



Knock it Down!

In this activity, students will engage in a Sphero Mini driving activity! Students will work on knocking down all the pins as quickly as possible. Students will set up pins in individual spaces across the room, using the Activity Kit materials. Using rails and arches to “protect” the pins, students will determine which setting and speed can knock down the pins with the most force. This will lead into a discussion of motion and force as we engage in a unique activity with our Sphero Mini!

Materials

- Sphero Mini Robot
- Activity Kit Bowling Pins
- Device to control Sphero Mini (iPad, cellphone, etc.)
- Sphero Play App
- Space to record observations (paper/pencil or online platform)
- Internet access

Student Objectives

- Students will learn the basics of motion and force
- Students will be able to identify the most effective speed and setting to knock down the pins
- Students will collaborate with peers to knock down the pins and share observations
- Students will learn programming skills to drive their Sphero Mini robots

Teacher Technology Skills Needed

- Understanding of the Sphero Mini
- Understanding of Sphero Play App
- Skills for driving and controlling the Sphero Mini

Standards

NGSS Standards:

- 3-PS2-1 Motion and Stability: Forces and Interactions- Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
- 3-PS2-2 Motion and Stability: Forces and Interactions
Make observations and/or measurements of an object’s motion to provide evidence that a pattern can be used to predict future motion.
- 3SL1: Participate and engage effectively in a range of collaborative discussions with diverse peers and adults, expressing ideas clearly, and building on those of others.



- 3SL4: Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.

Procedure

1. Start the lesson by reviewing key motion and force concepts.
2. Once students have an overview of force and motion, they will be ready to take on the “Knock it Down” challenge. Students will set up the provided bowling pins throughout the room (space permitting).
3. Then, students will set up the arches and rails from the activity kit to surround/protect the pins.
4. Next, students will use the Sphero Mini to knock down the pins. This will be done by using the Sphero Play App.
5. Students will use trial and error to knock down the pins and determine the effectiveness of each mode (slingshot, tilt, drive, etc.) and speed settings.
6. This can continue until all pins are knocked down. During this process, students can document the effectiveness of each setting and how force and motion is impacted.
7. This lesson will conclude by having a group discussion about which method was most effective in knocking down the pins as well as key concepts and findings while using the Sphero Mini robot.

Extension Activity

- Task students with the challenge of designing additional pins to knock down. This can be done using classroom or household objects. The additional pins will be used to add difficulty to the activity and promote discussion on how easy or difficult it was to knock down certain materials.
- Challenge students by having them create a story to go along with the activity. These stories can be written by hand or done digitally. Once they are created, students can share them out with their peers and have one another read them.