

Phys 220 - Fun with Momentum!

Materials and Equipment: Basketball, tennis ball, soccer ball, ping pong ball, soft ball, Lacrosse Ball, golf ball, scales

Conservation of Momentum

Predict

Which of combination of the above two balls do you think will be the most dramatic?
Do you think one will be more dangerous than the other?

Investigate

Determine the mass of each ball and list them in order.

Systematically test all combinations of balls. Figure out which combination of balls produces the most dramatic effect.

Describe your procedure and what you did to ensure that all tests were fair and consistent.

Explain clearly how you determined what it means to be the most dramatic.

Use the conservation of momentum to show why this combination was the most dramatic and explain any other physics that may affect the results and why.

Conservation of Angular Momentum

In this section you will play around with some demo equipment and experience the effects of the *conservation of angular momentum*.

Station 1: Distribution of Mass

Experiment with your distribution of mass and observe what happens with your speed.

Describe in your write up what effect each movement had on your rotational speed.

1. Stand on the spinning board while holding a dumbbell in each hand.
2. With each trial below, have one of your lab partner's help you get started spinning:
 - Start with your arms out and then bring them in.
 - Now start with your arms in and then spread them out.
 - Try putting a leg straight out, and then pull it back in.
 - Try squatting down and then stand up.
 - Put the weights in each hand, start with arms straight out, then bring them in.
 - Other

Station 2: Direction of Angular Momentum

- Sit or stand on a rotating stool.
- Hold a weighted bicycle wheel with both hands.
- Have your lab partner get the bicycle wheel spinning *really* fast while you hold it.
- Now tilt the wheel to the right and then to the left.

What happens? What do you feel? Why is this?

Station 3: Direction of Angular Momentum

- Pick up the wheel that has the rope tied to one side.
- Hang the stationary wheel by the rope as shown in the picture.

What happens?

- Now get the wheel spinning *really* fast and carefully suspend it by the rope while it spins.

What happens this time? Why is it different?

Why do you think the demo bicycle wheels are so heavy?

What does this accomplish?

