



Setpoint Capybara

**Activity Book:
Remote control cart**



1. 0 – Knowledge block

In this class, we will use traditional Lego pieces and several accessories that make the assembly of robots possible. Today we will learn more about engines, gears and sensors.

Engines



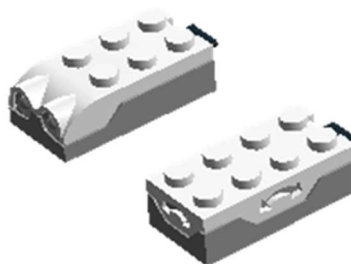
Electric **Motors** or electric **engines** are machines that transform electrical energy into mechanical energy.

Gears




Gears are sprockets that revolve around an axle. They connect through their teeth, so they can propagate movement.

Sensors



Sensors are devices that transform a physical stimulus into another type of physical stimulation in order to measure or monitor a variable.







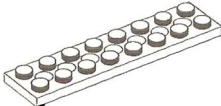

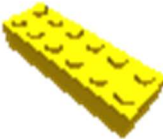
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1.1 – Assembly

In this activity we will make a cart that has its movement controlled by a tilt sensor.

Separating the pieces:










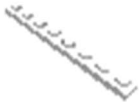

The first step is to separate the parts of the Lego kit that we will use for this activity. Separate the parts below and leave the others in the box, with the lid closed.

Piece	Color	Amount
	Gray	1
	Red	2
	Yellow	2
	Yellow	2
	Yellow	1
	Red	2
	White	2
	White	4
	Yellow	2



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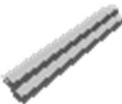



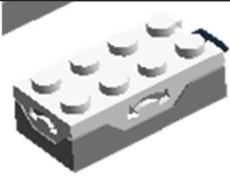
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	Gray	1
	Green	3
	Red	4
	Red	2
	Red	2
	Yellow	1
	Yellow	1
	Red	2
	Yellow	2
	White	2
	Red	2



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	Green	2
	Black	2
	Gray	1
	Gray	1
	Gray	4
	Black	2
	Gray	1
	Gray	1



Check if you have taken all the material:

Remember to close the box with the pieces that we will not use!

Assembling Cart:

Follow the step-by-step below to assemble the cart. If in doubt, call the monitor!

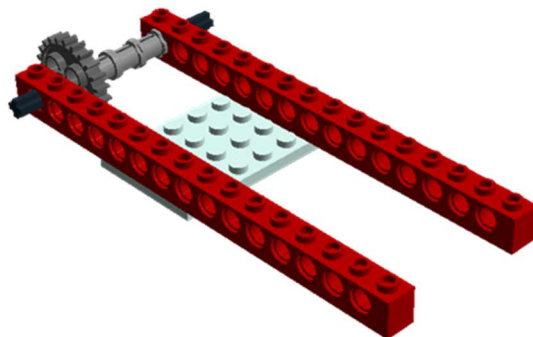
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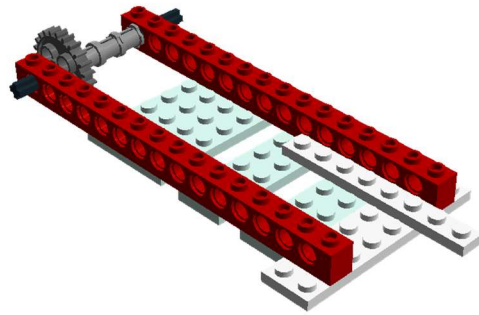
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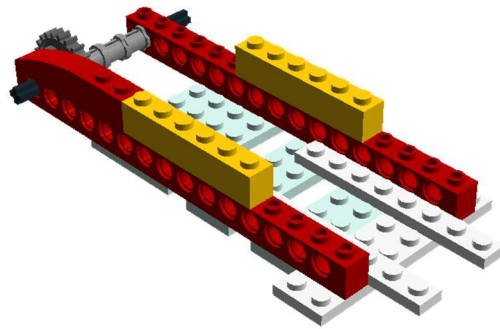


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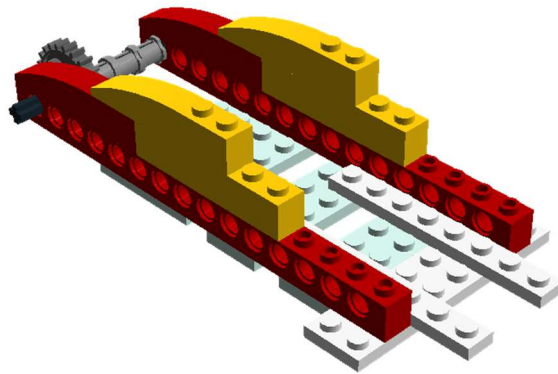
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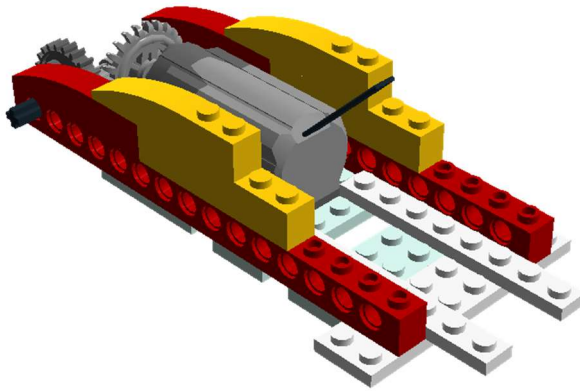
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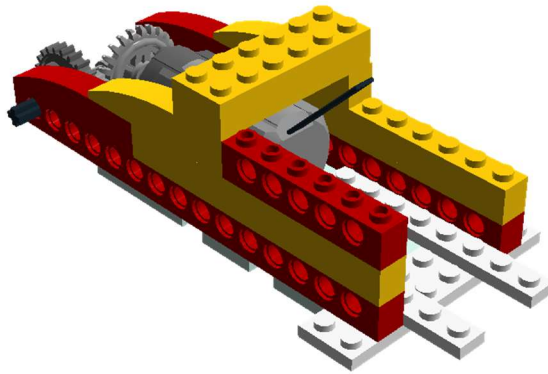


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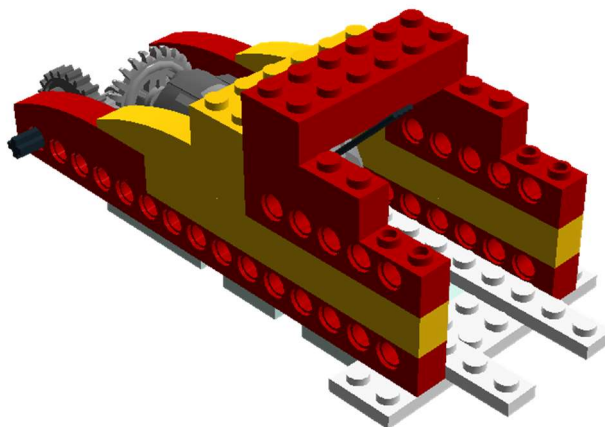
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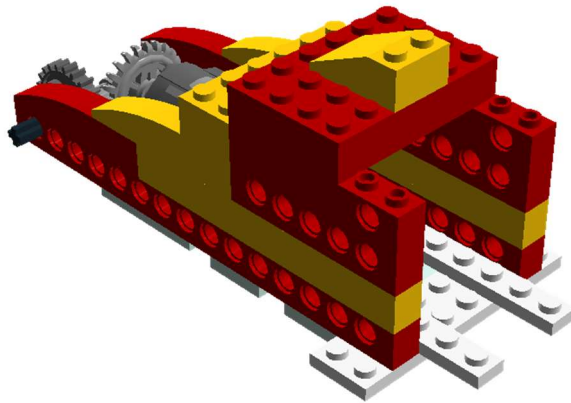
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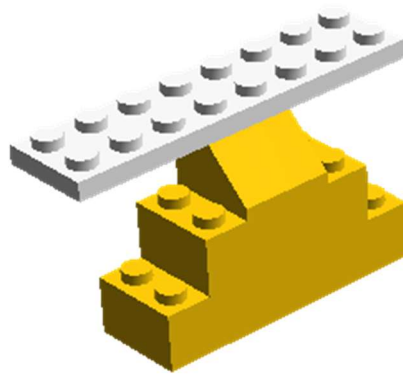


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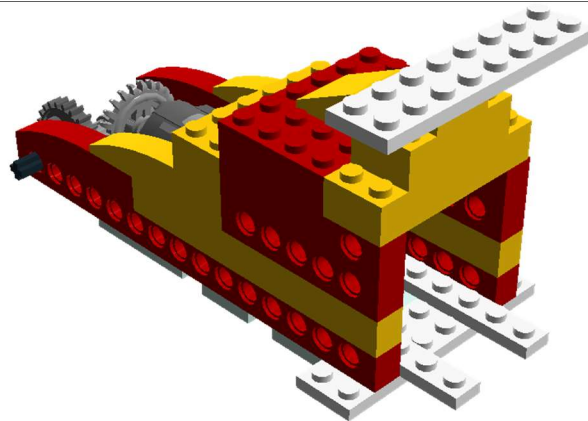
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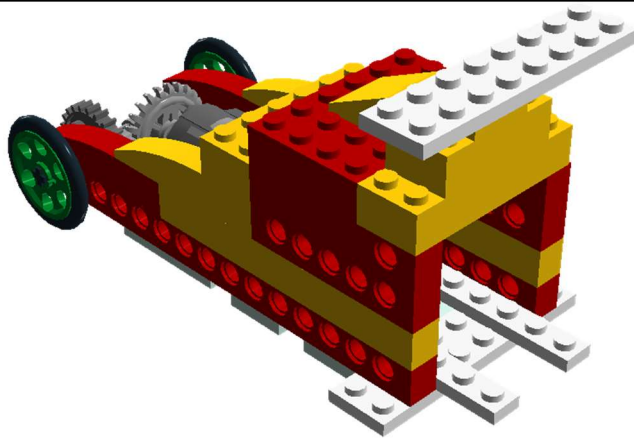
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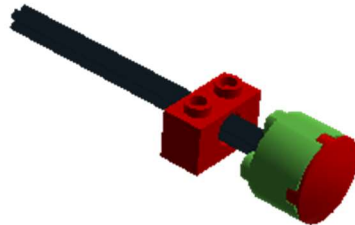


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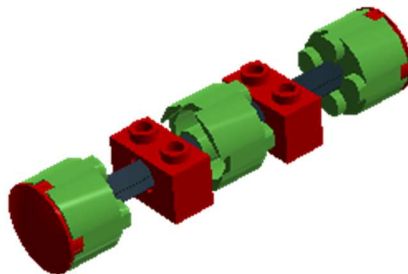
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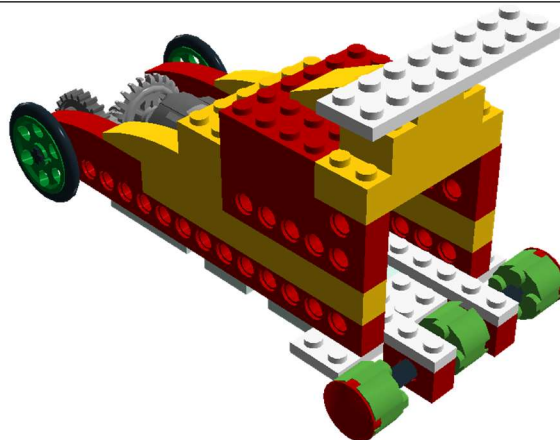
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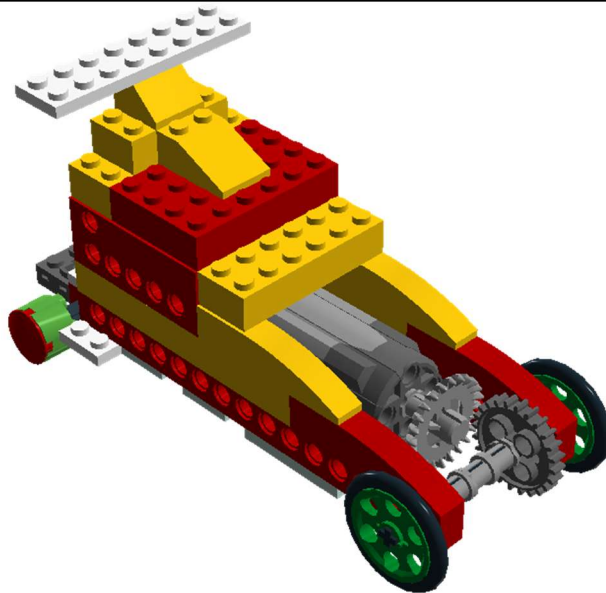
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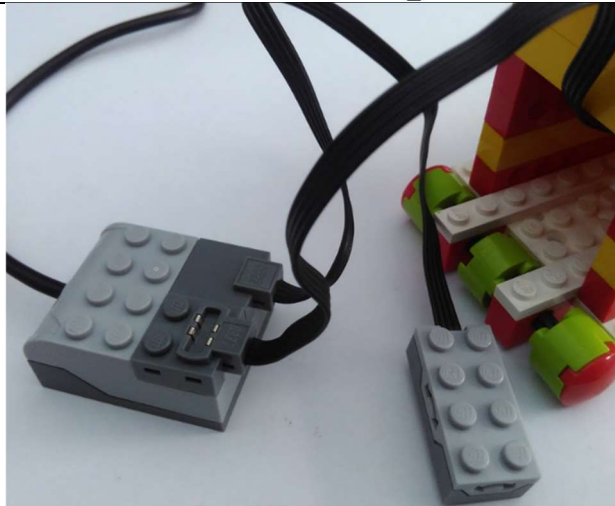


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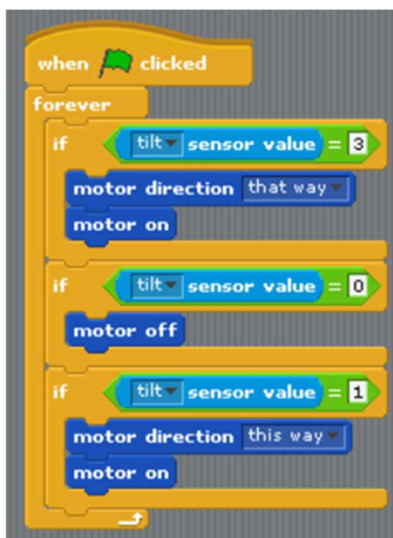


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1. 2 - Programming the engine to rotate

Let's open Scratch 1.4 on the computer and program the engine movement. The engine drive blocks should appear as soon as the WeDo 1.0 USB hub is connected and recognized by the computer.

1. Connect the USB Hub and check if the image blocks appeared
2. Add the blocks below:



Type	Command
Control	When Green flag Clicked
Control	Forever
Control	If the sensor value equals three
Motion	Engine direction that way
Motion	Motor On
Control	If the sensor value equals zero
Motion	Motor off
Control	If the sensor value equals one
Motion	Engine direction this way
Motion	Motor on

If you have difficulty, call the monitor!

Shall we start running?

Move the tilt sensor and see how the cart responds to your commands.

Are we going to make some changes?

What would happen if you changed the numbers into the control positions? How would you control the cart through the computer? How would you control the cart with another sensor?

It's time to organize everything!

Disconnect the cable from the computer.
Unmount the cart.
Store all parts and close the box.

Until next Class!