# Innovator's Challenge: Sphero Course Design

**Objective:**

- Develop creativity and problem-solving skills through course design and coding.
- Foster an understanding of the "innovator" learning profile.
- Encourage teamwork and iterative improvement.

**Standards:**

- CSTA 1A-AP-10: Develop programs with sequences and simple loops to express ideas or address a problem.
- NGSS 3-5-ETS1-2: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- ISTE 4: Innovative Designer: Students use a variety of technologies within a design process to identify and solve problems by creating new, useful, or imaginative solutions.

**Materials Needed:**

- Sphero Mini robots
- Kinazium kits or Legos and Lego platforms
- Coding devices (tablets or computers)

**Setup:**

1. Provide materials for students to construct obstacle courses.
2. Ensure each group has access to a Sphero robot and a coding device.

**Procedure:**

1. **Introduction (10 minutes):**
    - Explain the objective of the activity and introduce the Sphero robots.
    - Discuss the concept of innovation and the "innovator" learning profile.
2. **Planning Phase (15 minutes):**
    - Allow students to brainstorm and sketch their obstacle course designs.
    - Encourage creativity and practical design thinking.
3. **Building Phase (30 minutes):**
    - Students build their obstacle courses using Kinazium kits or Legos.

    - Ensure each course is complete and functional.
4. **Coding and Testing (20 minutes):**
    - Introduce basic block coding for the Sphero robots.
    - Allow students to code their robots to navigate their own courses.
    - Test and refine their designs.
5. **Course Rotation and Innovation (30 minutes):**
    - Groups rotate to another group's course and test it with their Sphero robot.
    - Each group identifies an area for improvement or adds a new innovative element to the course.
    - Encourage students to think like innovators and improve the existing design.
6. **Reflection and Discussion (15 minutes):**
    - Gather students to discuss their designs, innovations, and outcomes.
    - Provide feedback and encourage reflection on the process of innovation and problem-solving.

**Guiding Questions:**

- How did your initial design perform? What changes did you make to improve it?
- What challenges did you face while coding your Sphero to navigate the course?
- How did you approach adding an innovation to another group's course?
- What does it mean to be an innovator, and how did you demonstrate this in the activity?

**Conclusions:**

- Students should understand the basics of block coding with Sphero robots.
- Highlight the importance of innovation and iterative improvement in problem-solving.
- Emphasize the role of creativity and teamwork in successful engineering projects.