What's Your Angle?

Students will use the Sphero Mini to explore acute, right, and obtuse angles. Students will learn about and be able to identify the different types of angles. They will then measure the angles, program Sphero to drive over angles on a pre-made template and determine what type of angle it is. In this lesson, students will review different types of angles and have some coding fun with their Sphero Mini!

Materials

- Sphero Mini Robot
- Angles Worksheet PDF
- Device to control Sphero Mini (iPad, cellphone, etc.)
- Sphero Edu App or Website
- Space to record responses (paper/pencil or online platform)
- Internet access
- Protractor or virtual protractor

Student Objectives

- Students will learn the basics of angles - acute, obtuse, and right angles
- Students will be able to identify and measure different types of angles
- Students will collaborate with peers to share and reflect on their findings
- Students will learn coding and programming skills to drive their Sphero Mini robots

Teacher Technology Skills Needed

- Understanding of the Sphero Mini
- Understanding of Sphero Edu App or Website
- Beginner block-based coding experience

Standards

NGSS Standards:

- 4.MD.5- Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint and understand concepts of angle measurement.
- 4.MD.5a.- Recognize an angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.

- 4.MD.5b- Recognize an angle that turns through n one-degree angles is said to have an angle measure of n degrees.
- NY-4.MD.6- Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
- NY-4.G.1- Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
- NY-4.G.2a.- Identify and name triangles based on angle size (right, obtuse, acute).

Procedure

1. Start the lesson by reviewing selected angle vocabulary with students:
- Angle: A place where two lines intersect
- Acute: Measures less than 90 degrees
- Right: Measures 90 degrees
- Obtuse: Measures greater than 90 degrees but less than 180 degrees
2. Once students have an overview of angles, they will look at their provided Angles PDF and use their protractor to measure each angle.
3. Then, students will determine if the angle is an acute, obtuse, or right angle and record their responses.
4. Next, students will use the Sphero Mini to move over the angle. This will be done by using the Sphero Edu App. At this point, students can review basic coding concepts to code their Sphero Mini to create the angles that are presented on the PDF.
5. Students can then share their findings and responses with their peers. This can be done verbally or via an LMS platform.
6. This lesson will conclude by having a group discussion about angles and reviewing key concepts and findings while using the Sphero Mini robot.

Extension Activity

- Task students with the challenge of creating their own angles. This can be hand drawn or done via an online platform (ex: Google Drawings). Students will then share their created angles with their peers, and they will perform the Sphero Angle activity based on one another's creations.
- Challenge students by having them create and identify triangles to take their understanding of angles to the next level. Students will look at the triangles and determine multiple angle types that are within the triangles.