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EcoLogistics: Deliver Life to Biomes with Mobile Robotics

Objectives and Tasks

Learning Objectives

1. Identify the characteristics of different biomes (jungle, tundra, desert, forest, savanna, etc.).
2. Recognize essential elements that support life in each ecosystem.
3. Program a robotic car with Micro:bit that responds to movement to navigate a simulated environment.
4. Reinforce the idea of interdependence in nature and the importance of ecological balance.

Didactic Tasks

1. Create a physical scenario with images or models of different biomes.
2. Design an "eco-car" with Micro:bit + Artec that moves and deposits symbolic elements.
3. Program the vehicle to respond to tilt or movement direction (using accelerometer).
4. Simulate the distribution of "life" (elements such as water, light, animals...) according to the biome.

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5. Analyze how biomes change when their conditions are altered.

Interdisciplinary Relations

Related subjects

1. Technology: programming accelerometer and motors.
2. Artistic Education: visual design of biomes and represented elements.
3. Geography: global location of biomes.
4. Spanish Language: creation of narratives or oral presentations of the car's journey.

Practical Applications

1. Reinforce the concept of global ecological diversity.
2. Understand how small changes affect ecosystem balance.
3. Foster systemic, logical, and hands-on thinking.

Resources and Materials Needed

Physical Resources

1. Micro:bit board, motor board, and DC motors (as in your image).
2. Artec pieces to assemble the car.
3. Cards or mini-objects representing water, animals, solar energy, pollution, etc.
4. Physical scenario divided into zones/biomes (can be on the floor, cardboard sheets, or tables).

Digital Resources

1. MakeCode environment to program the car.
2. Projector or printer to create biome images.
3. Observation template to record necessary elements in each biome.

Session Structure

Introduction

1. Explanation of the movements of the Solar System: rotation, translation, and the relationship between distance to the Sun and orbital speed.
2. Presentation of the challenge: program Otto to follow the orbit that a planet would have around the sun.

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Development

1. Design the vehicle and select biomes.
2. Programming and movement.
3. Challenge: carry animals, plants, and atmospheric elements to their respective habitat.

Closure

- Each group explains the characteristics of their planet.
- Guided reflection: What happens if we bring an "inappropriate" element?

Expected Outcomes

Key Learnings

1. Knowledge of terrestrial biomes and their key elements.
2. Application of computational thinking with sensors.
3. Understanding of fragility and ecological balance.
4. Improvement of cooperation, creativity, and oral expression.

Final Products

1. Functional vehicle programmed with Micro:bit.
2. Biomes scenario.
3. Oral presentation from each group.

Additional Notes

Suggestions

- The simulation can be recorded on video for review or sharing.
- Integrate sound effects or personalized LED icons according to species.
- Repeat the activity by changing roles among groups to understand different perspectives.

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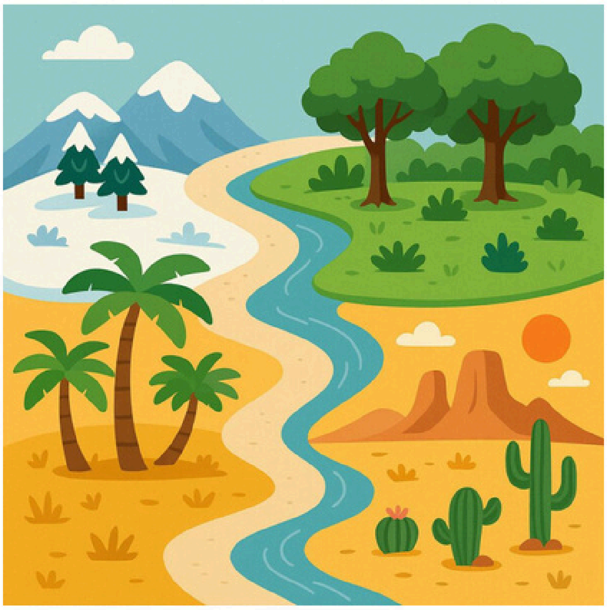
Possible Extensions

- Simulate phenomena such as deforestation, drought, or introduction of invasive species.
- Add sensors (temperature or light) to simulate real environmental conditions.
- Expand the number of programmed interactions to create a more complex ecological network.

Scenario Example



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WE TEACH ROBOTICS

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Programming Example

https://makecode.microbit.org/S33098-04932-61818-72817