



LEGO Boost Movement Part 1

Wheels and Crawler Tracks



Understanding the Weekly Activities

Goal - Help you learn how to build and program your own unique robots.

Each activity will teach you new building techniques and have you practice the programming skills that go with what you build. Be sure to notice the different ways you are building and programming each item. There is a LOT of great info packed into these “small” builds.

1. Complete each mini building and programming activity.
2. Choose some of these simple creations to be the basis for something more complex. For example, build a car out of one of the “Moving with Wheels” lessons.
3. As you learn more, combine what you have learned to keep making more and more complex robots. Remember to challenge yourself to try new things.

**We start simple but will get more complex.

Moving with the Move Hub





What You Will Learn

Different ways to use and make wheels.

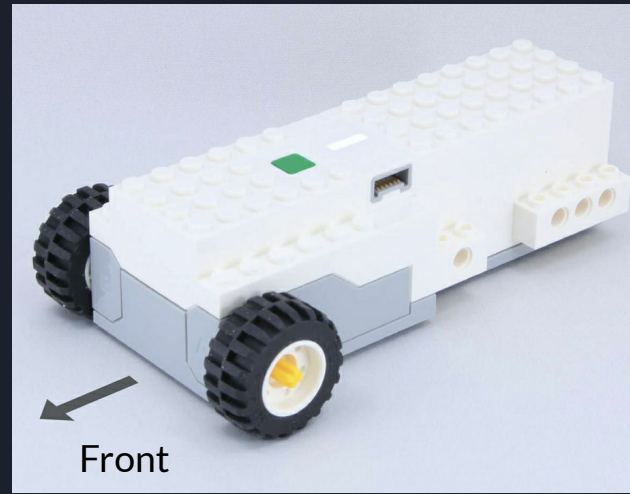
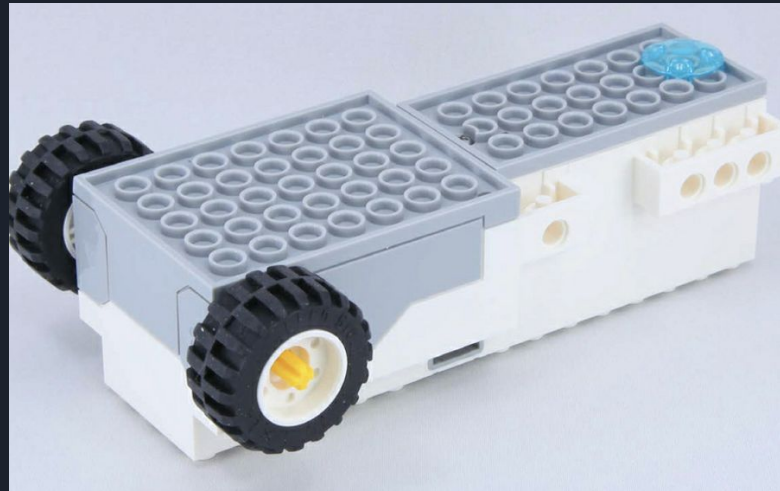
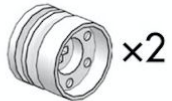
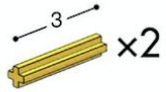
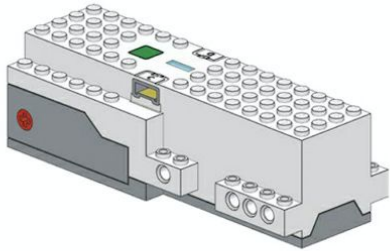
How to construct things with Crawler Tracks.

How to program different types of movements.

How to program and use the Joystick Widget.

How to use gears to increase or decrease power and speed.

Moving on Wheels #1 Building



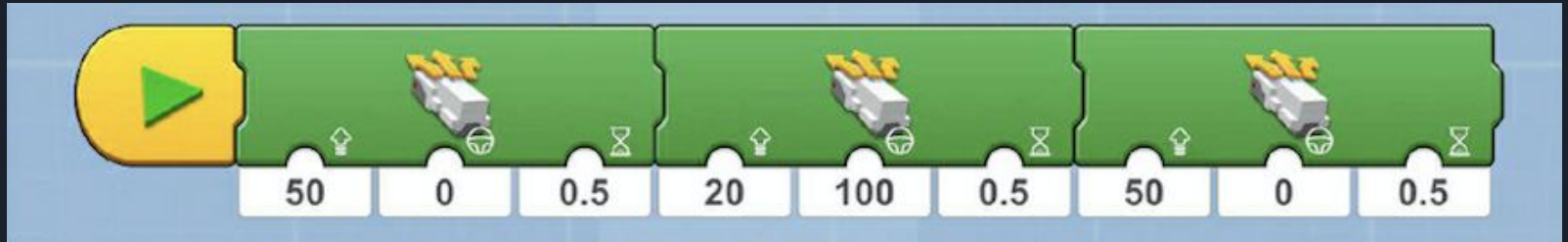
Let's try out some programming and then add some fun features.

Moving on Wheels #1 Programming

1.
Forward



2.
Turn



3.
ZigZag



Moving on Wheels #1


Programming Part 2

4. Joystick

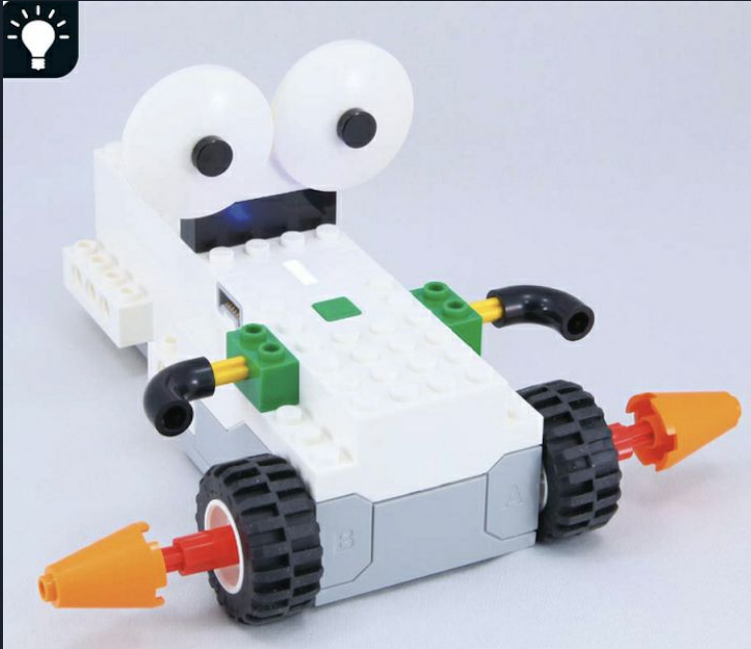


Joystick Widget - You can control your car with this joystick.

Use a **WAIT** block to give a slight delay. Without the delay the program could get confused because the joystick sends information continuously.

Now it is time to add fun features to your vehicle. 

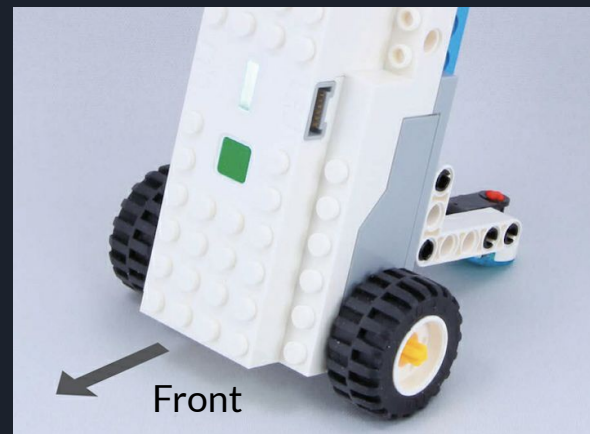
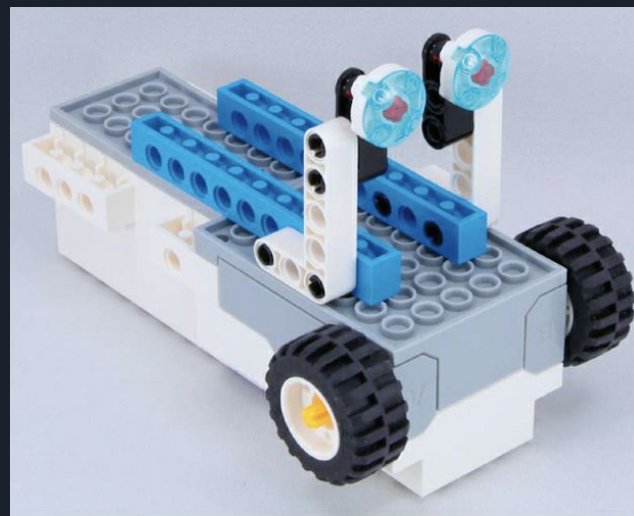
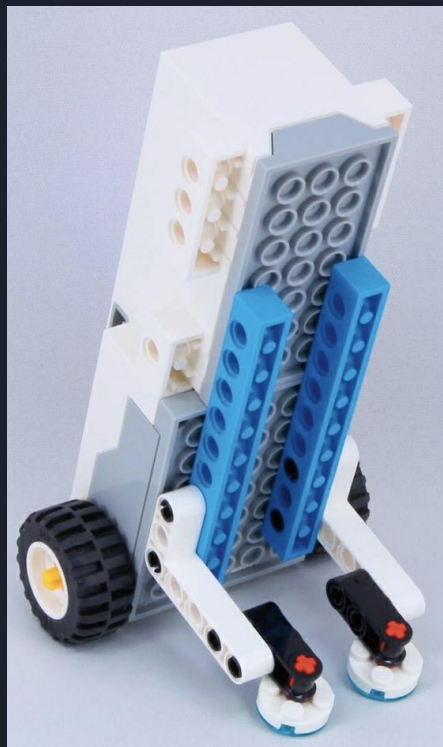
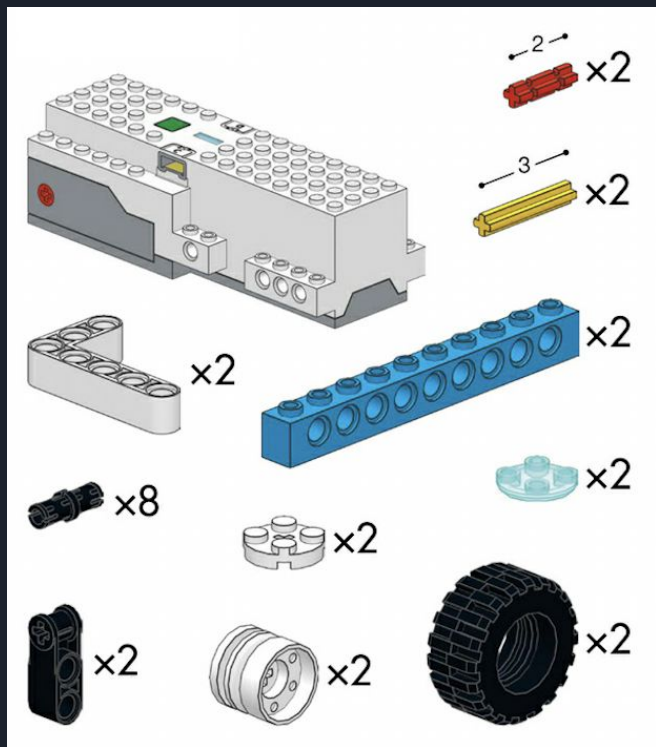
Moving on Wheels #1 Customizing



Try this or an idea of your own.

When ready, move on to the next build.

Moving on Wheels #2 Building



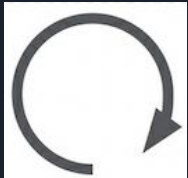
Moving on Wheels #2 Programming


**I won't have you repeat every new programming technique you learn with every build. You will do some basic testing and try some new things.

1.
Forward



2.



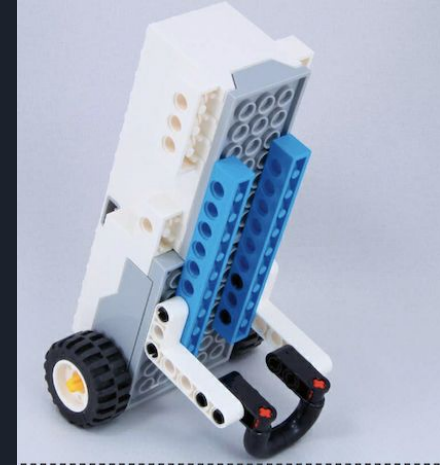
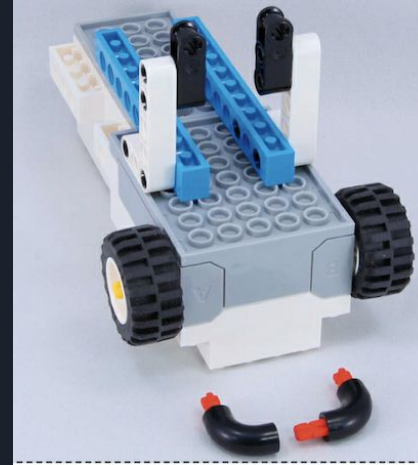
Now it is time to add fun features to your vehicle. 

Moving on Wheels #2

Customizing

Modify the Build - How does it move?
Better - The Same - Worse

Give it Personality

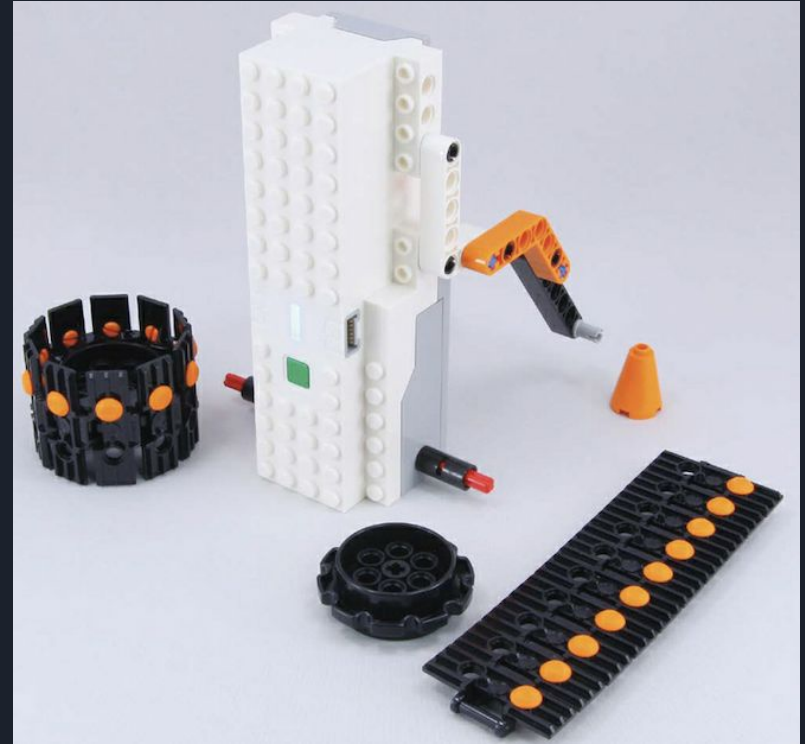
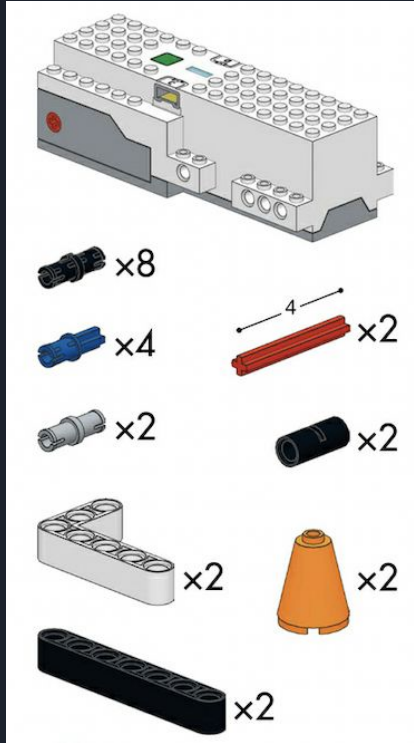


Try this or an idea of your own.

When ready, move on to the next build.

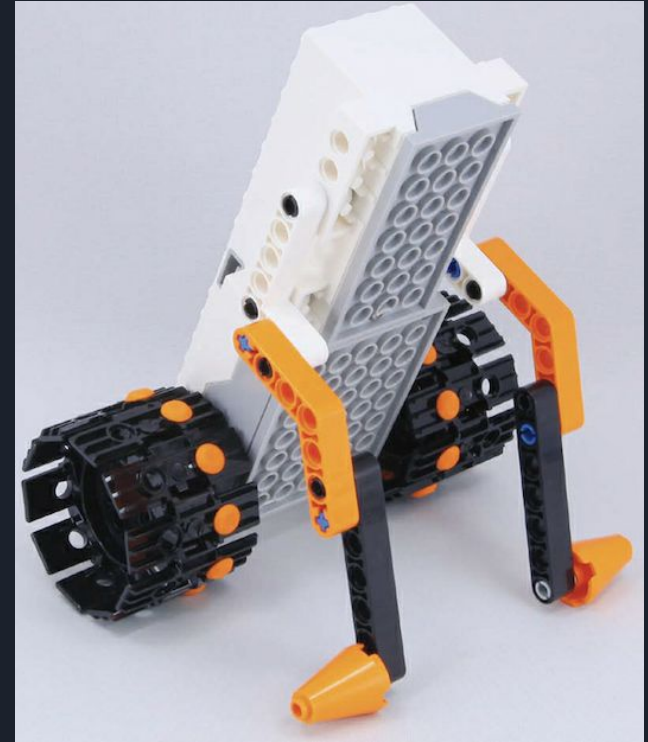
Moving on Wheels #3 Building Part 1

On what type of surface do you think this type of wheel will be most useful ?



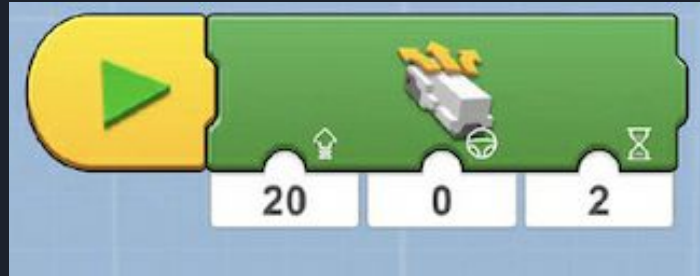
Moving on Wheels #3 Building Part 2

Notice the “arms” in the back for balance and support?
How are these different than the type you built in #2?



Moving on Wheels #3 Programming

1.

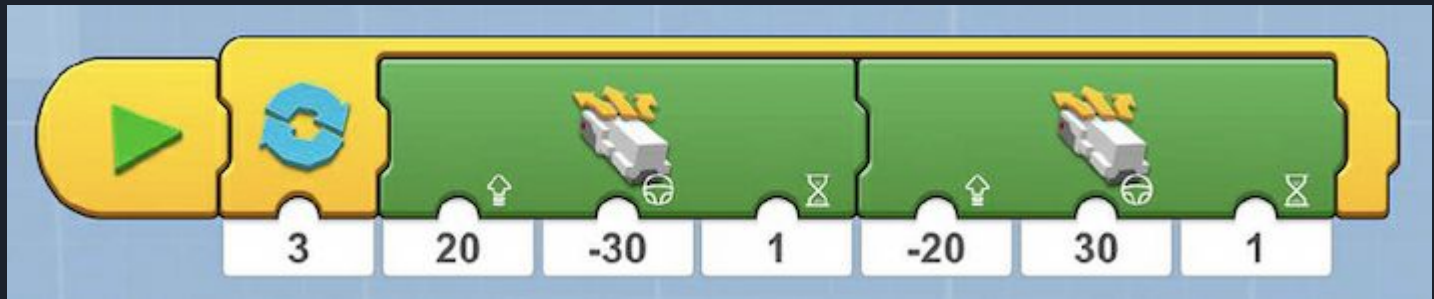
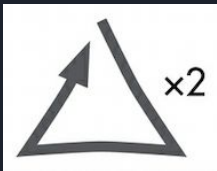


Next, add fun features
to your vehicle.



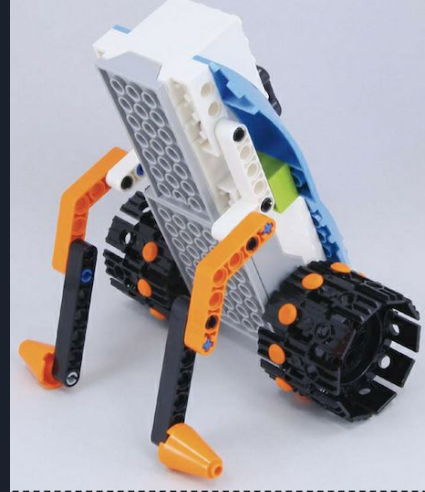
What movement do you think this
will create?

2.



Moving on Wheels #3

Customizing

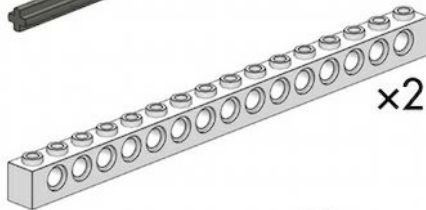
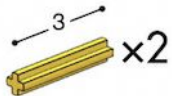
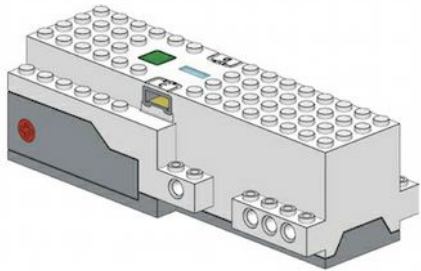


Try this or an idea of your own.

When ready, move on to the next build.



Moving on Wheels #4 Building Part 1

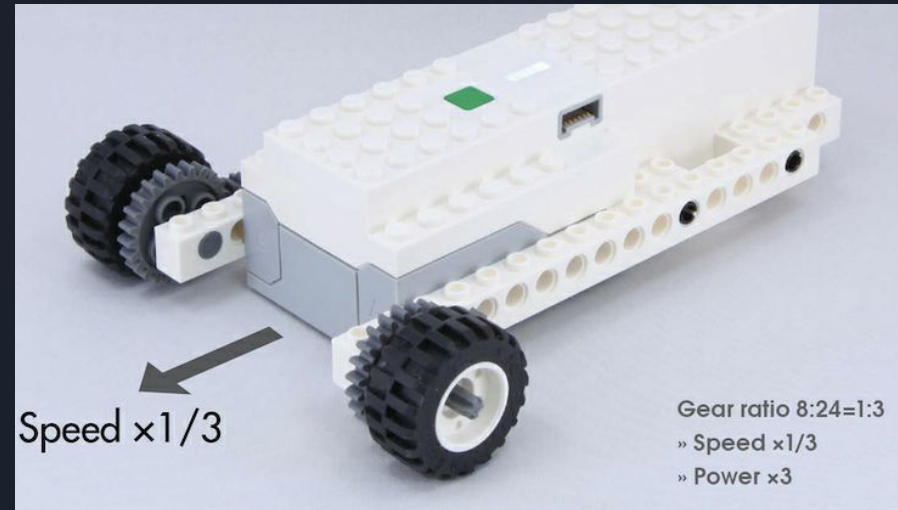


Using Gears to Adjust Speed and Power

Gear Ratio: 8:24 - 1:3
Read as 8 to 24 or 1 to 3

A small gear turning a large gear will decrease speed and increase power.

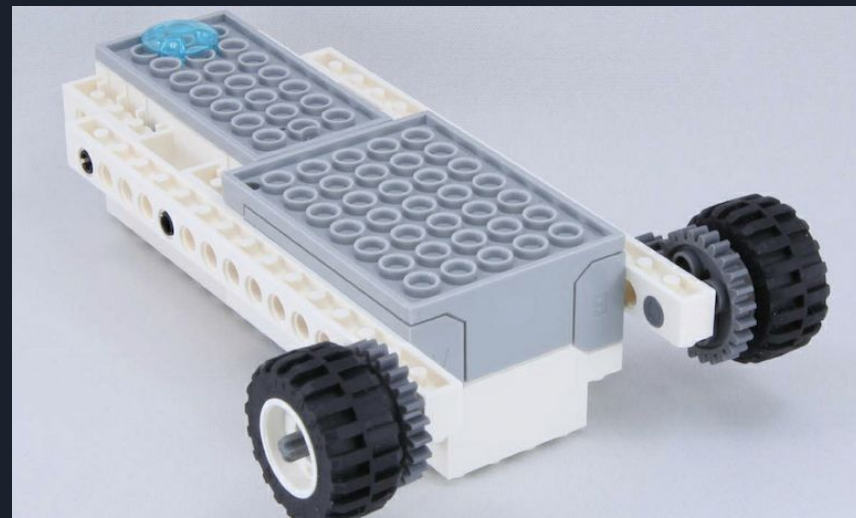
**You will increase speed later.



Gear ratio 8:24=1:3
» Speed x1/3
» Power x3

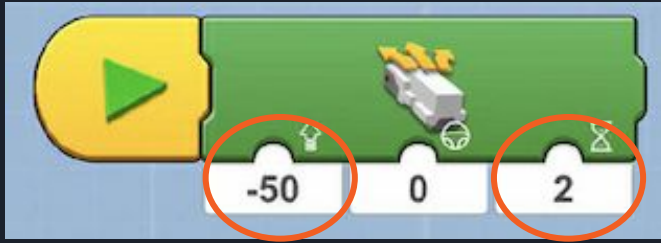


Moving on Wheels #4 Building Part 2



Moving on Wheels #4 Programming

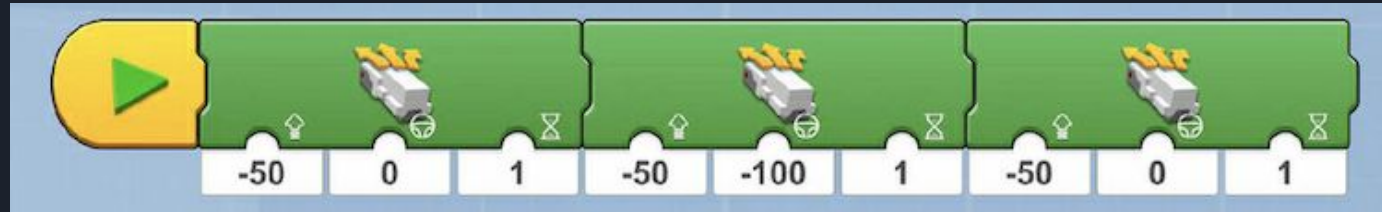
1.



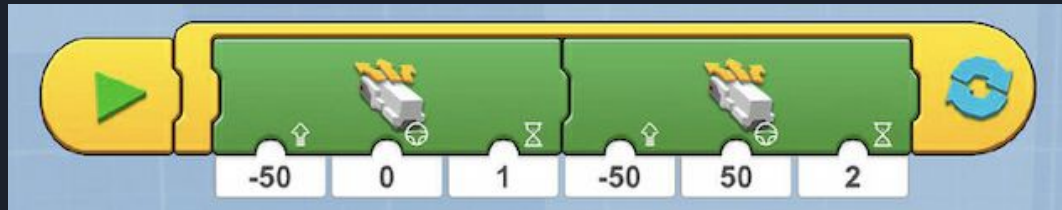
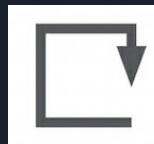
What do you notice that is different about this program than similar programs?

How do you think these differences will affect your program?

2.



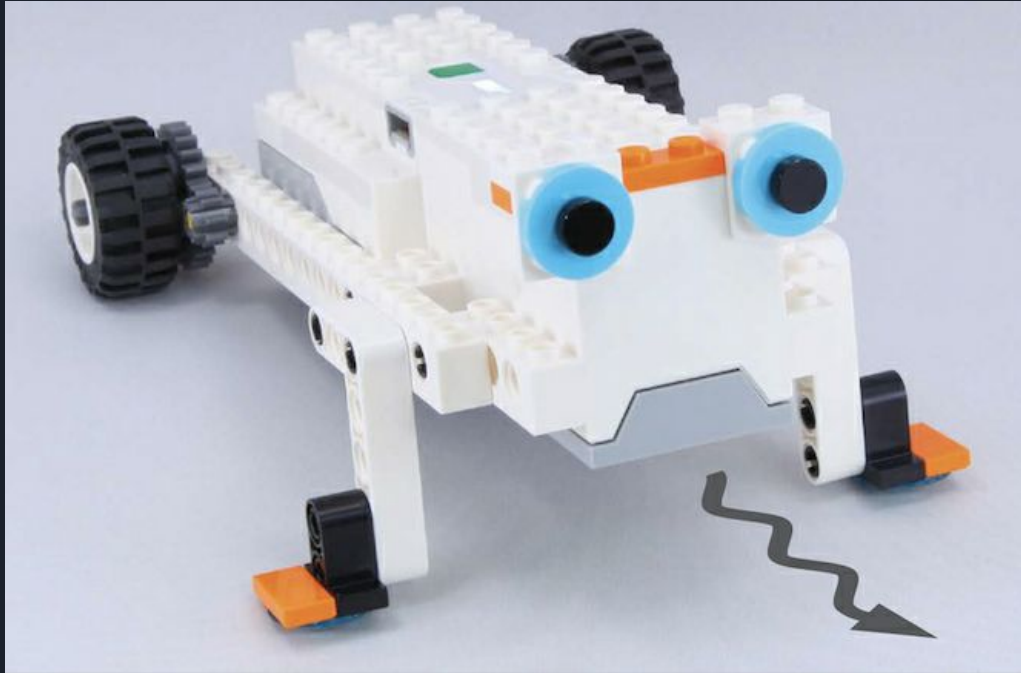
3.



Now it is time to add fun features to your vehicle. →

Moving on Wheels #4 Customizing

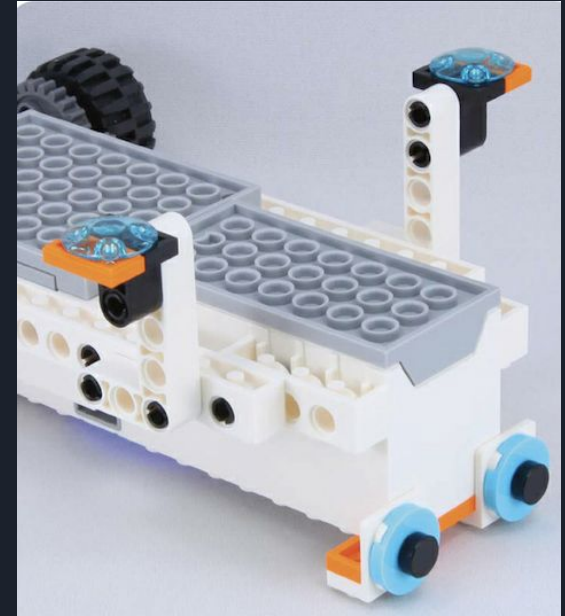
Modify the Build
and
Try Different Movements



See More Details



Moving on Wheels #4 Customizing Part 2

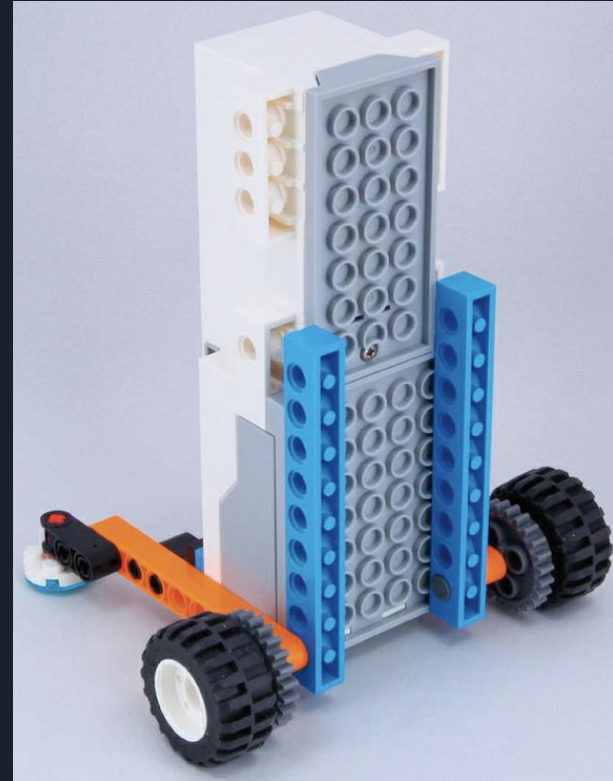
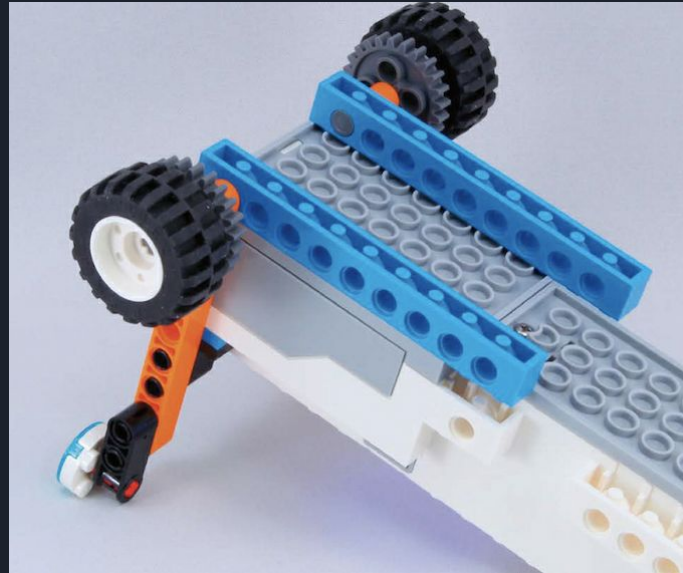


Try this or an idea of your own.

When ready, move on to the next build.



Moving on Wheels #5 Building Part 2

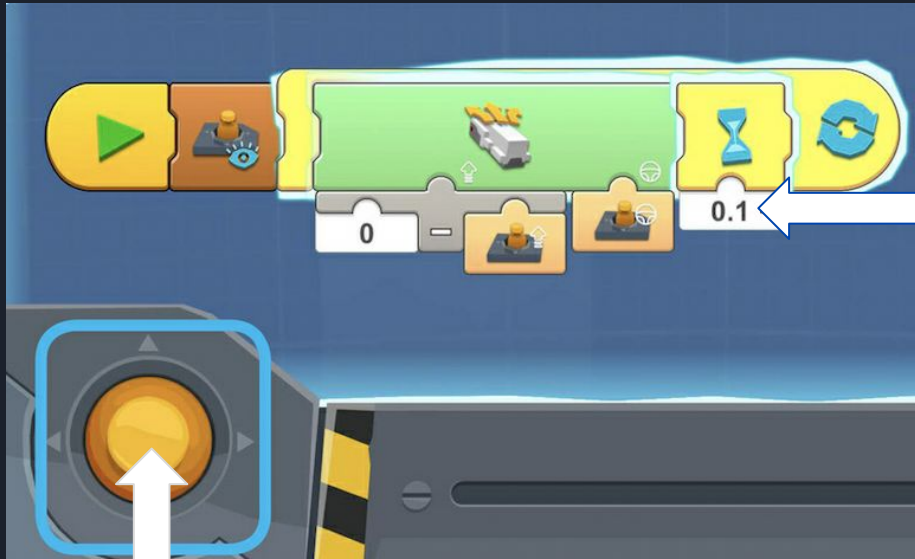


Moving on Wheels #5 Programming

1.



2.



Joystick Widget

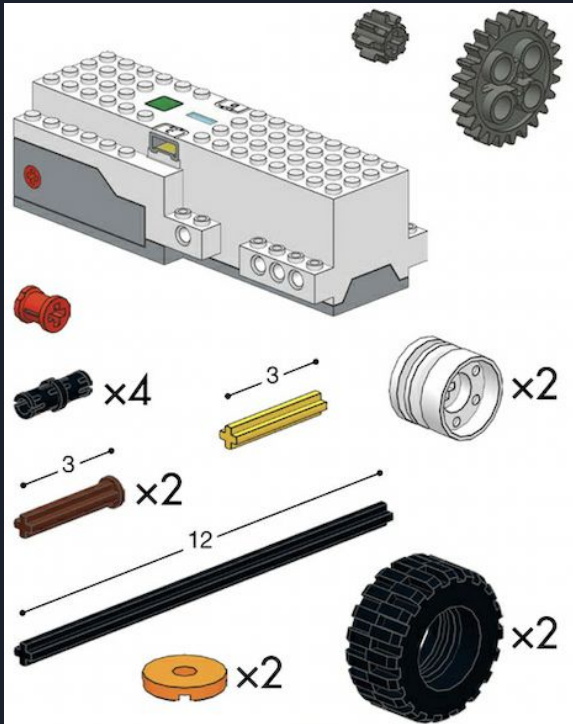
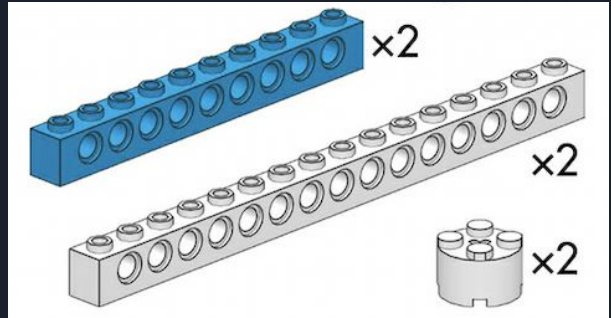
Don't Forget:

Use a **WAIT** Block
to give a slight
delay.

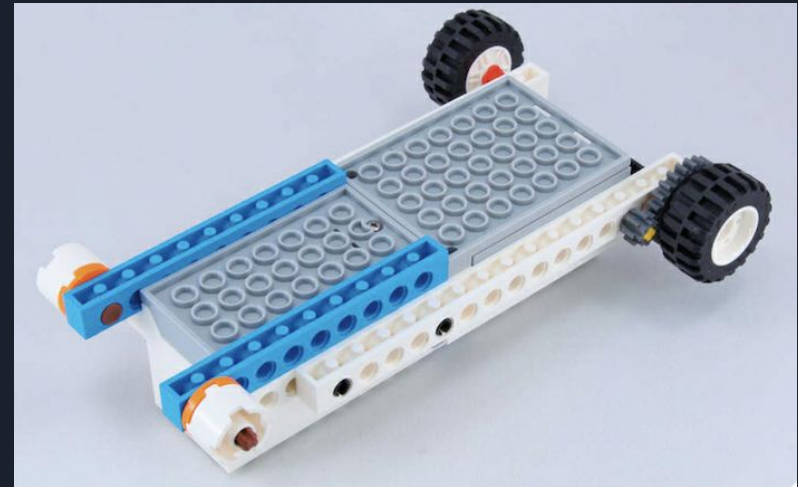
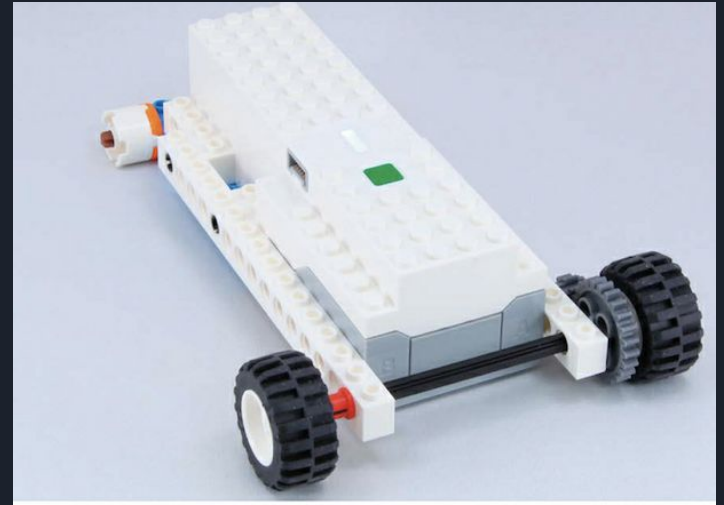
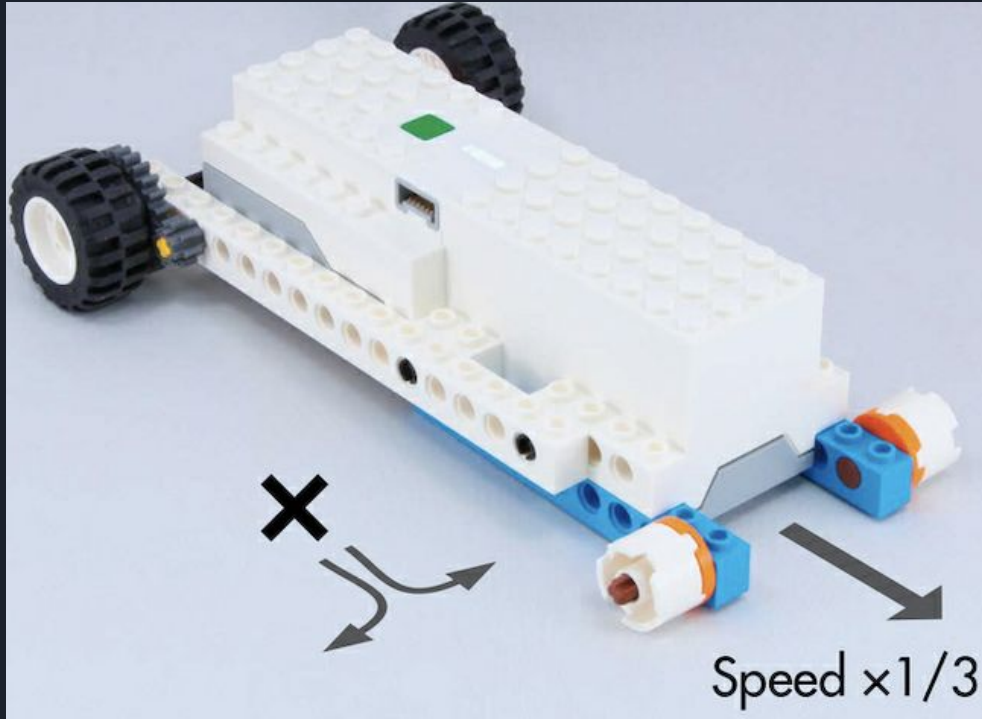
Now it is time to add
fun features to your
vehicle. →

Moving on Wheels #6

Building Part 1



Moving on Wheels #6 Building Part 2



Moving on Wheels #6 Programming


Notice the new block you are using in your program.

What do you think it will do?

How can you use this in the future?

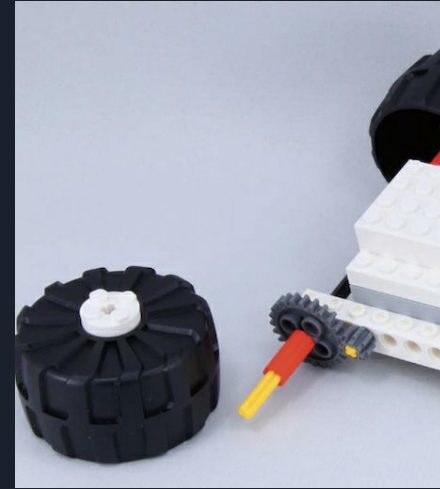
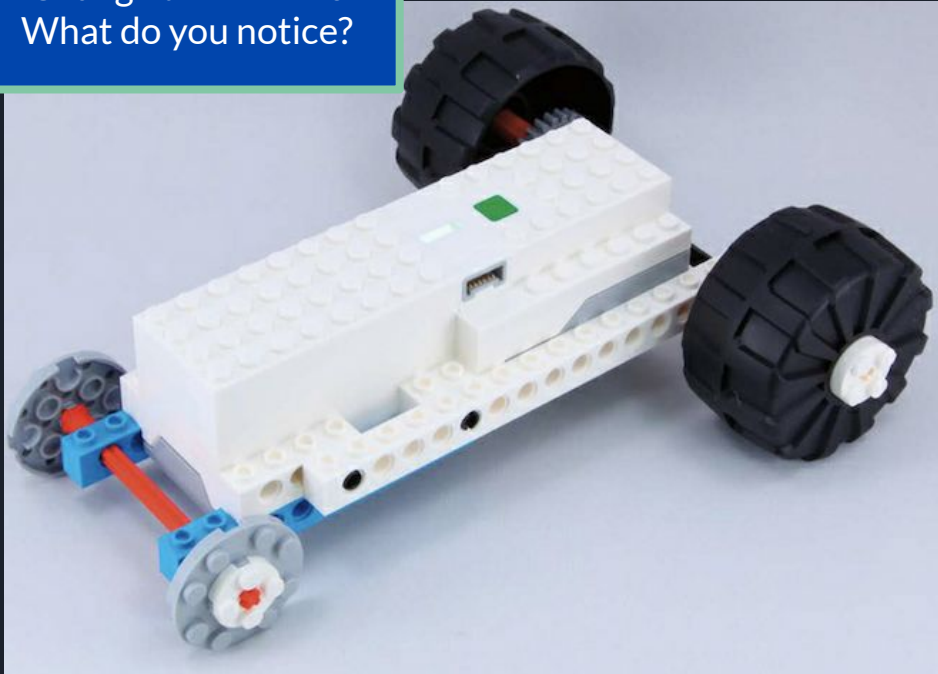
1.



Now it is time to add fun features to your vehicle. 

Moving on Wheels #6 Customizing Part 1

Change the Wheels
What do you notice?



Are you ready to **speed** things up?

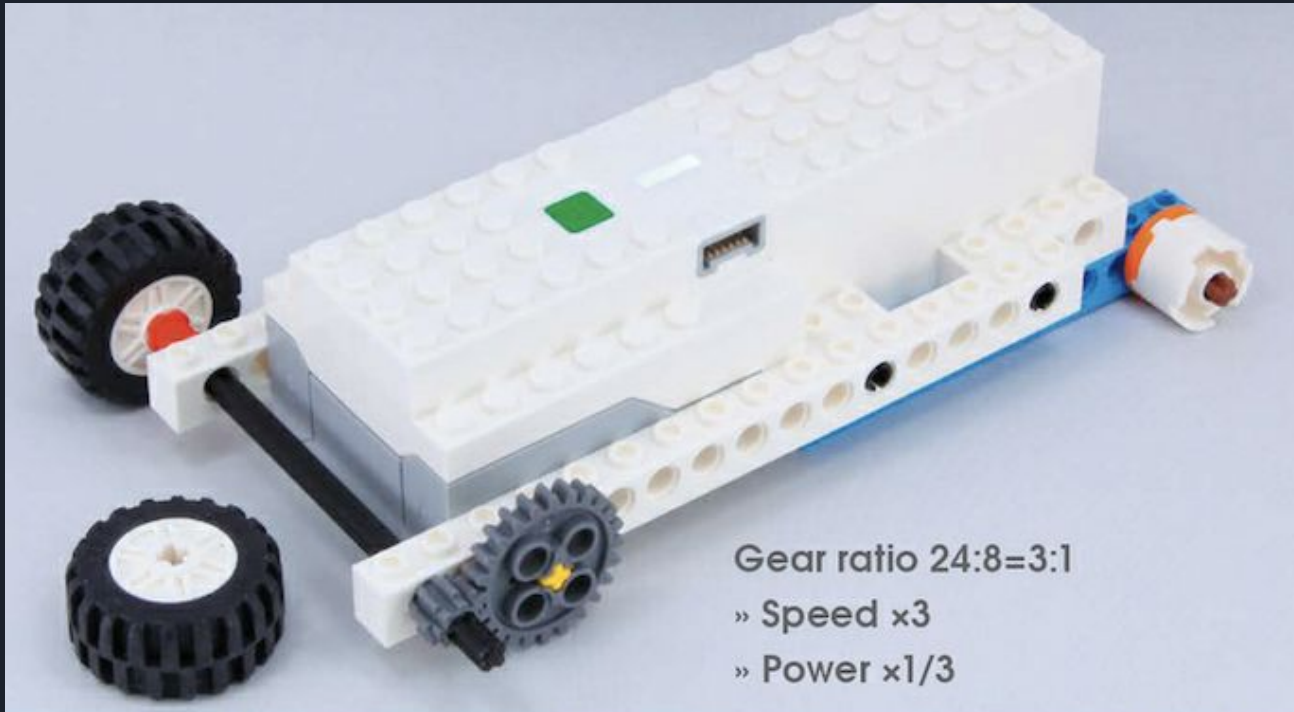
Try this customization next.



Moving on Wheels #6 Customizing Part 2

Increase the Speed - Try Different Wheels

What do you notice?



Gear ratio $24:8=3:1$

» Speed $\times 3$

» Power $\times 1/3$

**Using Gears to Adjust Speed
and Power**

Gear Ratio: $24:8 - 3:1$
(24 to 8, 3 to 1)

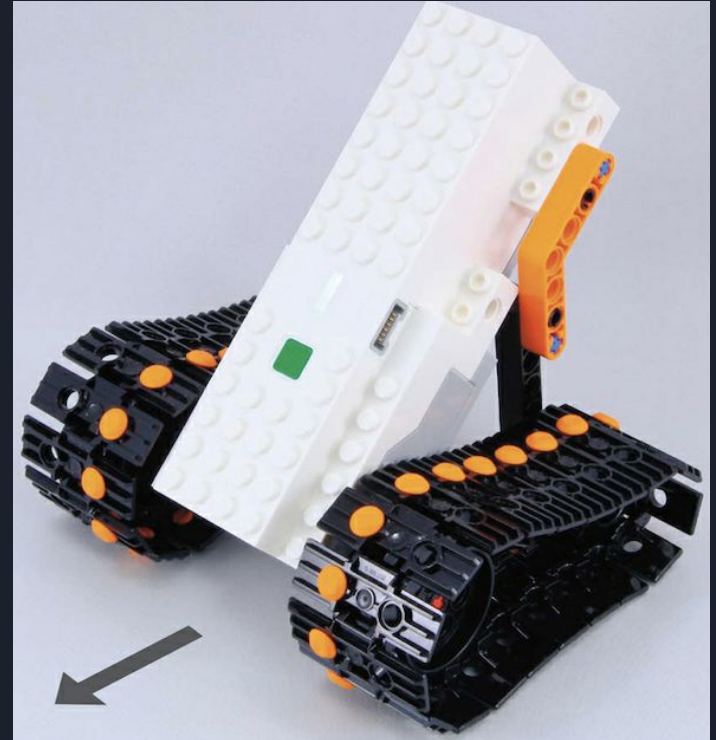
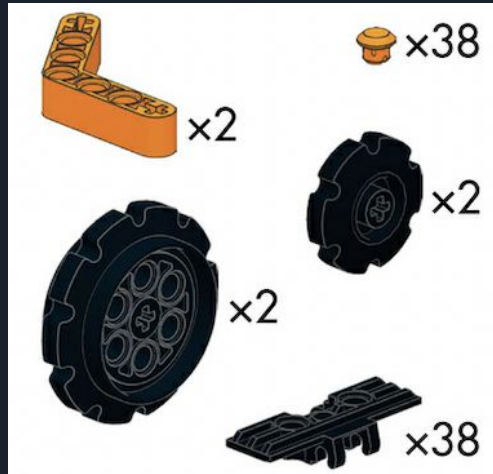
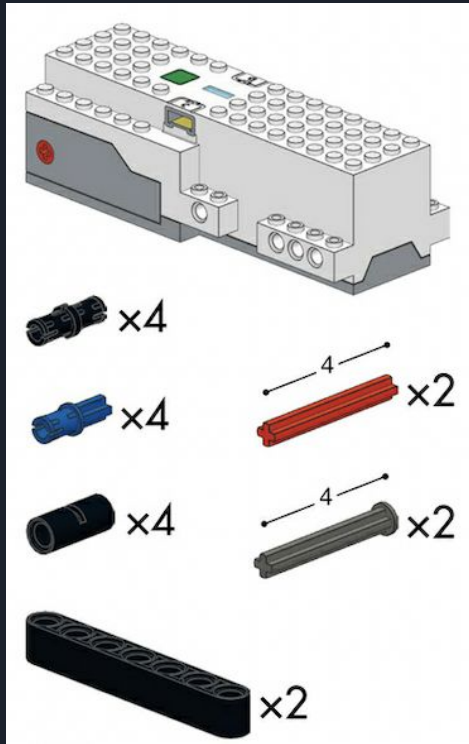
A large gear turning a small
gear will increase speed and
decrease power.

Try the Next Build



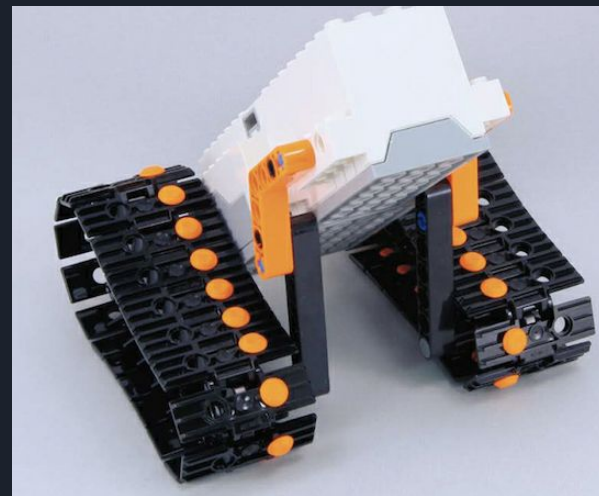
Moving with Crawler Tracks #1

Building Part 1



Moving with Crawler Tracks #1

Building Part 2

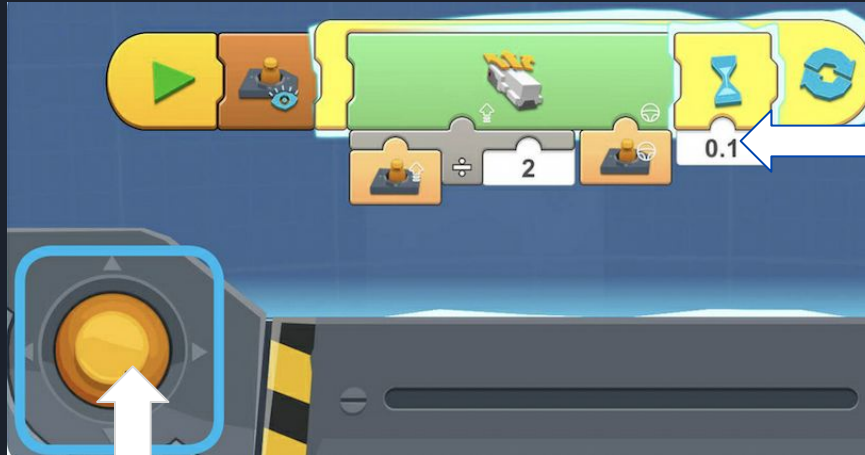


Moving with Crawler Tracks #1 Programming

1.



2.



Joystick Widget

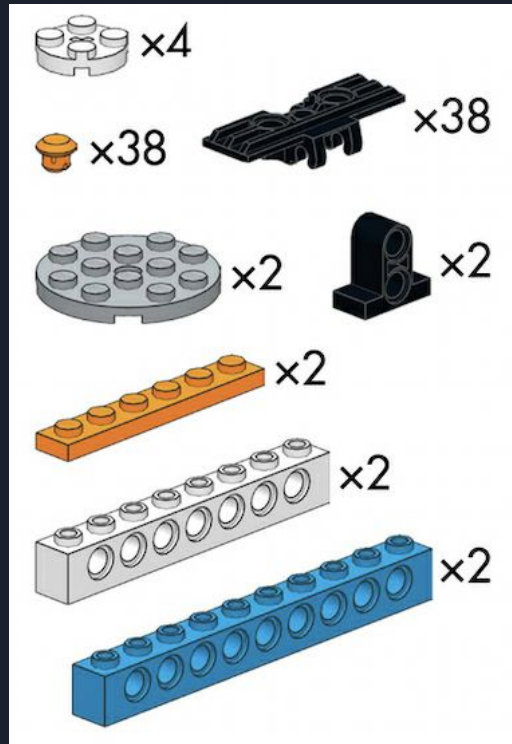
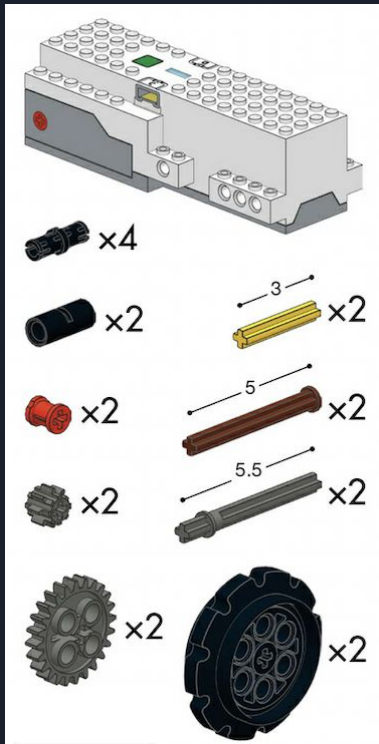
Don't Forget:

Use a **WAIT** Block to give a slight delay.

Now it is time to add fun features to your vehicle. →

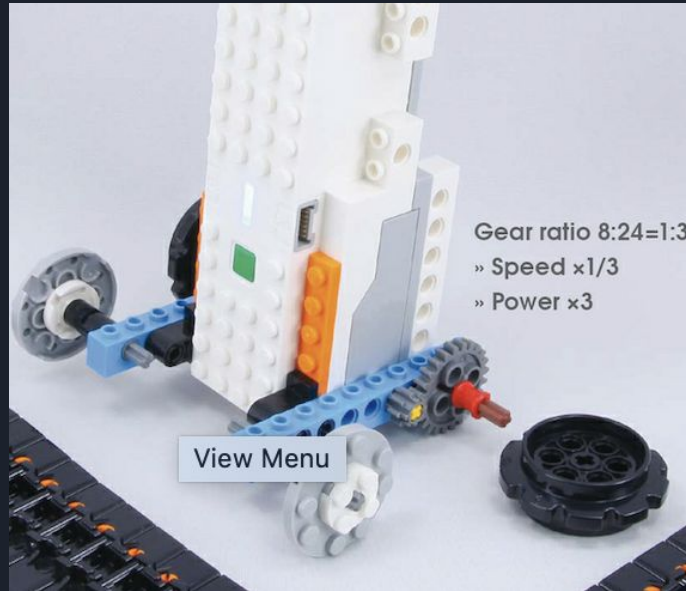
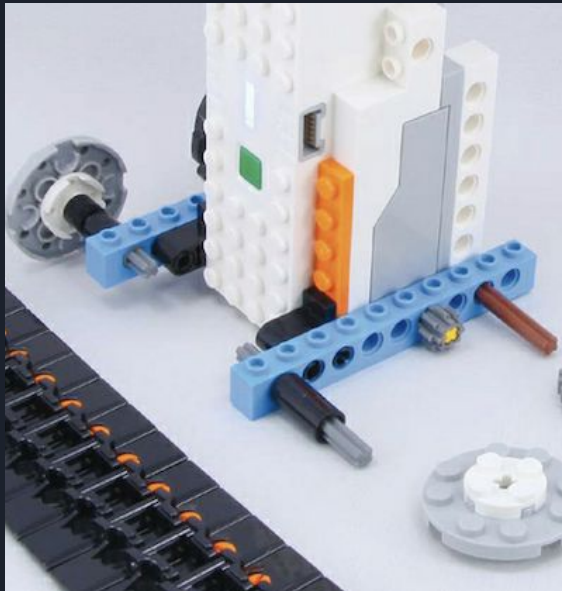
Moving with Crawler Tracks #2

Building Part 1



Moving with Crawler Tracks #2

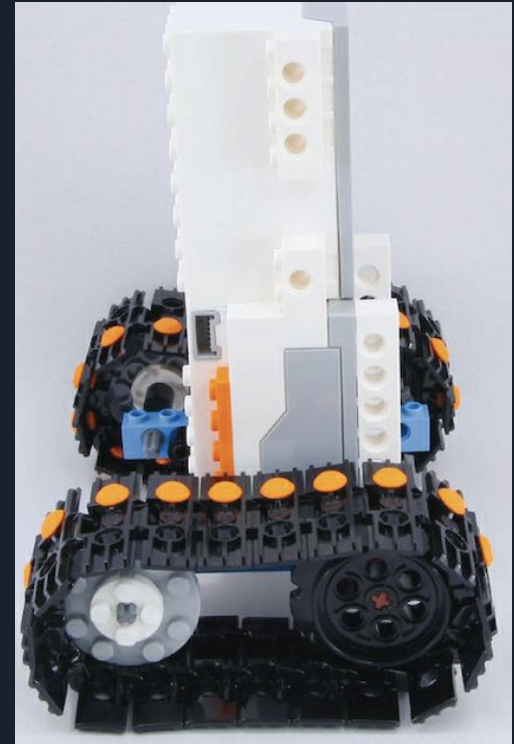
Building Part 2



Gear ratio $8:24=1:3$

» Speed $\times 1/3$

» Power $\times 3$



Moving with Crawler Tracks #2 Programming


1.



2.

You can control this model by tilting your iPad back and forth or left and right.



Now it is time to add fun features to your vehicle. 

Moving with Crawler Tracks #2

Customizing



Try this or an idea of your own.

You have completed all the building activities.



The End

Use what you learned to build something new.

I look forward to building with you again next
week!