Spin It to Win It: Engineering Spinners with Linking Cubes (2nd-3rd Grade)

Grade Levels: Second to Third Grade

Duration: 60 minutes

Standards:

- Next Generation Science Standards (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.
    - 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.
- Common Core State Standards (CCSS):
    - CCSS.ELA-LITERACY.SL.2.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 2 topics and texts, building on others' ideas and expressing their own clearly.
    - CCSS.ELA-LITERACY.SL.3.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

Objectives:

- Students will collaborate in pairs to design and construct a spinner using linking cubes, incorporating principles of symmetry and balance.
- Students will explore different spinner designs and compare their effectiveness in achieving long spin times.
- Students will engage in the engineering design process by testing their spinners, analyzing results, and making iterative improvements.
- Students will participate in a friendly competition to determine the longest spinning spinner.

Materials:

- Linking cubes
- Timer or stopwatch
- Writing/drawing materials for recording observations

Procedure:

Introduction (5 minutes):

- Review the concept of spinners and introduce the engineering challenge.
- Emphasize the importance of creativity, precision, and problem-solving in designing effective spinners.

Design and Construction (20 minutes):

- Pair students and distribute linking cubes.
- Challenge students to design and construct spinners that demonstrate symmetry and balance.
- Encourage students to experiment with different designs and configurations.

Testing Phase (20 minutes):

- Invite students to test their spinners by spinning them and measuring the duration.
- Encourage students to record their observations and compare the performance of different spinner designs.

Adjustments and Reflection (10 minutes):

- Allow students to make adjustments to their spinners based on their observations and test results.
- Facilitate a class discussion where students share their findings and reflect on the effectiveness of their spinner designs.

Friendly Competition (5 minutes):

- Organize a friendly competition where students take turns spinning their spinners.
- Use a timer or stopwatch to measure the duration of each spin.
- Congratulate the winners and celebrate the accomplishments of all students.

Assessment:

- Observation of students' collaboration, creativity, and engagement during the activity.
- Review of students' recorded observations and reflections on their spinner designs.
- Measurement of spinner spin times during the friendly competition.

Extension:

- Provide differentiated challenges for advanced students, such as designing spinners with specific attributes (e.g., incorporating multiple levels, incorporating additional elements for decoration).
- Encourage students to share their spinner designs with their classmates and explain the engineering principles behind their creations.