



Student Instruction Manual

Rail & Road Kit

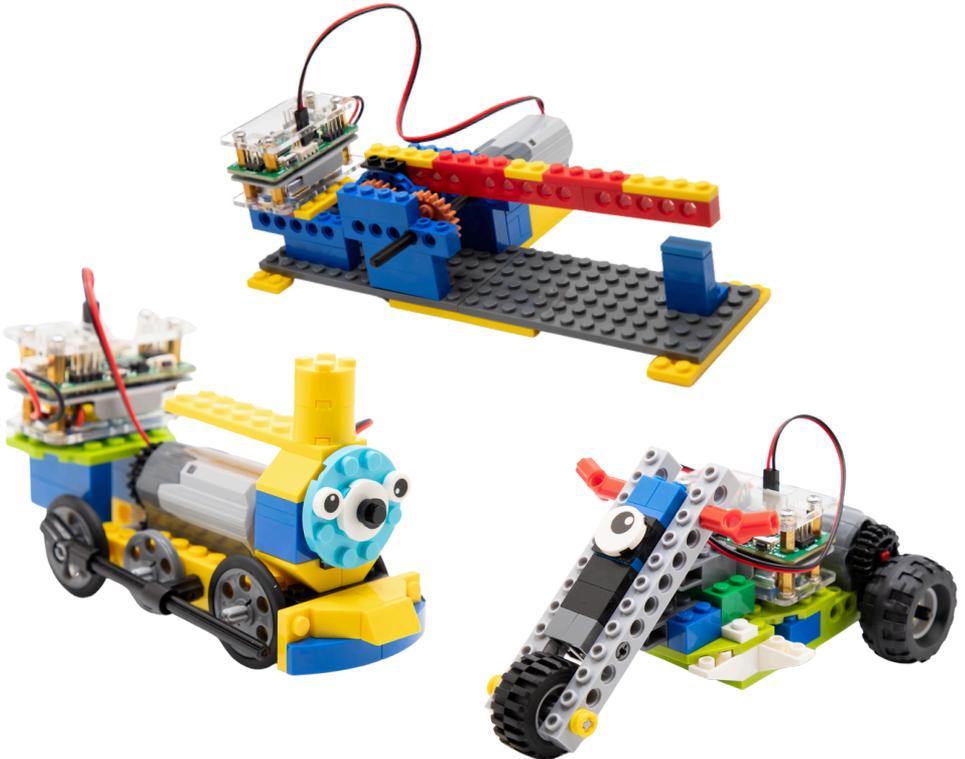




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About Windtree Education

Founded in California in 2010, Windtree Education is a non-profit organization dedicated to empowering students to explore their talents in STEAM — Science, Technology, Engineering, Art, and Mathematics.

Our mission is simple: to help every student discover their potential as a creator, problem solver, and innovator. Windtree began with a passion for robotics and coding, and has since grown into a leading provider of hands-on educational programs in engineering, design, and the creative technologies. From those roots, we developed Code2Grow, our proprietary online platform that makes learning to code accessible for every level — from beginner block coding to advanced programming.

Today, Windtree partners with schools and communities across California to provide students with meaningful, project-based learning experiences that inspire curiosity, build confidence, and promote collaboration.

Our curriculum blends cutting-edge technology with the timeless principles of exploration and discovery giving students the tools they need to transform imagination into innovation.

At Windtree, we believe education should be active, inclusive, and inspiring. Every program and product we create — including our Mechatronics kits — reflects our commitment to fostering creativity through hands-on experimentation and real-world engineering.

Together, we're building the next generation of makers, thinkers, and STEAM leaders.



Welcome to Mechatronics!

The Mechatronics kits are an innovative exploration into the world of engineering, robotics, and automation. Designed for learners of all ages, each kit introduces the integration of mechanical and electronic systems through fun, hands-on building.

From simple mechanical movements to powered, motorized creations, every project helps you discover how machines think and move. These kits encourage curiosity, creativity, and critical thinking — letting builders experiment, test ideas, and bring their own designs to life.

By combining the principles of mechanics, electronics, and motion, Mechatronics kits provide a foundation in real-world engineering and innovation. Whether you're a beginner or an aspiring inventor, these builds make learning about technology exciting, accessible, and inspiring.



What You Will Learn

All aboard! In this kit, you'll explore how machines move, roll, and stop. By building your own train, motorcycle, and railroad gate lever, you'll discover how movement and control work together to keep traffic on track.

Through hands-on building, you'll:

- See how wheels, gears, and levers make things move.
- Learn how simple machines help control motion.
- Experiment with how motors bring your creations to life.
- Practice teamwork, problem-solving, and creative design.

This kit introduces the basics of mechanical motion, cause and effect, and early engineering thinking — giving young builders the confidence to imagine and create their own moving inventions!

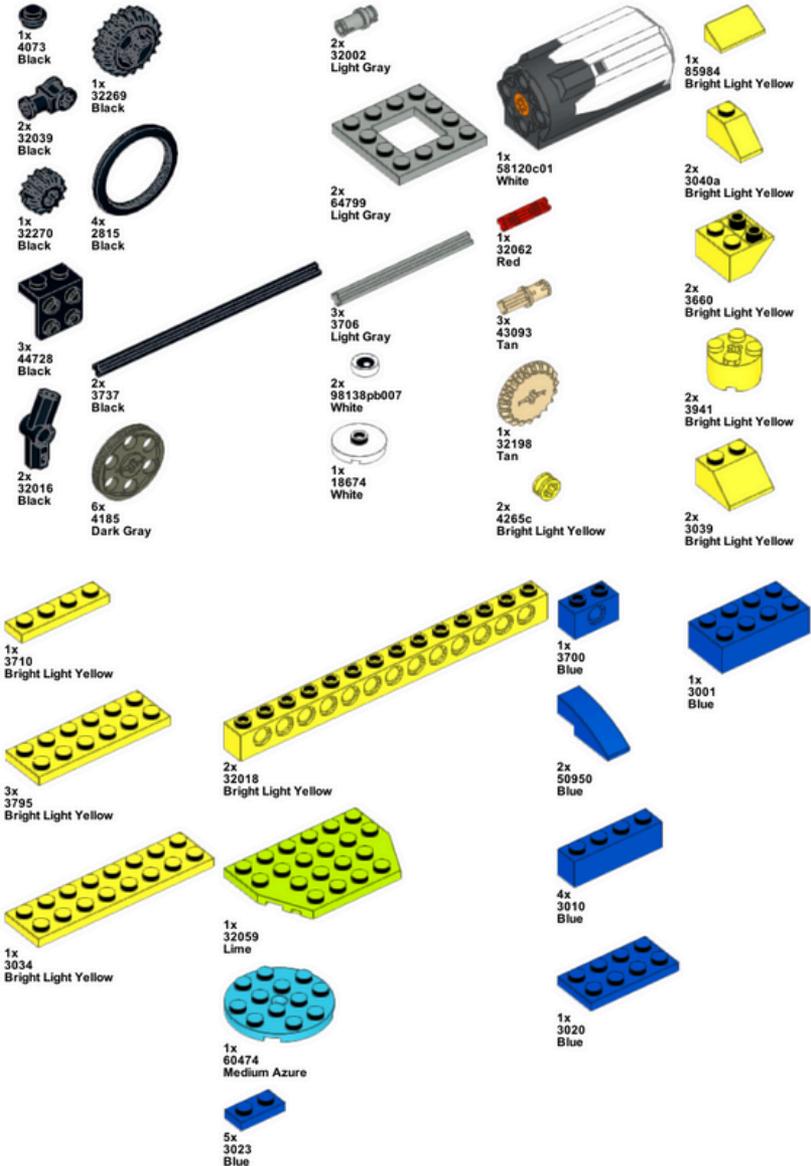


Little Train Assembly





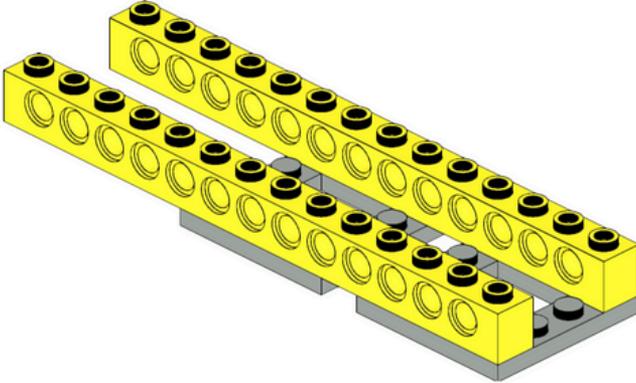
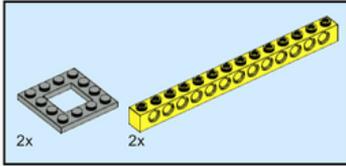
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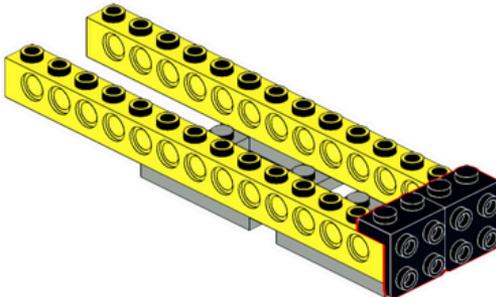


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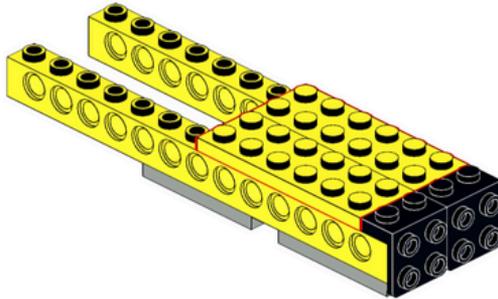
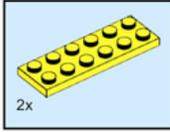
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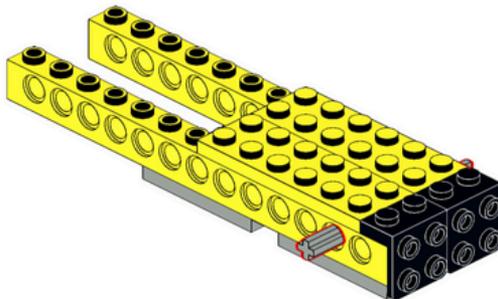
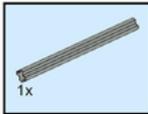


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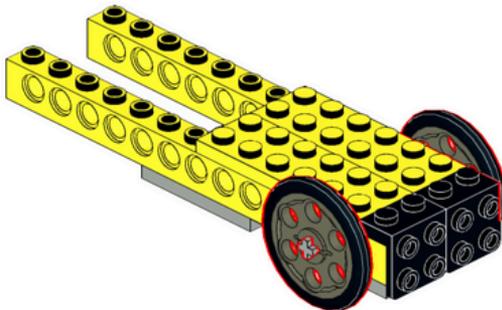




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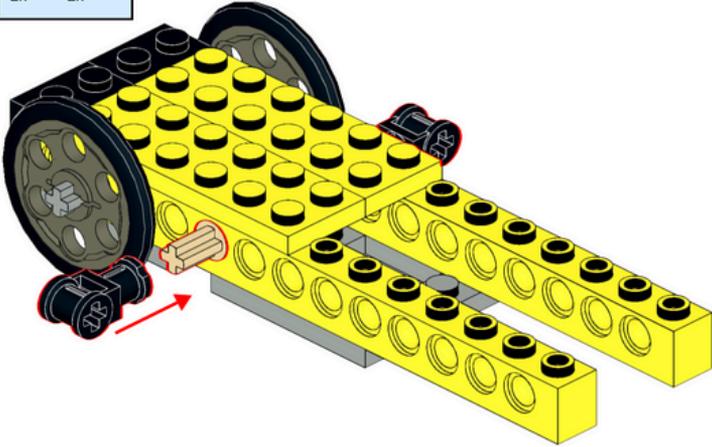
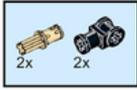


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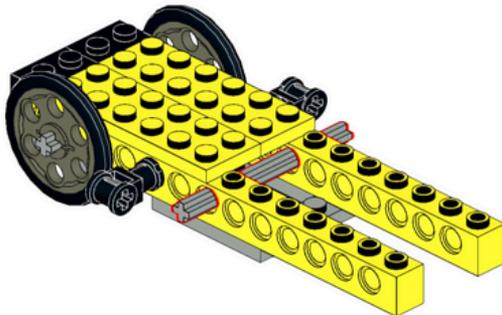
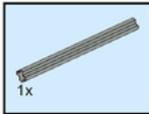




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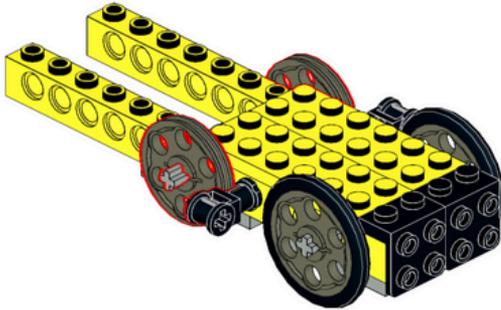
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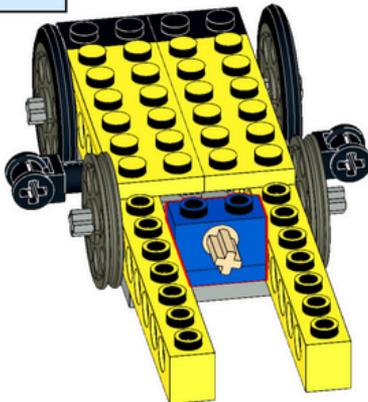
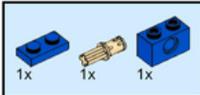


Little Train Assembly

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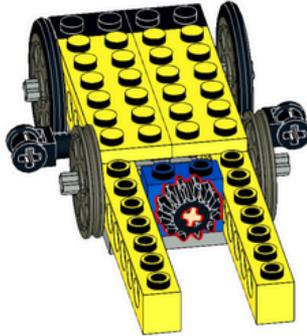


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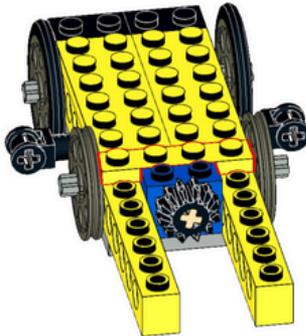
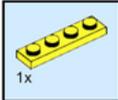




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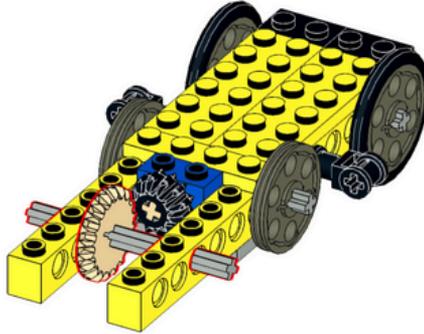
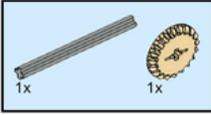


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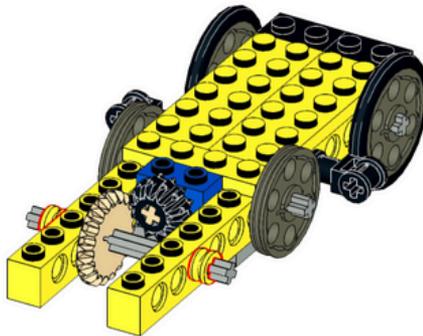




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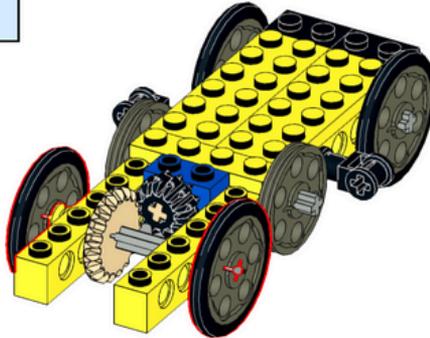


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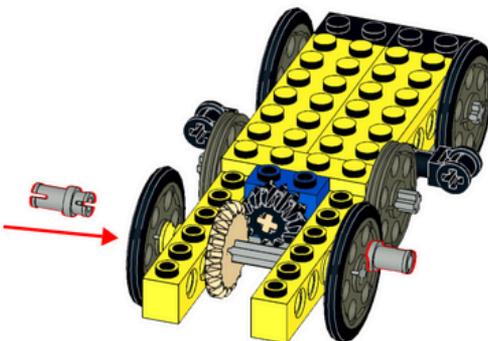




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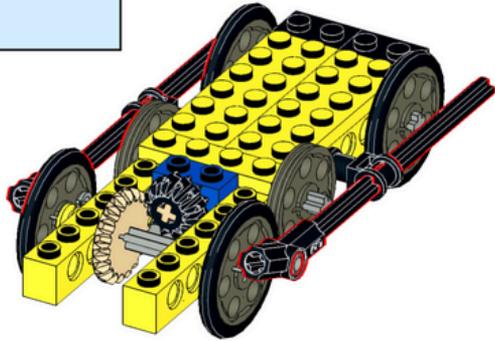
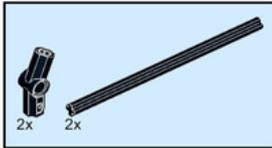


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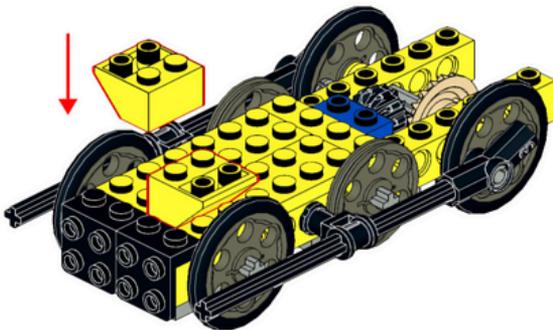
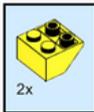




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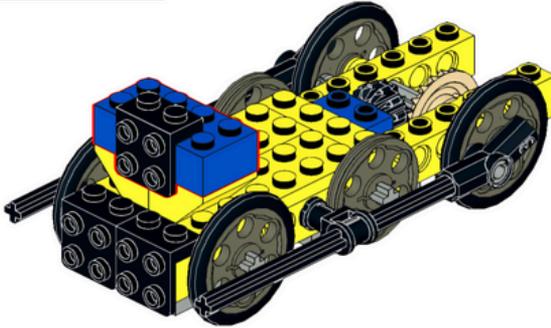
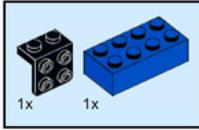


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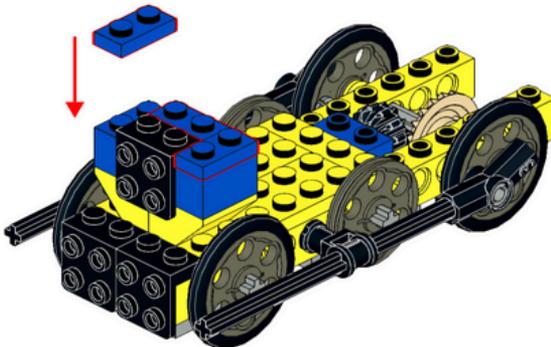




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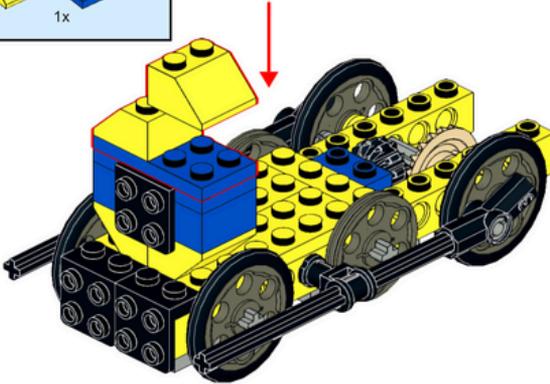
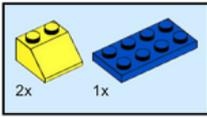


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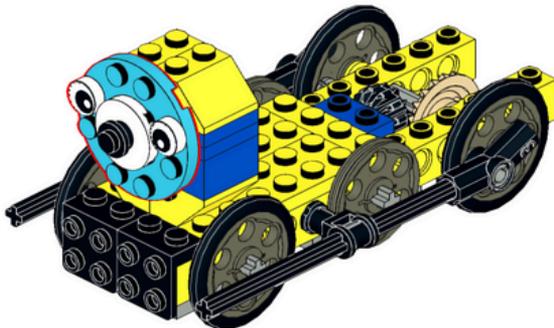
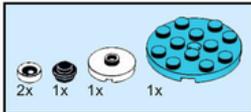




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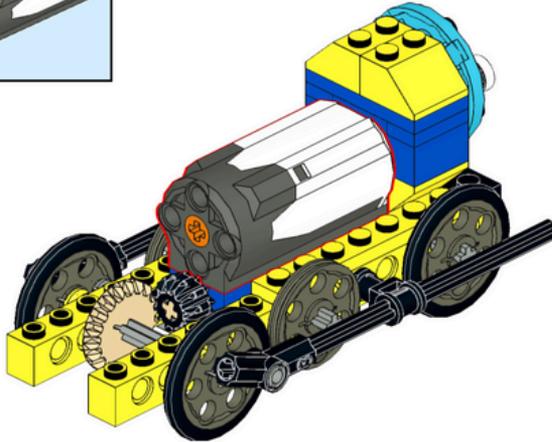
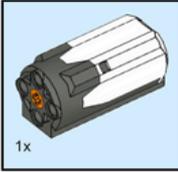


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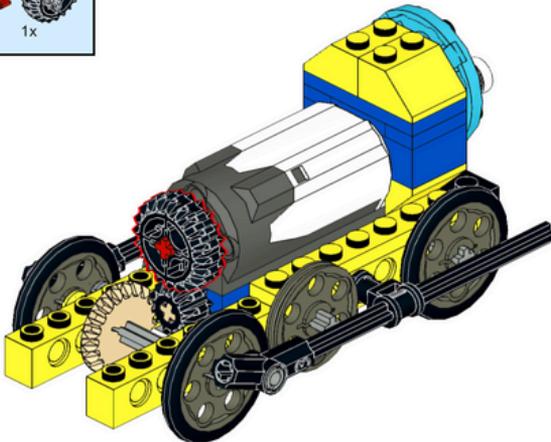
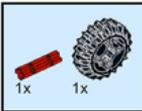




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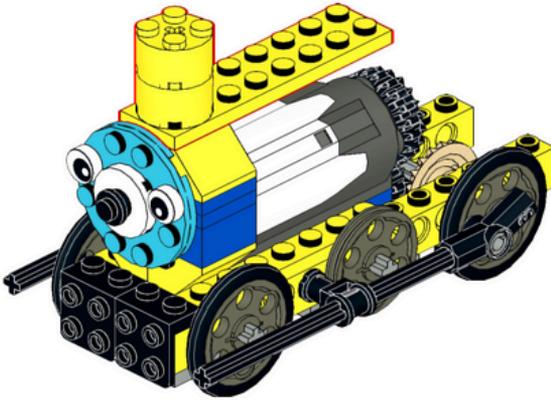
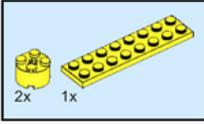


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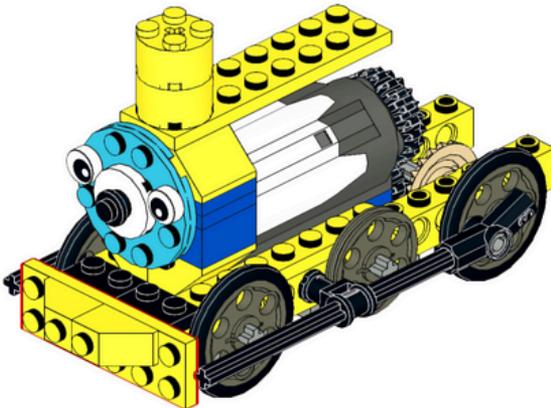
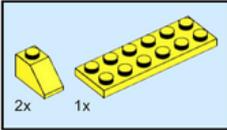




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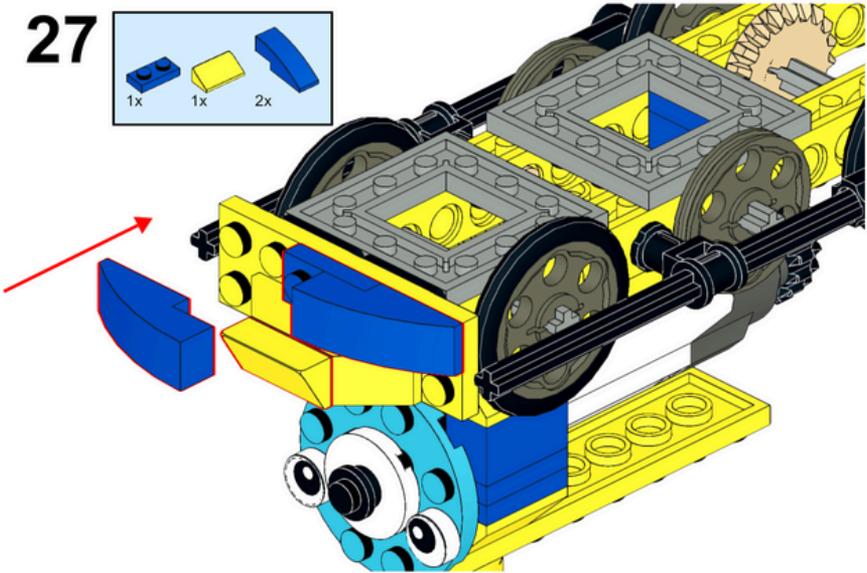
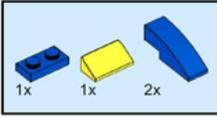


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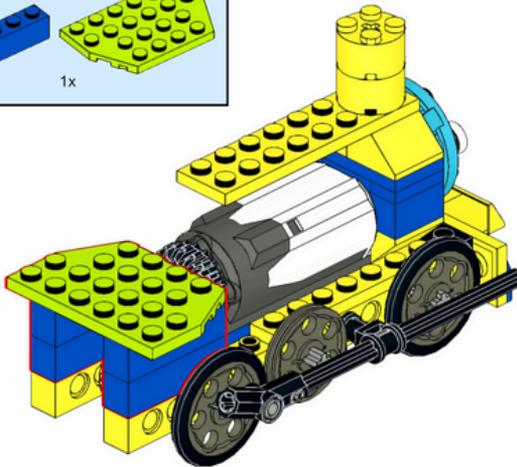
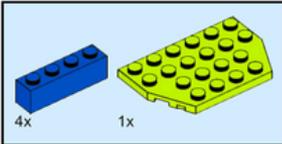


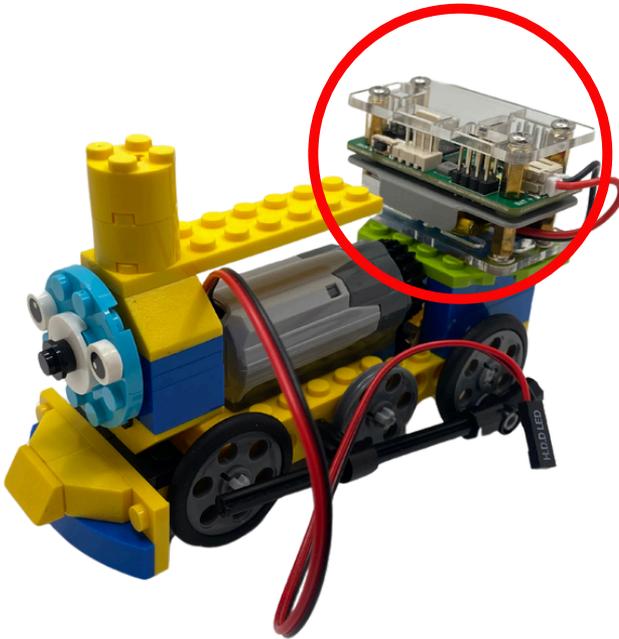


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Attach the C2G Mini Microcontroller

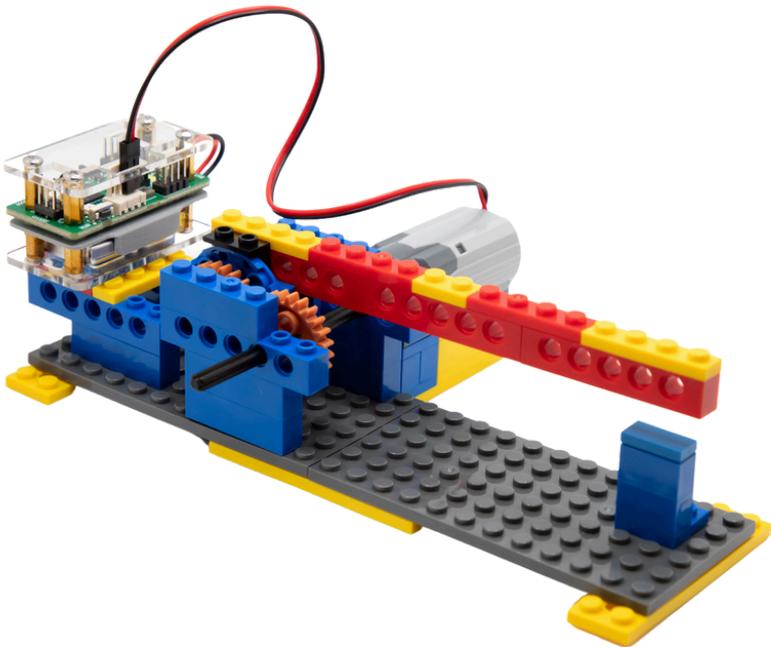


Congratulations on
completing the
Little Train build!





Railroad Gate Lever Assembly





Railroad Lever Kit Checklist

Check for all Gate Lever parts:



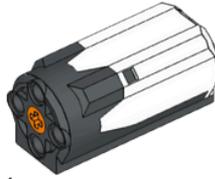
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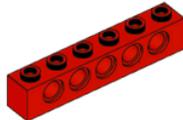
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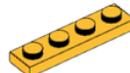
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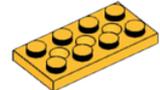
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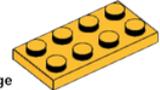
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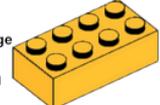
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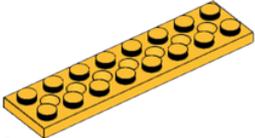
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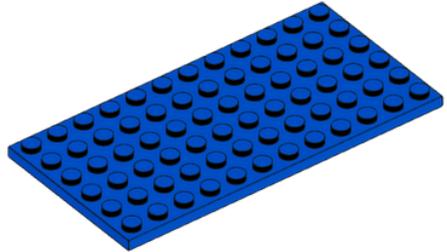
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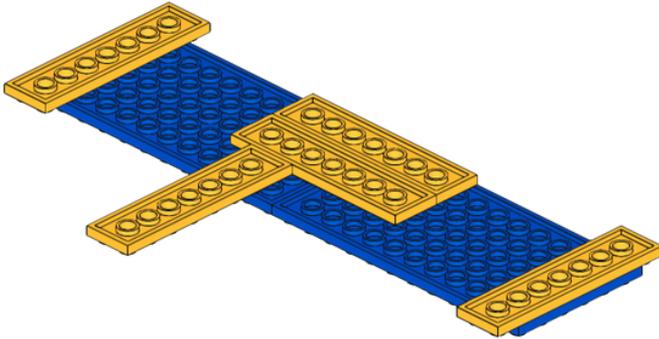
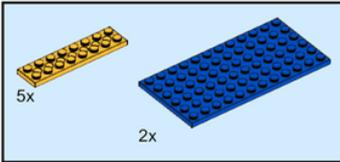


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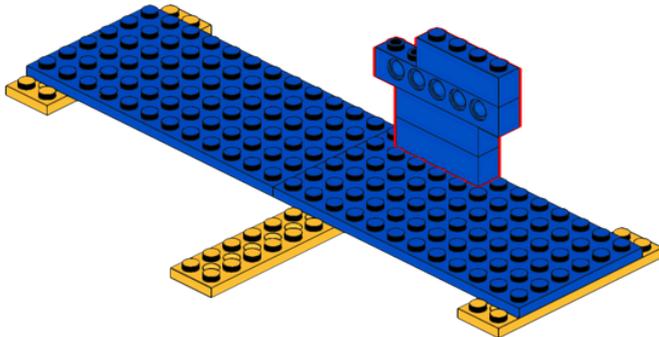
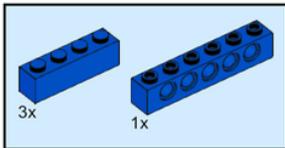


Railroad Lever Kit Assembly

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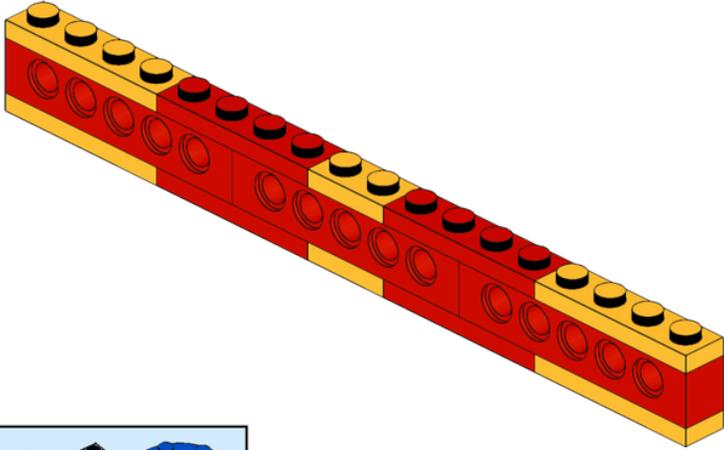
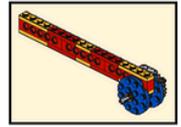
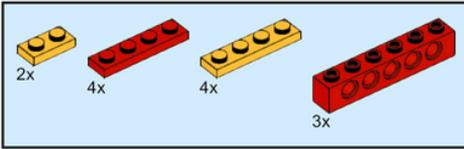
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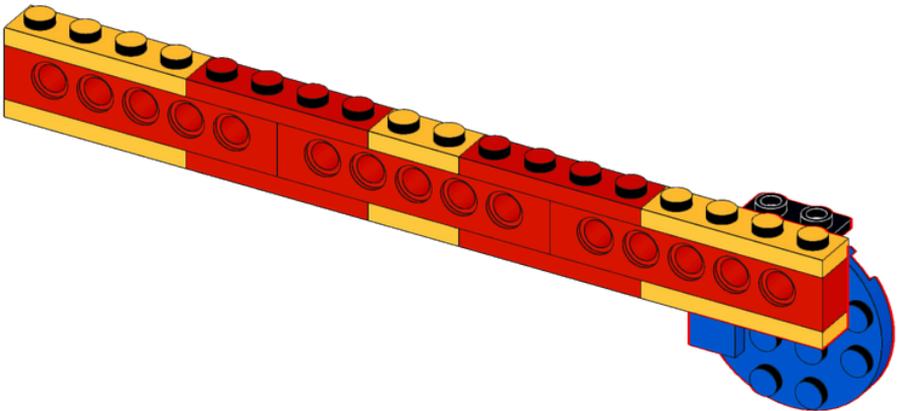
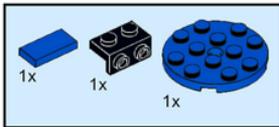


Railroad Lever Kit Assembly

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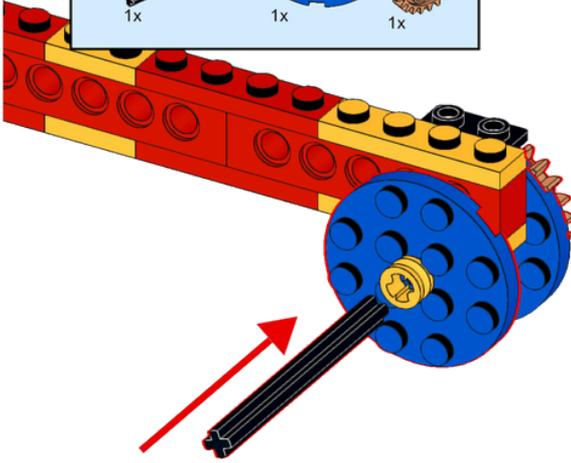
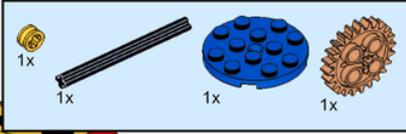
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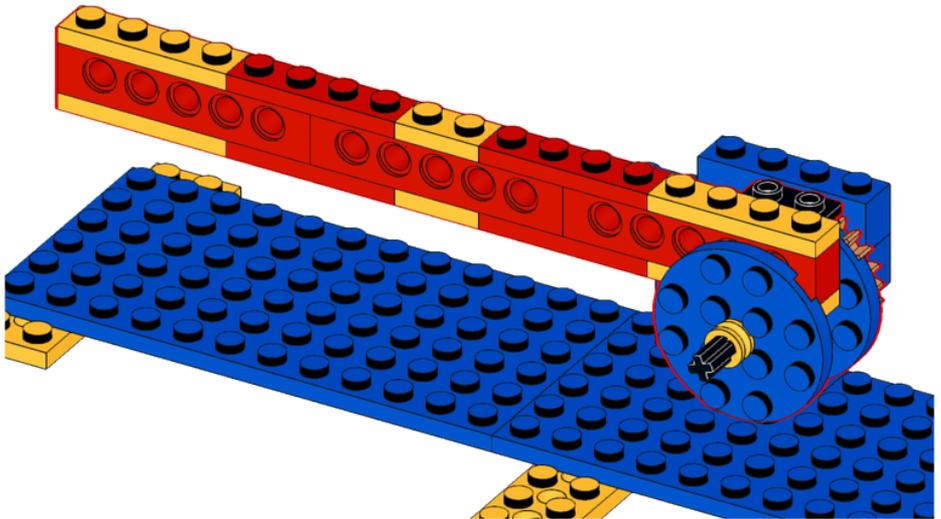


Railroad Lever Kit Assembly

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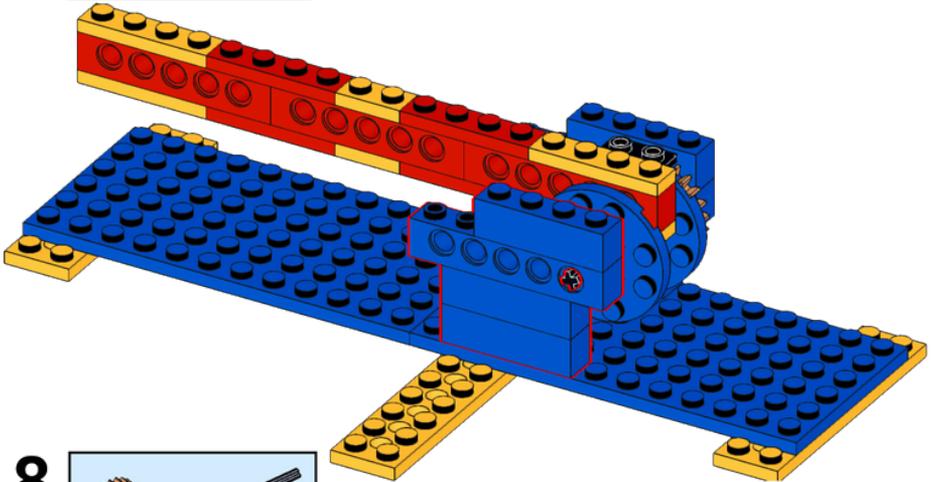
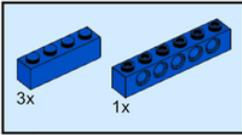
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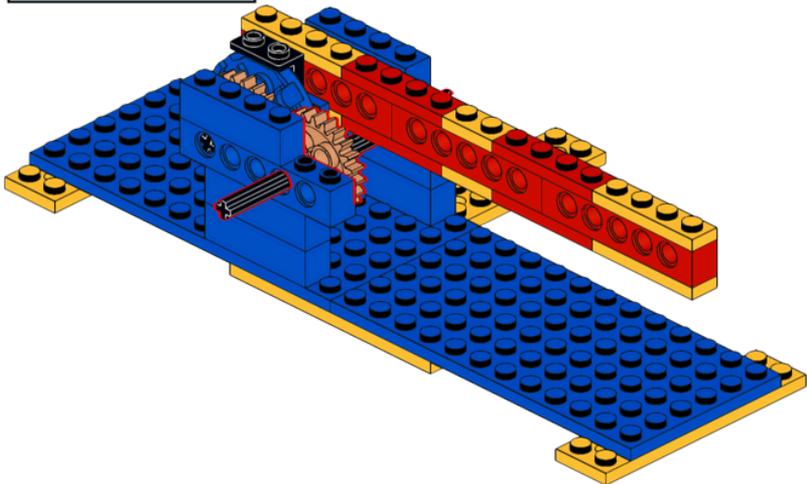
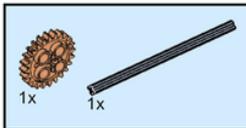


Railroad Lever Kit Assembly

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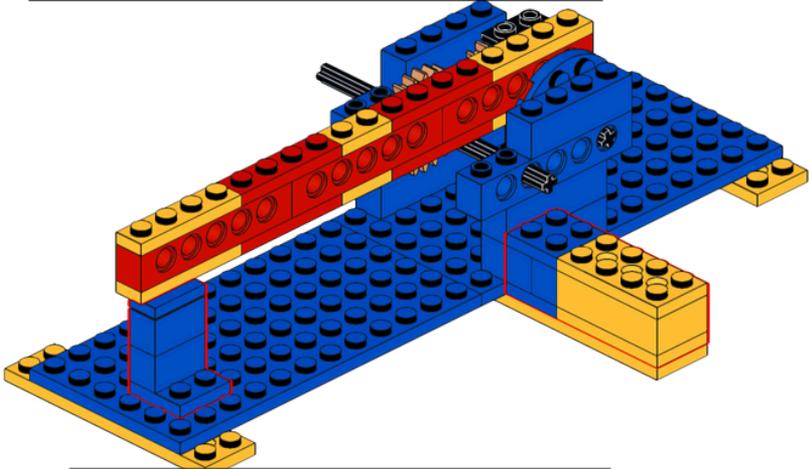
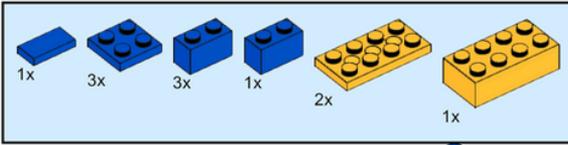
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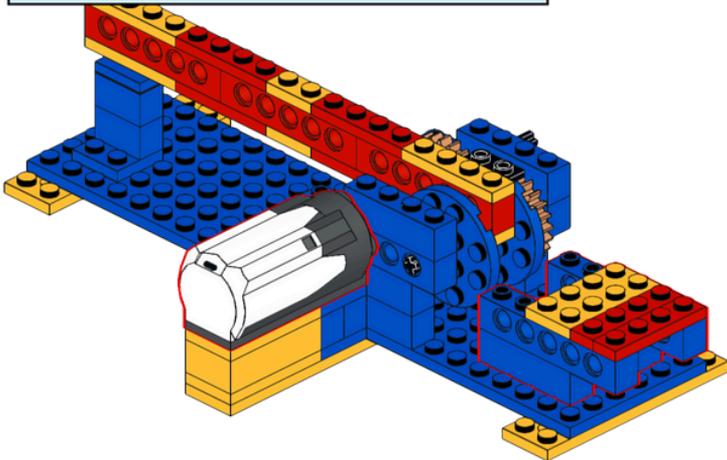
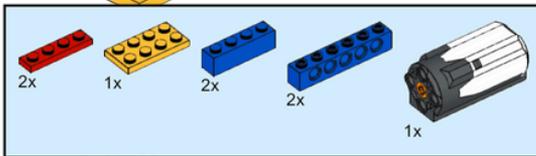


Railroad Lever Kit Assembly

9

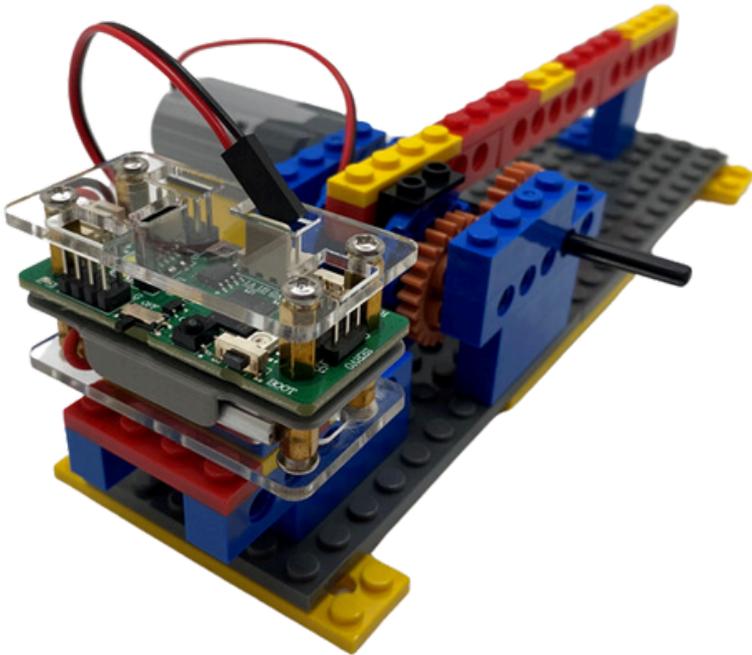


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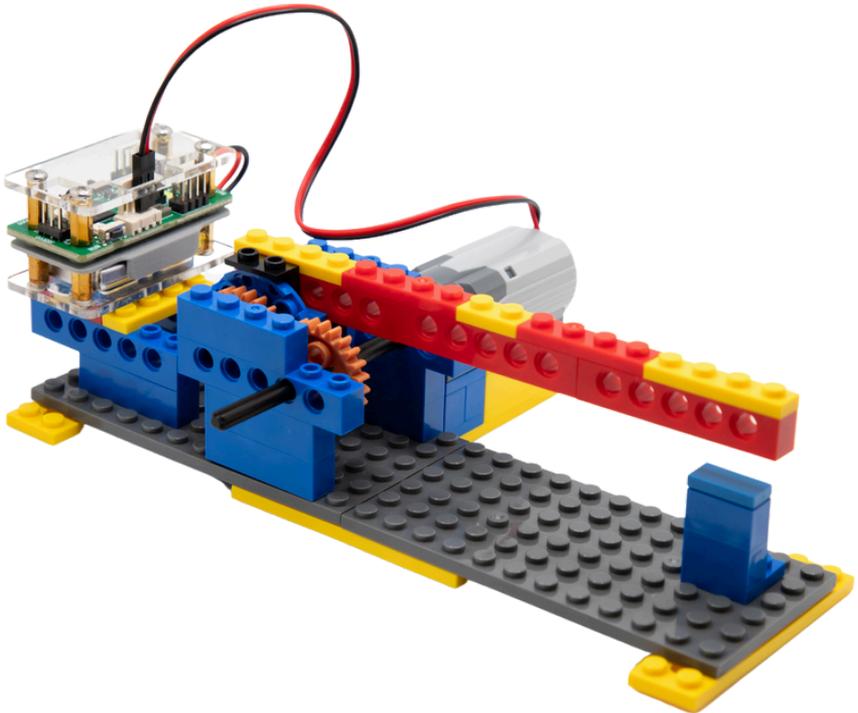


Mounting the Microcontroller





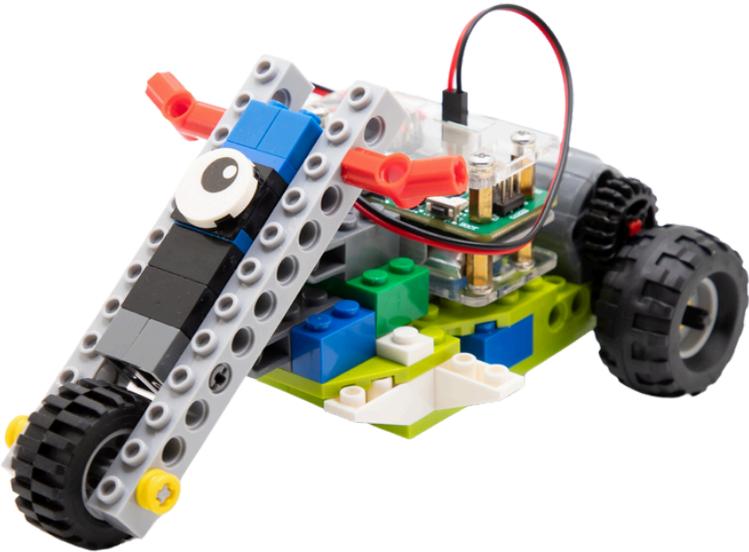
Congratulations on
completing the
Railroad Gate Lever build!





Student Instruction Manual

Motorcycle Assembly





Check for all Motorcycle parts:



1x
32270
Black



1x
44728
Black



1x
32269
Black



2x
57909
Black



1x
3708
Black



2x
2458
Dark Bluish Gray



2x
57910
Dark Bluish Gray



3x
55982
Light Bluish Gray



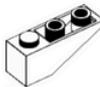
2x
3706
Light Bluish Gray



2x
3895
Light Bluish Gray



1x
4150pb148
White



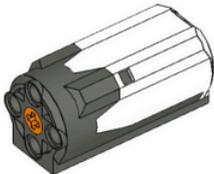
4x
4287
White



1x
3020
White



1x
3666
White



1x
58120c01
White



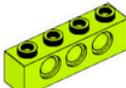
1x
32062
Red



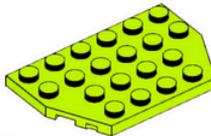
2x
32192
Red



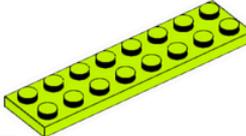
4x
4265c
Yellow



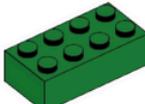
4x
3701
Lime



2x
32059
Lime



3x
3034
Lime



3x
3001
Green



1x
3023
Blue



6x
3004
Blue



2x
32064
Blue



2x
3022
Blue



1x
3003
Blue



1x
92402
Rubber Black

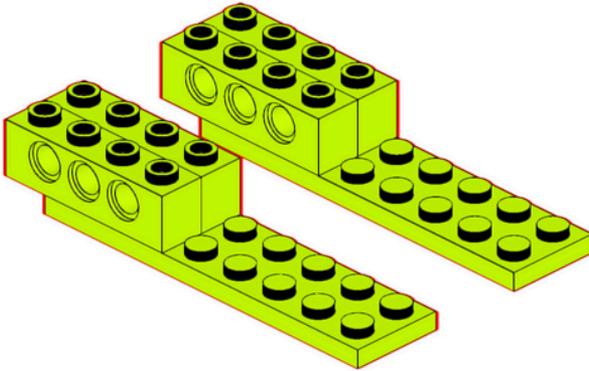
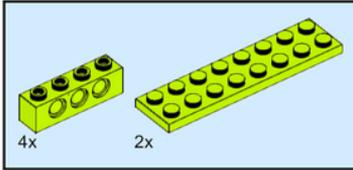


2x
56891
Rubber Black

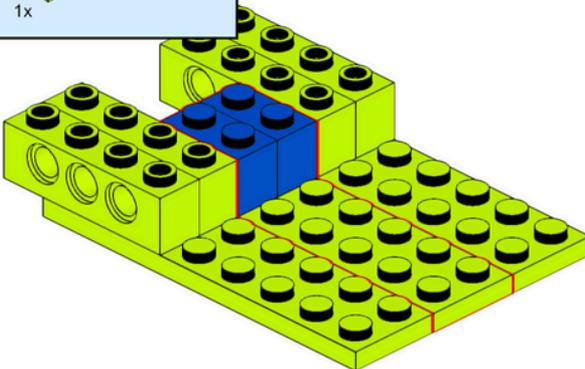
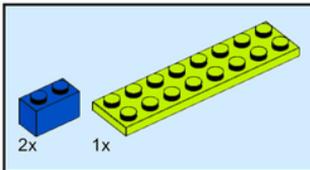




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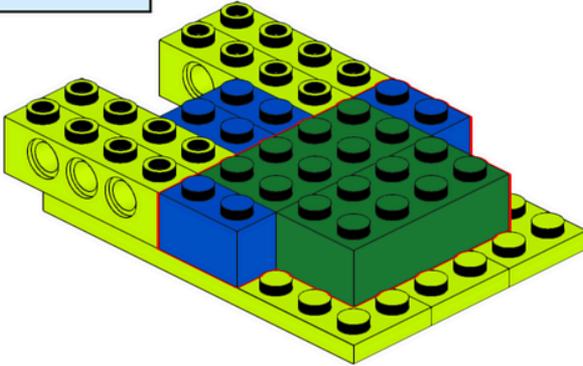
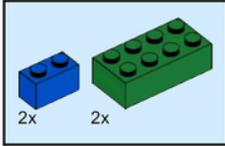


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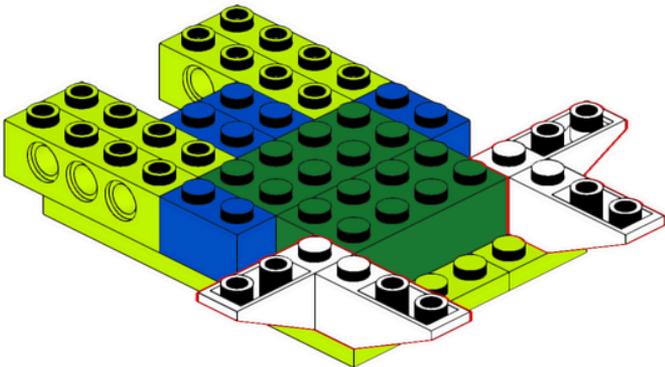
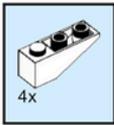




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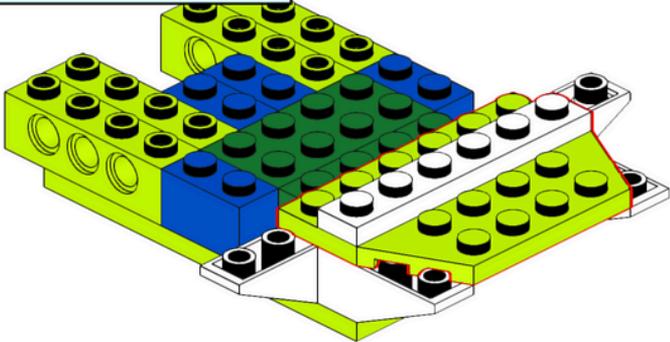
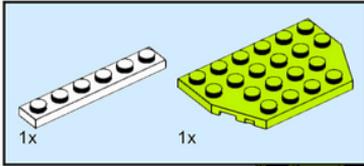


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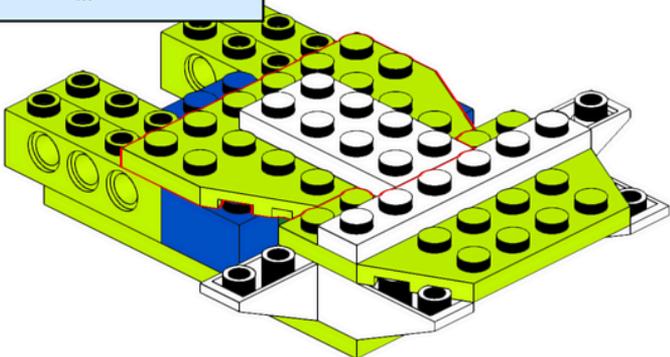
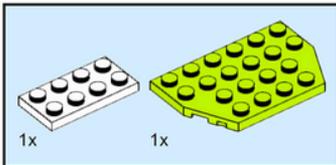




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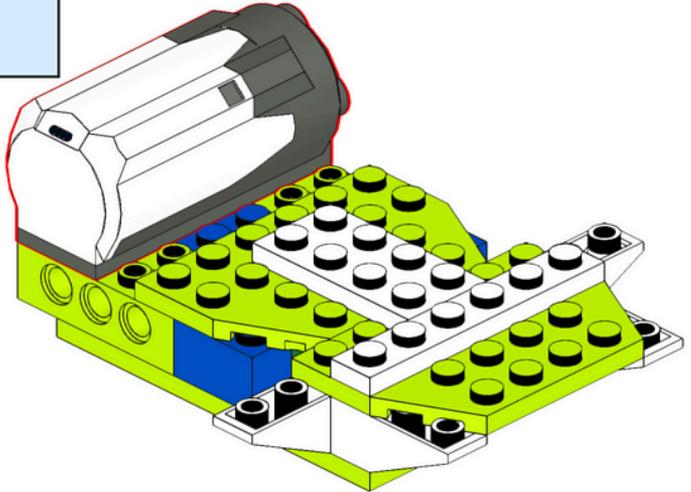
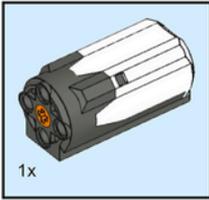


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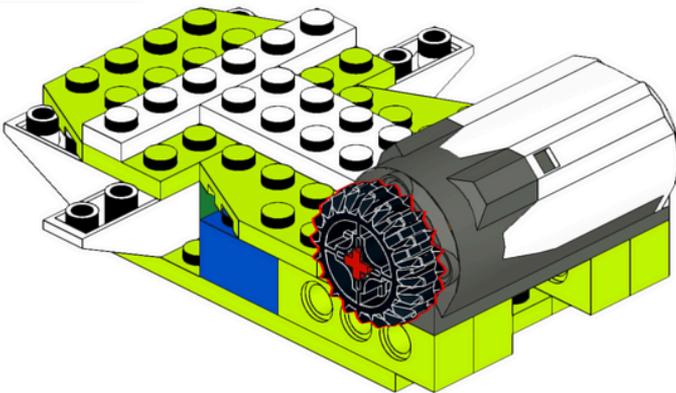
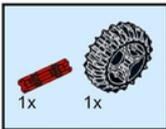




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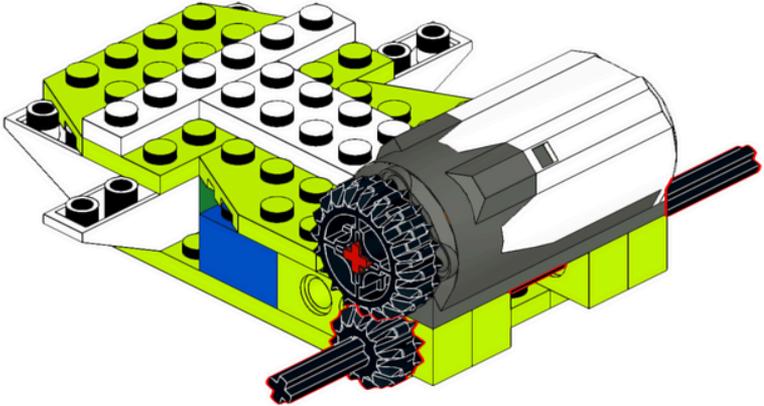
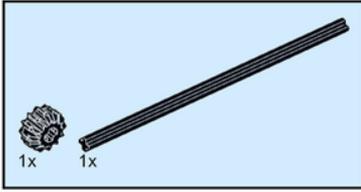


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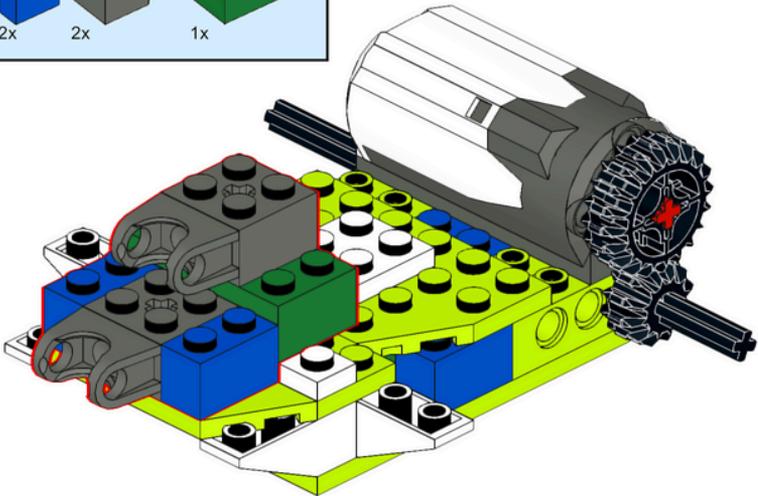
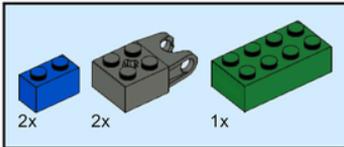




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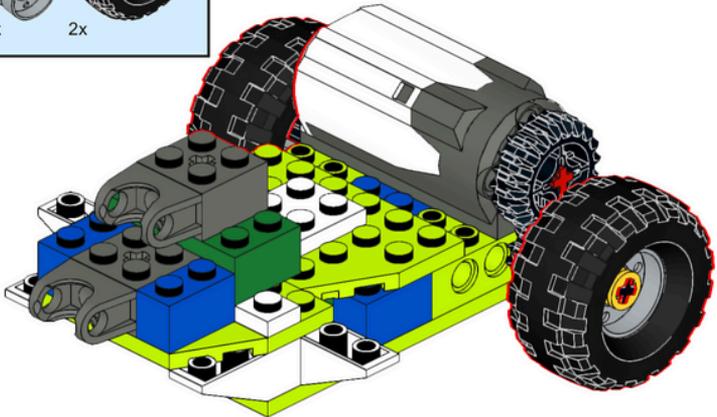
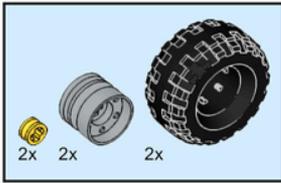


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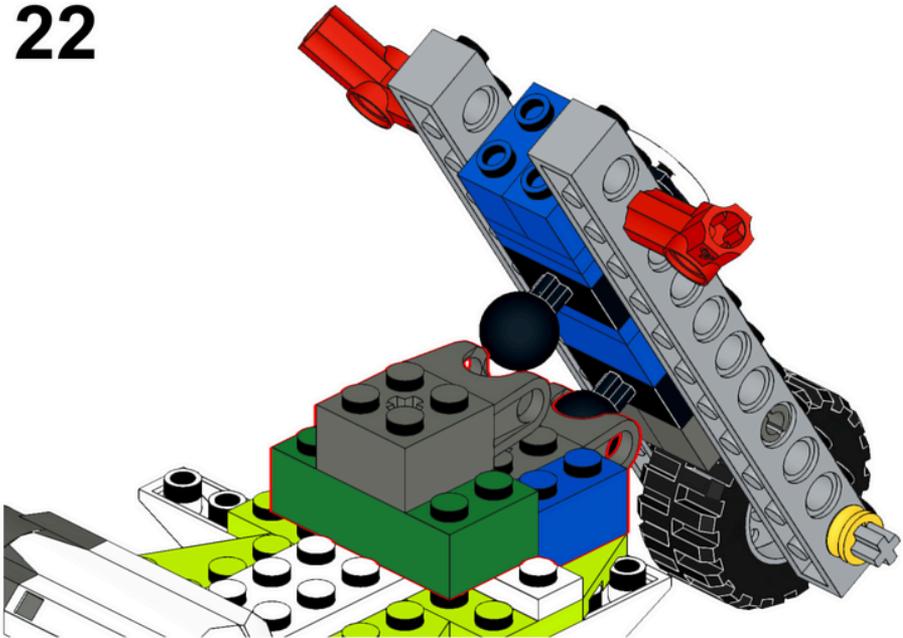




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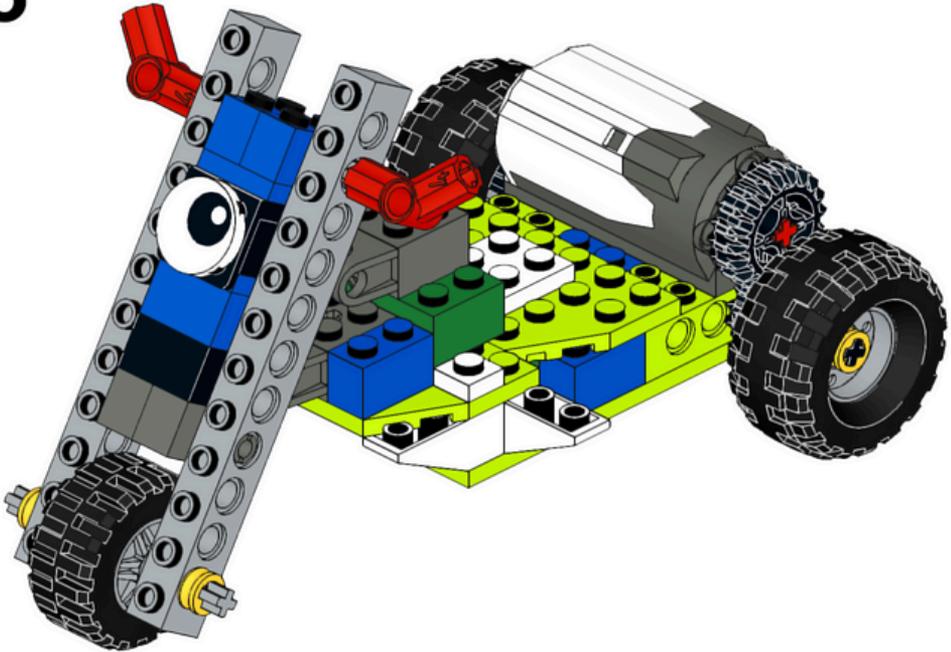


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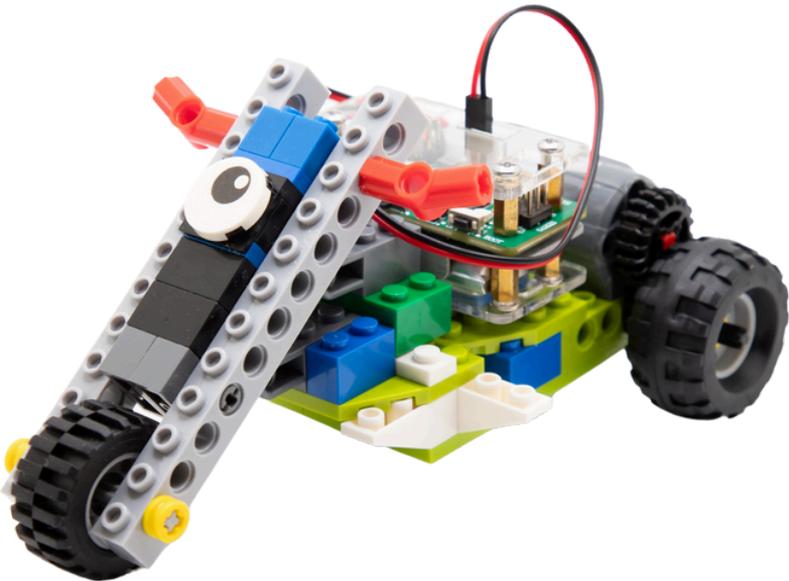


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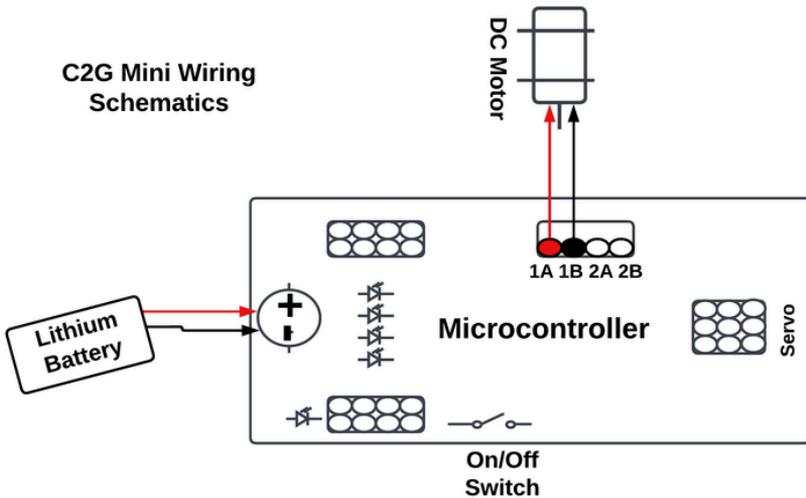
Congratulations on
completing the
Little Motorcycle build!





How to wire the robot?

C2G Mini Wiring Schematics



1A: Red wire of DC motor
1B: Black wire of DC motor

Lithium Battery Wiring

