LEGO Basics

Georgia Tech
LEGO UNITS

1 STUD LENGTH

8 [STUDS]

2 [STUDS]

1.2 [STUDS]
LEGO Heights

3 PLATES = 1 BRICK HEIGHTH = 1.2 [STUDS]

0.4 [STUDS]
Types of Bricks

**Technic Brick**
- 4 studs and 3 holes
- Holes shifted by 1/2 stud from top studs!

**Brick**
- 1 stud

**4 Studs and 3 Holes**
Alignment of Horizontal/Vertical Holes

6 bricks = EXACTLY 7 HOLES

ONLY THESE HOLES LINE UP!

4*1.2 + 2*0.6 = 4.8 + 1.2 = 6 [STUDS]

6 [STUDS]

6 BRICKS = EXACTLY 7 HOLES
Alignment Patterns

2 bricks + 2 plates = exactly 3 holes

2*0.4 + 2*0.6 = 0.8 + 1.2 = 2 [studs]
Alignment Patterns

Insert Technic pin every 3 holes
Alignment Patterns

4 bricks + 1 plates = 5 holes

2 \times 1.2 + 0.4 \times 2 \times 0.6 = 2.8 + 1.2 = 4 \text{ [STUDS]}

4 \text{ [STUDS]}

4 \text{ BRICKS} + 1 \text{ PLATES} = 5 \text{ HOLES}
LEGO CAD and ONLINE Reference

• DEMO LEGO BRICKSMITH

• PARTS: GUIDE.LUGNET.COM/PARTSREF
LEGO Technic Angle Connectors

#1  #2  #3  #4  #5  #6
LEGO Technic Axle

(notched)

(With Stud)

Number = axle length in Lego units
Technic Flexible Axle

#11

#12

#16

#14

#19

NUMBER = AXLE LENGTH IN LEGO UNITS
Technic Axle Joiners

Plain

Perpendicular

Perpendicular 3L

Perpendicular 3 Long

Perpendicular Double
Miscellaneous Axle Pieces

Axle Pin
Axle Towball
Axle Nut
Connector with Axlehole
Connector
SMALL Technic Bricks

Technic Brick 1x1 with hole

Technic Brick 1x2 with axlehole

Technic Brick 1x2 with hole

Technic Brick 1x2 with holes
MEDIUM Technic Bricks

TECHNIC BRICK 1X4 WITH HOLES

TECHNIC BRICK 1X6 WITH HOLES

TECHNIC BRICK 1X8 WITH HOLES

TECHNIC BRICK 1X10 WITH HOLES
LARGE Technic Bricks

TECHNIC BRICK 1X12 WITH HOLES

TECHNIC BRICK 1X14 WITH HOLES

TECHNIC BRICK 1X16 WITH HOLES
“A mechanical **bushing** is a cylindrical lining designed to reduce friction and wear, or constrict and restrain motion of mechanical parts.” (Wikipedia)
“A cam is a projecting part of a rotating *wheel* or shaft that strikes a *lever* at one or more points on its circular path.” (Wikipedia)
Small Technic Gear

Gear 8 Tooth

Gear 12 Tooth Bevel

Gear 12 Tooth Double Bevel

Gear 14 Tooth Bevel

Gear 16 Tooth
Technic Gear

Gear 16 Tooth with Clutch

Gear 24 Tooth

Gear 24 Tooth with Clutch

Gear 24 Tooth Crown
Technic Gear

Gear 40 Tooth

Gear Rack 1 x 4
Technic THICK Liftarms
Straight

LIFTARM 1 X 3 STRAIGHT

LIFTARM 1 X 5 STRAIGHT

LIFTARM 1 X 9 STRAIGHT

LIFTARM 1 X 15 STRAIGHT
Technic Liftarm Bent

LIFTARM 1 X 7 BENT

LIFTARM 1 X 9 BENT

LIFTARM 1 X 9 BENT

LIFTARM 1 X 11.5 DOUBLE BENT
Technic Liftarm L shape

Liftarm 2 x 4 L shape

Liftarm 3 x 3 L shape

Liftarm 3 x 5 L shape
Technic pins

Technic Pin

Technic Pin 3L Double

Technic Pin 1/2

Technic Pin 3/4

Technic Pin Long with Friction

Technic Pin with Friction

Technic Pin Long with Stop Bush
Technic pin Joiners

Technic Pin Joiner Dual Perpendicular

Technic Pin Joiner Round
Technic plate

Technic plate 2 x 4 with holes

Technic plate 2 x 6 with holes

Technic plate 2 x 8 with holes
Technic plate

Technic plate 2 x 4 with holes

Technic plate 2 x 6 with holes

Technic plate 2 x 8 with holes
Technic
miscellaneous

Technic Pulley Large

Technic Universal Joint

Technic Universal Screw
**Slope brick**

Technic Slope Brick 18 4 x 2

Technic Slope Brick 33 3 x 1

Slope Brick 33 3 x 1 Inverted

Slope Brick 33 3 x 2

Slope Brick 33 3 x 2 Inverted
Slope bricks

Technic Slope Brick 33 3 x 3

Technic Slope Brick 33 3 x 4

Slope Brick 45 2 x 1

Slope Brick 45 2 x 1 Inverted

Slope Brick 45 2 x 2
Slope bricks

Technic Slope Brick 45 2 x 2 Inverted

Technic Slope Brick 45 2 x 3

Slope Brick 45 2 x 4

Slope Brick 65 2 x 2 x 2

Slope Brick 75 2 x 2 x 3
Plates
Special Gear Arrangements
Rack and Pinion

Rotation to Linear Motion

“A rack and pinion is a pair of gears which convert rotational motion into linear motion. The circular pinion engages teeth on a flat bar - the rack. Rotational motion applied to the pinion will cause the rack to move to the side, up to the limit of its travel.” (Wikipedia)
Worm Gear

(under construction)