LAWS OF MOTION

Topic	Space ping-pong
Objectives	Students will understand and be able to apply Newton's Third Law of Motion.
Standards and benchmarks addressed	06-PS2-1. Apply Newton's Third Law of Motion to design a solution to a problem involving the motion of two colliding objects.

Action

Phase 1: Engage

The teacher can say something like, "Today we are going to learn what it might be like to design for space. With a partner and on a table, play a round of ping-pong."

For a more cost-effective lesson, you can use thick cardboard paddles and small rubber balls. No matter which materials you settle on, ask students to describe all the reasons why this activity is fun using part I of the handout provided.

Phase 2: Explore

Now have students complete step II of the handout provided by drawing a free body of force diagram for all the forces that are acting on the ball. More info on how to do this can be found at:

https://www.brightstorm.com/science/physics/newtons-laws-of-motion/free-body-force-diagrams/ or https://www.real-world-physics-problems.com/free-body-diagram.html

Phase 3: Explain

Now have students complete parts III and IV of the worksheet provided.

Phase 4: Elaborate

Now is a good time to revisit Newton's Third Law of Motion. Then have students do step V of the worksheet provided

Extension idea: Students could iterate and test ideas on how to make water or space ping-pong more like regular ping-pong. Use the original criteria for what makes ping-pong fun to evaluate these designs.

Phase 5: Evaluate

Assess students' worksheets for content mastery, paying particular attention to step V.