Statues

by Ana Carrasco

Grade Level

3rd grade

Lesson Overview

This is an introductory lesson addressing balanced and unbalanced forces. Students will learn about balanced and unbalanced forces using their bodies as well as a ball.

Learning Objectives

Students will understand the meaning of balanced and unbalanced forces in physics.

Standards

NGSS 3-PS2-1: Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

Preparation

- Students should be well acquainted and know each other's names.
- Students should have experience working in small groups on a design project.

Materials and Resources

- Foam ball (like for dodgeball)
- For background (if desired): Khan Academy https://www.khanacademy.org/science/physics/forces-newtons-laws/balanced-unbalanced-forces/v/balanced-and-unbalanced-forces

Activity 1: Becoming Statues (*10 minutes*)

1. Gather students and partner them up in an open area. Label one partner "student A" and the other partner "student B." Meet with all B partners and tell them that they will gently push their partner on the count of three in the second round (don't tell student A).

2. Student A will become a statue standing on one leg, and must be able to hold the pose for 5 seconds (student B will count). Ask student B to do the same in the next round.
3. Student A will be a one-legged statue again, this time student B will carefully push student A on the count of three.
4. Students are invited to sit in a circle to debrief.
5. “What happened in the first round?” Students will answer. “What did we do?” Students will answer (e.g., “We were statues.”). “What happened in the second round?” Students will respond (e.g., “We were statues, and then the statues fell over.”).
6. “What made the statues fall over?” Students respond (e.g., “They were pushed.”).
7. “Why were they able to stay still for 5 seconds before?” Students will answer (e.g., “Because they were balanced.”). “And when they were pushed they became what?” Students will answer (e.g., “Unbalanced.”).
8. “Student A was pushed using force from student B, which set her/him in motion. In the first round the statue was balanced. In the second round student A became unbalanced by student B’s force.”
9. “There are always forces at work. In the first round all of the forces were acting at the same amount of force, and thus they were ‘balanced,’ keeping the student from moving.”
10. “In the second round the forces became ‘unbalanced’ because student B pushed student A, setting her/him in motion.”

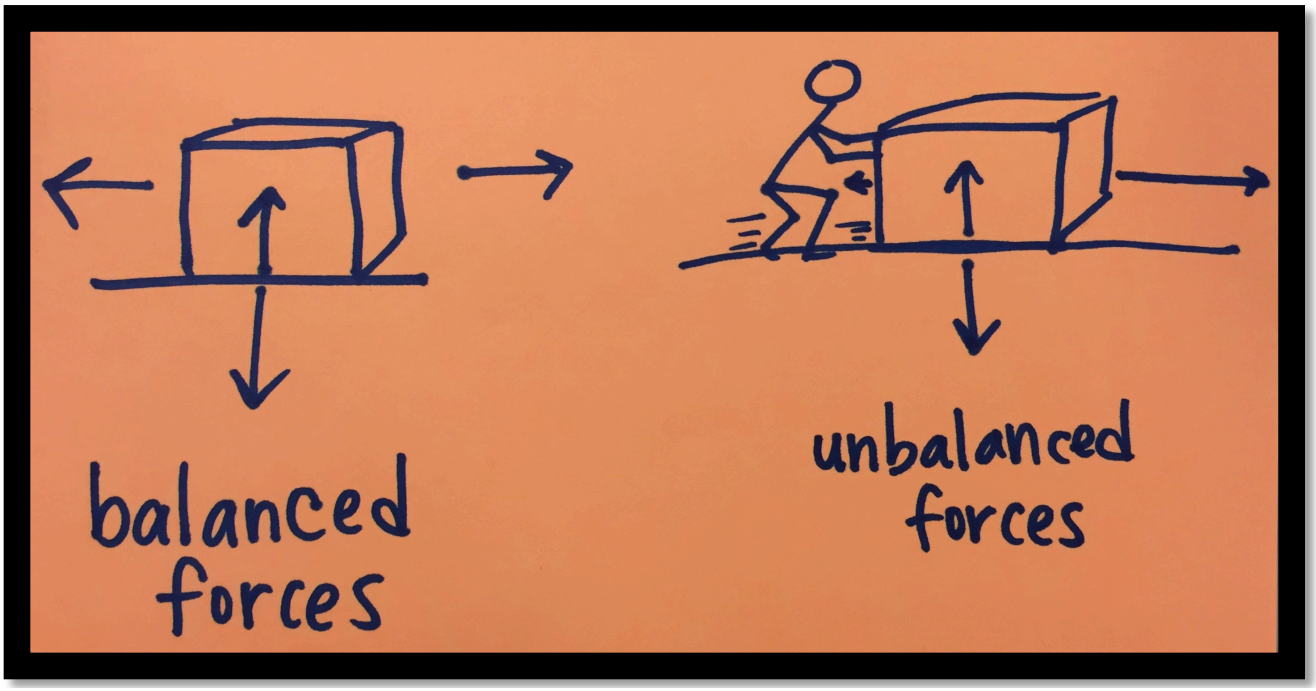
Activity 2: Ball Pass (*5 to 8 minutes*)

1. Students will sit in a circle.
2. “We will now play a game with a ball. You must create balanced and unbalanced forces using this ball. The ball must touch the ground at all times.”
3. “When the forces acting on the ball are balanced call out ‘balanced,’ and when they are unbalanced call out ‘unbalanced.’ Remember the ball must always touch the ground.”
4. “Everyone must have a turn passing and receiving the ball, and no one should have two turns.”
5. “Lets begin!” Students will play until all students have received and passed the ball.
6. Students can try to pass the ball as fast as possible.

Activity 3: Debrief (*5 minutes*)

1. Catch the ball and ask the students, “When were balanced forces acting on the ball?” Students respond (“When it was still,” “When we stopped it”). “When were unbalanced forces acting on the ball?” Students respond (“When it was rolling.”).

2. Draw a diagram (example below). “This is an example of balanced forces, and next to it is an example where the forces are unbalanced because the object is being set in motion.”



3. “Can you think of any examples of balanced or unbalanced forces you’ve seen?” Students respond. “Can balanced and unbalanced forces act on anything?” Students respond.
4. “Before you enter the classroom after recess (or lunch), you must give me an example of balanced or unbalanced forces that you saw outside.” Record student findings on a T-Chart. Discuss the responses as a group, checking for agreement.
5. Conclude the lesson. “You will be excused when someone next to you gently creates an unbalanced force setting you in motion to your next activity.”

Troubleshooting

Students may have trouble working in pairs.

Groupings should allow for students to be successful while working with a diverse range of students. Each team should have students with varying skills sets, strengths, and challenges. If you are aware of a difficult dynamic between two students, it may not be a good idea to put them in the same group (until they are ready to work on their relationship by designing together).

Assessment

The instructor will know if the activity is successful if: the students have an understanding of balanced and unbalanced forces and can provide an example, students can reflect on their experience, and all students were participating.