Skills Ontario 2022
LEGO® Robotics Challenge   Grade 4–6 and Grade 7–8

Challenge Brief: Robotic Arm for Factory Automation

Our Challenge theme is manufacturing automation. Your team will design and build a **stationary robotic arm** using any LEGO Programmable Brick (NXT, EV3, Inventor, SPIKE, etc.), a **maximum of 3 motors**, any number of sensors, and the coding language of your choice. You'll need to program a sequence that demonstrates the full capability of your robotic arm so it can function autonomously for the judges.

The robotic arm should **identify and move at least three different objects** of your team's choice. Objects do not have to be made of LEGO but will need to be moved from one location to another where the locations are of different heights. One location could be a moving conveyor belt. There should be **at least three different locations at different heights.**

You can create a factory setting that uses a mix of materials beyond, and including, LEGO. Maybe your robot will pick up cups, maybe your delivery surfaces will be wood, cardboard, or LEGO. Just remember the robotic arm must be completely constructed of LEGO elements, but it can be working in a non-LEGO environment, if you choose.

Depending on the robot arm's application, **your robot may move in any direction**. For example, you might choose:
- grasp/release, lift, and rotate arm
- grasp/ release, lift, and rotate gripper
- grasp/release, lift arm one, lift arm two

These are just three of many options. You may want to only grasp/release and lift and use the third motor for a conveyor belt. The choice of applications is yours!

Tip: Being efficient by using just one motor to grasp/release *and* lift will give you more options, so don't forget to consider various robot arm designs to fit your chosen application.

Remember to submit your CAD Robot Design, Design Documentation and Business Documentation prior to the Challenge Day. Check the deadlines!

Your project will be demonstrated live for the judges at the assigned time on your presentation date.

Suggested Resources
https://www.kuka.com/en-us/industries/consumer-goods-industry/automation-food-industry
https://www.youtube.com/watch?v=ceLIAkFdSEM

Questions? Reach out to the Tech Chair, Ian Dudley, at ianskills@orangestem.ca