Sphero Mini Golf Madness

Objective:

- Teach students basic block coding with Sphero robots.
- Develop engineering design skills through hands-on creativity.
- Foster teamwork, problem-solving, 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-ETS1-1: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- 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.

Materials Needed:

- Sphero Bolt or Sphero Mini robots
- Cardboard for constructing courses
- Tape, markers, and scissors
- Black paper circles to represent holes
- Coding devices (tablets or computers)

Setup:

1. Provide materials for students to construct mini putt-putt 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 basics of block coding and the engineering design process: Ask, Imagine, Plan, Create, Test, and Improve.
2. **Planning Phase (20 minutes):**
    - Allow students to brainstorm and sketch their mini golf course designs.

    - Encourage creativity and practical design thinking.
3. **Building Phase (30 minutes):**
    - Students build their mini golf courses using cardboard and other materials.
    - Ensure each course has a designated "hole" marked with a black paper circle.
4. **Coding Practice (20 minutes):**
    - Introduce basic block coding for the Sphero robots.
    - Allow students to practice coding their robots to navigate simple paths.
5. **Testing and Iteration (30 minutes):**
    - Students code their robots to navigate the course to the hole.
    - Each script of code counts as a swing.
    - Optionally, assign a par to each course.
    - Allow time for adjustments and iterative improvements after testing.
6. **Reflection and Discussion (10 minutes):**
    - Gather students to discuss their designs, strategies, and outcomes.
    - Provide feedback and encourage reflection on the engineering design process.

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 teamwork and communication impact your design process?
- How did you decide on the par for your course?

Conclusions:

- Students should understand the basics of block coding with Sphero robots.
- Highlight the importance of the engineering design process in problem-solving.
- Emphasize the role of creativity and iteration in successful engineering projects.