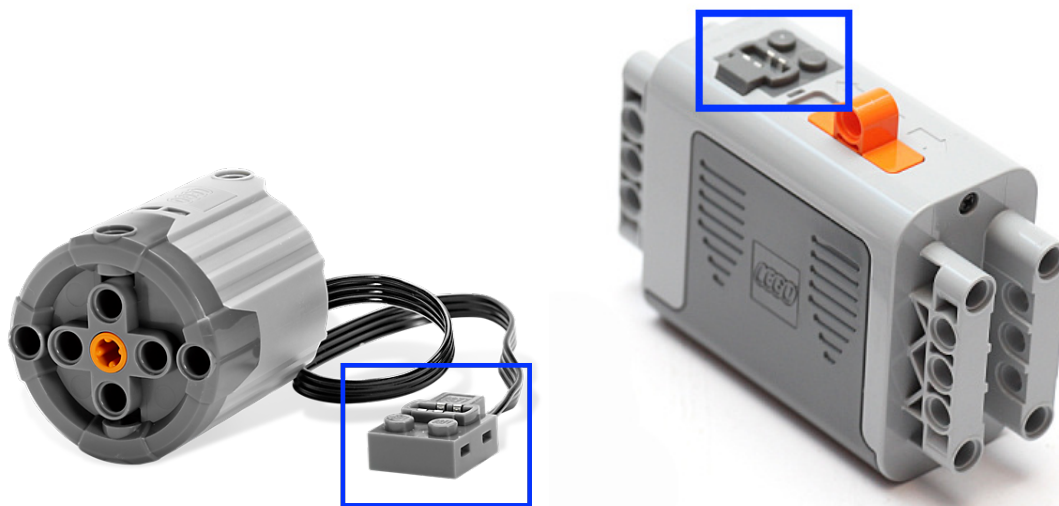


Setting Up and Using LEGO Power Functions Components

Here we describe how to set up and use LEGO Power Functions components for the non-variable and variable speed configurations of the DIY Rotating Tank.

Fixed Motor Speed

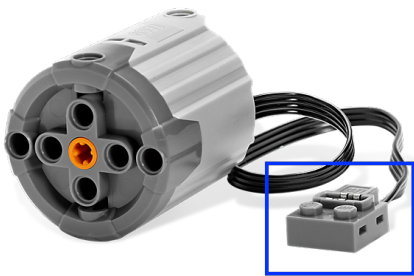
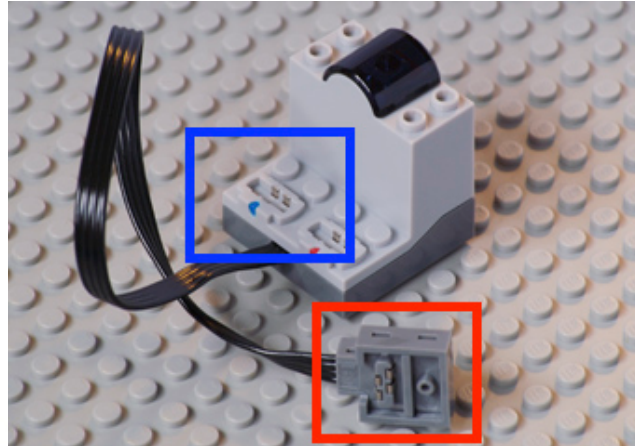
- Attach the end of the wire emanating from the vertically mounted XL Motor to its receptor on the Battery Box (both segments highlighted below).



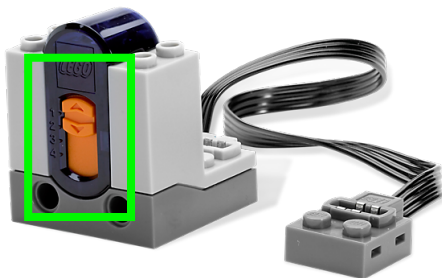
- To turn on the XL Motor, slide the orange switch on the Battery Box in either direction (one direction spins clockwise and the other direction spins counterclockwise).
- Return switch to the middle to turn off the XL motor.

Variable Motor Speed

- Attach the end of the wire emanating from the IR Receiver to its receptor on the Battery Box (both segments highlight in red below).
- Attach the end of the wire emanating from the vertically mounted XL Motor to either receptor on the IR Receiver (both segments highlighted in blue below).



- To use the IR Speed Remote Control and IR Receiver, make sure that the orange switch on both components is set to the same number (toggles are highlighted in green below).
- Turn on the XL motor by sliding the orange switch on the Battery Box in either direction (return to middle to turn off the XL motor). Note that the XL motor starts spinning after input to the IR Speed Remote Control.
- If the XL Motor is connected to the blue receptor on the IR Receiver, turn the blue dial on the IR Speed Remote Control to change speed. Same applies for the red receptor and dial. Color is denoted by a tick mark. May experience some delay between input and response.



Putting Everything Together

Here we describe how to combine the OXO turn table and LEGO assembly to create the DIY Rotating Tank

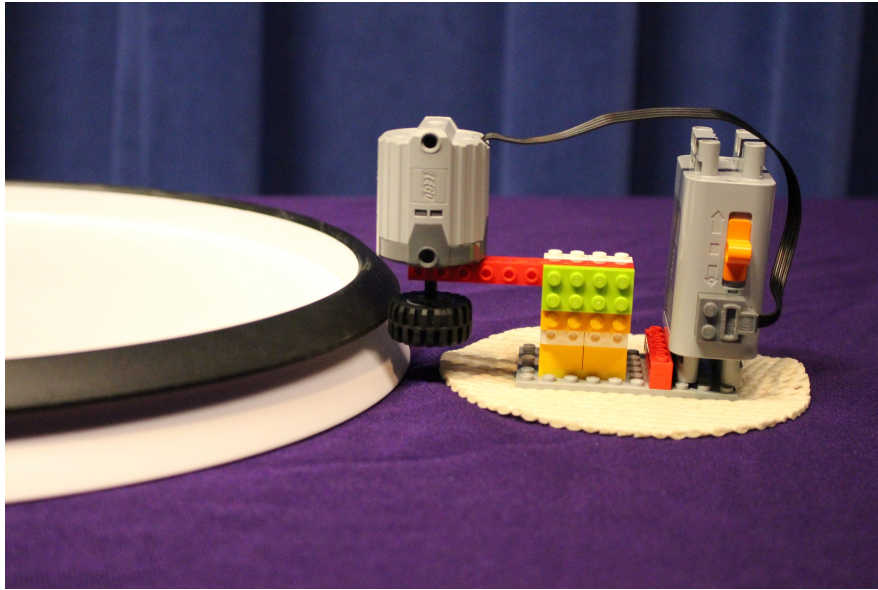
Place the OXO turn table on a level surface.



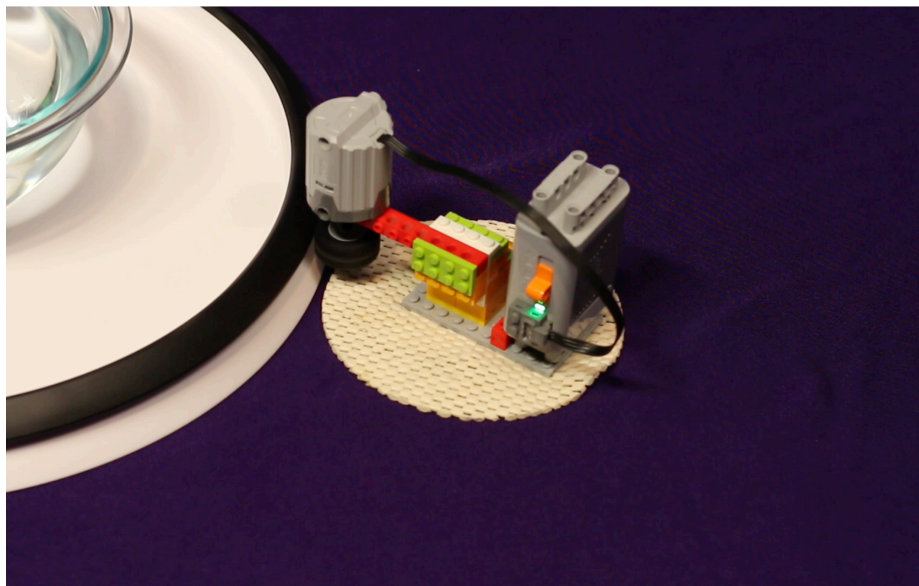
Place a sheet of rubber adjacent to the OXO turn table (a jar opener such as <http://a.co/9Z6tq8t> will work well). The sheet of rubber is intended to keep the LEGO assembly in place.



Place the LEGO assembly on the sheet of rubber and position the wheel so that it remains in contact with the OXO turn table. Check from the side and ensure that the wheel is pressing only against the black band and not against the white base of the OXO turn table. Move wheel on axle as necessary to achieve this.



The DIY Rotating Tank is now ready to use. Switch on the battery pack and have fun! Visit our website <https://diynamics.github.io/> or our YouTube channel <http://tinyurl.com/diynamicsvideos> to learn more about the project and the types of experiments that can be performed. Contact diynamicsteam@gmail.com if you have any questions.



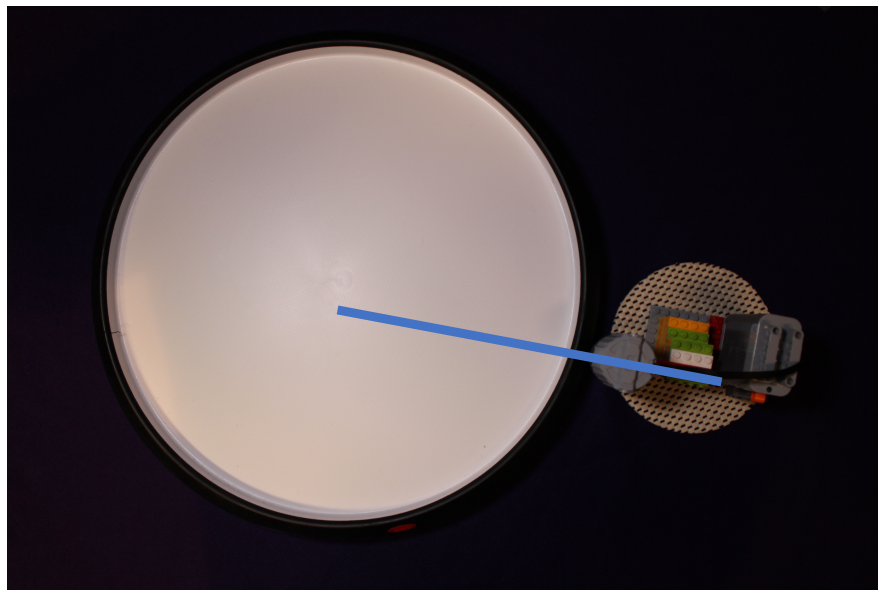
Troubleshooting

Q: What are the optional components used for?

A: The optional components allow users to switch the speed of the DIY Rotating Tank motor as it is running. The LEGO Power Functions IR Receiver and IR Speed Remote Control enable speed of rotation to be incremented along 7 steps. This ability provides the opportunity to study additional aspects of fluid dynamics (i.e. Taylor Columns as shown in <https://youtu.be/7GGfsW7gOLI>)

Q: Why does the LEGO assembly keep on losing contact with the OXO turn table?

A: This can occur due to several reasons. To address this, ensure that the LEGO assembly is pressing against the OXO turn table and is held in place by the adjacent sheet of rubber. Position the LEGO assembly such that the beam supporting the motor is pointed roughly to the OXO turn table center (as shown by blue line in image below). Double check to ensure that the LEGO assembly wheel is only in contact with the OXO turn table black band.



Q: Can I use pieces other than the ones detailed in the instructions?

A: Yes. There are many combinations of LEGO pieces that can be used to achieve the same goal. The design previously described is open for customization and parts can be switched out as appropriate (i.e. replace the current wheel with a larger one to increase speed of rotation).