

Great Ball Contraption CHALLENGE

A GEARS/ETHOS EVENT



The Great Ball Contraption Challenge is a new program designed to encourage small teams to push the limits of LEGO engineering. The task is simple, move a ball from one corner of a baseplate to the next. But the challenge is to move it in a Rube Goldberg Machine style. How complicated or creative can this movement be?

With the COVID safety concerns continuing into the spring season, we encourage teams to meet off-campus to build and create on their own time. GEARS will have open lab nights each week starting in March for teams to visit, brainstorm, gather pieces and build.

This program is also open to all ages. If parents want to be part of a team with a child, that is fine. If an adult wishes to build their own module, that would be acceptable too.

The Challenge will conclude on May 22nd at the Showcase Event when all of the teams gather to line up their modules and watch the balls pass from one to the next creating a Great Ball Contraption.

Objective

Create a module that can move a LEGO Sports Ball from the left front corner of a baseplate to the right front corner in a unique method.

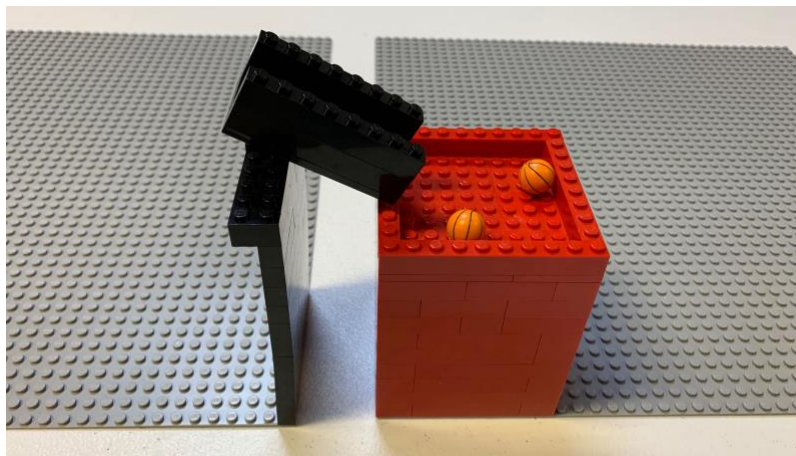
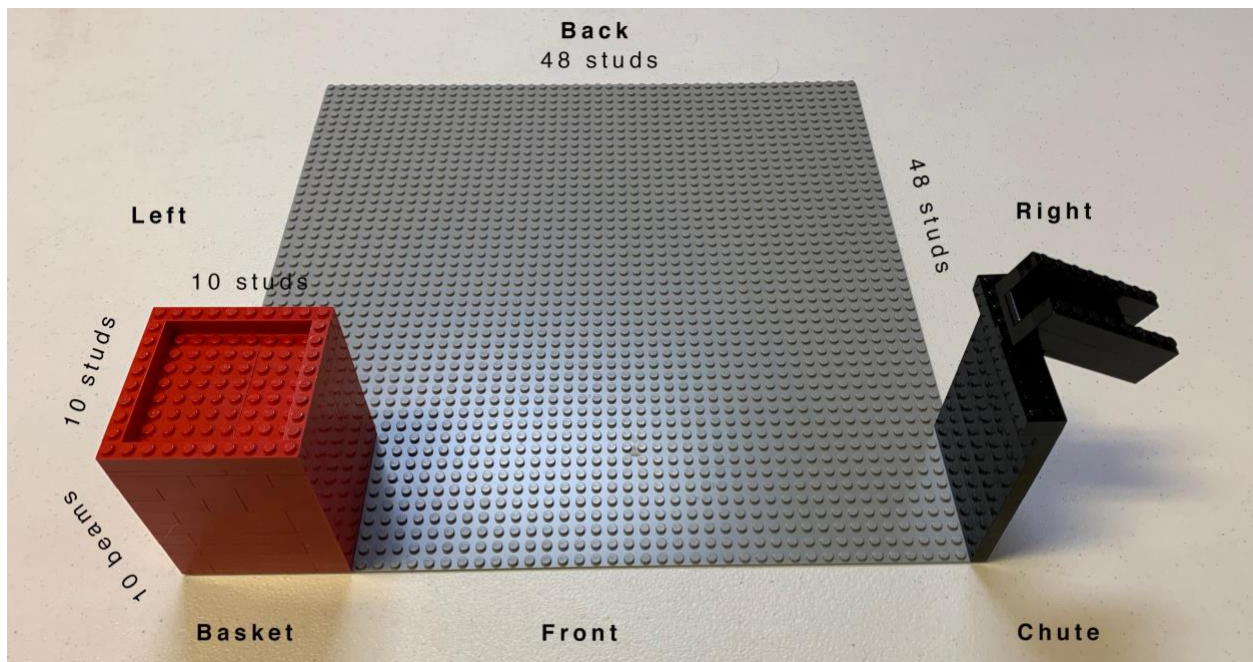
Legal Parts

Only LEGO products can be used. These include but are not limited to the following lines:

- System
- Technic
- Mindstorms
- Power Functions
- BOOST

Building Guidelines

- Module should be designed to fit completely on a single Classic Gray **Baseplate** (48x48).
- Consideration for extra width will be given on an individual basis.
- No extra depth for building is allowed.
- Electronics can extend off the back of the baseplate if needed.
- Modules do not have a height restriction.
- A **Basket** must be in the front left corner.
- A **Chute** must be in the front right corner and extend in the neighboring module.
- Module should be able to accept and deliver 1 ball per second.



The **Chute** from one module will deliver balls to the **Basket** of the next one.

Glossary of Terms

Balls – See LEGO Sports Ball.

Baseplate – Plates that are built on. They have **studs** on the top and smooth bottoms.

Basket – Part of the module that accepts the ball from the neighboring module.
Size is 10 x 10 outside dimension, 8 x 8 inside dimension, 10 bricks tall.

Beam – Technic LEGO that does not have **studs**.

Brick – Standard LEGO piece that is at least 3 **plates** high.

Chute – Part of the module that releases the ball to the neighboring module. It must drop the ball in a controlled manner into the next **Basket**.

LEGO Sports Ball – (also called **Ball**) Found in Soccer sets from 1998-2006 and Basketball sets from 2003-2006. Each ball is 1.75 **studs** in diameter.
Bricklink items: Soccer ball – x45pb03, Basketball – 43702pd02.

Measurements – All dimensions are in LEGO. A **Brick** is 1 LEGO tall. A **Stud** is one LEGO wide.

Module – Self-contained machine that moves balls through it in a unique way.

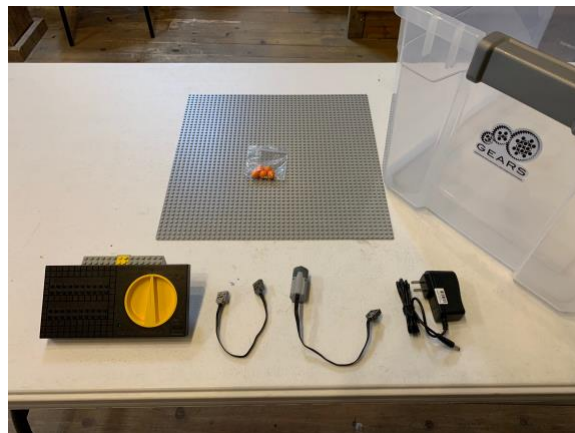
Plate – A thin LEGO part, 3.2 mm high. When you put 3 of them on top of each other, you get a **Brick**.

Stud – Circular bumps on the top of LEGO bricks as part of their interlocking technology. Studs are also used as a form of measurement.

GEARS Kit of Parts

Registration for the **Great Ball Contraption Challenge** includes the use of a kit of parts. These parts must be returned after the showcase. Any missing parts will be invoiced for the replacement value.

- Large tote for storing and transporting
- Classic Gray Baseplate (48x48 studs)
- 5 LEGO Sport Balls
- Train Speed Regulator and transformer
- Power Function Motor
- Power Function Extension Wire
- Optional Electronics
 - o EV3 brain, sensors and motors
 - o EV4/Spike Prime brain, sensors and motors



Registration

- Teams – 1-2 members per module
- Ages – Open to all ages, including adults
- Cost – \$75 per participant

Schedule

Due to the current COVID safety precautions, this program is intended for families to build at home with minimal time spent at either GEARS location. Open lab time at GEARS is a chance to get additional pieces and trouble shoot engineering challenges.

- Registration Opens – March 1
- Kit Pick-up Begins – March 2
- GEARS Lab Time Begins – March 8
 - o GEARS @ ETHOS on Mondays from 6-8pm
 - o GEARS @ Granger on Tuesdays from 6-8pm
- Showcase Event date – May 22

Showcase Event

On Saturday, May 22, teams will gather at GEARS with their modules. Each module will be set up and balls will transfer from module to module creating the Great Ball Contraption. Awards will be given for the following categories:

- Exceptional LEGO Engineering
- Use of System LEGO
- Use of Technic LEGO
- Outstanding Theme