

Introduction to *FIRST* LEGO League Challenge

Created by FLLTutorials.com





Three *FIRST* Programs (K-12)

FIRST LEGO League:

Discover

Explore

Challenge

FIRST Tech Challenge

FIRST Robotics Competition



UNEARTHED



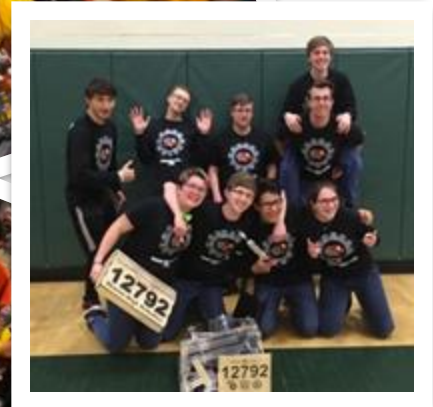
DECODE

PRESENTED BY RTX



REBUILT

PRESENTED BY JAS



“I don’t use kids to build robots. I use robots to build kids”

- Dean Kamen

Table of Contents

- Overview of *FIRST* LEGO League Challenge
- Innovation Project
- Robot Game
- Robot Design
- Core Values
- Our Team

Team

- North America (ages 9 to 14/grades 4-8); Elsewhere (ages 9-16)
- Check with local organizers for variations
- Teams consists of 2-10 students
- Two official adult coaches with clearances per team
- Kids on the team do the work, coaches/mentors guide the overall process

Approximate Timeline

August 5, 2025: Challenge documents released

August-November 2025: Team meets weekly to solve the challenge

November-December 2025: Qualifiers

December 2025 - February 2026: State/Regional Championship

April 2026: World Championships

May-June 2026: Official Open Invitationals run by Program Development Partners

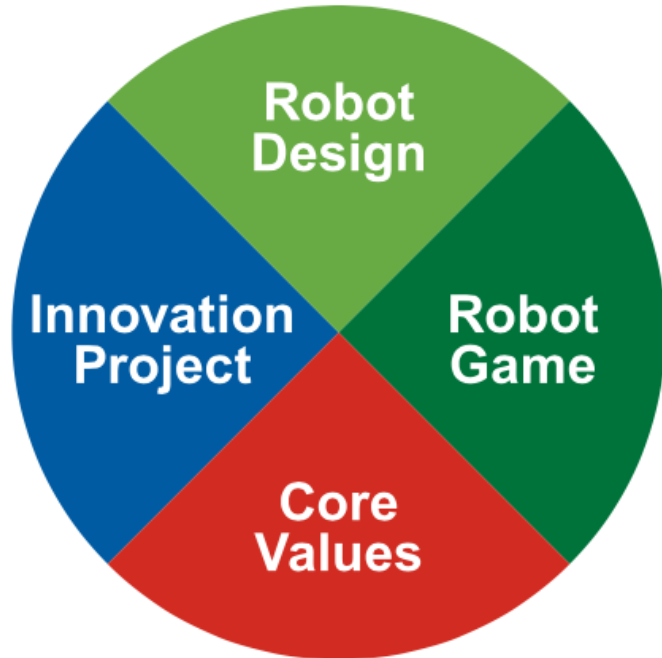
Timelines vary by region. Contact your local organizers for specifics.

Team Costs

- LEGO Robot - approx. \$500.00 (Core Set + Expansion Set)
 - SPIKE Prime, MINDSTORMS EV3, MINDSTORMS Robot Inventor
 - Purchase from *FIRST* or directly from LEGO Education
- Wooden Robotics Table – approx. \$100.00
- National Team Registration – \$275
- Challenge Set - \$75 (expect 2%-4% increase)
- Local Tournament Registration Cost - \$75-250+
- Travel Expenses
- Team Shirts/Supplies

Cost vary by region. Contact your local organizers for specifics. Above costs are in USD and for North America only.

Four Parts of *FIRST* LEGO League Challenge



- Four equally weighted parts
Each accounts for 25% of your total performance
- Evaluated using rubrics and points scored on the game

Innovation Project

Innovation Project is based on a yearly theme

2024-25 SUBMERGED – Solve a problem related to ocean exploration

2020-21 RePlay Season - Help people get more active

2017-18 Hydrodynamics Season - Improve the way people find, transport, use, or dispose of water

2014-15 World Class – Improve the way we learn something

Innovation Project Overview

Identify a real-world problem within the overall theme

Research and identify existing solutions

Design new solutions or improve an existing one in some way

Create a prototype or model for the solution

Share the solution with others

Iterate the design using feedback/testing

Communicate your ideas to judges in a 5-min presentation

Sample Project (SUBMERGED)

PROBLEM:

- Marine biologists and experts find sampling and carrying seafloor sediments (20 - 40 m) to be difficult
- Embedding the corers is hard, even sometimes having to use small hammers to do it
- They must be kept in a vertical position to not mix the different layers of collected samples

EXISTING SOLUTIONS

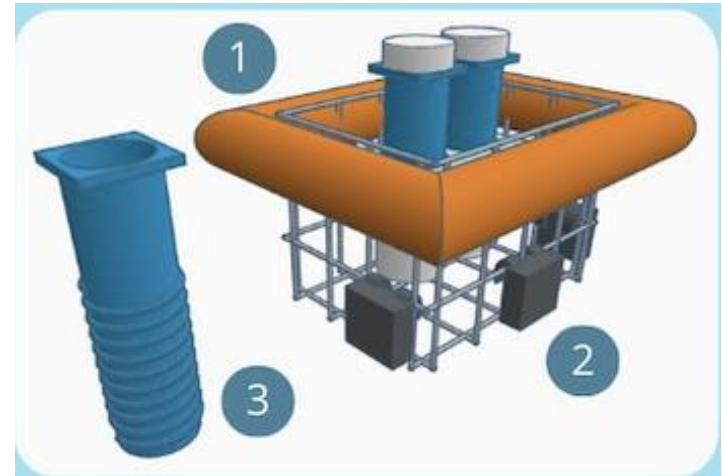
- Baskets to transfer corers vertically must be carried by hand
- Nets to store the corers can still tip over.
- In both cases, balloons can be used to lift samples to the surface, although they must be inflated with air from the diver's tank and their pressure needs to be controlled while ascending

Sample Project (SUBMERGED)

SOLUTION: ScuBasket

Basket that holds 6 corers that descends to the seafloor and comes back up on its own.

1. An inflatable connected to a small CO₂ bottle activated by the diver, with an automatic valve controlled by pressure.
2. A ballast to control the buoyancy and stability of the corers in vertical position.
3. Each corer has a screw-like shape to make the insertion into the seafloor easier, using a hand crank.



Robot Game

Overview

- 4ft x 8ft table with a mat
- LEGO-based missions
- LEGO MINDSTORMS or SPIKE Prime to solve the missions
- Theme changes yearly
- 2 tables placed next to each other at competition



Robot Runs

- 3 matches, best score counts
- 2.5 minutes to complete as many missions as you can (Note: majority of teams will not do all the missions)
- Points vary by mission
- Each mission has its own set of rules and instructions
- Referees score you at the end of each match using a scoresheet

FIRST LEGO LEAGUE
CHALLENGE

ROBOT GAME
RULEBOOK

Equipment Constraints: When this symbol appears to the left of a mission, the following equipment is required. You are required to bring any part of this mission's mission model at the end of the match, to score for this mission.

Equipment Inspection: If your robot and all your equipment fit completely in one search area and are under a height limit of 12 in. (305 mm) during the pre-match inspection.

MISSION 11 CORAL MUSEUM
If the coral reef is hanging on the coral reef support.
Bonus: If the robot is in the coral reef.
If the coral reef is flipped up.

MISSION 12 SHARK
If the shark is touching the coral.
If the shark is touching the reef and it is at least partly in the shark habitat.

MISSION 13 CORAL REEF
If the coral reef is flipped up, not touching the reef.
If a reef segment is standing upright, outside of home, and touching the reef.

MISSION 14 SCUBA DIVER
If the scuba diver is no longer touching the coral runway.
If the scuba diver is hanging on the coral reef support.
The scuba diver must be in the water.

MISSION 15 ANGLER FISH
If the angler fish is behind within the shipwreck.

MISSION 16 RAISE THE MAST
If the shipwreck's mast is completely raised.
If the shipwreck's mast is completely raised to the top.

MISSION 17 HARKEN'S TREASURE
If the treasure chest is completely outside the robot's head.

MISSION 18 ARTIFICIAL HABITAT
If an artificial habitat rock segment is completely flat and upright.
Then and after exposure of the artificial habitat rock, each segment by its public base of segment is considered upright when the end is above its yellow base.

MISSION	DESCRIPTION	SCORE
MISSION 10	UNEXPECTED ENCOUNTER	20
MISSION 11	READ OVER THE SUBMERGED	10
MISSION 12	SHARK DISCOVERY	20
MISSION 13	RAISE THE WHALE	10
MISSION 14	CHANGING SHIPPING LANE	10
MISSION 15	SAMPLE COLLECTION	5
MISSION 16	RESEARCH VESSEL	5
MISSION 17	PRECISION TOWER	5
MISSION 18	FINAL SCORE	5

2025-26 Season: UNEARTHED (Archaeology)



Robot Design

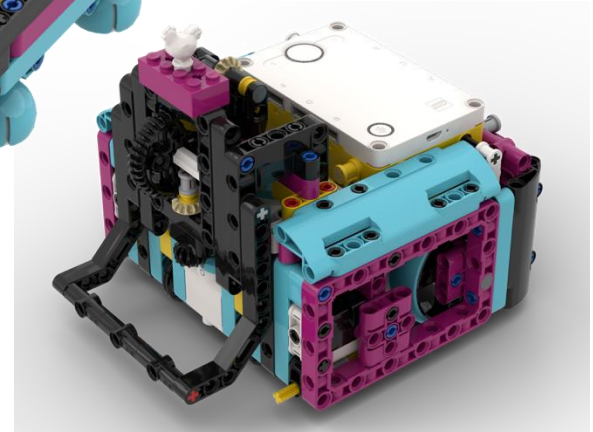
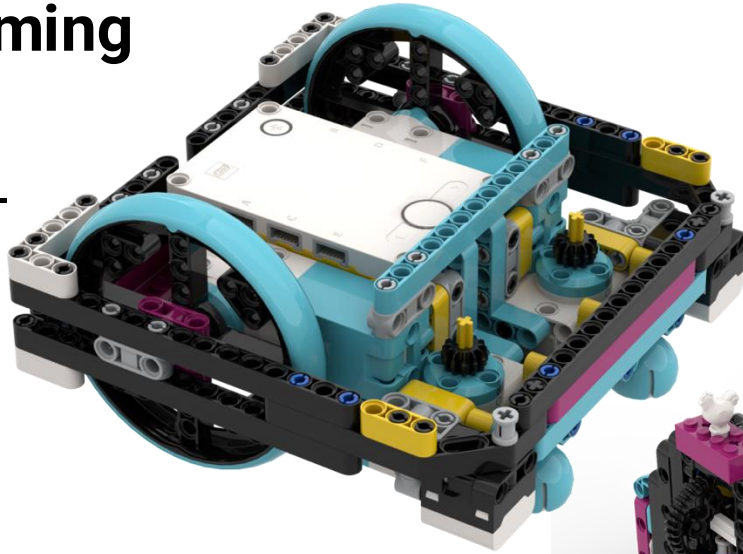
Robot Design Overview

- Step 1:** Analyze the missions and develop a strategy
- Step 2:** Build and program a robot to meet that strategy
- Step 3:** Test the robot and make improvements as needed
- Step 4:** Develop solutions to individual missions
- Step 5:** Test code and solutions
- Step 6:** Iterate code and robot as needed
- Step 7:** Document the process to share with judges in 5-mins



Building and Programming

- Programming in block-based or text-based languages
- Learn physics and engineering concepts
- Optional CAD skills



Core Values

What are Core Values?

- The cornerstones of the program
- The set of ideas that every FIRST team should live by



We are stronger
when we work
together.



We respect
each other and
embrace our
differences.



We apply what we
learn to improve
our world.



We enjoy and
celebrate what we
do!



We explore new
skills and ideas.



We use creativity
and persistence to
solve problems.

What is Gracious Professionalism and Coopertition?

Gracious Professionalism:

- High-quality work, emphasis on the value of others
- Respect for individuals and the community.
- Competition and mutual gain are not separate notions.

Coopertition:

- The idea you should respect and support teams you compete against.



Learning Life Skills through *FIRST*

- Teamwork
- Communication
- Problem Solving
- Helping one another
- Giving back to community



Our Team

Meeting Times/Attendance Requirements

Fill in

How do you join the team?

Application

Tryouts

Recommendation Letter

Team Expectations

Cost:

Attendance:

Behavior/Code-of-Conduct:

Parent support and Involvement: