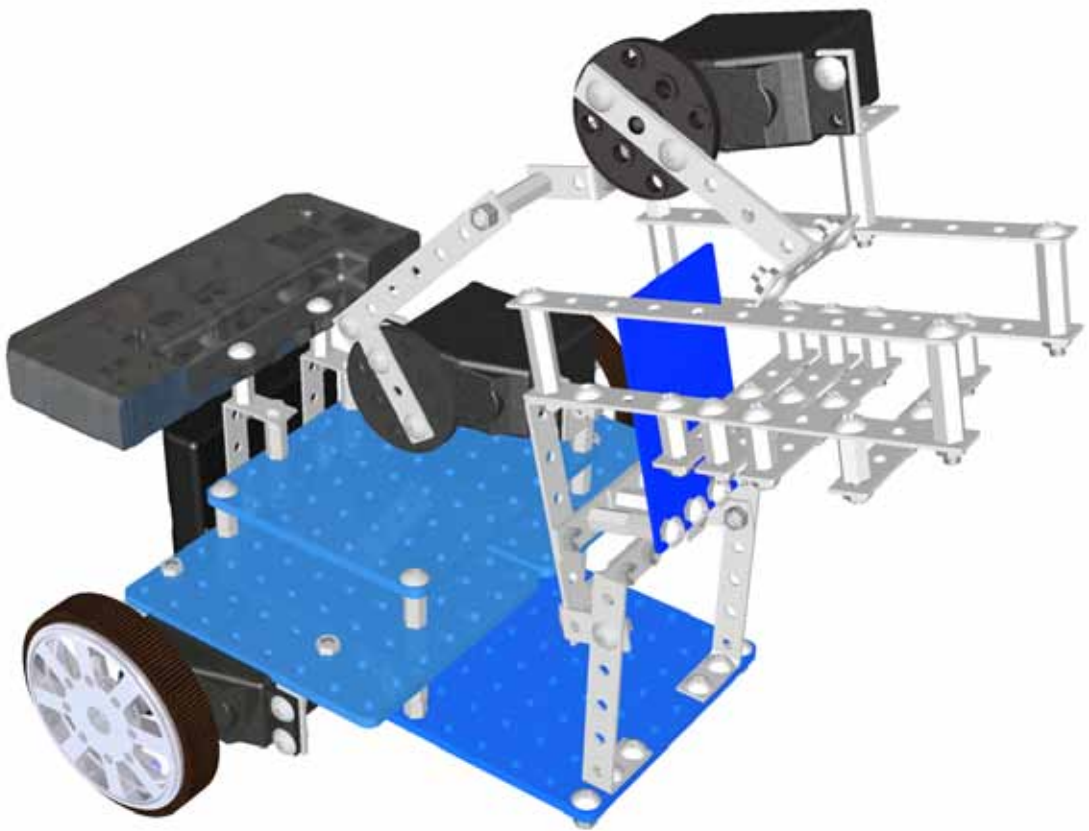


8. Shooting Robot



Introduction and working principle

– Projectile Motion



Shooting Robot is a robot enabled to smack ping-pong balls using elastic force of the polycarbonate plate. In addition, it can adjust angle (height) of the launcher on it, using linkage systems.

Based on the same principle, Shooting Robot is differed to Handball Robot in the way that a ball is launched. It shoots off a hit drawing a skew arch at a fixed angular degree, while Handball Robot creates a hit that flies straight out on the ground from the batter.

It is able to adjust the distance to shoot off a hit at desired target by adjusting the angular degree of launcher.

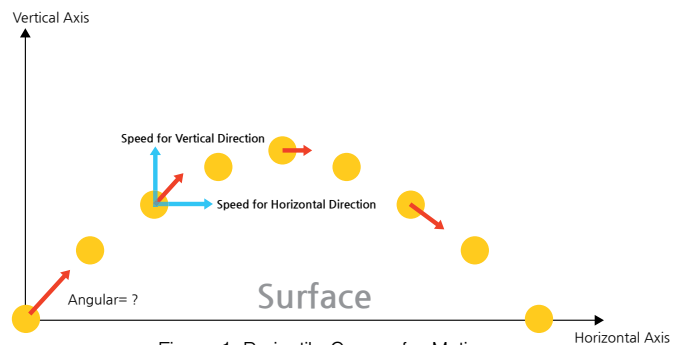


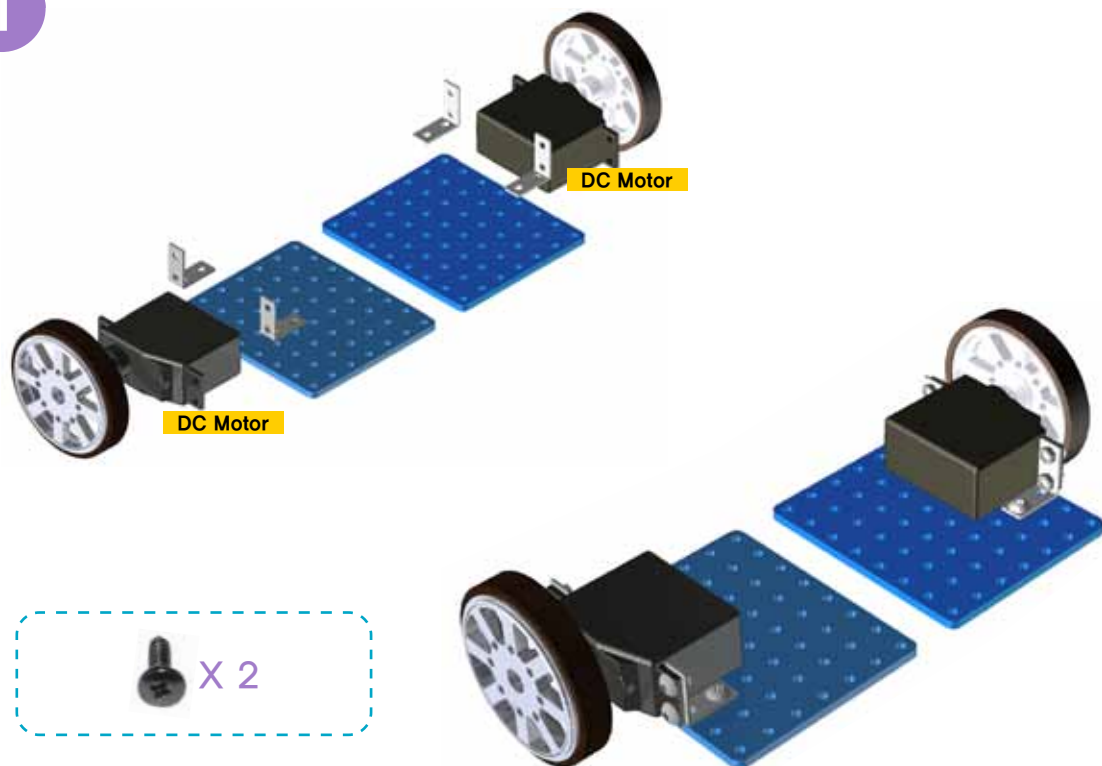
Figure 1. Projectile Curve of a Motion

As illustrated in the above graph, an object (called a projectile) that is thrown near the earth's surface moves along a curved path under the action of gravity only, which acts downward to cause a downward acceleration. Accordingly, vertical motion, like a thrown-up ball on a straight perpendicular line, comes to zero when a projectile arrives at the highest point, and slowly increases speed falling down to surface. However, the horizontal motion remains constant until the ball arrives at surface.

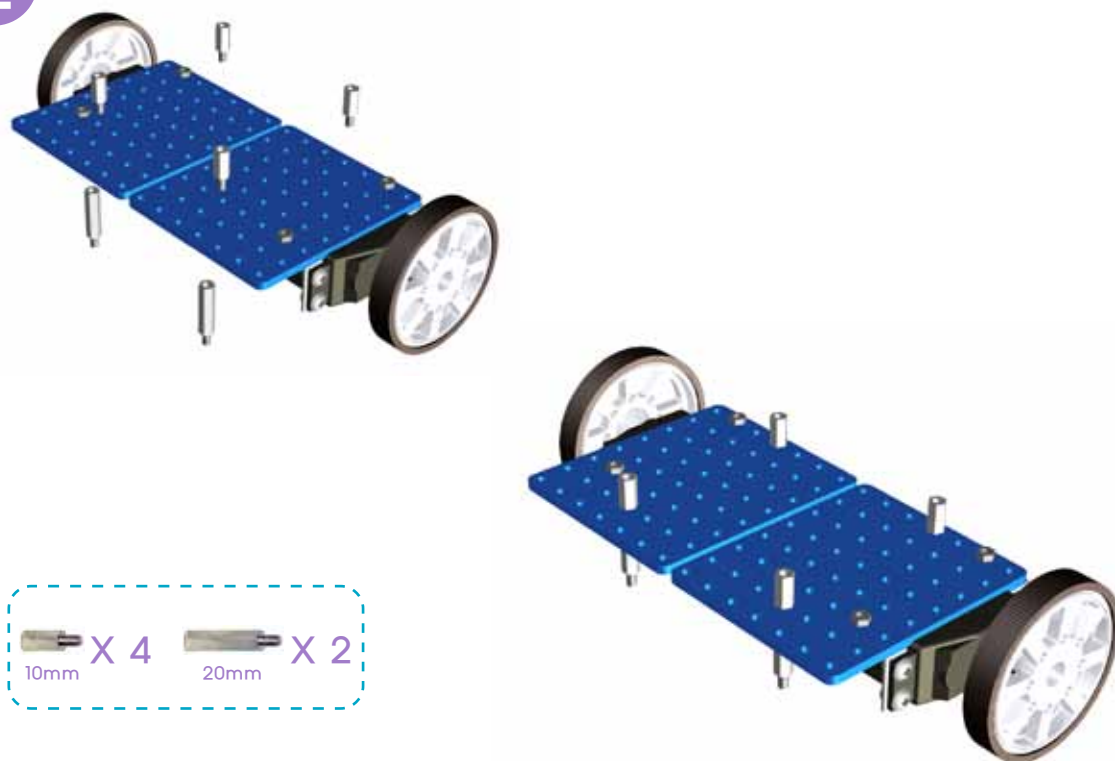
In the event of shooting off a ball with an equal level of force applied, the speed gets most to horizontal direction. At the same time, if a ball is allowed in the air over the longest period of time, it is able to arrive at the maximum distance.

As such, it is 45 angular degrees that enables the ball to arrive at the maximum distance. If angular degree gets less than 45 and closes to zero, the speed toward horizontal direction becomes higher but the distance that a ball goes gets shorter due to less time remaining in the air. Reversely, if angular degree gets more than 45 degree, the time remaining in the air gets longer but a ball is not able to go farther due to less speed toward horizontal direction. In conclusion, it is 45 angular degrees that we can shoot off a ball the farthest. We become able to drop a ball exactly at the target point, by adjusting the angular degree of launcher.

1



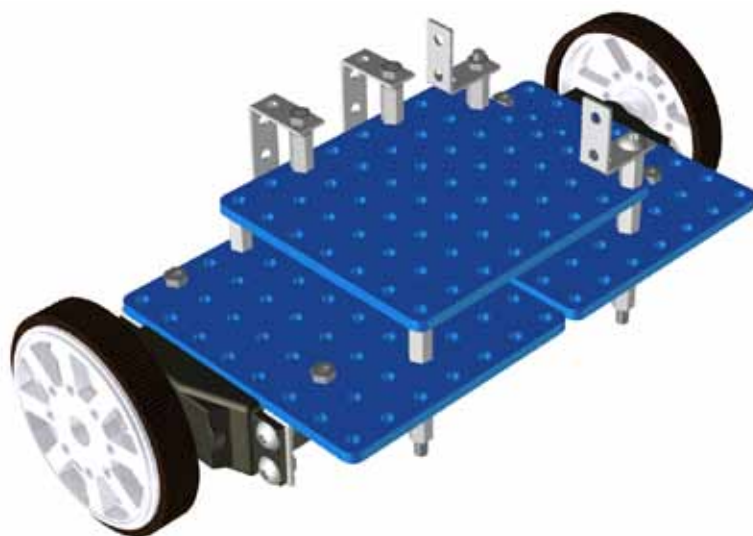
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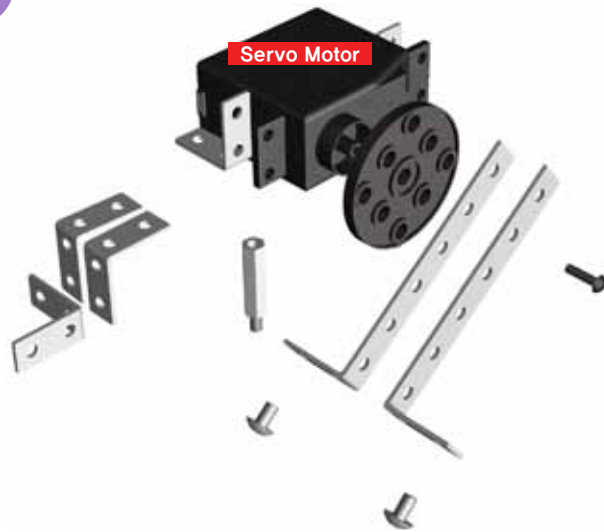


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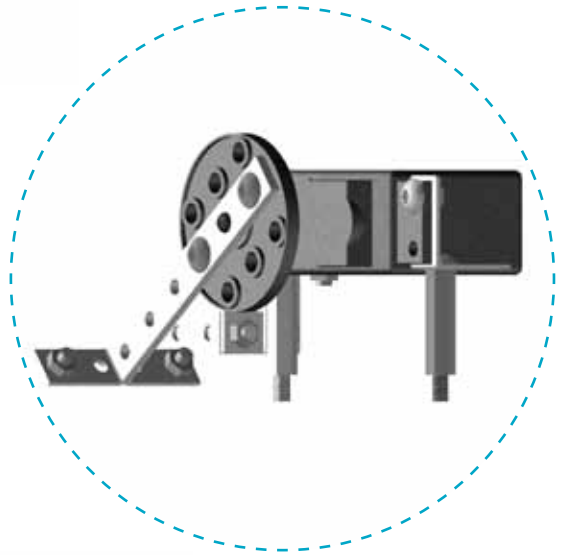


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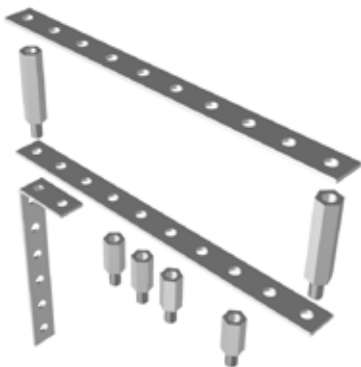




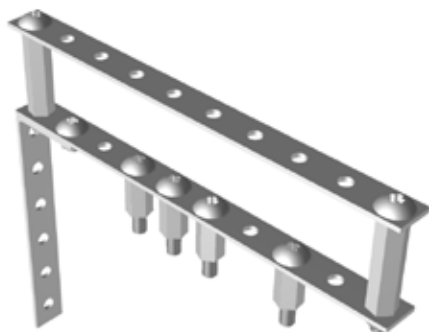
30mm



5



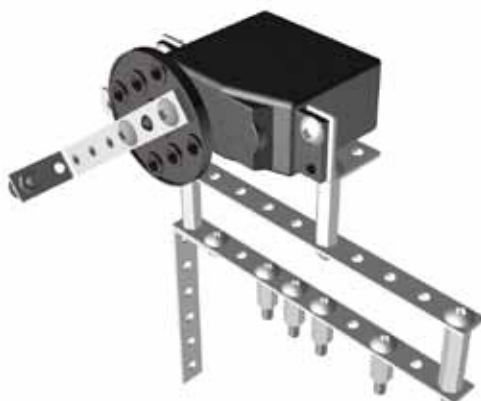
10mm X 4 20mm X 2



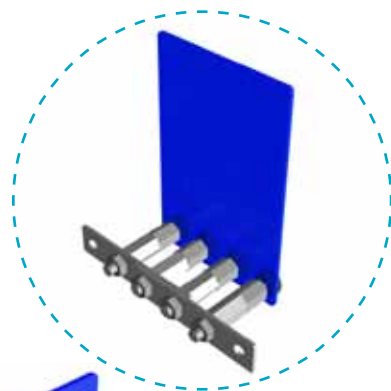
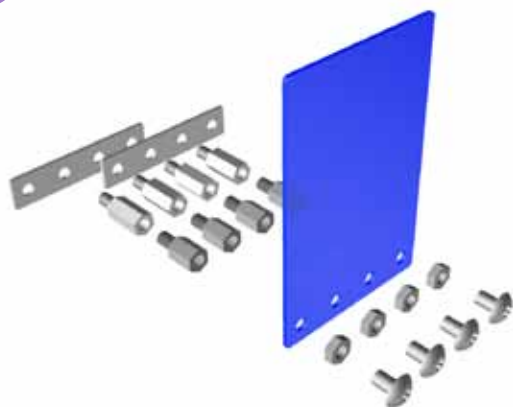
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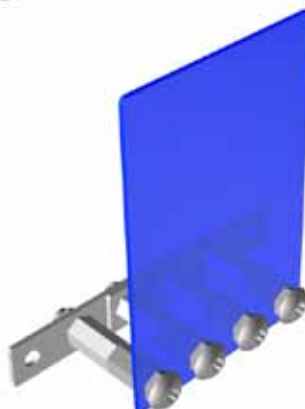
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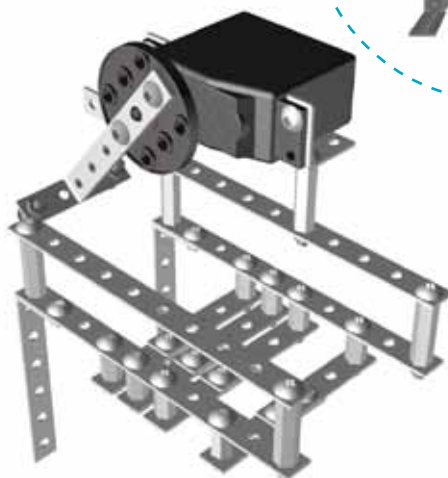
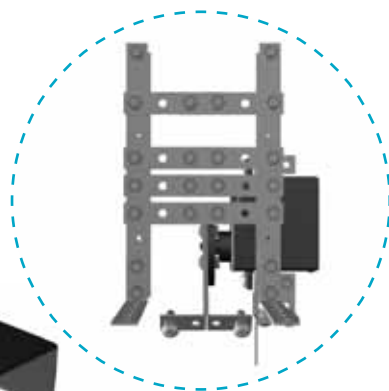
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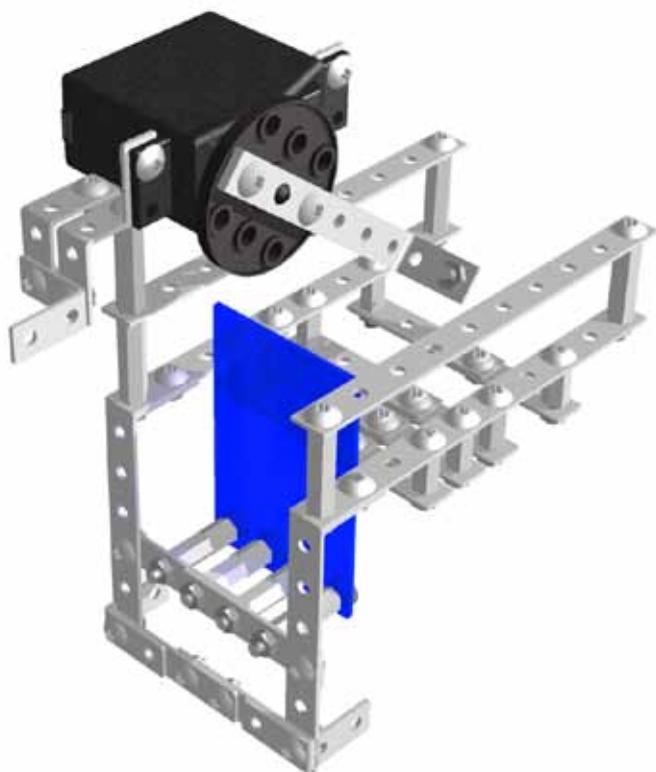
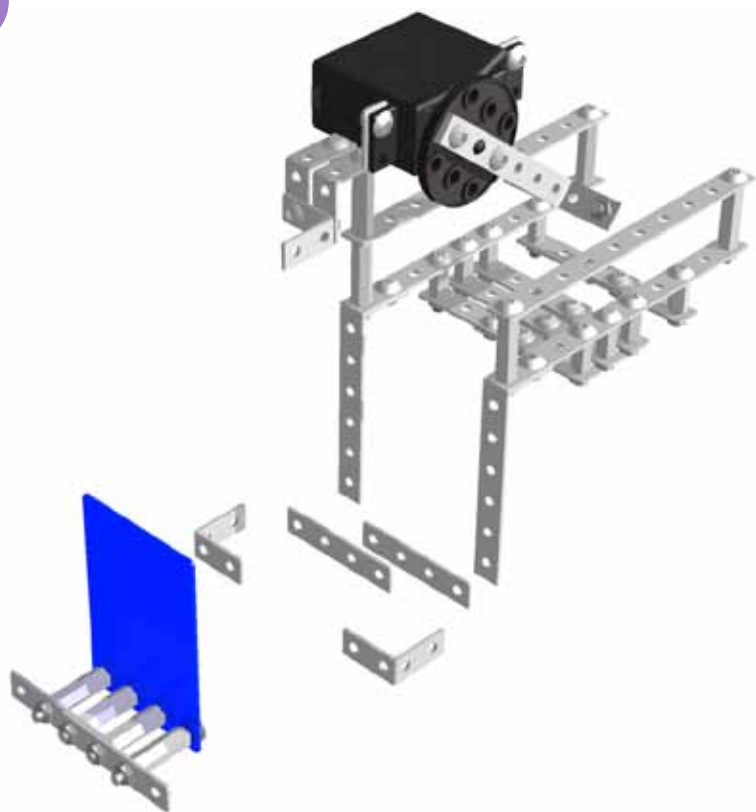


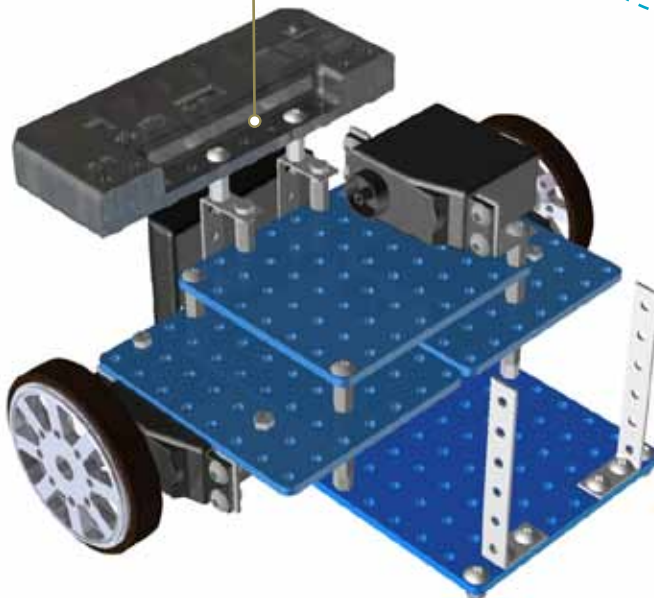
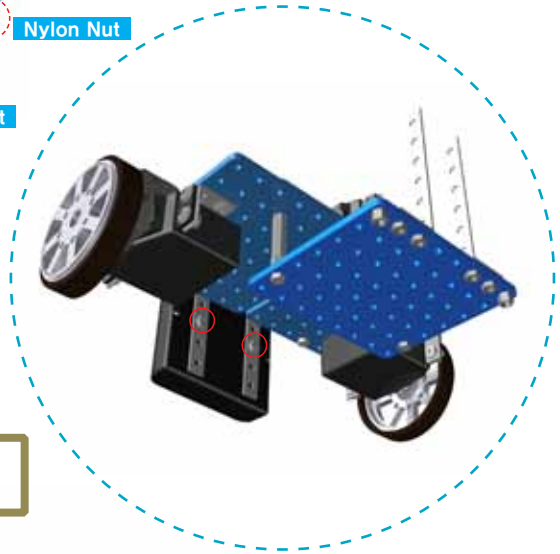
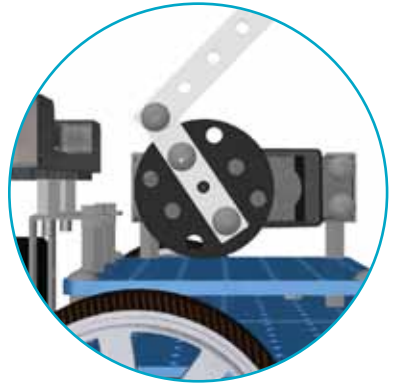
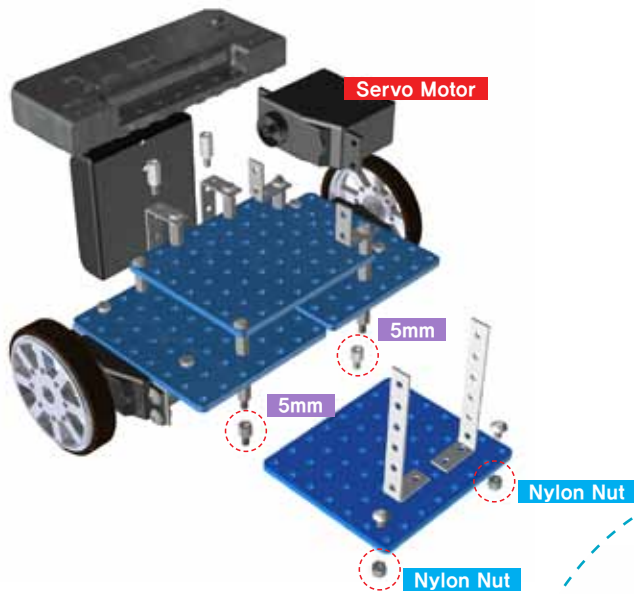
7mm X 4 10mm X 4

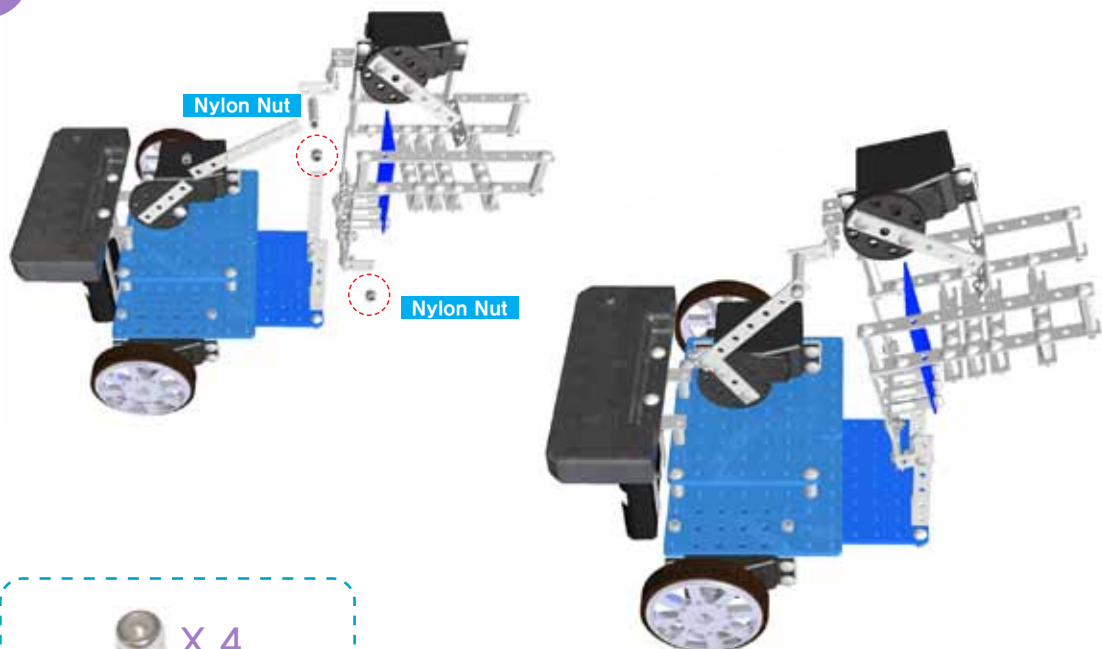


8



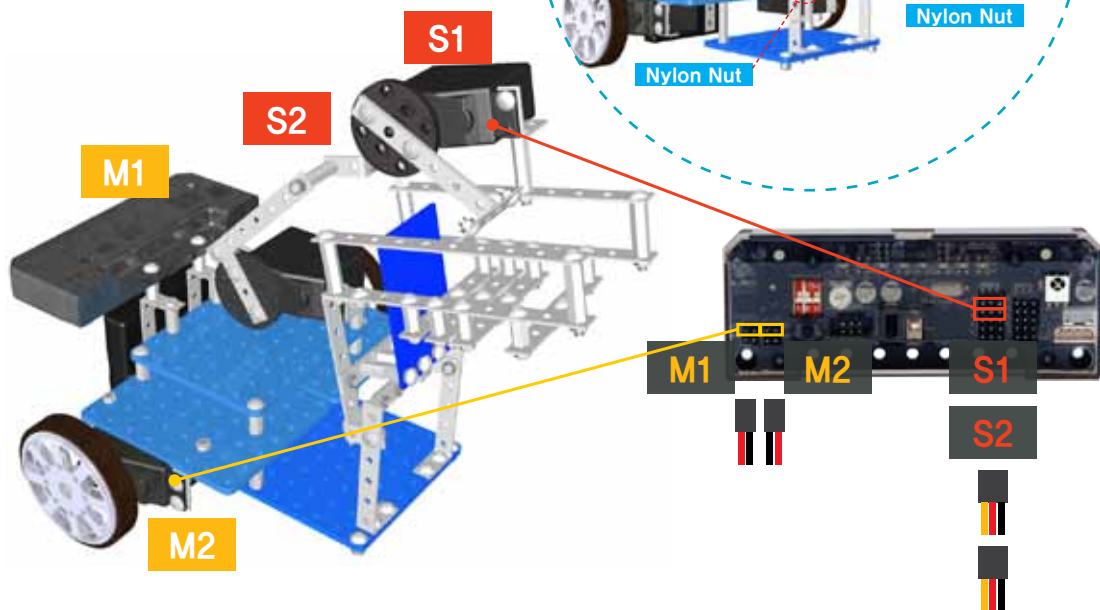
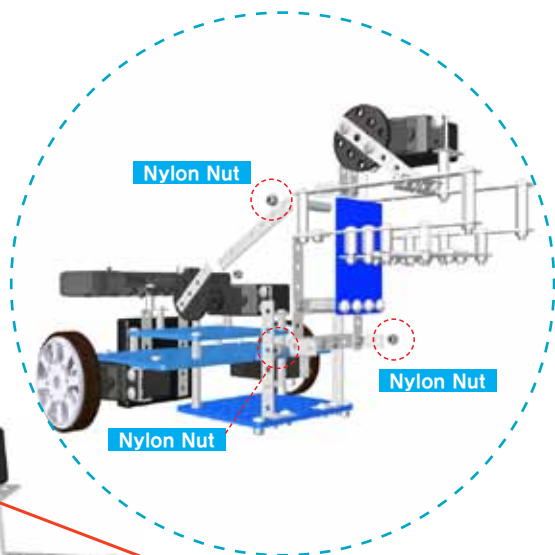




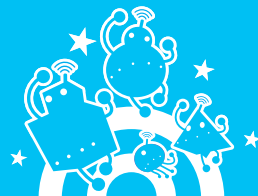


X 4

스마트폰으로
QR코드를 스캔하여,
구동영상을 확인하세요.



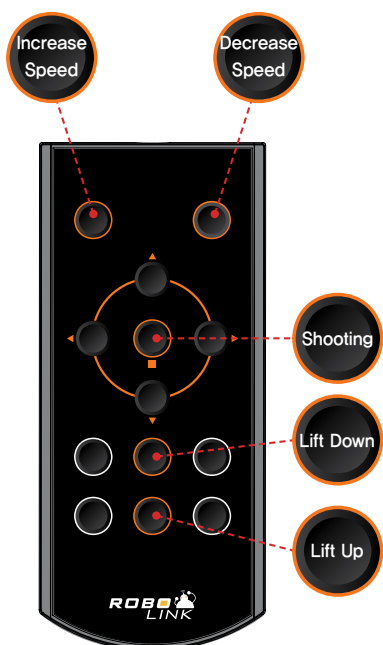
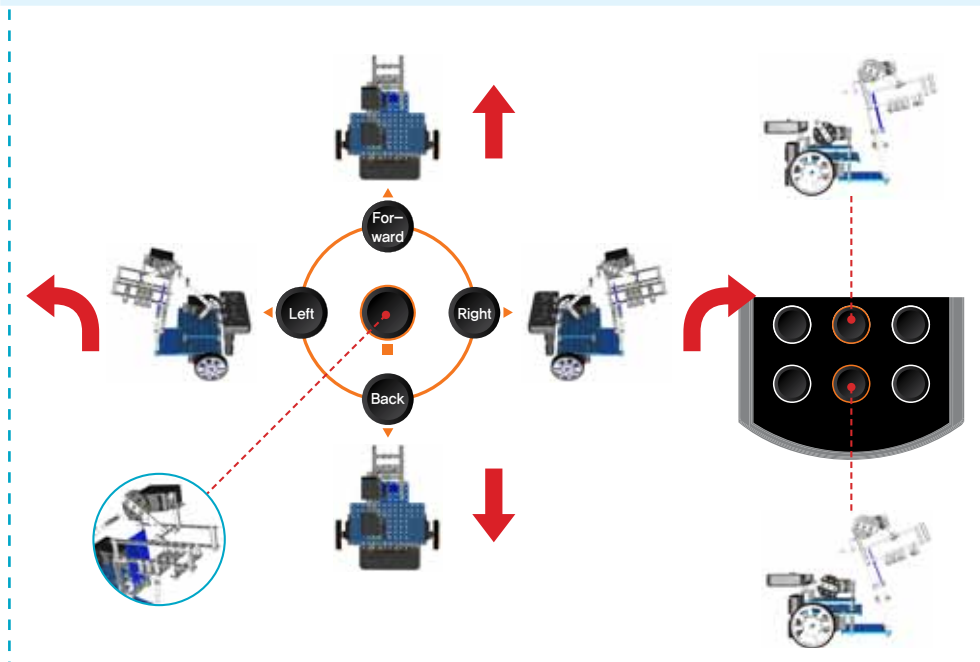
Acting Module



For driving Shooting Robot, select and press program mode 8.



In Smart Rokit Step 2, program is due to be running on with number 2 toggle of DIP switch turned upward. In other words, Smart Rokit Step 2 basically uses channel number 3. Refer to '2. Channel set-up for remote control' in page number 15 that gives you more in details for further reference.



When the speed increases, a brightness of the light increases.



When speed is high



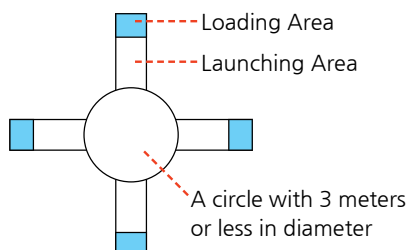
When speed is low

Play the Game!

– Shooting Robot Game



Requirements : arena (refer to the below illustration) and a number of ping-pong balls



1. Form an arena using insulating tape or other stuff, as illustrated in the below. Make a circle with 2 or 3 meters in diameter at the center. Then, place a basket or any of the kind at the center of the circle, which can receive and hold launched ping-pong balls.
2. The game can be played either by a pair of team, consisting of 2 players for each team, or on the basis of individual competition, 1 to 2 minutes of play time is most recommendable.
3. Loading Area (marked in square in blue color) is the place where the shooting robot should be located for a start, and can be loaded with a ping-pong ball. Launching Area is the place where a ping-pong ball shall be launched. If a ping-pong ball is launched from out of the allowing area or from inside of the circle, the shooting robot shall be disqualified. The suitable length for Launching Area is between 0.5m to 1m.
4. Before starting the game, every single shooting robot shall be placed in Loading Area. With a start, each player shall load his shooting robot with a ping-pong ball. Then, each loaded shooting robot shall come into Launching Area and shoot off the ball into the basket. After shooting off the ball, each player is allowed to load it with another ping-pong ball, only after the shooting robot returns to Loading Area.
5. Who has put in the ping-pong balls most within the limit of designated time wins the game. It would be much better if each individual or each team uses ping-pong balls of different colors to count scores with ease.
6. Whether a shooting robot comes in Loading Area or not shall be identified and decided based on the two wheels of the robot. If both of the wheels of robot have completely come into Loading Area and do not border on the area line, it shall be considered as qualified. The same rule principle shall be applied to Launching Area.