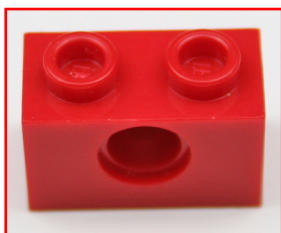


PARTS, PIECES, AND TERMINOLOGY

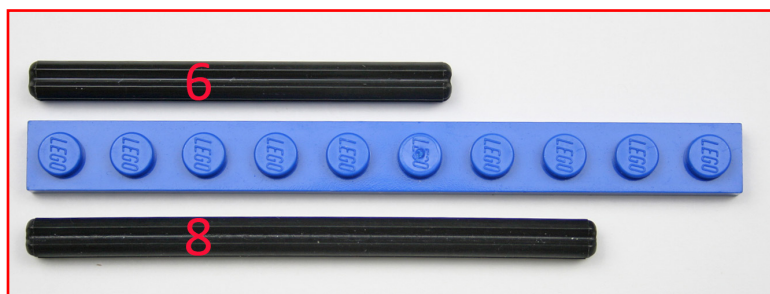
First, a little on LEGO® brick terminology. Regular bricks are referred to by the number of studs—the raised parts on top. They can be any number of studs wide and any number in length. For example, below is pictured a 2x4 brick (read “two by four”), one of the most basic pieces.



This piece is two studs wide by four studs long. Here’s a 1x2 brick with a hole in the middle:





Axles are indicated by how many studs long they are. Line up the axle next to a brick and count the number of studs. The axle’s lengths in each experiments’ parts list are marked by a red number. The example below picture shows axles that are six and eight studs long.



Other bricks are more unique in shape and size, and most are available in more than one color. A specific design of a brick has a **Design Number**. The same brick design is interchangeable

with other bricks of the same design, even if they are a different color. To specify both a color and design, you need the **Item Number**. For example, a 1x2 brick with a hole in it has a certain **Design Number**, but that part can be red, blue, or many other colors. The red and blue versions each have a unique **Item Number**, which specifies both the design and color.

	Design Number	Item Number
	3700	3700021
	3700	3700023

With that understanding, below are the LEGO® parts and pieces needed for the experiments in this workbook. You may already have many of them in your collection. For those missing, they’re listed in the table by both **Design Number** and **Item Number**. Even if you don’t have the same color of a particular brick, as long as you have the same design, you’ll be fine. Your model will just look a little different than the pictures in the workbook. Send pictures and we’ll post them on our website!

PURCHASING LEGO® BRICKS

There are particular bricks you need for the course and a few non-LEGO parts. As a convenience for you Beakers & Bricks makes a Large Kit that includes everything you need, including the non-LEGO parts. Or, if you want to get the bricks on your own (maybe you have a bunch already!), Beakers & Brick makes a Small Kit that includes just the non-LEGO brick parts.

If you decide to get the bricks on your own, the LEGO Group has two sites where you can find what you need. On either site type in the **Item** or **Design Number** and the site will come up with the part if it’s available. Add the quantity you need to your cart and continue that process for all the parts. It’s easy and quick to order, although it might take a while for some parts to get to you—they may be coming all the way from Denmark! Please plan accordingly.

6 INTRODUCTION TO PHYSICS AND ENGINEERING

One last note: the LEGO Group occasionally changes the Design and Item Numbers. If you see any changes, please let me know. To the best of my ability I'll keep an updated parts list on our website.

The non-LEGO brick parts include a length of micro-para-cord, a particular size and strength of rubber bands, and a short wooden dowel made out of hard maple. These you can obtain yourself at a hobby or craft store, or you can purchase the kit.

WEBSITE ADDRESSES

Beakers & Bricks: <https://edible-knowledge.com/store/>

- the Large Kit (all LEGO brick and non-LEGO brick parts) and Small Kit (non-LEGO brick parts only) are available here

Pick-A-Brick™: <https://www.lego.com/en-us/pick-and-build/pick-a-brick>

Bricklink: <https://www.bricklink.com/v2/main.page>















BRICKS & PIECES™

Part Name	Color	Item Number	Design Number	Quantity Needed	Part Picture
Technic 7M Beam	blue	4506043	32524	4	
Technic 3M Beam	blue	4509376	32523	2	
Connector peg W. Friction 3M	blue	4514553	6558	9	
Beam 1x1	gray	6100030	18654	3	
Tube Wdouble 04.85	light gray	6173127	29219	2	
Beam R.Frame 5x11 04.85	light gray	4540797	64178	2	
beam 3M. W/4 SNAPS	gray	6282158	65489	2	
Angular Beam 90Degr. W.4 snaps	gray	6313453	49130	2	
Rim Narrow 018x7 W Hole 04.8	light gray	6044729	13971	4	
Double Cross Block	light gray	6276969	42142	2	
DOUBLE CONICAL WHEEL Z20 1M	tan	6346517	18575	2	
TECHNIC ANG. BEAM 4X2 90 DEG	light gray	6271831	42137	4	
Universal Joint	light gray	6335279	61903	4	
2x1x3 Steering Knuckle Arm	light gray	6331859	61408	1	
cross axle 12M	black	370826	3708	2	






8 INTRODUCTION TO PHYSICS AND ENGINEERING

Part Name	Color	Item Number	Design Number	Quantity Needed	Part Picture
Technic Lever 3M	black	6331723	65123	2	
Angle Element, 180 Degrees (2)	black	4107783	32034	2	
Cross Blok 3M	black	4173970	42003	2	
Worm	light gray	6185471	32905	1	
Cross Axle, Extension, 2M	red	4513174	59443	1	
Spool 0 15,83 x 7,99	light gray	4521532	61510	1	
Gear Wheel Z24	gray	6133119	24505	3	
Gear Wheel T=8, M=1	gray	6012451	10928	2	
Toothed Bar M=1, Z=10	light gray	4211450	3743	2	
Gear Wheel 40T	light gray	6195314	34432	2	
Technic Lever 4M	light gray	4211561	32006	2	
TECHNIC ANG. BEAM 3X5 90 DEG.	white	4585040	32526	2	
Cross Axle 3M	light gray	4211815	4519	4	
Plate 1x10	blue	447723	4477	1	
Plate 6x8	blue	303623	3036	2	



PICK-A-BRICK™

Part Name	Color	Item Number	Design Number	Quantity Needed	Part Picture
Technic 15M beam	blue	6057799	64871	15	
Technic Brick 1x2, 04.9	red	3700021	3700	2	
Technic Brick 1x2, 04.9	blue	3700023	3700	2	
HUB 011,2 x 7,84	light gray	4211758	42610	1	
Connector peg W. Friction	black	4121715	2780	41	
1/2 bush	light gray	6271165	42136	8	
Connector Peg	light gray	4211807	3673	1	
bush for cross axle	light gray	6275844	42978	14	
Plate 2x4	dark gray	4211065	3020	2	
TECHNIC ANG. BEAM 3X5 90 DEG.	gray	4211713	32526	1	
Cross Axle 4M	black	370526	3705	3	
Cross Axle 6M	black	370626	3706	5	
Cross Axle 8M	black	370726	3707	1	
1 1/2 M Connecting Bush	tan	6013938	32002	4	

10 INTRODUCTION TO PHYSICS AND ENGINEERING

Part Name	Color	Item Number	Design Number	Quantity Needed	Part Picture
Double Conical Wheel Z12 1M	black	4177431	32270	3	
Connector Peg/Cross Axle	tan	4666579	6562	2	
Brick 2x4	red	300121	3001	32	
Brick 2x2	red	300321	3003	2	
Brick 2x8	red	6036408	93888	6	

NON LEGO® ITEMS

	Quantity	Part Picture
2 3/16" long wood dowel, 3/4" to 1" in diameter, preferably oak or similarly dense wood	1	
Micro paracord 1.18mm in diameter	64 inches	
3 1/2" x 1/4" rubber band	1	