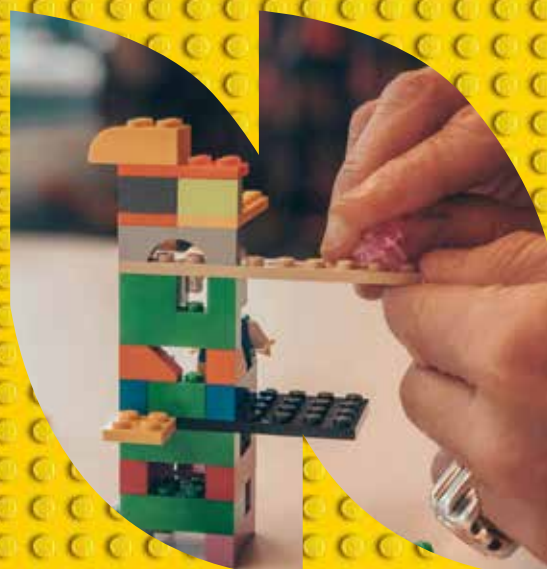


**Illinois
Extension**



Illinois 4-H



CREATING WITH BUILDING BRICKS PROJECT RESOURCES





WELCOME

Welcome to the Creating with Building Bricks project! Plastic building bricks, like LEGO®, MEGA BLOKS®, and others have been a favorite toy of people around the world since the mid-1900s¹. The variety of brick types available and the way the bricks interlock to connect with each other provide people with endless opportunities to create scenes, objects, characters, and more!

In this project, channel your creativity to make original building block creations (also known in the LEGO® community as a “MOC” or “My Own Creation”) to share with others, and build your construction and engineering skills along the way!

Explore the resources available in this guide, from books, to videos, to websites, and choose the ones that are right for you! We encourage you to identify an adult in your life that can help guide you in your learning. There are tools for this helper in the back of this resource guide!

You decide where you want to take your learning! At the end of your learning journey, you’re invited to share something you created at your local 4-H show or fair.

We hope you enjoy this project!



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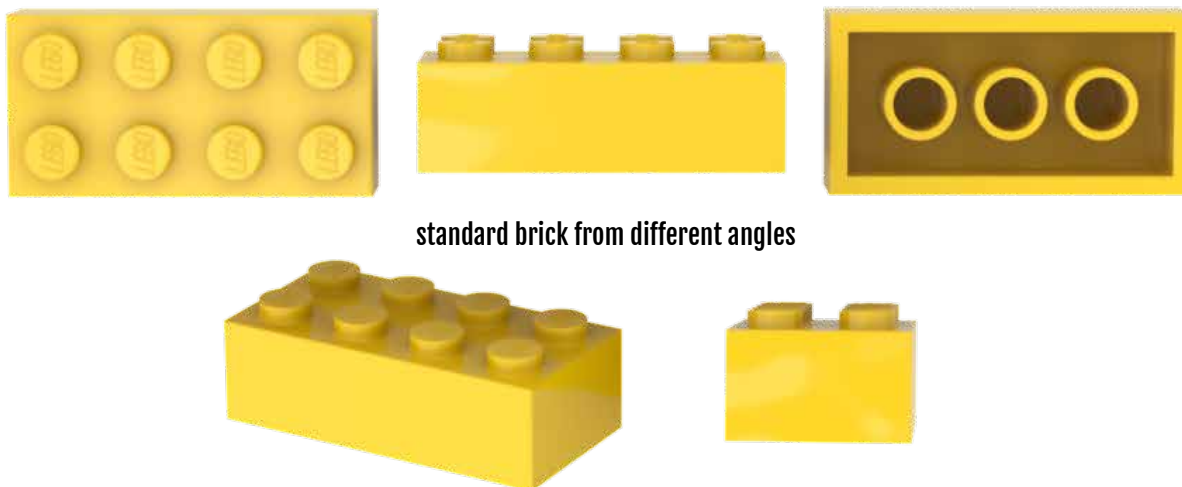
GETTING STARTED WITH YOUR PROJECT

In this project, you'll create with plastic building bricks! The goal is for you to improve your building skills and let your creativity shine.

BUILDING BRICK BASICS

Parts of a Brick

Understanding the different parts of a building brick can help you make better builds and help you understand building instructions.

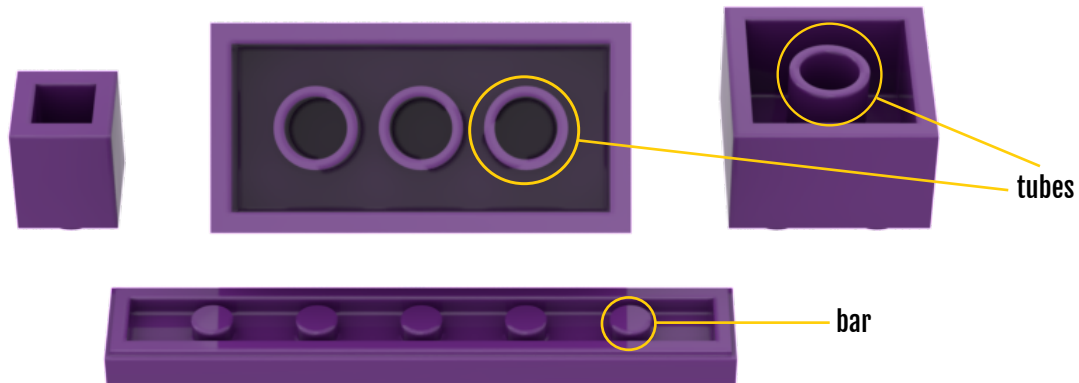


- **Stud** - The stud is the small round bump on top of most bricks. Often the name of the company that made it is written on the stud in small letters. These cylindrical bumps are designed to connect with the tube portion of another brick².

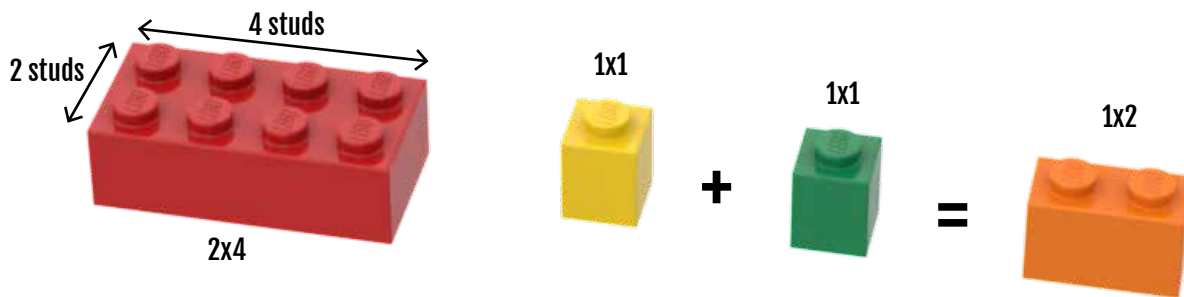


- **Tube** - The tube is an open cylinder-shaped structure in the bottom of most bricks³. When the tube side of a brick is pressed against the stud side of another brick, they should hold together! Smaller bricks have thinner bars instead of tubes. Some small bricks won't have a tube or bar, but instead use the outside of edge of the brick to lock into a stud.



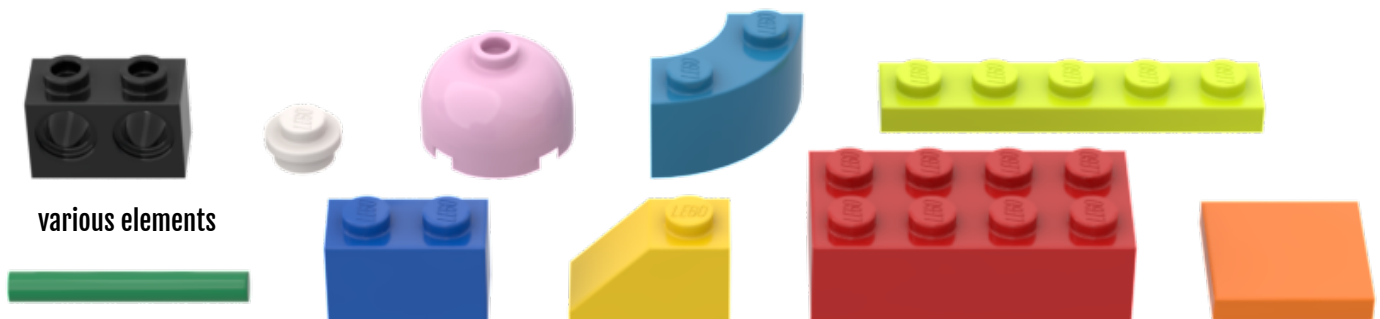


Did you know? In the building community studs are commonly used to help measure the size of pieces. You can count the number of studs on a brick to measure it. A brick that has 2 studs in one direction and 4 in the other is known as a 2x4 (pronounced “two by four”)². Brick sizes are standardized so smaller bricks can be combined to match the size of larger bricks. For example, two 1x1 bricks combined are the same size as one 1x2 brick.



Part Types

There are more than 3000 types of plastic building parts (also known as elements) being produced by LEGO® right now⁴! When working with plastic building bricks its helpful to know some of the most common part types. Knowing these elements will help you understand build instructions and tutorials, and help you find and order the parts you need for your builds⁵!

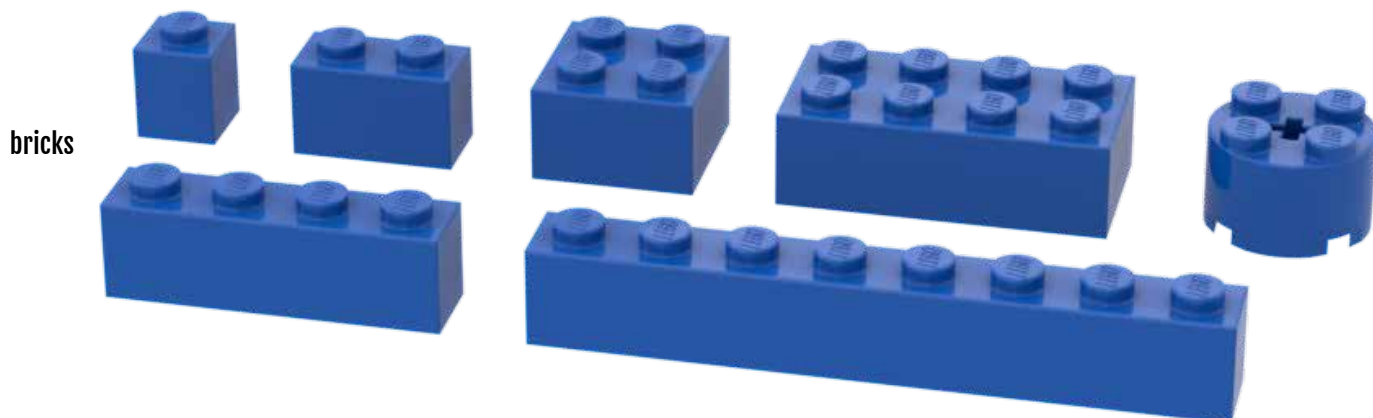


- **Element** - Plastic building parts of all types are called elements, since not all of them are actually bricks!





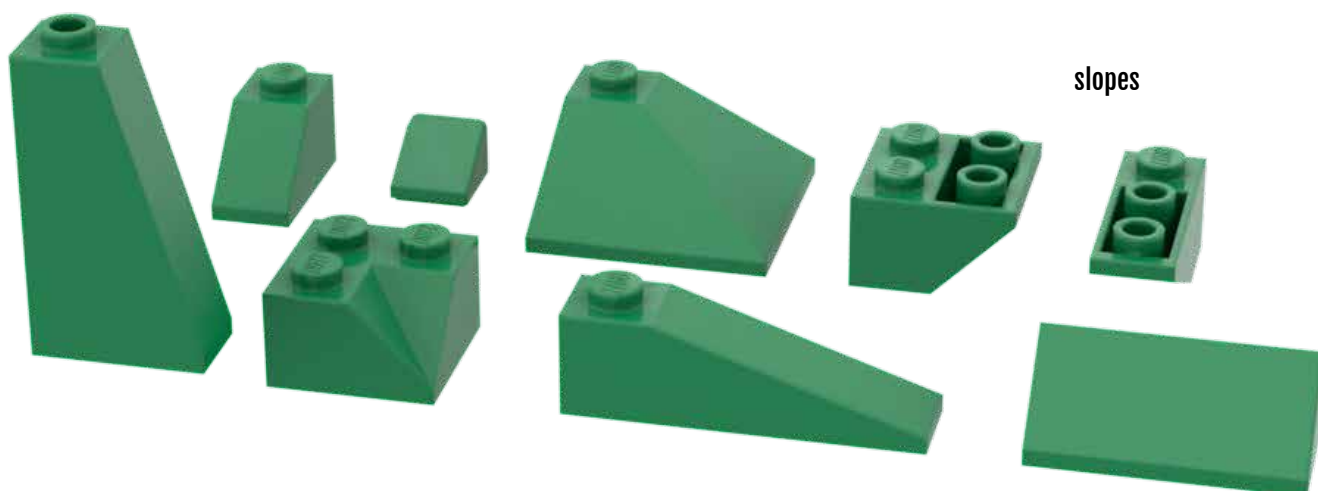
- **Brick** - A brick is rectangular piece with straight sides. These are the pieces that most people think of when they picture a LEGO® or MEGA BLOKS® piece. Bricks have a standard height of 9.6 mm (.38 inches) tall. While the standard brick is rectangular, there are curved bricks that are round in shape when looking down at the stud side of the brick.



- **Plate** - A plate is a flat brick with studs on top. You have to stack 3 plates on top of each other to reach the same height as a standard brick.



- **Slope** - A slope is a brick that has one or more slanted sides. They come in a variety of angles and shapes. Some angle to the top of the brick and others angle to the bottom.





- **Tile** - A tile is a flat, plate-like piece that doesn't have any studs on it, so it's smooth.



tiles

- **Baseplate** - A baseplate is a large flat plate-like item larger than 8x16 studs with a waffled underside that bricks can't be attached to. This underside lets the baseplate lie flat on surfaces and provides a strong base for building on top of. Baseplates can be one solid color or can have designs printed on them, such as roads or water.



baseplates

- **Decorative Elements** - Decorative elements are pieces made to replicate real-world items like trees, flags, windows, doors, and fences. These items help add detail and realism to your builds.



decorative elements

- **Minifigure** - A minifigure, or minifig, is a small, plastic figure with limbs that move. Minifigures usually represent humans. They have a variety of interchangeable parts that allow you to customize them for your needs. Minifigures can help bring your builds to life!

A variety of other element types exist, including arches, cylinders, cones, panels, and more. A whole system of parts focused on connecting with pins and axles that is used for more advanced mechanical builds is known as Technic™.

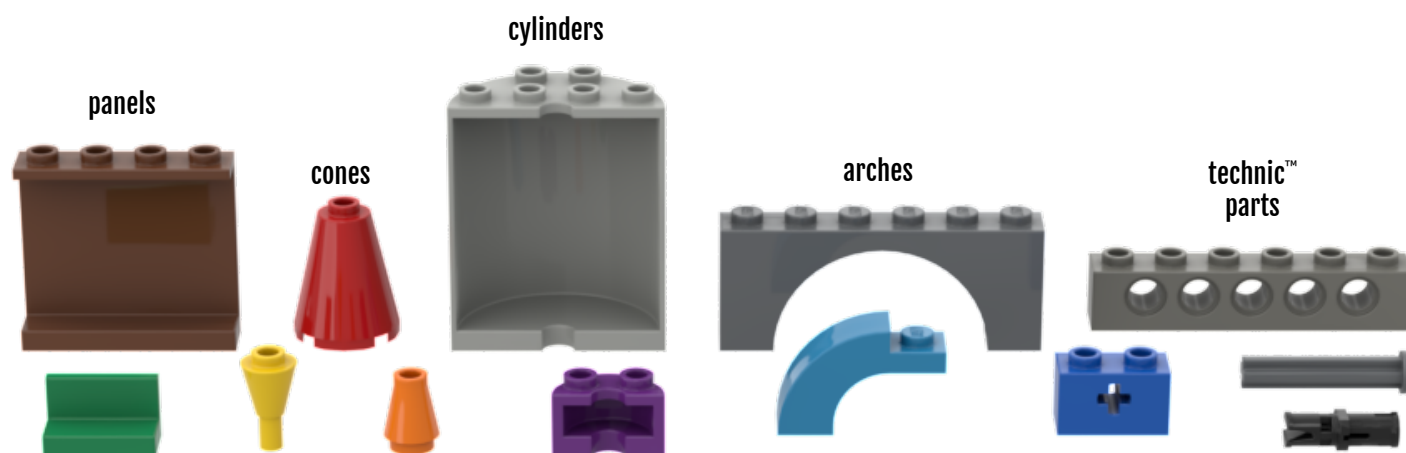


minifigures



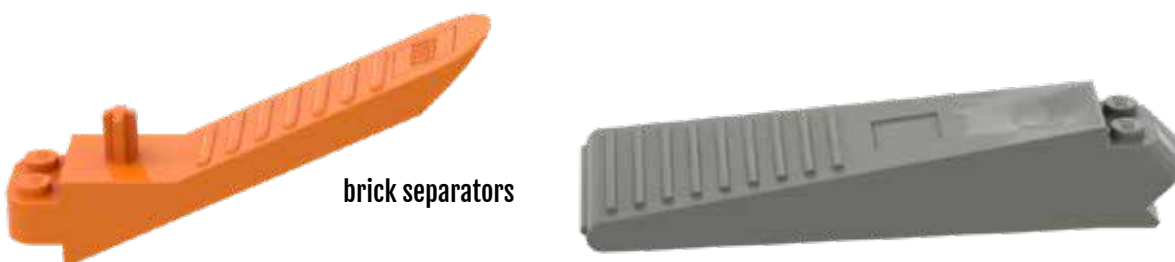


Experiment with different part types to see how you might be able to use them in your builds.



Looking to learn more about common parts? Check out Brick Architect's LEGO® parts guide online at <https://brickarchitect.com/parts/>. This guide helps you see the most common parts, and lets you explore the different categories of elements.

- Brick separator - A brick separator is a tool to help separate building brick pieces from each other. These parts are used as levers or wedges. Different building brick brands have different style separators. Check out LEGO®'s guide of how to use their separator online at <https://go.illinois.edu/brickseparator>.



STARTING YOUR PROJECT

To start working on this project, you just need to start building and creating! You can build whatever you want! However, if you want to enter your creation in your local 4-H show, it must be original, fit into one of the featured exhibit build categories, and follow any size restrictions in the exhibit guidelines. An original build means you came up with the idea yourself and didn't follow any directions to make the build. Below you'll find information about the different types of builds that can be entered for this project.

Size restrictions can be found in the exhibit guidelines in your local show book. Logos of trademarked or copyrighted brands (like superheroes) should not appear in builds unless they are already printed on licensed purchased bricks (or printed on a sticker included in a licensed purchased set). See the copyright section of this guide for more info. Builds should also reflect the guidelines in the 4-H Code of Conduct.

Featured Build Categories





The following build types can be exhibited at your county 4-H general projects show.

- **Art** - Create visual art with building bricks as the medium, including artistic mosaics and sculptures.
- **Building** - Construct a building such as a house or skyscraper. Replicas of existing buildings, such as your house, are allowed in this category, as long as you design the model and don't build from a kit.
- **Creatures** - Build real or imaginary animals, monsters, or people. This category includes domestic animals (like pets and farm animals), wild animals (current or extinct), as well as fantasy creature builds (like dragons, aliens, and unicorns). All creatures must be brick built. No mixed and matched minifigures are allowed.



▲ Art



▲ Building



▲ Creature

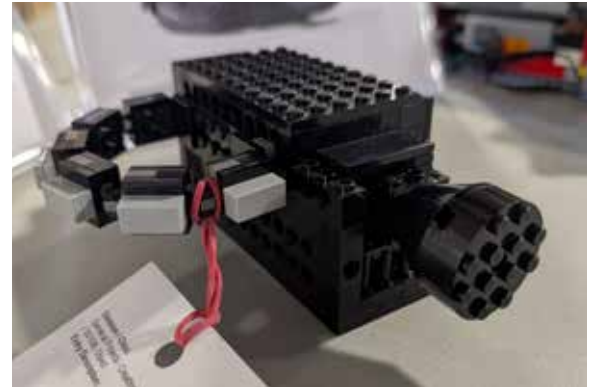
- **Functional** - Build a non-mechanical item that can be used in the real world, like a jewelry box, pencil cup, or phone charging stand. Bring a picture of the build in use.
- **Mechanical** - Create a device that includes mechanical movement to accomplish a real-world task. Use of gears and Technic™ style pieces is encouraged. Example builds include a functioning clock, candy vending machine, etc. Mechanical builds will frequently combine various simple machines like levers, pulleys, screws, and axles to achieve tasks. Mechanical builds can use motors.
- **Object** - Build a full-size or scaled (shrunk down or enlarged) replica of a real-world object, like a food item, household object, or plant. Leave any brand logos off your replica. Be sure to bring a picture of the item you are replicating to judging so judges can compare your build to the real thing!



▲ Functional



▲ Mechanical



▲ Object





- **Scene/Storytelling** - Build a scene that tells a story. This usually means the scene will show some kind of action. Scenes can be realistic or set in imaginary worlds. The build can incorporate items from the other exhibit categories (such as creatures, buildings, and vehicles) as well as minifigures.
- **Vehicles** - Build a vehicle, such as a car, boat, train, airship, or spaceship!
- **Virtual** - Have a big idea but don't have the bricks to make it happen? Create your own virtual build, which could fit in one of the other exhibit categories, using free digital building software such as Brick-Link Studio, or similar. Bring printouts of your build from several required angles and be prepared to talk about your design process.



▲ Scene/Storytelling



▲ Vehicle



▲ Virtual

GETTING SUPPLIES

Below are some ideas for getting access to supplies for this project!

- **Join a Club** - Your local 4-H office, library, museum, community center, or other organization might have a club you can join that has supplies and provides you the opportunity to practice your building skills. Though you probably can't take bricks home from these groups, they are a good place to start so you can understand the types of parts you might eventually want to purchase.
- **Buy from a Physical or Online Store** - Many local toy stores or chain department stores will have plastic building bricks for sale from a variety of brands, both in their physical and online stores. You can also look for more specialized stores and website, like those listed below.
 - **Bricks & Minifigs** (<https://bricksandminifigs.com>) - After-market LEGO® toy shop featuring new and used sets, bulk bricks, minifigures, components, and accessories.
 - **The LEGO® Store** (<https://www.lego.com/en-us>) - Official LEGO® stores, and online marketplace featuring





ing sets, parts, and accessories.

- **BrickLink** (<https://www.bricklink.com>) - Marketplace where builders can source LEGO® parts (new and used) for their builds.
- **LEGO® Pick a Brick** (<https://www.lego.com/en-us/pick-and-build/pick-a-brick>) - Official LEGO® shop for ordering new individual elements or bricks.
- **Buy from Thrift Stores or Garage Sales** - Often the cheapest place to get building bricks (if you don't mind them being used) is at local thrift stores or garage sales. Online websites like Facebook Marketplace can also be good places to find deals on bricks. This method of finding bricks can take patience.
- **Build Virtually with Free Software** - Don't have the funds to get all the bricks you need to make your building dreams come true? You can build virtually with free software on your tablet or computer. See the "Virtual Resources: Virtual Building Software" section on page 16 for more information on some of the programs available.

LEARNING BUILDING TECHNIQUES

One of the best ways to learn building techniques is to build sets designed by real building brick designers! Instructions can be found in sets that are purchased from major brick manufacturers like LEGO® or MEGA BLOKS®. In addition, LEGO® archives all of their building instructions on their website (<https://www.lego.com/en-us/service/building-instructions>) and in the LEGO® Builder App (<https://www.lego.com/en-us/builder-app>). Many books that you can purchase or find at your local library also feature building instructions.

To increase your skills at building your own original creations you can also check out print and internet resources related to plastic building block construction. We've highlighted some of our favorites in the resource section of this guide. The highlighted resources are just a starting point for members. You can explore beyond these recommendations. Please be sure to have parental permission and supervision when browsing internet resources related to this topic. We encourage you to work with a parent or adult helper on your project journey!



CONNECTING WITH THE BUILDING BRICK COMMUNITY

A great way to get ideas for builds and improve your building techniques is to connect with other people who like creating with building bricks, especially experienced builders. See some ideas below on how you can tap in to this community!

- **Local School or Library LEGO® Clubs** - Local libraries, elementary schools, middle schools, high schools, and colleges might have their own LEGO Clubs. See if these groups are open to the public, then sign up or drop in!





- **LEGO® User Groups** - A LEGO® User Group (LUG) is a group of people who love LEGO®! These groups can be a great source of community and support, and they often host local events! Look out for shows or events these groups might be hosting in your area! There are several active LUG communities in Illinois and in neighboring states:
 - **Chicago Area LEGO® User Group** (<https://www.facebook.com/ChicagoLUG>) - Chicago Area
 - **Gateway LEGO® User Group** (<https://www.gtwlwg.org>) - St. Louis Area
 - **Heartland LEGO® User Group** (<https://www.instagram.com/heartland.lug>) - Southern Illinois
 - **Northern Illinois LEGO® Train Club** (<https://niltc.org>) - Elgin Area
 - **Universal LEGO® User Group** (<https://facebook.com/universalLUG>) - Chicago Area
 - **Windy City LEGO® User Group** (<https://windycity-lug.com>) - Chicago Area
- **Conventions** - There are lots of conventions, big and small, dedicated to all things LEGO®! Conventions are places to see amazing builds, complete your own mini builds, learn from expert presentations, meet others from the LEGO® community, and purchase cool merchandise. A few conventions that are typically held in Illinois are listed below.
 - **Brick Convention** (<https://www.brickconvention.com/springfield>) - Often held in Springfield or Wheaton, Brick Convention is a LEGO® fan event that features activities, experiences, displays, and special guests.
 - **Brick Fest Live** (<https://www.brickfestlive.com>) - Held annually in Tinley Park, Brick Fest Live is a family event that features build activities, derby races, life-size models, and more.
 - **Brickworld Chicago** (<https://brickworld.com/chicago>) - Held annually in Schaumburg, Brickworld is one of the biggest brick conventions in the United States, featuring displays, vendors, kids activities, panel discussions, and more.
 - **The Ultimate Brick Show** (<https://tubsofficial.com>) - Often held in Marion, Ultimate Brick Show is an event featuring build displays, hands-on challenges, a community mosaic wall, workshops, and more.



Did you know? One term you might come across while exploring LEGO® communities is “AFOL”. This is an abbreviation for “Adult Fan Of LEGO®”. AFOL are adults who have a passion for LEGO® and consider it one of their hobbies. Many of the people whose builds are on display at conventions are AFOL. Don’t be afraid to reach out to these adult builders for advice and inspiration!





PRINT RESOURCES

Books and other print items can be great resources to learn about building brick construction techniques! Explore some options below that can help teach you about how to make your ideas a reality. Some of these books may need to be purchased, but many may be available from your local library. Don't feel limited by our list of suggestions. You can find other resources from your local bookstore or library. Some resources may include step-by-step building instructions. You can use these building instructions to get practice with build techniques, but you should only use them as inspiration to create your own unique builds.

Note: Books marked with an asterisk () would generally be found in the adult section at the library. While all content is appropriate for kids, the writing level of the text, or the difficulty of the included building techniques might be challenging for younger 4-H members.*

GENERAL BUILDING TECHNIQUES

- **Brickman's Big Book of Better Builds: All the Skills You Need to Become a LEGO® Master*** (by Ryan McNaught) - Comprehensive guide to building with LEGO® bricks from design to construction, with basic and advanced techniques (*published in 2023*).
- **The Art of LEGO® Design: Creative Ways to Build Amazing Models*** (by Jordan Schwartz) - Guide featuring information on supplies, brick types, building strategies, using patterns and textures, composing scenes, sculpting, and more (*published in 2014*).
- **The LEGO® Ideas Book** (by Simon Hugo, Tori Kosara, Julia March, and Catherine Saunders) - More than 200 ideas for builds to use as inspiration for original creations, along with tips and tricks on becoming a better builder (*new edition published in 2022*).
- **The Unofficial LEGO® Builder's Guide** (by Allan Bedford) - Detailed guide to LEGO® building techniques such as construction, color selection, and more (*published in 2012*).



BUILDINGS

- **How to Build LEGO® Houses** (by Jessica Farrell, Nate Dias, and Hannah Dolan) - Book featuring ideas for more than 30 different house models. Techniques from these models can be used to inspire your own original creations (*published 2021*).
- **The LEGO® Neighborhood Book: Build Your Own Town!** (By Brian Lyles and Jason Lyles) - Book helping teach how to create buildings with realistic details. Techniques from the featured models can be used to inspire your own original creations (*published 2014*).
- **The LEGO® Architect*** (By Tom Alphin) - Book that explores different architectural styles and movements, and provides instructions on how to create buildings in those styles. Techniques from the featured mod-



els can be used to inspire your own creations (*published 2015*).

- **The LEGO® Architecture Idea Book*** (By Alice Finch) - Book with more than 1000 ideas for creating brick-work, siding, windows, columns, roofing, and other building elements (*published 2018*).

CREATURES

- **How to Build LEGO® Animals** (by Jessica Farrell and Hannah Dolan) - Book featuring ideas for building more than 30 different animals. Techniques from these models can be used to inspire your own original creations (*published 2023*).
- **How to Build LEGO® Dinosaurs** (by Jessica Farrell, Hannah Dolan, and Nathan Dias) - Book featuring ideas for more than 30 different dinosaurs and prehistoric creatures. Techniques from these models can be used to create your own original creations (*published 2022*).

MECHANICAL

- **LEGO® Gear Bots** (by Klutz) - Activity kit (book and parts) focused on learning how to make kinetic (moving) creatures with LEGO® bricks (*published in 2020*).
- **LEGO® Technic Non-Electric Models: Simple Machines*** (by Yoshihito Isogawa) - Building book focused on models that use simple machines to accomplish tasks. Be inspired by these builds to create your own mechanisms (*published 2021*).
- **The LEGO® Power Functions Idea Book: Machines and Mechanisms*** (by Yoshihito Isogawa) - Building book focused on projects with gears, motors, gadgets, and other moving elements. Use the mechanisms you learn to build in this book to make your own original creations (*published 2015*).
- **The Unofficial LEGO® Technic Builder's Guide*** (by Pawel Sarel Kmieć) - Tips on building machines and mechanism with the LEGO® Technic™ system. Learn about gears, linkages, simple machines, differentials, steering systems, and more (*second edition published in 2016*).



OBJECTS

- **Iconic Objects Made from LEGO® Bricks** (by Joachim Klang) - How to book on building everyday objects from LEGO® bricks. Use the ideas and techniques in this book as inspiration for your own builds (*published 2021*).





VEHICLES

- **How to Build LEGO® Cars** (by Nate Dias and Hannah Dolan) - Book featuring ideas for more than 30 different car model builds. Techniques from these models can be used as inspiration for your own original creations (*published 2021*).
- **The LEGO® Technic Idea Book: Wheeled Wonders*** (by Yoshihito Isogawa) - Building book focused on building cars, trucks, motorcycles, and other vehicles. Use the building techniques in this guide to inspire your own vehicle builds (*published in 2010*).
- **The LEGO® Trains Book*** (by Holger Matthes) - Book focused on how to build all things trains, from locomotives to passenger cars (*published 2017*).





INTERNET RESOURCES

Websites and internet videos can be great sources of information on building brick construction! Look for info at the websites below, or explore on your own. Remember to have parental permission and supervision when looking for resources on the internet!

WEBSITES

- **The Brick Blogger Building Techniques** (<https://thebrickblogger.com/category/advanced-lego-guides/lego-building-techniques/>) - List of blog posts from TheBrickBlogger.com on various LEGO® building techniques. Some interesting posts include: “Building with LEGO®: Bases & Borders”, “LEGO® Building Technique: Forced Perspective”, “LEGO® Building Technique: LEGO® Water”, “How to Make Beautiful LEGO® Trees”, and more.
- **The Unofficial LEGO® Advanced Building Techniques Guide** (<https://www.brickshelf.com/gallery/KimT/Mixed/Instructions/advancedbuilding.pdf>) - A huge downloadable guide that teaches several advanced LEGO® building techniques including “SNOT” (“Studs Not On Top”), lettering, striping, curves, and more.
- **Tips & Bricks** (<https://www.tipsandbricks.co.uk>) - Site with extensive, easy to understand, technique and tip sections to help builders improve their building skills.



VIDEOS

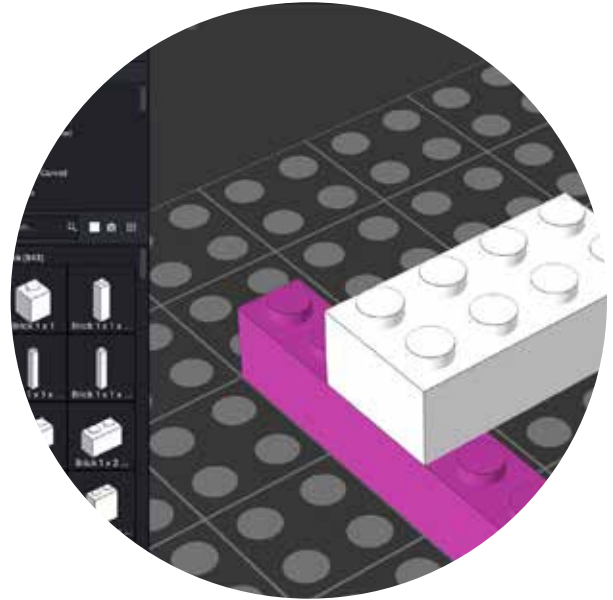
- **Back Room Builder on YouTube** (<https://www.youtube.com/@BackRoomBuilder>) - Tutorials to help any builder improve their building techniques. The “Tips and Tricks” and “How to Make” playlists are particularly helpful.
- **Bricks Master Builders on YouTube** (<https://www.youtube.com/@Bricks.Master.Builders>) - Tutorials on general mechanical building techniques, building with LEGO® Technic™, and making various mechanical components.
- **Jaystepher on YouTube** (<https://www.youtube.com/@jaystepher>) - Tutorials for build techniques, from making vehicles, to home decor, to objects, to siding.
- **Playwell Bricks on YouTube** (<https://www.youtube.com/@PlaywellBricks>) - Tutorial playlists for beginner, intermediate, advanced building techniques, and tutorials for using the virtual building software Studio.
- **Tiago Catarino on YouTube** (<https://www.youtube.com/@TiagoCatarino>) - Builder (and former LEGO® designer) with tutorials on creating objects, buildings, characters, and more using LEGO® bricks.





VIRTUAL BUILDING SOFTWARE

- **BrickLink Studio Virtual Building Software** (<https://www.bricklink.com/v3/studio/download.page>) - Free digital brick building software powered by the LEGO® Group that lets users build models using virtual parts. The LEGO® parts catalog is integrated into the software. It is currently available for the Windows operating system.
- **Getting Started with BrickLink Studio Tutorial Playlist** (<https://studiohelp.bricklink.com/hc/en-us/categories/5404814688023-Getting-Started>) - Playlist of video tutorials featuring tips on getting starting on using the BrickLink Studio free online building app.
- **MecaBricks Workshop** (<https://www.mecabricks.com>) - Free, online, in-browser digital brick building application. This software can be used on a variety of devices, like phones, tablets, and laptops, as long as they have internet access.
- **MecaBricks Workshop: A Primer for First Time Users** (<https://www.mecabricks.com/en/forum/topic/65>) - Brief introduction with screenshots on how to use the MecaBricks Workshop program.
- **LeoCAD** (<https://www.leocad.org>) - Free downloadable software to build virtual building brick models. Available for Windows, Linux, and macOS operating systems.
- **LeoCAD Basic Tutorial** (<https://www.leocad.org/docs/tutorial1.html>) - Quick start guide to using the most commonly used LeoCAD features.





COPYRIGHT GUIDELINES

These guidelines aim to help you ensure your building bricks project will follow laws protecting the creations of others. It is illegal to reproduce a trademark or likeness you do not own or have not received permission to use. This is called copyright protection. It is similarly illegal for youth to use an image or brand that someone else owns as part of their 4-H project exhibit without the permission of the copyright/trademark holder.

Use of the 4-H Name and Emblem

Enrolled 4-H members are authorized to use the 4-H Name and Emblem. This includes permission for an enrolled 4-H member to use the 4-H name and emblem in exhibits you create for personal use and as part of 4-H sponsored events.

Use of the green clover shaped image is not protected. The 4-H “emblem” is distinguished by the four H’s that signify Head, Heart, Hands, and Health. No creative rendering, or change in color or shape of the official 4-H emblem is allowed. Downloadable approved 4-H emblems and details can be found at go.illinois.edu/CloverResources.

Use of Other Copyrighted Materials

Youth cannot feature a trademarked character, image, or logo in their build without permission from the owner. Everything that is current or popular is probably trademarked. Examples include:

- No building a re-creation of a popular character like Bluey® or Pikachu®.
- No re-creating school, sports, or company logos. If you’re building a replica of an item out of bricks, like a shoe or guitar, leave off the logos.
- No recreating copyrighted images or artwork in brick form, including as a mosaic.
- No using other people’s build directions and passing them off as your own.

Youth CAN use legally sourced branded items as part of their exhibit.

- They can use a minifigure of a copyrighted character purchased from a company like LEGO® or MEGA BLOKS® that has a license to create and sell figures of that character. For example, LEGO® has made licensed minifigures of a variety of characters from popular culture, from Disney characters, to Marvel and DC superheroes, to Harry Potter. These minifigures can be used in builds.
- They can use a printed brick or a printed sticker of a copyrighted character or logo that came from a set from a company like LEGO® or MEGA BLOKS® that has a license to create and sell figures of that copyrighted item.





When planning builds, remember that even military emblems are protected by copyright. Some emblems are allowed, while others are not. Learn more at <https://dod.defense.gov/Portals/1/Documents/Trademarks/DOD%20Guide%20about%20use%20of%20seals%20logos%20insignia%20medals-16%20Oct%2015F.pdf>.

If using digital software to create a mosaic out of building bricks, use your own original image (or a copyright free image) as the input. Do not use an image you took or someone else took of a copyrighted work as your input.

Visit the Illinois 4-H State Fair website (go.illinois.edu/StateFair4H) for additional information on copyright, including frequently asked questions.





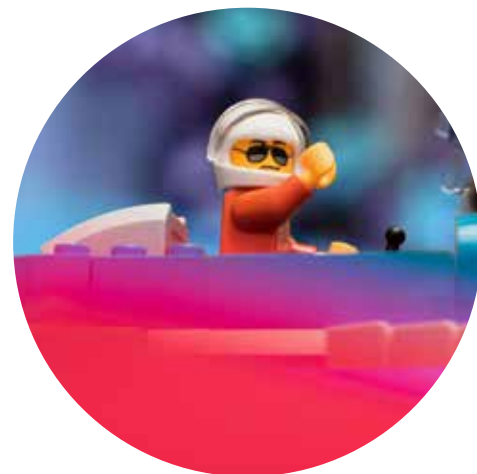
CONNECTING TO OTHER 4-H PROJECTS

Did you know that building bricks can be used in other 4-H projects? Check out some project recommendations and related resources below! In addition to these projects, you might choose to create an educational exhibit for another project area that uses building bricks as your medium. For example, you can build a diorama out of building bricks about how to choose a good campsite for the Outdoor Adventure project.

PHOTOGRAPHY

If you like to take pictures of your building brick creations, you can enter those in the Photography project! In this project youth learn about how to use camera equipment, and how to use lighting and other techniques to take great pictures. Learn more about this project at go.illinois.edu/4Hphotography. Check out resources below that can help you connect building bricks with photography.

- **LEGO® Minifigure Photography** (by Klutz) - Activity kit (book and parts) focused on learning how to take great photos with LEGO® minifigures (*published in 2023*).
- **Four Bricks Tall** (by Anna Bitanga) - Blog featuring tips and videos on how to shoot photos featuring LEGO® minifigures. Two helpful posts include:
 - **My LEGO® Photography Workflow** (<https://fourbrickstall.com/my-lego-toy-photography-workflow>)
 - **LEGO® Photography How-To: Phone Phones in a Tiny House** (<https://fourbrickstall.com/lego-photography-how-to-phone-photos-in-a-tiny-house>)



ROBOTICS

If you want to create and program LEGO® robots, you can do that in the Robotics project! In this project you learn how to build robots and program them to complete tasks. You'll learn to use sensors of various types and how to write visual or text-based code. Illinois 4-H also has a yearly State Robotics Challenge for teams working with LEGO® robots. LEGO® also has a competition for teams, called FIRST LEGO® League (FIRST stands for "For Inspiration and Recognition of Science and Technology"). Learn more about this project at go.illinois.edu/4Hroboticsproject. Check out resources below that can help you connect building bricks with robotics.

- **Carnegie Mellon Robotics Academy** (by Carnegie Mellon University) - Website featuring free LEGO® SPIKE Prime curriculum and activities (https://www.cmu.edu/roboticsacademy/roboticscurriculum/Lego%20Curriculum/lego_spike_prime_resources.html)





VIDEO

If you like to make stop motion animations with building bricks, you can enter those creations in the animation category in the Video project! In this project youth learn to shoot and edit video, develop a storyline, use different camera angles and zooming techniques, as well as work with scene elements. In addition, they learn to record and edit audio to accompany their finished videos. Learn more about this project at go.illinois.edu/4Hvideography. Check out resources below that can help you connect building bricks with video.

- **LEGO® Make Your Own Movie** (by Klutz) - Activity kit (book and parts) focused on learning how to make stop motion movies with LEGO® bricks (*published in 2017*).
- **Stop Motion Animation Challenge** (by Illinois 4-H) - Challenge activity, complete with resources such as a tutorial on stop motion animation using the Stop Motion Studio app, and a storyboard worksheet (go.illinois.edu/4HStopMotion)
- **Stop Motion Tutorials** - Website with beginner and expert guides on making stop motion videos (<https://www.stopmotiontutorials.com/en/>)
- **The LEGO® Animation Book: Make Your Own LEGO® Movies** (by David Pagano and David Pickett) - Book focused on bringing your builds to life using stop motion animation (*published in 2016*).



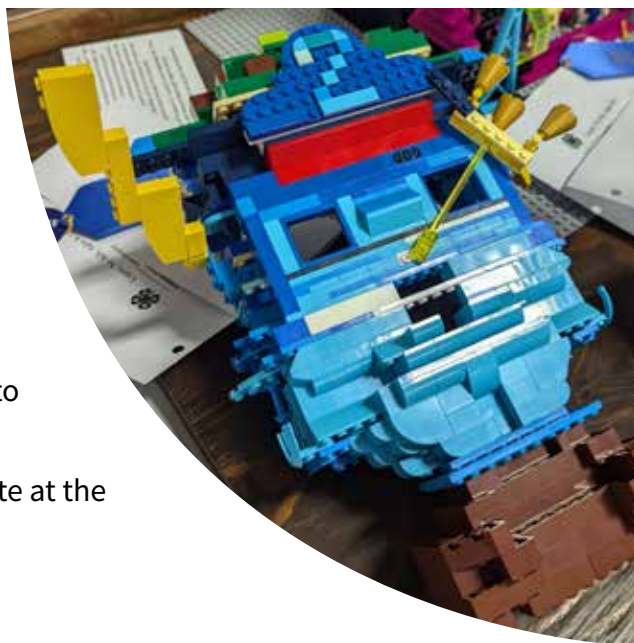


SHOWING YOUR LEARNING

4-Hers are encouraged to demonstrate their learning in this project by showing off their builds in their local 4-H fair or show. View your county fair or show book for specific details on exhibit requirements for this project.

Projects will be judged on a variety of factors, including creativity, construction, and their overall appearance. See the scoresheets for more information. Scoresheets are available on the Illinois State 4-H Show website at (go.illinois.edu/StateFair4H). If a build you make could be entered in more than one category, consult the scoresheets to decide where you think it will do better and enter it there!

The best projects from local 4-H shows are eligible to compete at the Illinois State Fair 4-H General Projects Show each August!





LEADER OR PROJECT HELPER RESOURCES

Having a trusted adult to guide learning can help youth take their projects to the next level. Thanks for being that helper! The resources below can be used by volunteers to teach building brick lessons with groups of youth or can be used as guides to help supplement learning by a single member.

CREATING WITH BUILDING BRICKS 4-H SPECIAL INTEREST CLUB RESOURCE GUIDE

Resource guide for staff and volunteers to help them plan and run a 6-session 4-H Special Interest (SPIN) club for the Creating with Building Bricks project. Lesson outlines, tips, resources, and more featured. Online at go.illinois.edu/4HBrickClubGuide.

LEGO® ACTIVITIES FOR 8 TO 10 YEAR OLDS

Article by Scholastic featuring a variety of activities that use LEGO® bricks to enhance learning and development for youth ages 8 to 10. Online at <https://www.scholastic.com/parents/kids-activities-and-printables/activities-for-kids/lego-activities-8-to-10-year-olds.html>.

LEGO® CLUB ACTIVITY IDEAS

List of various engineering design challenges youth can complete using building bricks. These can be used as the basis for group meetings, or as challenges for individual kids. Online at <https://www.educatingyoungengineers.com/lego-club-activity-ideas>.

LEGO® EDUCATION LESSONS AND INSPIRATION:

Community of educators who share their lessons and activities related to teaching with LEGO® bricks. The site includes links to LEGO®-produced resources, as well as resources created by educators around the world. Online at <https://community.legoeducation.com/lessons>.

LEGO® QUEST

Blog featuring a series of unique building challenge ideas from blogger Sam. You can browse all the quests by reading the “What is LEGO® Quest?” blog post. Online at <https://legoquestkids.blogspot.com>.

THE LEGO® LIBRARIAN

Blog from a youth service librarian that features a variety of LEGO® build challenge ideas. Online at <https://legolibrarian.com>.





BUILD INSPIRATION





CREDITS

This resource was compiled by Amy Henschen. Editing support was provided by Kristin Huls and Maezie Nettleton. It was originally published in June 2025. Please note that while all links were working at time of publication, links may become inactive or move over time. If you encounter a broken link, try searching for the name of the resource, and report the broken link to your local 4-H staff. This book is not authorized or endorsed by the LEGO® Group or MEGA BLOKS® and mentions of any products in this book are not meant as endorsements by Illinois Extension.

SOURCES

- 1 May, J. (2024, May 13). *Brick by Brick: A History of LEGO®*. Central Rappahannock Regional Library. <https://www.librarypoint.org/blogs/post/history-of-lego/>
- 2 Brickipedia (Ed.). (n.d.). *Stud*. Stud - Brickipedia, the LEGO® Wiki. <https://en.brickimedia.org/wiki/Stud>
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PHOTOS & IMAGES

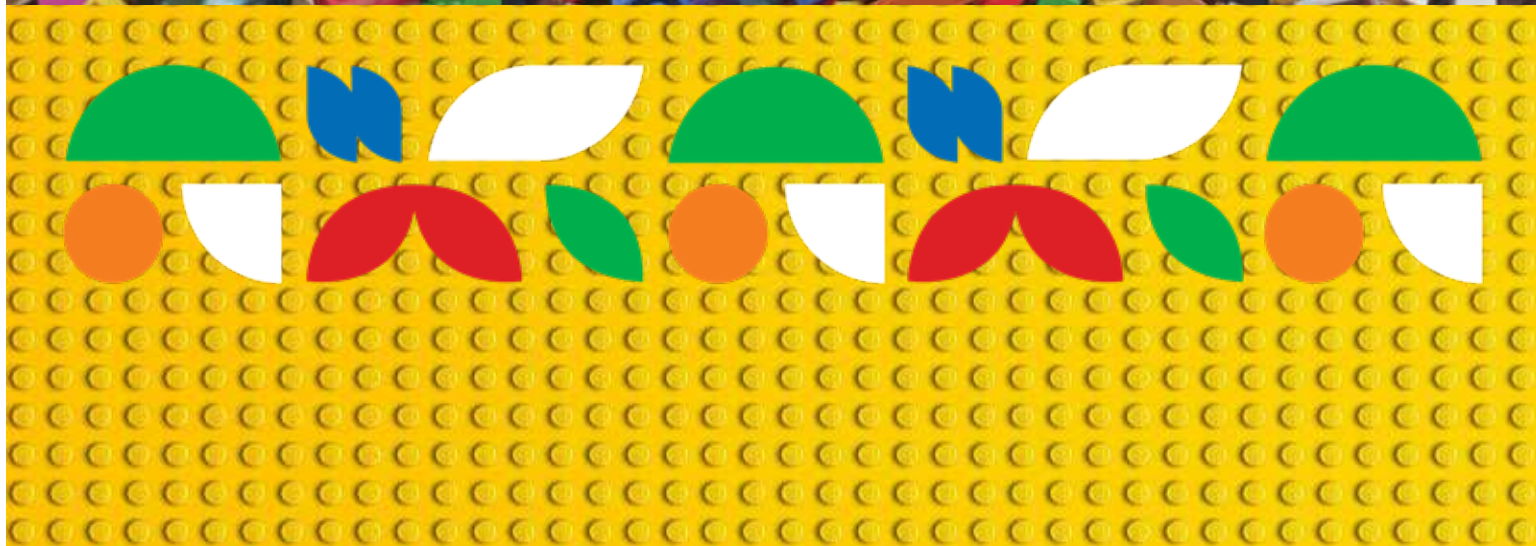
- Cover: black brick-built shadow crawler creature, build by Christopher Simonton, photo by Amy Henschen; close-up of brick tower with hands building it, photo by Sebastien Bonneval on Unsplash; brick built cactus, build by Tinsley Kash, photo by Amy Henschen,
- Page 2: hands building with bricks, photo from Storyblocks
- Pages 3-7: all brick renderings created by Amy Henschen using Studio
- Page 8: fox mosaic, build by Elliana Hyland, photo by Amy Henschen; White House, build by Jonathan Vandike, photo by Amy Henschen; penguins, photo by Grianghrif on Unsplash; pencil holder, build by Isaac McVicker, photo by Amy Henschen; gum ball machine, build by Logan Johnson, photo by Amy Henschen; video camera, build by Dexter Murphy, photo by Amy Henschen
- Page 9: horse show diorama, build by Abigail Kindred, photo by Amy Henschen; black car, build by Russell Durante, photo by Amy Henschen; Edinburgh library digital build, photo by Stewart Lamb Cromar 2021 ([https://commons.wikimedia.org/wiki/File:Lego_Main_Library_\(4_3\)_\(51264947632\).jpg](https://commons.wikimedia.org/wiki/File:Lego_Main_Library_(4_3)_(51264947632).jpg)), <https://creativecommons.org/licenses/by-sa/2.0/legalcode>; LEGO® store facade, photo by Moheen Reeyad ([https://commons.wikimedia.org/wiki/File:LEGO®_Store_Ngee_Ann_City_\(154207\).jpg](https://commons.wikimedia.org/wiki/File:LEGO®_Store_Ngee_Ann_City_(154207).jpg)), <https://creativecommons.org/licenses/by-sa/4.0/legalcode>
- Page 10: set being built from instructions, photo by Cajeo Zhang on Unsplash
- Page 11: railroad MOC at Bricks Cascade Convention, photo by Bill Ward via Flickr (<https://www.flickr.com/photos/bill-ward/49635895721/>), <https://creativecommons.org/licenses/by-sa/2.0/legalcode>
- Page 12: various books in a pile, photo by Amy Henschen
- Page 13: various books on a library shelf, photo by Amy Henschen





- *Page 14:* caboose photo by mostlytechnic on Flickr (<https://www.flickr.com/photos/mostlytechnic/5582451072/>), <https://creativecommons.org/licenses/by-nc/2.0/>
- *Page 15:* teen on computer, photo by Annie Spratt on Unsplash
- *Page 16:* screenshot of build in Studio by Amy Henschen
- *Page 17:* clover backdrop on cheerleading stage, build by Payton Norin, photo by Amy Henschen
- *Page 18:* Joker and Batman on a boat, photo by plo on Unsplash
- *Page 19:* minifigure pilot, photo by Ivan Diaz on Unsplash
- *Page 20:* youth making a brick stop motion movie on a tablet, photo by Amy Henschen
- *Page 21:* brick-built mask, build by Lydia Clemons, photo by Amy Henschen
- *Page 22:* brick graveyard gate, photo by Giampiero Fanni on Unsplash
- *Page 23:* ship build by Andrew Haas, photo by Amy Henschen; shipwreck photo by US Navy; train robbery scene, build by Cole Malo, photo by Amy Henschen ; spaceship photo by R K on Flickr (<https://www.flickr.com/photos/starstreak007/5911083917/>); grey house, build by Emmett Ripperda, photo by Amy Henschen; alien creature photo by FonsoSac on Flickr (<https://www.flickr.com/photos/132764302@N08/25770020510/>); drill replica build, build by Brady McDonnell, photo by Amy Henschen; 4 seasons art mosaic, build by Barbara Palmer, photo by Amy Henschen. All Flickr images CC BY-NC-SA 2.0 <https://creativecommons.org/licenses/by-nc-sa/2.0/>
- *Page 24:* record shop build, photo by Rylie Howerter on Unsplash
- *Page 25:* army scene, build by Silas Stickling, photo by Amy Henschen
- *Back Cover:* pile of bricks, photo by Xavi Cabrera on Unsplash





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