Robot Design Summary

Team Number: 39374

Team Name: C.R.A.B

Robot's Name	Crabbot				
Favorite Mission	Mission 7 (Saving Gerhard)	**Maximum Score**	148	**Typical Score**	134
Favorite Robot Feature	The Claw	**Most Innovative Robot Feature**	Dog Gears		
How often does your robot or its attachments break?	Frequently	Fairly Often	Occasionally	Almost Never	
How often does your robot get stuck on the field and you have to retrieve it by hand?	Frequently	Fairly Often	Occasionally	Almost Never	

Strategy
We started with Extraction (Mission 5) and used the core samples for other missions like the 3D Printer (Mission 3) and Food Processing (Mission 10). Then we did the easiest missions with the most points. We avoided higher risk missions.

How many Motors and Sensors are on your robot?					
Large Motors	**2**	**Medium Motors**	**1**	**Color / Light Sensor**	**2**
Ultrasonic Sensor	**0**	**Touch Sensor**	**0**	**Gyro / Angle Sensor**	**1**

Design Process

Because this was our first year, we started with the simple Educator Robot. Then we slightly modified it so that it could complete more than one mission. We used Dog Gears and attachments that we could easily switch out. We built attachments for each mission we wanted to attempt. Then we kept the best ones.

As we created programs that worked, we made them into MyBlocks so they could be reused in other programs.

We used the light sensor to detect the robots position on the board. Then we took reflectivity measurements using the Port View on the brick display. We used this data to calibrate the sensor thresholds.

Robot Design Summary

Team Number: 39374

Team Name: C.R.A.B

Program Summary

All programs begin with a control program called Uber, which waits for a button press to start a sub-program. Each button starts a different sub-program. The sub-programs use MyBlocks for reusable sequences. The sensors are used to find specific locations on the board, and keep the robot going in the right direction.

Programming Language Used:

☐ LEGO MINDSTORMS EV3 ☐ OTHER_____

Program Name	Mission(s) Accomplished	Robot Actions	Attachments Used	Program Structure (Architecture)	Mechanical and/ or Sensor Feedback Used	Mission Success Rate
Uber	None	Waits for a button press to start another program. Resets the Gyro sensor.	None	Loop Block, Switch Block, Gyro Reset, MyBlocks for each mission	It uses a switch with a case for each button on the brick.	N/A
M05	Mission 5	Drives to the top of the West T, turns, and uses the cage attachment to pull out the core samples.	Cage attachment	Gyro Drive Loop, Light Sensor Loop, Variables, Gyro Turn Loop, MyBlock	It uses the Gyro sensor to drive straight, and make turns. It uses the Light sensor to find the T.	80%
M10	Mission 10 and 13	Drives to the top of the East T, moves the Food Production to green, drops the water, and backs into the Observatory.	Claw attachment	Gyro Drive Loop, Light Sensor Loop, Variables, Gyro Turn Loop, MyBlock	It uses the Gyro sensor to drive straight, and make turns. It uses the Light sensor to find the T.	85%
M03	Mission 3	Drives to the top of the West T, turns, and opens the claw to release the regolith.	Claw attachment	Gyro Drive Loop, Light Sensor Loop, Variables, Gyro Turn Loop, MyBlock	It uses the Gyro sensor to drive straight, and make turns. It uses the Light sensor to find the T.	75%
M01	Mission 1 and 2	Drives forward until it pushes the solar panels, and lifts the arm attachment to launch the cart.	Giant arm attachment	Gyro Drive Loop	It uses the Gyro sensor to drive straight.	90%
M07	Mission 7	Drives past the space station, lowers the arm, and drives backward to hook Gerhard. Then it moves next to the station and drops Gerhard.	Bouncy arm attachment	Gyro Drive Loop, Light Sensor Loop, Gyro Turn Loop.	It uses the Gyro sensor to drive straight, and make turns. It uses the Light sensor to find the T.	55%

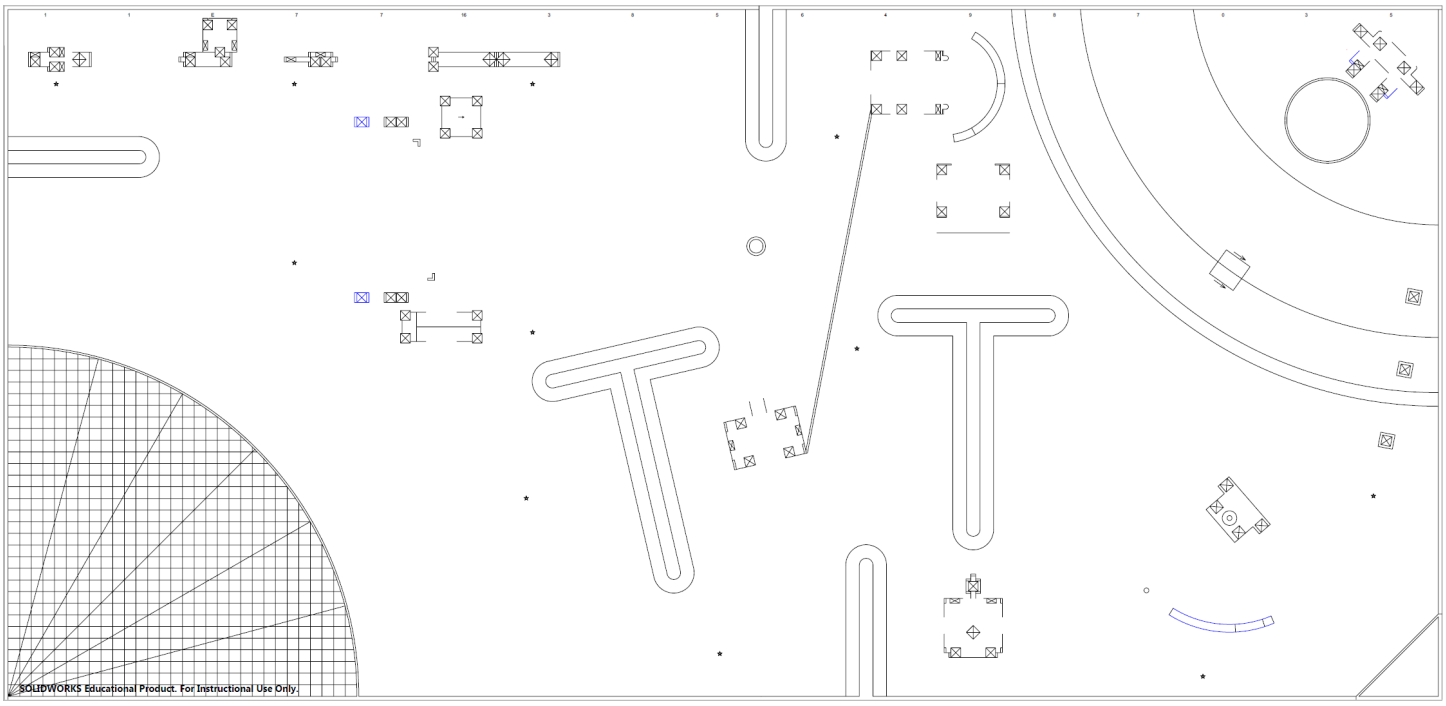
Robot Design Summary

Team Number: 39374

Team Name: C.R.A.B

Program Name M05

Robot Path Diagram



Program Description

TWest (MyBlock)

- Uses the Gyro to drive straight from the base to the bottom of the west T
- Inches forward until the left light sensor detects white
- Turns one wheel until the right color detects white
- Does two gyro turns and steers to reach the top of the west T
- The left motor stops when the left light sensor detects white, and the right motor continues until the right light sensor detects white.

M05 (MyBlock)

- Uses the gyro sensor to drive straight, then it turns into the axle holding the core samples
- It lowers the cage attachment
- It slowly backs away from the axle
- It returns to base

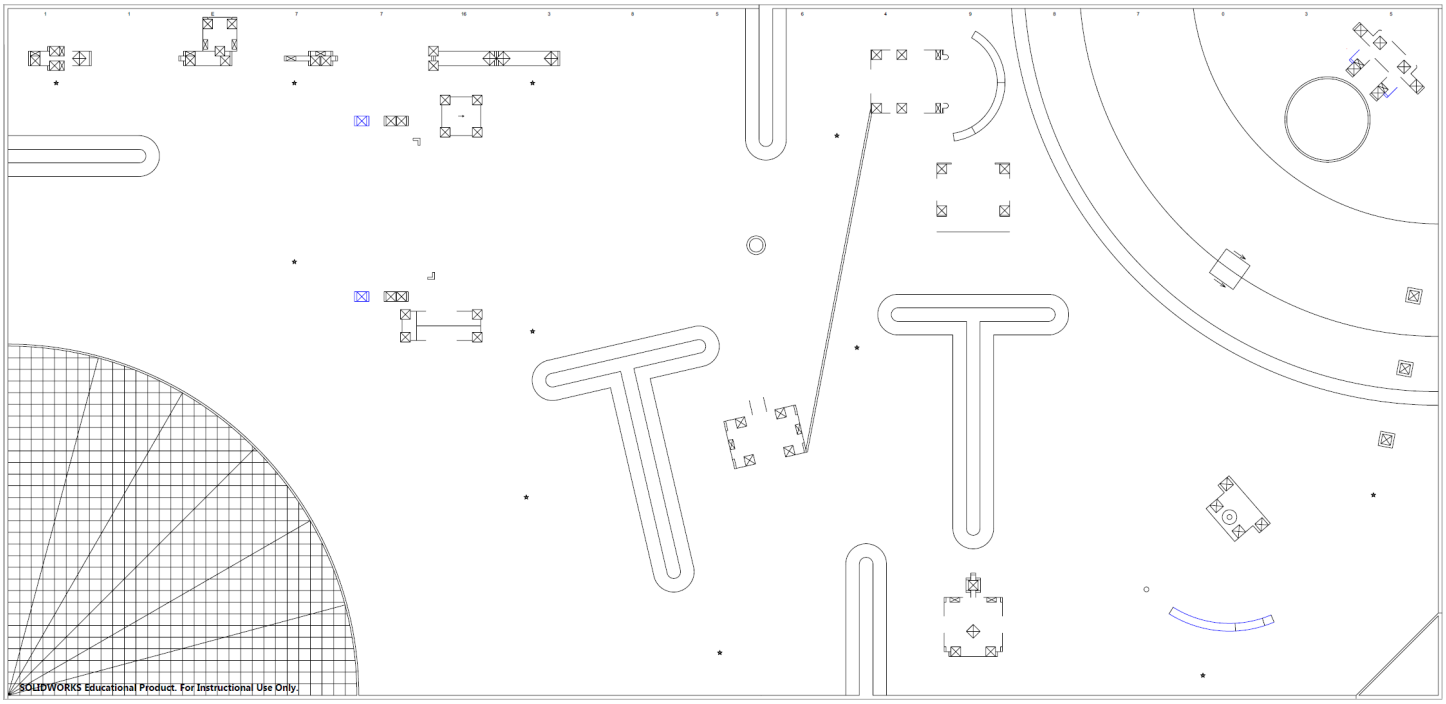
Robot Design Summary

Team Number: 39374

Team Name: C.R.A.B

Program Name M10

Robot Path Diagram



Program Description

TEast (MyBlock)

- Uses the gyro to drive straight toward the east side of the board
- It stops when the left light sensor detects white
- It makes a gyro turn
- It drives toward the east T until the left light sensor detects black
- It makes a gyro turn
- It drives straight until the left sensor detects black. The left motor stops and the right motor keeps going until the right light sensor detects black.

M10 (MyBlock)

- Drives forward very slowly (to push the Food Processing bar)
- Opens the claw to drop the water sample
- It backs away from the Food Processor
- It closes the claw
- It drives backwards and turns into the Observatory
- It returns to base

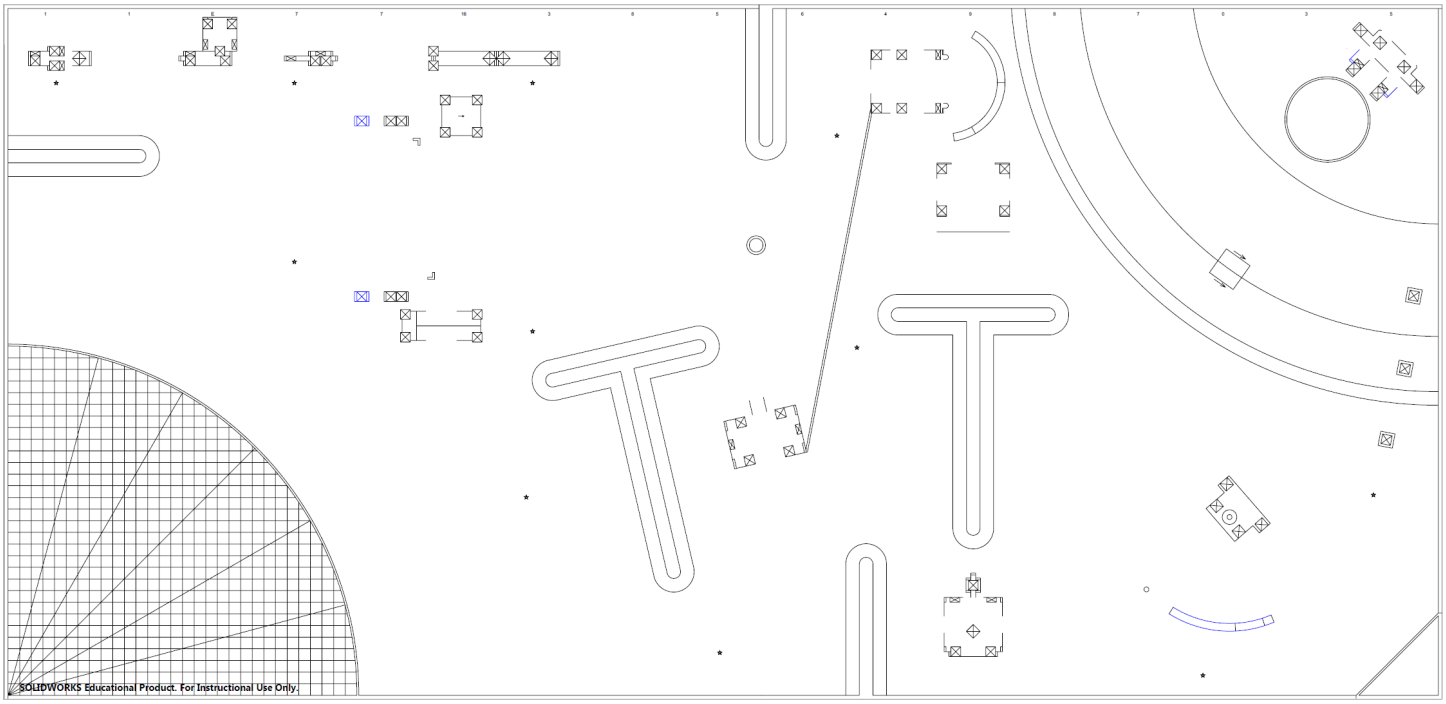
Robot Design Summary

Team Number: 39374

Team Name: C.R.A.B

Program Name M03

Robot Path Diagram



Program Description

TWest (MyBlock)

- Uses the Gyro to drive straight from the base to the bottom of the west T
- Inches forward until the left light sensor detects white
- Turns one wheel until the right color detects white
- Does two gyro turns and steers to reach the top of the west T
- The left motor stops when the left light sensor detects white, and the right motor continues until the right light sensor detects white.

M03 (MyBlock)

- Uses the gyro sensor to drive straight
- It turns into the 3D printer
- The claw opens to drop the regolith sample
- It returns to base

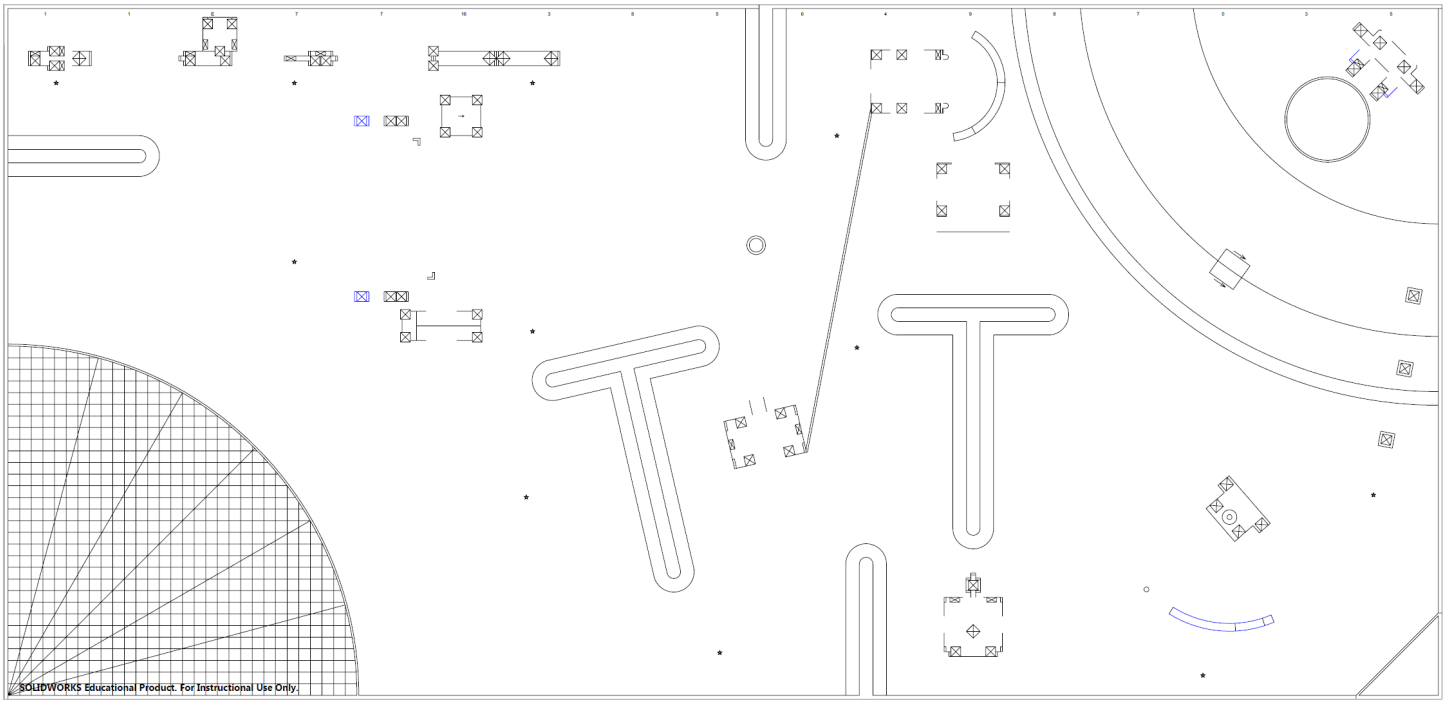
Robot Design Summary

Team Number: 39374

Team Name: C.R.A.B

Program Name M01

Robot Path Diagram



Program Description

M01 (MyBlock)

- Uses the gyro to drive straight from the base toward the solar panel array
- It lifts the giant arm for 1 second
- It releases the giant arm
- It returns to base

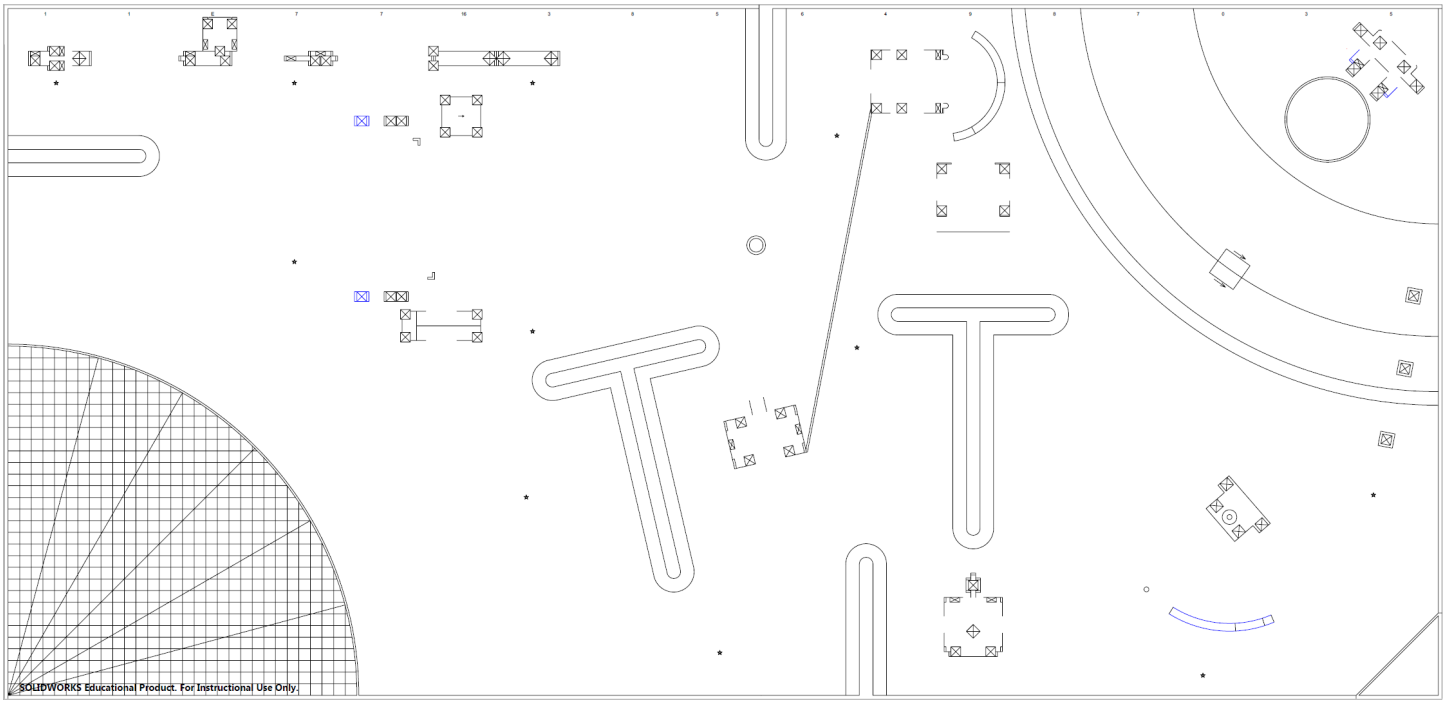
Robot Design Summary

Team Number: 39374

Team Name: C.R.A.B

Program Name __M07_____

Robot Path Diagram



Program Description

M07 (MyBlock)

- Uses the gyro to drive straight toward the bottom of the west T
- The left motor stops when the left light sensor detects white
- The right motor drives until the right light sensor detects white
- It lifts the arm
- It does a gyro turn counterclockwise
- It drives straight until the left light sensor detects white
- It lowers the arm
- It backs up
- It lifts the arm (with Gerhard attached)
- It drives backward into position next to the Space Station
- It pauses to stop Gerhard from swinging
- It lowers arm at a power of -1
- It returns to base