FIRST® LEGO® League Challenge UNEARTHED™ Building Instructions

Build 3: Map Reveal

This build is 76 pieces, and 37 building steps.

Welcome to text-based instructions from Bricks for the Blind. Before you start building, here are some terms we'll be using:
- In Front of/Front: towards you.
- Behind/Back: away from you.
- Up: towards the ceiling.
- Down: towards the floor.
- Stud: the bump on a LEGO brick. Example: A 2x1 brick has two studs on it.
- Vertically: going from front to behind.
- Horizontally: going from left to right.
- Upright: pointing up towards the ceiling.
- That one/ppp: previously placed piece.
- Plate: piece with studs.
- Tile: smooth piece without studs (unless otherwise specified)
- Symmetrically: a mirror image. Example: If you place a 2x1 brick with technic connector on the front wall at the right, connector to the front, and then place another such piece symmetrically on the back wall, at the right, the technic connector of the second piece should point to the back, since it will be placed symmetrically.
- Centered-vertically: even amount of space in front of and behind the piece
- Centered-horizontally: even amount of space left and right of the piece.
- Row: studs lined up horizontally (left to right/side to side).
- Column: studs lined up upright or vertically (top to bottom/back to front).
- Standing upright: the piece is perpendicular to the ground, like a wall.
- Lying flat: the piece is parallel to the ground, like a piece of toast which fell off the table.
- Anti-stud: the portion of a piece which accepts studs, like the bottom of a plate.
- Jumper plate: a 1x2 plate with a single stud on top, or a 1x3 plate with only two studs on top.

A note on LEGO Technic™ part names. These parts are somewhat different from regular LEGO bricks. Here are some definitions in case the builder or helper is not familiar with LEGO Technic™.

Axles - An axle is a connector which has an X shaped cross-section. Because their cross section is not round, anything connected to an axle using an axle-hole will rotate with that axle. Axles are longer than they are wide, and the length of an axle corresponds with how many bricks long it is. Aka a 3L axle is three bricks long. Axles come in a variety of lengths, with a 2L axle being the shortest available. They may be combined with pins, or have circular stops on them. A stop prevents the axle from sliding through an axle-hole at a specific point on the axle.

Pins - A pin is a connector which has a circular cross section and a flanged notch out of one or both ends. This flanged notch allows them to click into bricks with a pin-hole. Pins come with and without friction ridges, which are small bumps on the pin which prevent them from rotating freely. For standard pins, black is a high friction pin, and gray is a low friction pin. A standard length pin is two brick lengths long, with a stop in the middle. This prevents a brick from being pushed from one side of the pin to the other. A 1L pin is one brick long and still retains the stop, however it also includes a hollow stud at the other end. A 3L pin is three bricks long, and only contains a stop at one side, allowing two bricks to be pushed onto the other side of the pin. Pins may also have one side which is an axle.

Lift-arms - A lift-arm is a basic structural element, similar to a brick or a plate, but usually without any studs. It is a beam with rounded ends and with holes in it, with the same spacing as the studs on a LEGO brick. lift-arms come in a variety of lengths, including a 1x1 lift-arm which looks like a cylinder. Thick lift-arms are as wide as a LEGO brick, and thin lift-arms are half as wide as a LEGO brick, but not the same thickness as a LEGO plate! The holes in a lift-arm arm may accept axles or pins. They also come in a variety of shapes, including tees, ells and triangles.

Gears - A gear is a functional element. They are typically discs with teeth on the outside, there are also worm gears which look like a spiraling cylinder! Gears connected by axles transmit or even transform rotational motion!

Axle and Pin Connectors - These elements are typically smaller than lift-arms and are used to connect some combination of pins or axles. They might have pins or axles, as well as axle or pin-holes. They have a lot of different angle combinations! The simplest just connects two axles or pins together in a straight line.

Bushes/Bushings - LEGO Technic™ uses bushes largely as spacers, but they also can reduce friction between rotating parts, or can form useful elements such as handles. Bushes are typically light gray, generally cylindrical, and have an axle-hole running through the middle. They have a flange at the front and back to make them easier to pull on and off.

Technic™ Bricks and Plates – There are also regular bricks and plates that are adapted for use with Technic™ elements. Technic™ bricks have holes for either pins or axles on the sides and are only one brick wide. One of the most common of these is a 1x2 brick with a single pin hole. Most often, these bricks have pin holes, not axle holes. Technic™ plates have holes on the flat surface between the studs and are a minimum of two bricks wide. The holes in these plates can accept pins or can allow an axle to pass through and still spin.

For builders with low vision, or a sighted building partner who may want to follow along with the printed visual instructions that come with each set. As low vision users may benefit from viewing the instructions on a personal device where they can zoom in on content and use assistive technologies to enhance the visuals.

Sorting Instructions:

This LEGO set comes in the bag labeled 5 and some large pieces from bag 0. Sort the pieces into groups as described below. Note that where there are multiple colors of the same brick in a step, the colors will be split across two groups to make telling the difference easier for the builder! LEGO includes a few spare parts in case you lose something. Set these into their own group away from the rest, in case you need them later.

Build 3
Group A contains all of the black 2L pins from this bag. These pins have friction ridges.
Group B contains all of the blue 3L pins from this bag. These pins have friction ridges.
Group C contains all of the blue 2L axle/pin combos from this bag. These pins have friction ridges.

Bag 5 (5 groups of bricks)
Main Build
Group 1 contains the pieces for steps 1-10. Include a lime green 7x11 hollow frame from bag 0.
Group 2 contains the pieces for steps 11-15. Include two lime green 7x11 hollow frames from bag 0.
Group 3 contains the pieces for steps 16-21.
Group 4 contains the pieces for steps 22-28.
Group 5 contains the pieces for steps 29-37. Include a green 6x10 plate from bag 0. Stack all of the round plates in this group in this order, from top to bottom: pink with a flower pattern, orange with a flower pattern, brown, blue, tan. Also stack the two blue 1x2 plates with rounded ends from step 32, but leave the brown one loose.

Building Instructions:

Groups B, C and 1. You will use the pins from groups A, B and C throughout the build.

Main Build

1.1. We'll start by building a frame. Place a light green 7L liftarm vertically in front of you with the holes facing left and right.

1.2. Push a black 2L pin from group A, from the right, into the second hole from the front of the previous piece. Repeat symmetrically on the front side.

2. Find a light green 7x11 hollow frame. This looks like two 11L liftarms connected by two 7L liftarms, forming an open rectangle. Rotate this frame so the 11L liftarm sides are at the front and back and the 7L liftarms are on the left and right. Push the front and back holes on the left side of this piece, from the right, onto the pins from the previous step.

3.1. Now we'll make a couple of spacers for the corners! Push a blue 3L pin from group B, with the stop ring on the left, from the left into a light gray 1L liftarm. Recall that a 1L liftarm looks like a hollow cylinder. Push the pin all the way through so it extends 1L past both sides of the 1L liftarm.

3.2. Repeat step 3.1.

3.2. Rotate one of the spacers so it is upright with the pins extending up and down. Push the pins into the corner holes on top of the back row of the 7x11 hollow frame.

4.1. Now we're going to make some grass. Set the frame aside for now. Place a green 6x6 plate in front of you.

4.2. Place a green 1x2 tile, horizontally on the left two and right two studs on the front row of the previous piece. Repeat symmetrically on the back side.

5. Keeping the tiles on the front and back rows, flip the 6x6 plate upside down. Find the small circles which are now on top of the 6x6 plate. These are anti-studs which are offset from the normal anti-studs. There are five rows of five of these circular anti-studs. Place a tan 3x3 plate, upside down, centered horizontally and vertically on the circular anti-studs.

6.1. Place the left stud of a dark gray 2x2 corner brick, upside down with the corner at the back right so the studs form a braille letter D, on the circular anti-studs behind the right column of the previous piece.

6.2. Find a dark gray 5x5 technic right angle brick. This piece has two 1x4 technic bricks connected at one corner. Rotate this piece so it is upside down with one 1x4 technic brick vertically on the left and the other horizontally at the front pointing to the right. Place this piece on the front row and leftmost column of circular anti-studs so it is in front of and to the left of the 3x3 plate.

7.1. Flip the 6x6 plate rightside up so the 2x2 corner brick is at the front right under the 6x6 plate. Place a red 2x2 slope brick, with the slope on the right, centered vertically on the leftmost two columns of the 6x6 plate.

7.2. Place a light gray 1x1 slope tile, with the tall side at the back, in front of the left column of the previous piece.

8. Place a light gray 1x2 slope brick, horizontally with the slope on the right, to the right of the previous piece.

9.1. Skip one stud to the right and place a green 1x1 round plate with three leaves, with the leaves pointing to the back. This should be behind a 1x2 tile.

9.2. Place a pink 1x1 round plate with a flower pattern on the previous piece.

10. Place the frame back in front of you, horizontally with the upright pins on the back row. Set the grass assembly, in the same orientation we built it, on the frame. The bricks on the bottom go between the liftarms. The location of the grass in the frame doesn't matter. The grass doesn't actually attach to the frame and can slide left and right.

Group 2.

11. Find a light gray 11L liftarm with perpendicular holes. This looks like a normal 11L liftarm, except that every hole is perpendicular to its neighbors. Push this piece, horizontally with the smooth sides at the front and back, from the top onto the pins on the back row of the frame. The grass assembly should be able to slide smoothly left and right.

12.1. Place a light gray 2x4 L-shaped liftarm, with the short leg upright on the right and the long leg at the bottom pointing horizontally to the left, in front of you.

12.2. Push a light gray 2L pin, from the back, into the second hole from the left on the bottom row of the previous piece. This pin does not have friction ridges and should spin freely.

12.3. With the grass assembly slid all the way to the right, push the pin from the previous step, from the front, into the rightmost hole of the 11L perpendicular liftarm from step 11. The L-shaped liftarm must have the short leg upright on the right and the long leg at the bottom pointing horizontally to the left or it will interfere with the grass assembly.

13.1. Place a light gray 5L liftarm vertically in front of you with the holes facing left and right.

13.2. Push a black 2L pin from group A, from the left, into the second hole from the front of the previous piece. Repeat symmetrically on the right side.

13.3. Rotate this assembly so it is vertical with the pins pointing down. Push the pins into the front two holes on the rightmost column of the 7x11 hollow frame from step 1.1.

14. Push a black 2L pin from group A, from the right, into the front and back holes on the right side of the 7x11 hollow frame.

15.1. Now we'll attach another frame. Place a light green 7L liftarm vertically in front of you with the holes facing left and right.

15.2. Push a black 2L pin from group A, from the right, into the second hole from the front of the previous piece. Repeat symmetrically on the front side.

15.3. Push the front and back holes of a light green 7x11 hollow frame, with the 11L liftarm sides at the front and back and the 7L liftarms on the left and right, from the right onto the pins from the previous step.

15.4. Rotate this assembly 90 degrees clockwise so the 7L liftarm is at the back. Push the front two holes on the left side of the previous piece, from the right, onto the two pins on the right side of the first hollow frame. We now have an L-shaped frame.

Group 3.

16.1. Now we'll build another frame. Set the L-shaped frame aside for now. Place a light green 7x11 hollow frame, with the 11L liftarm sides at the front and back and the 7L liftarms on the left and right, in front of you.

16.2. Push the pin side of a blue 2L axle/pin combo from group C, with the axle at the top, from the top into the front left corner hole of the previous piece.

16.3. Push a light gray 2L pin, from the top, into the back right corner of the 7x11 hollow frame. This pin does not have friction ridges so it should spin freely.

17.1. Place a light gray 1x1 technic brick, with the holes facing left and right, in front of you.

17.2. Push a black 2L pin from group A, from the left, into the hole of the previous piece.

17.3. Repeat steps 17.1-17.2.

17.4. Push the pin of one of the assemblies we just made, from the right with the studs at the top, into the front hole on the right side of the left 7L liftarm on the 7x11 hollow frame. To do this, you'll have to push it from the inside of the hollow frame. Repeat symmetrically on the back side.

18.1. Push a red 3L axle connector, with the axle holes on the top and bottom, from the top onto the axle sticking up from the front left corner of the 7x11 hollow frame.

18.2. Push a black 2L axle into the top axle hole of the previous piece.

18.3. Push a red ball onto the previous piece.

19. Place a green 1x6 plate, vertically and centered vertically, on the studs of the two 1x1 technic bricks we attached in step 17.4.

20. Place a pink 1x1 round plate with a flower pattern on the second stud from the back on the previous piece.

21. Place the L-shaped frame in front of you, with the longer side at the front pointing to the left and the shorter side on the right pointing to the back. Find the 5L liftarm which extends 1L to the front of the L-shaped frame. Push the pin sticking up from the back right corner of the frame we just finished, from the bottom, into the front hole of this liftarm. This frame should be free to rotate when it's attached.

Group 4.

22.1. Now we'll build some more grass. Set the frames aside. Place a green 6x8 plate horizontally in front of you.

22.2. Place a green 1x2 tile, horizontally on the left two and right two studs on the front row of the previous piece. Repeat symmetrically on the back side.

23. Keeping the 6x8 plate horizontal, flip it upside down. Place a tan 3x3 plate, upside down, centered horizontally and vertically on the circular anti-studs of the 6x8 plate.

24. Place a dark gray 5x5 technic right angle brick, upside down with one 1x4 technic brick vertically on the left and the other horizontally at the back pointing to the right, on the back row and leftmost column of circular anti-studs of the 6x8 plate.

25. Place a dark gray 5x5 technic right angle brick, upside down with one 1x4 technic brick vertically on the right and the other horizontally at the front pointing to the left, on the front row and rightmost column of circular anti-studs of the 6x8 plate.

26.1. Keeping it horizontal, flip the 6x8 plate rightside up. Place a green 1x1 round plate with three leaves, with the leaves pointing to the left, on the third stud from the front of the third column from the left of the 6x8 plate.

26.2. Place a green 1x1 round plate with three leaves, with the leaves pointing to the right, on the third stud from the back of the third column from the right of the 6x8 plate.

27. Place an orange 1x1 round plate with a flower pattern on the previous piece.

28. Place the frame in front of you so the rotating 7x11 hollow frame is at the front and the L-shaped frame is at the back with the longest leg horizontal. Rotate the rotating hollow frame clockwise as far as it will go. Find the 1x6 plate on this frame. It should be vertically on the left. Set the grass assembly we made inside the hollow frame to the right of the 1x6 plate. It will not connect to any studs.

Group 5. This group has a stack of 1x1 round plates, a stack of 1x2 plates with rounded ends, and a loose 1x2 plate with rounded ends.

29.1. Now we'll build the last grass assembly. Set the frame aside for now. Place a green 6x10 plate horizontally in front of you.

29.2. Place a green 1x2 tile, horizontally on the left two and right two studs on the front row of the previous piece. Repeat symmetrically on the back side.

30.1. Place a red 2x2 round plate, centered vertically and horizontally on the 6x10 plate.

30.2. Place a green 1x1 round plate with three leaves, with the leaves pointing to the back, on the third stud from the front on the third column from the right of the 6x10 plate.

30.3. Take the top round plate from the stack of 1x1 round plates. This is a pink 1x1 round plate with a flower pattern. Place this behind the right stud of the left 1x2 tile on the front row of the 6x10 plate.

30.4. Take the next plate from the top of the stack of 1x1 round plates. This is an orange 1x1 round plate with a flower pattern. Place this on the second stud from the back on the third column from the left of the 6x10 plate.

31. Keeping the flowers on the left side of the 6x10 plate, flip the grass upside down. Place a dark gray 5x5 technic right angle brick, upside down with one 1x4 technic brick vertically on the left and the other horizontally at the back pointing to the right, on the back row and leftmost column of circular anti-studs of the 6x10 plate.

32.1. Find the loose brown 1x2 plate with rounded ends and place it, upside down and vertically, in front of the second anti-stud from the right of the previous piece.

32.2. Take the next stud from the stack of 1x1 round plates. This is a brown 1x1 round plate. Place this, upside down, to the left of the front stud of the previous piece.

32.3. Take one of the 1x2 plates with rounded ends off of the stack. The plates in this stack are blue. Place this, upside down and horizontally, on the second and third anti-stud from the right on the second row of circular anti-studs from the front of the 6x10 plate.

32.4. Skip one anti-stud to the left and place the next round plate, upside down, from the stack of 1x1 round plates. This is a blue 1x1 round plate. There should only be one 1x1 round plate left.

32.5. Place the right stud of the last blue 1x2 plate with rounded ends, upside down and horizontally, behind the left stud of the first blue 1x2 plate with rounded ends from step 32.3.

32.6. Place the last 1x1 round plate, upside down, on the third anti-stud from the right on the back row of circular anti-studs on the 6x10 plate. This plate is tan.

33. Place a dark gray 5x5 technic right angle brick, upside down with one 1x4 technic brick vertically on the right and the other horizontally at the front pointing to the left, on the front row and rightmost column of circular anti-studs of the 6x10 plate.

34. Keeping the 6x10 plate horizontal, flip it rightside up with the two 1x1 round plates with flower patterns on the left. Place a red 2x2 round tile with a stud on top on the 2x2 round plate on top of the 6x10 plate.

35. Find a light gray pneumatic tee. Rotate this so the long side is on the top pointing left and right and the stem of the tee is pointing down. Push the stem into the hollow stud of the previous piece.

36. Find a silver 22L flexible hose. This hose has a small loop at each end. Push one of these loops onto each of the ends of the tee. The hose should form a loop, rotate this loop so it is straight up and down like the handle of a bucket.

37. Place the frame in front of you so the rotating 7x11 hollow frame is at the front and the L-shaped frame is at the back with the longest leg horizontal. Rotate the grass assembly we just made so it is vertical, with the two 1x1 round plates with flower patterns at the front. Set it inside the vertical hollow frame on the right side of the frame assembly. Once again, it will not connect to any studs.

Congratulations! Now this build is complete!

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