

## **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.



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### 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://invernaderounicaescrri.wordpress.com/desarrollo-del-proyecto/>) •  
(<https://www.youtube.com/watch?v=odDgrxIVZns>)
- (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.