

LEGO CLUB GUIDE

Created by the Educating Young Engineers Organization



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Why LEGO?!

First and foremost, children love LEGOs. Children are natural engineers, they are constantly asking questions and imagining new ideas. LEGOs are ideal for children to use to build their ideas because LEGOs are simple, durable, and reusable. In addition for a school club they are perfect to use because they are familiar, translatable and low cost.

LEGOs are basic building blocks and the simplicity of LEGOS allows for the children to be even more creative. Often times after completing a challenge they will explain different functions of each of the LEGO blocks. This means that even though the LEGOs do not have many specific details, the children use their imagination to define the functions of each block.

The durability of LEGOs is very important. When investing in any type of classroom equipment a key factor is how long the materials will last for. LEGOs do not wear down or break easily.

Another important aspect of LEGOs is that they are reusable. After each LEGO Club the LEGO creations are taken apart and the LEGOs go back in their bins so that they can be used to solve different challenges in the next LEGO session. It is important that children learn to share, and LEGOs teach this to children. If everyone does not share the LEGOs then no one would be able to make new LEGO creations.

The primary goal of EYE is to engage children in basic engineering challenges and teach engineering concepts, which can be a difficult subject to target. However using LEGOs simplifies teaching engineering because the children already play with LEGOs. With LEGOs, you skip the step of having to teach children how to use certain equipment and then giving them the challenge. Instead, you can just go directly to giving the children challenges.

One of the primary reasons LEGO clubs work so well is that LEGOs are translatable. The activities that are done in the LEGO Club can continue at home and vice versa. This allows for the children to be inspired by a LEGO activity they do in the LEGO Club, and then go home and recreate or redesign and add to what they created in the LEGO Club.

LEGOs are also low cost for the amount of time spent using them.

Creating Excitement

Before you start a LEGO Club you should promote the club so that children and their families will be excited for it! If your school has a parent-teacher organization or something analogous you can discuss the LEGO Club there. We recommend preparing a small speech or presentation that highlights the quality aspects of LEGOs that were discussed in the "Why LEGO?!" section. Another option is if your school has a Facebook to post your idea and ask for people to "like" if they like the idea of a LEGO Club! Once interest spreads you can create a Facebook page for the LEGO Club.

Generating Funds

For the supplies you will need to purchase plenty of LEGOs and this requires startup money. First check to see if your school offers funds for startup clubs that you can apply for. You can also ask local businesses for donations to your LEGO fund. Another option is to organize fundraisers to raise money as well as generate excitement. If this is not an option, you can charge each child who will be participating in the club a registration fee to cover the expenses.

Gathering Materials

Before you order LEGOs, you can organize a LEGO drive at your school. Send home flyers with every student and spread the word on your Facebook page asking children and parents to donate extra LEGOs that they have. You can gather the LEGOs at a specific place and time or you could ask teachers to collect them in their classrooms and then you can pick them up from there.

You can purchase LEGOs in a variety of ways, but we recommend online because you can bulk order and it is generally less expensive. The amount of LEGOs that you will need depends on the size of your club, but generally a minimum of 100 pieces per child is a good starting point. The most important things to order are basics bricks, larger baseplates, people, and wheels. All these items can be found in bulk on the LEGO website (<http://shop.lego.com>) and on the LEGO Education website (<http://education.lego.com/en-us/products>). If you would like help selecting an order for your club, please email us and we would be more than happy to help create an order for you educatingyoungengineers518@gmail.com! Purchasing small bins to store the

LEGOs in is also a good idea because when you run a club you can have 2-3 children working out of each bin.

Finding a Location in Your School

Having a designated LEGO classroom that the children will go to for every LEGO Club is ideal. Ask around to teachers to see if a certain classroom or the cafeteria is available for use after school on a particular day each week. It may be necessary to fill out a facilities request form from your school.

Recruiting Children

We recommend that to get children to sign up for LEGO Club, you send home and informational flyer and registration form to the parents for all of the children in the school. Also, if you have started a face book page you can announce that registration for the club has opened on there! On the registration form you should ask for the child's name, teacher, grade, parent email, and contact information. Since clubs tend to be popular and space is limited it works well if you have the forms turned into the main office ask the front desk secretary to keep them in the order in which they were turned in.

Scheduling

Once you have children signed up for the LEGO Club, depending on how many participants you have it may be necessary to have multiple sections of LEGO Club. For the Dorothy Nolan LEGO Club, which was first run by EYE, there were two sections of LEGO Club. The groups alternated weeks and met for a total of twelve sessions. The benefit of having more sections is that you can reuse activities. As far as grouping the children, it is easiest on the parents if siblings are in the same group. This also creates a great dynamic so that during the club younger and older children work together to solve the LEGO Challenges.

Recruiting & Organizing Volunteers

The goal is that you will have one person who consistently runs the LEGO club each week and then you will recruit parent and student volunteers to be at each LEGO Club for extra help. Student volunteer support can be found by reaching out to the National Honor Society at your districts high school. Once you have volunteers signed up you can use sign up genius (<http://www.signupgenius.com/>). This allows you to input all of the dates that the LEGO Club will be held on and then you can have volunteers (parents and students) visit the website to sign up for the days that they are available to volunteer.

Planning Activities

When brainstorming ideas of challenges start by seeing if there have been any weather phenomena, new movie releases, or interesting events on the news. It is best when the children are given a challenge if they are also given real life context because this gives them a reason to put even more effort into their design. Below under "Example Activities" are some of the activities that EYE has used in the Dorothy Nolan LEGO Club. There are also a lot of activities online if you search for "LEGO build ideas."

Cleaning LEGOs

The LEGOs will become unsanitary and smelly from being used in LEGO Club. To wash the LEGOs purchasing a mesh bag is very helpful. Start by putting the LEGOs in the bag and soak the bag of LEGOs in a sink filled with a small amount of Clorox and warm water. Then rinse out the LEGOs and hang them over the sink to dry. While they dry use Clorox wipes to wipe out the LEGO bins. Then when the LEGOs are all the way dried off (this will take a while leave them for a day) they can go back in the bins and they will be sanitized and will smell significantly better!

Example Activities

The Drop Test

- The challenge is to choose pieces and assemble them so that when they are dropped from a height of four feet they will not break apart.
- We discussed if there is a strategy that you could have when assembling the pieces!

LEGO Man Gets Stuck in a Canyon

- The challenge is to find a LEGO Man and drop him into the bottom of the Grand Canyon (a trashcan) and then devise a solution using LEGOs to get the LEGO man out of the trash canyon!
- The majority of students will begin by building a staircase, but when asked to try building a solution without stairs (as LEGO man would get tired if he had to climb up all those stairs) they build elevators. When asked if they can find a solution that does not involve stairs or elevators, we have found that there are a variety of very interesting solutions.

LEGO Dream House

- This challenge is to build a LEGO Dream House! The sky is the limit with this challenge.

New Transportation Devices

- Task students with making a new and ecological form of transportation. An additional constraint can be that no wheels are allowed, this gets students to really start thinking outside of the box! We saw many great new inventions as well as innovations involving wind power.

Clean Water

- Begin by polling LEGO Club members to see how many of them are able to drink water directly from their sinks. Then explain that globally, clean water is not so easily accessible. Ask the children to design a water filtration system that cleans out all of the germs and unsafe chemicals from dirty water to make it drinkable!

Beastly Boats

- This challenge is to construct unsinkable ships. Filled a sink with a tub of water, and the students created ships that must endure the "ocean" waves. The students should be given multiple trials to see if their ship kept the passengers in, and water out.

Ultimate Playgrounds

- For this challenge, have students brainstorm and build playgrounds that they would enjoy playing on. Some ideas include glass slides, sandboxes, and water park sprinklers.

Musical Monsters

- This LEGO Club challenge involves combining ideas to create an elaborate monster! To do this every young engineer starts by building their own monster while music plays in the background. Then when the music stops everyone must pass their monster to the left. When the music begins again, kids add onto a fellow LEGO Club member's design. At the end every monster will be unique because of the variety of ideas!

The Name Challenge

- The name challenge is to create your name out of LEGOs. Encourage students to take both a 2D and a 3D approach!

Pyramids

- Begin by discussing Egypt and the amazing pyramids. When an important Pharaoh passed away, he would be put in an elaborate coffin surrounded by treasures to carry with him into the after life. To prevent grave robbers, the Pyramids had complex paths and traps to catch any person who was trying to steal the Pharaohs treasures. Ask students to build a pyramid and enclose an object within it that had significance to them. Some students can even designed traps to capture thieves!

Amazing Mazes

- Challenge students to create a maze that a marble can run through including turns, tunnels, and dead ends to make the maze difficult to navigate. Then, time how long it takes to get the marble through the maze without helping it (only tilting the large base piece). Then time other students using the same maze and see who wins!

Presents

- Everyone loves giving and receiving presents! Challenge students to build a gift they've received, or given. Hopefully someone will build LEGOs!

Pressure

- Have students imagine that their LEGO man is working in a mine underground deep inside the crust of the Earth. They must created a support system so that when the miner works in the mine, the rocks and pressure above will not result in a cave in!
- Discuss how to make strong and durable supports.

The Tower

- Because of overpopulation in LEGOville, the city has decided that because it has no more land to build on, the LEGO people must build up instead of out. The challenge is to help LEGOville solve their problem by constructing the tallest LEGO skyscraper that while maintaining stability.
- Ten minutes later, the LEGO builder is told that their tower must be able to withstand an earthquake (a shake test)
- Discuss the qualities of a tall tower that is able to withstand the earthquake versus a tower that collapsed after the earthquake.

The Bridge

- A LEGO person who lives in the United States wants to visit his LEGO friend in England. To get across the ocean that separates the U.S. and England, LEGO man can only drive. Challenge students to build a bridge that is strong and sturdy so no LEGO people fall into the ocean (or sink).
- Discuss how to make supports for the bridges using trusses and arcs.

Build your fears

- Challenged young engineers to build their fears! Common fears include crabs, boats, stairs, or even girls! Building their fears in LEGOs helped some of the children to be less scared of the things they built.

Amusement Parks

- Amusement parks are filled with fun rides that involve lots of physics and engineering to make them work. Challenge young engineers to build various parts of an amusement park.