

# 7th Grade Science STEAM Integration

**Unit 7: Populations and Resources**

**Topic: Coding and Robotics**

**Time: 2 Days**

## Standards:

[MS-LS2-1](#). Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

[MS-LS2-2](#). Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

[MS-LS2-3](#). Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

[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.

## Scenario

You're designing a simulation game for an ecology lab to show how resource availability and reproduction affect predator and prey populations over time. Using Scratch, you'll build an interactive model where players must keep an ecosystem in balance.

## Success Criteria

I can code an interactive simulation that models how reproduction and resource availability affect population size.

## Lesson Outline

### Day 1: Plan and Begin Coding

1. Concept Review (10 min):
  - Review basic predator-prey dynamics (e.g., rabbits and foxes).
  - Discuss inputs that increase or decrease populations.
2. Game Design Plan (10 min):
  - Create logic:
    - If food increases → prey population increases
    - If prey increases → predators increase
    - If no food or too many predators → populations crash
3. Start Scratch Project (25 min):
  - Sprites: prey, predators, food resources
  - Code movement, reproduction cycles, and population counters
  - Add conditions for starvation or extinction

### Day 2: Finish, Play, and Reflect

1. Complete Coding (20 min):
  - Add a point system, messages, or difficulty scaling
2. Playtest (15 min):
  - Peer test each other's games.
  - Try to achieve ecosystem balance for 10+ time steps.
3. Reflection (10 min):
  - What made balance hard to achieve?
  - How does this reflect real ecosystems?

