

FIRST[®] LEGO[®] League **TUTORIALS**

Powered by EV3Lessons

LEGO CAD Software

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ROBOT DESIGN LESSON

WHY USE LEGO CAD SOFTWARE?

- **Can be an easy way to share your designs with others**
 - EV3Lessons shares many designs using LEGO Digital Designer (LDD)
- **Can help you document your designs and enable someone to create a duplicate or make repairs**
 - FIRST LEGO League and WRO teams often create their design in LDD for documentation purposes
- **Can be used to upload your design into some virtual robotics environments**
 - Tools such as Cogmation's Virtual Robotics Toolkit enable users to upload their own robot designs in a simulated environment

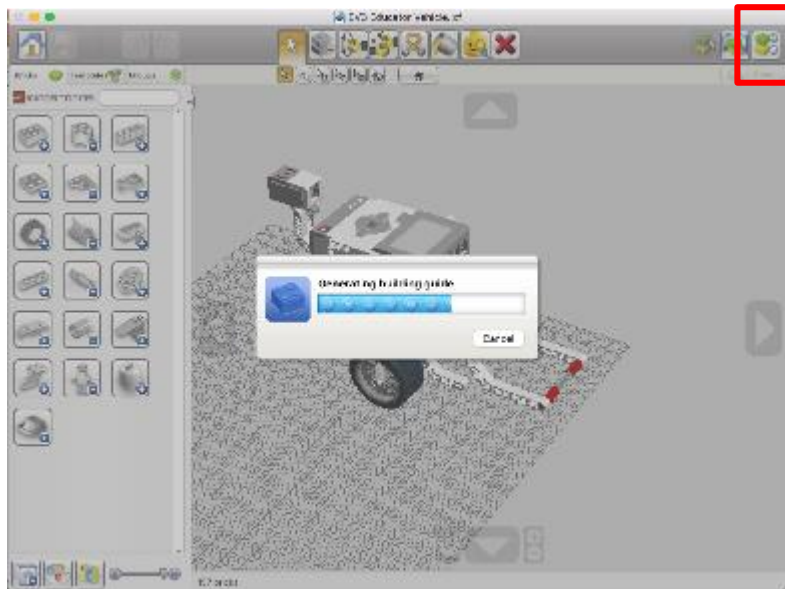
LEGO DIGITAL DESIGNER

- There are many tools available for creating LEGO designs
- LEGO Digital Designer (LDD) is frequently used and free to download here: <http://ldd.lego.com/en-us/download>
- You can open .lxf files on EV3Lessons.com using this software

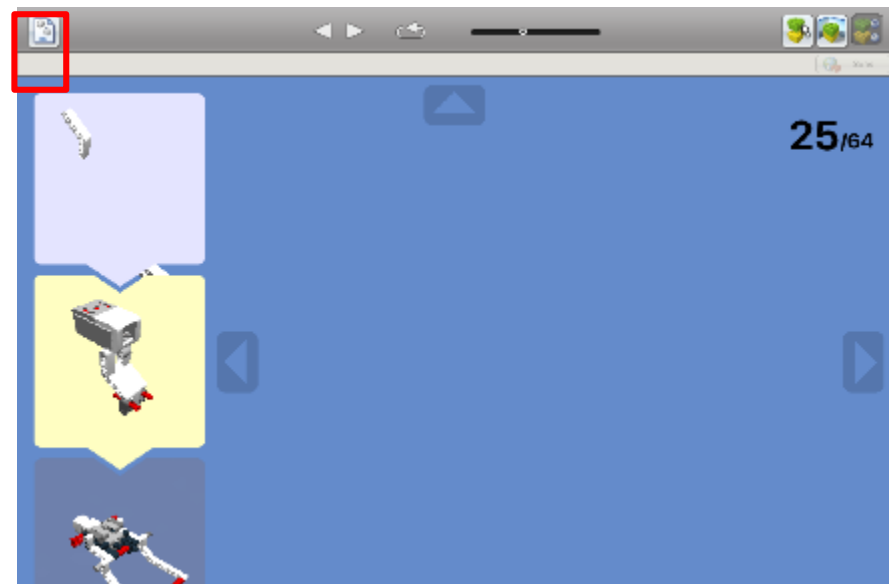


GENERATING HTML BUILDING GUIDE FROM .LXF FILES

Select Building Guide Mode Icon



Select HTML Icon

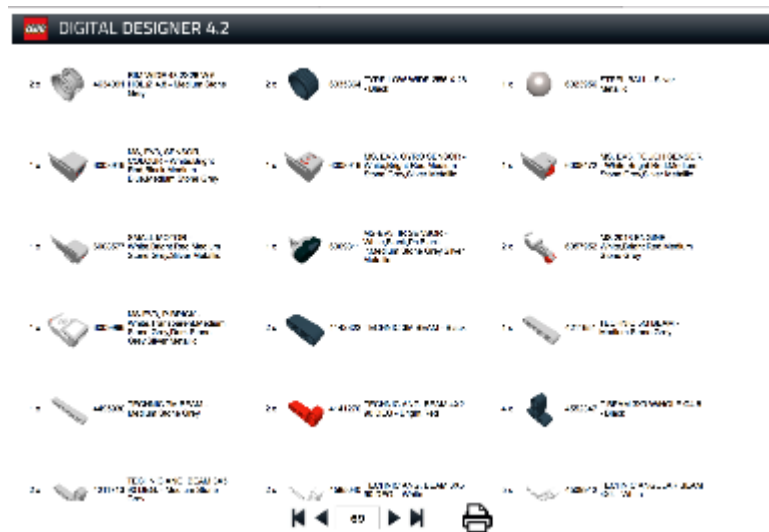
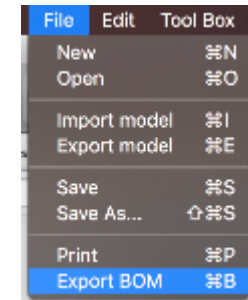


Note: Building Instructions created by LEGO Digital Designer often don't make sense and cannot be customized

GENERATING A PARTS LIST

- The last page of the build instructions (HTML Building Guide mode) has a parts list

- Alternatively, you can select **Export BOM (Bill of Materials)** from the menu

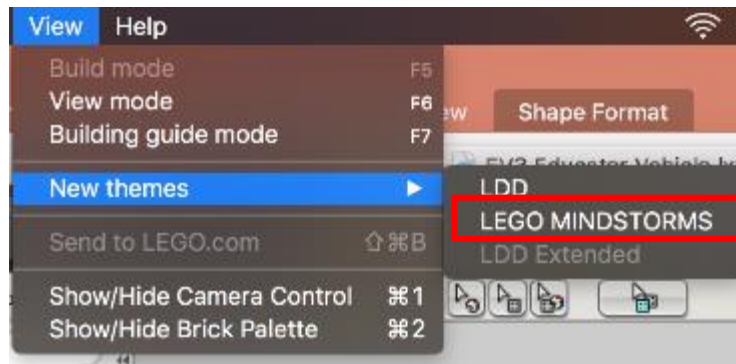


	A	B	C	D	E	F
1	Brick	Name	Picture	Part	Color code	Quantity
2	4634091	RIM WIDE 43, 2X26 W 5 HCL Ø 4.8		56908	194 - Medium Stone Grey	2
3	6035364	TYRE LOW WIDE Ø56 X 28		41897	25 - Black	2
4	6023055	STEEL BALL		99646	315 - Silver Metallic	1
5	6008919	MS, EV3, SENSOR, COLOUR		95650	194 - Medium Stone Grey, 1 -	1
6	6008916	MS, EV3, GYRO SENSOR		99380	194 - Medium Stone Grey, 1 -	1
7	6008472	MS, EV3, TOUCH SENSOR		95648	194 - Medium Stone Grey, 1 -	1
8	6008577	SMALL MOTOR		99455	21 - Bright Red, 194 - Medium	1
9	6008811	MS-EV3, IR SENSOR		95654	194 - Medium Stone Grey, 1 -	1

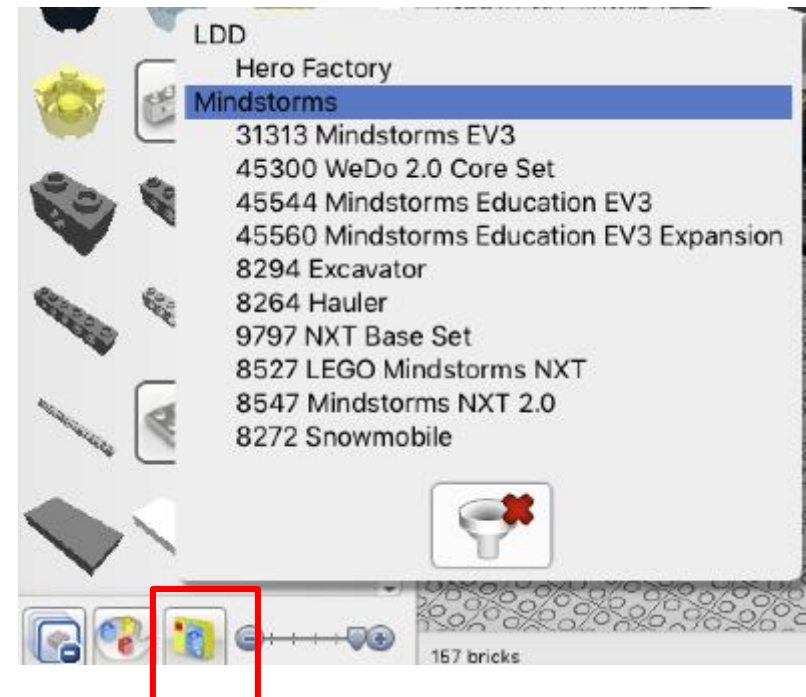
USING LDD TO CREATE MINDSTORMS DESIGNS

TIP #1: Filtering will help you find MINDSTORMS-related parts quickly

Step 1: File → View → New Themes Select MINDSTORMS

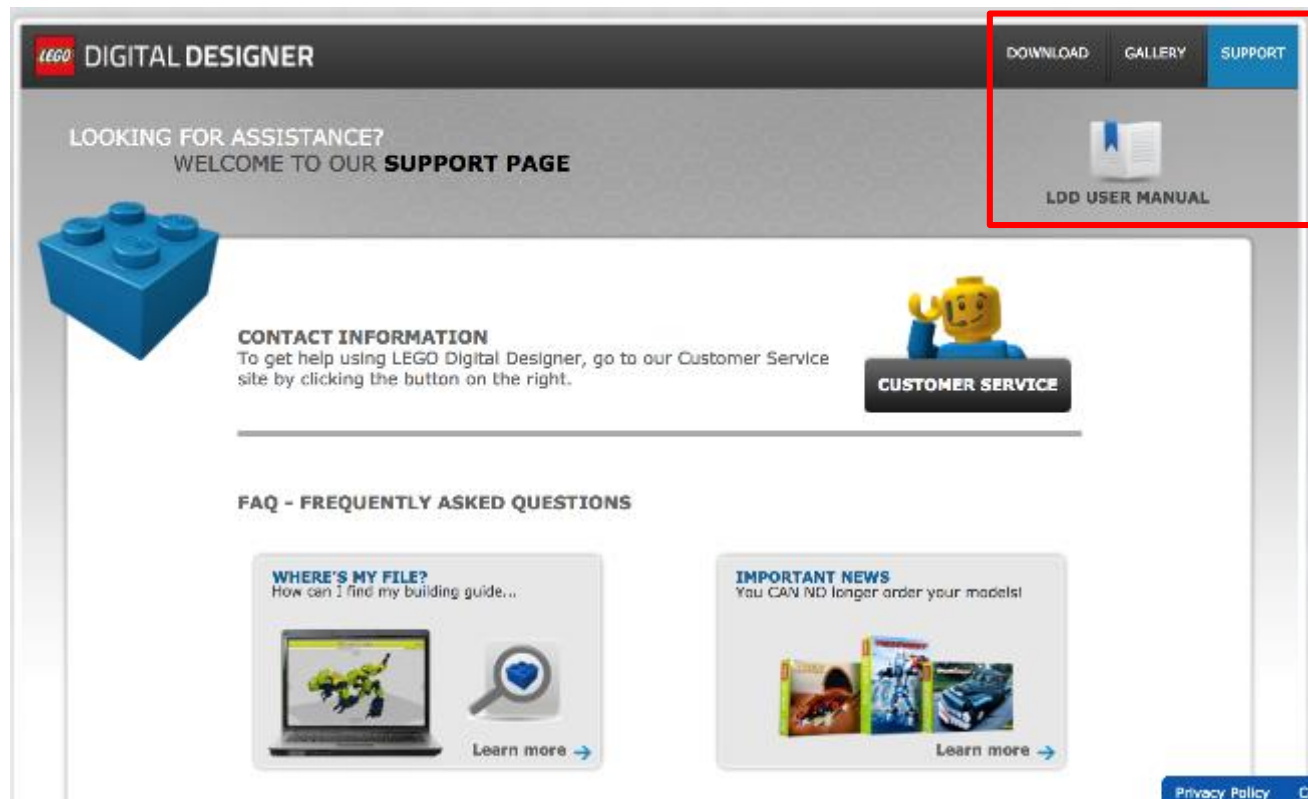


Step 2: Bottom Left corner: Select “Filter Bricks by Boxes” and then select which MINDSTORMS kit you want to use.



USING LDD TO CREATE MINDSTORMS DESIGNS

TIP #2: Read the Support Manual which can be downloaded at <http://ldd.lego.com/en-us/support>



LOTS MORE TIPS & TRICKS

Virtual Robotics Toolkit Introduction to LDD Videos:

https://youtu.be/F0bunR-iBHU?list=PLH3wHnw9b170XP7HkZ6wc-FNI_7kxZOyo

https://youtu.be/-laTwfQXmY0?list=PLH3wHnw9b170XP7HkZ6wc-FNI_7kxZOyo

Isaac Lloyd Tips & Tricks Videos:

<https://youtu.be/X4c7Q0W4cDI>

<https://youtu.be/p-UBj76eEGA>

LIMITATIONS WITH LDD

- 1) Build instructions generated by the software often seem out-of-order and do not make sense**
- 2) Build instructions cannot be customized**
- 3) Sometimes builds that work in the real world are not permitted in the LDD environment**
- 4) Pneumatics, rubber bands and other elements often cannot be connected and placed correctly**

OTHER LEGO CAD SOFTWARE

LDCad: <http://www.melkert.net/LDCad>

MLCAD: <http://mlcad.lm-software.com/>

LeoCAD: <http://www.leocad.org/trac>

CREDITS

- This tutorial was created by Sanjay Seshan and Arvind Seshan
- More lessons at www.ev3lessons.com and www.flltutorials.com



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