

Robotics Challenge Manual

- I. [What is the challenge? What are the required project specifications?](#)
- II. [How are projects evaluated and prizes awarded?](#)
- III. [What is included in the provided kit?](#)
- IV. [Learning Resources for Robotics Projects](#)

What is the challenge? What are the required project specifications?

Teams must have at least four (4) student members, and individual schools are limited to three (3) teams maximum. Teams must design, build, and test a prototype device that addresses the challenge prompt for the current year and meets the required specifications below.

2024 Challenge Prompt: “HELP A PERSON WITH A DISABILITY COMPLETE A TASK”

All projects must meet the following specifications to be eligible for awards:

- All projects must utilize, at minimum, **one microcontroller, one sensor, and one output**. *These are included in the kit provided by the MOST. The use of additional components is permitted, but not required.*
- All projects must be accompanied by a **poster or fair board** that demonstrates how teams used the Engineering Design Process to design, build, and test their projects. *Fair boards can be provided by the MOST upon request to eventcoordinator@most.org.*

How are projects evaluated and prizes awarded?

Four awards (1st, 2nd, 3rd, and 4th Place) will be given in two divisions (Junior, Grades 4-8 and Senior, Grades 9-12), determined by the **highest average subjective judging score**. Judges will evaluate projects in a science-fair style judging session on three metrics: **technical proficiency, design creativity/process, and student comprehension of STEM concepts**.

An additional award will also be given in each of the following categories:

- ‘Fan Favorite’ Project
- Best Team Spirit/Enthusiasm

What is included in the provided kit?

Kits for up to 40 teams (30 Junior, 10 Senior) are available for pick-up on a first-registered, first-served basis by arrangement with eventcoordinator@most.org. Teams must have at least four (4) student members, and individual schools are limited to three (3) teams maximum. The use of additional components **is** permitted, but is not required.

JUNIOR LEVEL KIT (30 AVAILABLE)	SENIOR LEVEL KIT (10 AVAILABLE)
Stepper Motor	Mega 2560 Controller Board
Servo Motor	LCD1602 Module (w/pin header)
IR Receiver Module	RFID Module
5V Relay	RC522
Uno R3 Controller Boars	Prototype Expansion Module
LCD 1602 Module (w/pin header)	Power Supply Module
Stepper Motor Driver	GY-521 Module

JUNIOR LEVEL KIT, CONT.

Power Supply Module
Prototype Expansion Module
4 digit 7 Segment Display
1 digit 7 Segment Display
Tilt Ball Switch
Fan Blade and 3-6V DC Motor (w/wire)
Joystick Module
Temp and Humidity Module
Ultrasonic Sensor
Button (5)
Potentiometer
Passive Buzzer
Active Buzzer
9V Battery w/snap-on Connector
Remote
USB Cable
Female to Male Dupont Wire (10)
Breadboard Jumper Wire (65)
Shift Register IC
16-pin Motor Driver IC
830 Tie-Points Breadboard
Thermistor
Diode Rectifier (2)
LED (25)
Photoresistor (Photocell) (2)
Resistor (120)
RGB (2)
NPN Transistor (2)
AWG Wire (Red & Black)

SENIOR LEVEL KIT, CONT.

Servo Motor
Stepper Motor Driver Module
Remote Control
MAX7219 Module
1 Digit 7 Segment Display
4 digit 7 Segment Display
16-pin Motor Driver IC
Shift Register IC
Active Buzzwe
Passive Buzzer
Potentiometer 10k (2)
PIR Motion Sensor Module
Sound Sensor Module
Water Level Detection Module
Ultrasonic Sensor
RTC Module
Rotary Encoder Module
Temp and Humidity Module
IR Receiver Module
Joystick Module
5V Relay
Fan Blade and 3-6V Motor
Membrane Switch Module
830 Tie-Points Breadboard
9V Battery w/snap-on Connector Clip
9V1A Adapter
Breadboard Jumper Wire (65)
Female to Male Dupont Wire (20)
USB Cable
Resistor (120)
Thermistor
Diode Rectifier (5)
100uF Electrolytic Capacitor (2)
10uF Electrolytic Capacitor (2)
NPN Transistor (5)
NPN Transistor (5)
Tilt Ball Switch
Button (5)
Red LED (5)
Yellow LED (5)
Blue LED (5)
Green LED (5)
White LED (5)
RGB LED (2)
104pF Ceramic Capacitor (5)
22pF Ceramic Capacitor (5)
Photoresistor (Photocell) (2)
AWG Wire (Red & Black)

Tips for Robotics Project Construction

*Be sure you understand the challenge rules when designing your prototype! Revisit the earlier sections of this manual that define the **challenge prompt** and **judging criteria** for the project.*

Equipment & Installation Guides

Junior Kit:  [Elegoo Super Starter Kit for UNO V1.0.2019.09.17.pdf](#)

Senior Kit:  [The Most Complete Starter Kit for MEGA V1.0.2021.05.13.pdf](#)

Resources for Students

<https://projecthub.arduino.cc/>

<https://learn.adafruit.com/>

Resources for Teachers

<https://www.arduino.cc/education/>