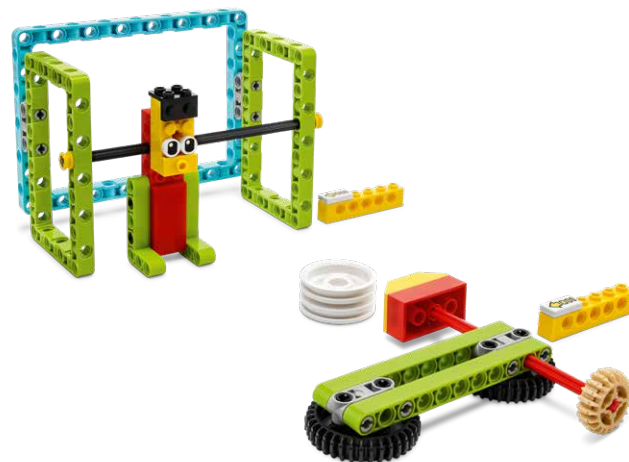


2000470

Penalty Kick

Lesson Plan



Explore how the shape of an inclined plane/wedge can change the direction of a penalty kick. Can you beat the goalie?

In this lesson, your students will explore how force vectors and the resulting motion of two colliding objects help soccer players shoot a ball in different directions.

🕒 30–45 Minutes

📦 Beginner

🎓 Grades 6–8

Engage (Whole Class, 5 Minutes)

- Facilitate a quick discussion about penalty kicks in soccer.
- Ask questions like this one to get your students thinking:
 - What enables soccer players to shoot the ball in different directions? (*The angle of the player's foot as it hits the ball determines the direction in which it'll go.*)
- Transition your students to the building challenge.

Explore (Individual Work, 20 Minutes)

- Have your students work independently to build a mechanical kicking foot, goalie, and goalpost.
- The Student Worksheet explains the building steps. There aren't any specific building instructions.
- Your students can refer to the pictures on the Student Worksheet for inspiration, or rely on their imaginations.

Explain (Whole Class, 10 Minutes)

- Prompt your students to explain how the shape of each shoe affected the direction of the penalty kick shot.
- Ask questions like these:
 - Why did the kicking mechanism shoot the ball sideways when you replaced the flat shoe with the wedged shoe? (*The wedged shoe has an inclined plane. When it collides with the ball, the force [i.e., the abnormal normal force] is always directed perpendicularly [i.e., at a right angle] to the surface.*)

Elaborate (Individual Work, 10 Minutes)

- Have your students create drawings, short videos, or audio recordings explaining how the shape of the kicking surface changed the direction of the kick.

Evaluate (Individual Work)

- Ask each student to give an example of an inclined plane/wedge and explain how its shape can change the direction of an object's motion.

Can you beat the goalie?

Build:

- A goal and goalie
- A kicker with a flat shoe for straight shots
- A kicker with a wedge-shaped shoe for angled shots
- 2 position markers
- Use the pictures for inspiration, or use your imagination
- Place the goalie in front of the goal and try to score by kicking with the straight shoe
- Change to the wedge-shaped shoe and try again.
- Use the position markers to mark the kicker and goal positions.
- What are the main differences between the 2 shoes? What variable(s) did you change in order to beat the goalie?

