

Building Mission Models

for *FIRST* LEGO League Challenge



Getting Organized

Sort Your Bags by Number

For the MASTERPIECE season,
you should find the following
items in your Challenge set box

Bag #1 - 2	Bag #10 - 2
Bag #2 - 2	Bag #11 - 1
Bag #3 - 2	Bag #12 - 1
Bag #4 - 2	Bag #13 - 1
Bag #5 - 2	Bag #14 - 1
Bag #6 - 3	Bag #15 - 1
Bag #7 - 1	2 unnumbered bags
Bag #8 - 2	2 loose black axles
Bag #9 - 1	1 sheet of 3M dual lock

1 rolled up challenge mat



Open and Sort by Number

- Open only one set of numbered bags at a time. E.g. all bag number 1s
- There can be multiple bags with the same number (See Slide 3 to check how many there should be)
- Building instructions are by bag number.

Bag Number
Element Overview
Prepack Overview
Bag 1
Bag 2
Bag 3
Bag 4
Bag 5



Sorting Can Save You Time

- Sort the parts in each bag into general part types so that they are easier to find (axles, liftarms, frames, pins, etc.)
- You can use LEGO sorting trays, paper plates, small bowls, box lids, trays, etc.
- This step will help find the right part you as you build



Elements in Bag 3 sorted before building

**Building
Efficiently and
Reliably**

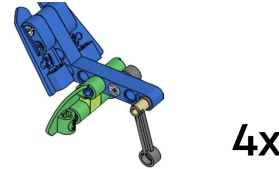
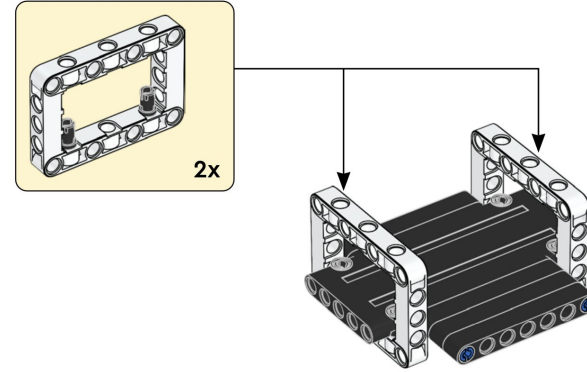
Build in Pairs

- Building in pairs or small groups works well.
- One person finds the parts for the step, one person puts the pieces together, and one person checks to make sure the step was done correctly.
- Change roles every few steps.



Multiplier Symbols

- Be sure to pay attention to the multiplier symbols (e.g. X2, X4) symbols at the start of a subset of instructions.
- You can save time by constructing them simultaneously.
- In MASTERPIECE, sometimes the multiplier symbol only shows up after you have built one copy.



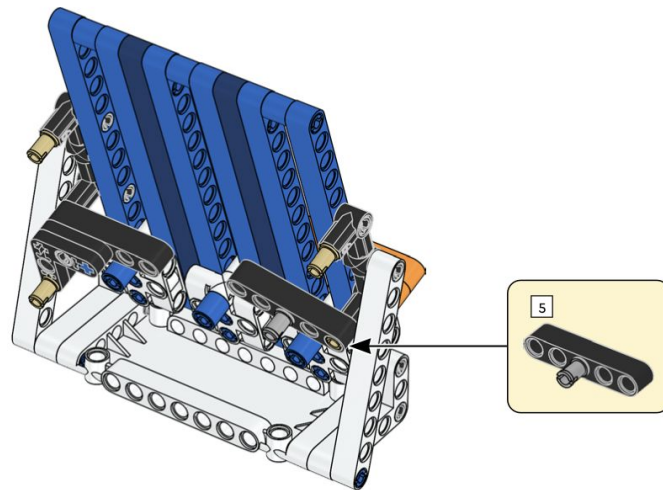
Follow the Instructions

- Take your time and always build exactly what the instructions tell you.
- Do not improvise or “improve” the model.
- Your model must look like and behave exactly the same way as the ones at the competition.



Check Your Work

- Have your coach or adult check the build or compare with another team's set if needed.
- Be careful and use the right part in the right step
- Common mistakes include:
 - Using the wrong length liftarm in a step (e.g. 11M instead of a 13M liftarm)
 - Using the wrong pin (friction vs. frictionless)



E.g. Using a black friction pin instead of a frictionless pin in this step will change how the model operates

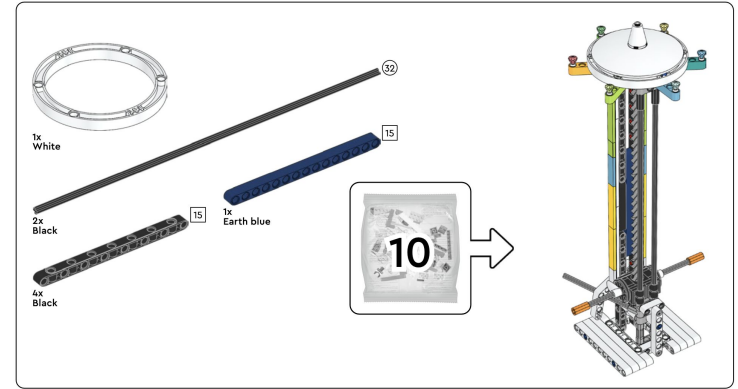
Some Models Take Longer to Build

- When splitting up the work, note that some models and bag numbers take a lot longer to complete than others.
- You can check ahead and see how many step numbers are in each build instruction and/or refer to this table with approximate build times for the MASTERPIECE season.

Bag No.	Time	Bag No.	Time
1	16mins	8	15 mins
2	20 mins	9	13 mins
3	30 mins	10	21 mins
4	6 mins	11	13 mins
5	20 mins	12	10 mins
6	35 mins	13	7 mins
7	15 mins	14	1 min

Unnumbered Bags

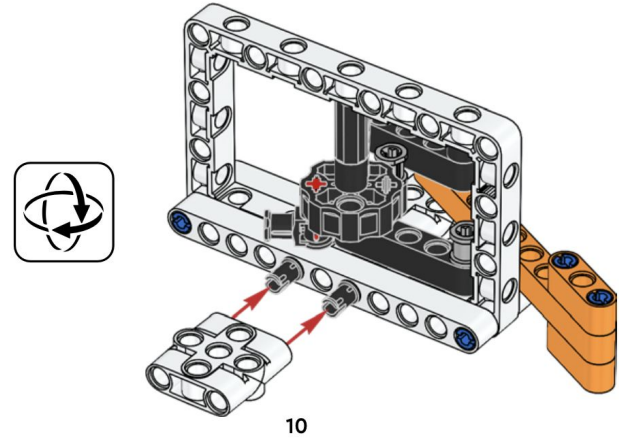
- Larger elements such as hoses, long axles, large frames, and 13M/15M beams are just loose in the box or in unnumbered bags. (M = LEGO Modules)
- Check the top of the instructions page for parts needed before you begin.
- **If you are trying to presort by mission model so that a student can take elements home and build, be sure you look for all the larger items in the unnumbered bags or loose items at the bottom of the box.**



**6 Elements in Unnumbered Bags
+ 2 Loose Items (black axles)
+ Everything in Bag 10**

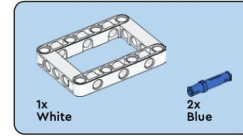
Flip Symbol

- The model sometimes requires flipping before the next element is added. Check before you add the pins/next element



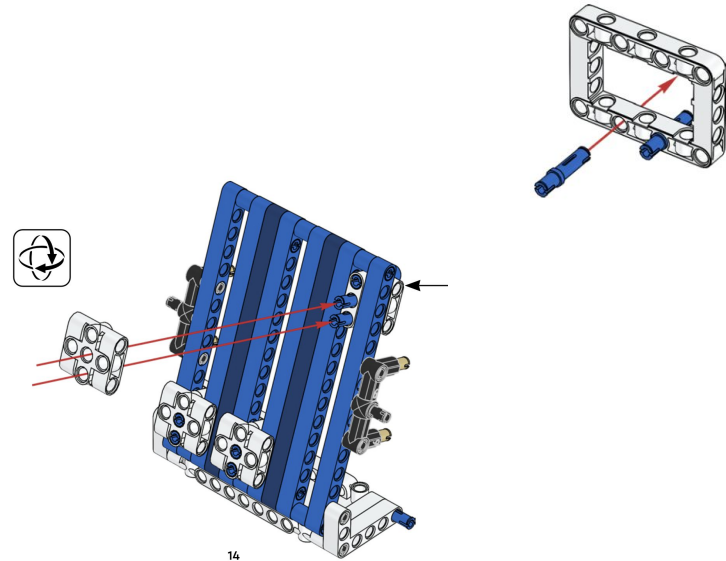
Arrows

- Sometimes instructions have arrows or show where one element is added.
- However, pay attention to how many items are in the blue box and look for them in the image.
- Pay attention to which pins/holes you need to use. It is easy to put a peg in the wrong hole.
- Sometimes there is no arrow indicator, but if you look closely, elements were added in the step.



11

In Step 11 you can see an arrow for 1 pin. However another pin was also added in this step



Setting Up the Mat

Setting up the Challenge Mat

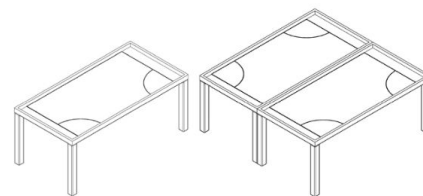
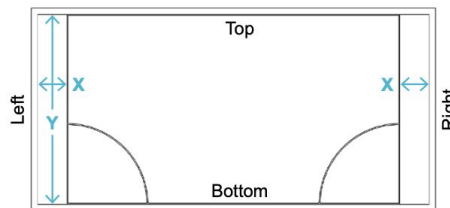
- Placement of the challenge mat is a very important step before placing the models on it.
- The rules for placement can vary every year (Check the Robot Game Rulebook and see image on right)
- The instructions will tell you how far East-to-West and North-to-South the mat should be placed relative to the table.

Field Mat Placement

1. Check the table surface for bumps. Sand or file them away and then vacuum well.
2. On the vacuumed table only, unroll and place the mat as shown below. Never fold the mat, and never crush or bend a rolled mat.
3. Slide the mat against the bottom border wall and align it centrally. There should be no gaps except for one at

the top wall of about 1/4 in. (6 mm). When table size and mat placement are correct, the areas to the left and right of the mat each measure about $X = 6.75$ in. by $Y = 45$ in. (171 mm by 1,143 mm).

4. Optional – To hold the mat in place, you can use thin strips of black tape, covering only the mat's left and right borders.



Practice setup

Tournament setup

Setting up the Models

- Place finished models loosely on the challenge mat.
- Be sure to follow the text and images in the Field Setup section of the Robot Game Rulebook very carefully. They will tell you which way a model should face.
- Use the markings on the challenge mat itself as alignment points. If it doesn't align, it is probably an indication of something wrong with the build itself.



Watch: <https://youtu.be/m6L7fs3mu9w>

Pressing Models into Place

- Once everything looks correct, follow the set-up instructions to place the dual-lock (square with X) on the Challenge mat as shown in the Robot Game Rulebook.
- Press the models down in place holding and pressing as close to the dual lock as possible.
- Not all models will need to be dual-locked. Some will stay loose on the markings on the mat.

3M™ DUAL LOCK™ RECLOSABLE FASTENER PLACEMENT



You will find sheets of Dual Lock™ squares in your Challenge set to secure the models to the mat. Dual Lock is an important part of field setup. If the models are not secured properly, you will have difficulty completing the missions.

SECURING MODELS – The squares on the mat with the X inside show where to apply the Dual Lock. Use the Dual Lock as shown in this example and be very exact. When pressing down a model, press on its base instead of pressing from higher up, which might crush the model. To remove the model from the mat, lift it from its base to separate the Dual Lock.

Watch: <https://youtu.be/m6L7fs3mu9w>

Packing Away Models

- You can pack up and put away your challenge set if you need to. The models are generally very durable
- Remove models from as close to the dual lock as possible.
- One side of the dual lock should come off with the model. The other side stays on the mat.
- Place all smaller items such as minifigures in ziplock bags so that you do not lose the accessories

Common Questions and Issues

Leftovers

- There are always some small leftover elements
- The image on the right shows all the leftover elements once you have placed all your models on the mat
- There should be no large elements left over
- Bag 4 of MASTERPIECE contains a lot of extra LEGO bricks that are used in Mission 04 (MASTERPIECE)

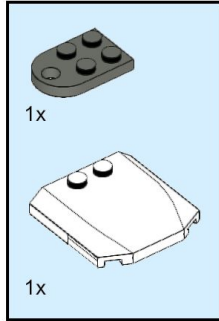


No Build Instructions

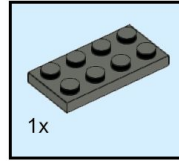
- No build instructions for a bag number simply means the bricks are used in some other way
- Bag 15 contains team souvenirs (badges, tiles and precision tokens)
- See next slide for instructions



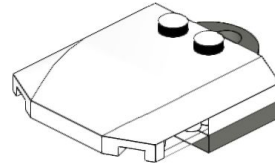
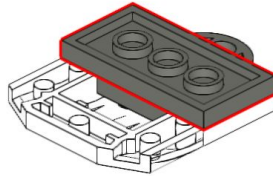
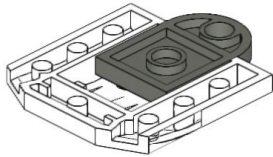
1



2



3



Missing Items

- It is very uncommon to be missing a LEGO element or a whole bag.
- Can't find a small part?
 - Check the bags, check the ground, and check to see that the element was not used earlier in another step by mistake.
- Can't find the Dual-lock?
 - Check the box again - it tends to blend in with the cardboard
- Can't find a larger item?
 - Check the unnumbered bags or bottom of the box.

To prevent losing elements, make sure that you empty the bags of LEGO on to a tray or container of some kind rather than on the floor or table.

Missing Items

- If you really can't find an item, call LEGO for help: 1-800-422-5346 (USA/CAN) or 00800 5346 5555 (International), You can also visit the missing parts/customer service page of the LEGO website
- You will need to know the set number (45823) and the part you need. The Element Overview document in the Building Instructions section will tell you the part number.



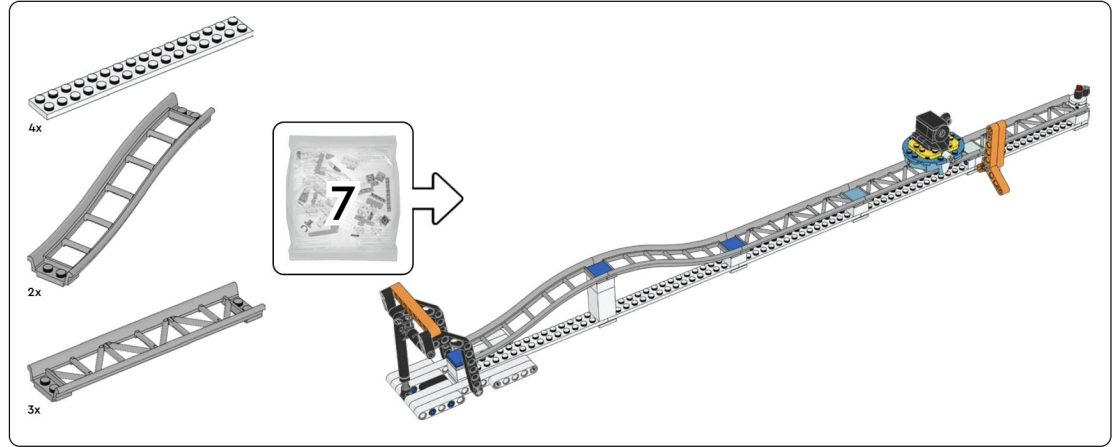
- Bag Number
- Element Overview
- Prepack Overview

Grey		Lime green	Transp. blue	Earth blue	Orange	Bright bluish green
5x 4231015	1x 4380465	2x A540203	2x 4070559	1x 4398255	7x 4384953	1x 4329195
2x 4282158	1x 4502295	2x 6454026	1x 4042793	1x 4251377	7x 4102418	1x 4270179
2x 6455168	1x 4217815	1x 4446536	2x 4238043	1x 4275889	1x 6547162	1x 4310580
10x 4311453	1x 4238962	2x 6185471	2x 4308236	1x 4307763	7x 4320158	1x 4363427
2x 4211998	3x 4231767	2x 6273713	1x 4233106	1x 4500211	7x 6454723	1x 6233477
4x 4317395	4x 6271629	2x 4319270	2x 6425490	1x 6347795	2x 6454185	1x 6254100
2x 6278484	2x 4217805	2x 6263462	1x 6456813	1x 6413028	6x 6444697	1x 6454100
4x 4214149	2x 6178172	2x 4167465	2x 4365602	1x 6264642	8x 6360758	1x 4314611
1x 4794434	1x 4377864	2x 4347985	1x 6259145	1x 4392268	1x 4310064	1x 4000752
1x 4377864	3x 6185380	1x 4368818	1x 6454729	1x 4327777	1x 4315083	1x 6454496
2x 6298859	2x 6176437	2x 4355751	1x 4307963	1x 4253463	2x 4274860	1x 4274993
1x 4211807						
9x 4348924						

Issues Specific to This Season

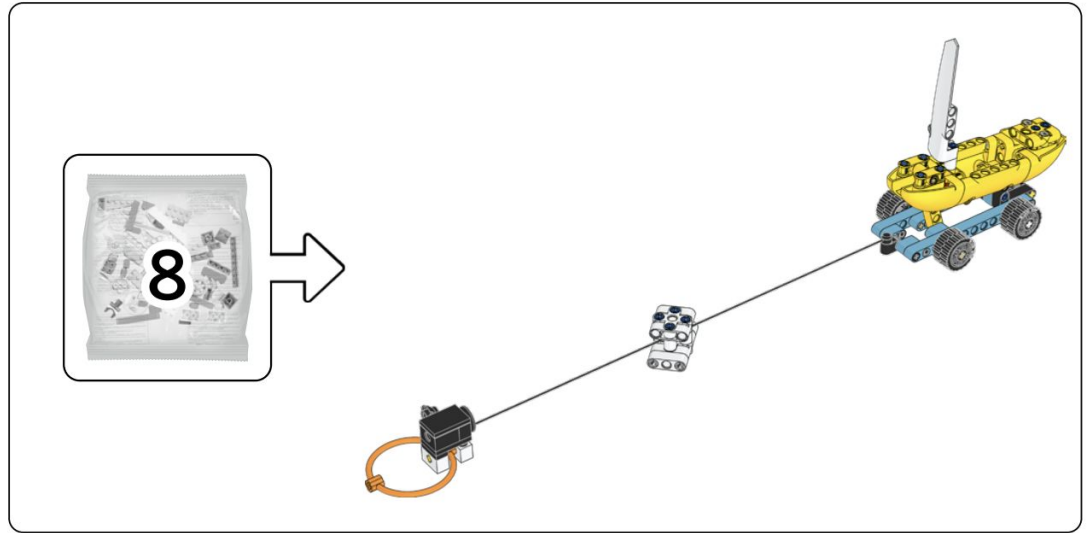
Bag 7 Errors

- It says you need four 2X16 white plates from the unnumbered bag, but you need 5 to build the model.
- The opening page also forgets to mention that you need two 13M lift arms in white from the unnumbered bags.



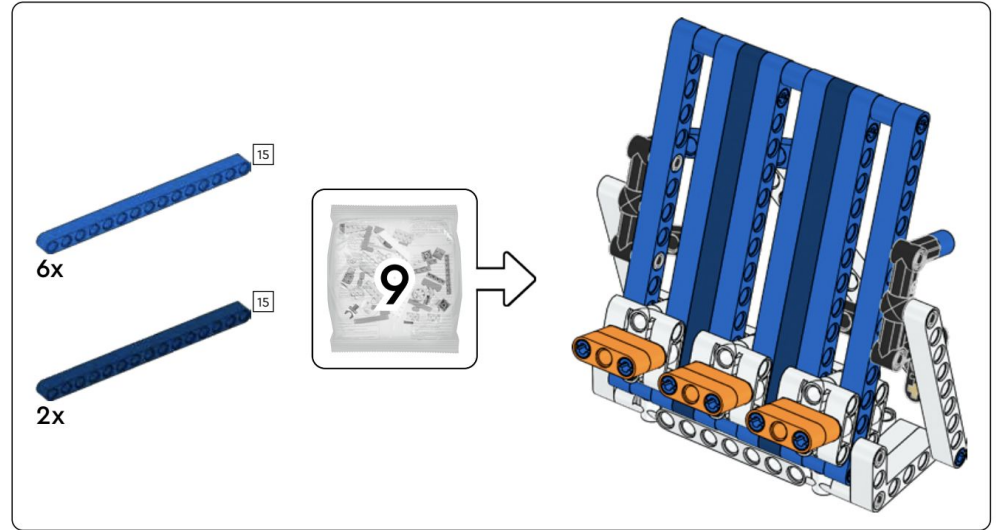
Bag 8 Errors

- Opening page of instructions fails to mention you also need 2 13M light blue liftarms from the unnumbered bags.



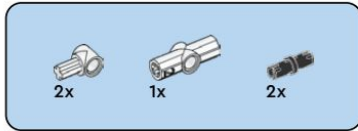
Bag 9 Error

- Opening page of the instructions did not indicate you need a 13M from an unnumbered bag.



Bag 11 Error

- Step 12 points to the wrong part of the model. Be careful.



12

