

# Part 12 Focus Guide

Make the L path repeatable

## TEACHER NOTE

Keep the code and route constant for the baseline. Students are testing repeatability first, not hunting for a perfect single run.

## Prep

- Part 11 robot/code and a taped target endpoint at (36, 24) inches
- Consistent chassis reference point, square, tape measure, and heading reference
- One Part 12 Student Trial Record per team
- Clear route, turn sweep, side boundaries, stopping buffer, and POWERING ON poster

## Planned pauses

| TIME | ASK                        | LISTEN FOR                                        |
|------|----------------------------|---------------------------------------------------|
| 0:27 | What remains constant?     | Start, heading, reference, surface, code/settings |
| 0:36 | Is one perfect run enough? | No; repeat trials reveal spread                   |
| 0:54 | What must be clear?        | Legs, sweep, side areas, stopping buffer          |
| 1:05 | When authorize START?      | After call, pause, boundary, visual clear         |
| 1:25 | When enter?                | STOP, visible DISABLED, captain                   |
| 1:45 | Calibration pattern?       | Repeatable distance miss; isolate straight test   |

## Lab sequence

1. Define x forward, y right, target (36, 24), target yaw -90, and one chassis reference point.
2. Run three baseline trials with identical setup and a full POWERING ON gate each time.
3. After STOP and visible DISABLED, record x, y, yaw, endpoint error, and exit reason.
4. Look for bias, spread, timeouts, or segment-specific evidence.
5. Choose one change, write a prediction, and run two or three comparable retests.
6. Compare mean error and consistency; state what the evidence supports.

# Part 12 Technical Notes

Separate repeatability, accuracy, and diagnosis

## Three different questions

| QUESTION          | MEASURE                              | MEANING                                         |
|-------------------|--------------------------------------|-------------------------------------------------|
| Is it accurate?   | Distance from target / heading error | How close the result is to the desired endpoint |
| Is it repeatable? | Spread among trials                  | How closely repeated results group              |
| Why is it wrong?  | Segment telemetry + controlled tests | Which cause is supported by evidence            |

## Do not overclaim

- A single good run does not prove repeatability.
- A tight cluster away from the target is repeatable but biased.
- An L-path endpoint combines straight and turn errors; use isolated tests before recalibrating wheel distance.
- Changing multiple variables prevents the team from knowing which change mattered.
- AprilTag or other vision data can later provide additional field observations, but it does not replace repeatable drivetrain testing.

### POWERING ON SAFETY GATE

1. Confirm the Driver Station shows **DISABLED**. Place and square the robot before the test.
2. Remove hands, tools, cables, tape measures, and loose objects.
3. Check the full route or turn sweep, side boundaries, and stopping buffer.
4. Call **POWERING ON!** loudly, then pause while everyone steps behind the boundary.
5. Visually confirm that no one is holding, touching, or reaching toward the robot.
6. Only then authorize INIT and START. Keep the operator ready to press STOP.
7. After the run, press STOP and visibly confirm **DISABLED** before anyone approaches.