

## The 2016/2017 FIRST® LEGO® League Challenge



*In the past, people often thought about how animals could help us. Today, it's time to think about how we can help each other. What might become possible when we work together with our ANIMAL ALLIES<sup>SM</sup>?*

### Solve problems in: **The Project**



- **Identify** a problem when people and animals interact
- **Design** a solution that makes the interaction better for animals, people, or both
- **Share** your problem and solution with others

For ANIMAL ALLIES<sup>SM</sup>, think of people and animals as allies in the quest to make life better for everyone. Sometimes people help animals and sometimes animals help people. Your Project mission this season is to make our interactions with animals better – hopefully better for all of us.

**Identify** Think about all the different ways that people interact with animals. Sometimes it happens on purpose and sometimes it happens by accident. Pick a situation when people and animals interact, then identify a specific problem you want to solve.

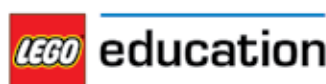
After you select a problem, find out about the current solutions. Why does this problem still exist? Why aren't the current solutions good enough? What could be improved?

***In the ANIMAL ALLIES<sup>SM</sup> Challenge, an animal is any member of the scientific animal kingdom (besides humans) that is currently alive today.***

**Design** Next, design a solution to your problem. Any solution is a good start. Your ultimate goal is to design an innovative solution that adds value to society by improving something that already exists, using something that exists in a new way, or inventing something totally new.

**Share** Think about who your solution might help, share your idea with at least one person. Present your solution to people who own, sell, or care for animals. Maybe share with a professional or someone who helped you learn about your problem. Can you think of any other groups of people who might be interested in your idea?

Finally, prepare a presentation to share your work with the judges at a tournament. Your presentation must be live and may include posters, slideshows, models, multimedia clips, props, costumes, and more. Be creative, but make sure you introduce your problem, solution, and how you shared your idea.





Solve problems in:

# The Robot Game

- **Read the Robot Game Rules in the Challenge Guide:**  
<http://firstlegoleague.org/challenge#animal-allies>
- **Identify one or more missions to solve**
- **Design a robot using LEGO® MINDSTORMS® that can solve the mission(s)**

– Mission results must be visible exactly as described at the end of the match (unless otherwise specified).

Do we need animals, or do they need us? Answer: YES! This Robot Game showcases just a fraction of our wonderful story with animals. As you work on the Missions, pay attention to the many ways innovation and technology have enabled humans and animals to exchange learning, friendship, help, daily needs, protection, amusement, and love... As you'll see, there are many fun problems left to solve!

## M01 - SHARK SHIPMENT

- **Visible at the end of the match:**
  - Tank and Shark are completely in Target 1: 7 Points, OR Target 2: 10 Points
- **Bonus** (Added only if a Target score is earned): Shark is touching only the tank floor and no wall: 20 Points
- **More:** After Launch for this Mission, nothing is ever allowed to touch the Shark except the Tank.



## M02 – SERVICE DOG ACTION

- **Visible at the end of the match:**
  - The Warning Fence is down: 15 Points
- **More:** The Fence must be down because the Robot completely crossed it from the west, after traveling between the Barriers: Y/N



## M03 – ANIMAL CONSERVATION

- **Before the match starts:** Hand-place your choice of one animal in your tray of the Animal Conservation Mission Model. The placement must match one of these options\*:
    - Reindeer facing west
    - Gorilla facing south
    - Bat facing south
    - Flamingo facing east
    - Frogs facing south & west
    - If placing another animal other than Reindeer, put Reindeer on that animal's mark facing west
  - **During the Match:** Participating Robots make the trays switch places. A switch is officially successful when the red axle causes the system to stop. Robots then have the option of removing the received animal and replacing it with a different animal for switching. The Referee resets the red axle.
  - **Visible at the end of the match:**
    - Two identical animals are completely on the same
- \*\*Side: 20 Points per pair  
– Both teams get points for all pairs
- **More:** Each pair must be created through rotation of the Animal Conservation Mission Model: Y/N



\* The five optional animals listed in this mission are the only ones allowed for exchange.

\*\* For M03, a "Side" is anywhere completely south of the symmetric line between Fields, including that Field's Storage areas.

## M04 – FEEDING

- **Visible at the end of the match:**
  - A piece of Food is completely in a Target Area: 10 Points (Each Piece)
- **More:** If multiple pieces of Food are in one area, all must match each other: Y/N



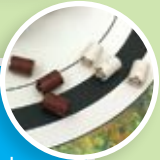
## M05 - BIOMIMICRY

- **Visible at the end of the match:** The Biomimicry Wall completely supports:
  - All the weight of the White Gecko: 15 Points
  - All the weight of the Robot: 32 Points
- **More:** For an object to score, no part of it may be in contact with anything but the Biomimicry Wall and/or Green Gecko, except two scoring objects may be in contact with each other: Y/N



## M06 – MILKING AUTOMATION

- **Visible at the end of the match:**
  - Milk and Manure have all rolled out: 15 Points
- OR
- Milk has all rolled out but not Manure: 20 Points
- **More:** The Robot's only movement of the Milk and/or Manure came by moving the red lever: Y/N



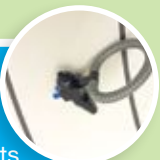
## M07 – PANDA RELEASE

- **Visible at the end of the match:**
  - The slider looks fully open clockwise: 10 Points



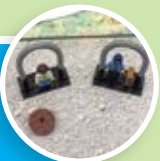
## M08 – CAMERA RECOVERY

- **Visible at the end of the match:**
  - The Camera is completely in Base: 15 Points



## M09 – TRAINING AND RESEARCH

- **Visible at the end of the match:**
  - The Dog & Trainer are completely in the Training & Research Area: 12 Points
  - The Zoologist is completely in the Training & Research Area: 15 Points
  - Manure \*Samples are completely in the Training & Research Area: 5 Points Each
- **More:** Only one Manure Sample may be Transported at a time: Y/N



\* Only disc-shaped Manure counts as Samples.

### M10 – BEEKEEPING

- **Visible at the end of the match:**
  - The Bee is on the Beehive and there is no Honey in the Beehive: 12 Points
- OR**
- The Bee is on the Beehive and the Honey is completely in Base: 15 Points



### M11 – PROSTHESIS

- **Visible at the end of the match:**
  - The Prosthesis is fitted to the Pet AND not held by the Referee: 9 Points
- OR**
- The Prosthesis is fitted to the Pet AND the Pet is completely in its Farm Target: 15 Points



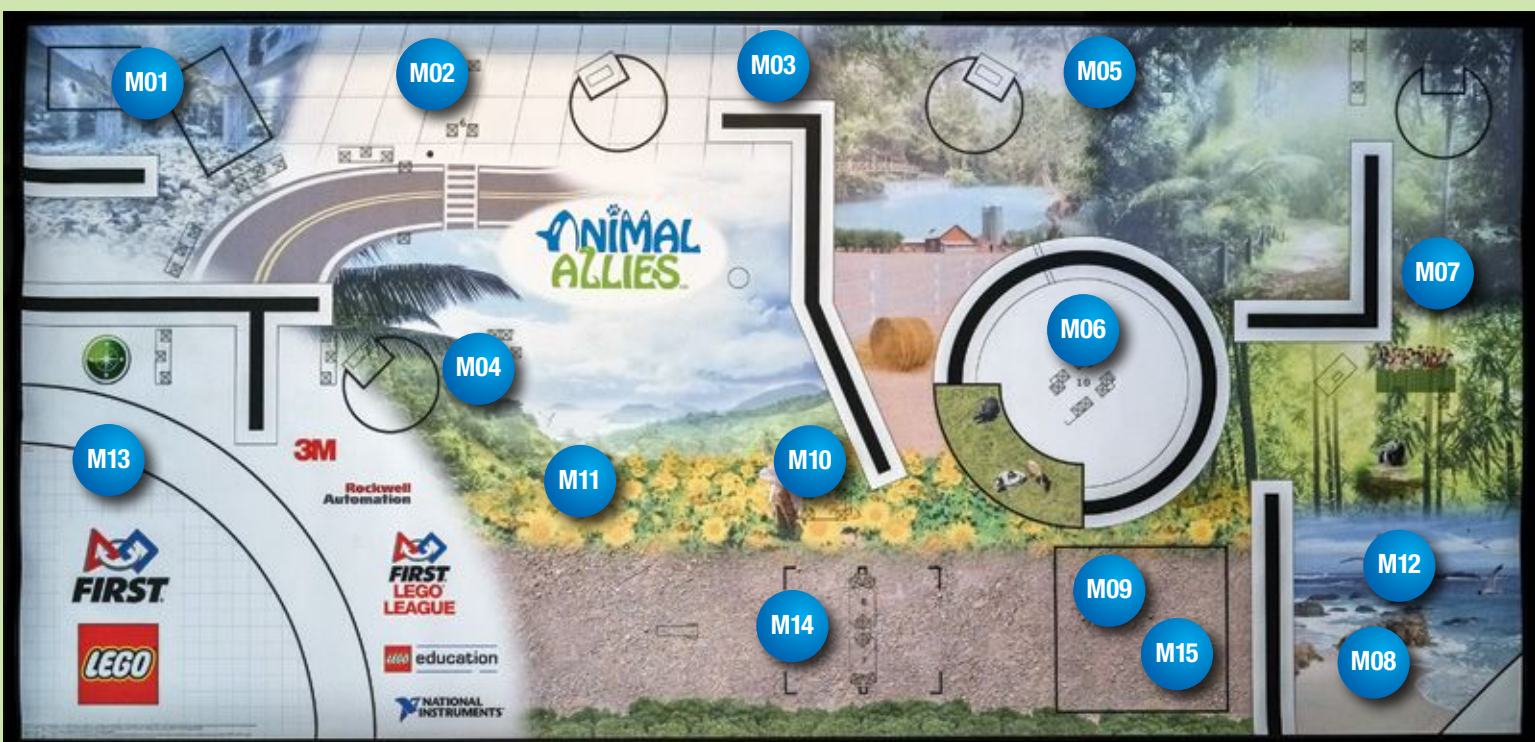
### M12 – SEAL IN BASE

- **Visible at the end of the match:**
  - The Seal is completely in Base and not broken: 1 Point



### M13 – MILK IN BASE

- **Visible at the end of the match:**
  - All three Milk are completely in Base: 1 Point



### M14 – MILK ON RAMP

- **Visible at the end of the match:**
- **Option 1:** 2 Points
  - All three Milk are completely supported by the Ramp
- **Option 2:** 3 Points
  - All of Option 1 (above),
  - AND they're the only things supported by the Ramp,
  - AND they're the only things touching the Ramp
- **Option 3:** 4 Points
  - All of Options 1 & 2 (above),
  - AND they're all standing



### M15 — ALL SAMPLES

- **Visible at the end of the match:**
  - All twelve Manure Samples are completely in the Training And Research Area: 5 Points Added to M09 penalties, worth Minus 6 Points Each.



**PENALTIES:** Before the match starts, the Referee removes five Manure Samples from Base, and holds onto them, leaving five still there. If you Interrupt the Robot, the Referee places one of the removed Samples in the white triangle, in the southeast, as a permanent/ untouchable Interruption Penalty. You can get up to five such penalties, worth Minus 6 Points Each.



Solve problems using:

## The Core Values

- We are a team.
- We do the work to find solutions with guidance from our coaches and mentors.
- We know our coaches and mentors don't have all the answers; we learn together.
- We honor the spirit of friendly competition.
- What we discover is more important than what we win.
- We share our experiences with others.
- We display Gracious Professionalism® and Coopertition® in everything we do.
- We have FUN!

## The Season's Key Moments

If you need help, look at the sample schedule in the Coaches' Handbook or log into *FIRST*® Steps for a step-by-step guide to your season: <http://www.firstlegoleague.org/first-steps>



Download the rubrics to help prepare for your event: <http://firstlegoleague.org/challenge#animal-allies>

<http://www.firstlegoleague.org>  
<http://www.firstinspires.org>

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