Ball Catcher

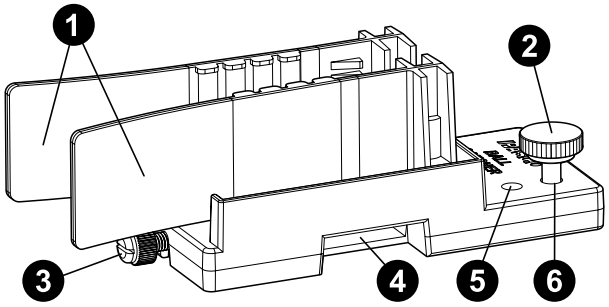
ME-1252

Introduction

The Ball Catcher is designed to be used to produce controlled inelastic collisions. A ball that is fired from a Projectile Launcher (ME-6800) or Mini Launcher (ME-6825B) into the Ball Catcher will be slowed to a rapid stop by the flexible sides. You can use this apparatus to study conservation of linear and angular momentum.

Equipment

Features



1. 2× flexible sides
2. Cart mounting thumbscrew
3. Meter stick mounting thumbscrew
4. Meter stick slot
5. Cart mounting hole
6. Thumbscrew storage hole

Required equipment

Required for all experiments:

- Projectile Launcher (ME-6800) *or* Mini Launcher (ME-6825B), with appropriate mounting apparatus for your experiment
- Phillips screwdriver

Required for cart experiments:

- Any PASCO Dynamics cart, such as the Smart Cart (ME-1240 or ME-1241) or the PAScar (ME-6933 or ME-6934)
- Any PASCO Dynamics track, such as the 1.2 m Aluminum Dynamics Track (ME-9493), 2.2 m Aluminum Dynamics Track (ME-9779), or PAStrack (ME-6960)

Required for meter stick experiments:

- Half-Meter Stick (ME-7044)
- Rotary motion sensor, such as the Wireless Rotary Motion Sensor (PS-3220) or the PASPORT Rotary Motion Sensor (PS-2120A)
- Meter stick clamp from the Meter Stick Torque Mass Hanger Set (ME-7035)
- Vertical rod stand appropriate for your rotary motion sensor

Assembly

1. Insert one of the small screws into one of the holes on the underside of the Ball Catcher's base. If you will be using the Projectile Launcher, which launches one inch diameter balls, use the hole closer to the edge of the tray. If you will be using the Mini Launcher, which launches 5/8 inch diameter balls, use the hole closer to the center of the tray.
2. Use a Phillips screwdriver to tighten the screw just enough that the tip of the screw is flush with the flat surface of the base.
3. Repeat Steps 1 and 2 for the corresponding hole on the opposite side of the base.
4. Insert the flexible sides into the tray of the Ball Catcher base so that they open outwards, as shown under **Features**. If you will be using the Projectile Launcher, slide the sides to the edges of the tray. If you will be using the Mini Launcher, bring the sides together so that their bases meet in the middle of the tray. The threaded hole on the bottom of each flexible side should align with one of the small screws.
5. Use the screwdriver to fully tighten both screws and secure the sides in place.
6. Insert the square nut into the rectangular hole in the base between the flexible sides.
7. Insert the meter stick mounting thumbscrew into the hole on the front of the base. Tighten the thumbscrew just enough that it passes all the way through the square nut.

Once the Ball Catcher is assembled, it should only be used with the appropriate launcher. If you wish to use the Ball Catcher with the other type of launcher instead, simply loosen and remove the screws securing the sides to the base and repeat the process to install the sides in the other position.

NOTE: If you are using the one inch Steel Balls (ME-9864) available for the Projectile Launcher, use only the lowest range setting. Using the steel balls at a higher setting will cause the balls to strike the back of the Ball Catcher rather than being caught by the sides and may derail the cart.

IMPORTANT: Always remove the ball from the Ball Catcher before storing the product. Leaving the ball in the Ball Catcher for extended periods of time will damage the flexible sides.

Setup

Cart experiment setup

1. Remove the cart mounting thumbscrew from the thumbscrew storage hole.
2. Place the Ball Catcher into the accessory tray of your chosen PASCO Dynamics cart. Make sure that the cart mounting hole on the Ball Catcher is aligned with the threaded mounting hole in the cart's accessory tray.

3. Insert the cart mounting thumbscrew into the threaded hole through the cart mounting hole. Tighten to secure the Ball Catcher in place on the cart. (See Figure 1.)
4. Make sure your chosen track is resting on a flat surface, then place the cart onto the track at the desired starting position.
5. Set up your Projectile Launcher or Mini Launcher at the desired distance from the Ball Catcher, then aim the launcher towards a point directly between the flexible sides. Make sure the launcher is level with the ground and is high up enough that the ball will *not* hit the Ball Catcher's tray before being caught by the sides.

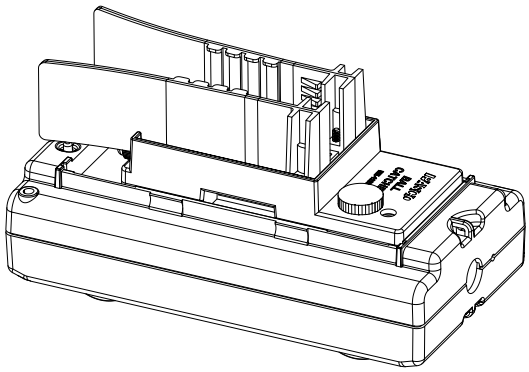


Figure 1: Ball Catcher mounted to a cart.

NOTE: If you are using the Smart Cart (ME-1240 or ME-1241), always mount the Ball Catcher with the open end facing the plunger. Mounting it in the opposite direction can cause the encoder wheels to briefly lose contact with the track when the ball impacts the catcher, causing errors in data.

Meter stick experiment setup

1. Loosen the meter stick mounting thumbscrew on the front of the Ball Catcher.
2. Slide the Half-Meter Stick (ME-7044) into the meter stick slot on the underside of the Ball Catcher. Slide the Ball Catcher to a point close to one end of the Half-Meter Stick, then tighten the meter stick mounting thumbscrew to secure the catcher in place.
3. Identify the position on the Half-Meter Stick where the stick and Ball Catcher balance without tilting in either direction.
4. Slide the meter stick clamp from the Meter Stick Torque Mass Hanger Set (ME-7035) onto the opposite end of the Half-Meter Stick. Move the clamp to the point you identified in the previous step, then secure the clamp in place.
5. Mount your chosen rotary motion sensor on an appropriate vertical rod, then connect the Half-Meter Stick and Ball Catcher to the sensor using the meter stick clamp.
6. Set up your Projectile Launcher or Mini Launcher at the desired distance from the Ball Catcher, then aim the launcher towards a point directly in-between the flexible sides. Make sure that the launcher is level with the ground and is high up enough that the ball will *not* hit the tray of the Ball Catcher before being caught by the sides.

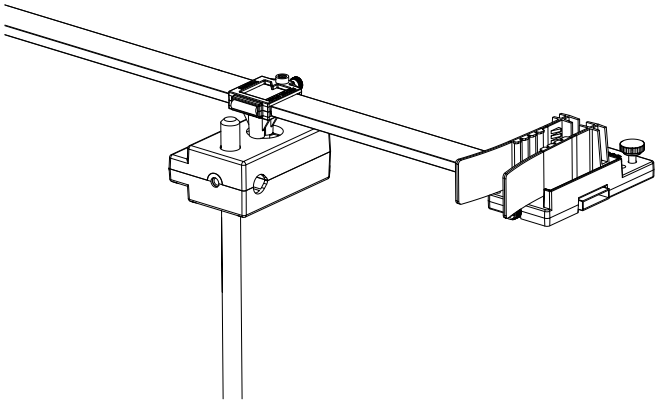


Figure 2: Ball Catcher mounted on a Half-Meter Stick.

Experiment files

Download one of several student-ready activities from the PASCO Experiment Library. Experiments include editable student handouts and teacher notes. Visit pasco.com/freelabs/ME-1252.

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