Analyze the life cycle of plastic products.
  - Brainstorm creative ways to reuse plastic containers.
  - Use AI tools to identify and sort recyclable materials.
- Attitudes:
  - Develop a sense of responsibility towards the environment.
  - Appreciate the role of technology in solving environmental problems.
  - Foster creativity and innovation in finding sustainable solutions.

Materials

- Assorted plastic containers (clean and labeled)
- Markers, crayons, colored pencils
- Worksheets with recycling symbols and facts
- Access to computers or tablets with internet
- AI-powered recycling apps or websites (if available)
- Materials for creating recycled crafts (scissors, glue, etc.)

Lesson Plan 1: Introduction

- Begin with a brief discussion about the importance of recycling and its impact on the environment.
- Show examples of eco-friendly products made in greenhouses and discuss their benefits. (https://www.youtube.com/watch?v=2FGdCh9F6Ho)
- Introduce the concept of artificial intelligence and how it can be used in recycling.

Lesson Plan 2: Sorting and Classifying Plastics

- Divide students into groups and provide each group with a set of plastic containers.
- Have students sort the containers based on their type (e.g., PET, HDPE, PVC).
- Discuss the different properties of each type of plastic and their recyclability.

Lesson Plan 3: The Life Cycle of Plastic

- Use a visual aid or video to explain the life cycle of a plastic product, from production to disposal. (https://www.youtube.com/watch?v=MMPDkorbbCQ)
- Discuss the environmental impact of plastic waste and the importance of reducing, reusing, and recycling.

Lesson Plan 4: AI and Recycling

- Introduce AI-powered recycling apps or websites that can identify and sort recyclable materials. (Descarga A.I.R-E Asistente Inteligente de Reciclaje para Android, Descarga A.I.R-E Asistente Inteligente de Reciclaje para iOS, Descarga Cleanspot para Android, Descarga Cleanspot para iOS, Descarga Recicla y suma para Android, Descarga Recicla y suma para iOS, iRecycle, Gimme 5, RecycleNation, RecycleSmart, Recycle Right, Brisbane Bin and Recycling, Grow Recycling, Recycle!)
- Have students use these tools to test their knowledge of plastic types and recyclability.
- Discuss the potential of AI to improve recycling efficiency and reduce contamination.
- Workshop about recycling with a local company

Lesson Plan 5: Creative Reuse

- Brainstorm creative ways to reuse plastic containers instead of throwing them away.
- Have students design and create their own recycled crafts using the plastic containers.
- Share and discuss the different creations, highlighting their functionality and aesthetic appeal.

Assessment

• Observe students' participation in discussions and activities. • Evaluate their ability to sort and classify plastics correctly.
• Assess their understanding of the life cycle of plastic and its environmental impact. • Review their creative reuse projects, considering their originality and functionality.

Extension Activities

• Research different types of AI technologies used in recycling.
• Visit a local recycling facility to see how plastics are processed. (visita empresa local)
• Organize a school-wide recycling campaign to raise awareness about plastic waste. • Create a presentation or video to share what they learned with other students and the community.

E-module 3: saving and quality of water used in greenhouses (2º Primaria)

Learning Objectives:

- Students will understand the importance of water conservation in greenhouses.
- Students will learn about factors affecting water quality in greenhouse systems.
- Students will explore how artificial intelligence (AI) can be used to optimize water usage and maintain water quality in greenhouses.
- Students will develop critical thinking and problem-solving skills related to water resource management.

Materials:

- Whiteboard or projector
- Markers or pens
- Handouts with activity instructions and questions
- Access to computers or tablets with internet connection
- Optional: materials for building mini-greenhouses (plastic bottles, soil, seeds)

Lesson Plan 1: Introduction to Water Conservation in Greenhouses

- Engage**:** Begin with a class discussion about the importance of water for plant growth and the challenges of water scarcity.
- Explore: Introduce the concept of greenhouses and their role in agriculture. Discuss the specific water needs of greenhouse systems.
- Explain**:** Explain the importance of water conservation in greenhouses to reduce water waste and minimize environmental impact.
- Elaborate**:** Show examples of different water-saving techniques used in greenhouses, such as drip irrigation and rainwater harvesting. (https://www.youtube.com/watch?v=2ExVLHs--Iw)
- Evaluate: Have students brainstorm and present their own ideas for water conservation in greenhouses.

Lesson Plan 2: Factors Affecting Water Quality in Greenhouses

- Engage: Start with a review of the water cycle and its relevance to greenhouse systems.
- Explore**:** Discuss the potential sources of water contamination in greenhouses, such as fertilizers, pesticides, and pathogens.
- Explain: Explain the importance of maintaining water quality for plant health and human safety.
- Elaborate: Introduce methods for testing and monitoring water quality in greenhouses, such as using pH meters and water testing kits.
- Evaluate: Conduct a class experiment to test the pH levels of different water

samples.

Lesson Plan 3: Introduction to Artificial Intelligence

- Engage: Begin with a fun activity where students try to teach a computer to recognize objects or solve a simple puzzle.
- Explore: Introduce the concept of artificial intelligence (AI) and its applications in various fields.
- Explain: Explain how AI can be used to analyze data, make predictions, and automate tasks. (Infogr.am, ArcGis Online, Piktochart, Flourish,Tableau Public…) • Elaborate: Discuss the potential benefits of using AI in agriculture, such as optimizing crop yields and reducing resource consumption.(https://www.youtube.com/watch?v=HpL1CCQt5Bg) • Evaluate: Have students brainstorm and present their own ideas for how AI could be used in agriculture.

Lesson Plan 4: AI for Water Management in Greenhouses

- Engage**:** Review the concepts of water conservation and water quality from the previous days.
- Explore**:** Introduce the concept of using AI to monitor and control water usage in greenhouses.
- Explain: Explain how AI-powered systems can analyze data from sensors to optimize irrigation schedules and nutrient delivery.
- Elaborate: Discuss the potential benefits of using AI for water management in greenhouses, such as reducing water waste and improving crop yields. (https://www.youtube.com/watch?v=RU53ordm-nc)
- Evaluate: Have students research and present examples of AI-powered water management systems used in greenhouses.

Lesson Plan 5: Project: Designing an AI-Powered Greenhouse

- Engage**:** Review the key concepts learned throughout the week. • Explore: Divide students into groups and challenge them to design their own AI-powered greenhouse.
- Explain: Provide students with guidelines and resources for their projects, including information on sensors, AI algorithms, and greenhouse design. (https://invernaderounicaescri.wordpress.com/desarrollo-del-proyecto/) • (https://www.youtube.com/watch?v=odD9rxIVZns)
- (alarcontrol, atenix)
- Elaborate: Have students work in groups to develop their designs, considering factors such as water conservation, water quality, and AI integration.
- Evaluate**:** Have each group present their project to the class, explaining their design choices and the potential benefits of their AI-powered greenhouse.

Assessment:

- Observe student participation in class discussions and activities. •

Review student responses on handouts and worksheets.
• Evaluate student project presentations and designs.

Extension Activities:

• Visit a local greenhouse or farm that uses AI technology. • Invite a guest speaker from the field of agriculture or AI. • Have students research and write reports on different AI applications in agriculture.