

Building Mission Models

for *FIRST* LEGO League Challenge



Getting Organized

Sort Your Bags by Number

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

2 loose black axles

1 sheet of 3M Dual Lock

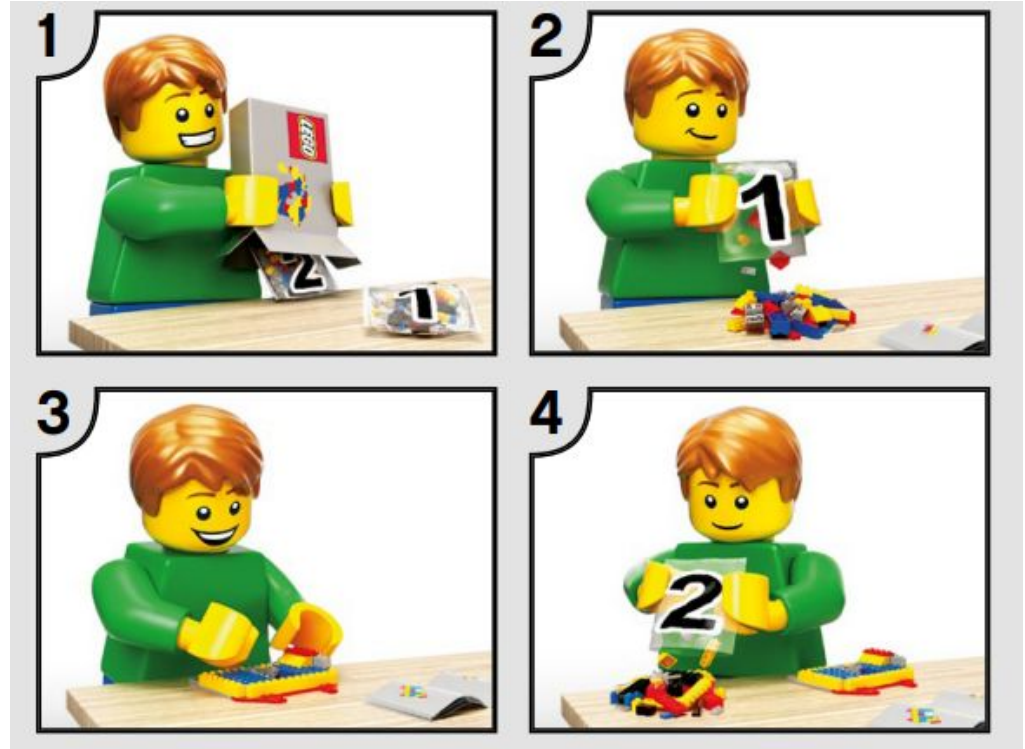
1 rolled up Challenge Mat



Photo Credit: Sharon Tiger Techs

Open and Sort by Number

- Only open the bags that are needed for each model (instruction) in the order identified.
- Do not open all bags at once as it will make it much harder to find the correct element.



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 part you need as you build



E.g. Elements from a bag sorted before building

**Building
Efficiently and
Reliably**

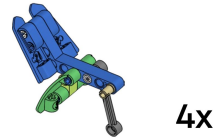
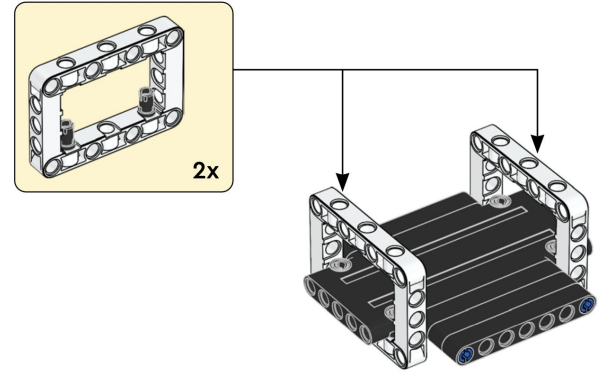
Build in Pairs

- 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. 2x, 4x) symbols at the start of a subset of instructions.
- You can save time by constructing them simultaneously.
- Sometimes the multiplier symbol only shows up after you have built one copy.



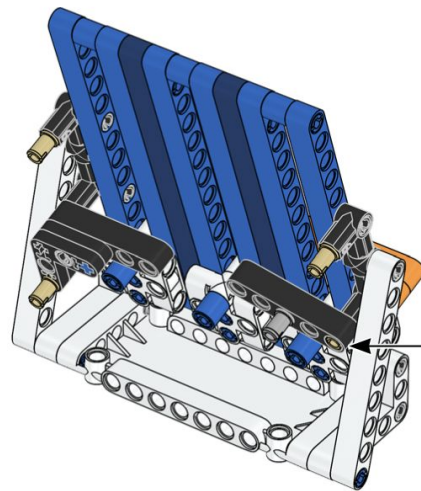
Follow the Instructions

- 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.

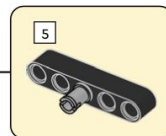


Check Your Work

- 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)



TIP: LEGO Technic is measured in "Modules". The "5" in this image means 5 Modules - it has 5 holes

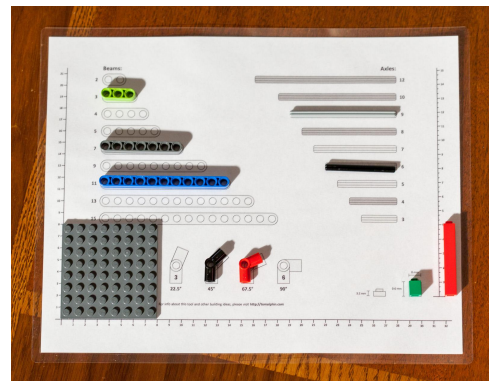
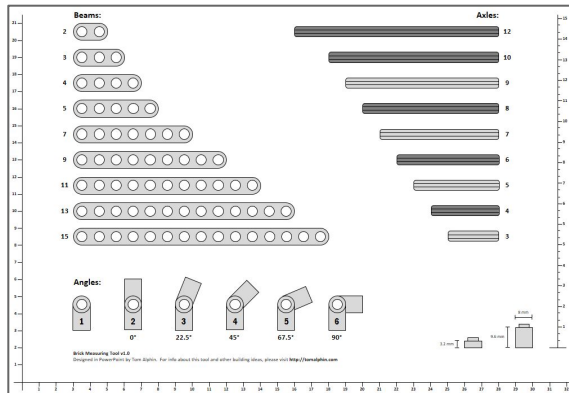


TIP: Pay attention to the color of the pins. This is light grey frictionless pin.

Use the Right Length/Angle

If your team members have trouble identifying the right lengths, consider printing out this free LEGO ruler:

<http://tomalpin.com/2014/02/lego-ruler-and-sorting-tool.html>



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 SUBMERGED season.

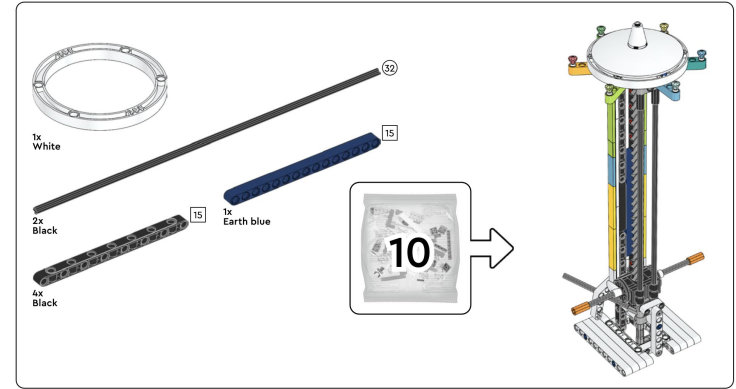
Will be updated in August 2024

Model No.	Time	Model No.	Time

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.

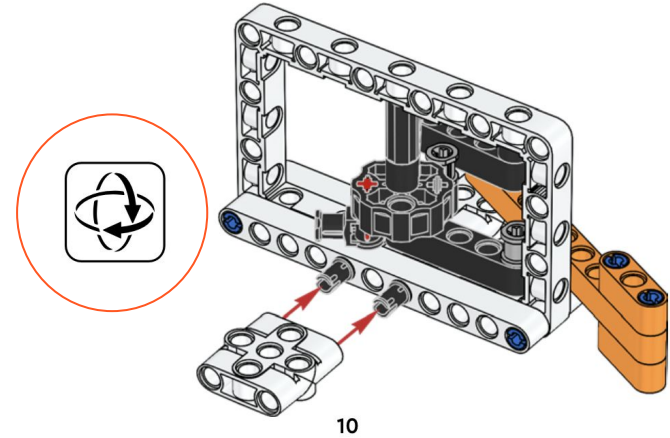
TIP: If you are trying to presort by mission model so that a student can take elements home and build, be sure you look for all the larger items in the unnumbered bags or loose items at the bottom of the box.



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

Flip Symbol

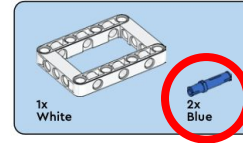
- The model sometimes requires flipping before the next element is added. Check before you add the pins/next element



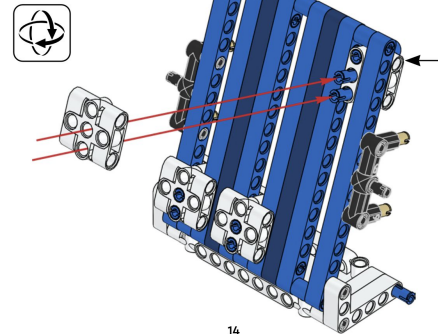
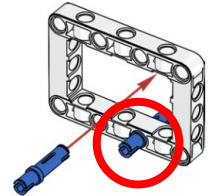
Arrows

- 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.

In Step 11 you can see an arrow for 1 pin. However another blue pin has already been inserted in this step



11



14

Setting Up the Mat

Setting up the Challenge Mat

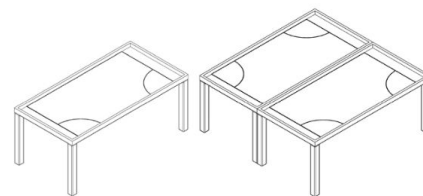
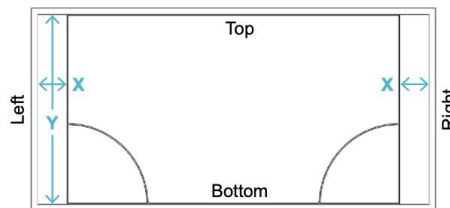
- Placement of the challenge mat is a very important step before placing the models on it.
- The rules for placement can vary every year (Check the Robot Game Rulebook and see image on right)
- The instructions will tell you how far East-to-West and North-to-South the mat should be placed relative to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

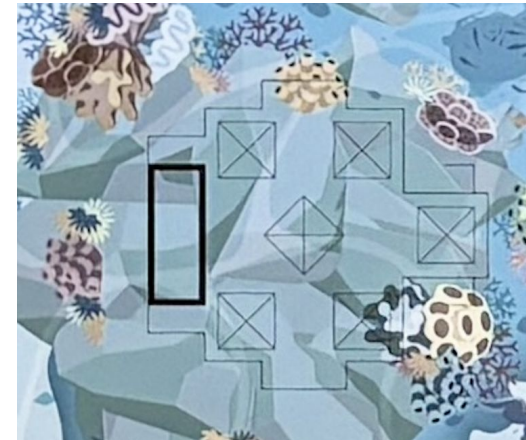


Practice setup

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.



Pressing Models into Place

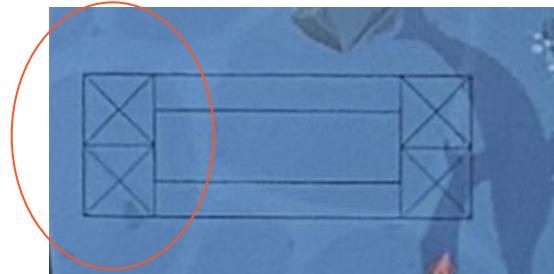
- Once everything looks correct, follow the set-up instructions to place the dual-lock (square with X) on the Challenge mat as shown in the Robot Game Rulebook.
- Press the models down in place holding and pressing as close to the dual lock as possible.
- Not all models will need to be dual-locked. Some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



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

Should I glue or lubricate the models?

- Do not glue (permanently or temporarily) any models even if they tend to “fall apart”
- Do not lubricate any models that seem hard to activate
- You should not make models behave differently than the ones at your competition
- If models are not acting as intended, press elements together and/or rebuild the model.
- Until FIRST issues an official update, do not deviate from official build instructions.



Is my model operating correctly?

- You can compare your model with another local team's models.
- If it does not look and behave in the same way, rebuild your model.



Leftovers

- There are always some small leftover elements
- The image on the right shows all the leftover elements from every bag number once you have finished building the models
- There should be no large elements leftover

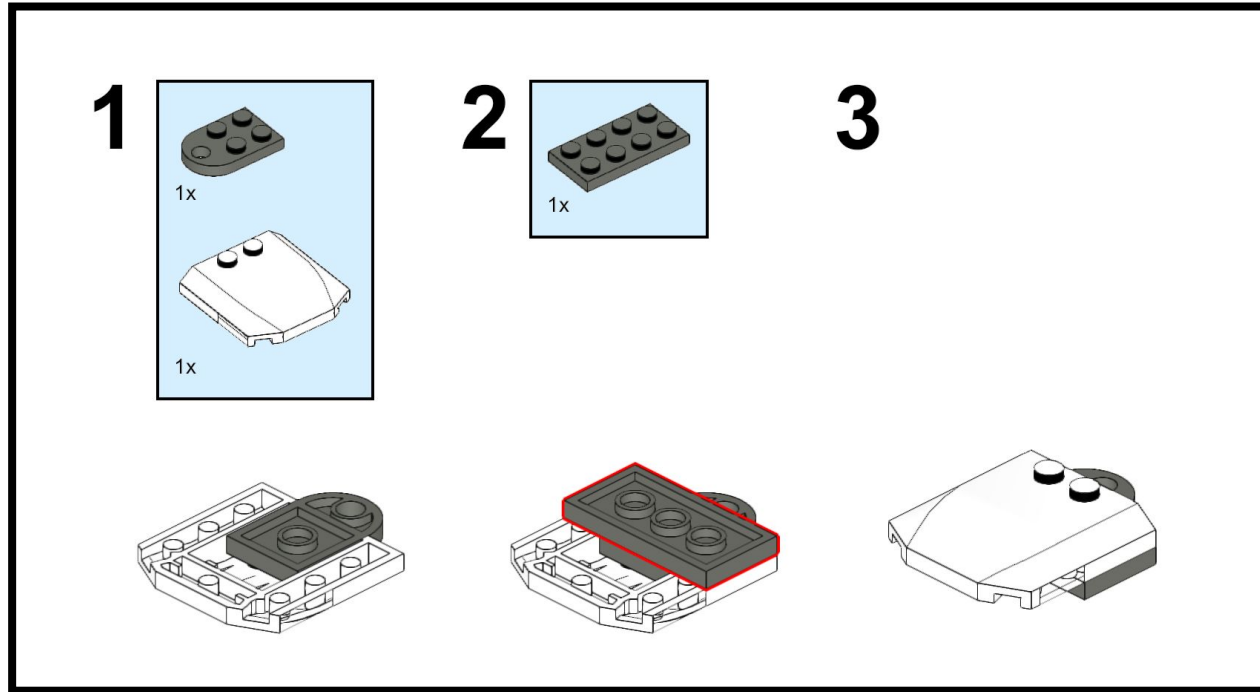
Update coming in August 2024

No Build Instructions

- No build instructions for a bag number simply means the bricks are used in some other way
- Bag 33 contains team souvenirs (badges, tiles) as well and 6 precision tokens which are used by the referee (see Robot Game Rulebook).
- See the next page for building instructions for the badges.



Build Instructions



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.

Tip: 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 (45826) and the part you need. The Element Overview document in the Building Instructions section will tell you the part number.



Issues and Tips Specific to SUBMERGED