

Hovercraft

ME-9838

Introduction

The PASCO Hovercraft is designed to help students experience frictionless motion and thus better understand Newton's Laws. Its large platform provides enough area for the rider to sit comfortably while riding. The durable Nylon skirt allows the Hovercraft to endure the rigors of the classroom environment.

The optional Cordless Air Source (SE-8806) is a convenient way to supply air to the Hovercraft. However, most vacuums and blowers used in a wood shop will also be sufficient to lift the platform.

Components

Included components:

- Wooden platform (1.2 m diameter, 1.9 cm thickness) with nylon skirt and rubber bumper
- Connection hose for air source
- 2× hose clamps

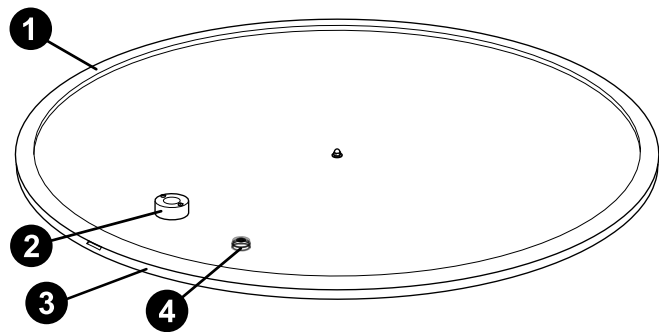
Required equipment:

- Cordless Air Source (SE-8806) or equivalent

Recommended equipment:

- Wireless Force Platform (PS-3229)
- PASCO Capstone or SPARKvue data collection software

Features



- 1 Rubber bumper
- 2 Hose connection port
- 3 Nylon skirt
- 4 Liquid level

Safety

Read the instructions fully before using the Hovercraft. Students should always be supervised by instructors when using the device. During use, follow the instructions of the experiment and all local safety guidelines that apply to you.

Setup and basic operation

1. Place the Hovercraft onto a smooth, non-carpeted surface, such as tile or wood flooring. If possible, make sure there are at least 10 meters of unobstructed space in all directions.
2. Sit down in the center of the platform.
3. Connect the air source to the platform, either using the provided tubing or by inserting the blower tube directly into the opening on the platform. If using the tubing, you will need to tighten the clamp around the blower output tube using a screwdriver.
4. Turn on the air source to inflate the Hovercraft skirt.
5. As the skirt inflates, center your weight using the level mounted on the platform. If the rider is not centered, the Hovercraft might experience friction.
6. Ask another participant to briefly push you on the Hovercraft. Allow students to observe the resulting motion.

CAUTION: Never stand up on the Hovercraft, as it is very easy to lose your balance and fall.

Suggested experiments

Newton's First Law

Additional required equipment:

- Cordless Air Source (SE-8806)

Procedure:

1. Ask several students to stand about five meters from the Hovercraft to observe its motion. Designate one student as the "rider" to sit on the Hovercraft, another as the "catcher" to stop the craft, and a third as the "marker" to place tape on the floor during its motion.
2. Provide a brief push to the rider to set the Hovercraft in motion.
3. Have the marker place tape at the position of the Hovercraft each second after the rider begins moving.
4. After the Hovercraft has been moving for about 10 seconds, have the catcher stop the craft.

Questions:

1. Describe the craft's motion both during and after the push.
2. Draw a force diagram for the rider both during and after the push.
3. Describe the spacing between the marks on the floor. What do these marks suggest about the Hovercraft's motion after the push?
4. Describe the motion as the Hovercraft is stopped. Draw a force diagram for the Hovercraft while it is being stopped.
5. Describe the causes of the motion you observed throughout the procedure.
6. Formulate a general rule to explain the craft's motion.

Newton's Second Law

Additional required equipment:

- Cordless Air Source (SE-8806)
- Rope

Procedure:

1. Ask several students to stand about five meters from the Hovercraft to observe its motion. Designate one student as the "rider" to sit on the Hovercraft, another as the "catcher" to stop the craft, and a third as the "marker" to place tape on the floor during its motion.
2. Hand the rider one end of the rope, then pull on the other end and exert a constant force on the rider for about three seconds.
3. Have the marker place tape at the position of the Hovercraft each second after the rider begins moving.
4. After the Hovercraft has been moving for about five seconds total, have the catcher stop the craft.

Questions:

1. Describe the craft's motion both during and after the push.
2. Draw a force diagram for the rider both during and after the push.
3. Describe the spacing between the marks on the floor. What do these marks suggest about the Hovercraft's motion after being pushed?
4. Describe the motion as the Hovercraft is stopped. Draw a force diagram of Hovercraft while it is being stopped.
5. Describe the causes of the motion you observed throughout the procedure.
6. Formulate a general rule to explain the craft's motion.

Newton's Third Law

Additional required equipment:

- Cordless Air Source (SE-8806)
- 2× Wireless Force Platforms (PS-3229)
- PASCO Capstone or SPARKvue data collection software

Procedure:

1. Ask several students to stand about five meters from the Hovercraft to observe its motion. Designate one student as the "rider" to sit on the Hovercraft, another as the "pusher" to provide a force to the rider, and a third as the "catcher" to stop the craft.
2. Connect both of the force platforms to SPARKvue or PASCO Capstone. For more information on this, see the manual for your chosen force platform and the SPARKvue or Capstone online help.
3. Have the pusher hold one of the force platforms perpendicular to the ground, and have the rider hold the other force platform flat against the pusher's, exerting as little force as possible.
4. Begin data collection, then have the pusher provide a force to the rider for about one second.
5. After the Hovercraft has moved across the floor for about five seconds, stop data collection and have the catcher stop the craft.

Questions:

1. Describe the craft's motion both during and after the push.
2. Use the data from the force platforms to produce a graph plotting both the pusher's force and the rider's force.
3. Draw a force diagram for the rider during the push.
4. Draw a force diagram for the pusher during the push.
5. Formulate a general rule about size and direction of forces between objects.

Specifications and accessories

Visit the product page at [pasco.com/product/ME-9838](https://www.pasco.com/product/ME-9838) to view the specifications and explore accessories. You can also download experiment files and support documents from the product page.

Technical support

Need more help? Our knowledgeable and friendly Technical Support staff is ready to answer your questions or walk you through any issues.

- Chat [pasco.com](https://www.pasco.com)
-  Phone 1-800-772-8700 x1004 (USA)
+1 916 462 8384 (outside USA)
- Email support@pasco.com

Limited warranty

For a description of the product warranty, see the Warranty and Returns page at www.pasco.com/legal.

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