

# 8th Grade Science STEAM Integration

**Unit 3: Magnetic Fields**

**Topic: Coding and Robotics**

**Time: 2 Days**

## Standards:

[MS-PS2-3](#): Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.

[MS-PS2-4](#): Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.

[MS-PS2-5](#): Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.

[MS-PS3-2](#): Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.

## Scenario

You're part of the tech development team at the Universal Space Agency. You'll use a micro:bit to code a launch tracker that displays energy transfer and motion as part of magnetic system testing.

## Success Criteria

I can program a micro:bit to simulate the motion of a magnetic launch system and provide feedback about energy transfer and acceleration.

## Lesson Outline

### Day 1: Programming the Launch Tracker (45 min)

1. Review: Force, Motion, & Sensors (10 min)
  - Use micro:bit accelerometer to detect motion
  - Discuss energy "input" (shake or button) and "output" (scroll, light, sound)
2. Plan Simulation Logic (10 min)
  - Inputs:
    - Shake = simulate launch
    - Button A = increase power
    - Button B = emergency stop
3. Code in MakeCode (25 min):
  - Add variables to store launch energy
  - Use LEDs to show strength of launch (low/med/high)
  - Optional: play sound on high-G launch

### Day 2: Run, Refine, and Connect (45 min)

1. Test and Debug Code (15 min):
  - Simulate real launches or integrate with student launcher
  - Ensure responses match sensor readings
2. Connect to Engineering Build (15 min):
  - Students explain how this simulation relates to force & motion in their launcher
  - Option to embed micro:bit on launcher to "track" launch attempts
3. Wrap-Up & Reflection (15 min):
  - Prompt: *How did magnetic force and coding combine to improve understanding of energy systems?*



