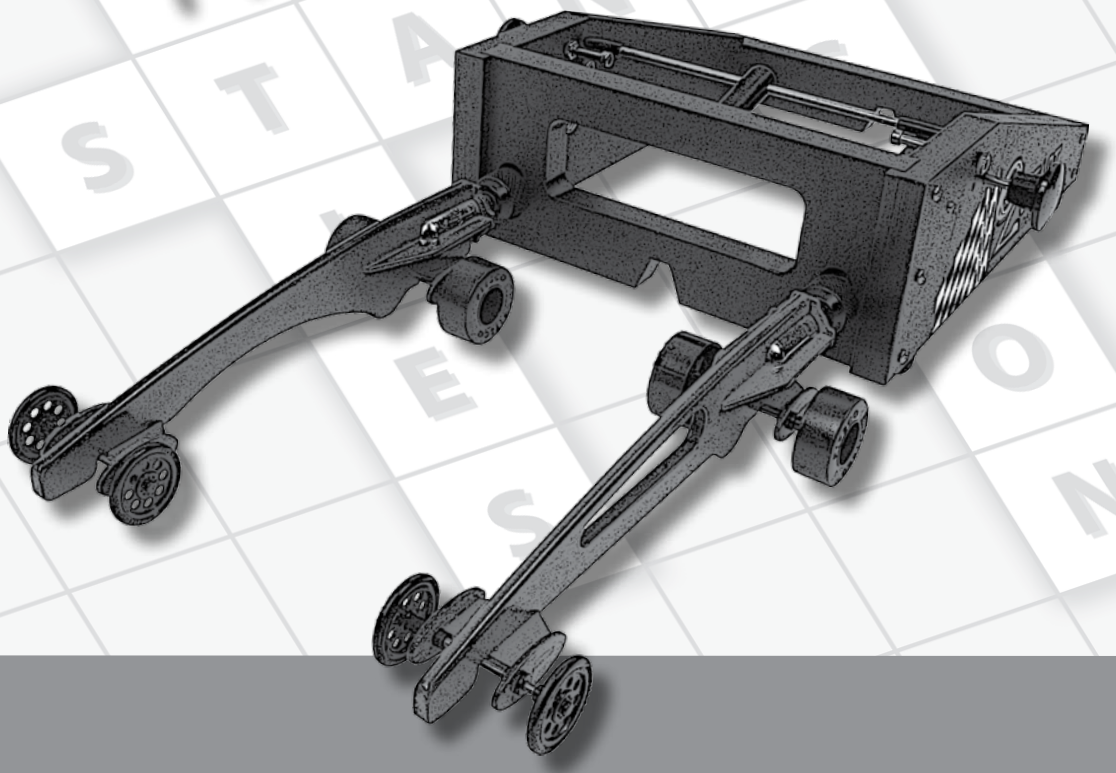
EZ Start Raceway

User Guide



PITSCO EDUCATION

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This user guide illustrates how to use the EZ Start Gate – or the complete EZ Start Raceway system. It also discusses how to use the EZ Start Raceway on the FasTrak Elevated Raceway. The first part discusses the start gate, the second part has additional instructions for adding the EZ Start Finish Gate, and the third and final section discusses use with the FasTrak.

For the Start Gate Only

Materials (included)

- Start gate
- 2 line anchors
- Spool of monofilament line

Materials Required (not included)

- Duct tape
- 2 towels

Set Up the Start Gate and Track

Note: The standard track length for CO_2 dragsters is 20 meters or 65 feet, 7 inches. This is the distance from the start line (where the dragsters line up) to the finish line (the sensors in the finish gate).

1. For your track, select a smooth, flat stretch of floor approximately 72 feet in length.
2. At the start and finish ends of the track, fasten a black ABS line anchor to the floor with duct tape (Figure 1).
3. Locate the spool of monofilament line. Tie a loop in the end of the line – use a knot such as the overhand or figure eight.
4. Hook the loop over one of the anchor screws on the ABS line anchor (Figure 2).
5. Walk to the opposite end of the track, allowing the line to unreel from the spool as you go. Extend the line just past the anchor and cut it.
6. Tie a loop at this end of the line using the overhand or figure eight knot so the loop is approximately 24 inches short of reaching the anchor screw. For example, if the track is 80 feet long, tie a loop in the line so the length of the line plus the loop is 78 feet long. The line should be tightly stretched. A tight line should prevent cars from going off course as they race down the track. Cut off any excess line extending from the loop's knot. **Note:** If your track is shorter than 80 feet, 24 inches short of the anchor screw might make the line overly tight.
7. Repeat Steps 3-6 for the other lane.
8. Roll up two towels and place them lengthwise in front of the line anchor screws. These will help keep the dragsters from being damaged when they stop at the end of the track.

Figure 1

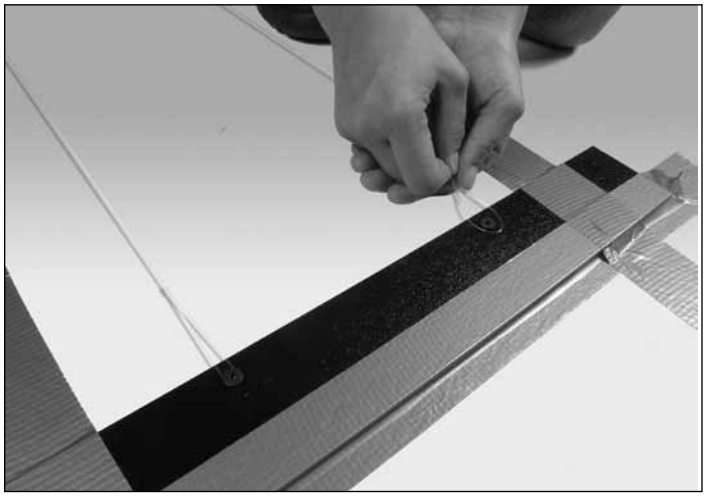


Figure 2

Ready the Dragsters at the Start Gate

1. Remove the guideline from one of the line anchor screws.
2. Thread the line through the screw eyes on the bottom of a dragster and then reattach the line to the line anchor screw (Figure 3). Roll the dragster several feet forward on the track.
3. Repeat Steps 1 and 2 for a second dragster in the other lane.
4. Position the EZ Start Gate at the start of the track in front of the line anchor screws but behind the dragsters.
5. Pull up the trigger bar on the start gate (Figure 4).
6. Pull out the safety catch knobs, and then pull up the two firing levers (Figure 5).
7. Push in the two safety catch knobs (Figure 6). Pull the trigger bar back so it lies on top of the firing levers.
8. Load a CO2 cartridge into each cartridge hole of the two dragsters on the track. Back a dragster into each of the firing pin housings.

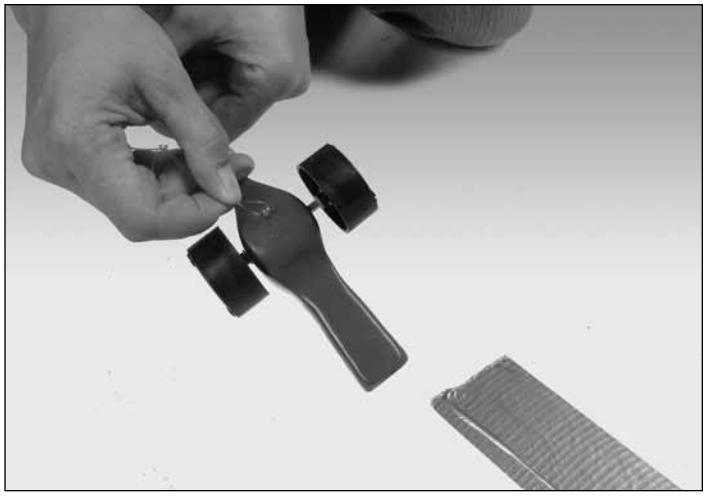


Figure 3

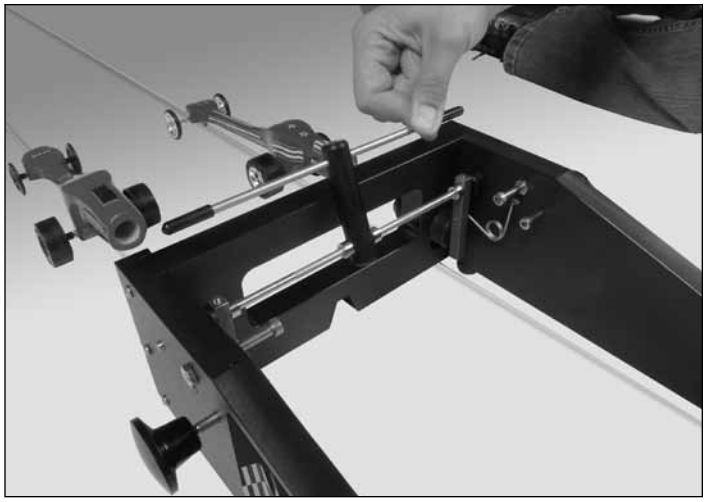


Figure 4

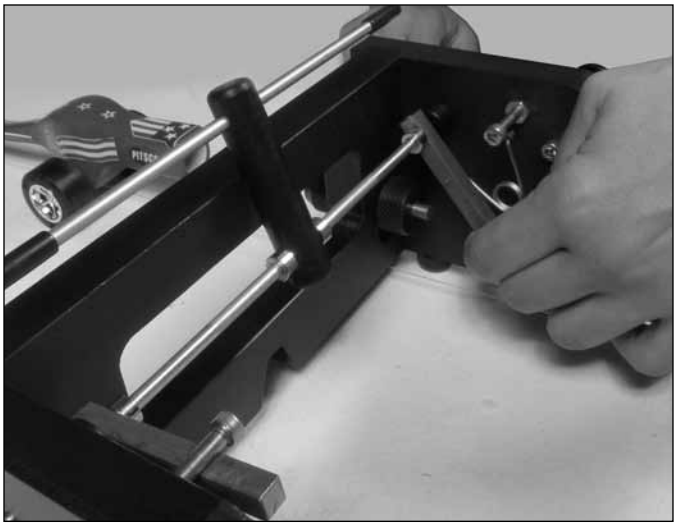


Figure 5

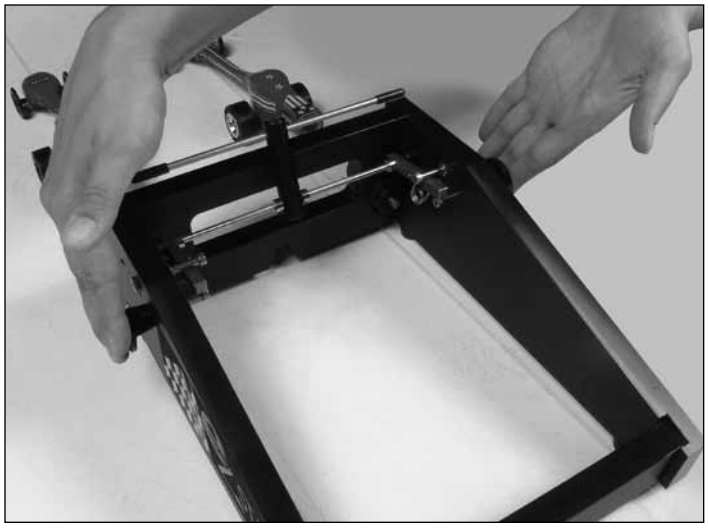


Figure 6

9. Make sure the center of each dragster's CO2 cartridge lines up evenly with and firmly against the center of the firing pin (Figure 7). If necessary, adjust the pin as follows:
    - Twist the firing pin housing to the left (when facing the front of the housing) to loosen it.
    - Move the firing pin housing up or down so that the pin aligns with the center of the dragster's CO_2 cartridge.
    - Twist the firing pin housing to the right (when facing the front of the housing) to tighten it. Do not overtighten.
10. Release the safety catches by pulling the knobs back out. Push down on the trigger bar to launch the dragsters.

Figure 7

Safety

Whether using just the EZ Start Gate or the complete EZ Start Raceway system, the tips below should be followed to create a safe racing environment.

- When the firing mechanism is set and the safety knobs (catches) are pulled out, no one should place their hands or fingers near the start gate other than to release the trigger bar.
- Students should maintain a distance of a least three feet from the race area.
- No one should be behind the finish gate directly in line with the raceway.
- Be sure to reposition the towels between races to avoid damage to the dragsters.
- All people near the track should wear safety glasses.

For the Complete System

If you have the complete EZ Start Raceway, these additional instructions illustrate how to set up and use the EZ Start Finish Gate. Do this part after setting up the track and start gate.

Additional Materials (included)

- EZ Start Finish Gate
- Power supply
- 2 detectors
- 4 quick-release pins (use only with the FasTrak raceway)

Set Up the Finish Gate

1. Plug the detectors into the detector jacks on the sides of the finish gate (Figure 8). Insert the other ends of the detectors into the back of the gate (Figure 9).
2. Plug the power supply into the power jack on the back of the finish gate (Figure 10). Plug the power supply into a wall outlet.
3. Place the finish gate at the end of the raceway approximately four feet in front of the anchor screws and rolled up towels.
4. After the dragsters are launched, the finish gate will indicate the winner by flashing a red light in the winner's lane.

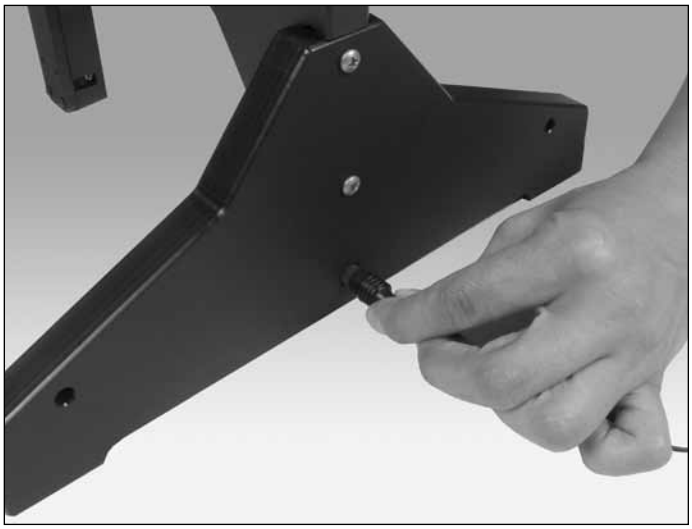


Figure 8

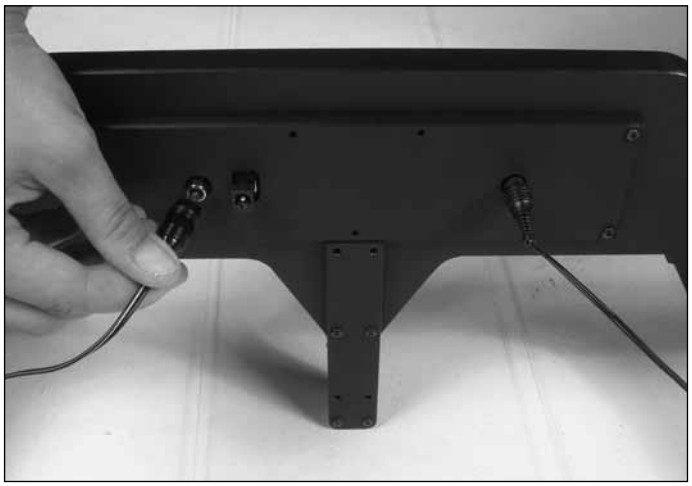


Figure 9

Figure 10

Using the EZ Start with the FasTrak

1. Set up the FasTrak as described in the *FasTrak User Guide*.
2. Center the start gate over the track approximately four feet in front of the track's string anchors (Figure 11).
3. Insert the quick-release pins through the holes in the legs of the finish gate (Figure 12), and set up the finish gate as described in the "Set Up the Finish Gate" section on the previous page.
4. Place the finish gate directly above the gap in the center rail at the finish end of the track. The gate should span both lanes, and the pins should rest on top of the track sides (Figure 13).

Caution: Be sure to use the safety precautions listed on page 4.

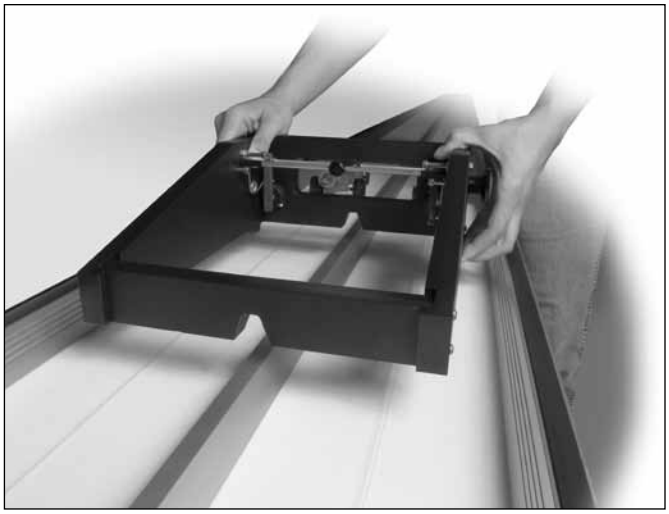


Figure 11

Figure 12

Figure 13

Which dragster kit is right for you?

For decades, building and racing CO_2 dragsters has been the powerhouse activity for technology classes.

Yet dragsters can also demonstrate science, math, and engineering. But building them requires tools, finishes, and design skills. Nontechnology teachers have been asking for a dragster kit they can use – and Pitsco is answering their call. Whether your students have a desktop and glue or an entire lab loaded with tools, there's a Pitsco dragster kit to propel their success.

Plus, all of these kits are compatible with standard CO_2 race systems and tracks. They launch with a manual system like the *EZ Start Raceway* or a combination like the *Impulse GII Race System* and *FasTrak Elevated Raceway* – and anything between!

No Tools Required – EZ Build Dragster Kits

When tools are limited but a teacher's ideas are not, *EZ Build Dragster Kits* give those ideas the green light.

With precision-cut parts that glue together, we designed this dragster kit for classrooms with few tools or younger students. All you need is a small work surface, glue, and a screwdriver. There are four designs to choose from, and students can add a finish to their dragster, if desired.

And the completed dragster illustrates Newton's laws, acceleration, and other concepts – just like the classic dragster.

Minimal Tools Required – Precut Dragster Kits

When students can sand and finish a dragster but designing, drilling, and cutting isn't an option, *Precut Dragster Kits* fit this area between the extremes.

Start by choosing from four styles of blanks with precut profile shapes and axle and cartridge holes. Students use coping saws or sandpaper to finely shape their dragster and then apply a finish. Add the wheels and axles, and they're ready to race!

An ideal kit for covering science concepts and expanding on the importance of finishing to make dragsters more aerodynamic.

Standard Tools Required – Metric Dragster Kits

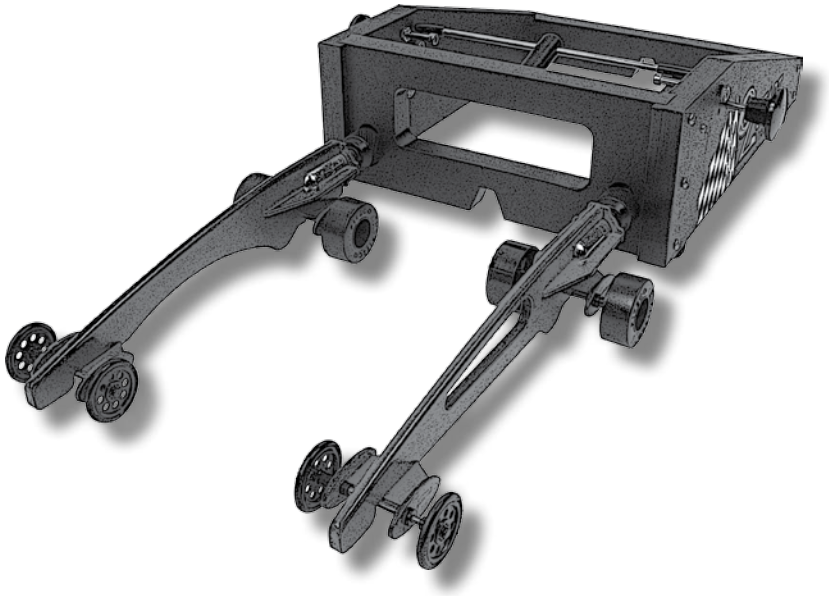
The classic *Metric Dragster Kit* requires drills, coping or band saws, and other tools. But these kits are the ultimate in dragster design and problem solving!

Students begin this process with grid paper and a pencil; then, they use a foam blank to translate a 2-D design into a 3-D model. Finally, they craft a dragster out of a basswood or balsa wood blank and apply a smooth finish.

The *Metric Dragster Kit* demonstrates science concepts like the other kits, but also requires design, measuring, and modeling skills and an understanding of aerodynamics.

For pricing and ordering information, visit shop-pitsco.com or call 800-835-0686.

eZ START RACEWAY



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