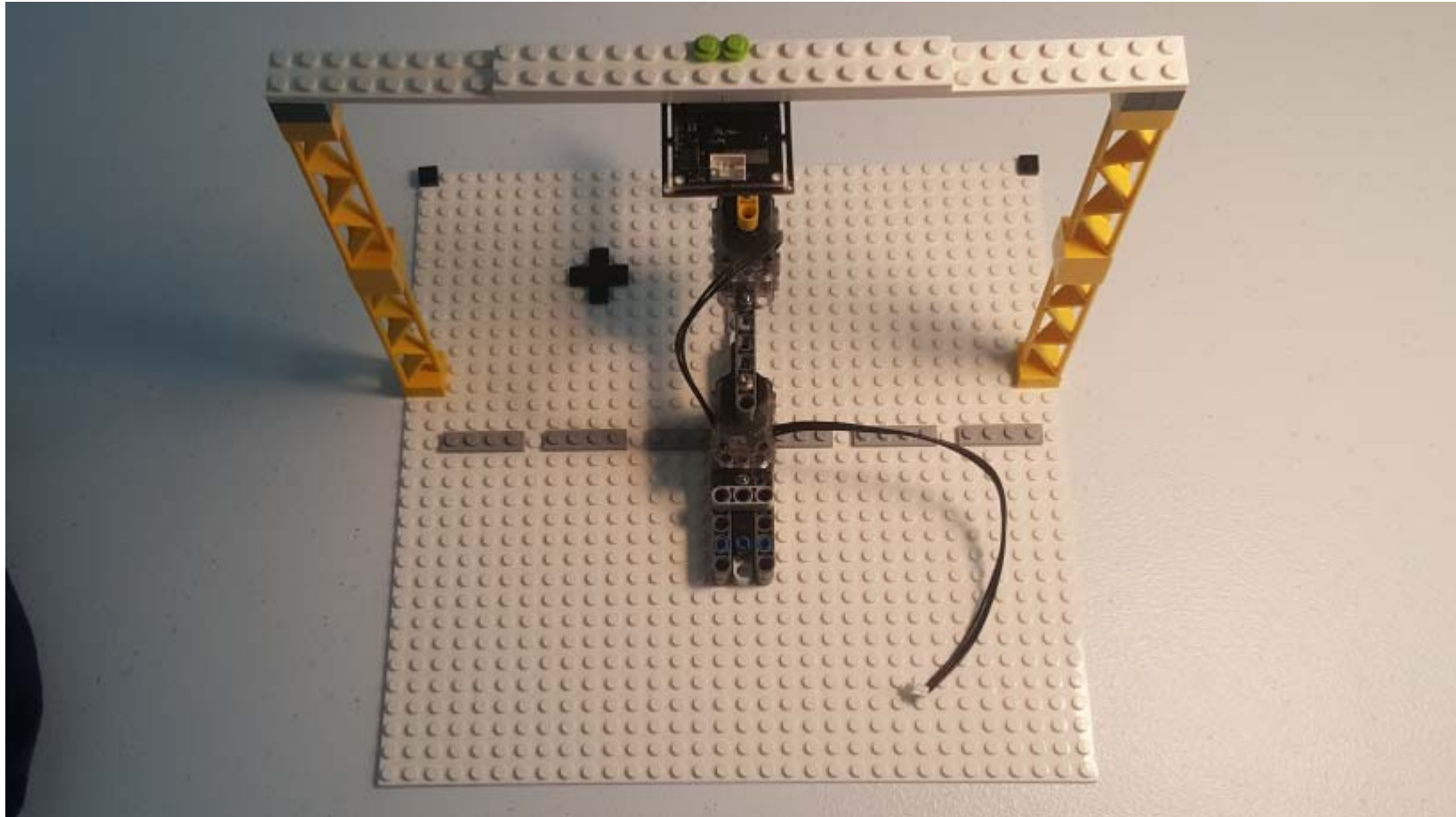
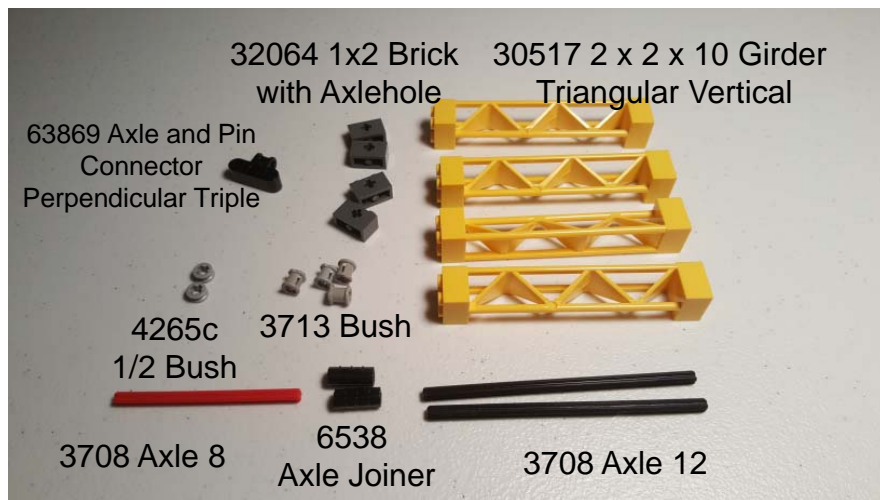
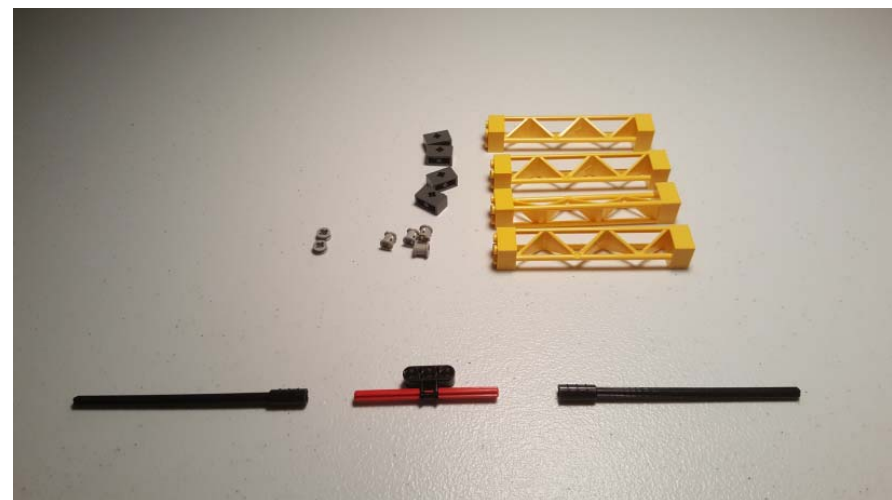


# Lego-based USB Camera Tower Build Instructions

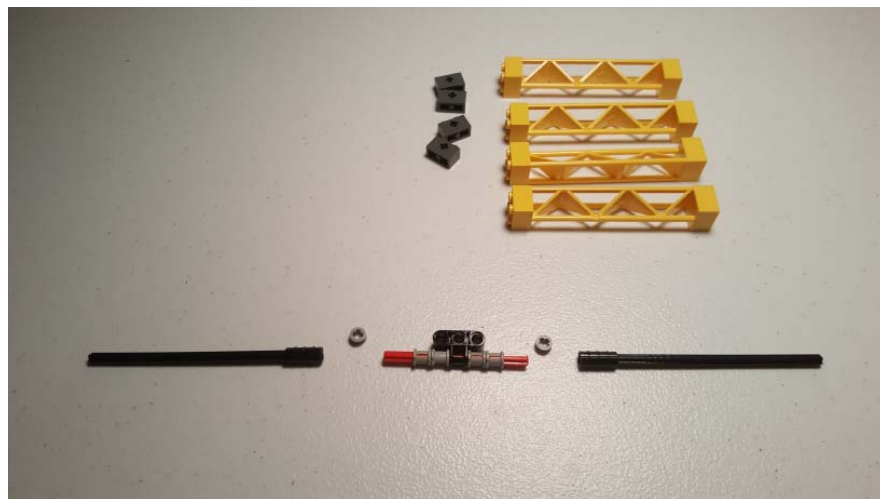




**Step 1:** Gather Parts



**Step 2:** Attach Axle-12 to Axle Joiner. Insert Axle-8 to Axle and Pin Connector triple



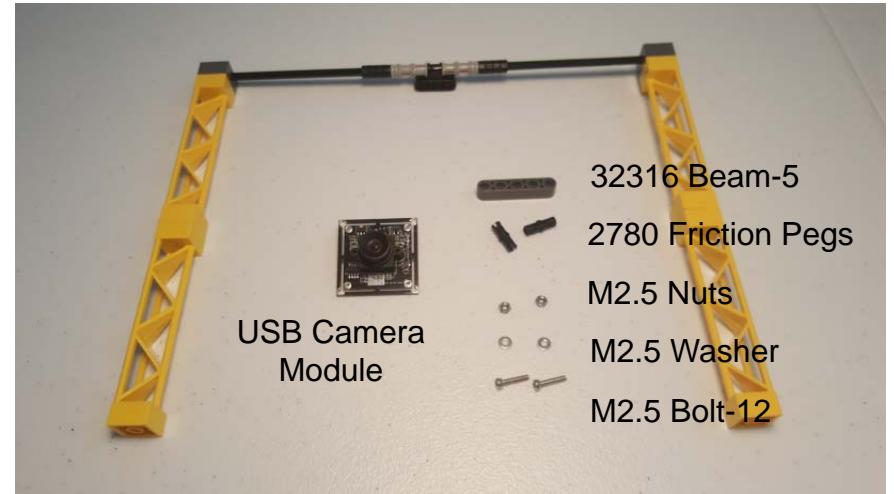
**Step 3:** Slide 2 Bushes to both left and right ends of Axle-8



**Step 4:** Slide half-bush and connect with Axle-12 thru Axle Joiner. Attach two 1x2 Bricks to Tower (NB: orientation of Brick's Axle hole and Tower)

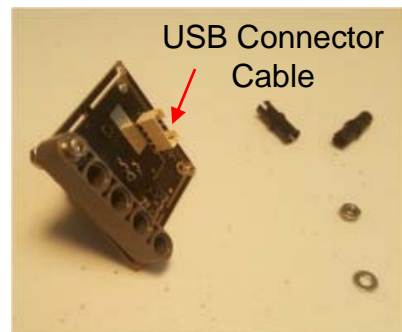


**Step 5:** Attach two 1x2 Bricks to remaining tower. Align Axle holes with left and right Axle-12 parts (see inset photo)

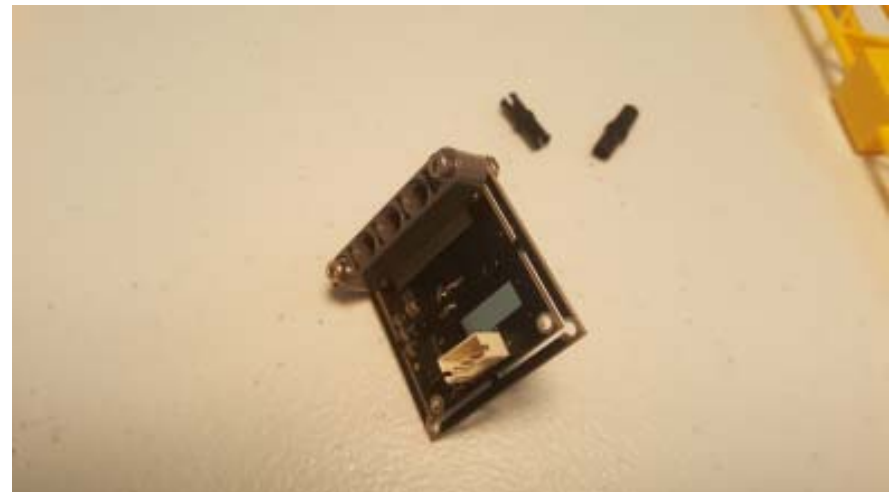


32316 Beam-5  
 2780 Friction Pegs  
 M2.5 Nuts  
 M2.5 Washer  
 M2.5 Bolt-12  
 USB Camera Module

**Step 6:** Gather Parts. Spinel 2MP full HD USB Camera Module (640x480) FOV 100 degrees [Amazon](https://www.amazon.com)



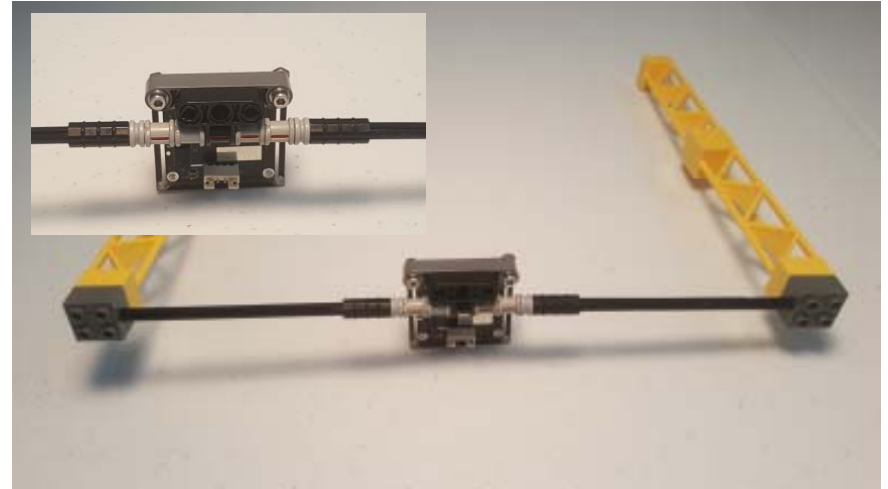
**Step 7:** Screw M2.5 Bolt into Washer and Beam 5 and secure with Nut. NB: Camera orientation and mounting hole locations (2 views above given)



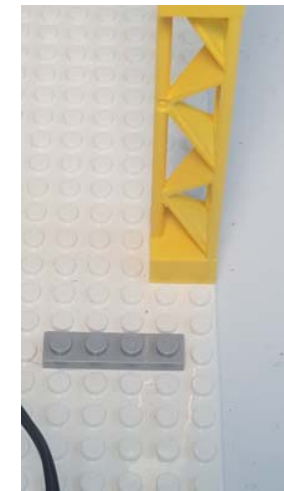
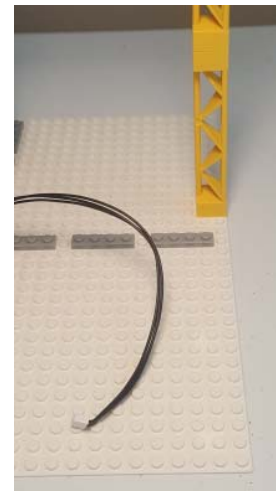
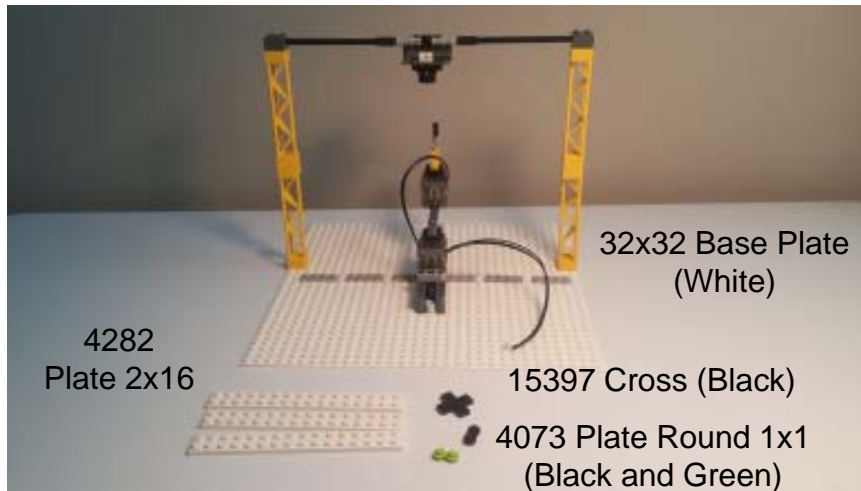
**Step 8:** Screw remaining M2.5 Bolt



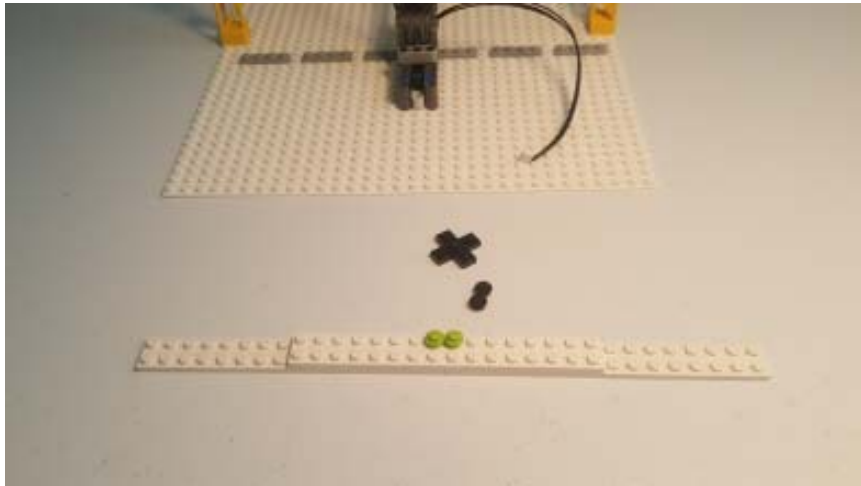
**Step 9:** Attach 2 Friction Pegs into Beam 5



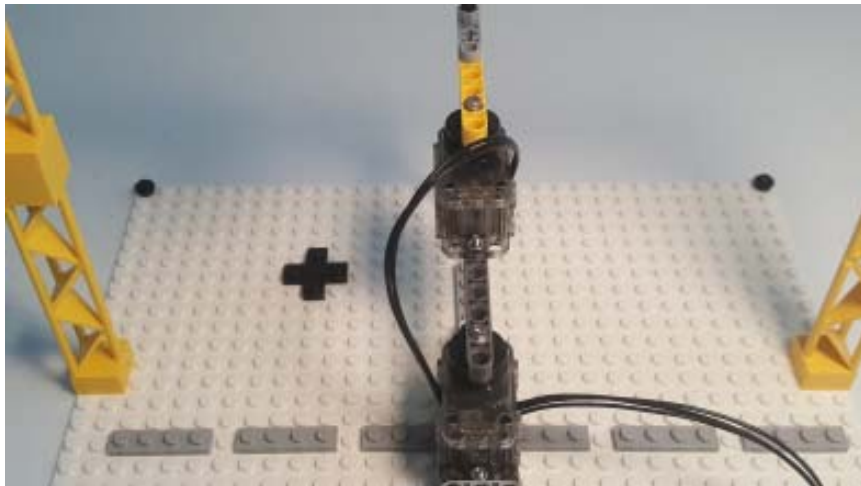
**Step 10:** Attach Beam 5 to Axle and Pin Connector Triple. NB: Camera orientation (inset photo)



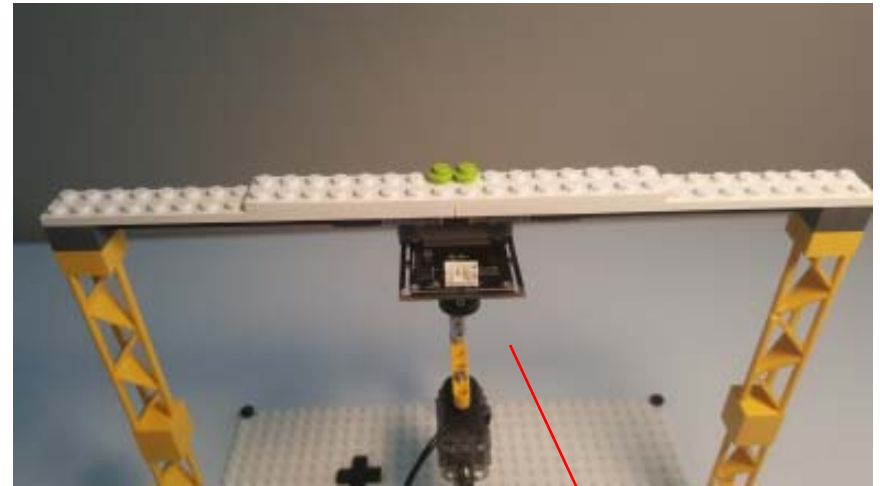
**Step 11:** Note spacing (2 right photos) and mount Tower to Base Plate. Gather parts



**Step 12:** Affix 2x16 Plate across two 2x16 plates. Place 1x1 Round in center

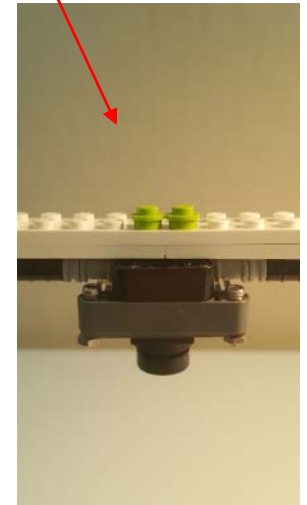


**Step 14:** Attach Black Cross (somewhere near arm) and Black Round 1x1 plates at top left and right corners



**Step 13:** Attach 2x16 plates to Tower. NB: Camera orientation.

Note how camera's lens is centered on the 2x16 Beam (as indicated by Green 1x1 Rounds)



**Congratulations! Completed construction of a Lego Camera Tower**



Completed Lego Camera Tower overlooking 2-DOF planar manipulator



Stack of 17 Technic Bricks between Base Plate and Lens.  $17 \times 6 \text{ mm} + 1 \text{ mm (due to stud)} = 103 \text{ mm}$  distance

