### Debugging Information

1. The Speed Limit should be initialized to 15.
2. DeltaT should be initialized to 0.1, position to -60, velocity to 0, and acceleration to 4.
3. Position and velocity should update each simulation step using the kinematic equations.
4. Once velocity exceeds the speed limit, the truck should stop accelerating.
5. Once the truck is at the lookahead distance (which you may have to calculate), the truck should start decelerating at a rate of 4 m/s2.
6. Once the truck reaches the stop sign (stop sign position = 38.16), the truck should stop and the simulation should end.
7. Use Copa, this sheet, and the graph and table tools to help you!

### Copa

Remember: Copa is designed to work *with* you, not *for* you. It will guide you along, but it’s up to you to answer, evaluate, and implement its questions and ideas. Copa may not always be right!

The more information you provide Copa, the more helpful it will be! Just like working with a human collaborator!

When you first ask Copa for information, Copa retrieves information you might need based on what you ask it and how you’re progressing in C2STEM. Copa only does this once, so make the first interaction count!

**Only use appropriate language with Copa, and stay on task! Researchers and teachers will see what you write!**

### Kinematic Equations

Your job is to figure out which variables in each equation correspond to each block in C2STEM!

Updating Velocity (Equation 1a)

vx = v0x + a x Δt

velocityfinal = velocityinitial + acceleration x change in time

Updating Position (Equation 1b)

px = p0x + vx x Δt

positionfinal = positioninitial + velocity x change in time

Displacement (Equation 2)

Δx = v0xt + ½axt2

Displacement = velocityinitial x change in time + ½ x

acceleration x time squared

Velocity Squared (Equation 3)

vx2 = v0x2 + 2axΔx

velocityfinal squared = velocityinitial + 2 x acceleration x

displacement

### Blocks

All blocks can be found on the left side of the screen under the “Control,” “Simulation,” and “Operators,” tabs at the top left of the screen. **You can ask Copa where specific blocks are as well!**

### Tools

“Graph” and “Table” tools are available on the right side of the screen in the middle horizontal bar to help you visualize how variables change over time.

To ensure that a variable is tracked on the screen and via the graph and table, be sure to check each variable’s checkbox that you want to track (left side of the screen) **before** running your model via the Green Flag button.