Session 2 – Motor Polarity Demo Before Mechanical Assembly

Goal: Powered by a Pico GPIO pin, students spin a TT motor *before* it's mounted, physically swap leads to reverse direction, then bolt both motors and the caster to the chassis. This order lets them understand polarity *before* hiding wires inside the frame.

Learning Objectives

- Observe a DC motor spinning forward and reverse by swapping leads.
- Recognise GPIO current limits → need for motor controller later.
- Complete chassis assembly after the demo.

Materials

Item	Qty
TT DC 3–6 V gear motor and Tire	2
Pi 500 + Pico on breadboard	1
Purple aluminium chassis	1
Caster bearing wheel + screws	1 set
Motor mounting hardware	2 sets
Screwdriver	1

> **Safety note:** Drive the motor only in 0.5 s bursts to avoid overloading the Pico.

1 · Motor Polarity Demo (15 min)

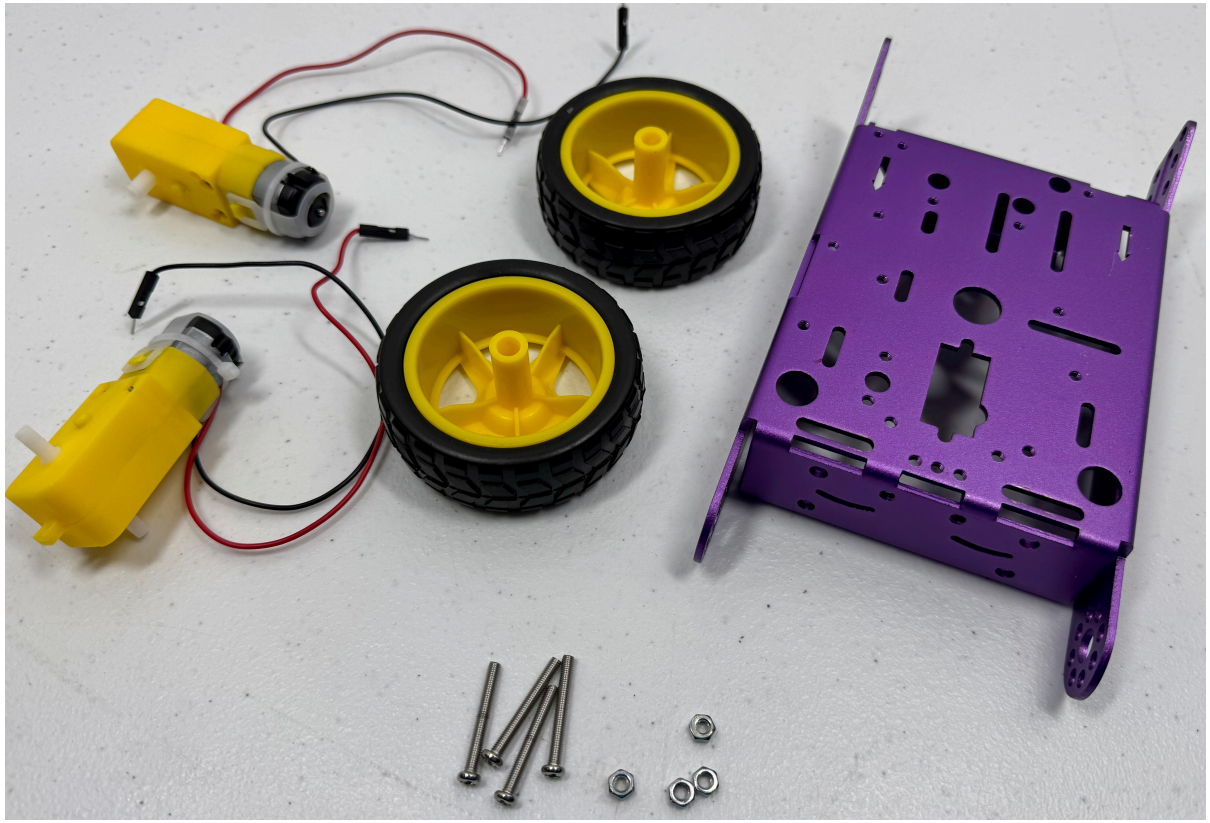
Demo Powering One Motor

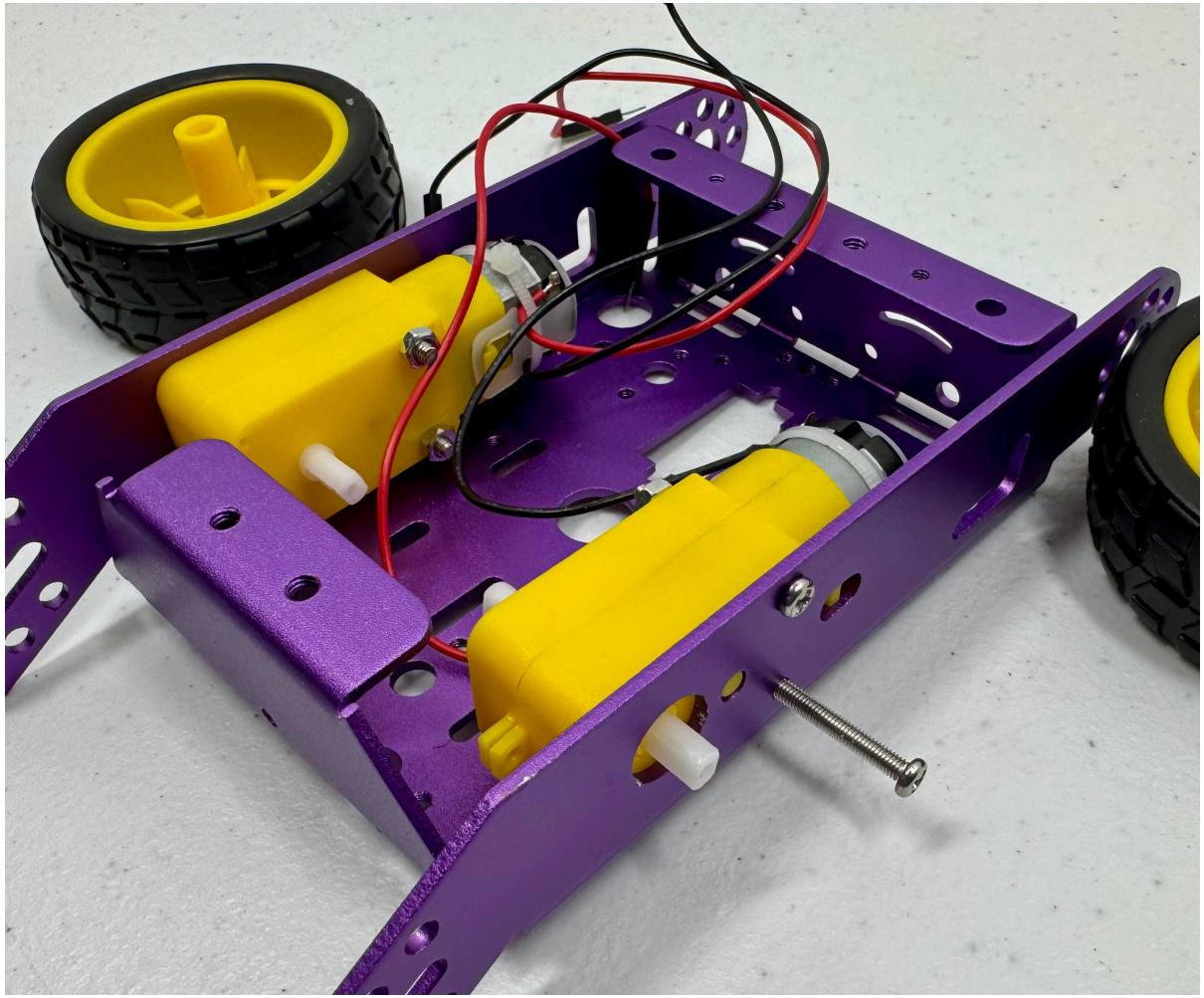
Reverse by Swapping Leads

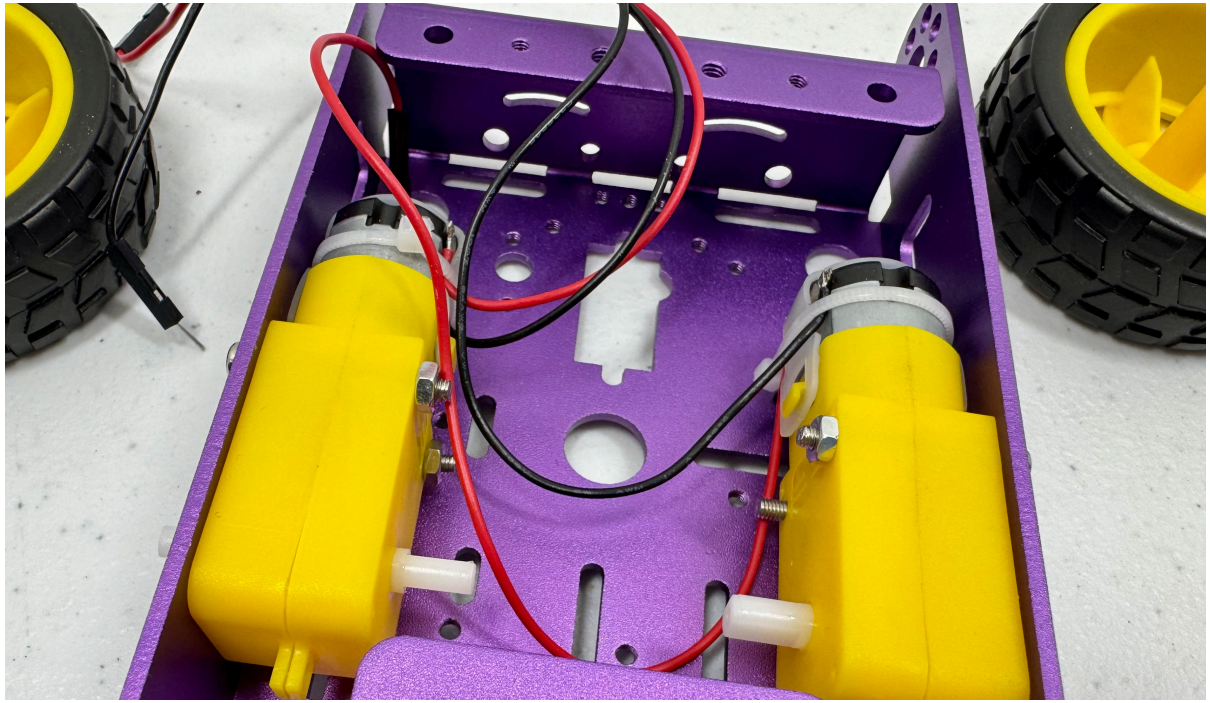
Discuss: Why can’t we keep driving motors directly from GPIO? → current limits, only one direction, no speed control.

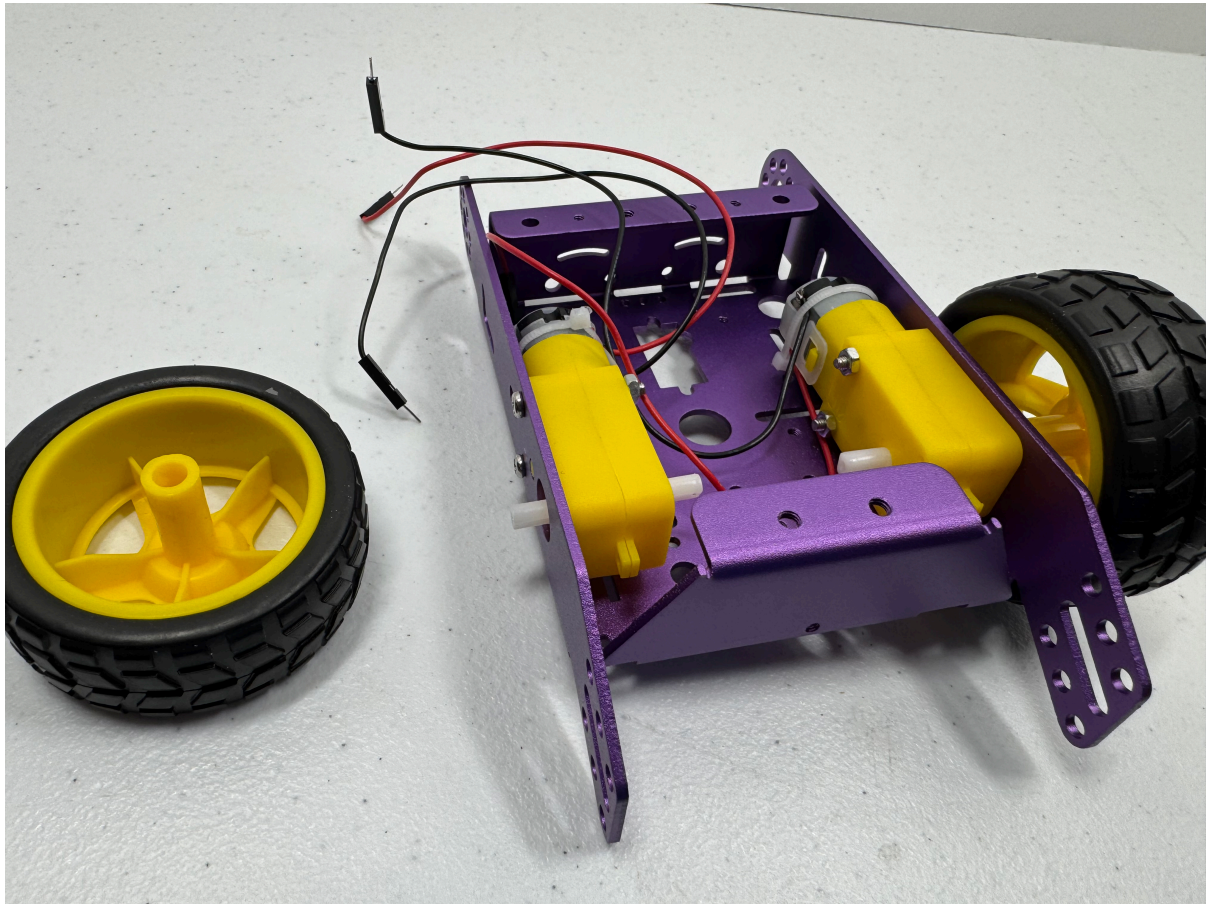
2 · Mechanical Assembly (25 min)

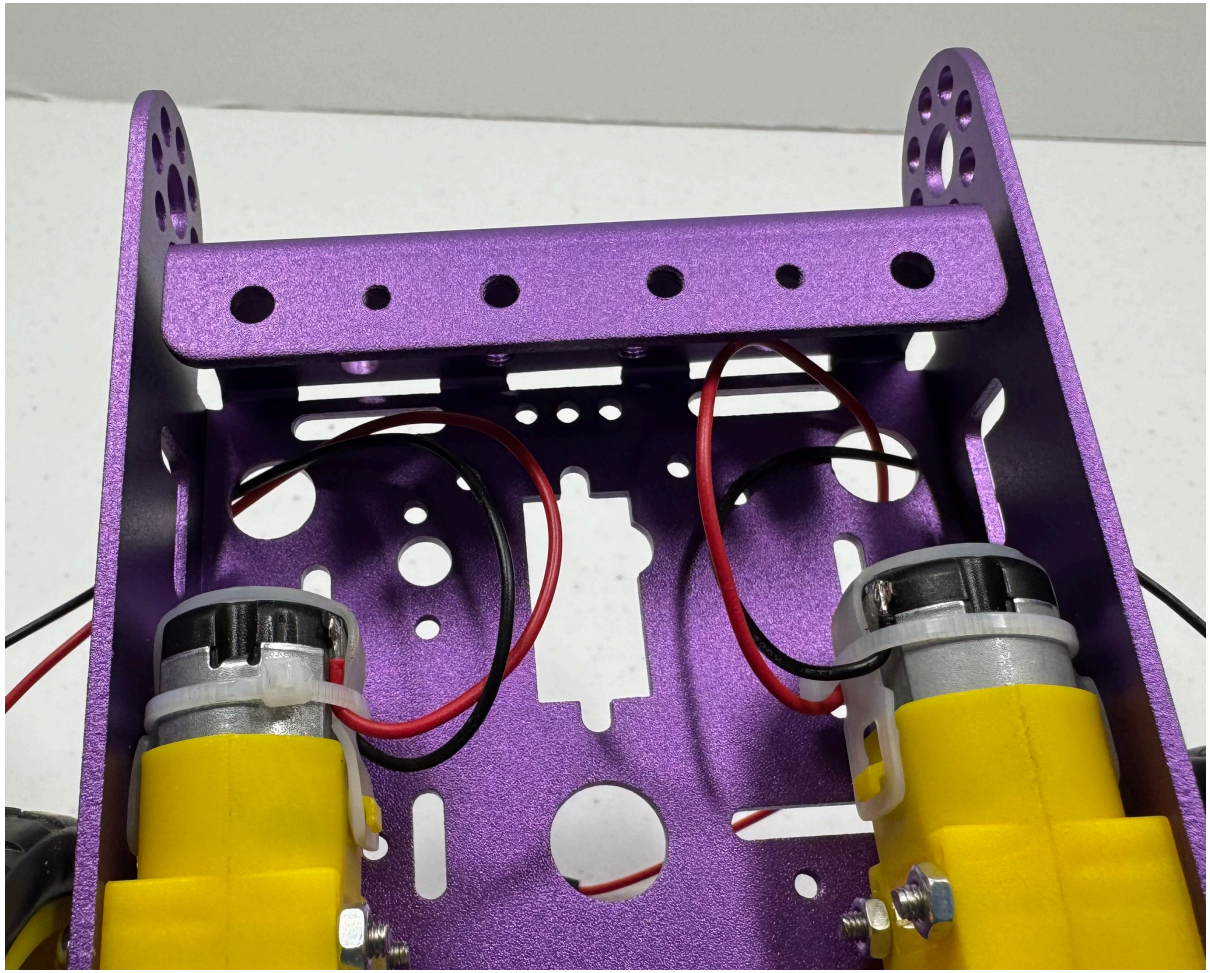
1. **Motor brackets** – Align each TT motor shaft forward; mount with screws.



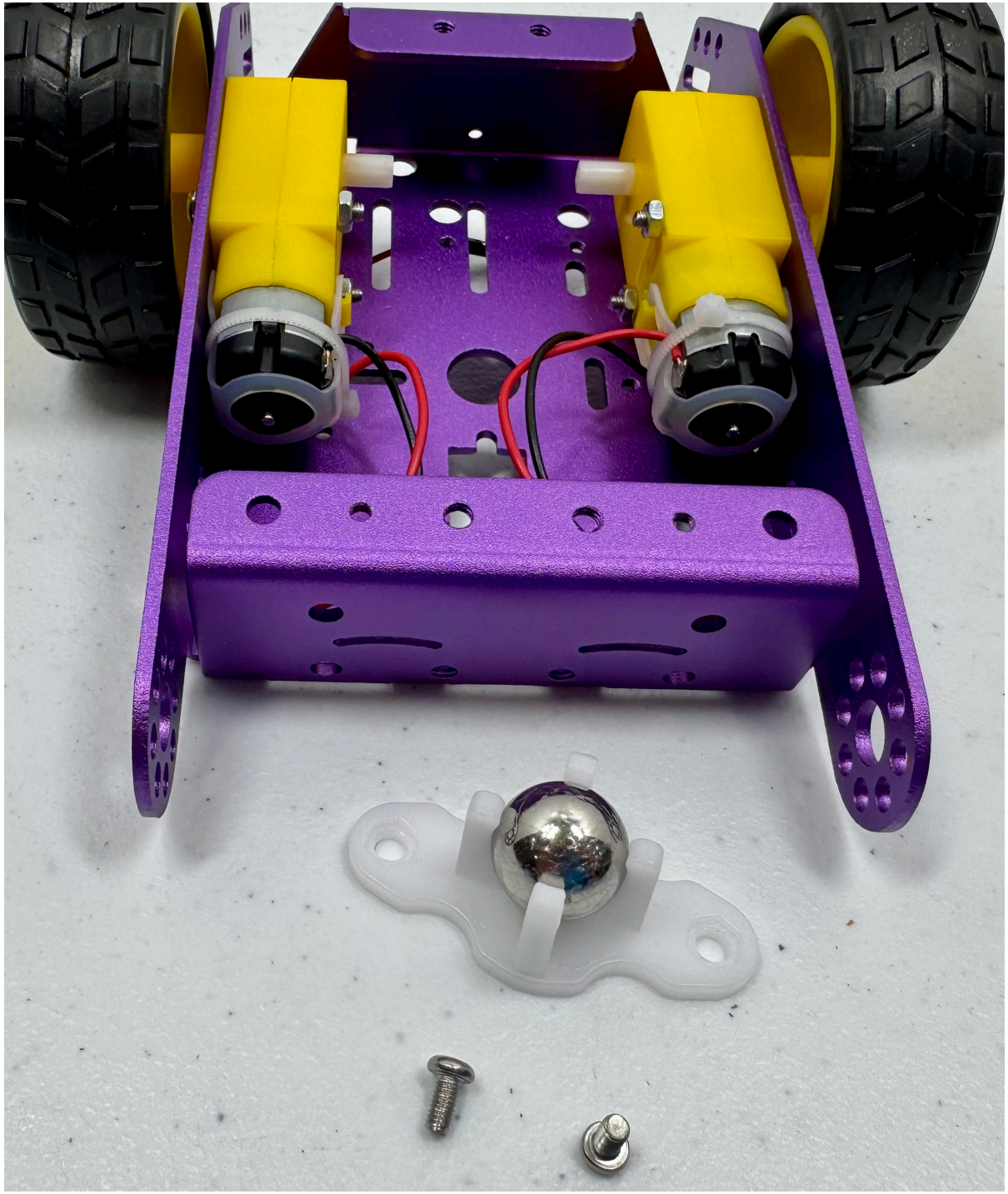


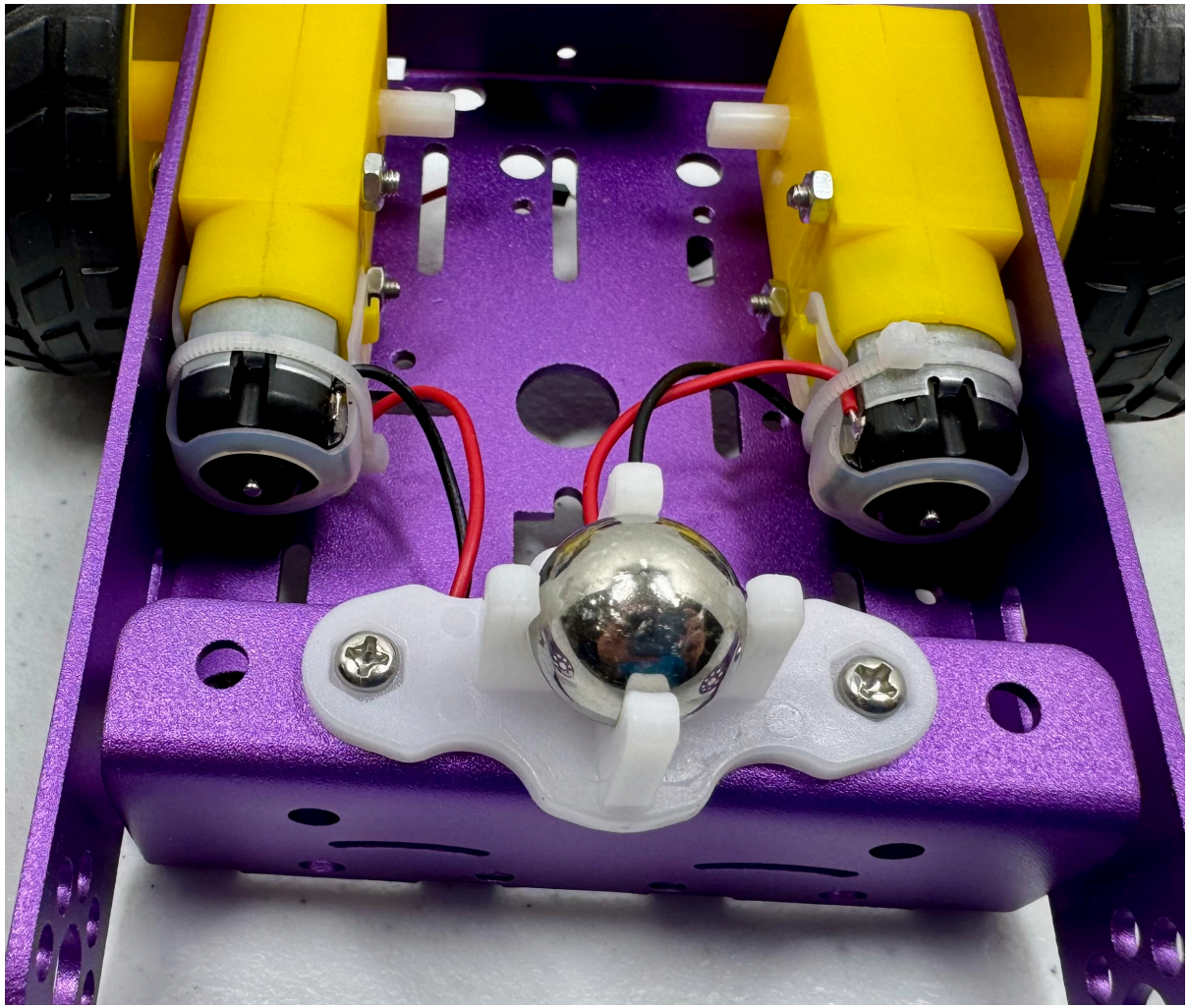


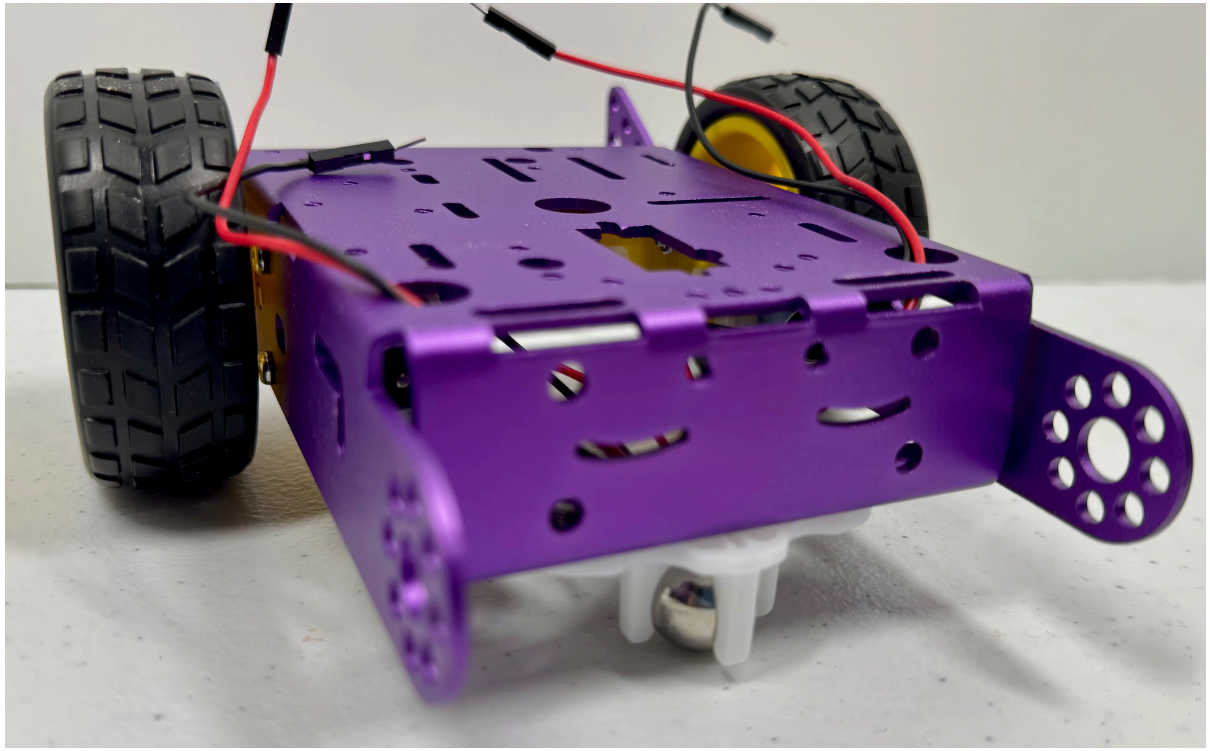




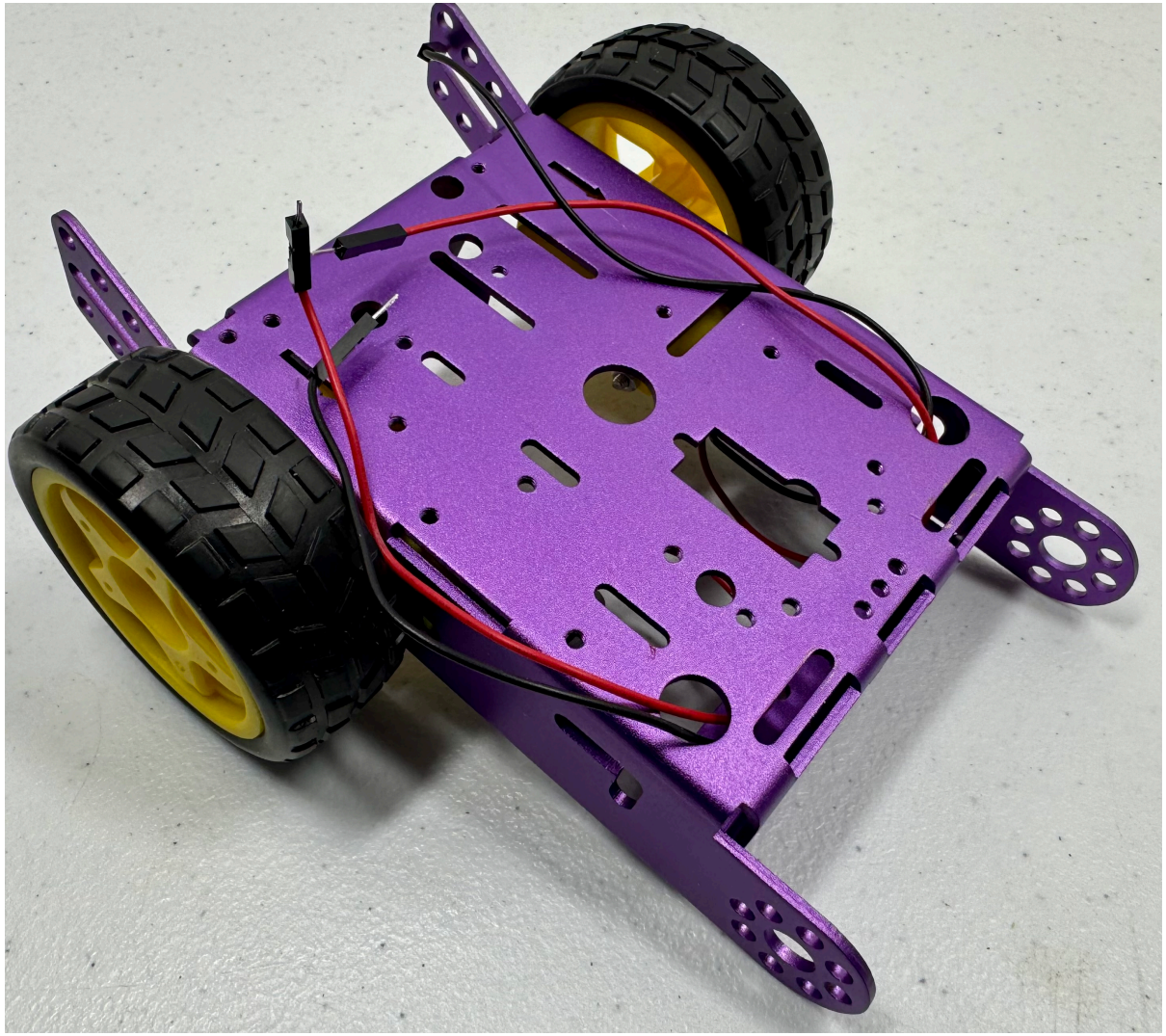
2. **Caster** – Secure to the front of the chassis.







3. Route motor leads into the chassis cut-out toward the breadboard.



(Demonstrate proper orientation before students tighten screws.)

4 · Wrap-Up & Teaser for Session 3 (5 min)

- Forward & reverse observed via lead swap ✔
- Caster + both motors mounted ✔

- Students articulate need for motor controller ✔

Next session: introduce the motor controller (H-bridge), add battery power, and code driven reversal + speed control.