Pasco Quick-Release Mount

The directions below outline how to prepare the track and build a quick-release crumple mount for a Pasco cart. (If you have a Vernier cart, use these alternate directions: *Vernier Quick-Release Mount*.)

You need the following supplies if you are attaching this mount to a Pasco cart:

- 1 smart cart track (Either the Pasco or Vernier track works with either company's smart cart.)
- 1 magnetic bumper (available in a set of 2 from Pasco Scientific: Magnetic Bumper Set ME-9885)
- 1 smart cart track end stop
- 1 steel double-wide mending plate (3.5" wide)

Safety Protocols:

When working with the lab materials, the following safety precautions are necessary.

- Students must conduct the experiment under the supervision of qualified personnel who can respond quickly to any unforeseen circumstances.
- Students involved in setting up the equipment and conducting the experiment must be properly trained in handling the sensor carts and understand the experimental procedures.
- Wear appropriate personal protective equipment (PPE) including sanitized safety glasses with side shields during the setup, experimentation, and takedown segments of the activities.
- Secure loose clothing, wear closed-toe shoes, and tie back long hair.
- Clear the workspace of any obstacles or hazards that could interfere with the experiment or cause accidents during the collision.
- Make sure that all parts of the carts are properly secured and stabilized before conducting the collision test. Follow manufacturer guidelines for setup and operation.
- Immediately clean up anything that falls on the floor, so it does not become a slip or fall hazard.
- Maintain a safe distance from the collision area during the activity to avoid injury from flying debris or malfunctioning equipment.
- Following the activity, inspect all equipment for any damage or wear and tear. Repair or replace any damaged components before further use.
- Wash hands with soap and water once all equipment is put in appropriate storage areas.

Part 1: Selecting and aligning the track against a wall

Select the smart cart track you intend to use (Pasco or Vernier). They both provide wheel slots appropriately spaced to accommodate a cart from either company. Line up one end of the track against a wall. This will be the stationary barrier the carts collide against. Level the track.	

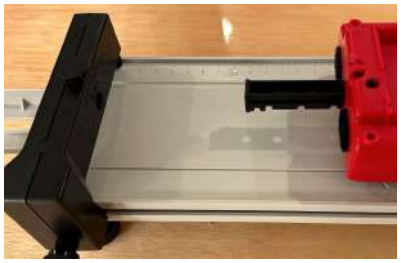
Part 2: Mounting the magnetic bumper to the cart

Line up the pin on the magnetic bumper with the corresponding hole in the cart chassis before screwing the bumper into place.	
Tighten the screw on the bumper.	

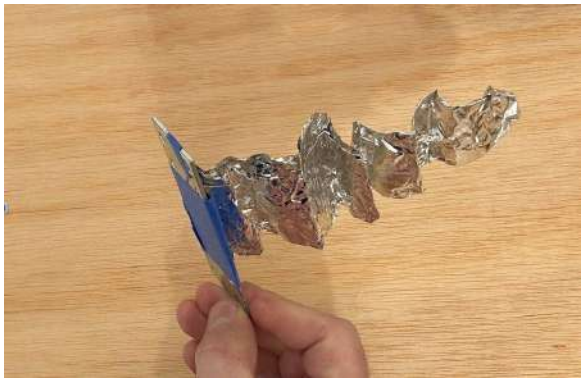
Part 3: Attaching the control condition bumper

Place the mending plate against the magnetic bumper so the bumps on the plate face outward. The plate will stick to the bumper. Slide the plate around to position it so there is adequate clearance for the track. The bottom of the plate should be no more than ⅛" above the bottom of the cart chassis. The cart now has the control condition bumper on it and is ready to test.	

Part 4: Launching the cart to test the control condition

Prepare to push the spring launcher beam on the cart into the body of the cart.	
Push the end of the spring launcher beam all the way into the cart chassis. It should lock into place.	
Lean the end of the depressed launcher beam against the bumper at this end of the track and press the trigger button on the cart to launch the cart.	

Part 5: Swapping in experimental condition crumple bumpers to test

When students build experimental condition crumple bumpers, instruct them to tape the structure to the mending plate you provide. The structure they design should extend from the side of the plate that has the raised bumps so the bumps are not on the back side, which would interfere with a close fit against the magnetic bumper.	
Students can secure their structure to the plate with transparent tape, masking tape, or painter's tape) The tape can wrap around the back side of the plate, but advise them to minimize the thickness of the tape on that side (as shown here). Too much material on the back side of the plate will create a gap between the plate and the magnetic bumper, which will compromise the bumper's relatively secure hold. Remind students to make sure to design their bumper so no part of it is touching the track. This may require them to bend or adjust the end of their bumper a bit.	

Slide one plate off (e.g., the control) and an experimental plate onto the magnetic bumper.

Place the cart on the track against the launcher.

Because the first contact of the bumper with the track system should occur when it reaches the barrier, students may need to adjust the end of the bumper so it is elevated above the track, and not touching it, before the cart is launched.