

What's the Angle Acceleration Activity

Learning Objectives:

1. Students will conduct experiment using incline and the force of gravity, using a tennis ball to knock down a pyramid of cups
2. Students will calculate the different angles used to in experiment and determine angle needed to achieve desired goal (break the pyramid)

Type of Teacher Tool: Small Group Activity

Targeted Grade Level(s): 9-12

Targeted Curriculum Areas: Math, Science, STEM

Videos/Resources/Materials Needed:

1. Physics 11: Newton's First Law of Motion
2. Physics12: Newton's Second Law of Motion
3. Physics 13: Velocity and Acceleration
4. Physics 14: Newton's Third Law of Motion
5. Tennis Ball (1 for each group)
6. 3 Solo cups (for each group)
7. Tape measure (1 per group)
8. Two pieces of wood with at least 3 ft in length (for each group)
9. Four 1 inch blocks to use for incline (per group)
10. 1 piece of 8 x 8 wood to be the incline (1 per group)

Teacher Instructions:

1. Set up the 3 Solo cups with 2 next to each other, and the third on top of the first two.
2. Use tape measure to mark of 3 feet in distance from the cups.
3. Line the long wood pieces about 6 inches apart, on either side of cups (This is to keep the tennis ball within the width of the cups)
4. Set up the incline. Put the square piece of wood, so that the incline stops at the 3 ft mark. Use the first block to make the incline. Place block under far side of wood/ramp. This will make a triangle with the floor.
5. After the incline is made, measure the horizontal length of the triangle formed with the incline. Note that the vertical length of triangle will be 1 in (or the height of the block), and the hypotenuse should equal 8 in (the length of the square ramp)
6. Set the tennis ball at the far end of the ramp from the cups. Gently let the tennis ball roll, and observe whether or not it breaks the pyramid (the top cup falls down)
7. Repeat attempts adding 1 inch block at a time to determine the number of inches needed to knock the top cup off.
8. **Optional:** Using Right Angle Trigonometry, calculate the angle of each incline

Assessment/Evaluation Option:

1. Have students discuss and compare their results with the other groups.
2. Have students turn in paper with the math used to find each angle.