

FIRST® LEGO® League Challenge SUBMERGEDSM Building Instructions

Build 4: Scuba Diver

This build is 8 pieces, and 4 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 the pieces:

Sorting Instructions:

This LEGO set comes in the bag labeled 8. There is no need to sort the bricks for this build.

Build 4

Open bag 8.

1.1. Build the scuba diver minifigure. This minifigure has a black wetsuit and black gloves. He also wears black diving gear. Build the minifigure by placing the legs in front of you with the feet pointing to the front. Then put the torso on the legs so the elbows point away from you when the arms hang down.

1.2. Find the diving gear. This has a 2x2 pattern of studs on one side with a bracket hanging off one of the sides. This bracket has a hole through the middle. Slide this hole over the neck stud so that the studs hang down on the minifigure's back. Finish the minifigure by putting the head on the torso. There is no tactile way to distinguish the front of the head from the back, so you may want to ask a sighted person for help align the face properly

2.1. Assemble the diving helmet by clipping the C shaped mask over the front opening on the helmet. If you hold the helmet so the big hole is at the bottom, and the front opening is at the front, the snorkel on the mask should be on the right. Keeping the mask at the front, put the helmet onto the minifigure's head.

2.2. Finally, put the swim fins on the minifigures feet so that they point forwards.

3. Now we'll give the diver a sea creature to hold. Find a dark purple plant flower stem with a bar and six stems. This has a short bar on one side and six long stems. Push the short bar of this piece, with the stems pointing up, into one of the diver's hands. This might be a piece of coral, or an anemone!

4.1. Now we will make a big loop which attaches to the diver's back so he can be hung onto some of the other builds. Find a black 7x7 ring with two 1L axle connectors. This piece is a large ring which has two axle connectors opposite each other. Place this piece in front of you so the axle connectors are on the left and right.

4.2. Push a brown 3L axle with an end stop, with the stop on the left, from the left through the right axle hole on the previous piece. You'll have to put this piece inside the right to push it through the right axle hole. Push it all the way until it stops.

4.3. Push a black 1x2 brick with an axle hole, with the axle hole facing left and right, from the right onto the previous piece so the studs face up. Push it all the way so the axle extends 1L past the brick.

4.4. Now place the diver in front of you, standing upright and facing you. Rotate the ring so the 1x2 brick is at the bottom with the studs pointing away from you. Push the brick onto the top row of studs on the back of the diver.

Congratulations! Now this build is complete!

Thank you so much for building this set!

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