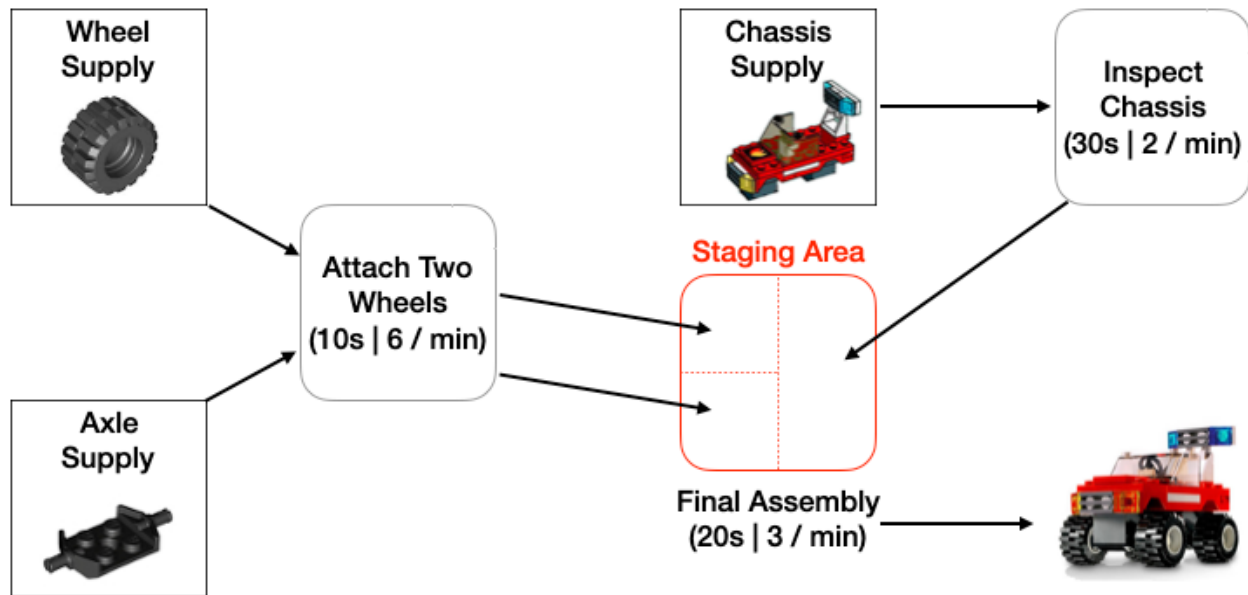


The Versatile LEGO Truck • Process Concepts

Once built, I stow the LEGO fire trucks away until we come to the process concepts lecture later in the course and then they make a reappearance. For this activity, the truck chassis is separated from the axle structure and the wheels are removed. An assembly line of students is set-up. The “process” to build a fire truck will take 60 seconds and is composed of three steps:

- Attach Two Wheels [popping two wheels onto one axle] (10 seconds | 6 parts/minute)
- Inspect Chassis [just checking it for defects] (30 seconds | 2 parts/minute), and
- Final Assembly [snapping the axles to the chassis] + inspection (20 seconds | 3 trucks/min.)

For safety reasons, the Staging Area does not allow deliveries of axles / chassis parts while Final Assembly is going on. The set-up looks like this:



The process begins with no work in process (WIP) in any of the process areas. The clock starts and students on the Attach Two Wheels process take two wheels, one axle, put them together and at the 10s mark, move it to the Staging Area. Meanwhile, the students on the Inspect Chassis process do exactly that – make sure the steering wheel turns, the blue bar lights move, the windshield is secure, etc. The students at the Final Assembly stage are starved, waiting for all of the parts to arrive before they begin work.

At the 20s mark, the second set of wheels is moved to the Staging Area, but we're still 10 seconds out from having a chassis to finish. At the 30s mark, the Final Assembly people can begin attaching the axle / wheel combinations to the chassis, the Inspect Chassis people begin working on their second chassis inspection, and the Attach Two Wheels process is blocked because there they can't deliver axles to the Staging Area while work is being done there.

Run this assembly process for a few minutes then debrief – introducing concepts like blocking and starving. Introduce the notion of buffers. Ask the students to come up with process design changes — still respecting the time allotments to each of the three processes — to reduce or remove the blocking and starving they observed with this initial process.

