Hovercraft

ME-9838

PASCO ®
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Hovercraft

Model No. ME-9838

Equipment List

Included Equipment	Replacement Part Number*
Wood Platform (1.2 meter diameter, 1.9 cm thick)	648-08988
Nylon Skirt	648-08985
Rubber Bumper	622-08686
Liquid Level	699-010
Connection Hose for Air Source	640-048
Hose Clamps (2)	623-069

*Use Replacement Model Numbers to expedite replacement orders.

Additional Equipment Recommended	
Cordless Air Source	SE-8806
Xplorer GLX	PS-2002
Force Platform (2)	PS-2141

Related Products	
Hovercraft Kit -- Includes everything needed to build the Hovercraft except the wood platform.	ME-9878

Introduction

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

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

The Hovercraft is available in two varieties:

- Hovercraft (ME-9838) is assembled and ready to use
- Hovercraft Kit (ME-9878) requires the addition of the wood platform and needs to be assembled according to the included instructions and drawings (See pages 8-9).

Equipment Setup and Basic Operation

1. Place the Hovercraft on a smooth, non-carpeted surface such as tile or wood flooring. An unobstructed space of 10 meters in all directions is ideal.

2. Sit down in the center of the platform.

3. Connect the air source to the platform using the provided tubing or by inserting the blower tube directly into the opening on the platform.

4. If using the tubing, a screwdriver is required to tighten the clamp around the blower output tube.

5. Turn on the air source to inflate the Hovercraft skirt.

6. As the skirt inflates, the rider should center his/her weight using the level mounted on the platform. If the rider is not centered, friction may be introduced.

7. Provide a brief push to the rider on the Hovercraft and observe the resulting motion.

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

Suggested Activities

Newton's 1st Law

Additional Equipment Required:

- Air Source (SE-8806)

Procedure:

1. Ask several students to stand about 5 meters from the Hovercraft to observe its motion.
2. Another student should be designated as the "catcher" to stop the Hovercraft.
3. A final student should be designated as the "marker" to place tape of the floor during its motion.
4. Provide a brief push to the rider.
5. Ask the "marker" to mark the position of the Hovercraft each second after the "pusher" releases the rider.
6. After moving across the floor for about 10 seconds, stop the Hovercraft.

Questions:

1. Describe the 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 motion the Hovercraft?
4. Describe the motion as the Hovercraft is stopped and draw a force diagram while stopping.
5. Describe the causes of the motion that you observed throughout the motion.
6. Formulate a general rule to explain the motions you observed.

Newton's 2nd Law

Additional Equipment Required:

- Air Source (SE-8806)
- Section of Rope

Procedure:

1. Ask several students to stand about 5 meters from the Hovercraft to observe its motion.
2. Another student should be designated as the "catcher" to stop the Hovercraft.
3. A final student should be designated as the "marker" to place tape of the floor during its motion.
4. Using a rope, provide a constant force to the rider for about 3 seconds.
5. Ask the "marker" to mark the position of the Hovercraft each second.
6. After moving across the floor for about 5 seconds, stop the Hovercraft.

Questions:

1. Describe the motion both during and after the pull.
2. Draw a force diagram for the rider both during and after the pull.
3. Describe the spacing between the marks on the floor. What do these marks suggest about the motion of the Hovercraft?
4. Describe the motion as the Hovercraft is stopped and draw a force diagram while stopping.
5. Describe the causes of the motion that you observed throughout the motion.
6. Formulate a general rule to explain the motions you observed.

Newton's 3rd Law

Additional Equipment Required:

- Air Source (SE-8806)
- Xplorer GLX (PS-2002)
- PASPORT Force Platform (2) (PS-2141)

Procedure:

1. Ask several students to stand about 5 meters from the Hovercraft to observe its motion.

2. Another student should be designated as the "catcher" to stop the Hovercraft.

3. The "pusher" should hold the Force Platform perpendicular to the ground.

4. The "rider" should place the other Force Platform up against the pusher's.

5. The pusher should provide a force to the rider for about 1 second.

6. After moving across the floor for about 5 seconds, stop the Hovercraft.

Questions:

1. Describe the motion both during and after the push.

2. Use the data from the Force Platforms to produce a graph with 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.

Hovercraft Kit Assembly Instructions:

1. Buy or cut a 46" diameter wood platform with a thickness of ¾"
2. Drill 1 ½" hole for air source (see figure 1)
3. Drill two 9/64" holes for air source adapter (see figure 1)
4. Drill 17/64" center hole (see figure 1)

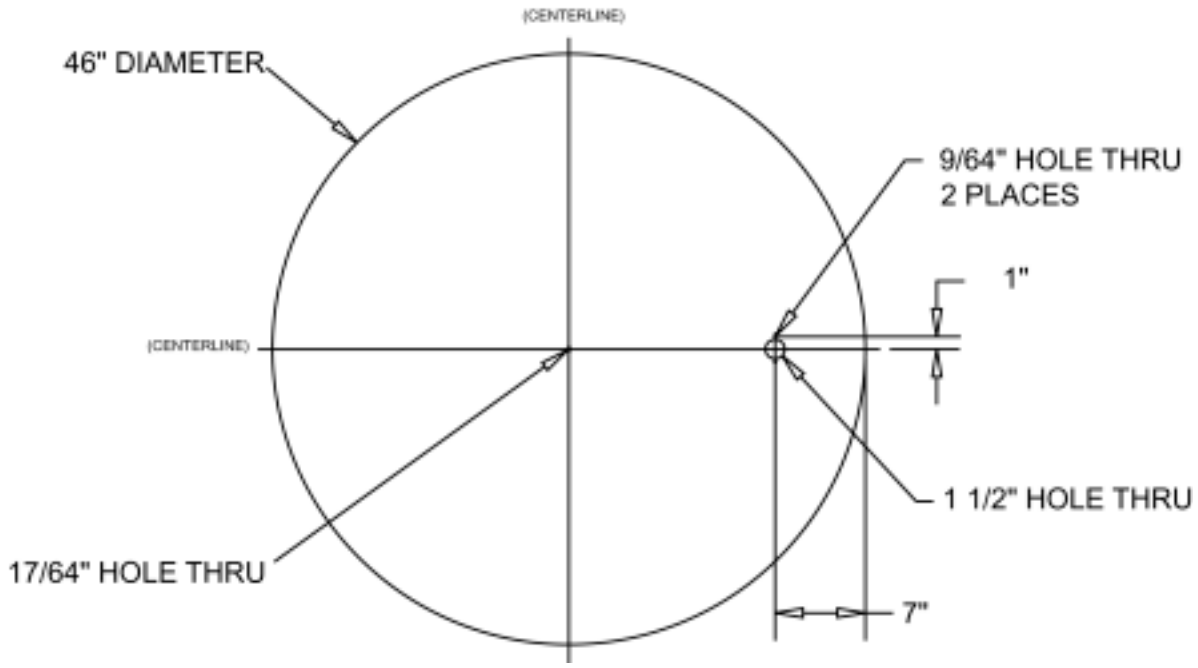

Figure 1. wood platform layout

5. Paint wood platform (Optional)
6. Stretch the Rubber Bumper around the outside edge of the wood platform. You must force a small section of the bumper onto the platform and work your way around the circumference of the platform.
7. Secure the rubber bumper to the plywood with the provided staples.
8. Cut wire approximately 150" long and bend one end into a small loop.
9. Thread wire through skirt opening; loop end first.
10. Using the included hardware, attach the center of the skirt to the wood platform. (See figure 2.)
11. Place the wood platform on a table with the bottom side up and drape the skirt around the edge of the platform.
12. Feed each end of the wire into the gripple.

13. Pull the two ends taut until the skirt is held firmly in the groove of the rubber bumper. Have another person walk around the bumper to be sure the skirt is in the groove as the wires are pulled taut.To prevent leaks make sure the wires are cinched up very tight.

14. Trim the wires from each side of the gripple. Be sure the sharp wires do not stick out!

15. Using the included wood screws, attach the air source adapter to the top of the wood platform (See Figure 4).

16. Use glue or double-sided tape to affix the bubble level to the top of the wood platform. Place the level away from the center of the platform, so the rider can view the level easily (See Figure 4)...

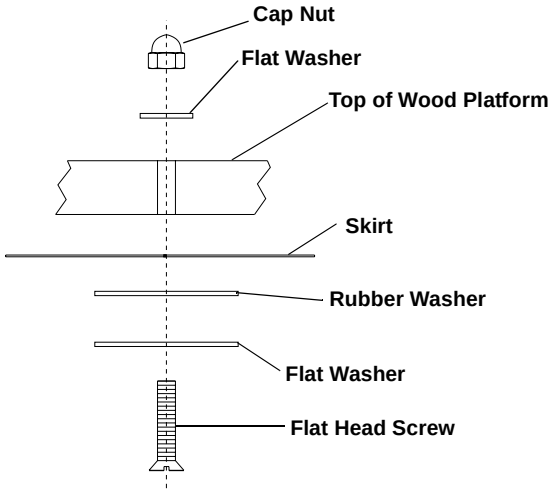

Figure 2. Attach center of skirt

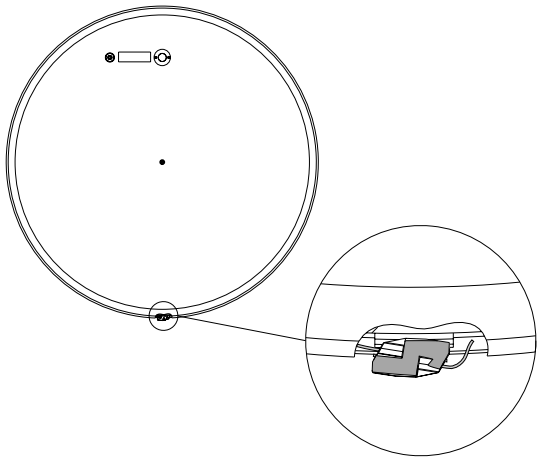

Figure 3. Gripple Detail

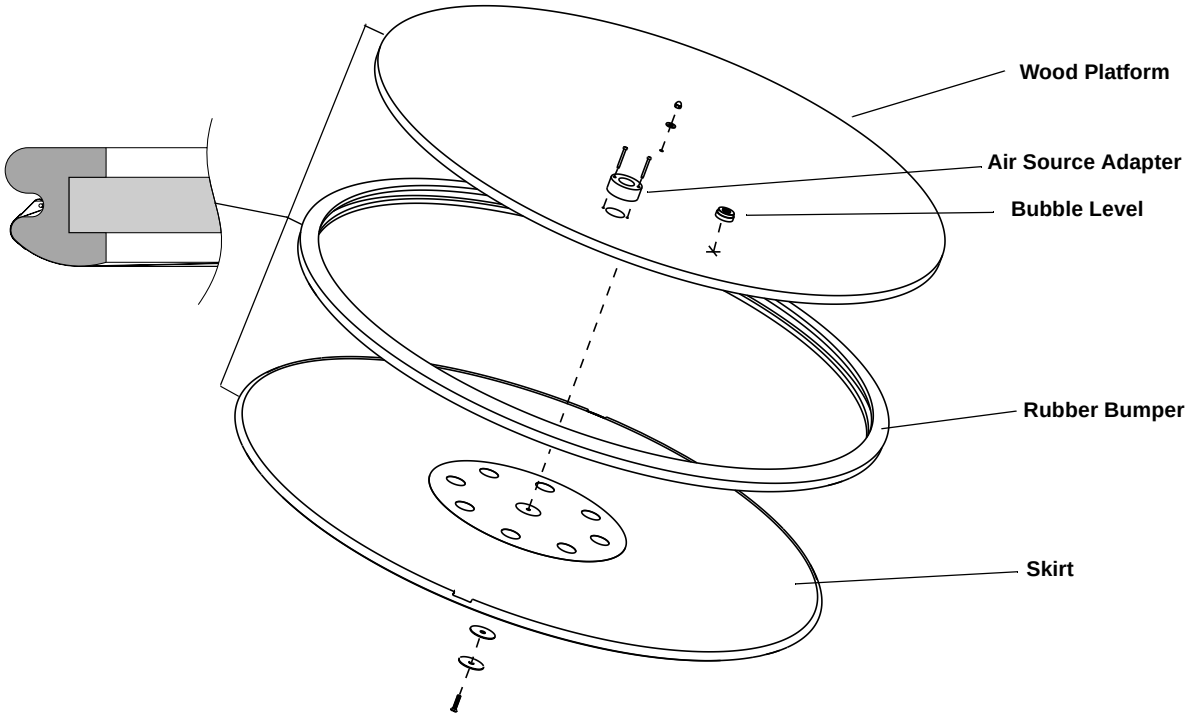

Figure 4. Exploded View

Safety

Read the instructions before using this product. Students should be supervised by their instructors. When using this product, follow the instructions in this manual and all local safety guidelines that apply to you.

Technical Support

For assistance with any PASCO product, contact PASCO at:

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Limited Warranty

For a description of the product warranty, see the PASCO catalog.

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