



 **blender** โครงการพัฒนาทักษะการออกแบบ
3D Modeling
for beginners

ผู้ช่วยศาสตราจารย์จารุต บุศราทิว
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IT@PBRU

๑๘ , ๑๙ , ๒๐ มีนาคม ๒๕๖๖



Blender

- ลำดับการทำงาน (workflow)
- สร้างโมเดลแบบโพลีกอน (Polygon Modeling)

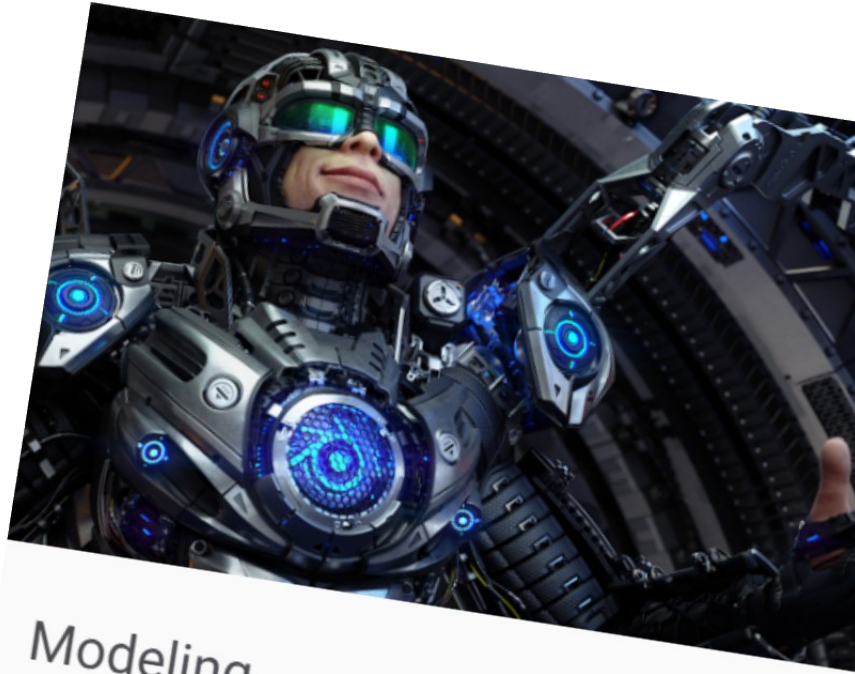


Free and Open Source

Blender is a public project hosted on blender.org, licensed as GNU GPL, owned by its contributors.

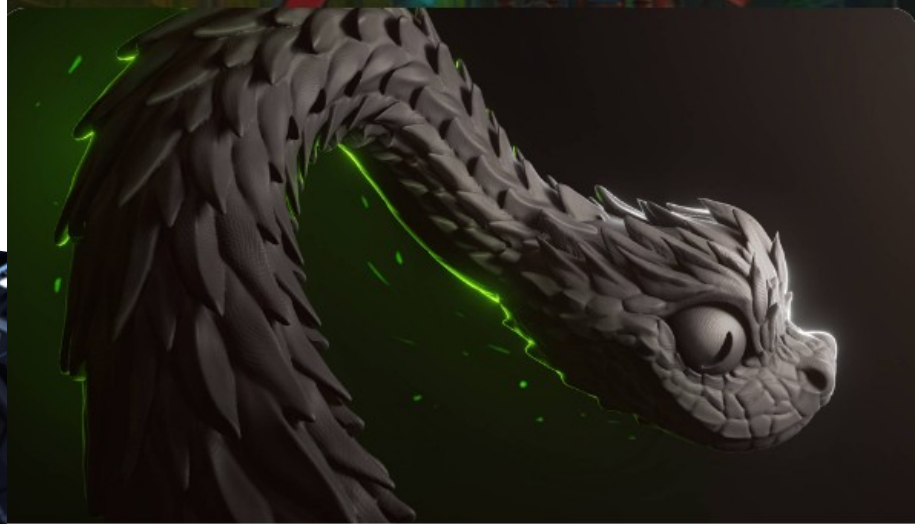
For that reason Blender is Free and Open Source software, forever. [Learn more](#)





Modeling

Sculpting, retopology, modeling, curves.
Blender's modeling toolset is extensive.



Sculpting

Digital sculpting tools provide the power and flexibility required in several stages of the digital production pipeline.





Modeling, Sculpt, UV

Blender's comprehensive array of modeling tools make creating, transforming and editing your models a breeze.

- Full N-Gon support
- Edge slide, inset, grid and bridge fill, and more
- Advanced sculpting tools and brushes
- Multi-resolution and Dynamic subdivision
- 3D painting with textured brushes and masking
- Python scripting for custom tools and add-ons





Rendering

Create jaw-dropping renders thanks to Cycles, high-end production path tracer.



Cycles Render Engine

Cycles is Blender's built-in powerful unbiased path-tracer engine that offers stunning ultra-realistic rendering.

- Real-time viewport preview
- CPU & GPU rendering
- PBR shaders & HDR lighting support
- VR rendering support



Scene

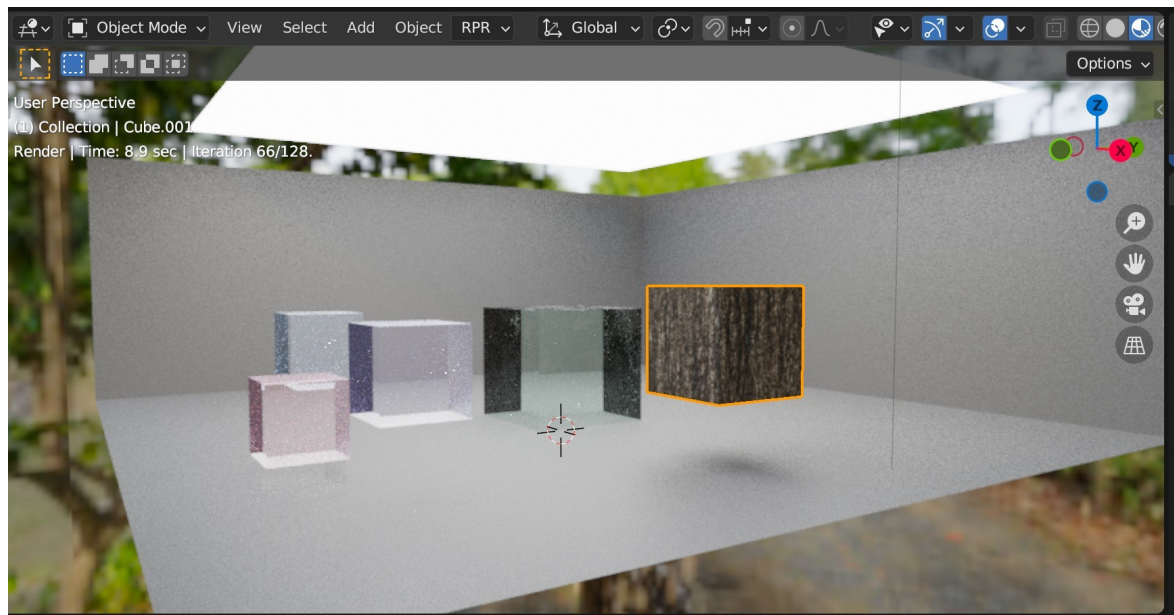
Render Engine: Radeon ProRender

Render Devices

- Intel(R) Co...@ 2.60GHz
- CPU Threads: 12
- AMD Radeon Pro 555X...
- Separate Viewport & Preview Devices

Sampling

- Min Samples: 64
- Max Samples: 128
- Noise Threshold: 0.05
- Time Limit: 0
- Tiled rendering
- Tile X: 512
- Tile Y: 512
- Tile Order: Center Spiral



Blender Window

Blender Render

Frame: 1 | Time: 03:17.91 | Scene: ViewLayer | Render Time: 196.9 sec | Samples: 96/128

Scene Collection

- Collection
- Camera
- Cube
- Cube.001
- Cube.002
- Cube.003
- Cube.004
- Light

CPU Time | Threads | Idle Wake Ups

CPU Time	Threads	Idle Wake Ups
34:57.81	83	163
1:44:16.44	15	25
1.55	2	0
5:59.06	4	0
15:52.76	11	94
59:18.59	250	2295
14.19	4	4
1:12.87	4	5

System: 7.92%
User: 82.78%
Idle: 9.33%

CPU LOAD

Threads: Processes:

- Interface
- Themes
- Viewport
- Lights
- Editing
- Animation
- Add-ons
- Input
- Navigation
- Keymap
- System
- Save & Load
- File Paths

▼ Cycles Render Devices

None | **CUDA** | OptiX | HIP | oneAPI

- NVIDIA GeForce GTX 970M (Display)
- Intel Core i7-6700HQ CPU @ 2.60GHz

▼ Operating System Settings

Make this installation your default Blender

Make Default

▼ Memory & Limits

Undo Steps	32
Undo Memory Limit	< 0 >
<input checked="" type="checkbox"/> Global Undo	
Console Scrollback Lines	256
Texture Time Out	120
Garbage Collection Rate	60
VBO Time Out	120
Garbage Collection Rate	60

▼ Video Sequencer

Memory Cache Limit 8192

Disk Cache

None | CUDA | OptiX | **HIP** | oneAPI

i No compatible GPUs found for Cycles
Requires AMD GPU with Vega or RDNA architecture
and AMD Radeon Pro 21.Q4 driver or newer

None | CUDA | OptiX | HIP | **oneAPI**

i No compatible GPUs found for Cycles
Requires Intel GPU with Xe-HPG architecture
and Windows driver version 101.3430 or newer





Animation & Rigging

Designed for animation, Blender is being used for award-winning shorts and feature films.

VFX

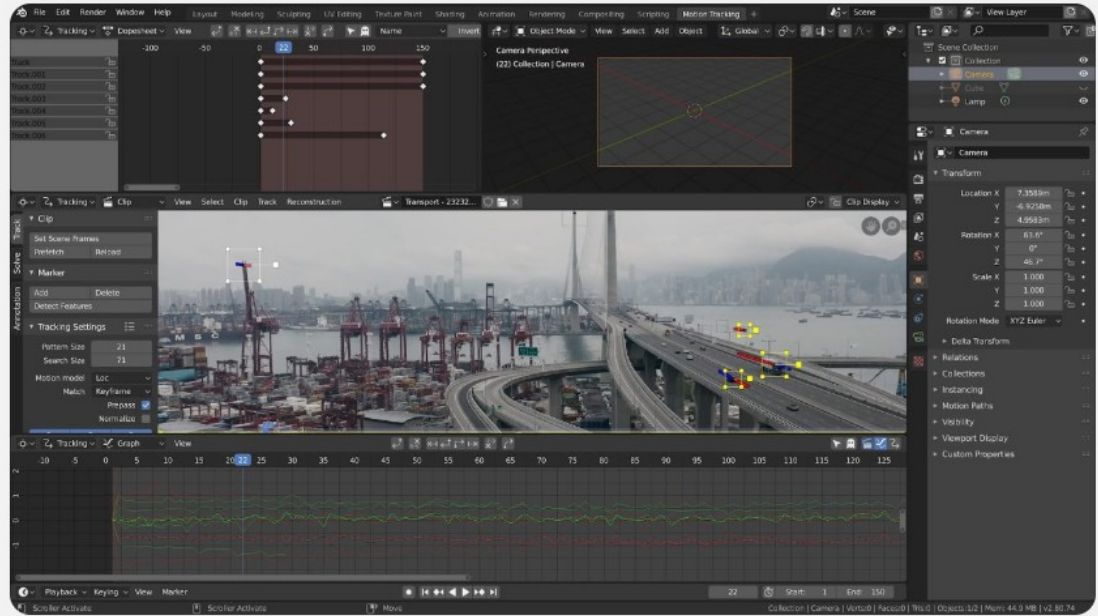
From camera and object motion tracking to masking and compositing, you can “fix it in post”.

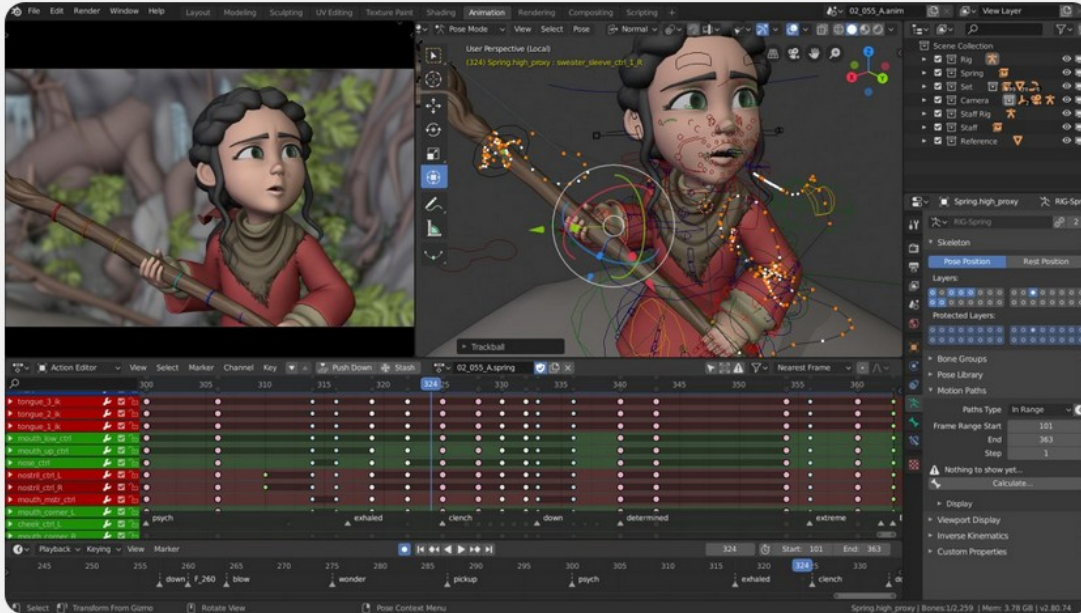


VFX

VFX professionals say: “Probably the best tracker in the market”. Blender includes production ready camera and object tracking. Allowing you to import raw footage, track the footage, mask areas and see the camera movements live in your 3D scene. Eliminating the need to switch between programs.

- Auto and Manual tracking
- Powerful camera reconstruction
- Real-time preview of your tracked footage and 3D scene
- Support for Planar tracking and Tripod solvers





Animation & Rigging

Thanks to the high quality rigging and animation tools, Blender is being used for numerous short films, advertisements, TV series and feature films now.

- Envelope, skeleton and automatic skinning
- B-spline interpolated bones
- Curve editor and dope sheets
- Custom bone shapes for fast input
- Sound synchronization



Story Art, Drawing 2D in 3D

Really! Drawing directly in a 3D viewport makes a lot of sense. It opens unsurpassed workflow freedom for storyboarders and 2D artists.

- Combine 2D with 3D right in the viewport
- Full Animation Support with Onion Skinning
- Layers & Colors for Stroke and Fill
- Sculpt brush strokes & Parent to 3D objects





Video Editing

The Video Editor offers a range of basic yet very efficient tools.



Simulation

Featuring industry-standards libraries like Bullet and MantaFlow, Blender offers powerful simulation tools.



```
97     row = layout.row(align=True)
98     row.prop(ob, "rotation_mode")
99     row.label(text="", icon='BLANK1')
100
101
102
103 class OBJECT_PT_delta_transform(ObjectButtonsPanel, Panel):
104     bl_label = "Delta Transform"
105     bl_parent_id = "OBJECT_PT_transform"
106     bl_options = {'DEFAULT_CLOSED'}
107
108     def draw(self, context):
109         layout = self.layout
110         layout.use_property_split = True
111         flow = layout.grid_flow(row_major=True, columns=0, even_colu
even_rows=True, align=False)
112
113         ob = context.object
114
115         col = flow.column()
116         col.prop(ob, "delta_location")
```

Scripting

Featuring an extensive Python API, every tool is available for scripting and customization.



Make it Your Own

Blender has a flexible Python controlled interface. Layout, colors, size and even fonts can be adjusted. Use hundreds of add-ons by the community or create your own using Blender's accessible Python API.

- Customize the interface layout and colors
- Hi-res/Retina screen support
- Create your own tools and add-ons
- Draw over the OpenGL viewport
- Connect with Blender's Render API



The Freedom to Create

 [Download Blender 3.4.1](#)

Windows · Installer · 257MB · 

macOS, Linux, and other versions 

[Looking for Blender LTS?](#)



LTS Releases Currently Maintained



Blender 3.3 LTS

The first long-term support release of the 3.x series. Supported until September 2024.



Blender 2.93 LTS

Blender 2.93 is the second installment of the LTS program with official support until 2023.





ความต้องการของโปรแกรม


Blender



Ready for action.

Whether it's on a USB stick, sitting on a folder on your desktop, or fully installed, Blender runs out of the box.




-  **No installation needed.**
-  **No internet connection required.**

 Truly portable, take it with you wherever you go!



Runs anywhere.












Blender is cross-platform, it runs on every major operating system:

-  Windows 8.1, 10, and 11
-  macOS **10.13** Intel · **11.0** Apple Silicon
-  Linux

All efforts to make Blender work on specific configurations are welcome, but we can only officially support those used by active developers.

For Windows there is an installer available if you wish to add an icon on the desktop, associate .blend file extensions, etc.



 blender-3.4.0-linux-x64.tar.xz
 blender-3.4.0-macos-arm64.dmg
 blender-3.4.0-macos-x64.dmg
 blender-3.4.0-windows-x64.msi
 blender-3.4.0-windows-x64.msix
 blender-3.4.0-windows-x64.zip
 blender-3.4.0.md5
 blender-3.4.0.sha256
 blender-3.4.1-linux-x64.tar.xz
 blender-3.4.1-macos-arm64.dmg
 blender-3.4.1-macos-x64.dmg
 blender-3.4.1-windows-x64.msi
 blender-3.4.1-windows-x64.msix
 blender-3.4.1-windows-x64.zip



Hardware Requirements

Minimum

- 64-bit quad core CPU with SSE2 support
- 8 GB RAM
- Full HD display
- Mouse, trackpad or pen+tablet
- Graphics card with 2 GB RAM, OpenGL 4.3
- Less than 10 year old

Recommended

- 64-bit eight core CPU
- 32 GB RAM
- 2560×1440 display
- Three button mouse or pen+tablet
- Graphics card with 8 GB RAM



Supported Graphics Cards

Always make sure to install the latest drivers from the graphics card manufacturer website. These requirements are for basic Blender operation, Cycles rendering using the GPU has higher [requirements](#).

NVIDIA

GeForce 400 and newer, Quadro Tesla GPU architecture and newer, including RTX-based cards, with NVIDIA drivers (list of all [GeForce](#) and [Quadro](#) GPUs)

AMD

GCN 1st gen and newer. Since Blender 2.91, Terascale 2 architecture is fully deprecated, try using 2.90 (albeit not supported, it might still work) [[list of all AMD GPUs](#)]

Intel

Haswell architecture and newer. [[list of all Intel GPUs](#)]

macOS

Version **10.13** or newer for Intel processors on supported hardware. Version **11.0** for Arm-based processors (Apple Silicon).



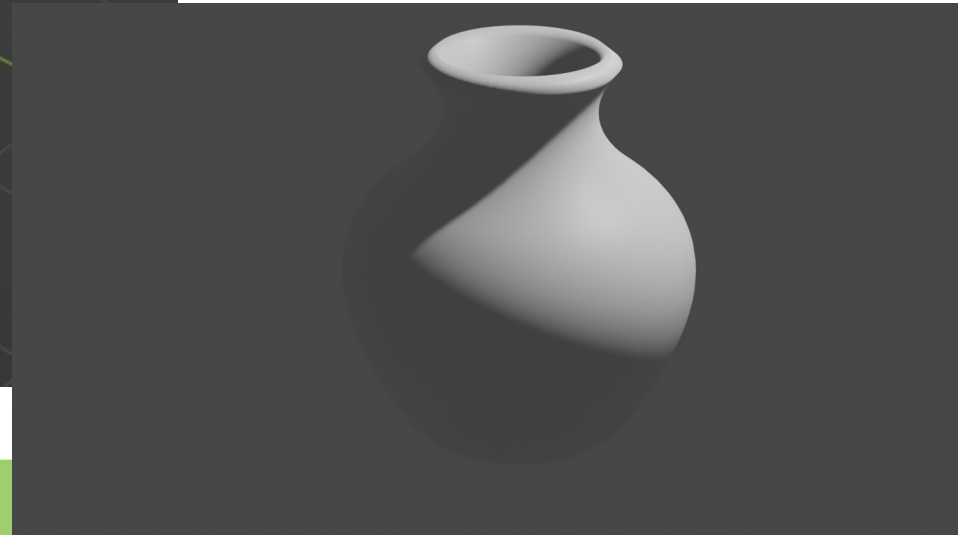
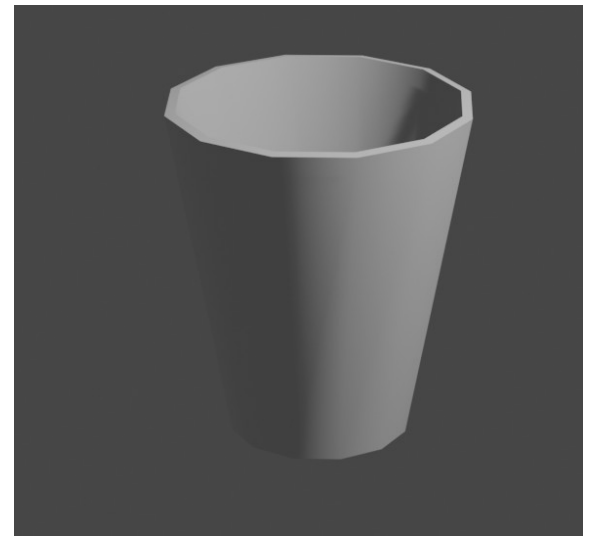
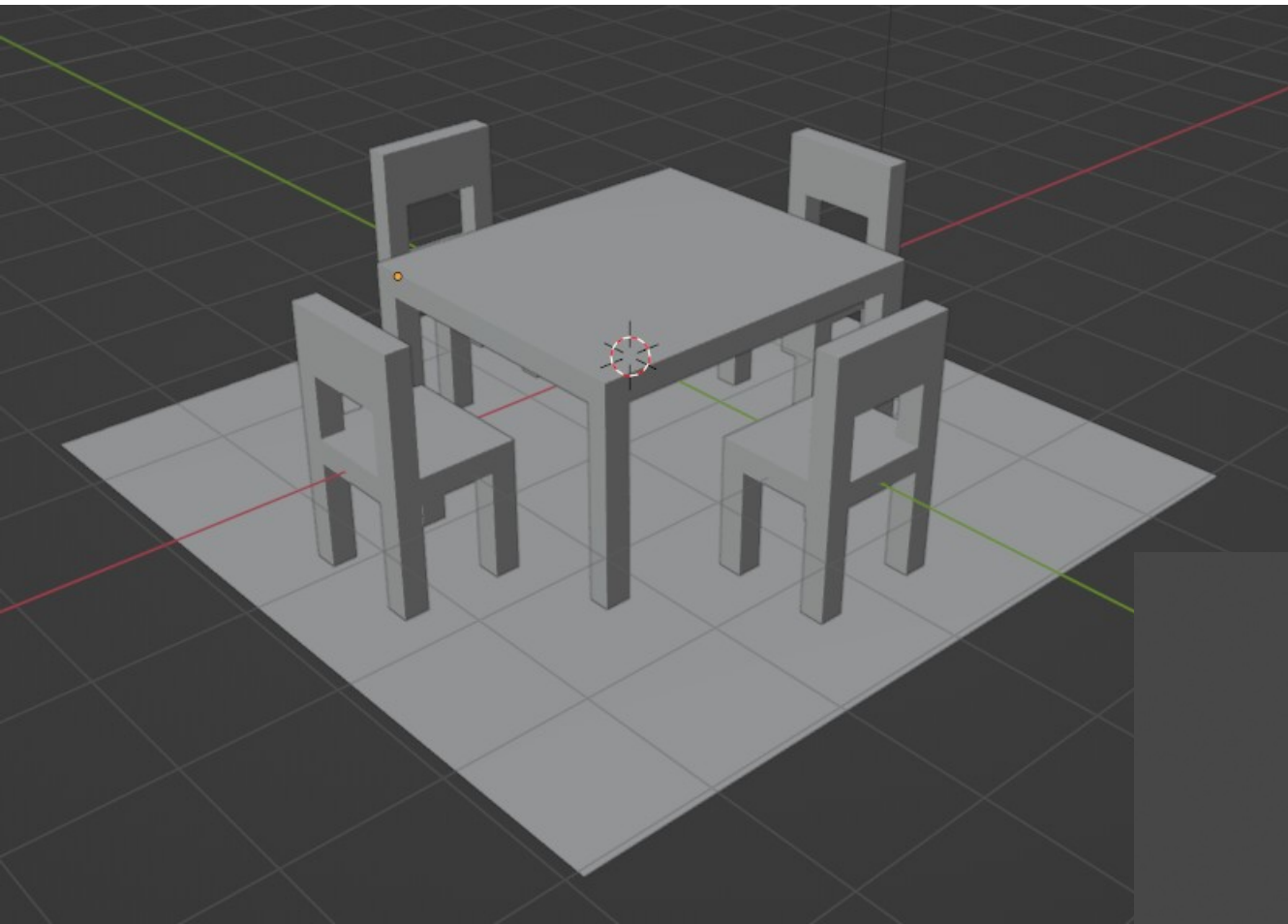
Previous Versions

- Since **Blender 2.93** Windows 7 is no longer supported. [Microsoft discontinued Windows 7 support in January 2020](#)
- Blender **2.9x** require macOS 10.13+
- Blender **2.8x** require [macOS 10.12+](#)
- [Blender 2.79](#) runs on all systems that support OpenGL 2.1 and above, with recent graphics drivers. For macOS, version 10.9 and later are supported.
- [Blender 2.76](#) and earlier require OpenGL 1.4 graphics cards. For Windows, XP and later are supported.



Step 1

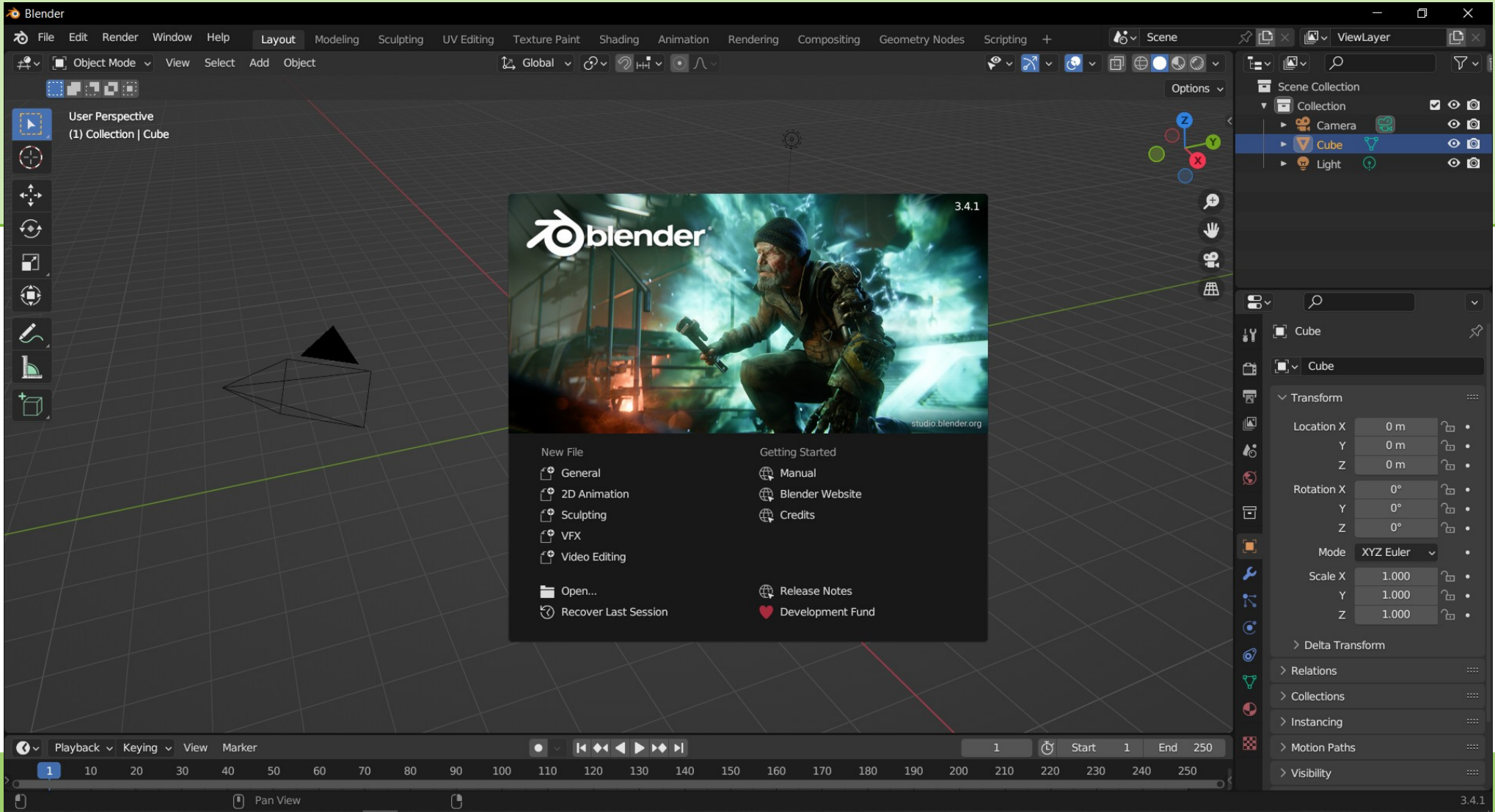




เริ่มต้นการใช้งาน และรู้จักเครื่องมือโปรแกรม Blender

- เรียนรู้หน้าต่างหลัก ๆ ในการทำงาน ของโปรแกรม Blender
- เรียนรู้การปรับแต่งแถบเครื่องมือ และคำสั่ง
- ส่วนประกอบ Blender
- Object Properties
- Materials Properties
- View Layers ใน Blender







3.4.1



studio.blender.org

New File

- General
- 2D Animation
- Sculpting
- VFX
- Video Editing

Open...

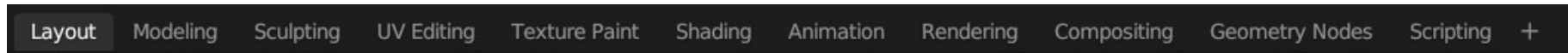
Recover Last Session

Getting Started

- Manual
- Blender Website
- Credits
- Release Notes
- Development Fund

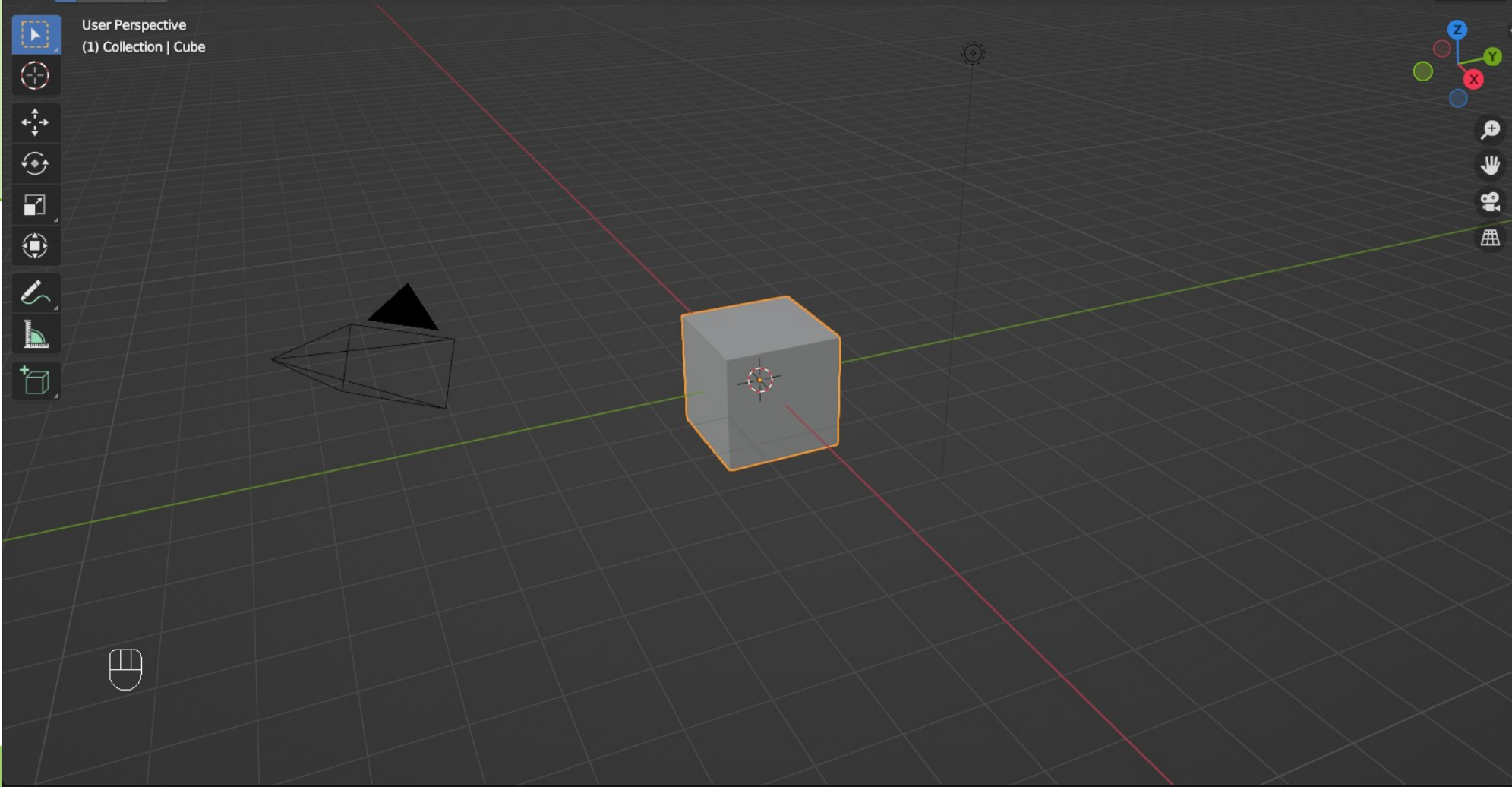


Blender #1

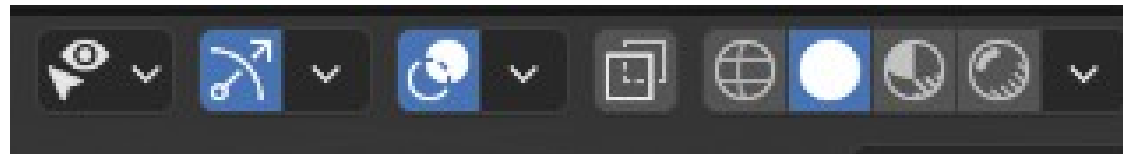
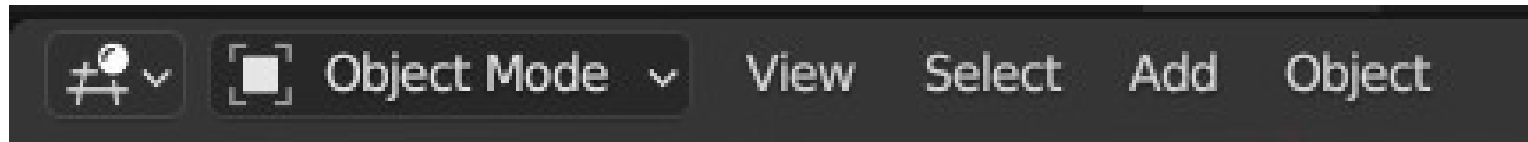




User Perspective
(1) Collection | Cube



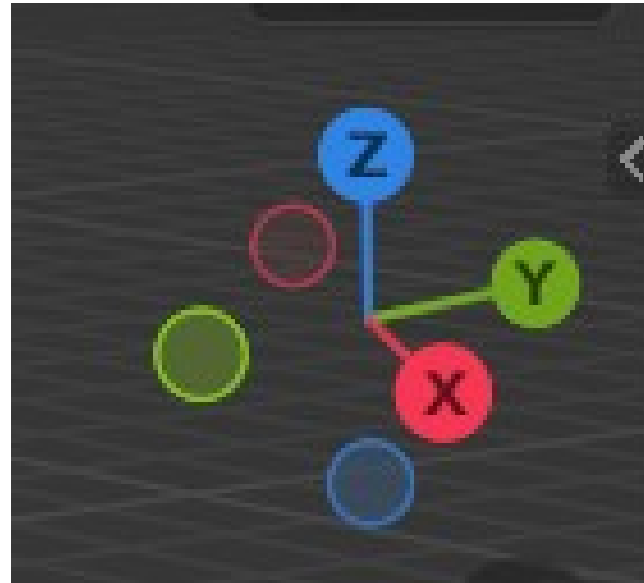
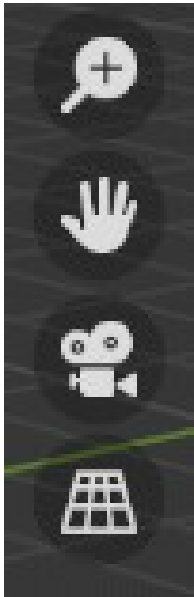
เมนูของ Layout



User Perspective

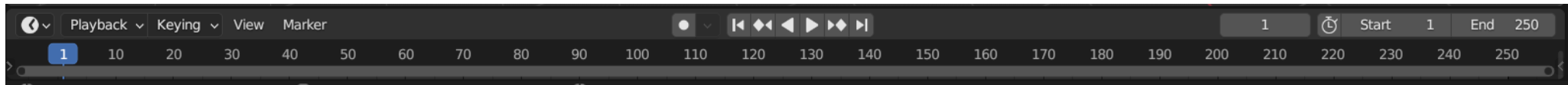
(1) Collection | Cube

Options ▾

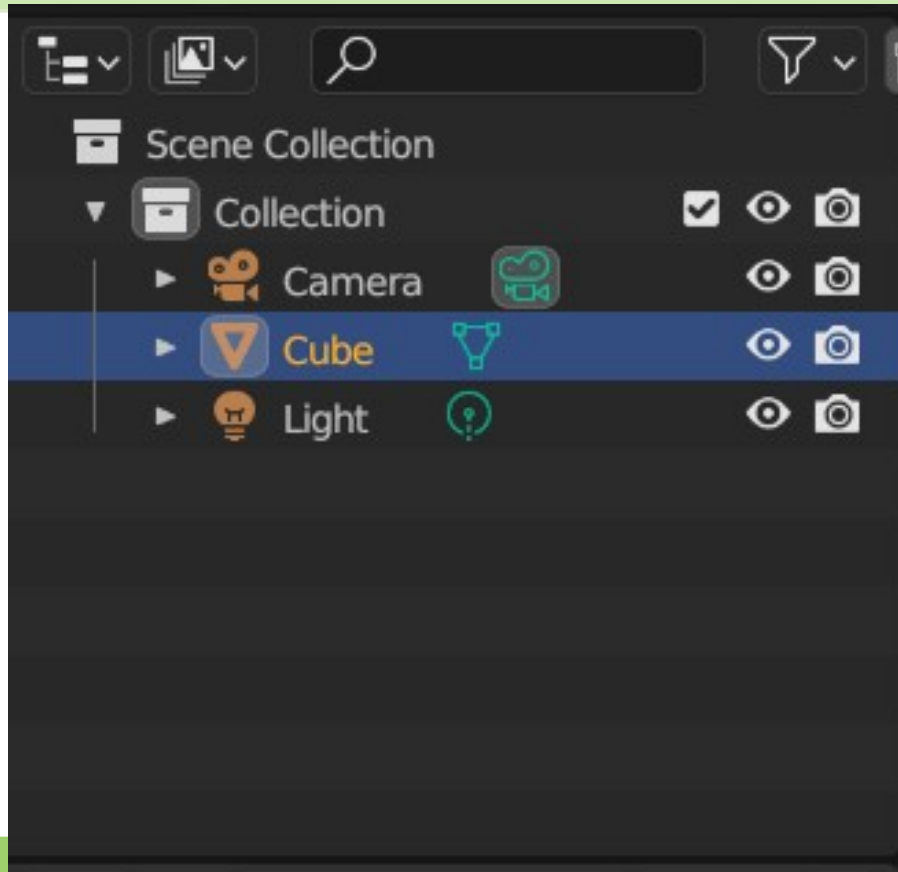


Time Line

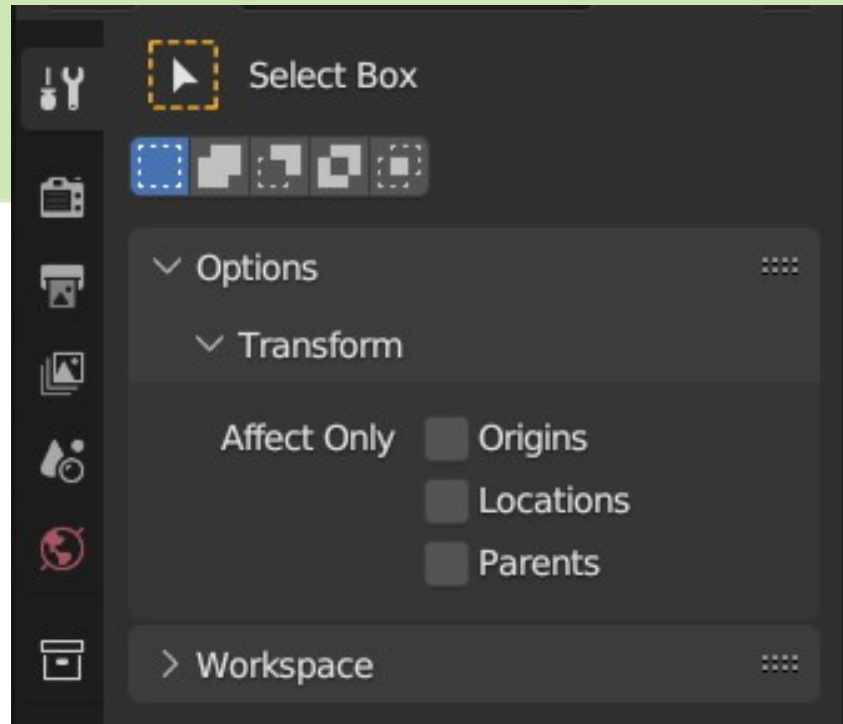
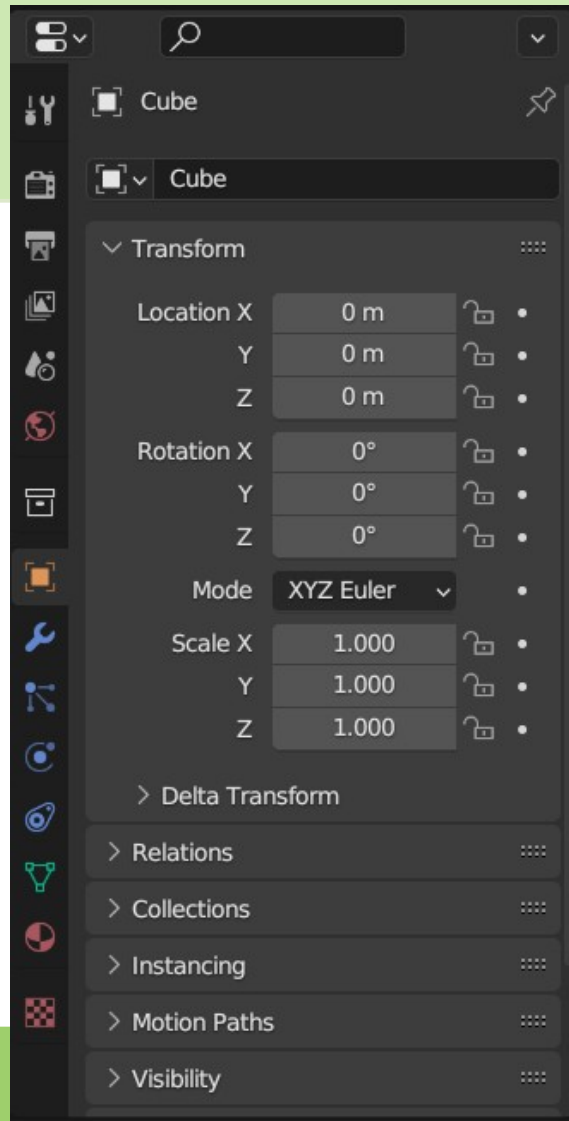
สำหรับจัดการกับ Animation/Video

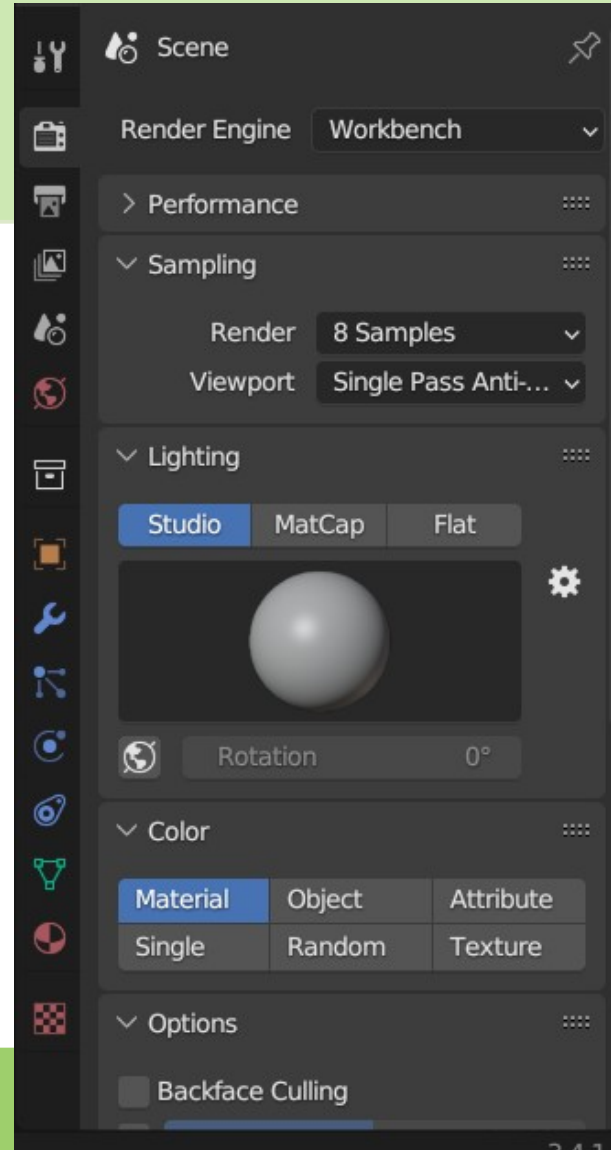
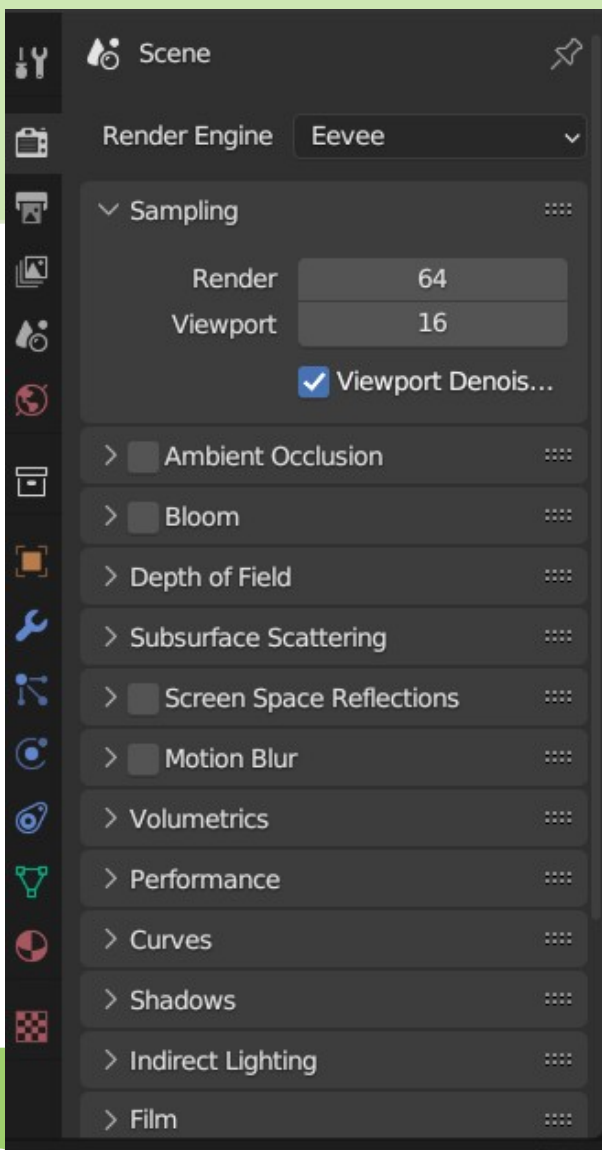


รายการใน Scene Collection



ตั้งค่า





Scene

Render Engine: Cycles

Feature Set: Supported

Device: CPU

Open Shading Lan...

Sampling

Viewport

Noise Thres... 0.1000

Max Samples: 1024

Min Samples: 0

Denoise

Render

Noise Thres... 0.0100

Max Samples: 4096

Min Samples: 0

Time Limit: 0 sec

Denoise

Path Guiding

Advanced

Format

Resolution X: 1920 px

Y: 1080 px

%: 100%

Aspect X: 1.000

Y: 1.000

Render Region

Crop to Render ...

Frame Rate: 24 fps

Frame Range

Frame Start: 1

End: 250

Step: 1

Time Stretching

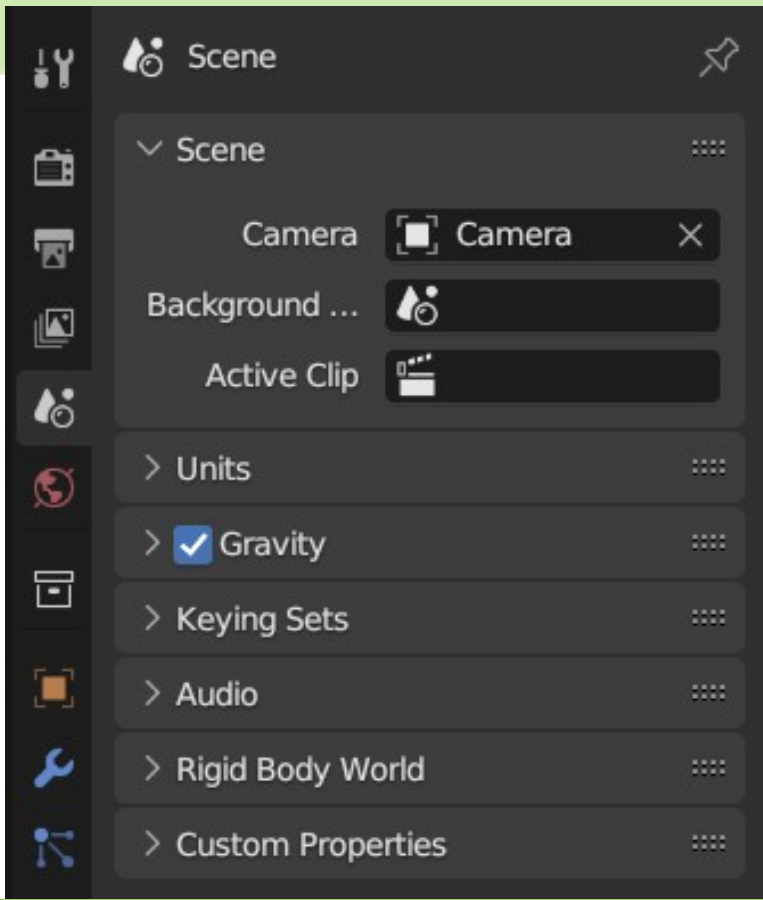
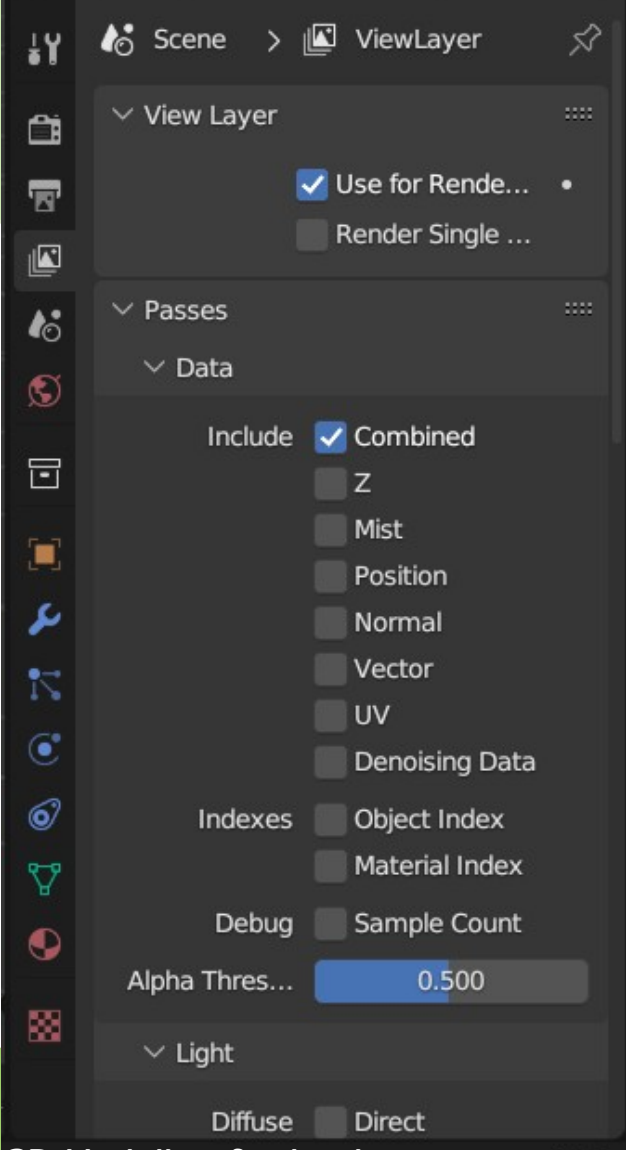
Stereoscopy

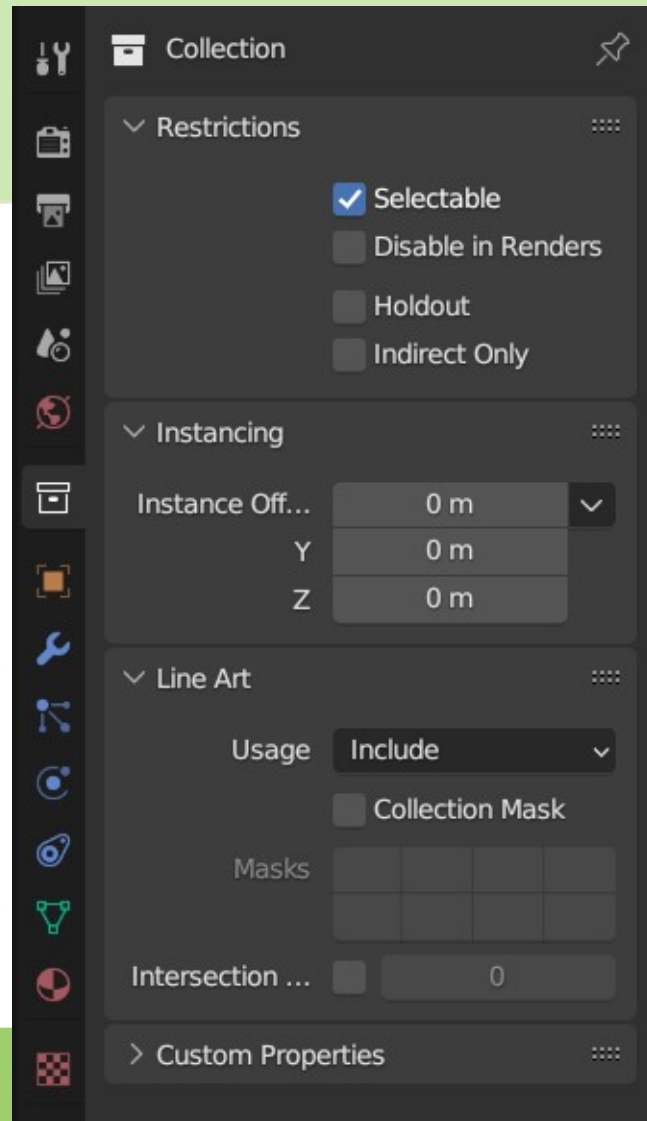
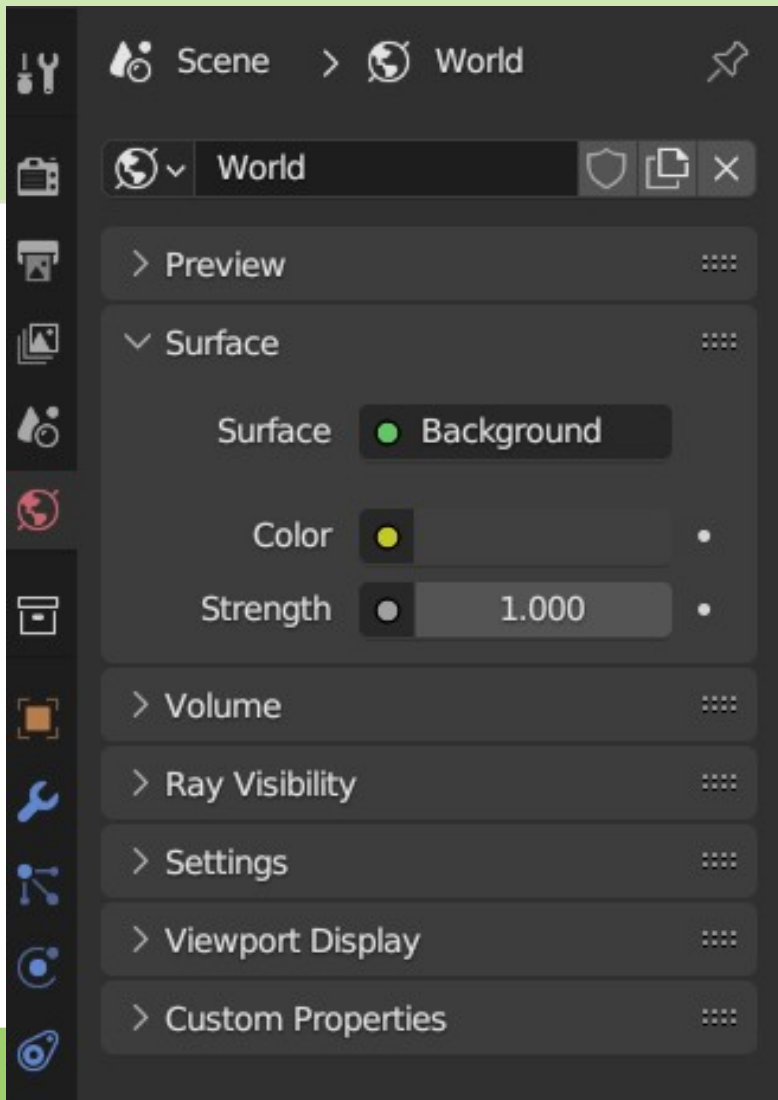
Output

/tmp\

Saving File Extensions

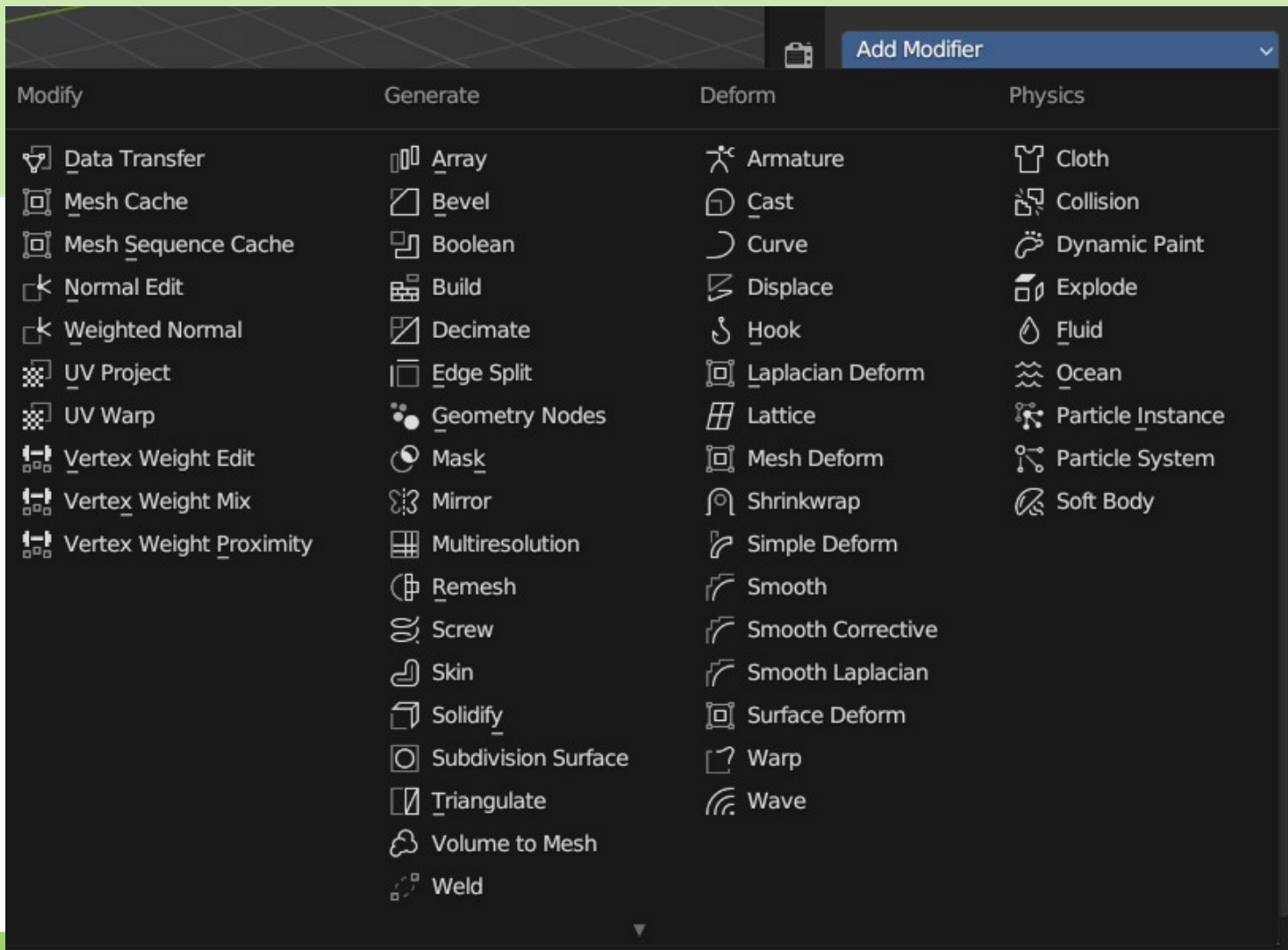
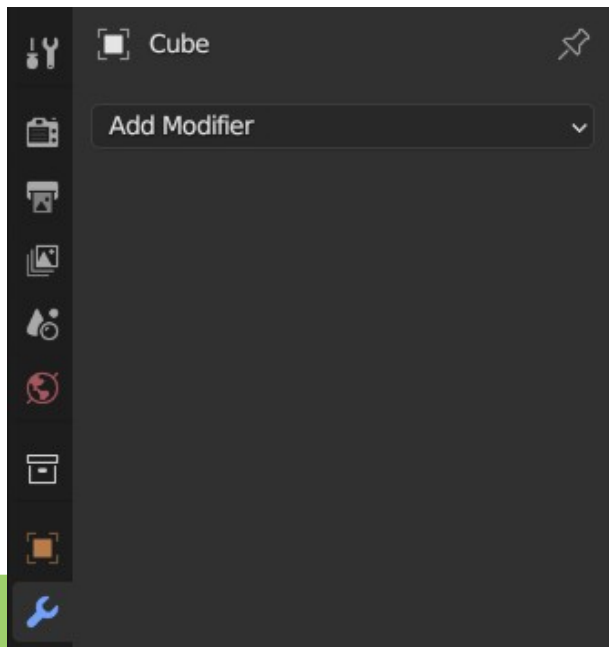




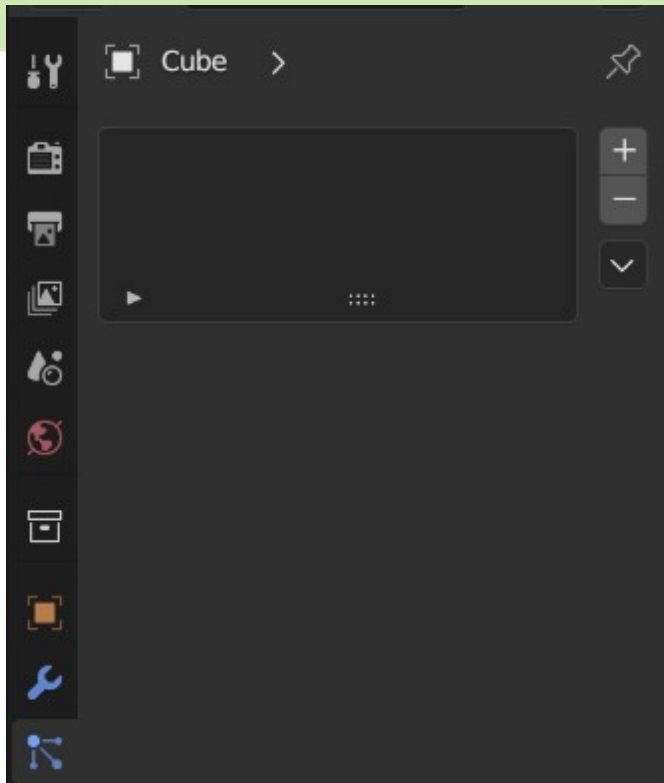


เรียนใช้

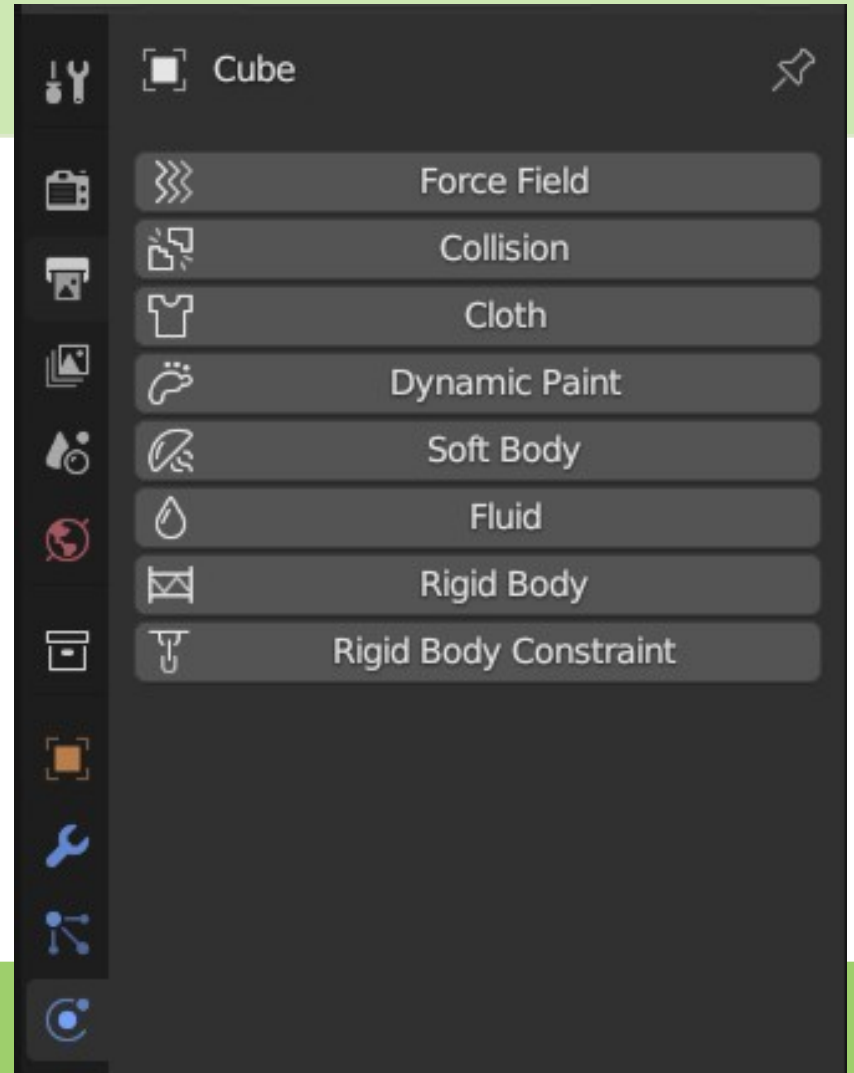
Modifier



Particles



Physics

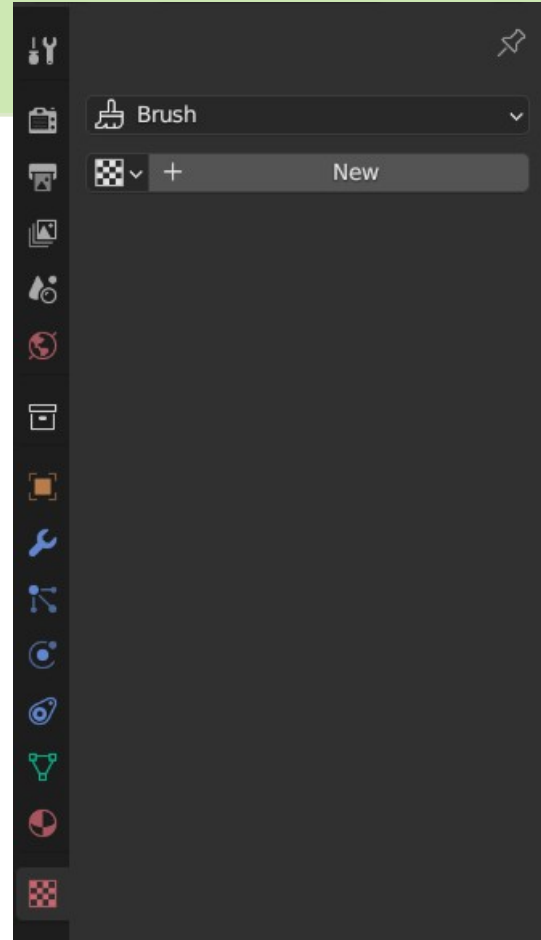
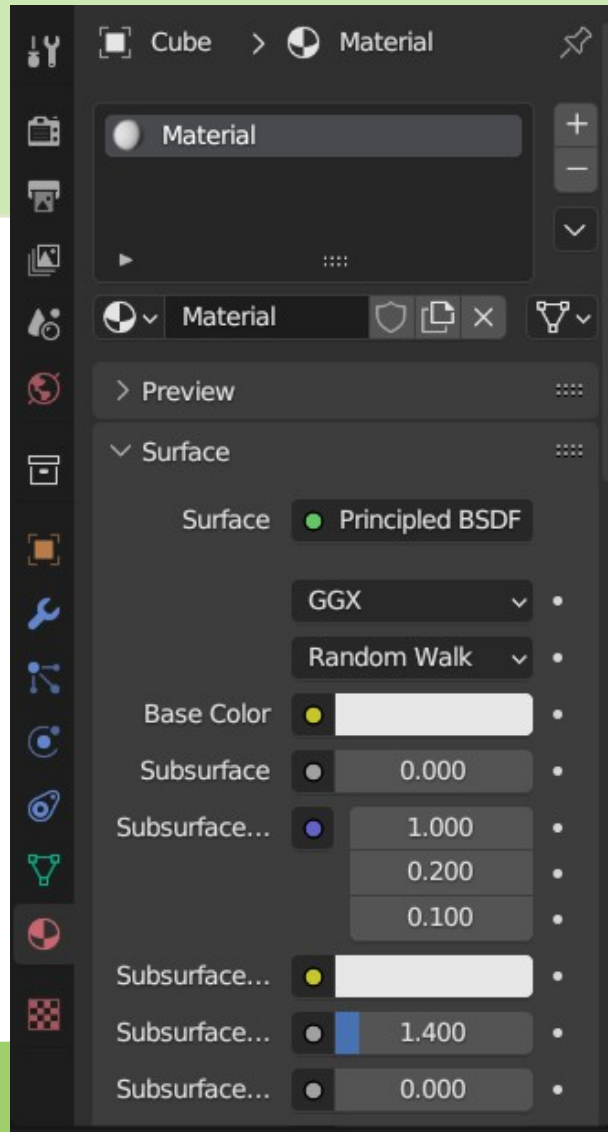
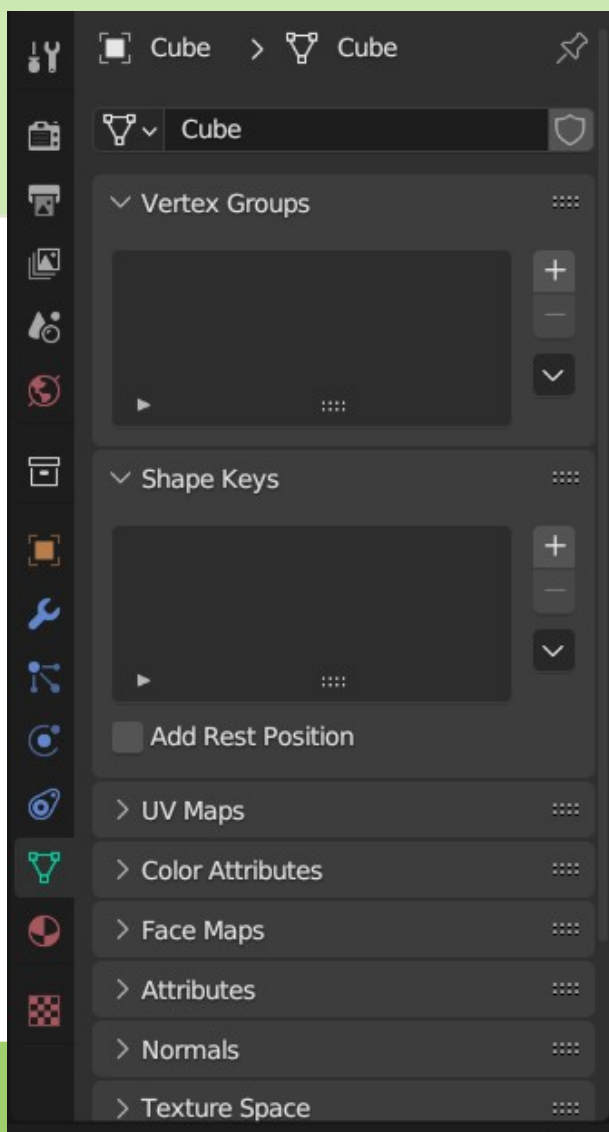


Cube

Add Object Constraint

Add Object Constraint

Motion Tracking	Transform	Tracking	Relationship
Camera Solver	Copy Location	Clamp To	Action
Follow Track	Copy Rotation	Damped Track	Armature
Object Solver	Copy Scale	Locked Track	Child Of
	Copy Transforms	Stretch To	Floor
	Limit Distance	Track To	Follow Path
	Limit Location		Pivot
	Limit Rotation		Shrinkwrap
	Limit Scale		
	Maintain Volume		
	Transformation		
	Transform Cache		

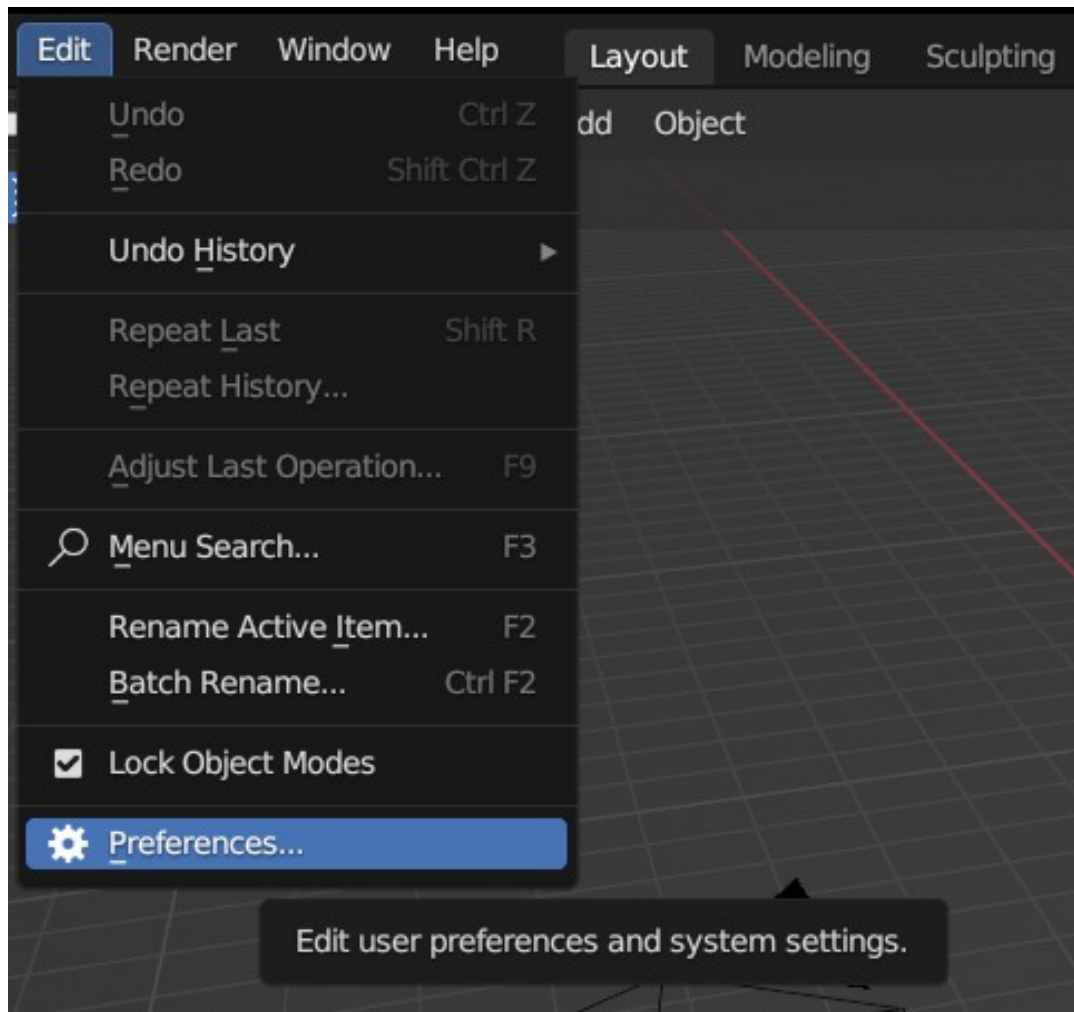


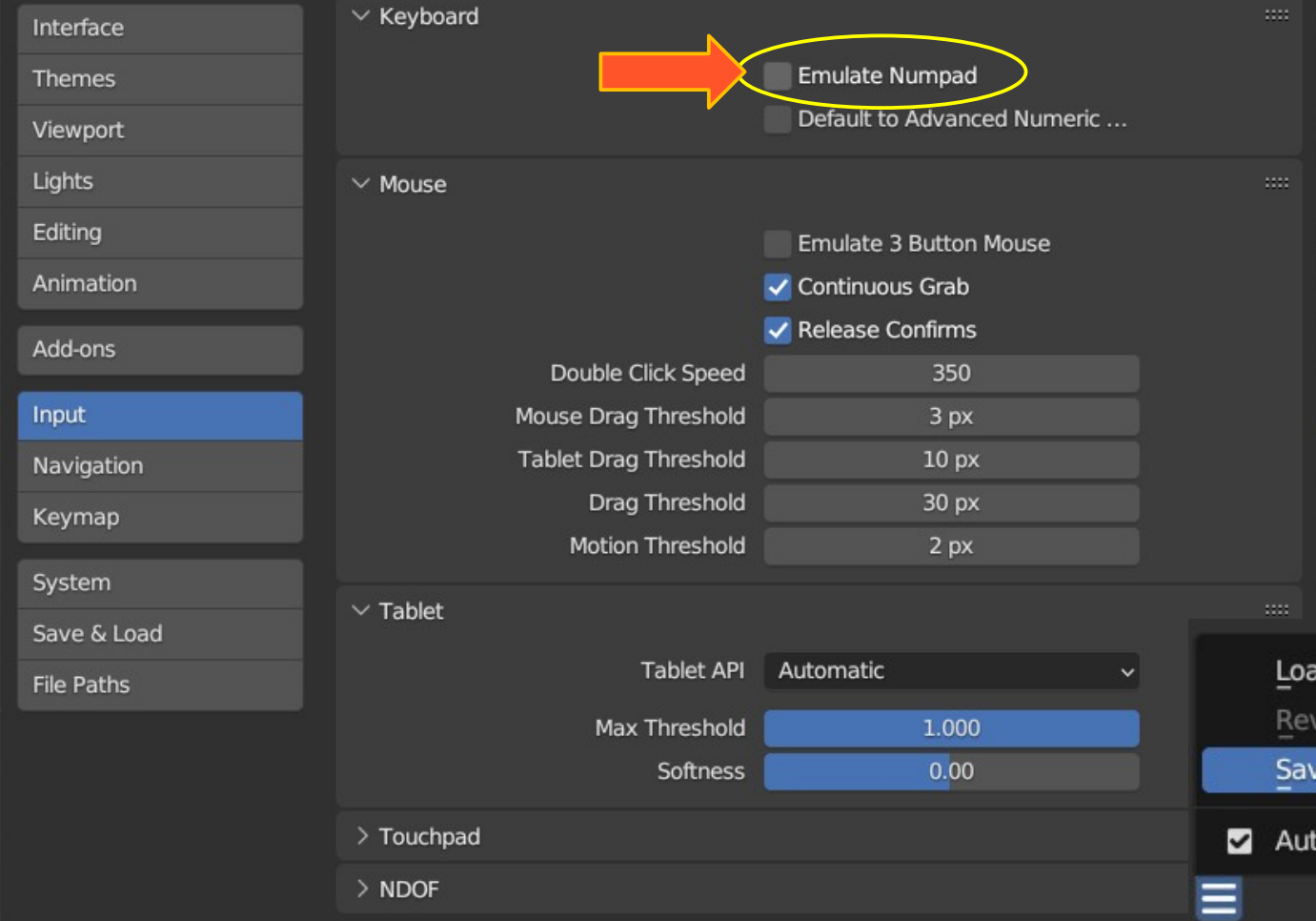
แนะนำการใช้ Mouse และ Keyboard

Mouse → 3 ปุ่ม ?

Keyboard → มี Numpad ?







Interface

Themes

Viewport

Lights

Editing

Animation

Add-ons

Input

Navigation

Keymap

System

Save & Load

File Paths

Keyboard

Emulate Numpad

Default to Advanced Numeric ...

Mouse

Emulate 3 Button Mouse

Continuous Grab

Release Confirms

Double Click Speed 350

Mouse Drag Threshold 3 px

Tablet Drag Threshold 10 px

Drag Threshold 30 px

Motion Threshold 2 px

Tablet

Tablet API Automatic

Max Threshold 1.000

Softness 0.00

Touchpad

NDOF

Load Factory Preferences

Revert to Saved Preferences

Save Preferences

Auto-Save Pre

Make the current preferences default.

Mouse & Keyboard Command





Top View

Orthogonal/
Perspective
View

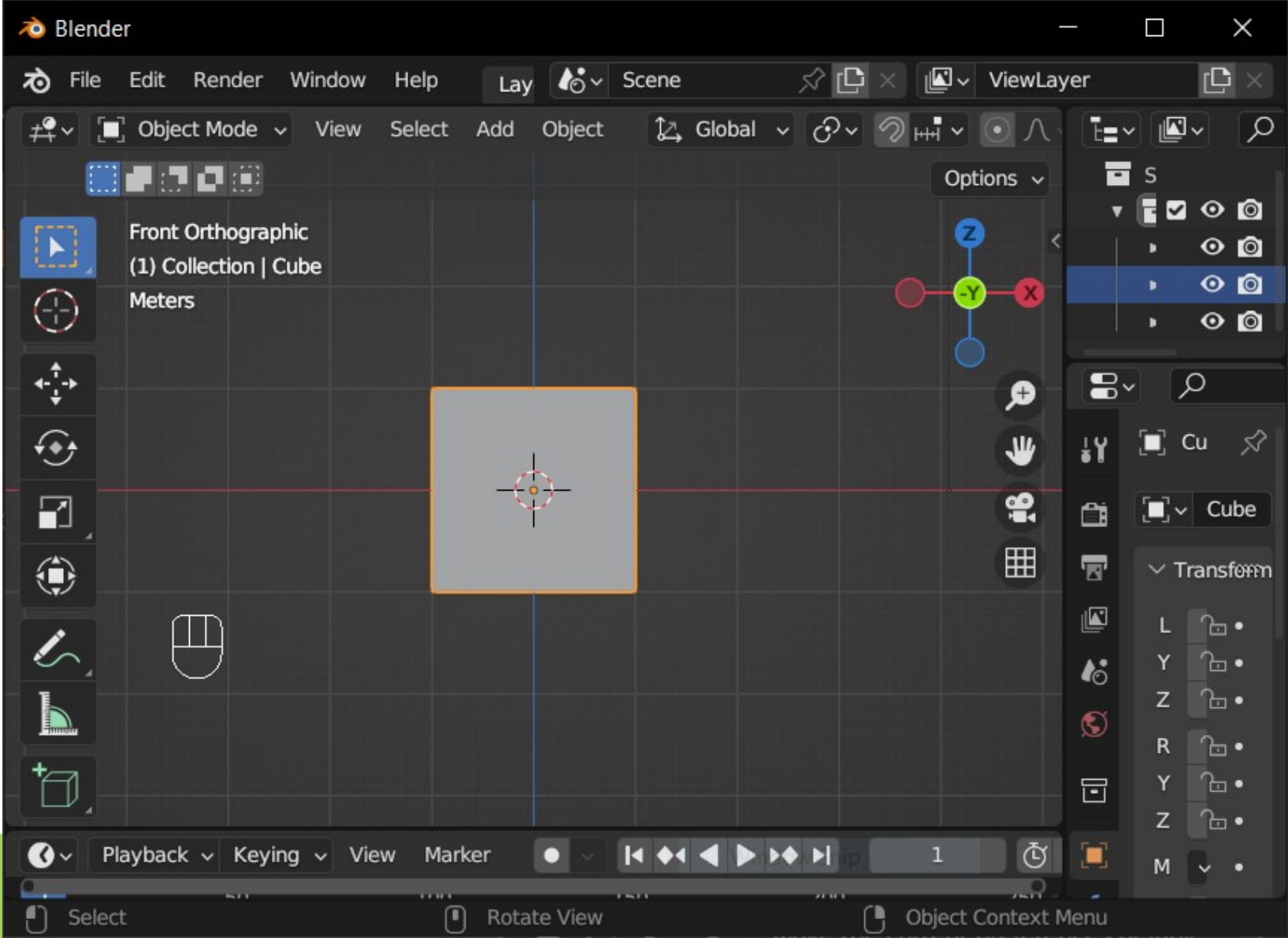
Flip View

Front View

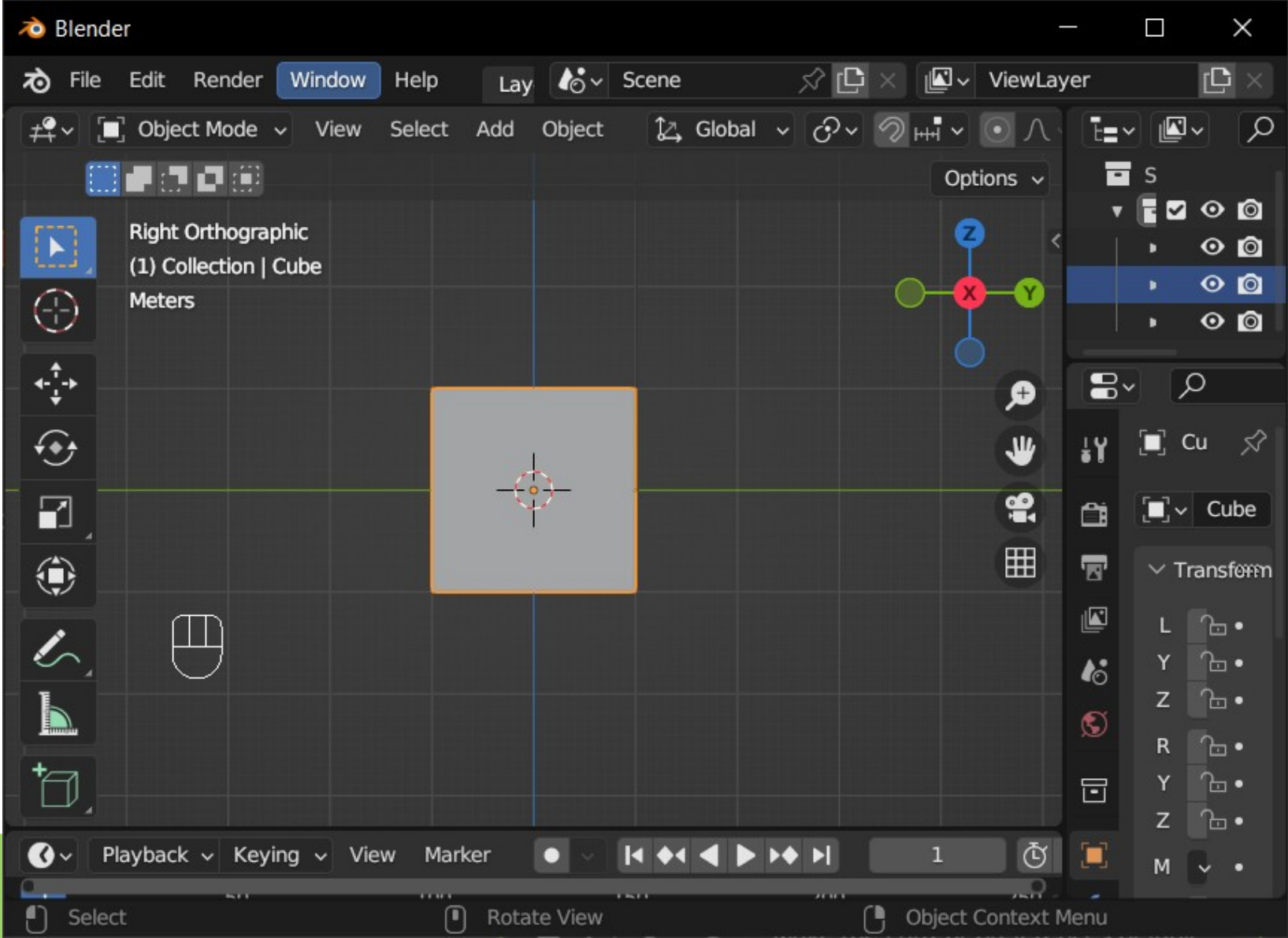
Camera View

Side (Right)
View

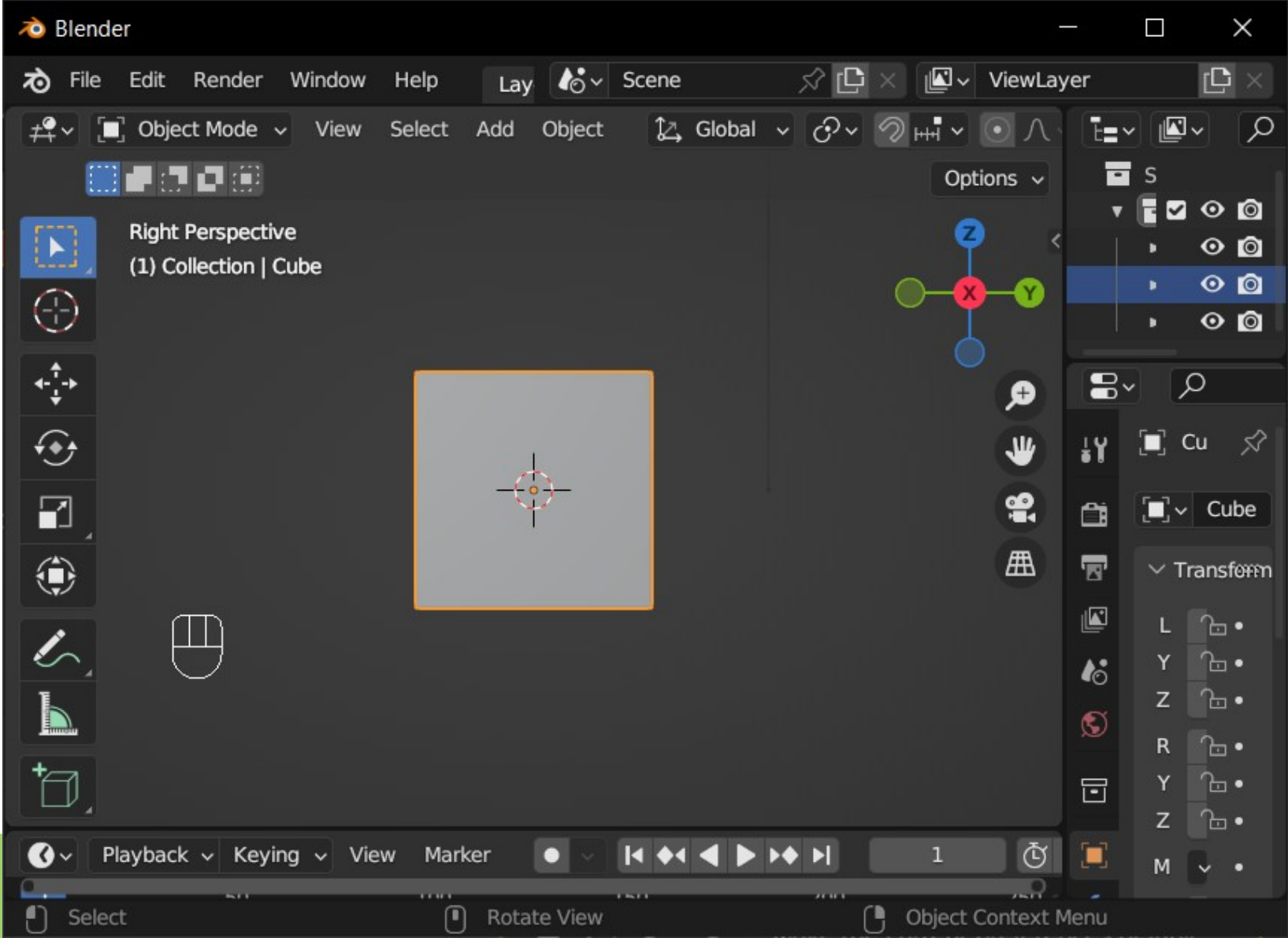
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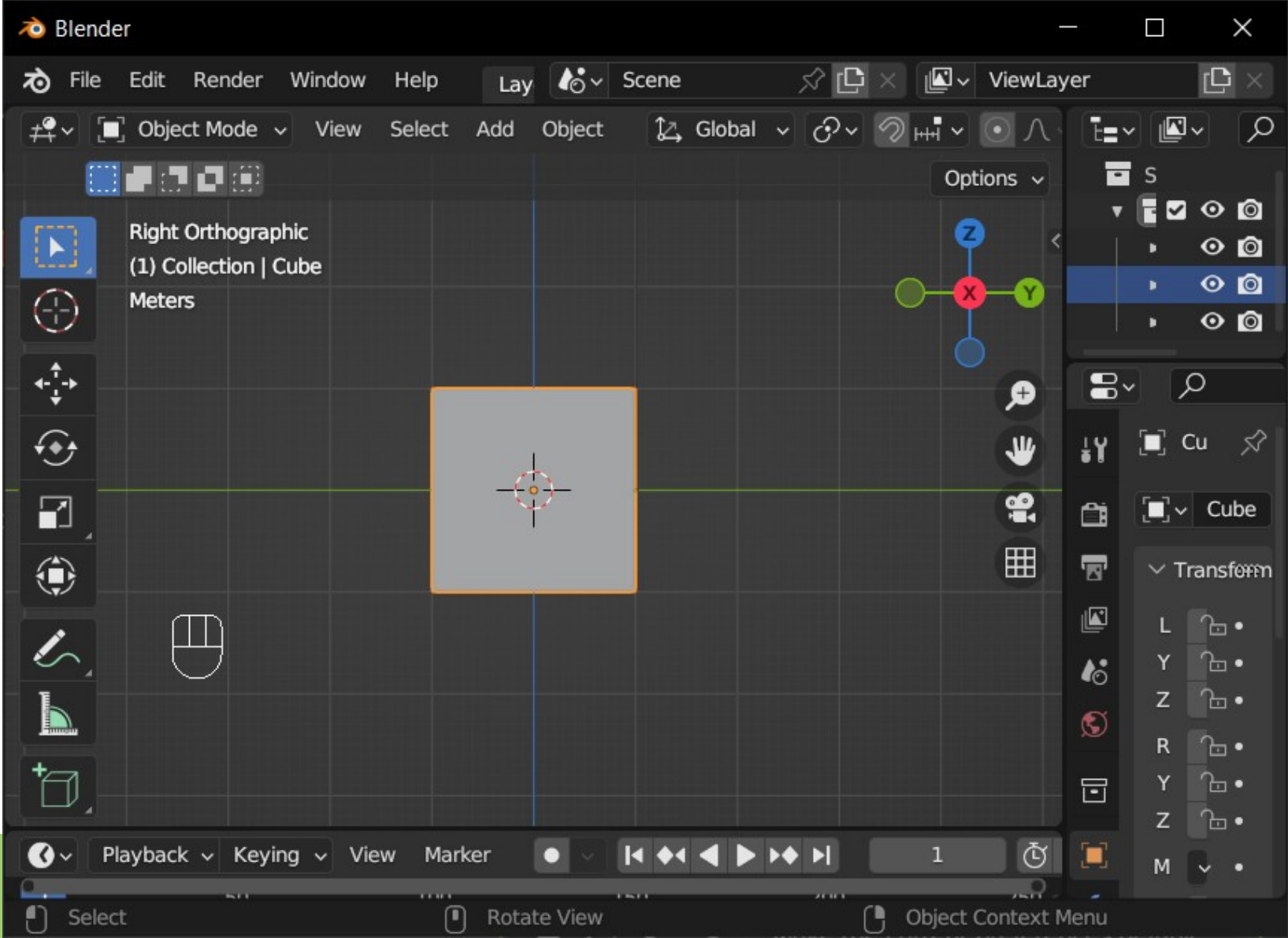
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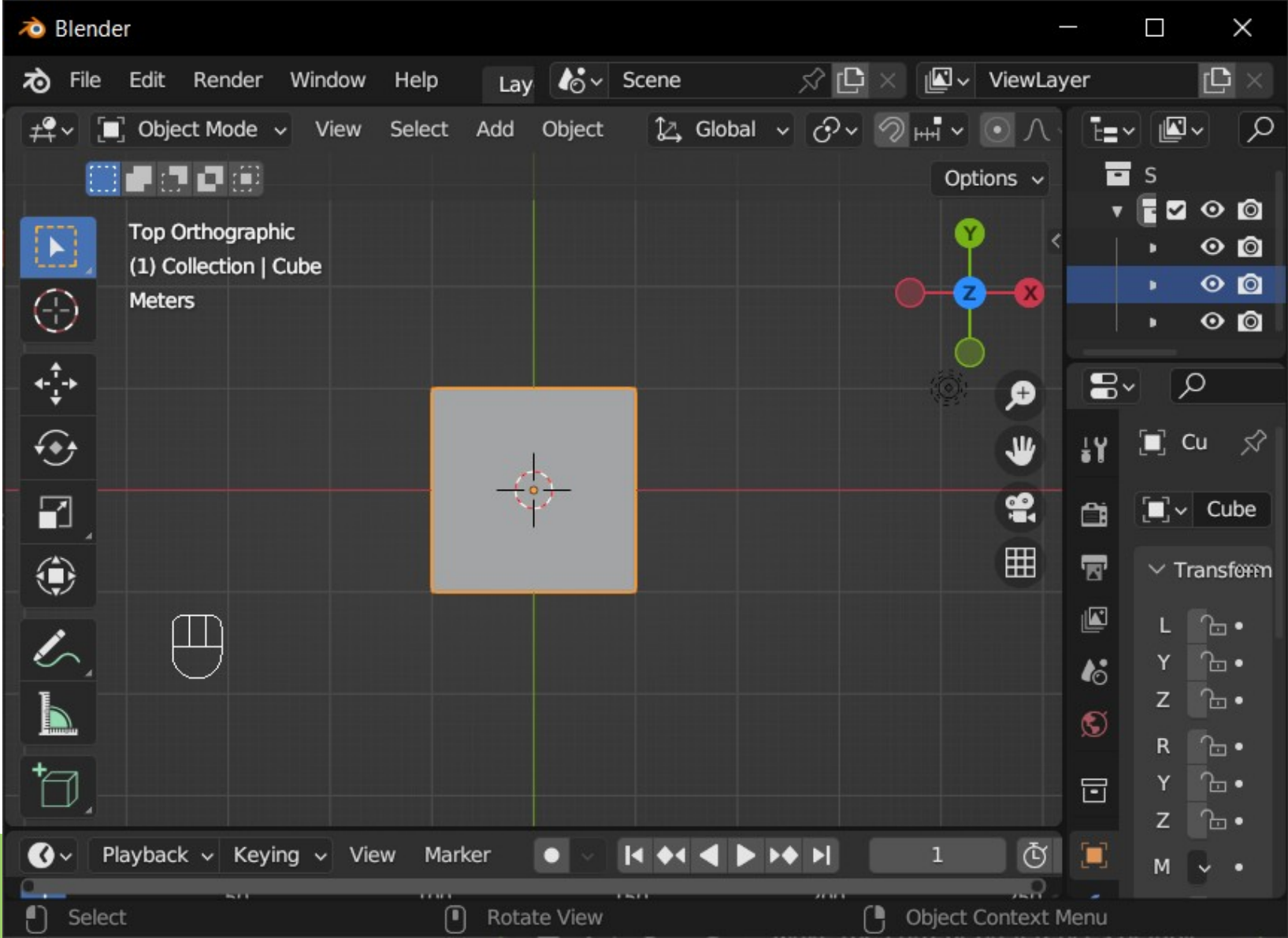
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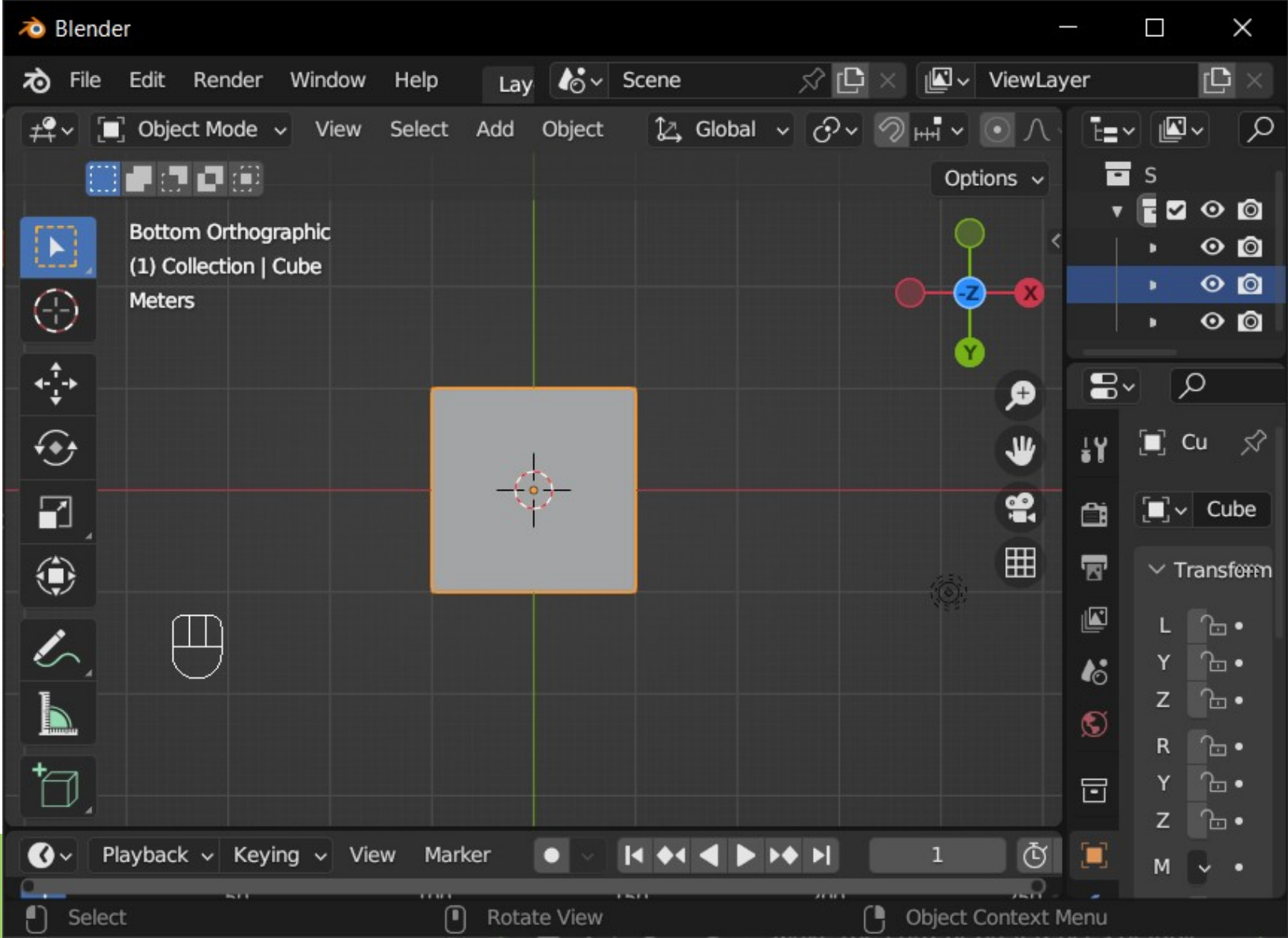
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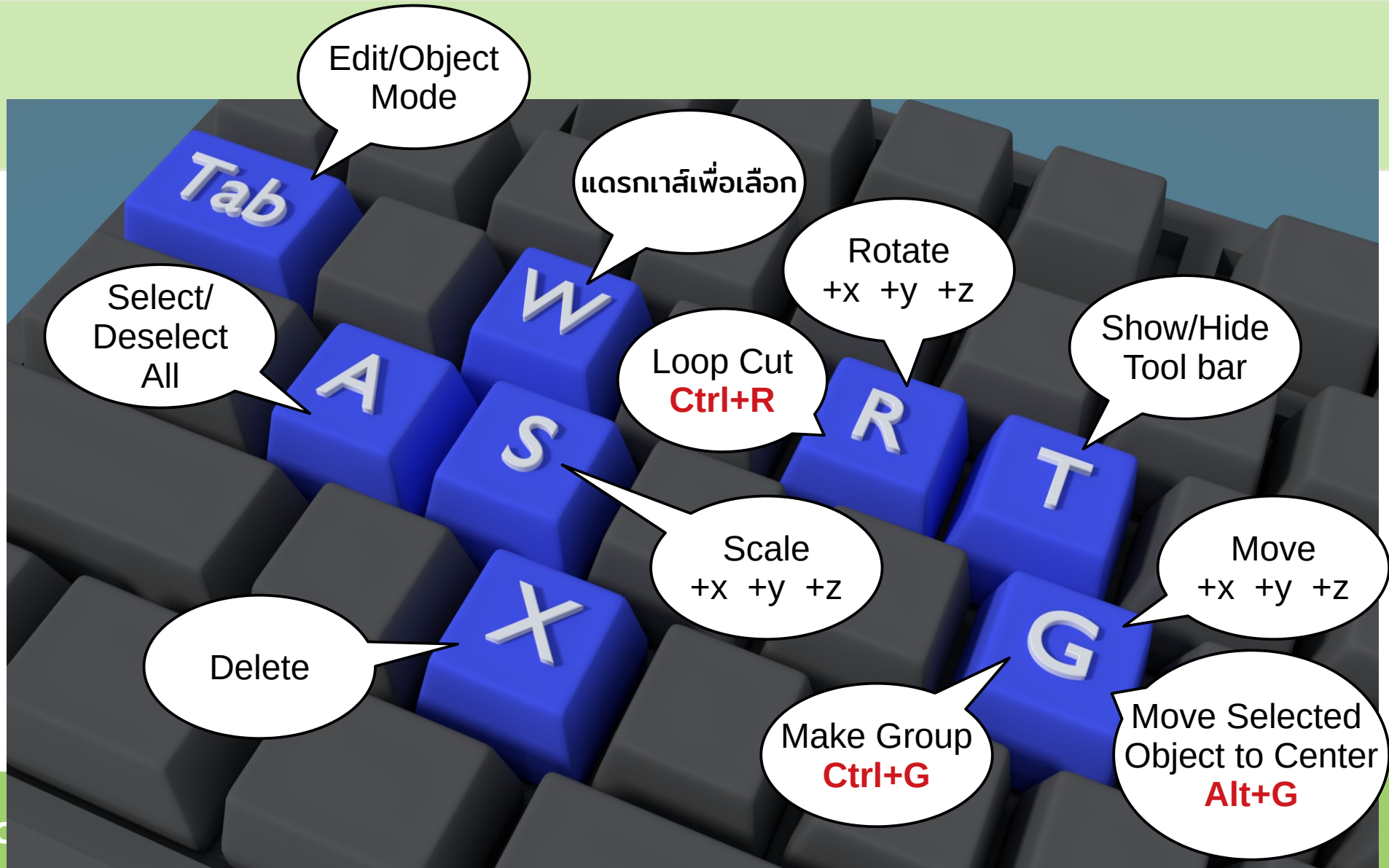
7



9







Edit/Object Mode

แตะเมาส์เพื่อเลือก

Select/Deselect All

Rotate
+x +y +z

Show/Hide Tool bar

Loop Cut
Ctrl+R

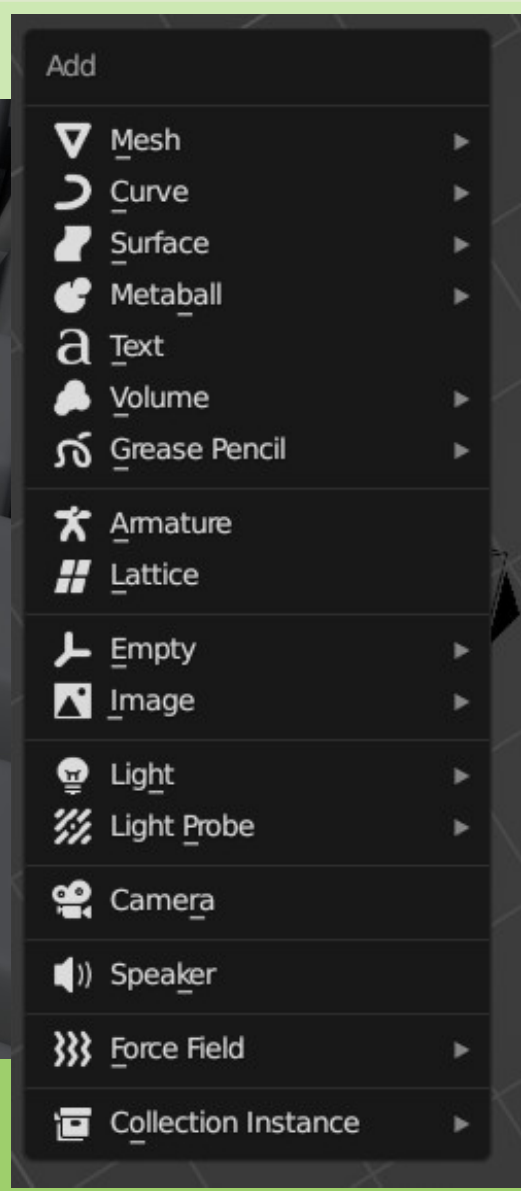
Scale
+x +y +z

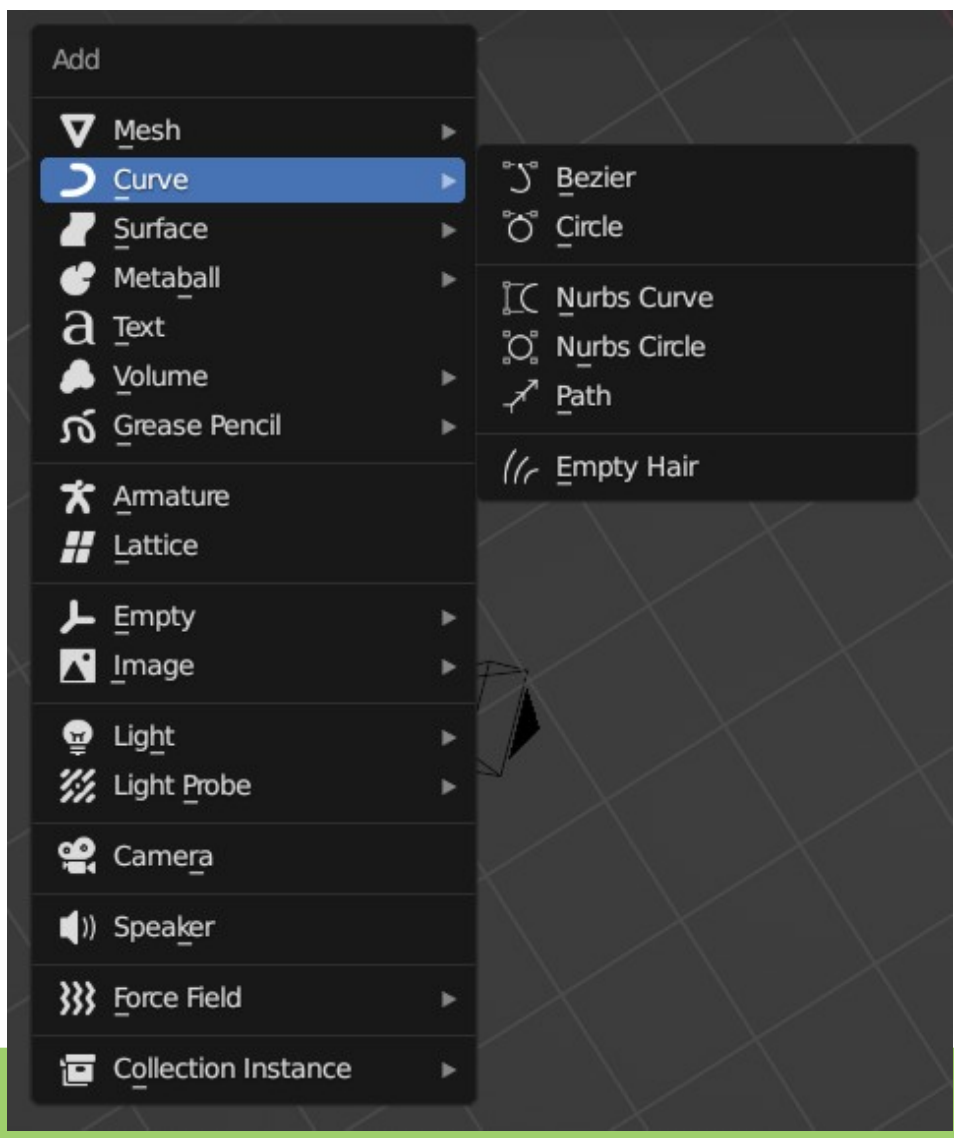
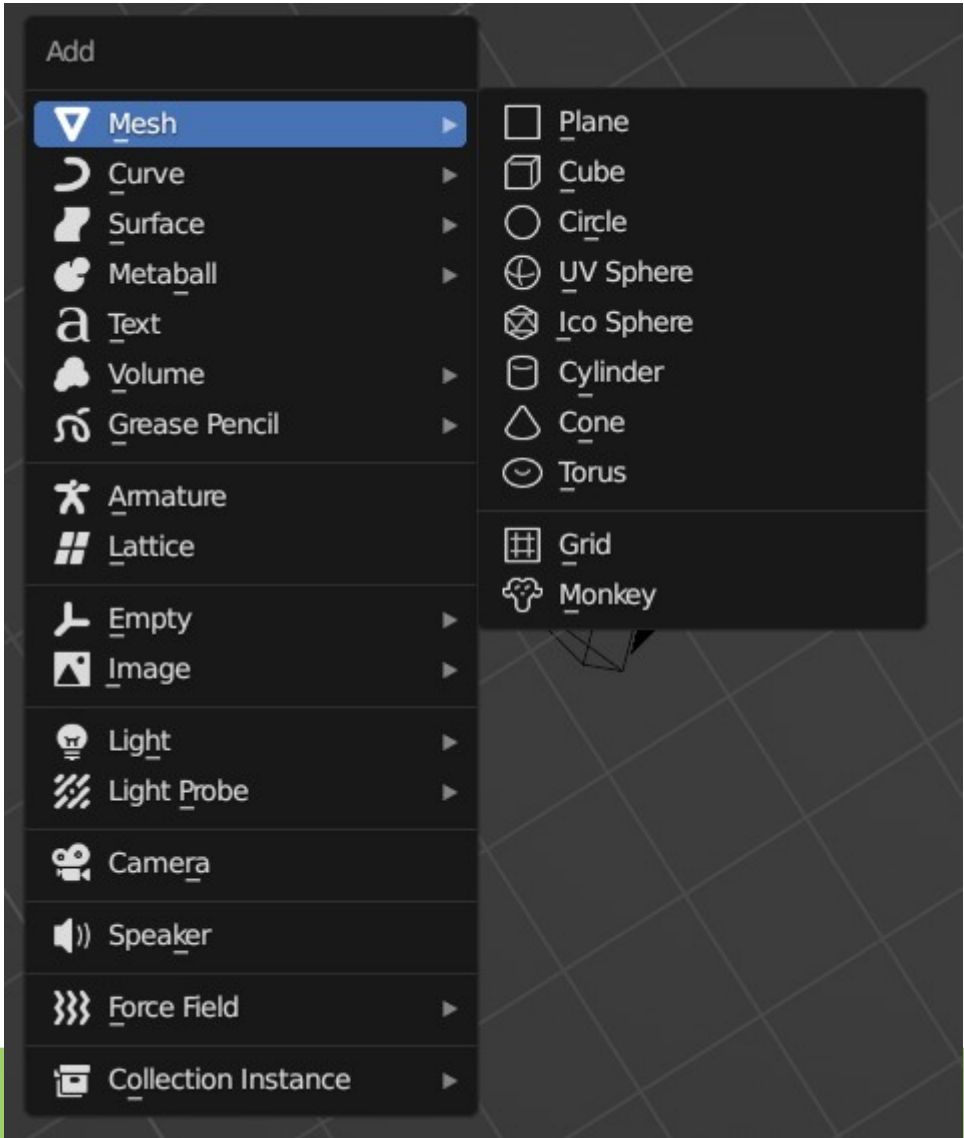
Move
+x +y +z

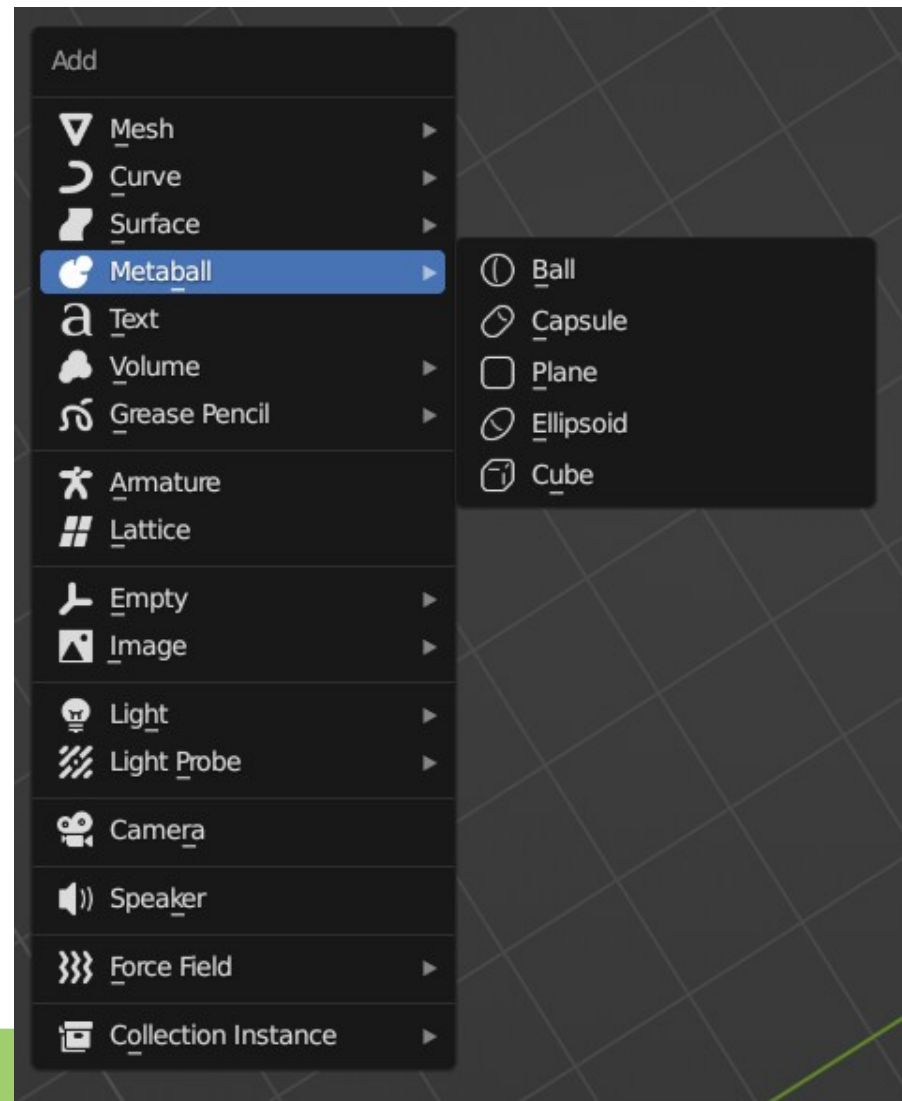
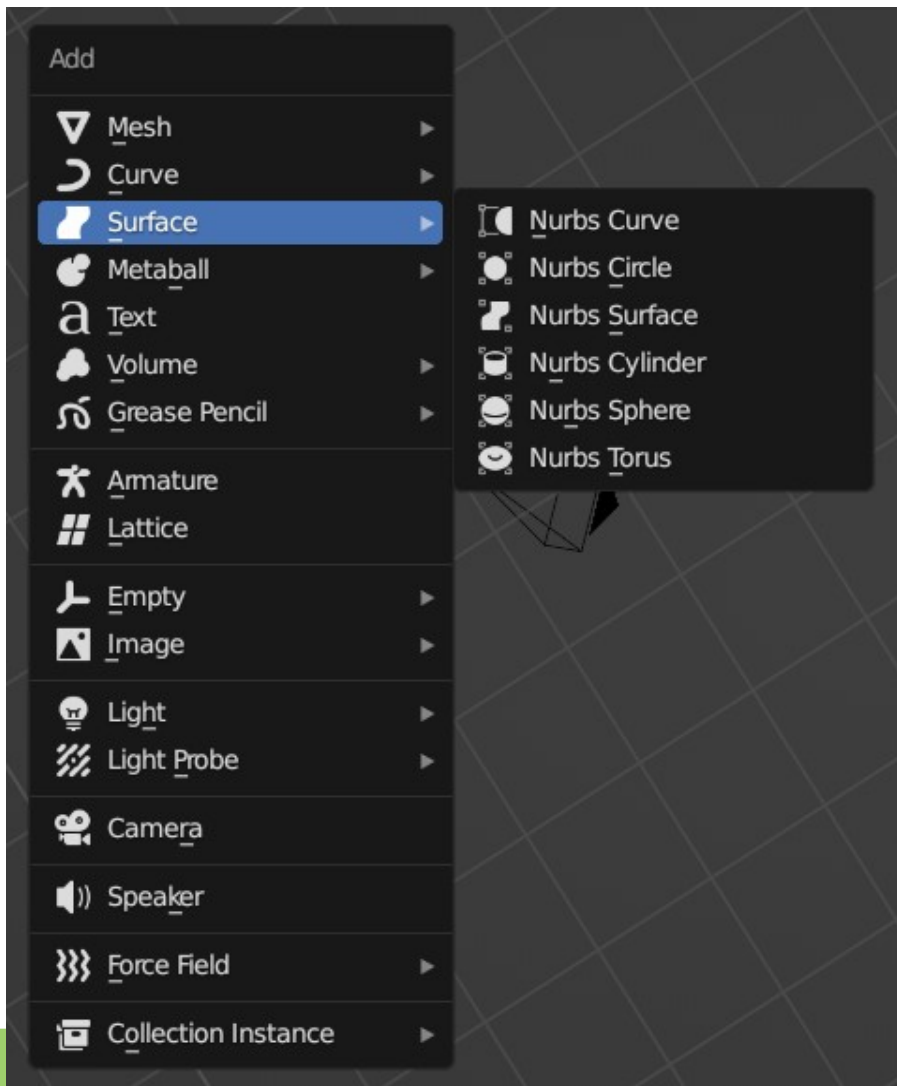
Delete

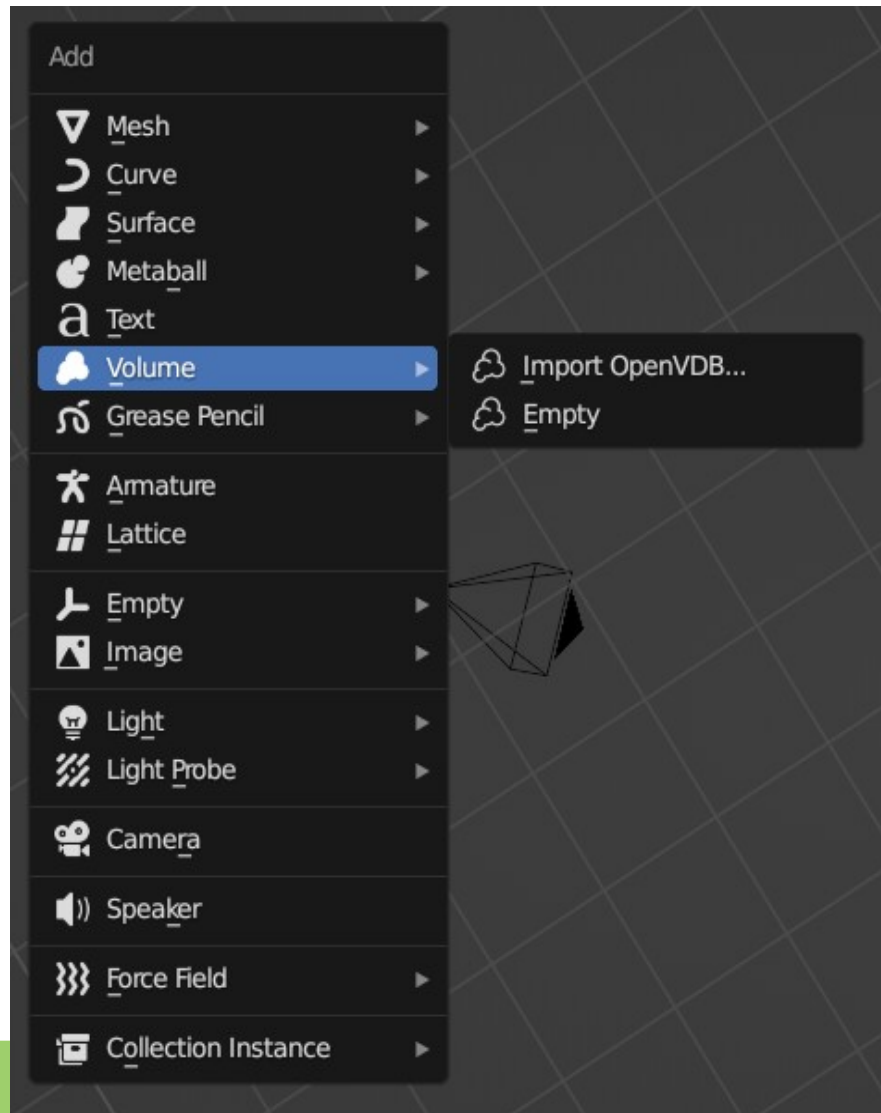
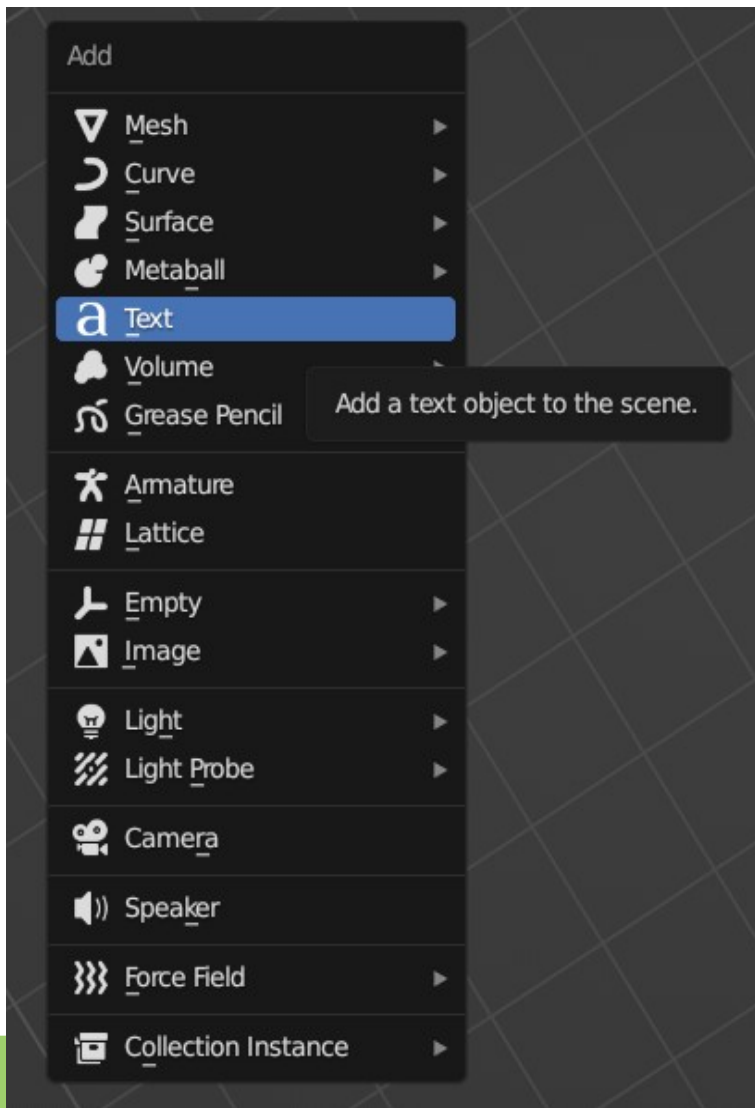
Make Group
Ctrl+G

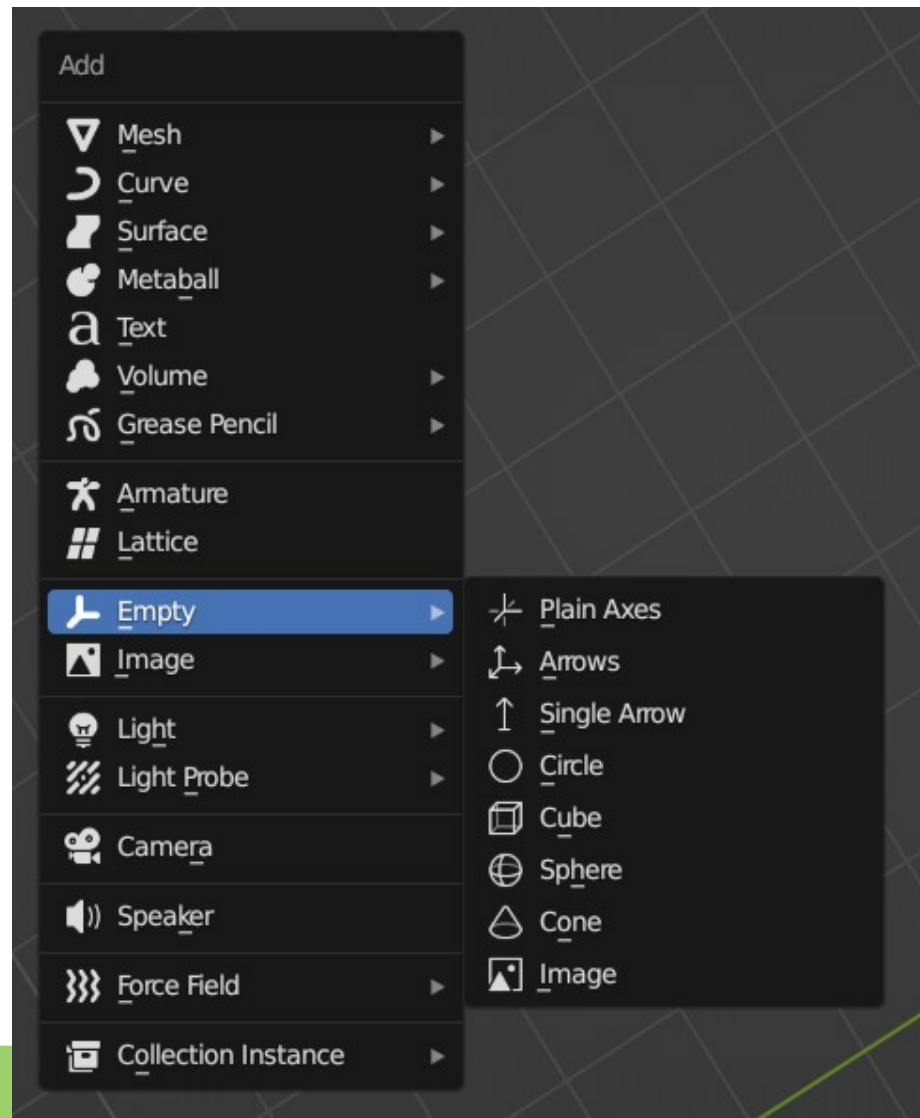
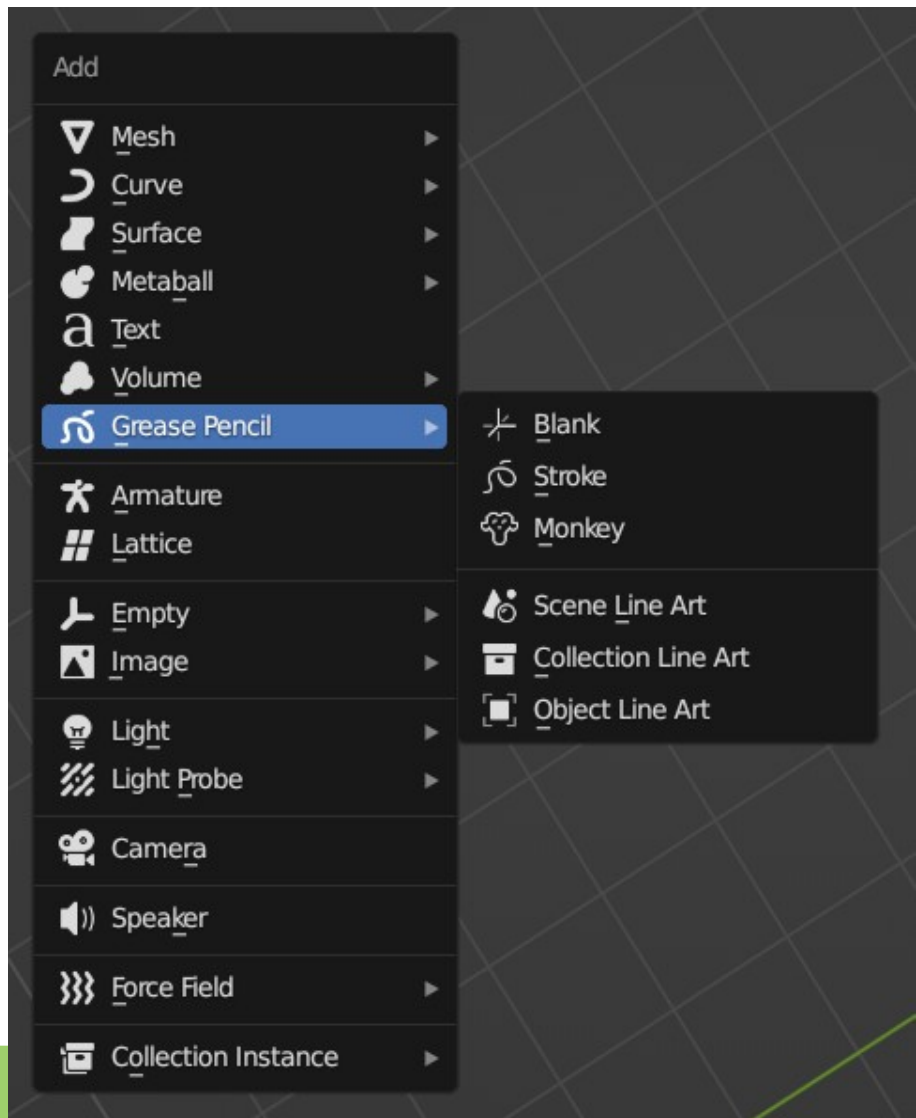
Move Selected Object to Center
Alt+G

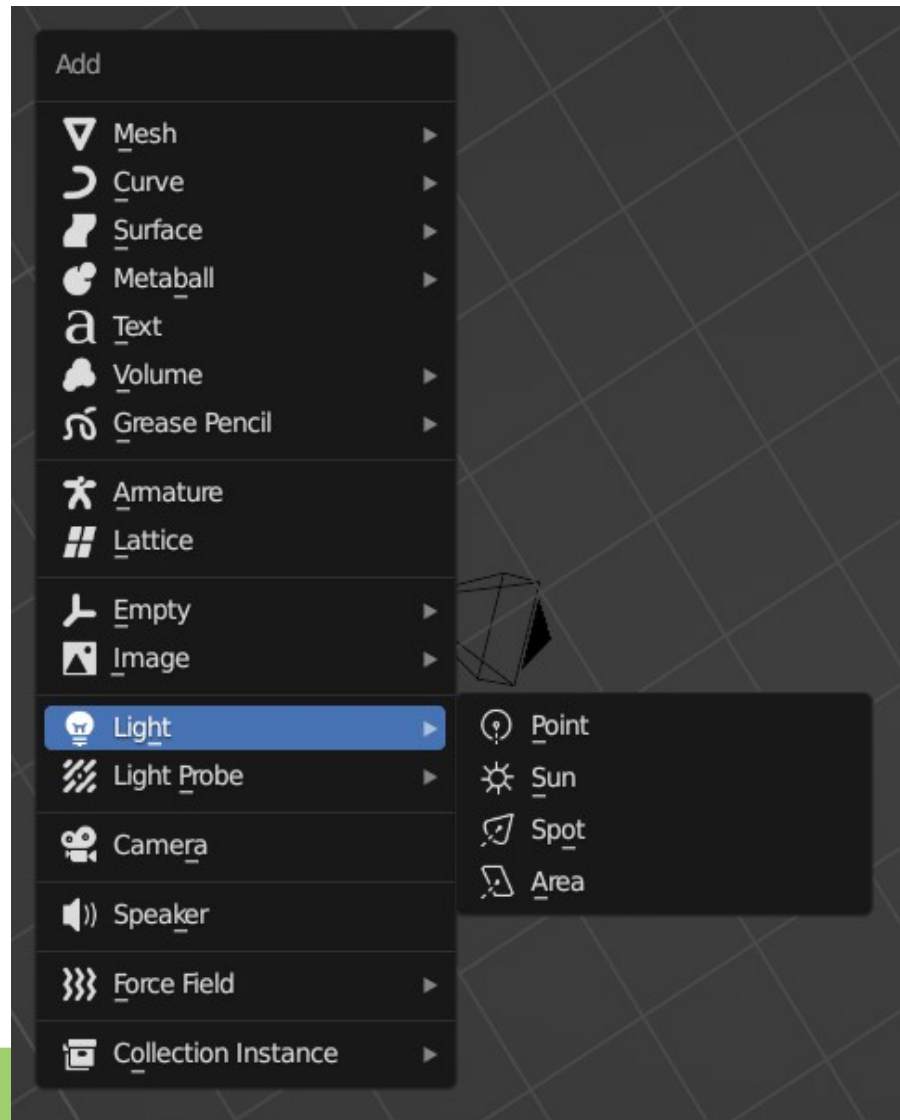
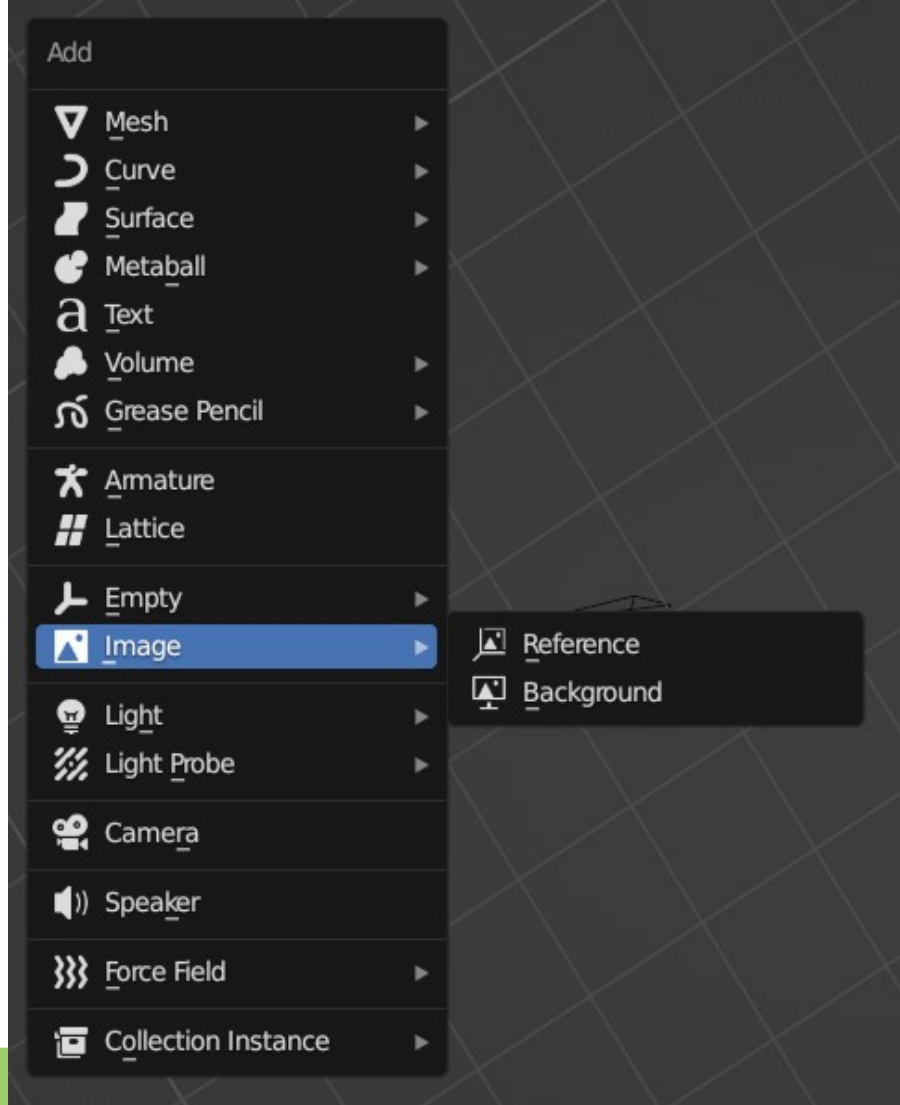


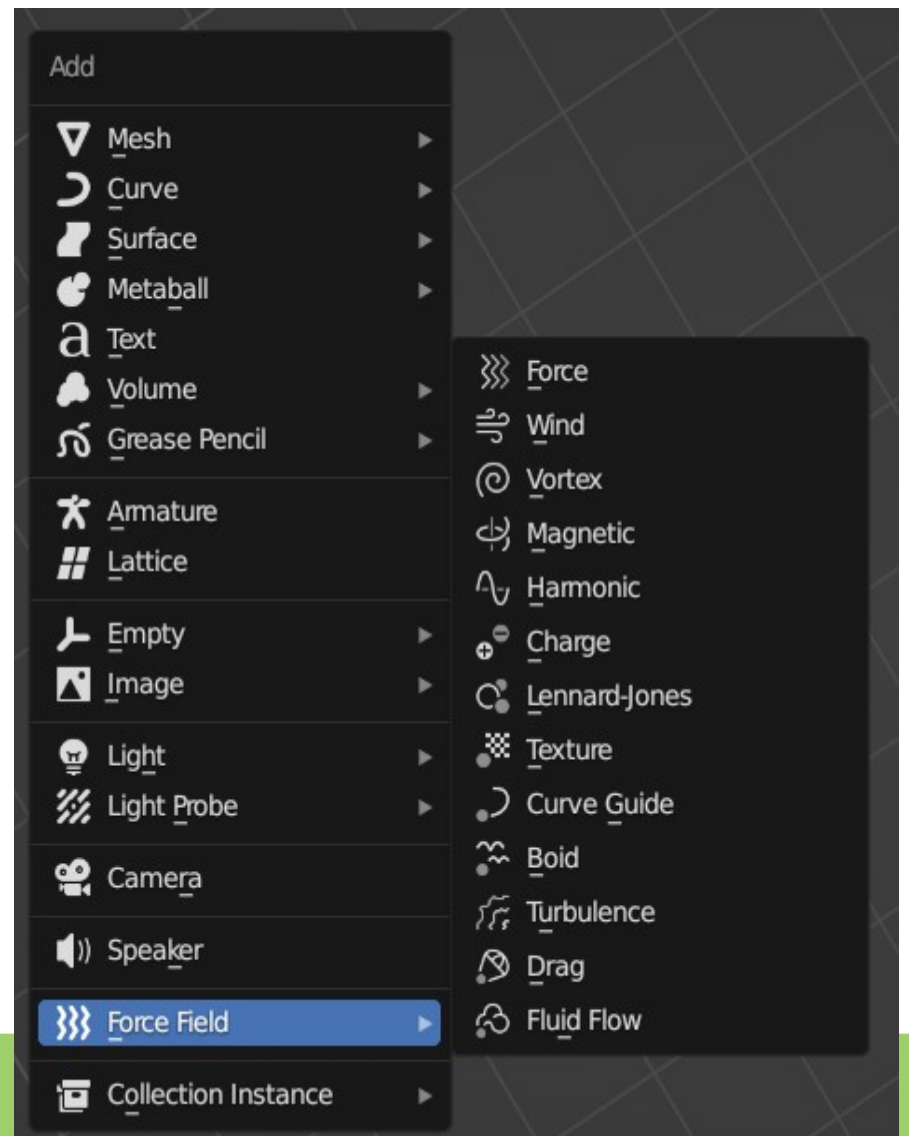
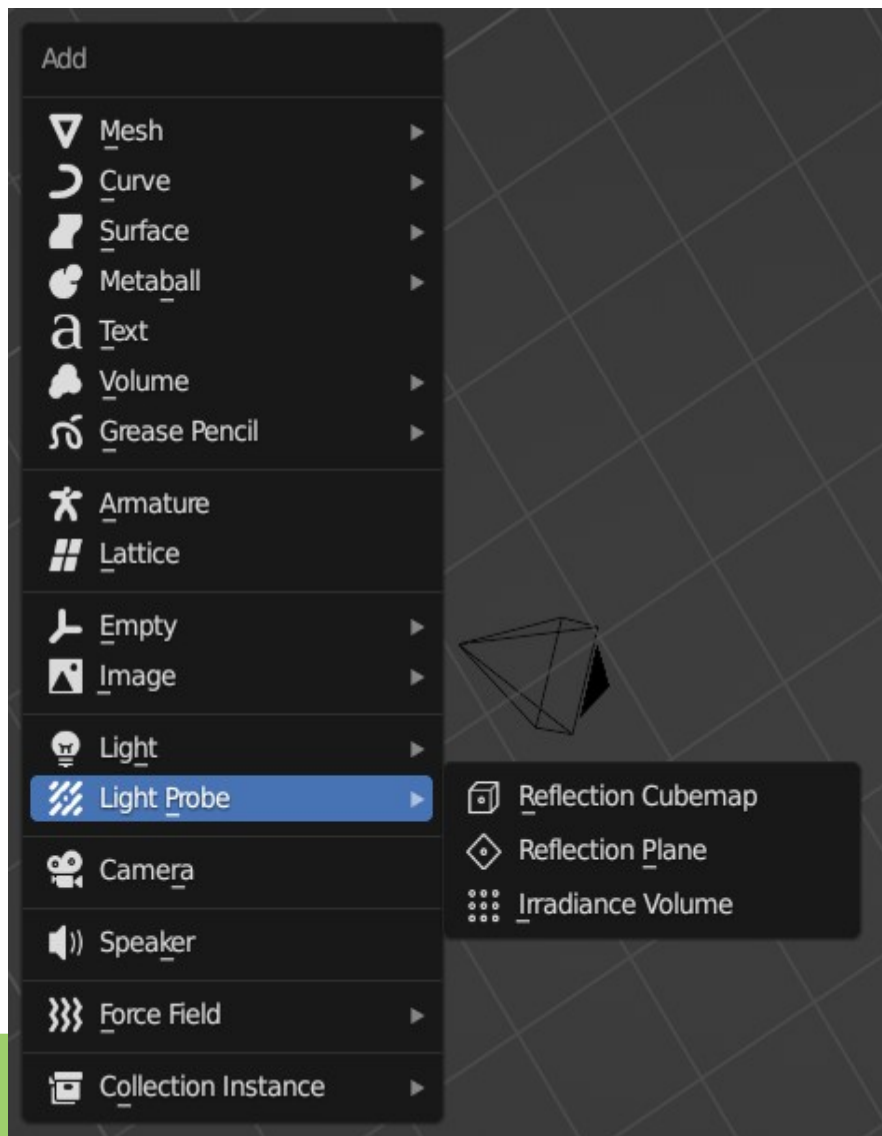










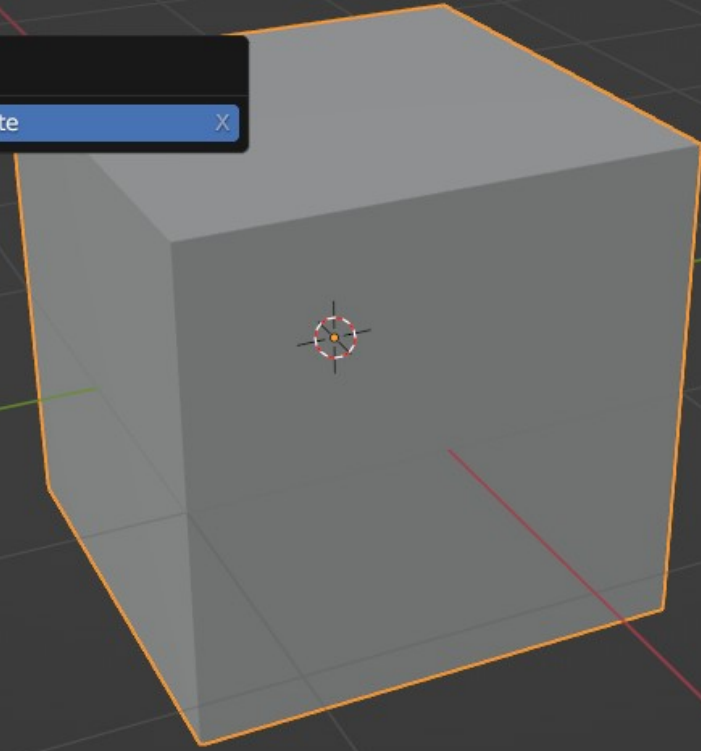
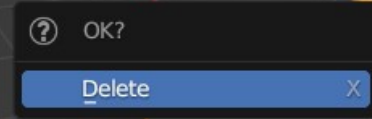


Object & Edit Mode



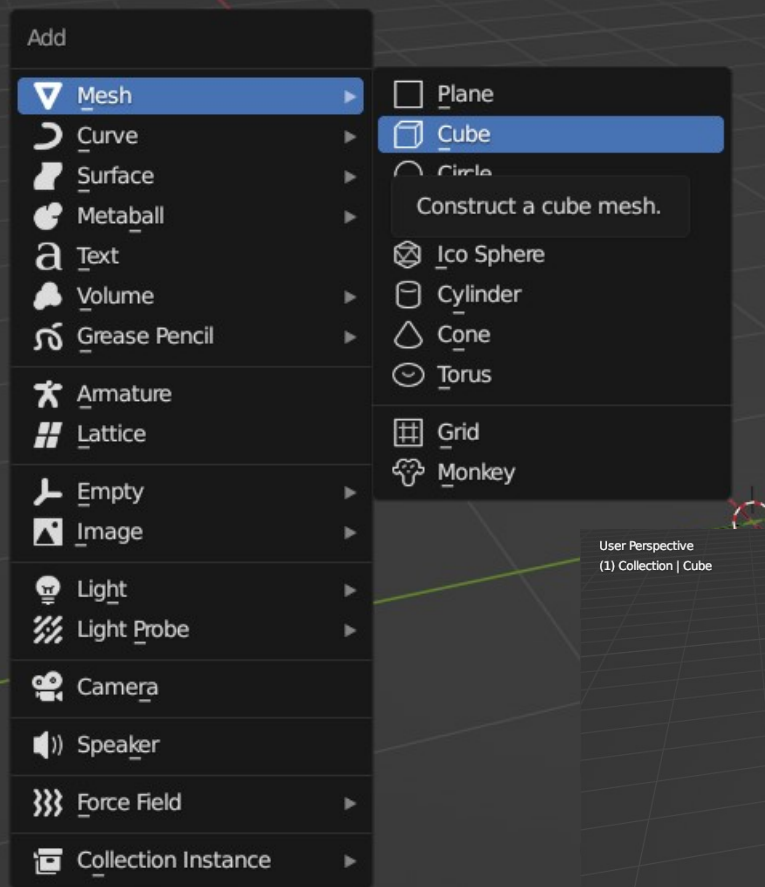
ลบกล่อง

X

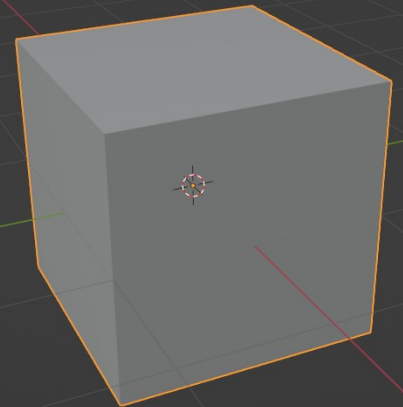


เพิ่มกล่อง

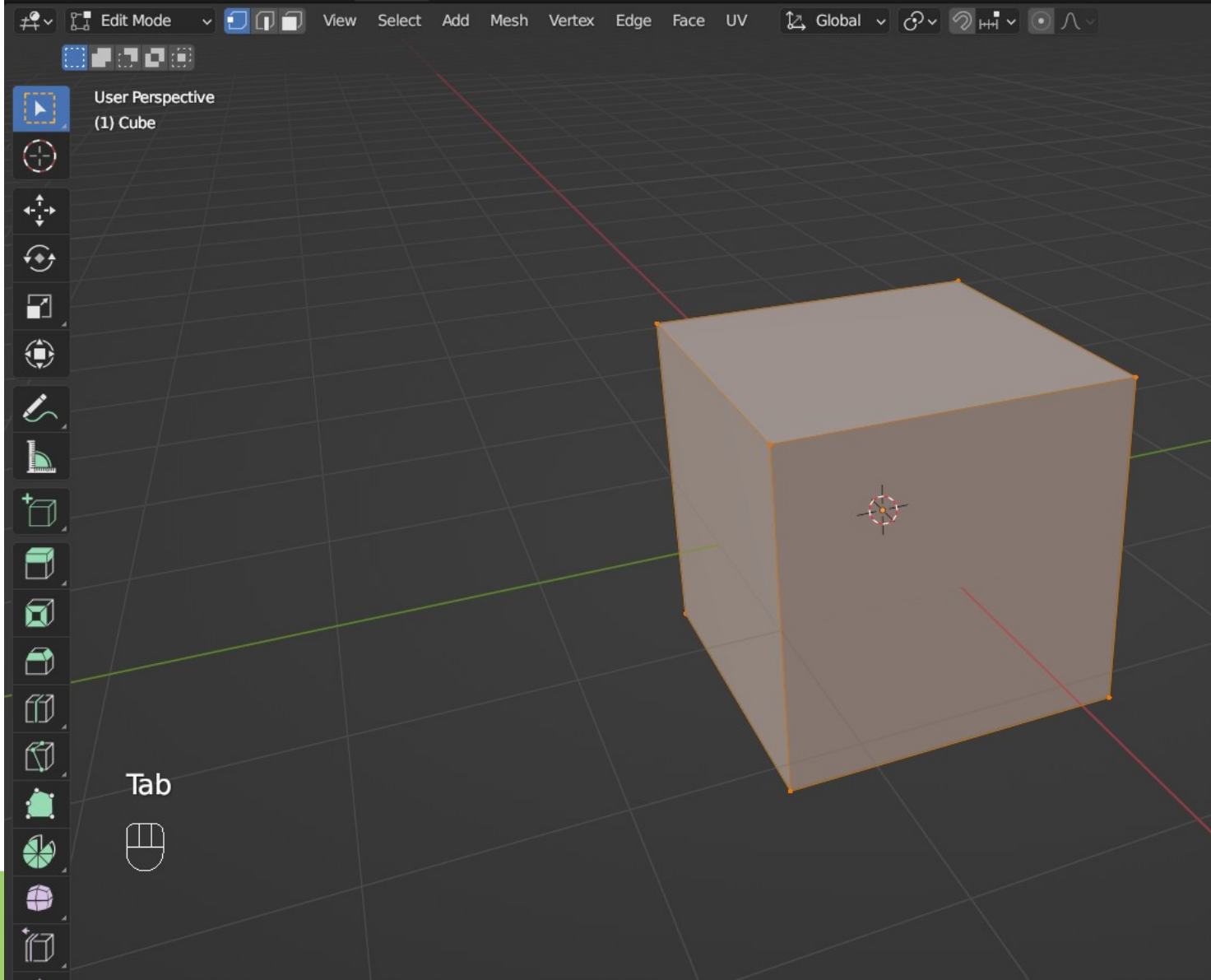
Shift + A



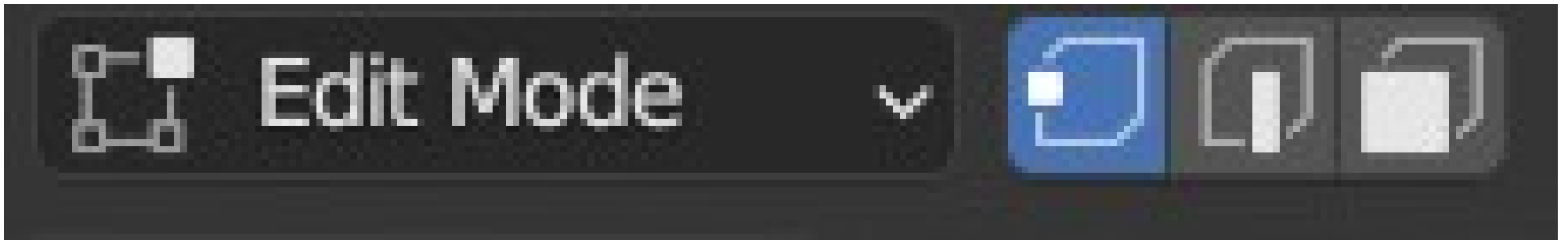
User Perspective
(1) Collection | Cube



กด Tab เพื่อเข้า Edit Mode



จัดการกับ Vertex, Edge และ Face



Extrude

E

Fill

F

Unwrap
UVs

U

Inset

I

Bevel
Ctrl+B

B

Move to
Collection

Knife Tool

K

Mirror Object
Ctrl + M
+(X/Y/Z)

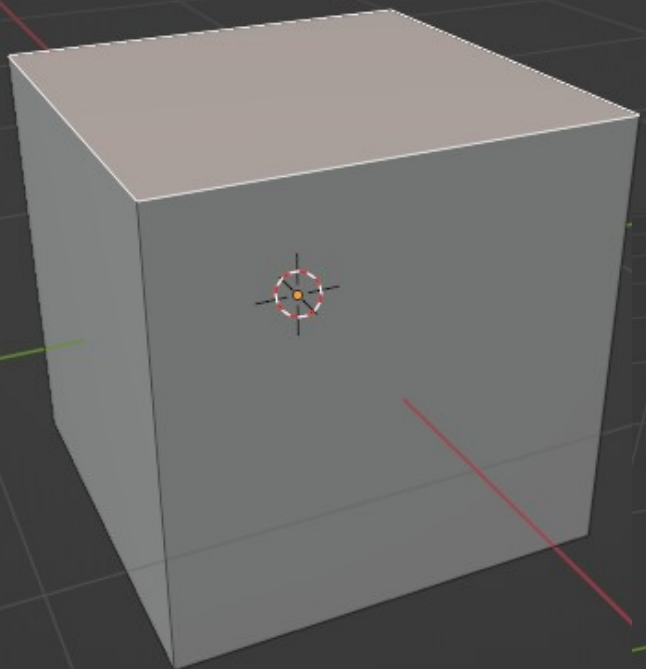
M

Subdivide

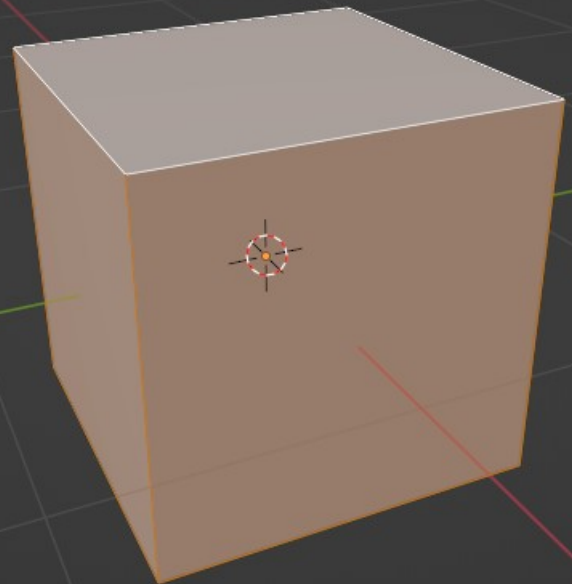




User Perspective
(27) Cube

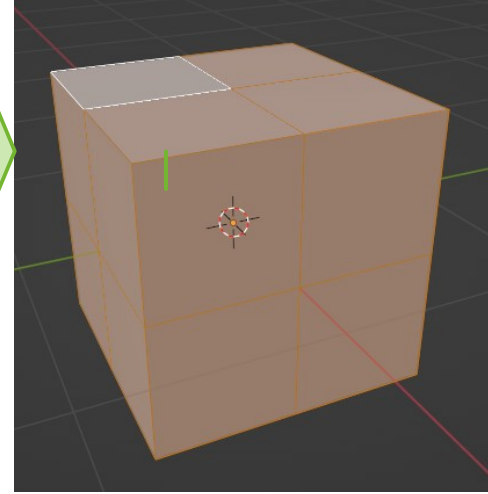
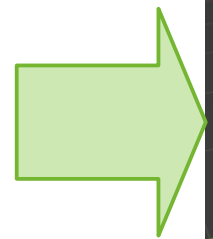


A

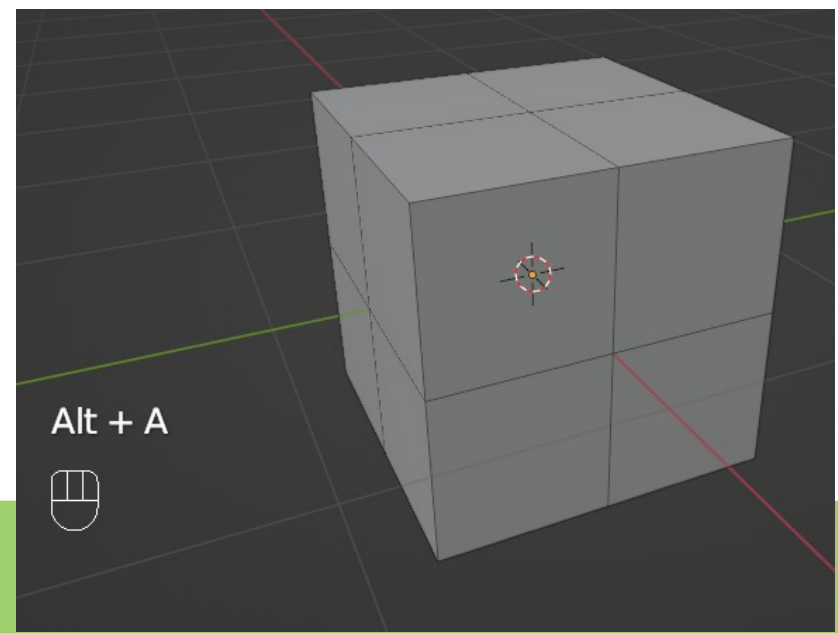


User Perspective
(27) Cube

- Face Context Menu
 - Subdivide**
 - Extrude Faces E
 - Extrude Faces Along Normals
 - Extrude Individual Faces
 - Inset Faces I
 - Poke Faces
 - Bridge Faces
 - UV Unwrap Faces U▶
 - Triangulate Faces Ctrl T
 - Tris to Quads Alt J
 - Shade Smooth
 - Shade Flat
 - Un-Subdivide
 - Split Y
 - Separate P▶
 - Dissolve Faces
 - Delete Faces



Right Mouse



Alt + A



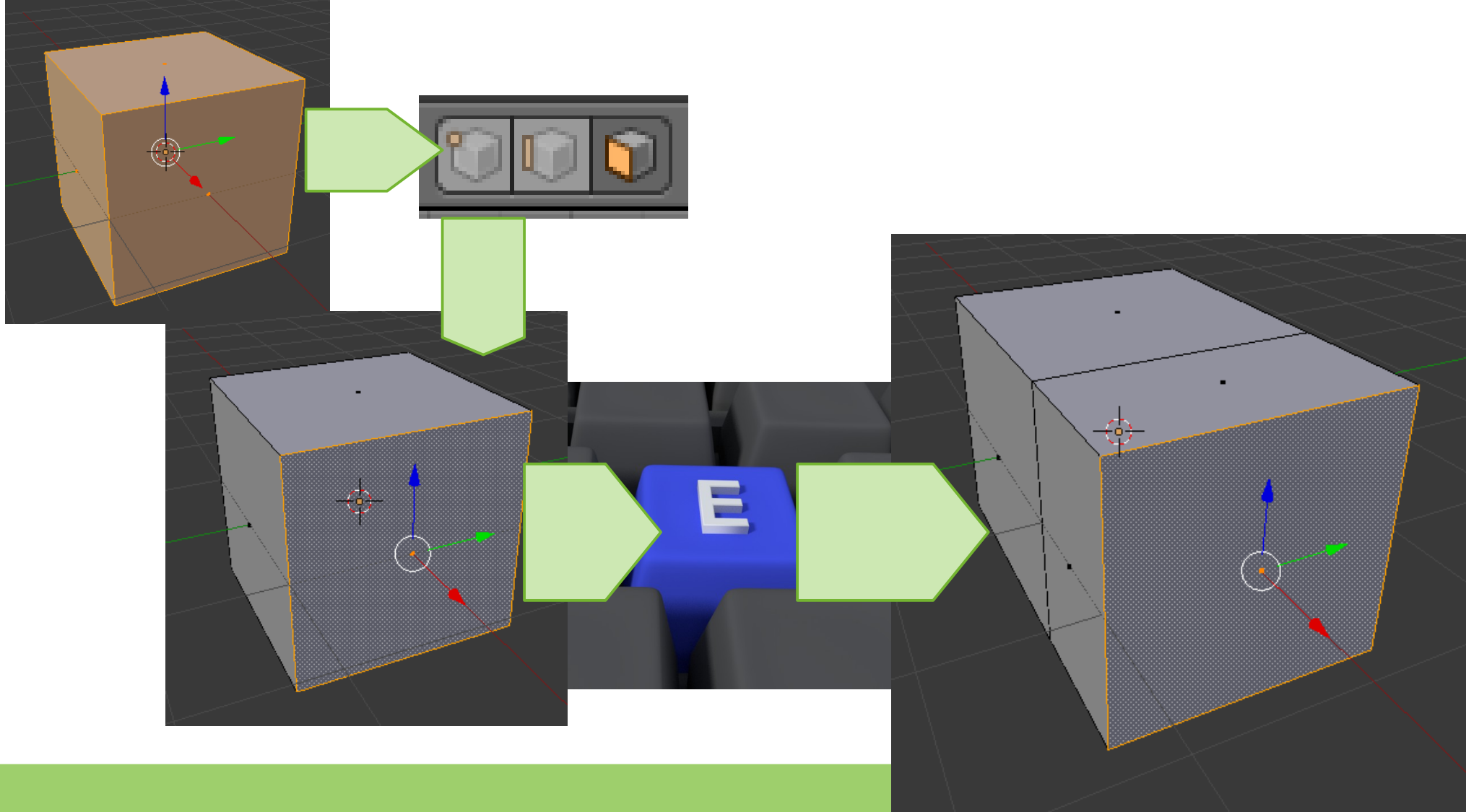
1. ลบโพลีกอน

2. เติมโพลีกอน

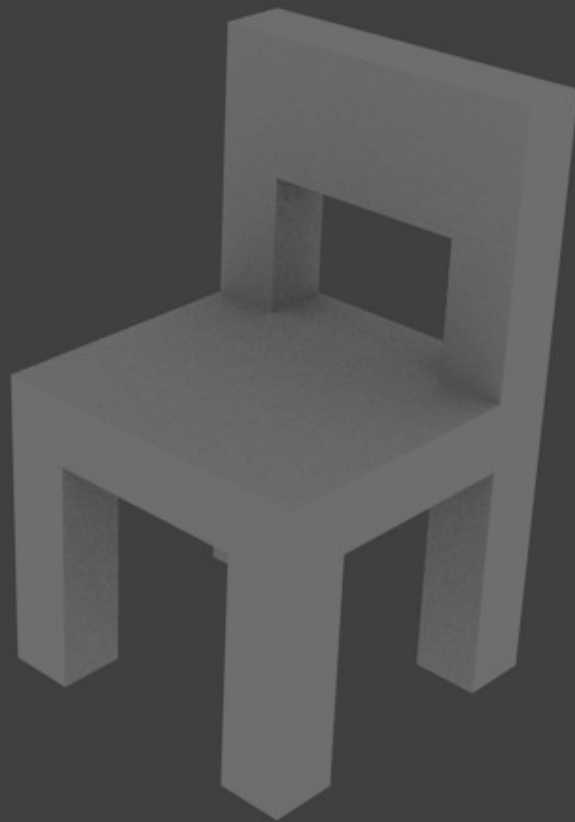


Extrude

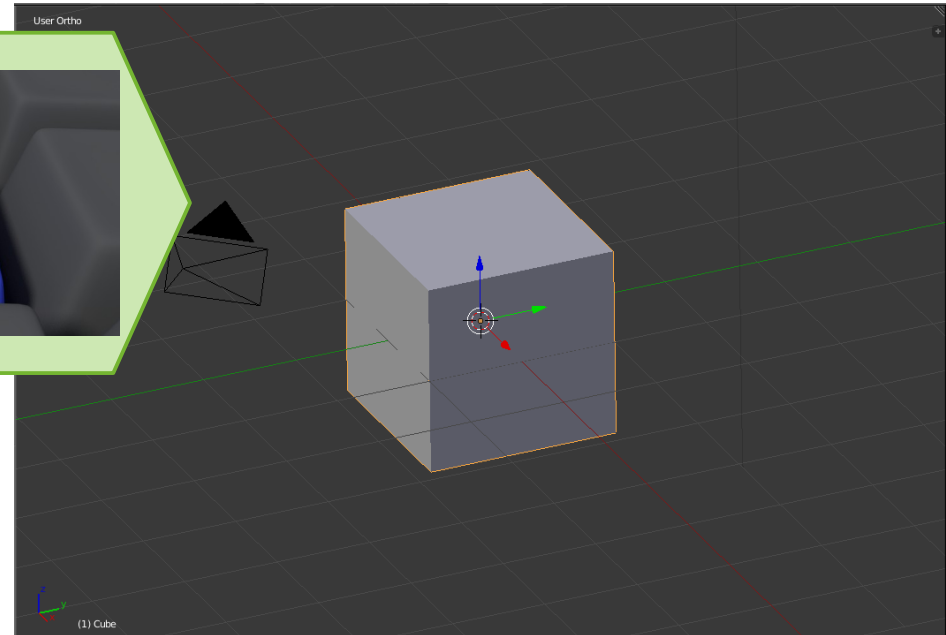
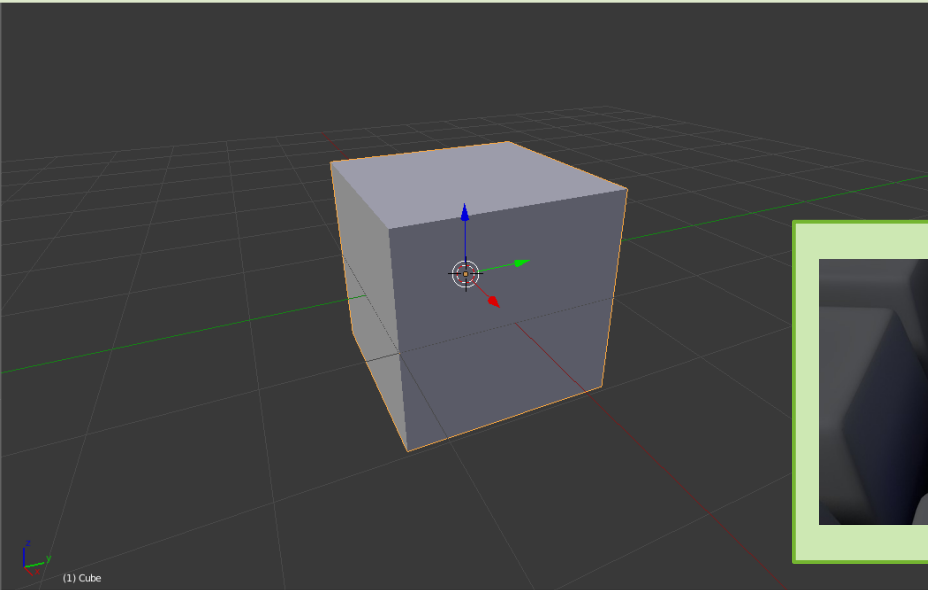


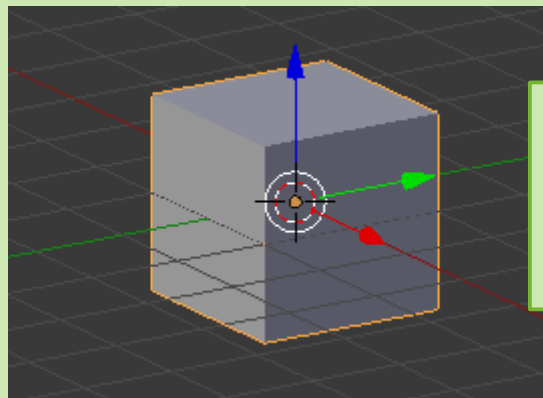


เก้าอี้

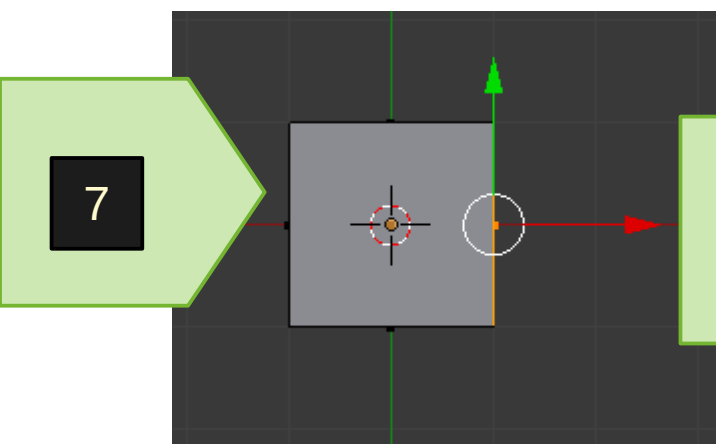
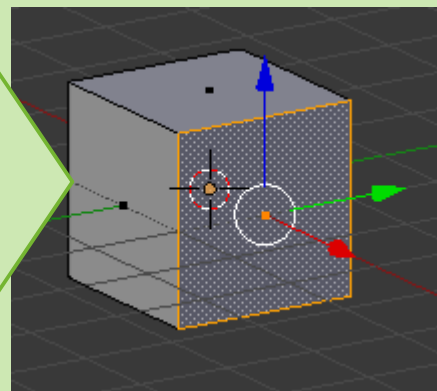
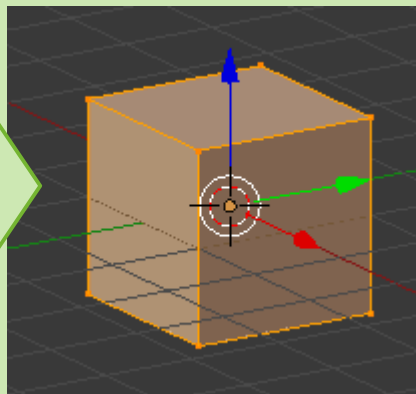


เปลี่ยนมุมมอง Perspective / Orthogonal

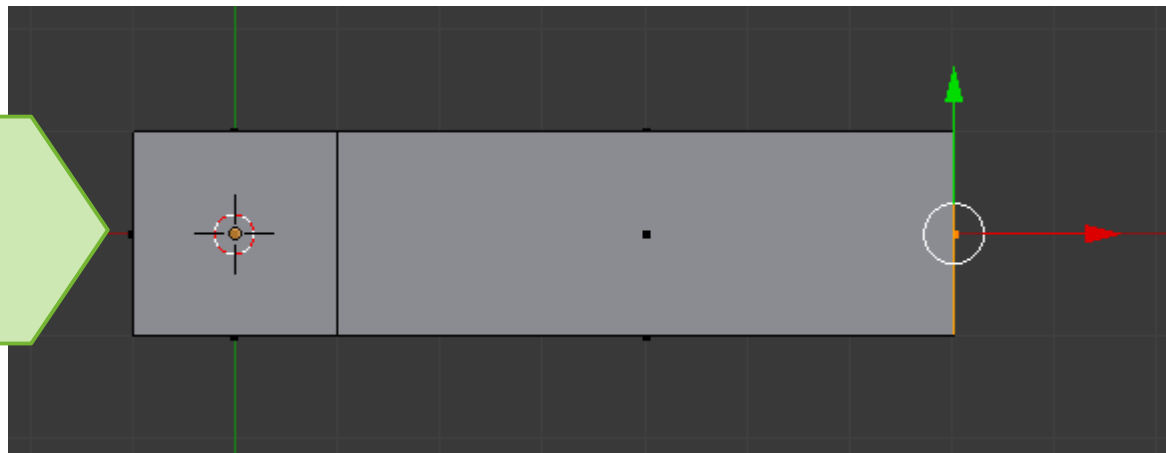




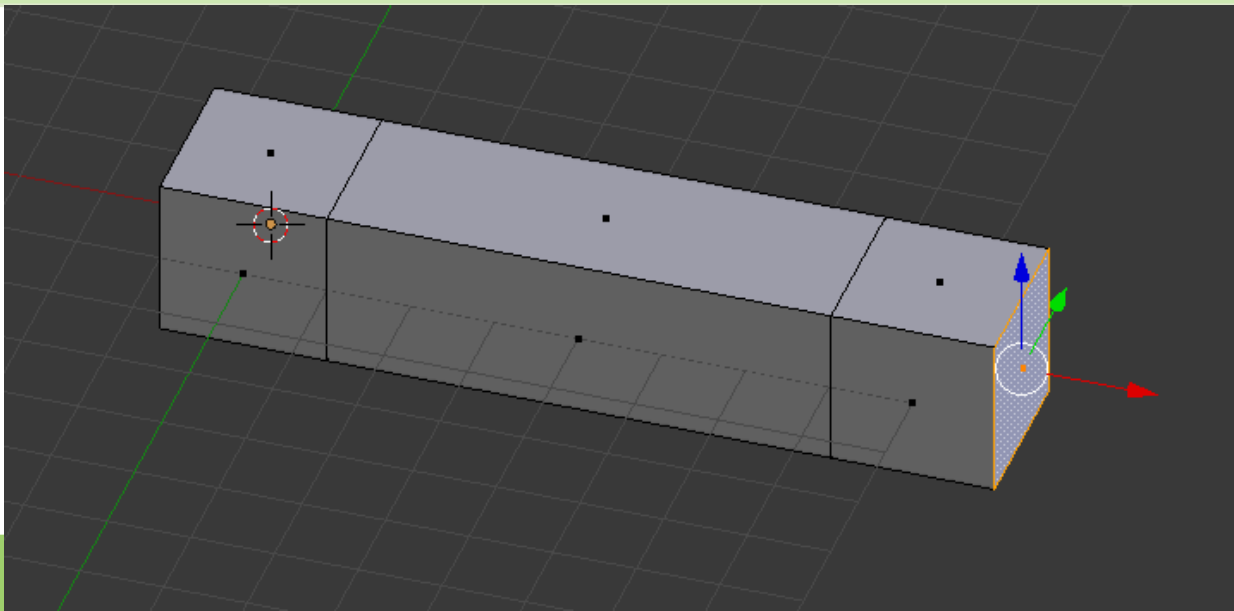
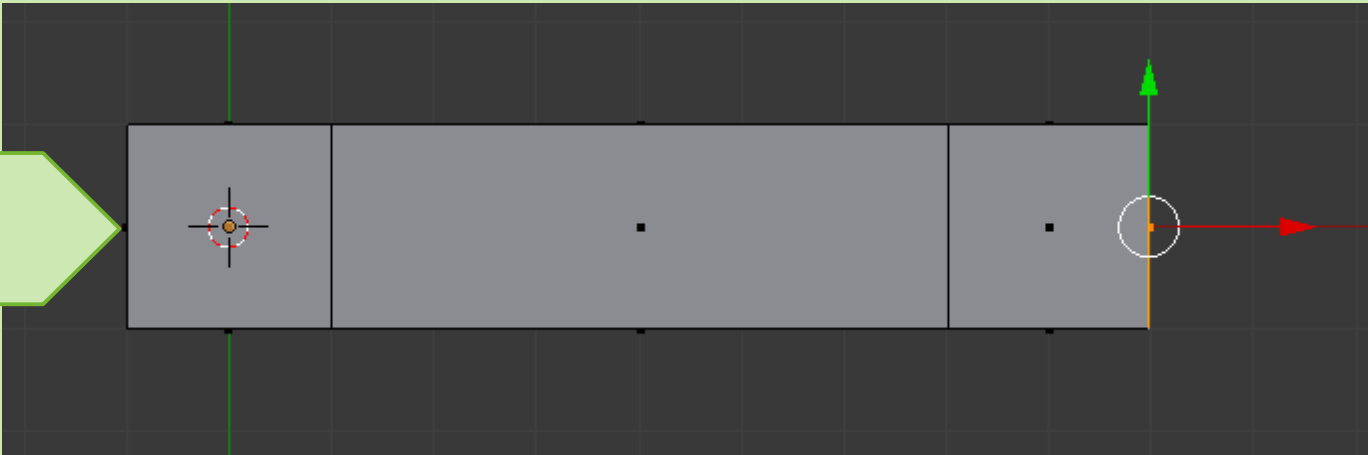
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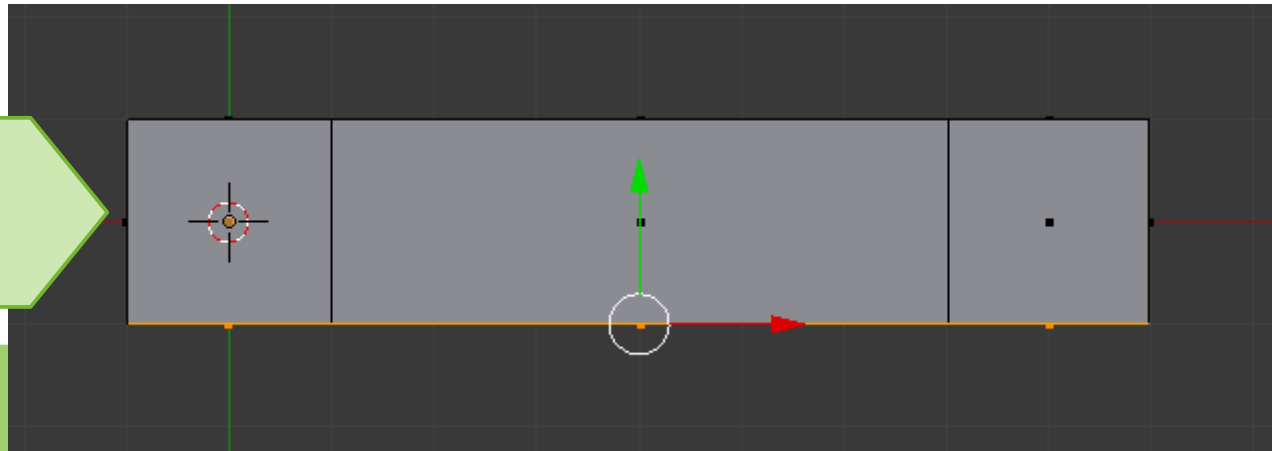
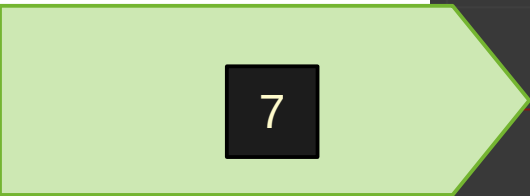
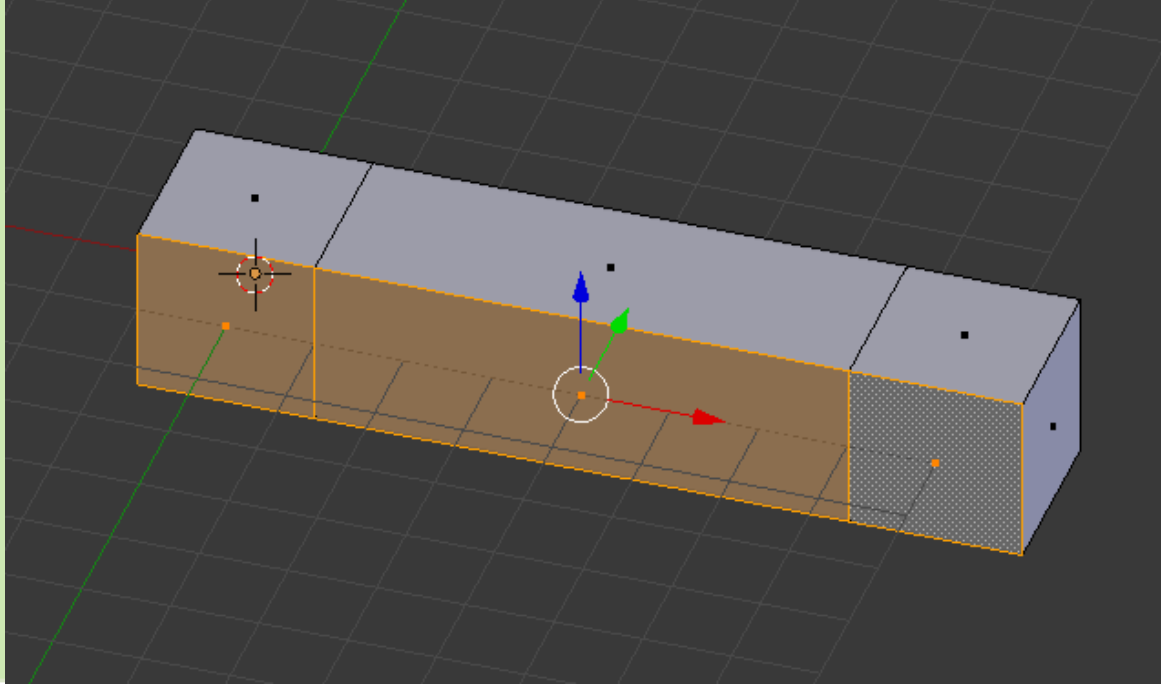


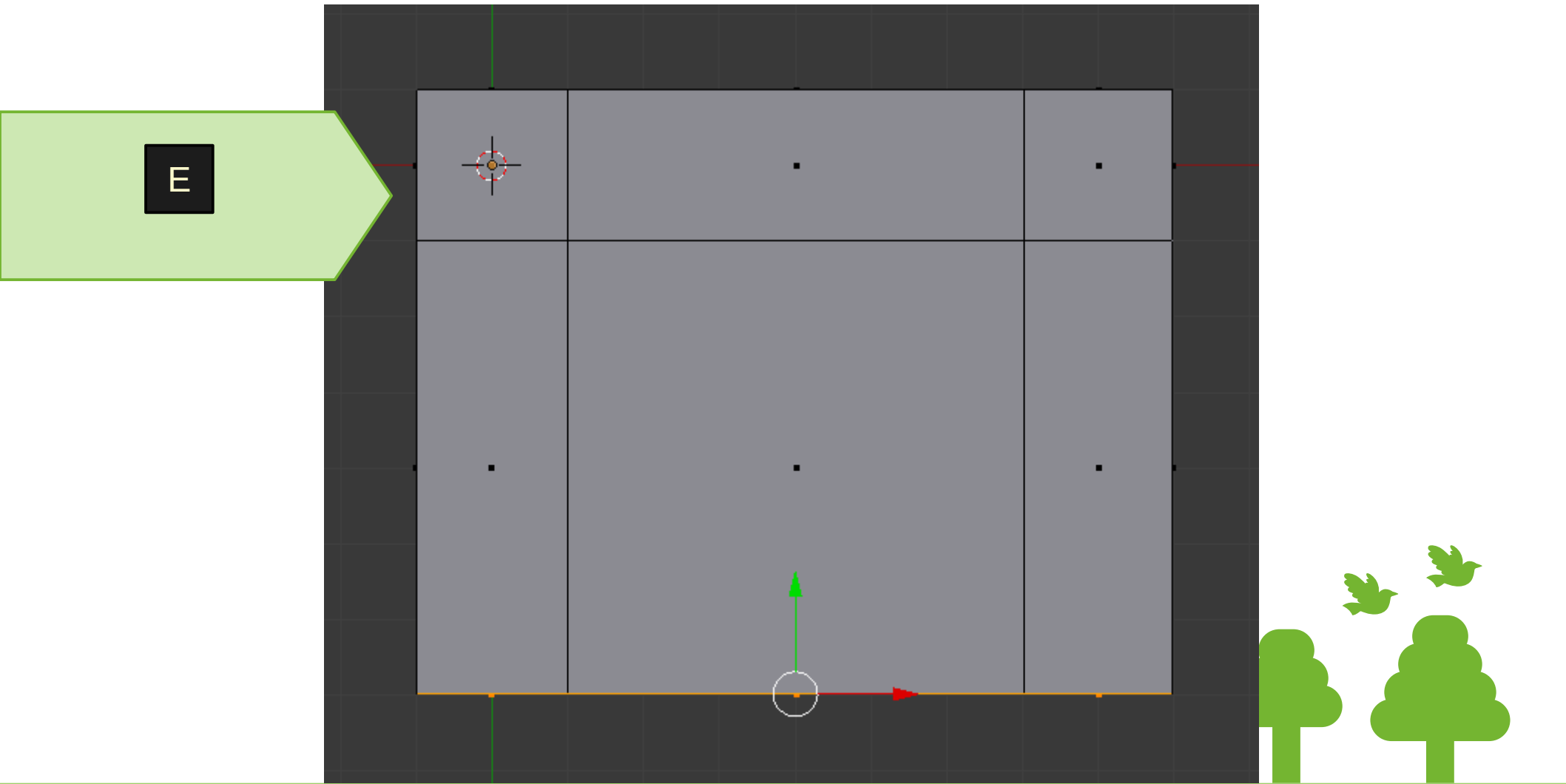
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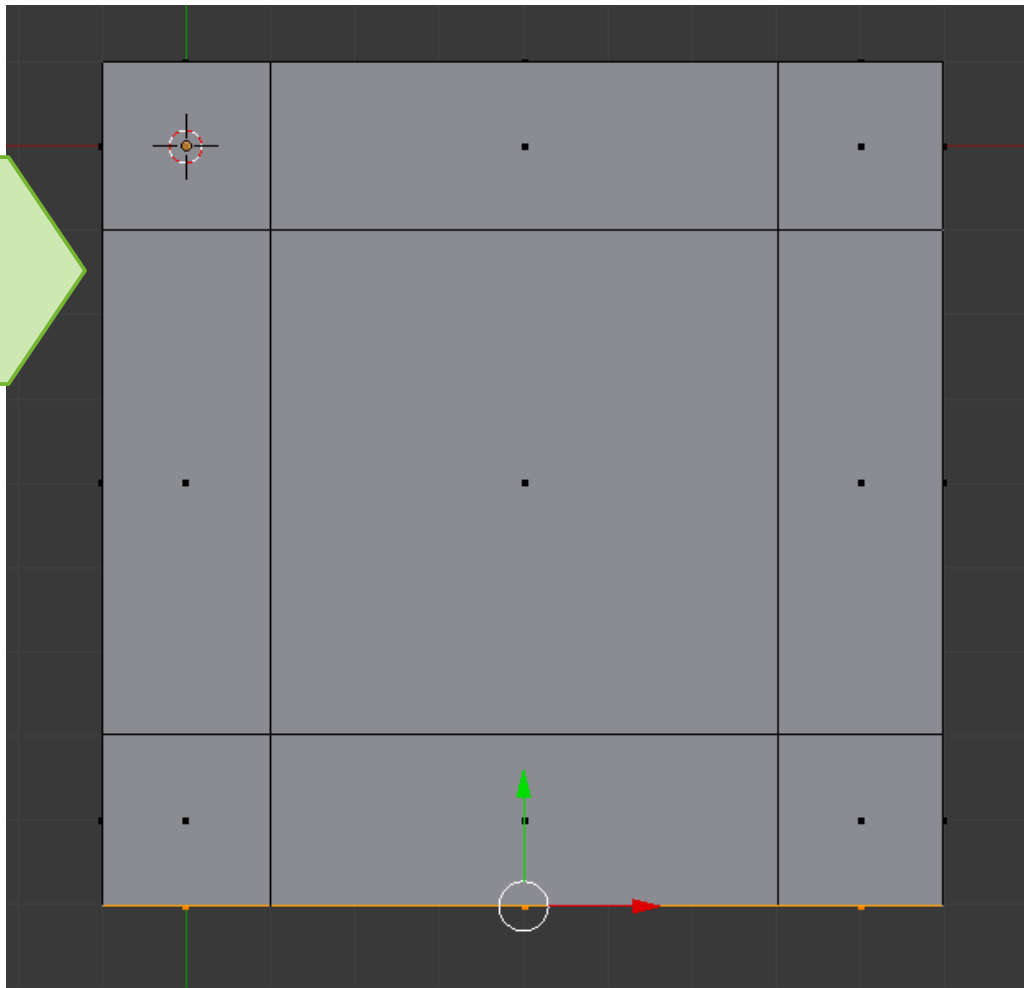
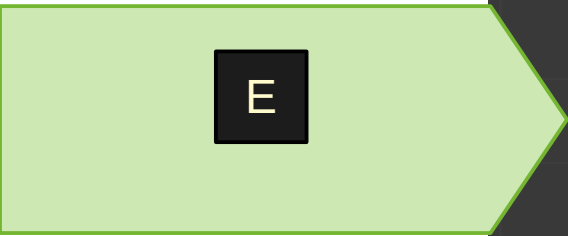


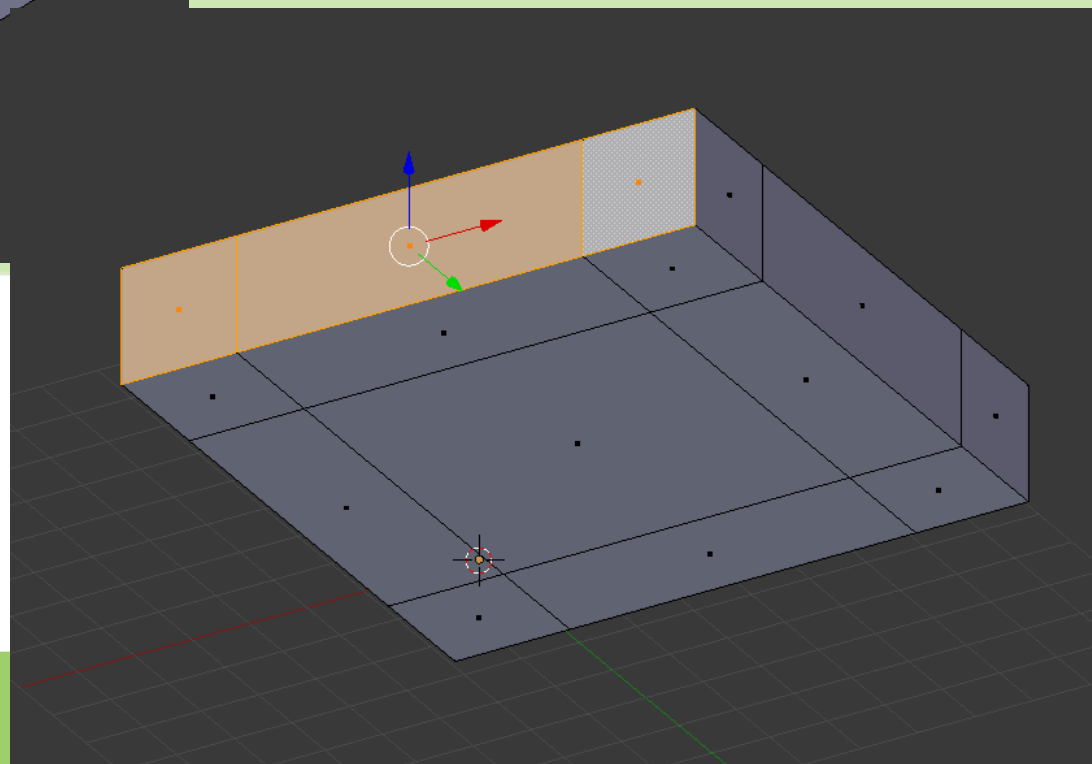
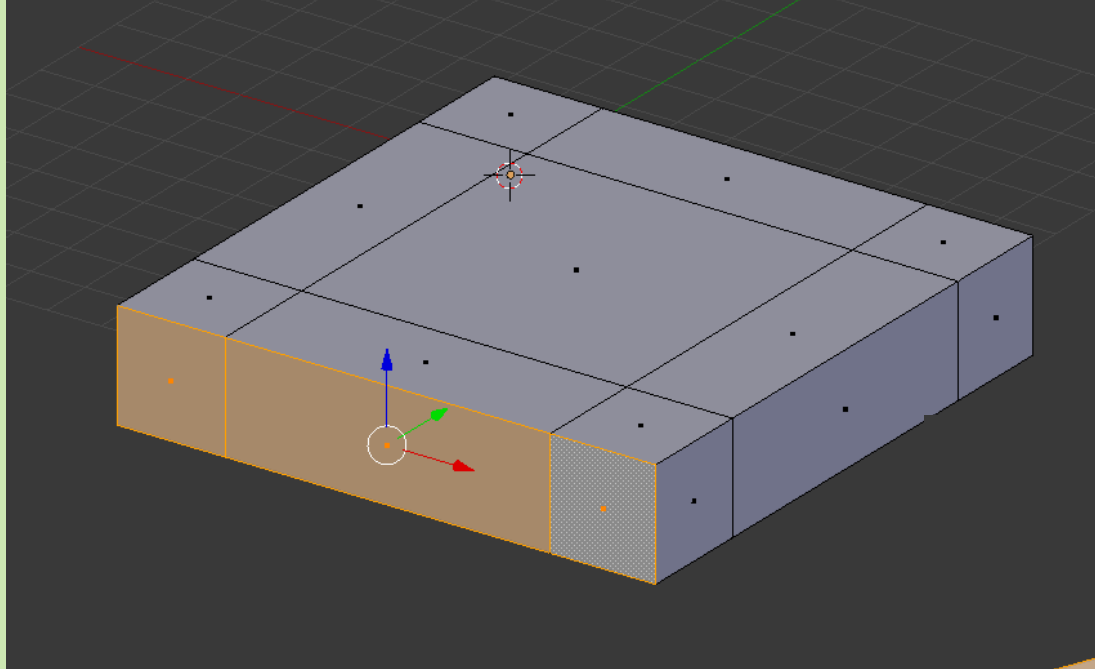
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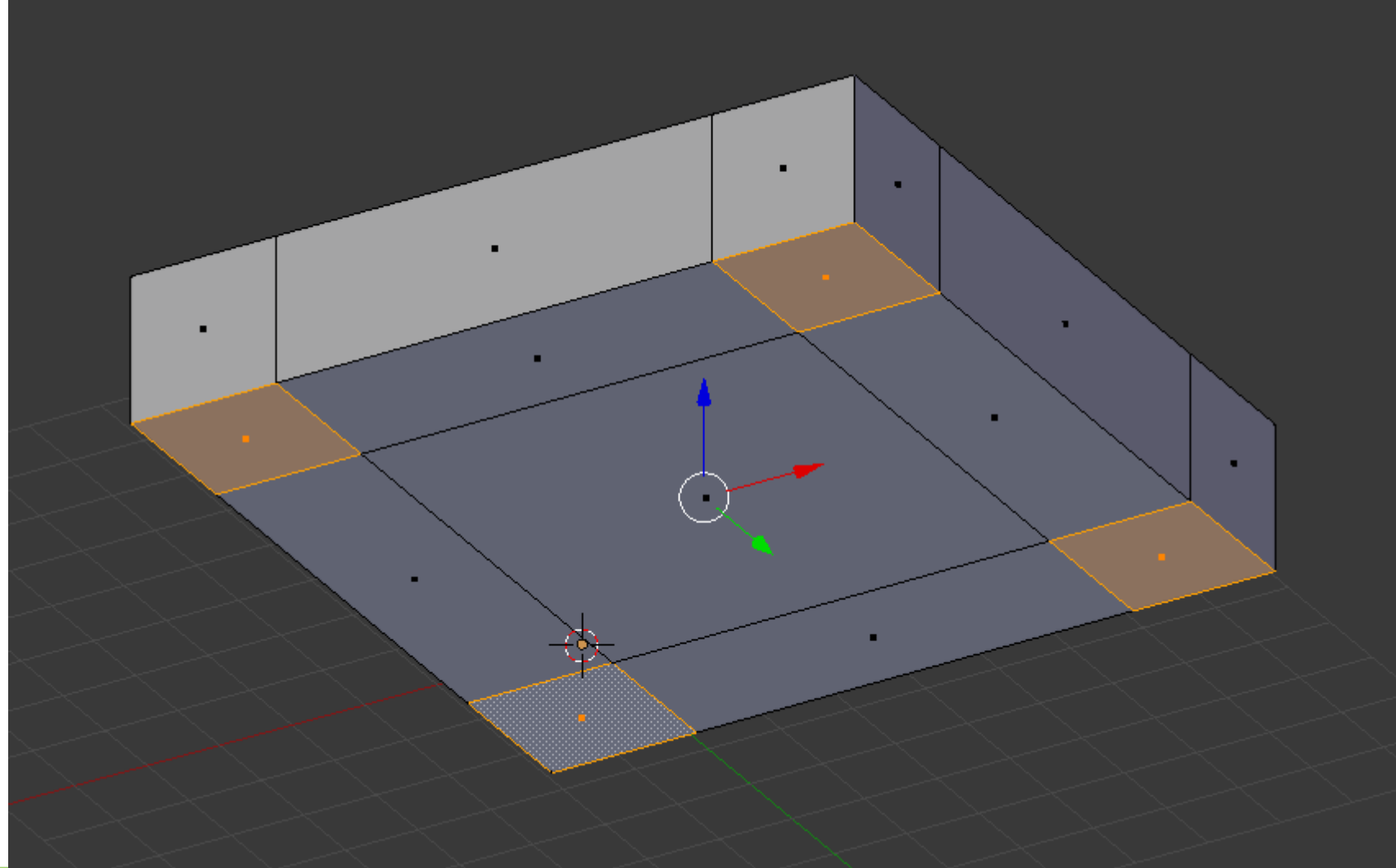




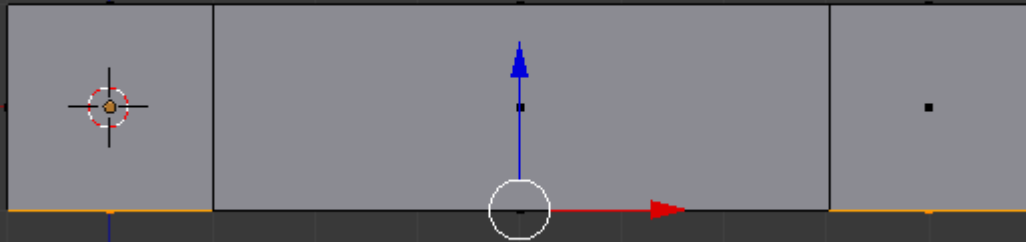




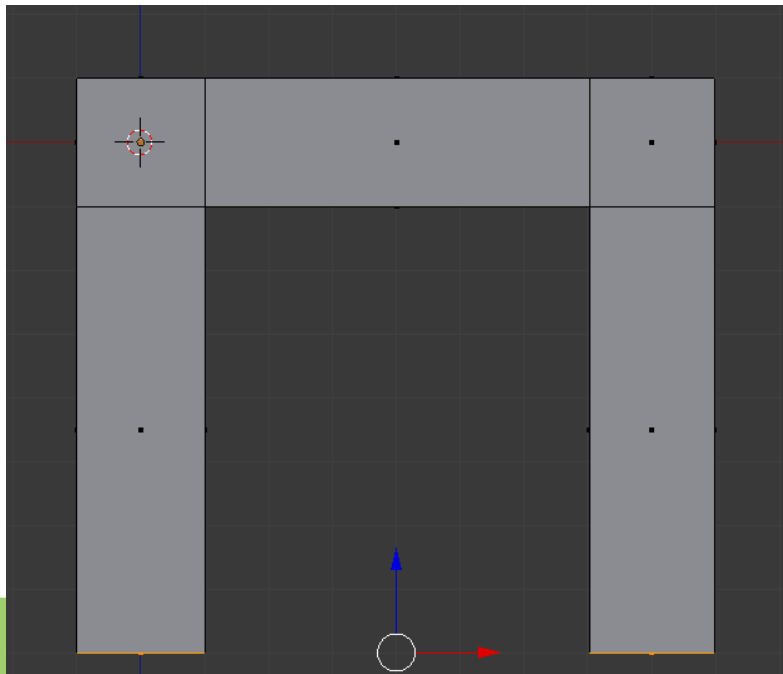


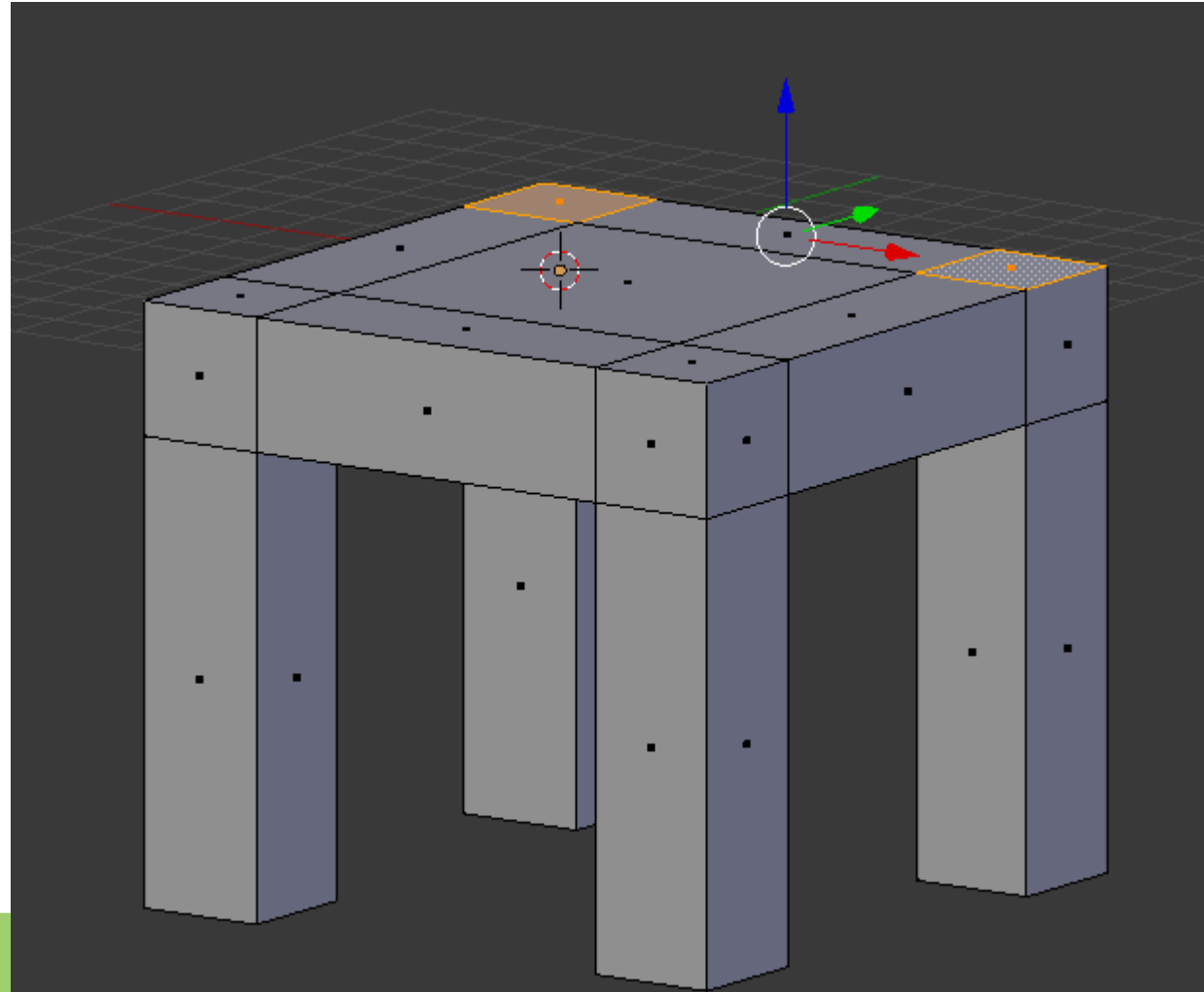
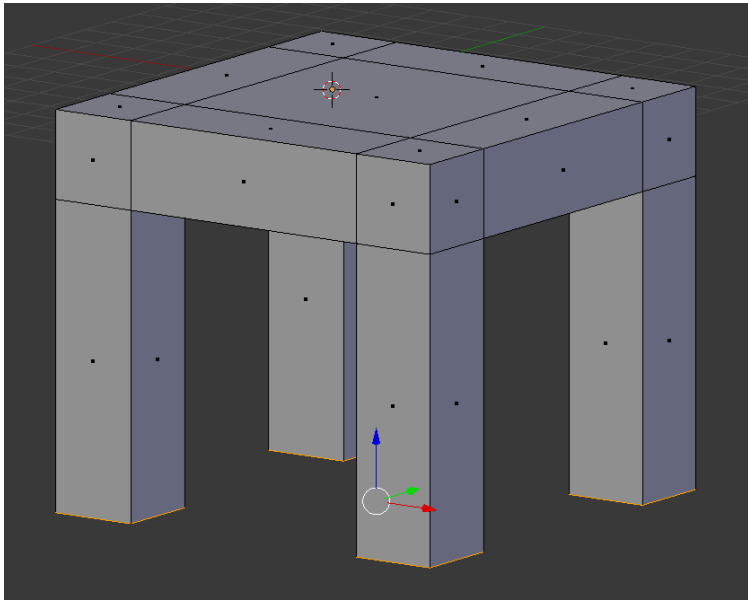


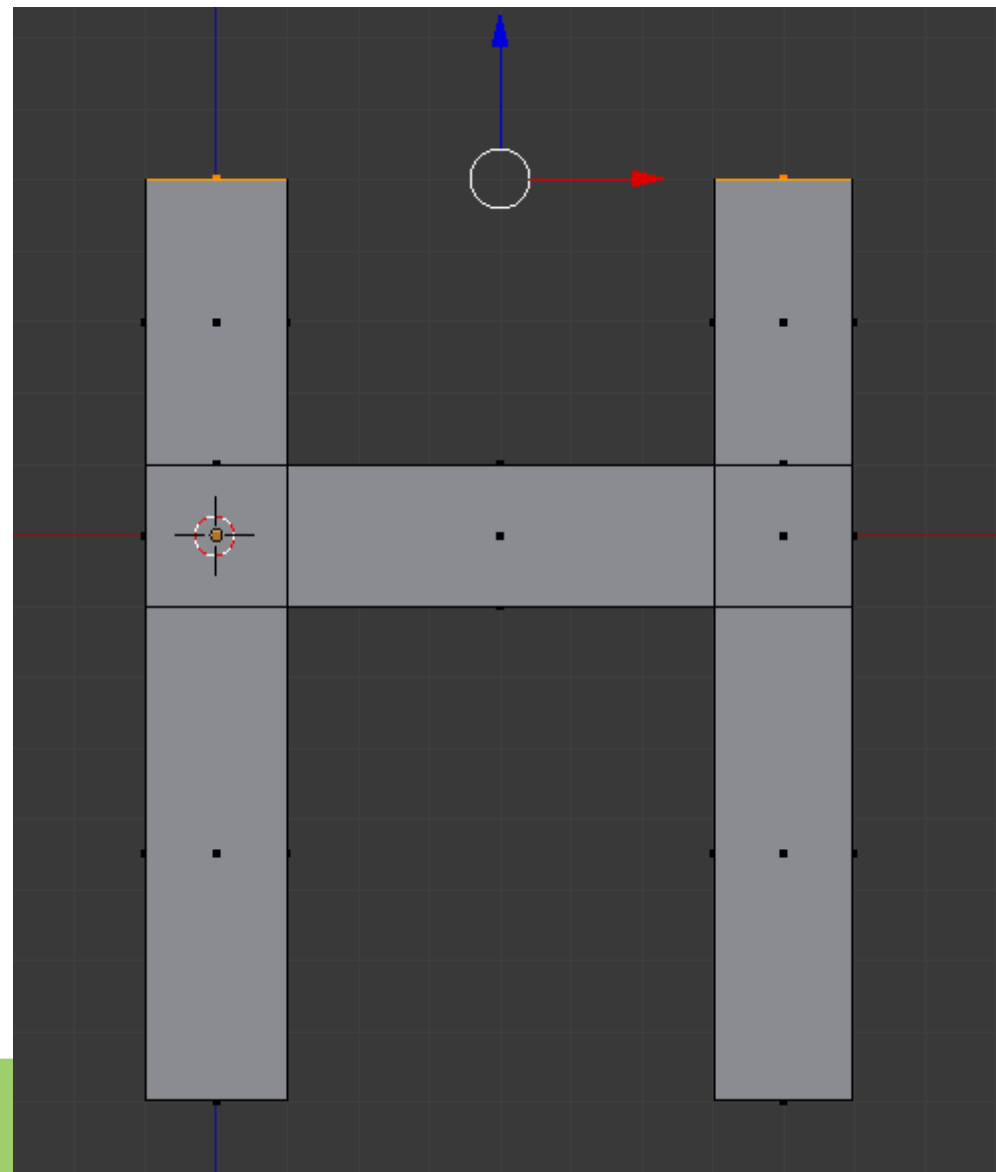
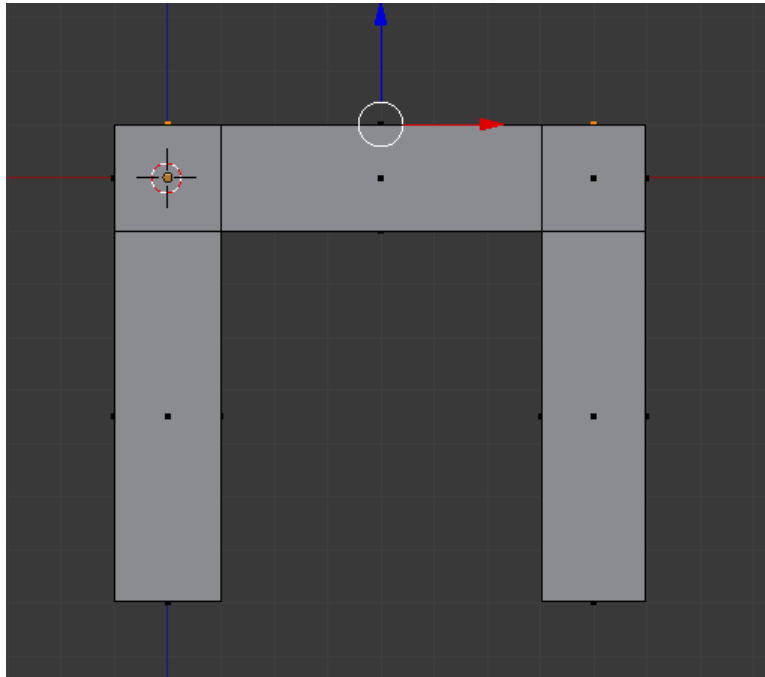
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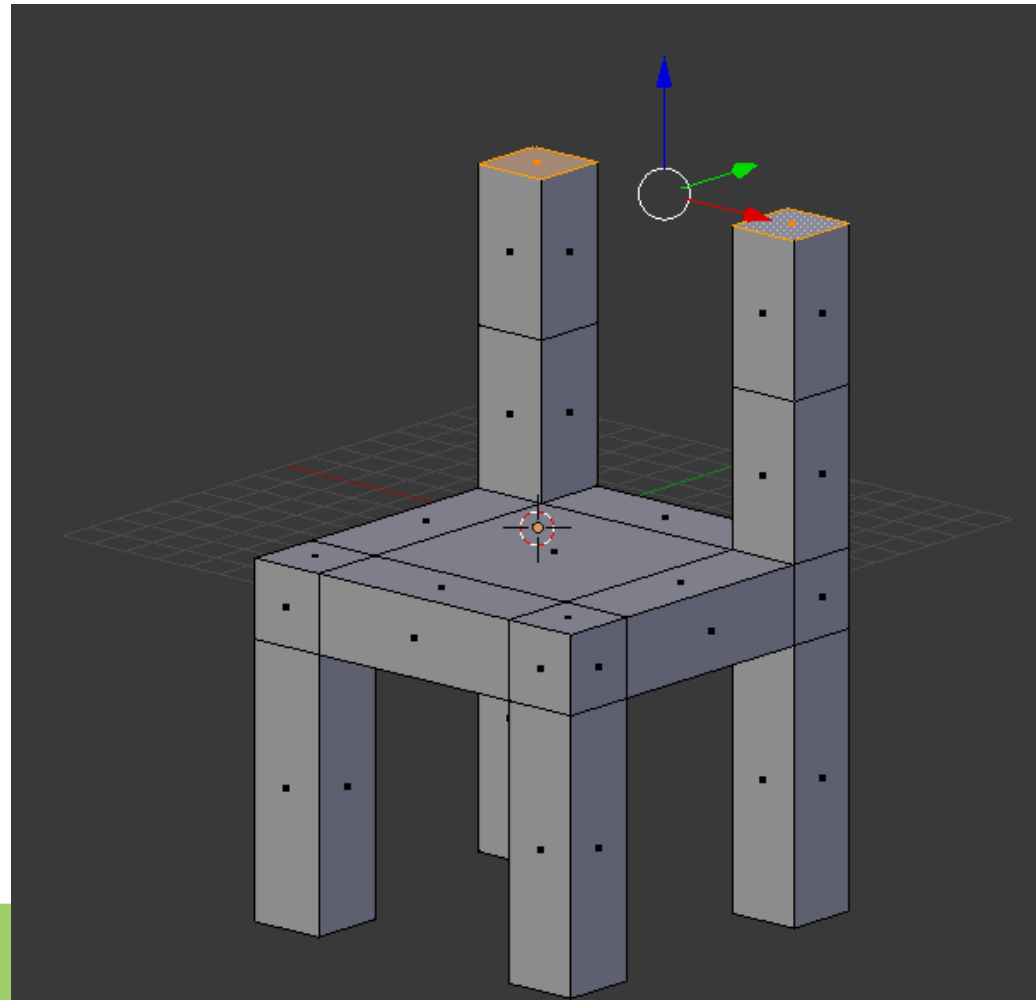
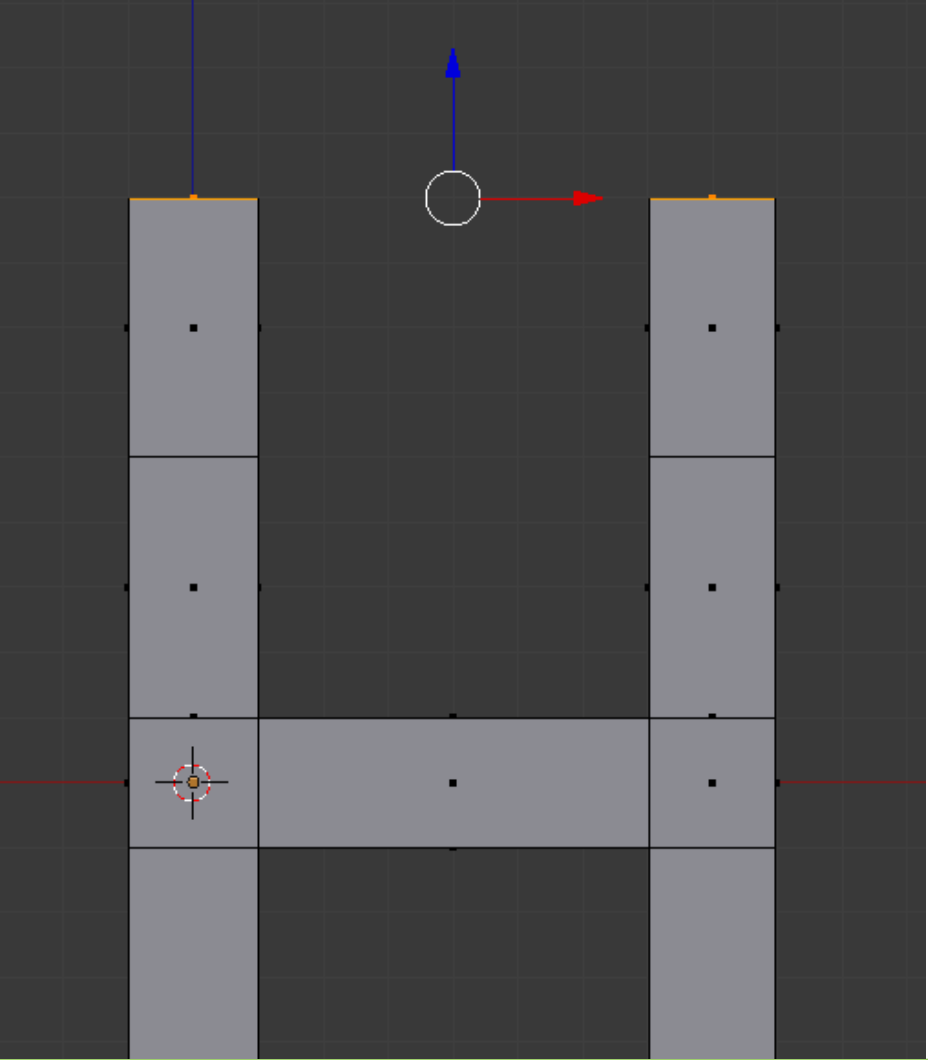


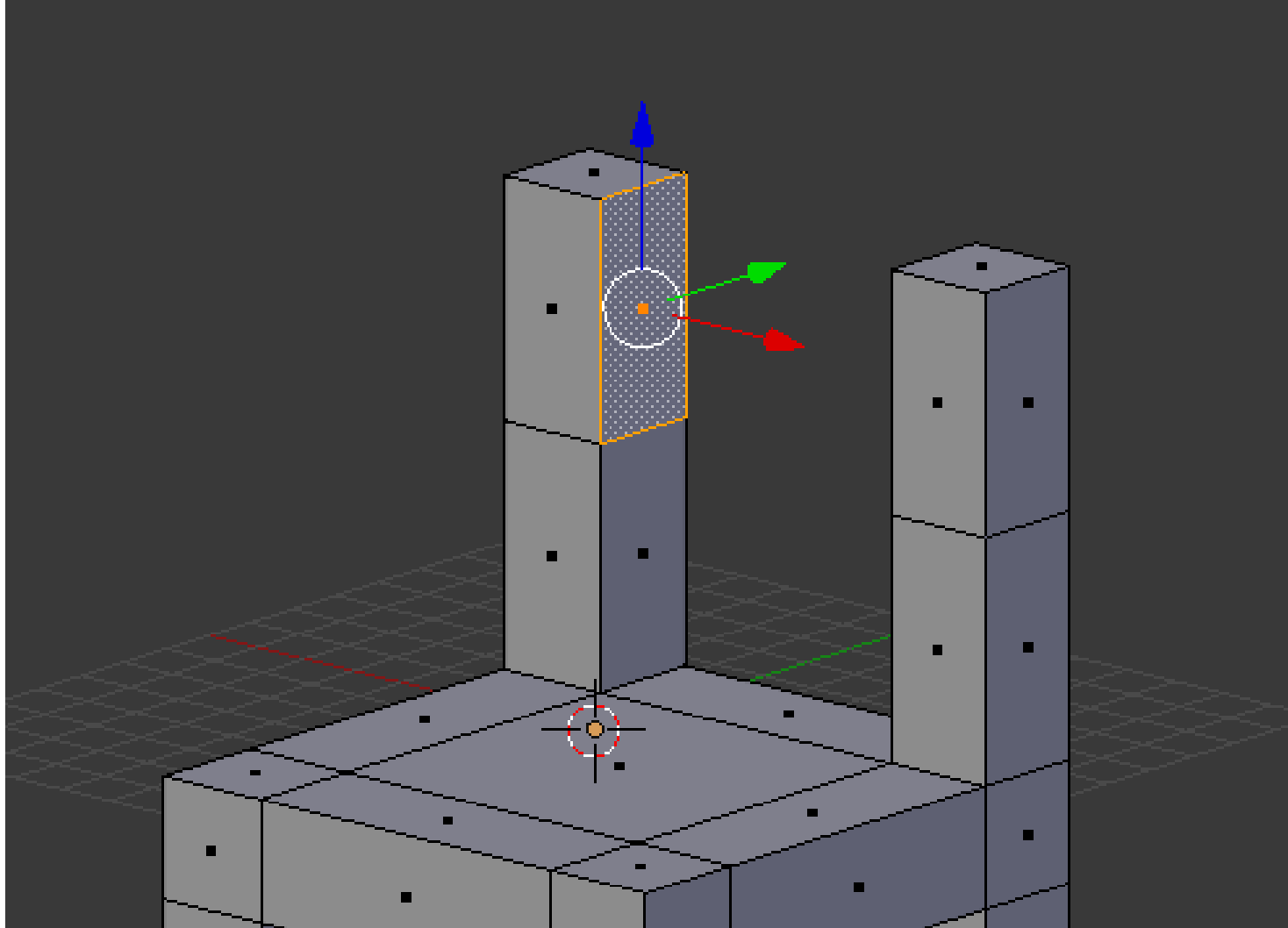
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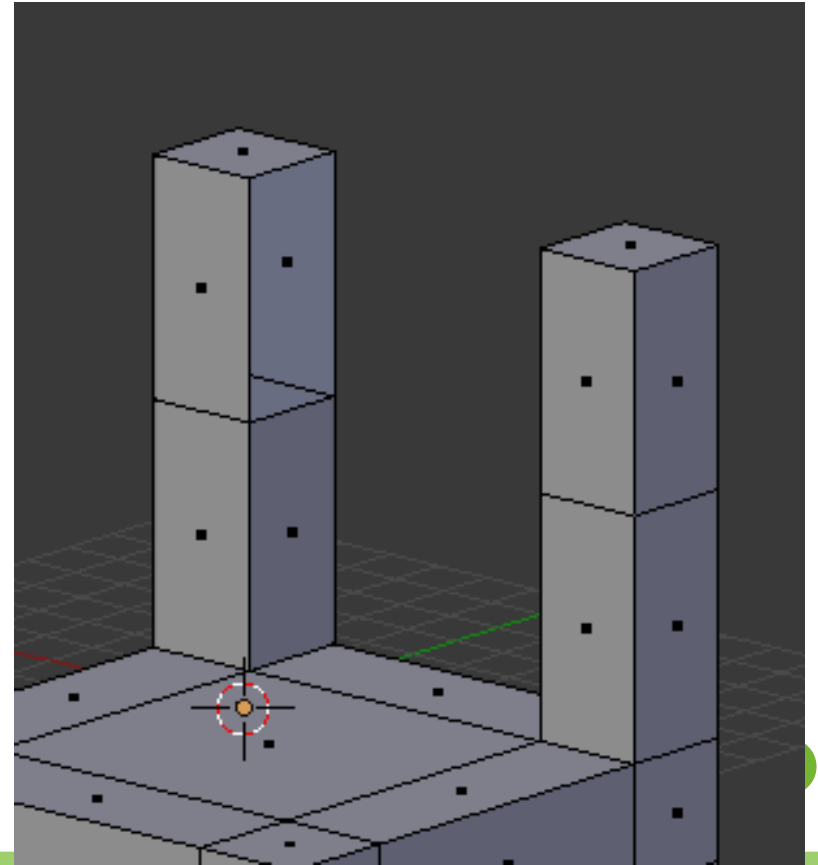
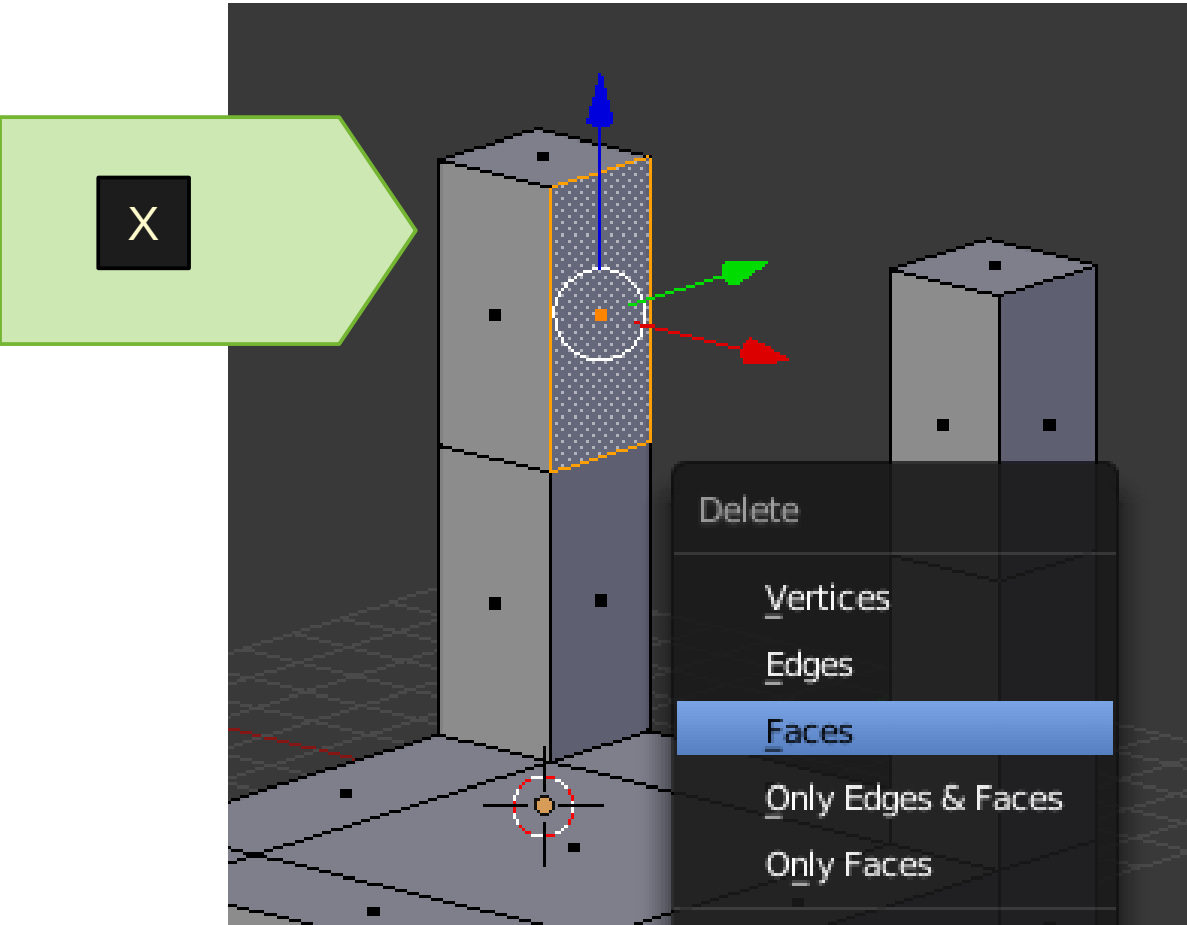


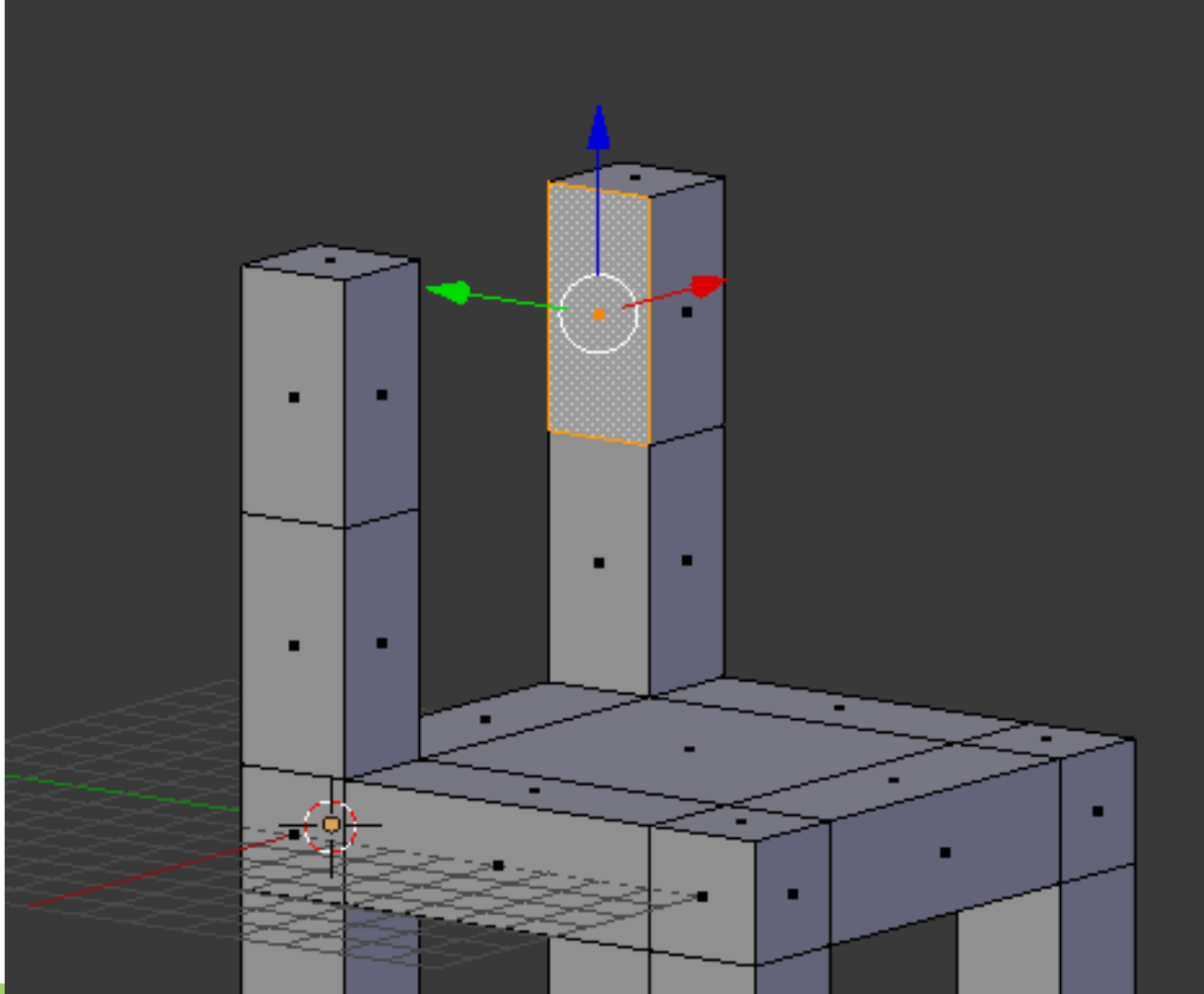


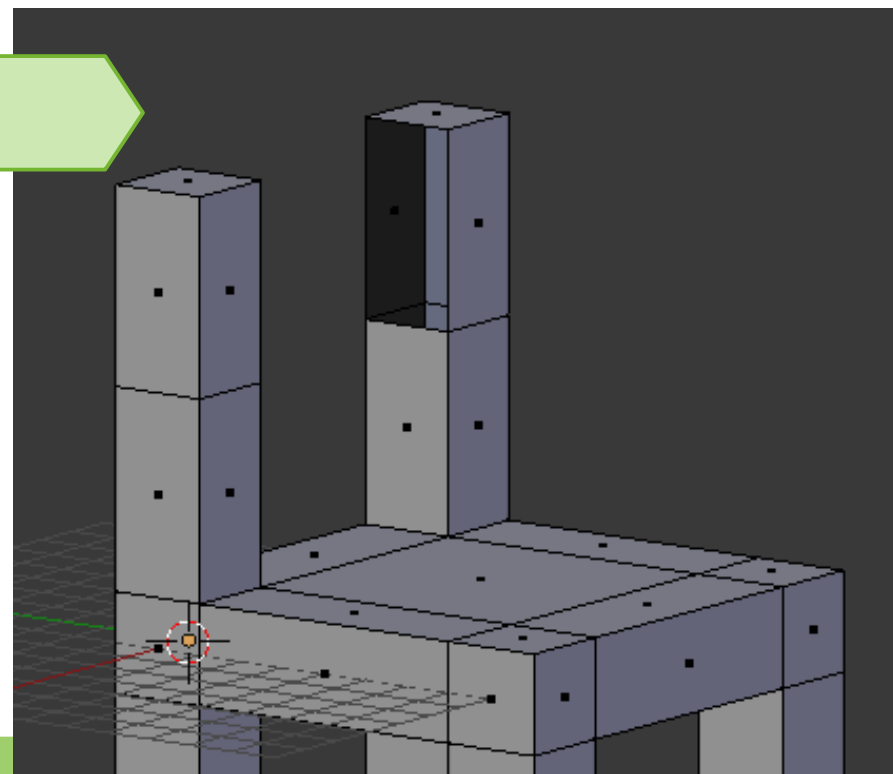
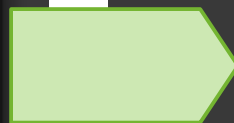
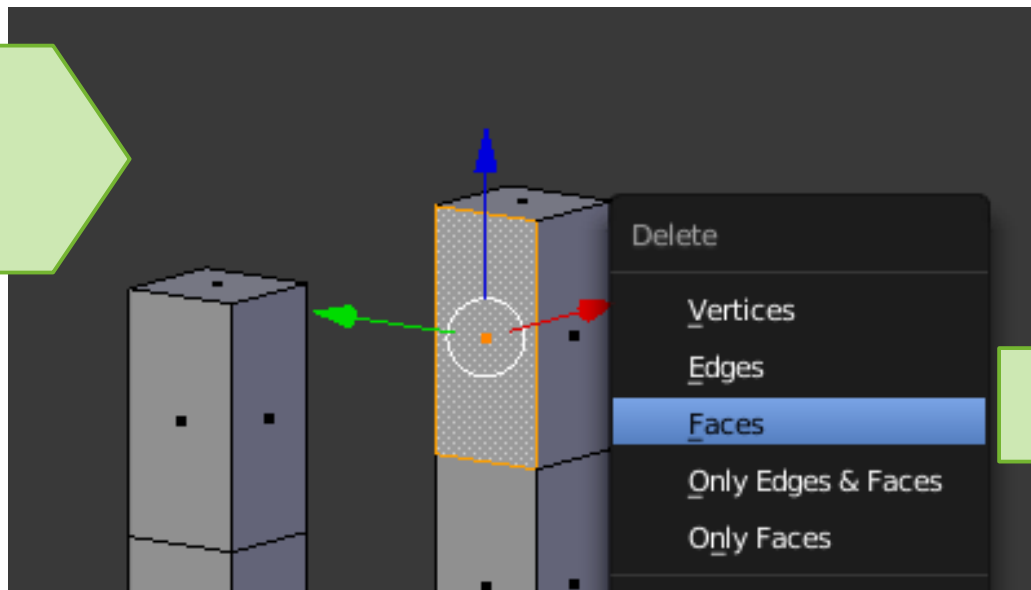


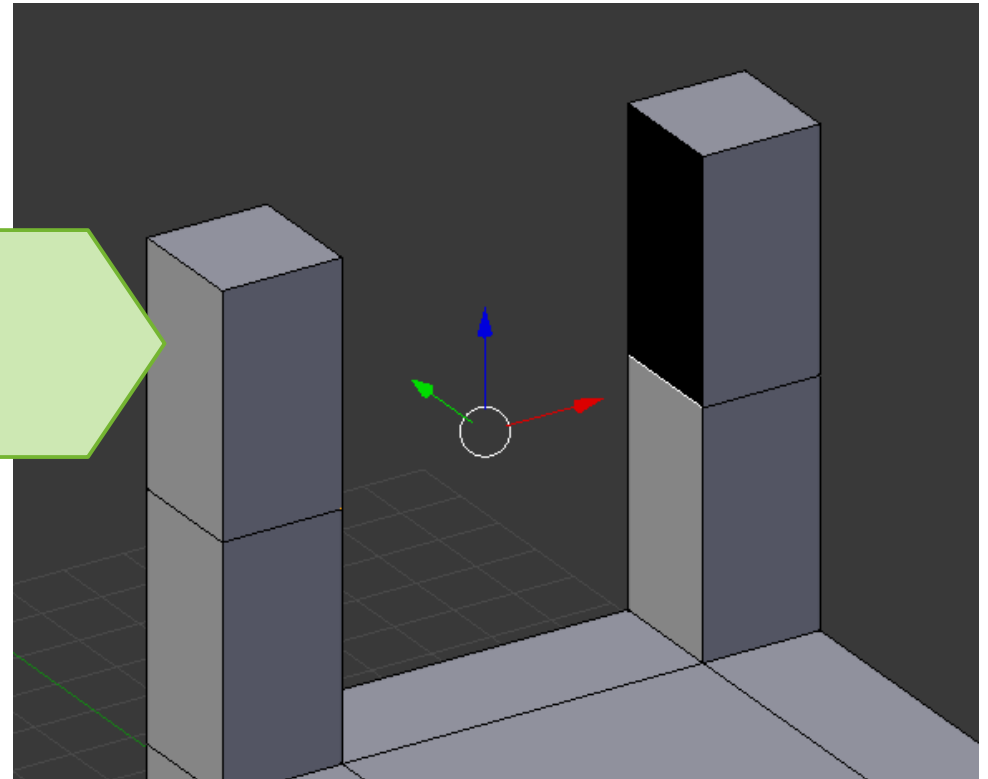
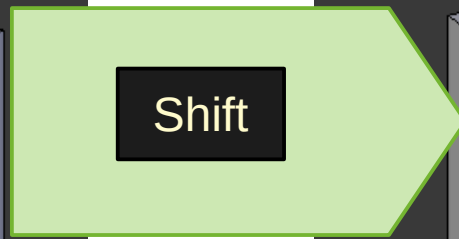
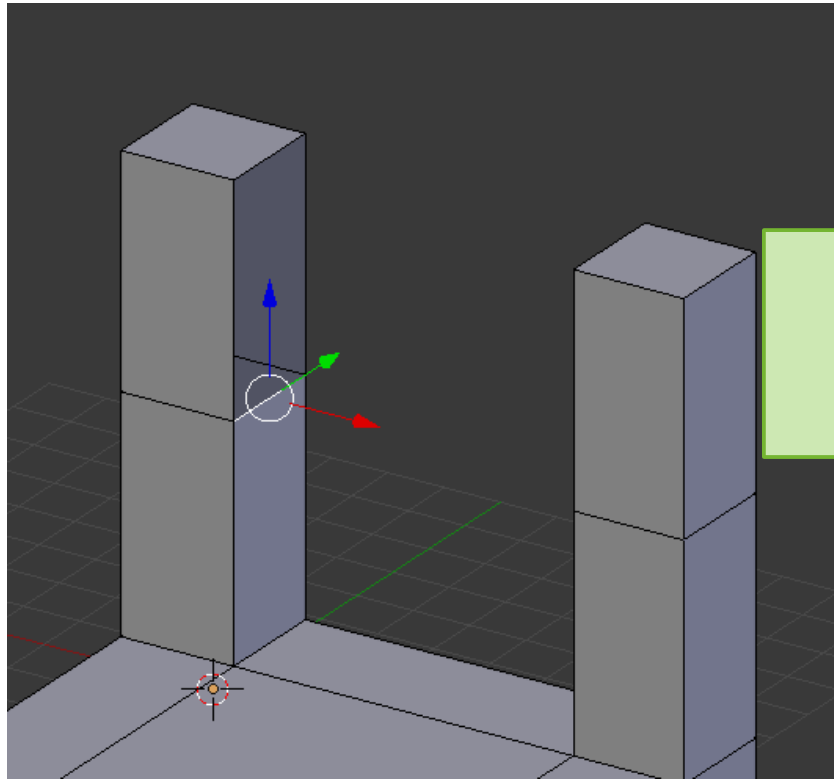




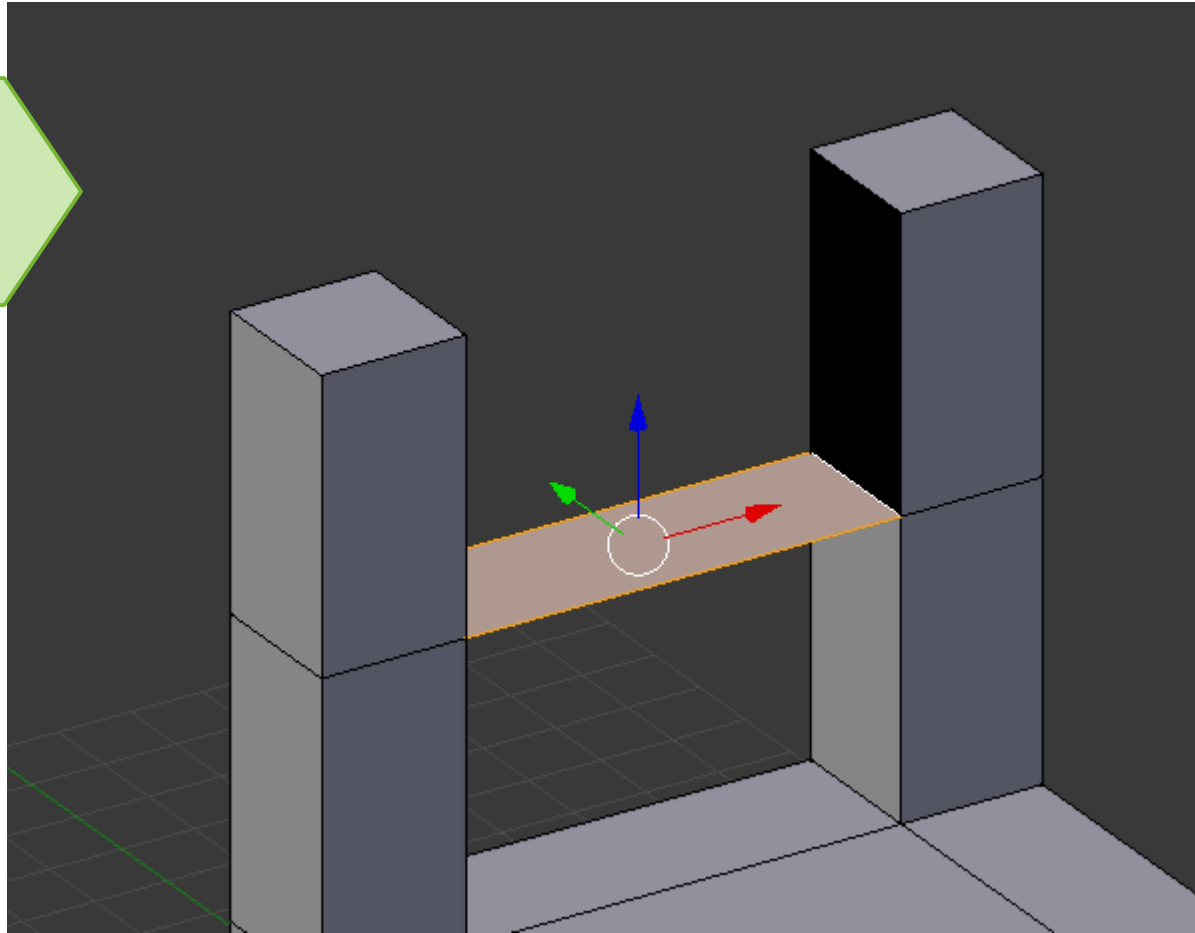


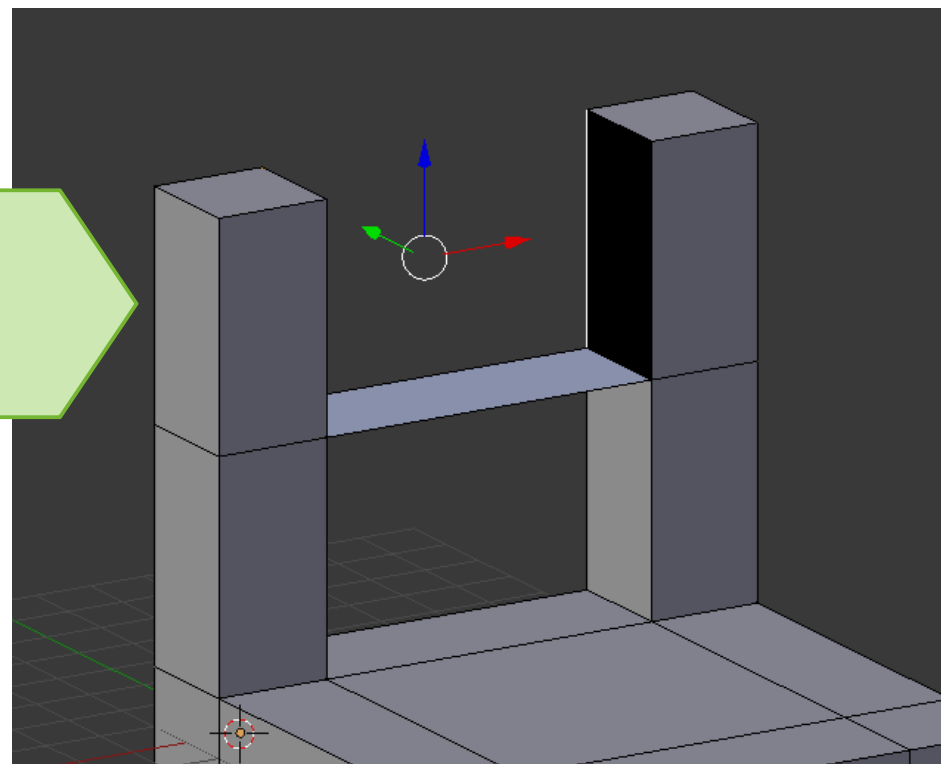
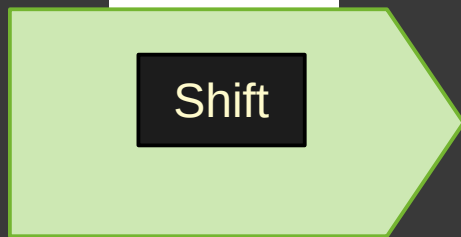
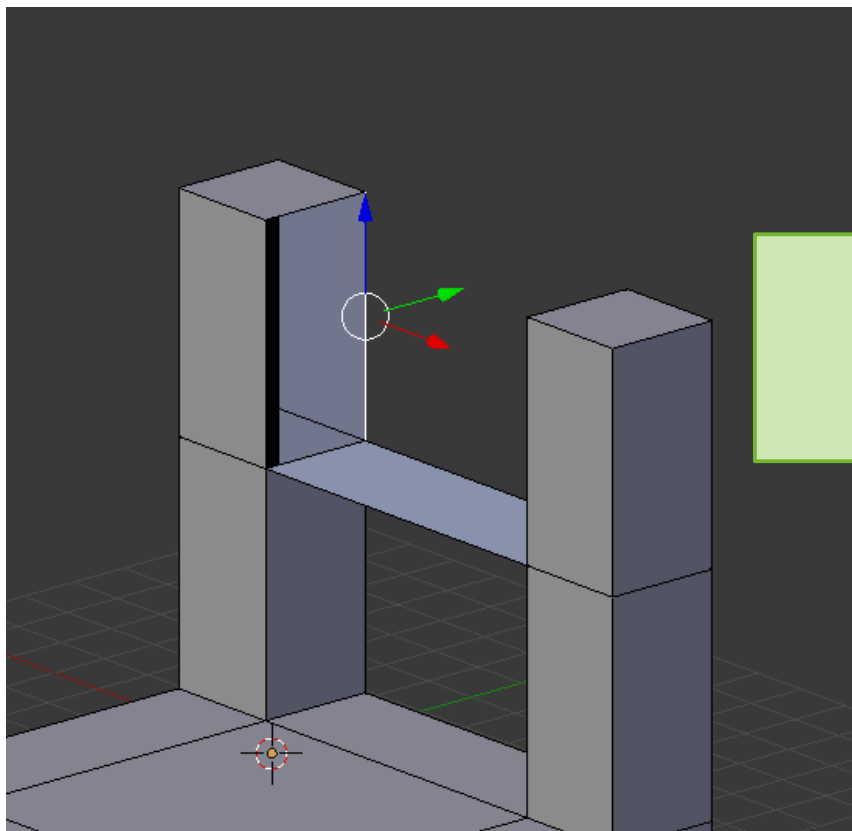




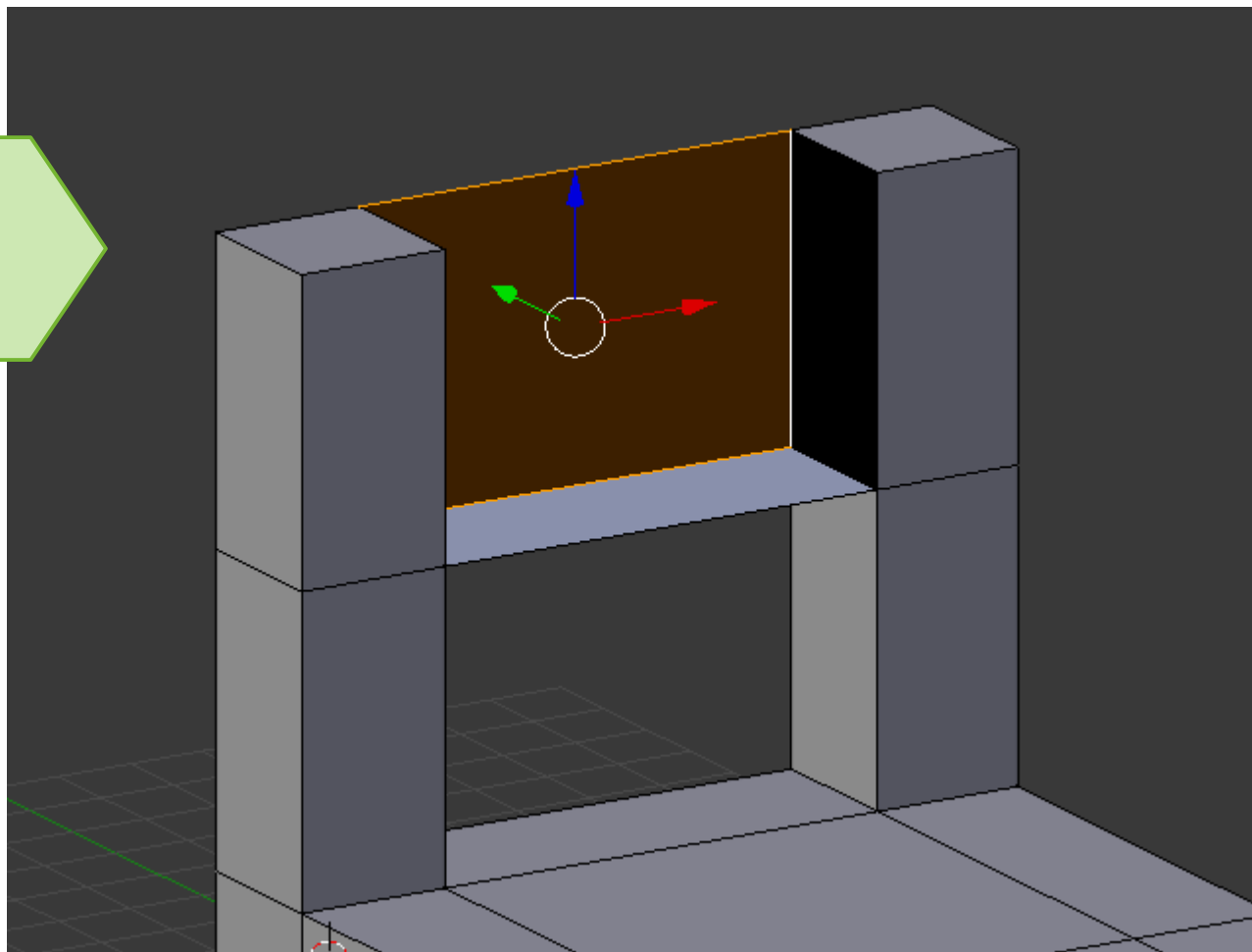


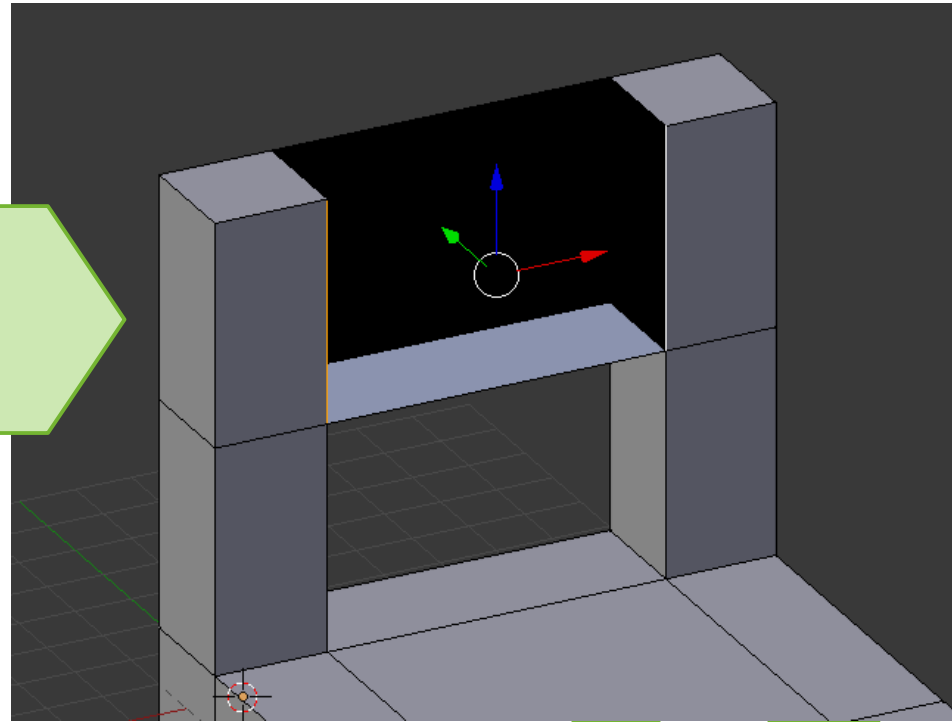
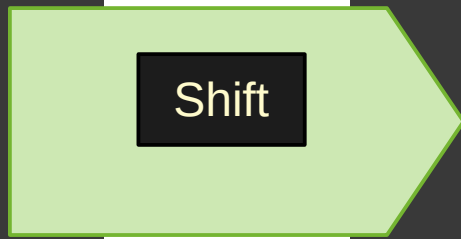
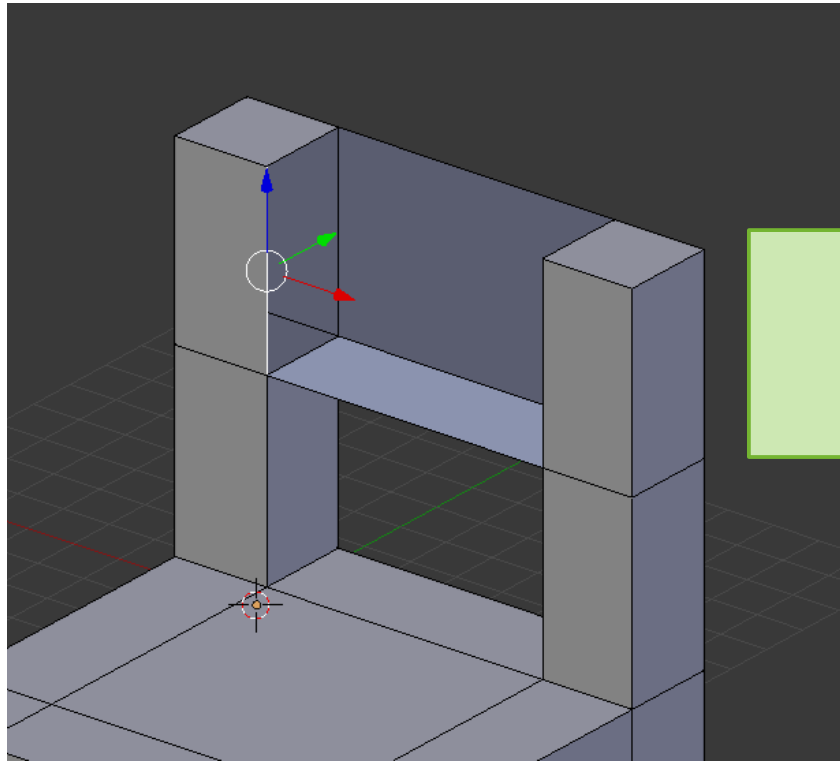
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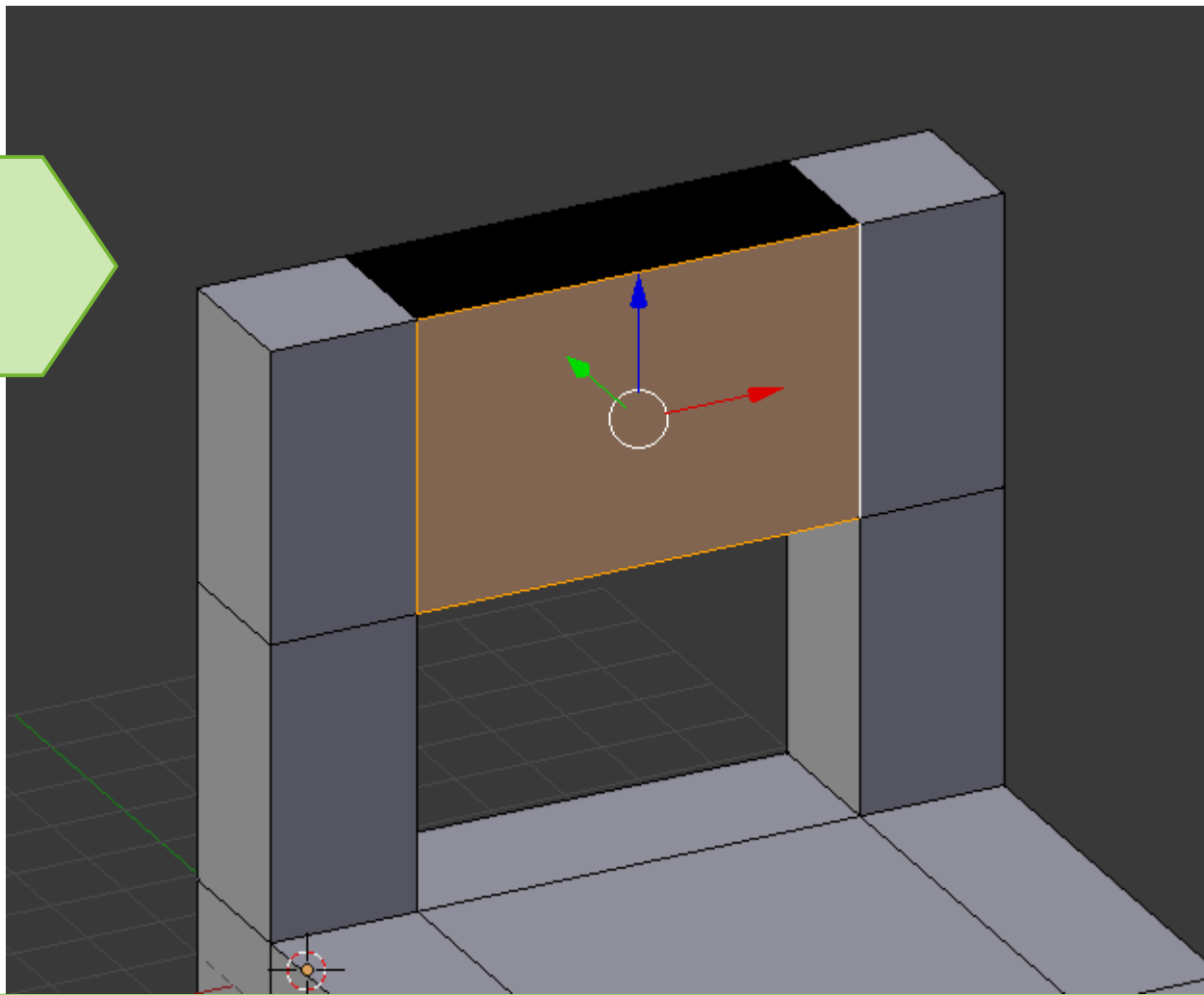


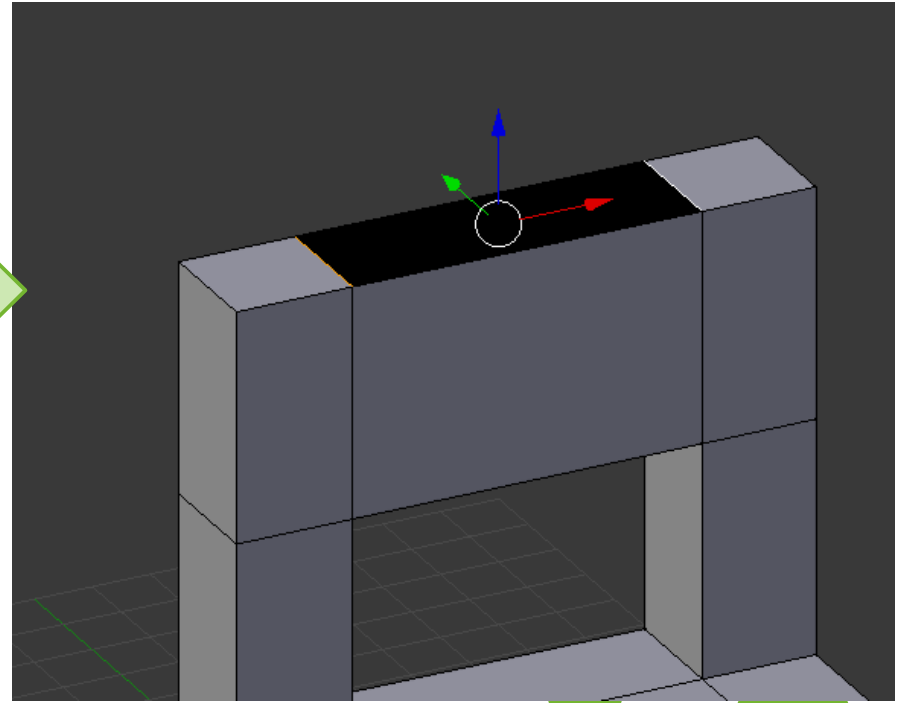
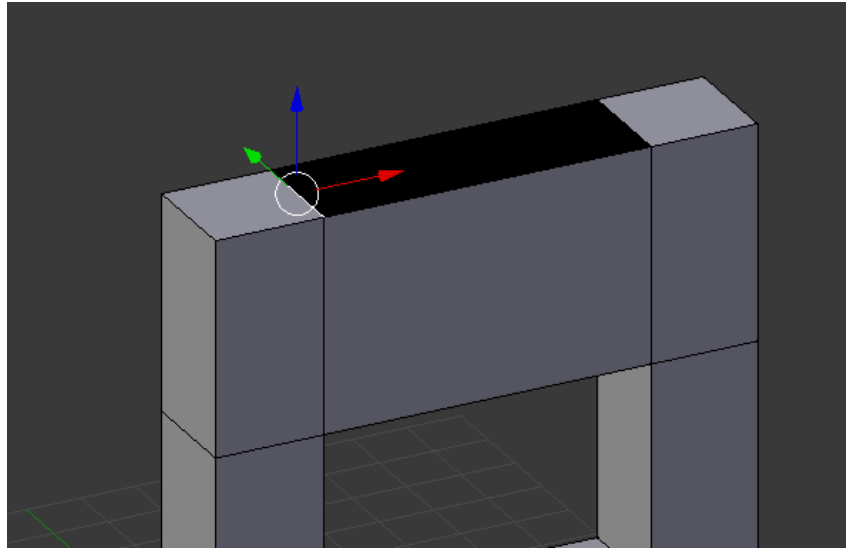
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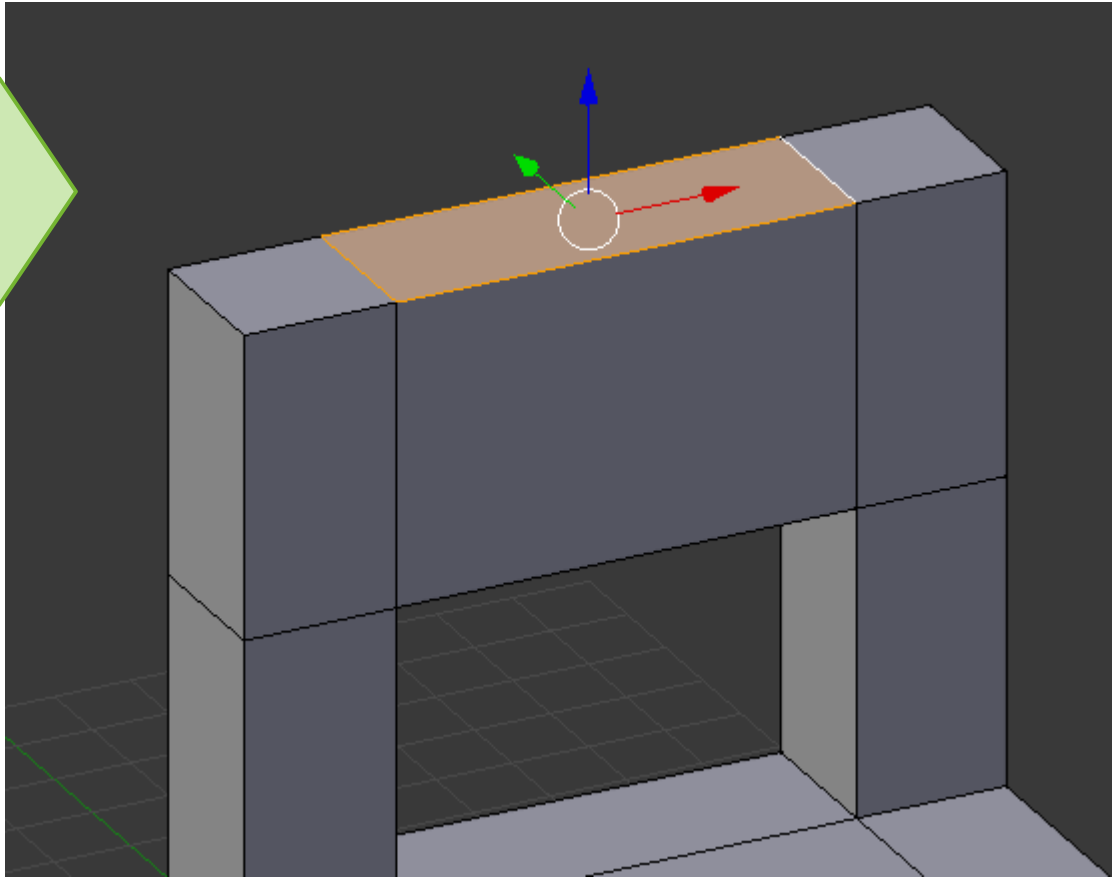


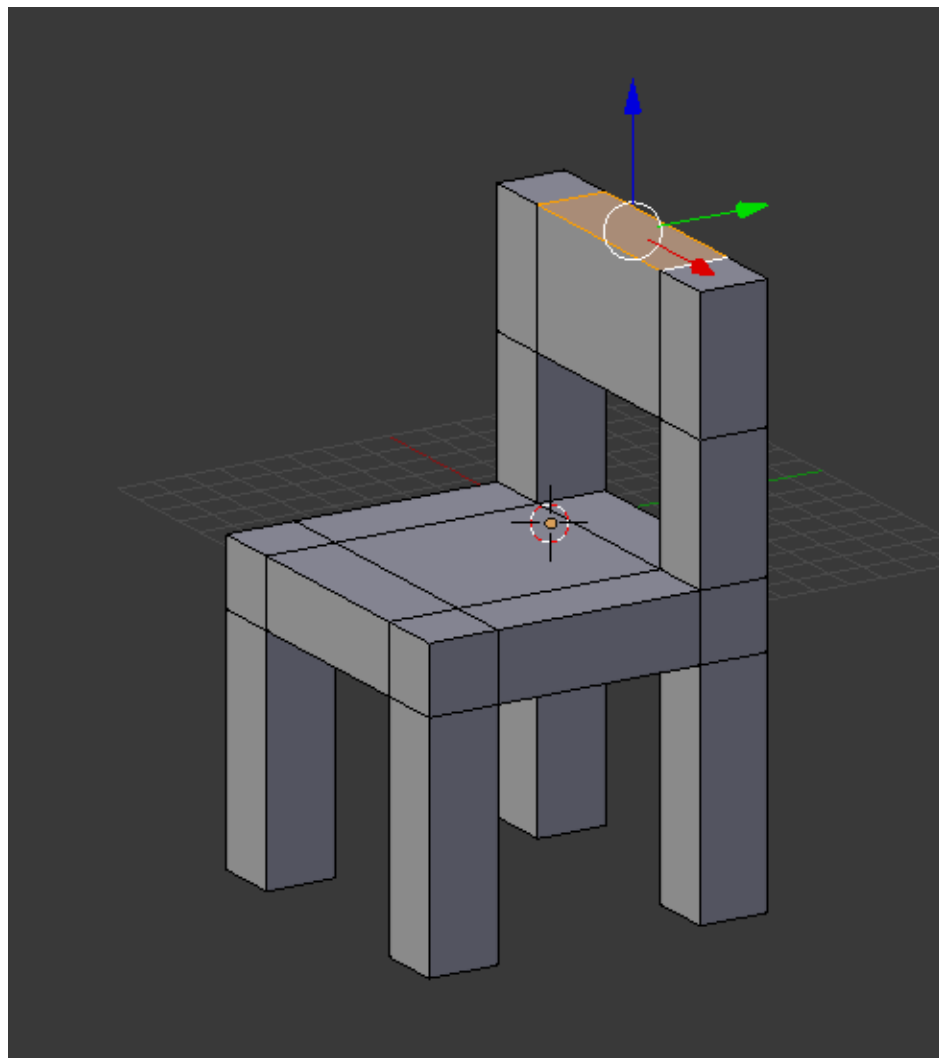
F





F

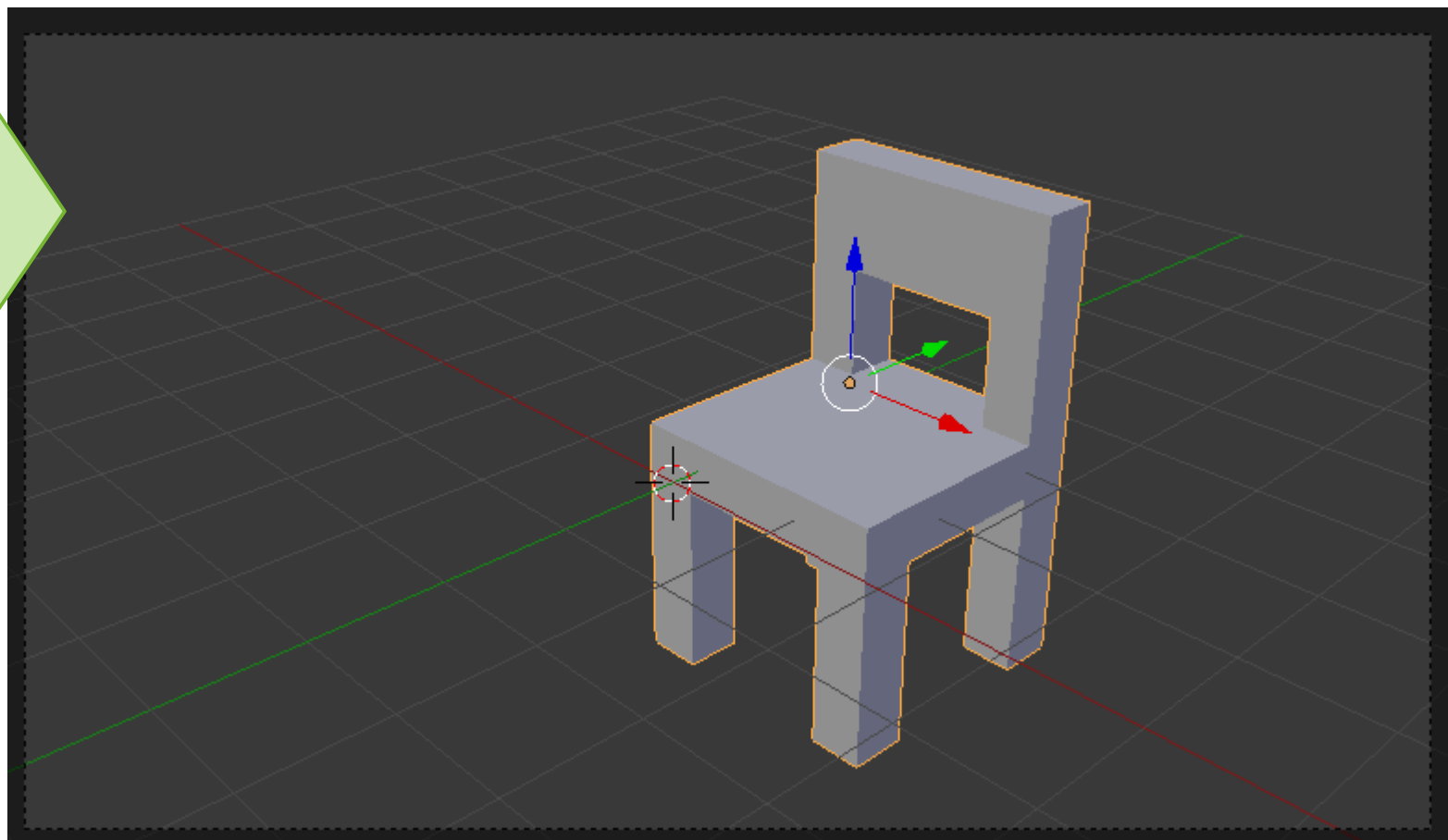




Tab

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S



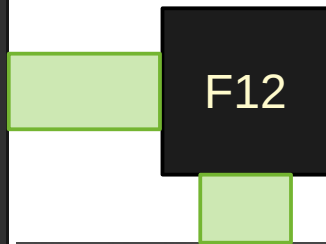
Render Engine **Eevee** ▾

▾ Sampling ⋮

Render	64
Viewport	16

Viewport Denois...

> Ambient Occlusion ⋮



Lab2 : โต๊ะและเก้าอี้ 4 ตัว

1. คัดลอกเก้าอี้เป็น 4 ตัว
2. จัดและซ้อนเก้าอี้
3. เพิ่ม Cube เพื่อสร้างโต๊ะ
4. ตั้งชื่อวัตถุให้เหมาะสม
5. เปิดแสดงเก้าอี้
6. จัดฉากและเพิ่มพื้น
7. เรนเดอร์



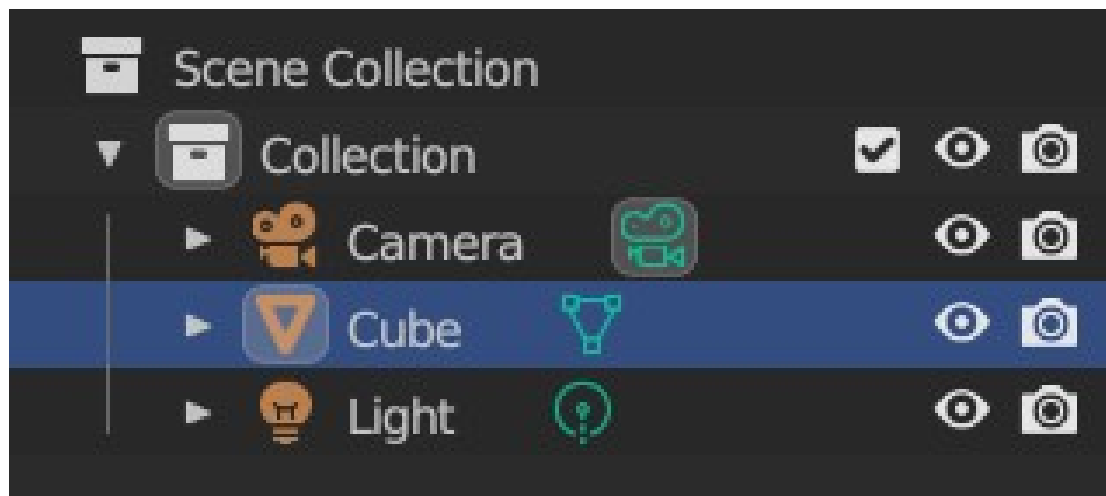
คัดลอกเก้าอี้เป็น 4 ตัว

1. เลือกวัตถุ
2. กด Shift+D
3. ย้ายวัตถุ
4. หมุนวัตถุ

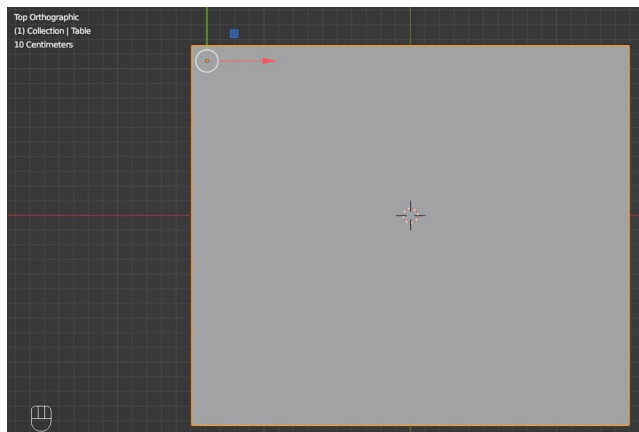
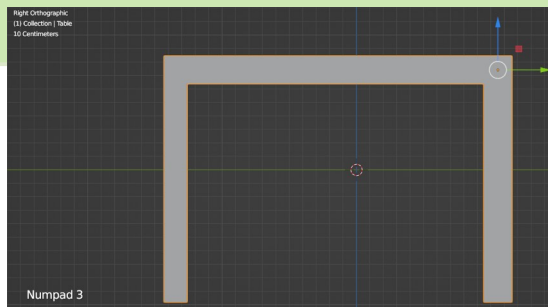
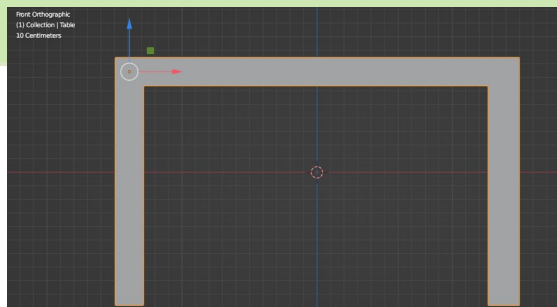


จัดและซ่อนเก้าอี้

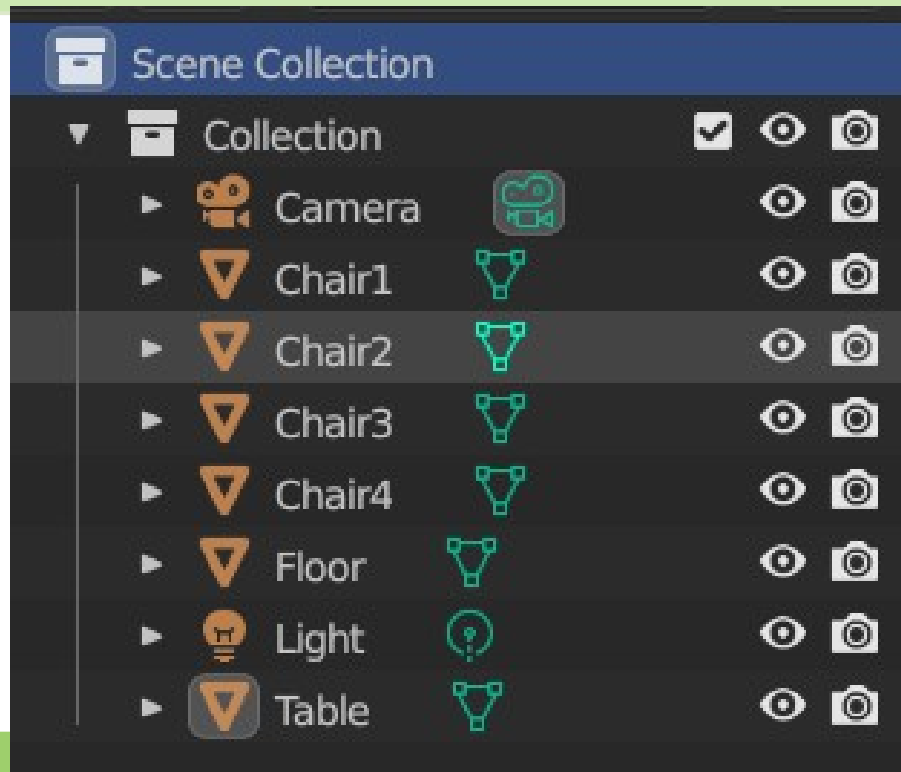
ปิดลูกตาที่ลูกตาของ Scene Collection



เพิ่ม Cube เพื่อสร้างโต๊ะ

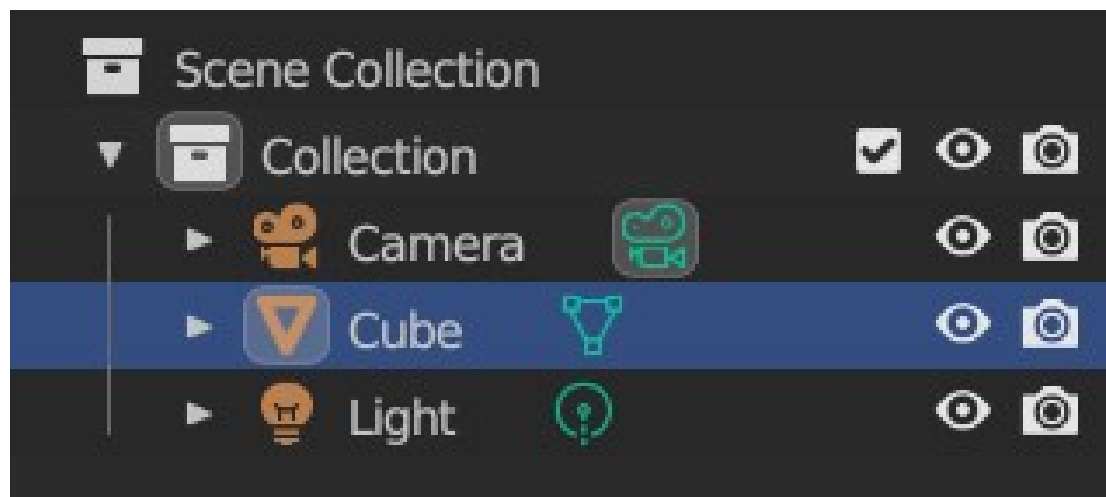


ตั้งชื่อวัตถุให้เหมาะสม

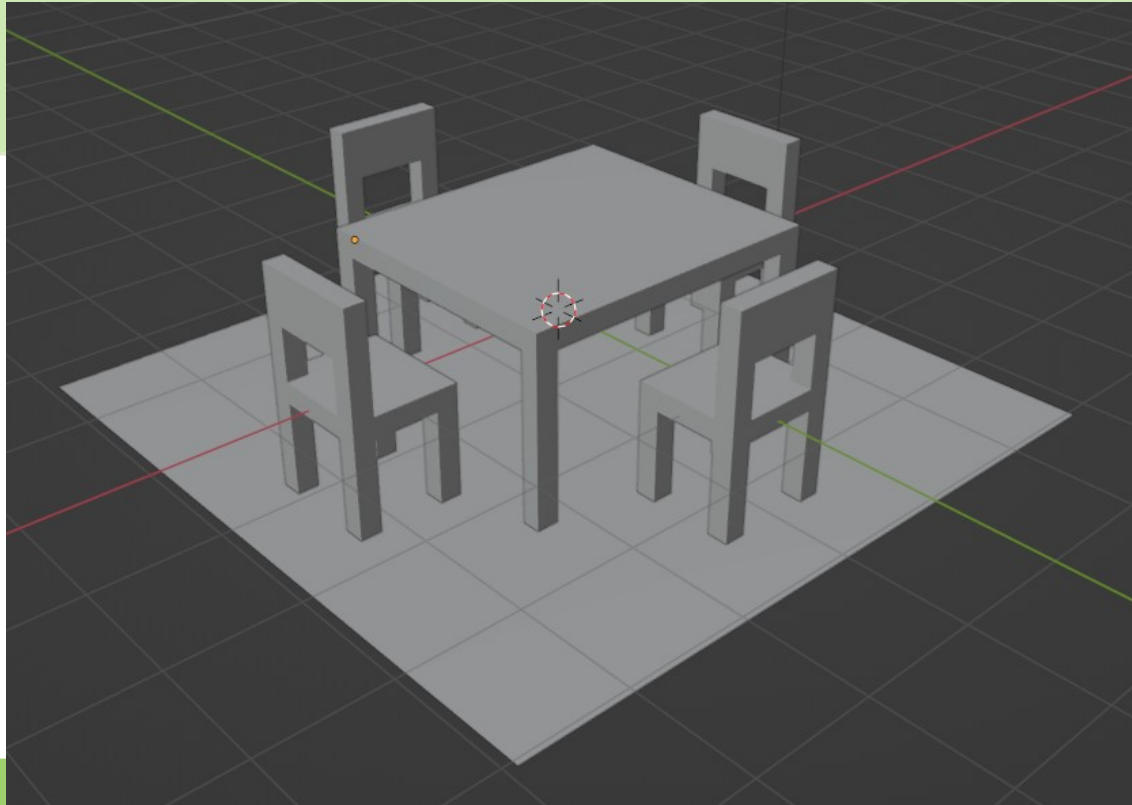


เปิดแสดงเก้าอี้

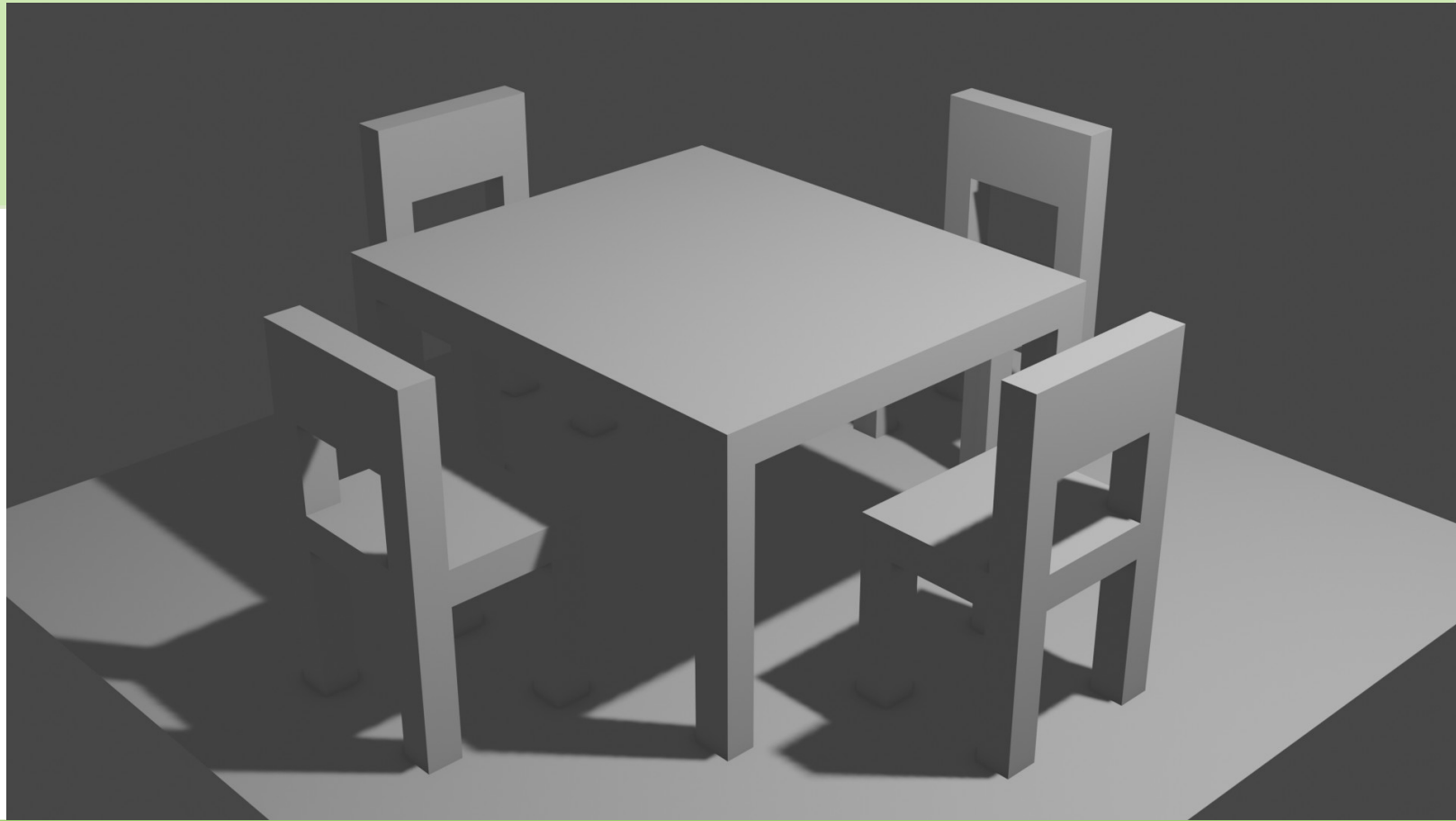
เปิดลูกตาที่ลูกตาของ Scene Collection



จัดฉากและเพิ่มพื้น



3D Model



Step2



Spin

1. เลือกมุมจากด้านบน (หรือด้านที่วาดเส้นร่าง)
2. สร้างเส้นร่างโดยลากจากจุดศูนย์กลาง
3. สั่ง Spin
4. เลือกแกนที่จะหมุน
5. คลิกที่ไอคอน (+)



ทดลองการสร้างวัตถุจาก Spin

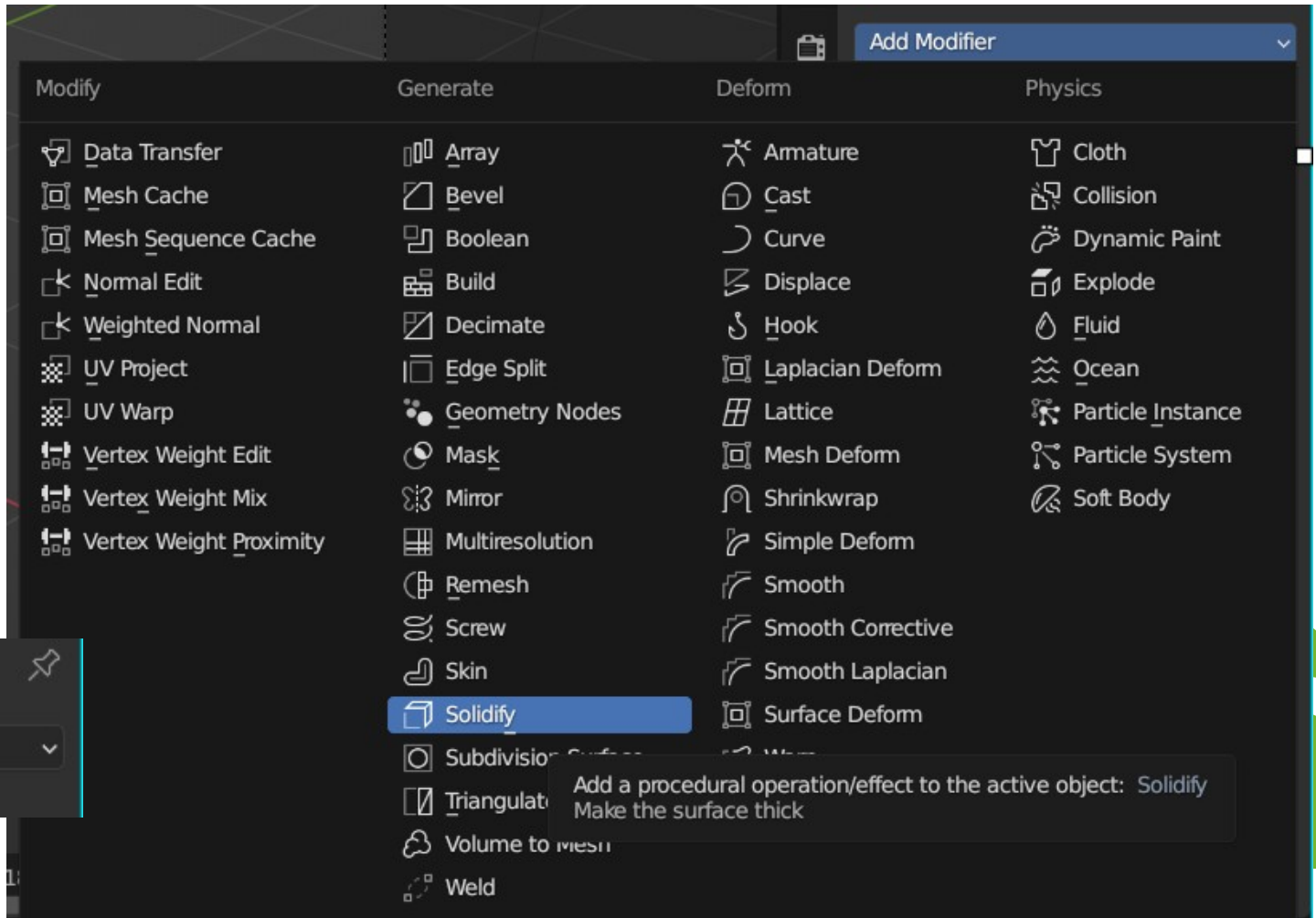
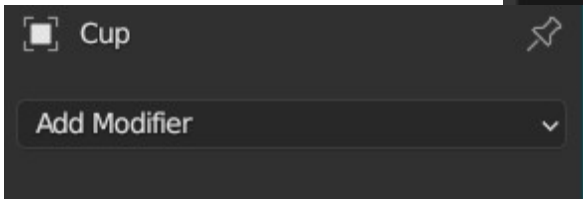
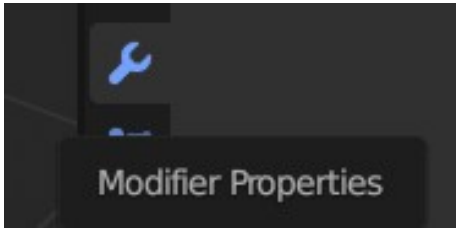
1. เพิ่ม plane แล้วเปลี่ยนมุมมองเป็นด้านบน
2. แบ่ง plane ในแกน x และ y อย่างละครึ่งด้วย Ctrl+R
3. ลบให้เหลือเฉพาะเส้นตรงเพียง 1 เส้นที่อยู่ทางด้านขวา
ของจุดศูนย์กลาง
4. เข้า Edit Mode เพื่อ Extrude จนเป็นรูปแก้วน้ำ
5. เลือกเส้นทั้งหมด
6. สั่ง Spin แล้วเลือก แกน Y หลังจากนั้นคลิก (+)



Solidify

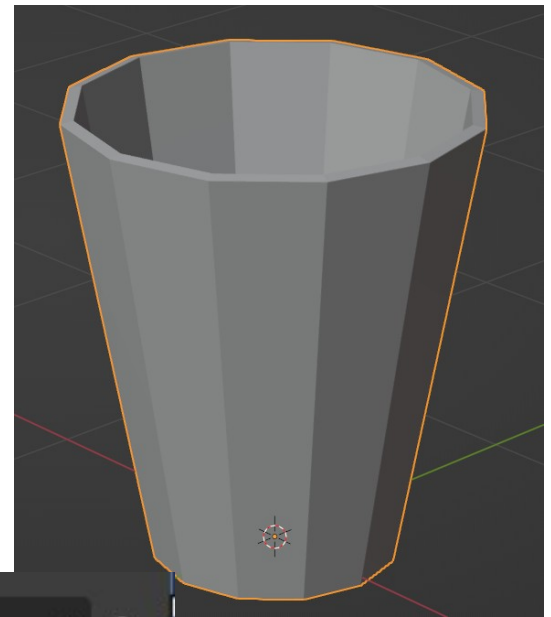
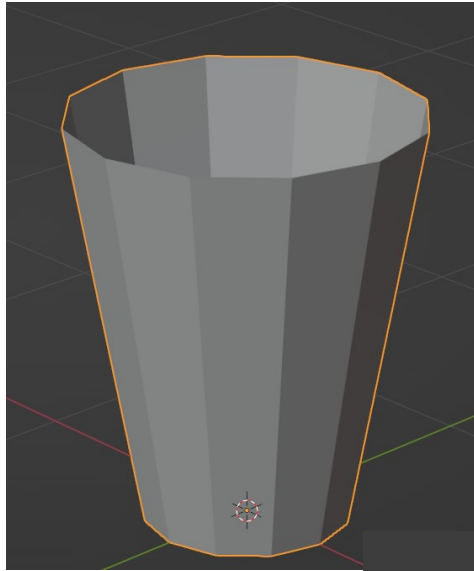
1. เลือกวัตถุ
2. คลิกไอคอน **Modifier Properties**
3. เพิ่ม **Solidify** จาก **Add modifier**
4. สั่ง **Apply**





3D Modeling software interface showing a list of settings for a 3D object:

- Mode: Simple
- Thickness: 0.01 m
- Offset: -1.0000
- Even Thickness:
- Rim: Fill, Only Rim
- Vertex Group: [Grid icon]
- Factor: 0.000
- > Normals
- > Materials
- > Edge Data
- > Thickness Clamp
- > Output Vertex Groups



3D Modeling software interface showing a list of settings for a 3D object:

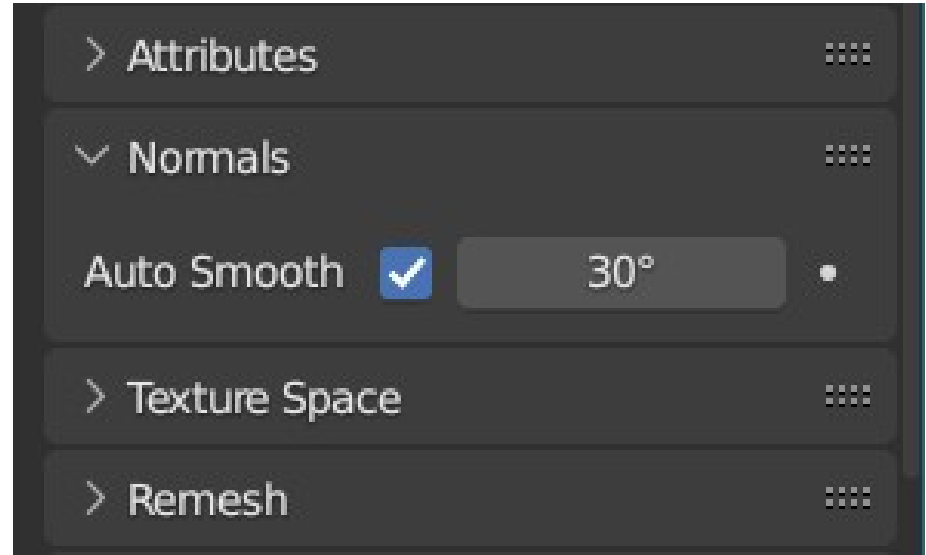
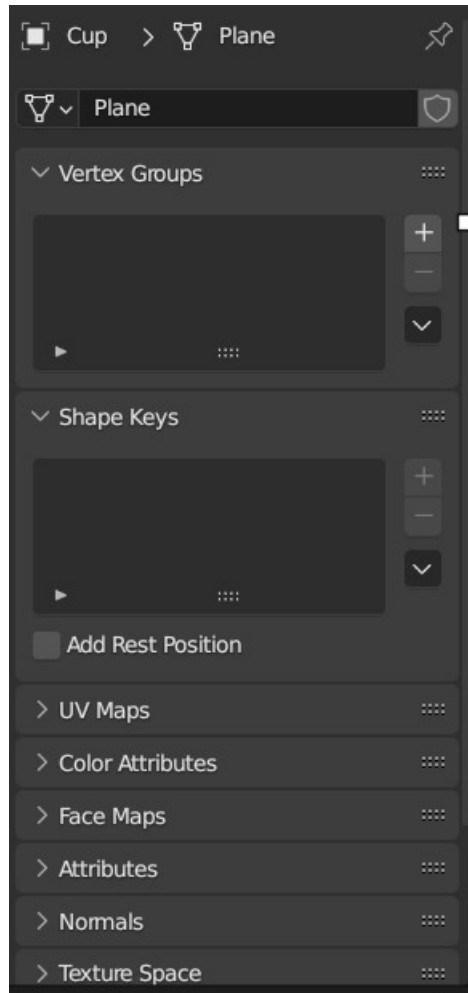
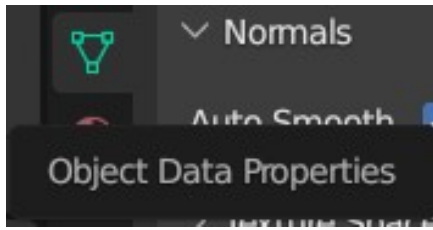
- Mode: Simple
- Thickness: 0.12 m
- Offset: -1.0000
- Even Thickness:
- Rim: Fill, Only Rim

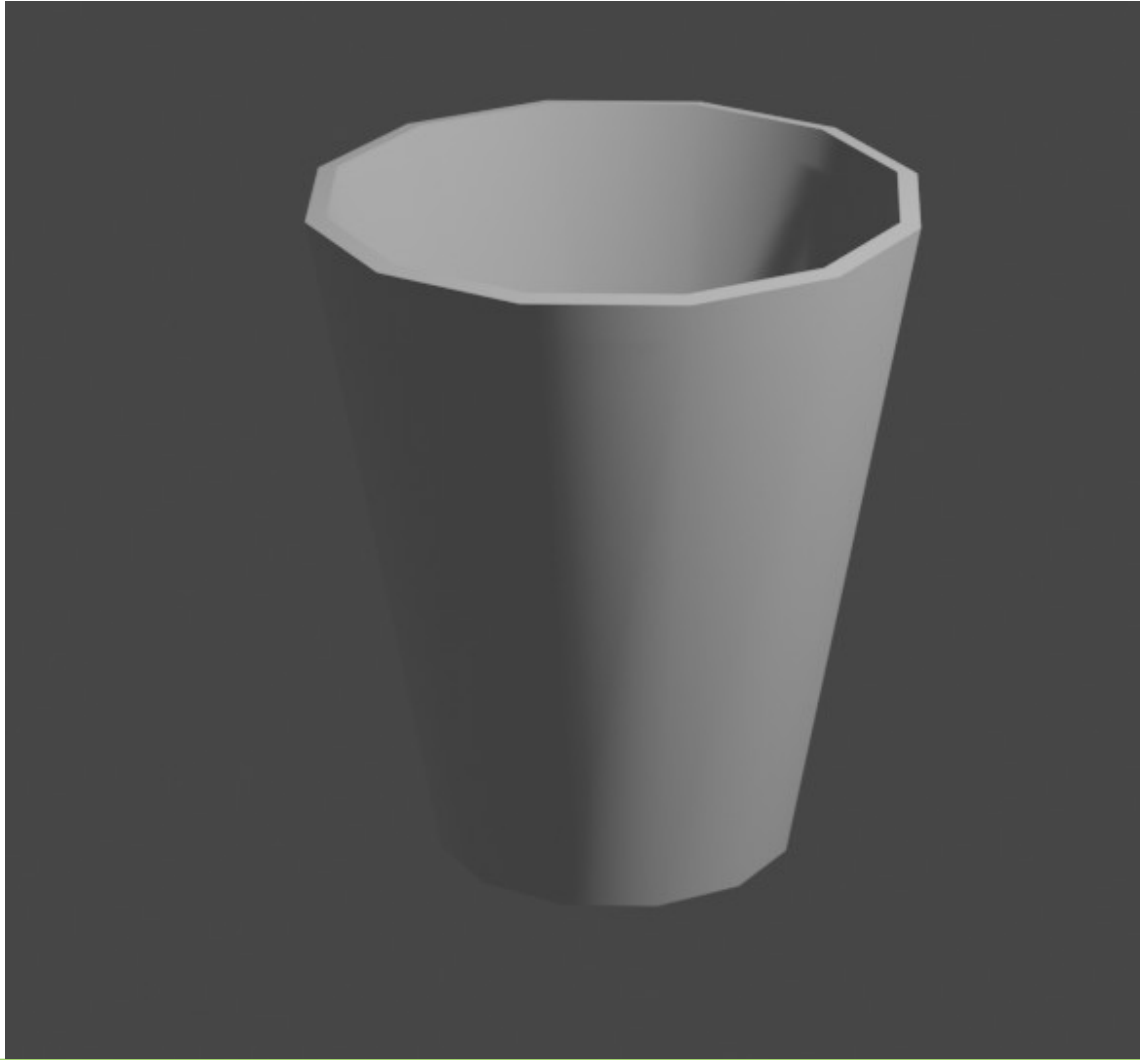
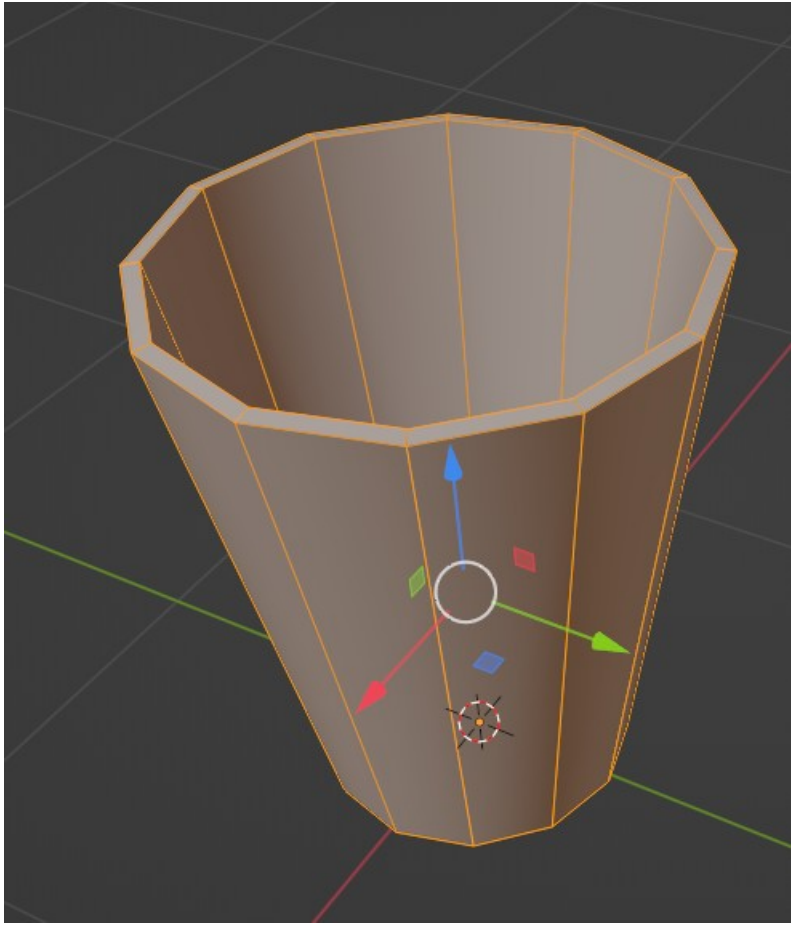


Smooth Shading

1. เลือกวัตถุ และเข้า Edit Mode
2. ที่เมนู Face เลือก Shade Smooth
3. ถ้าการเรนเดอร์ผิดพลาดให้ไปที่คำสั่ง
Object Data Properties ให้ปรับค่า
ในหัวข้อ Normals Auto Smooth เป็นจริง
และเปลี่ยนค่าองศาตามความเหมาะสม



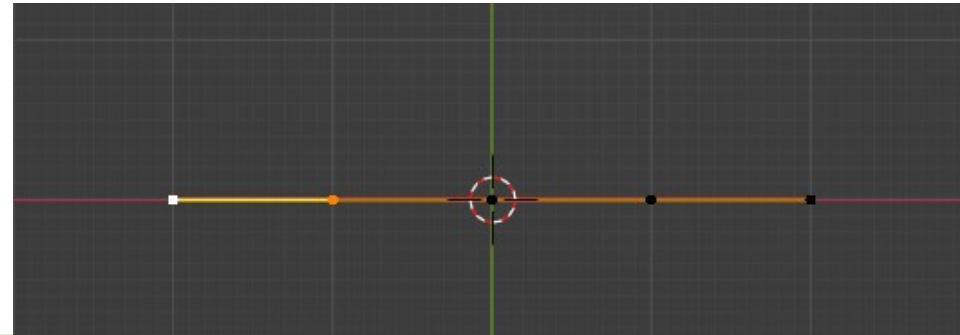
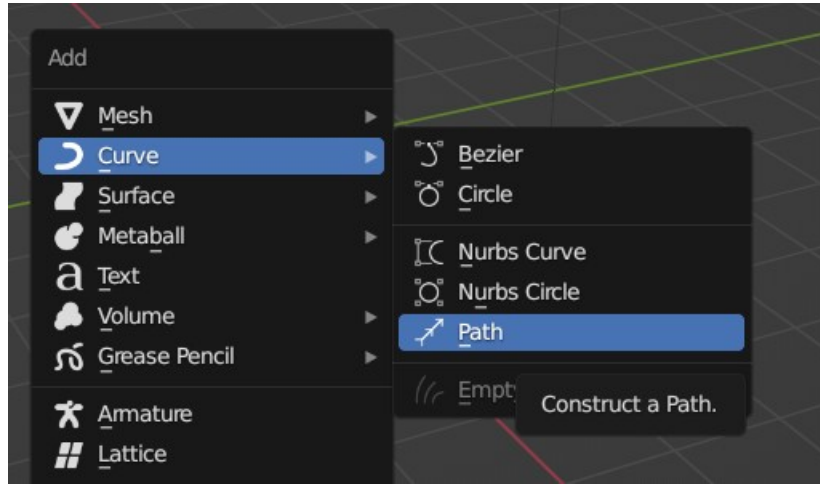




สร้างแฉกกัน

1. เพิ่ม Curve แบบ Path

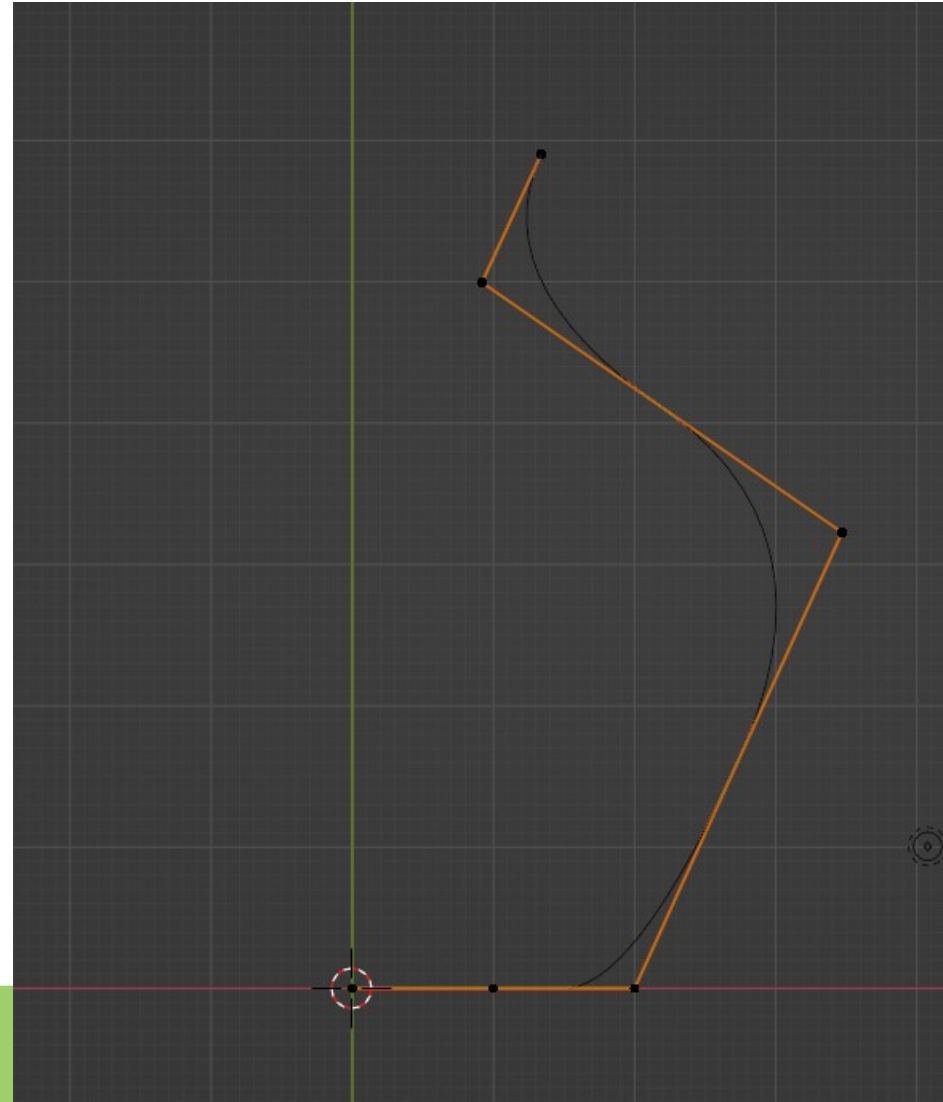
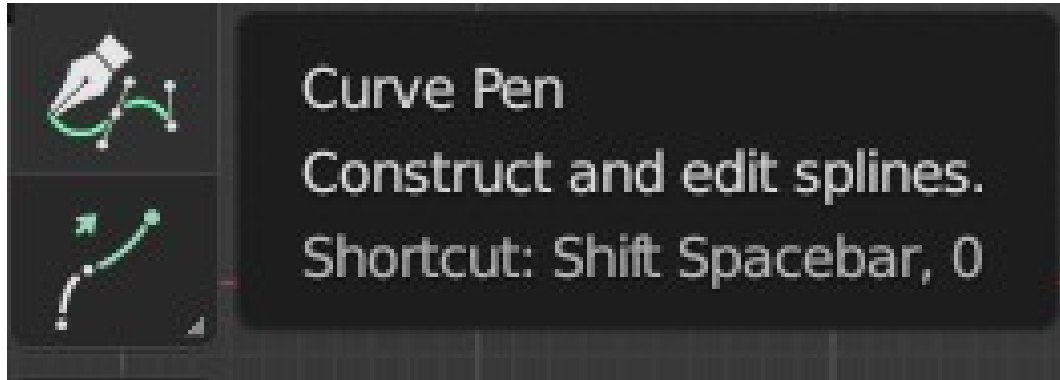
2. เข้า Edit Mode ลู Vertex ด้านซ้าย 2 โหนด (มีต่อ)



สร้างแจกัน

3. ใช้ Curve Pen

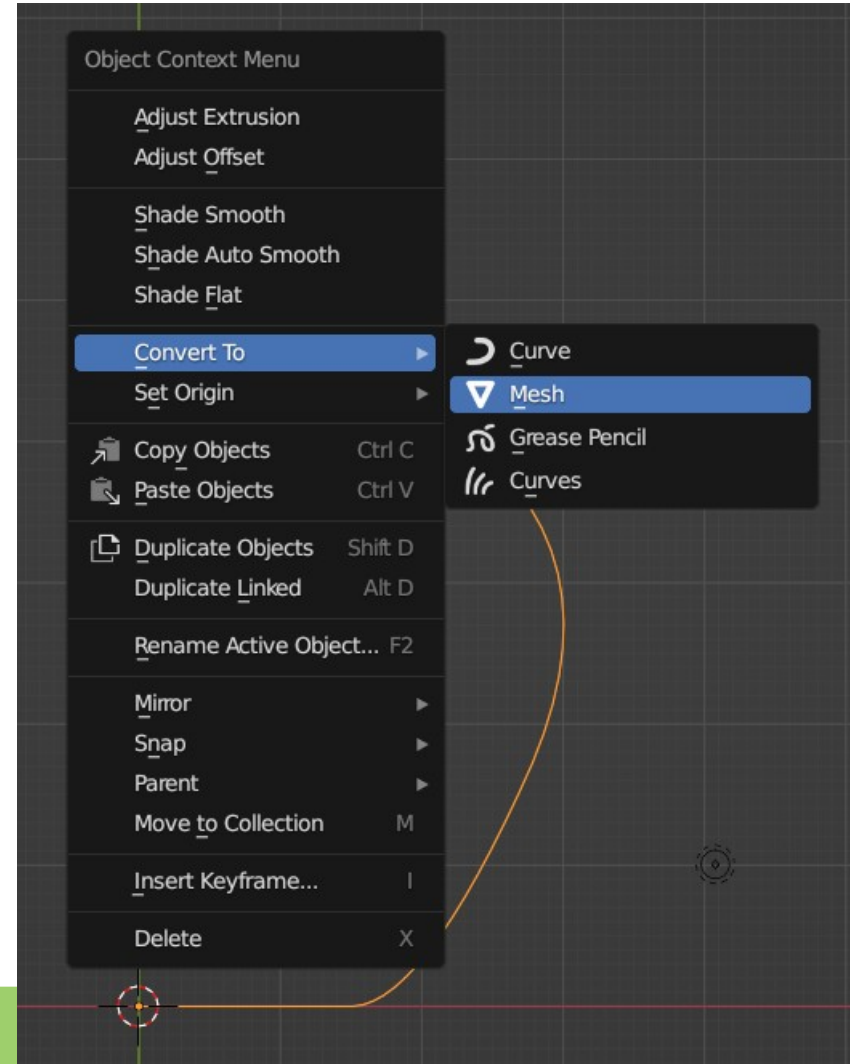
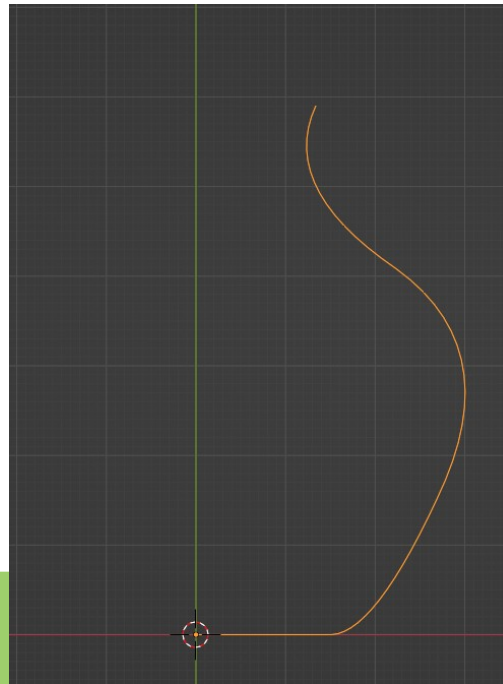
4. เลือกจุดสุดท้าย แล้วคลิกเพิ่ม
เพื่อสร้างกรอบของแจกัน



สร้างแจกัน

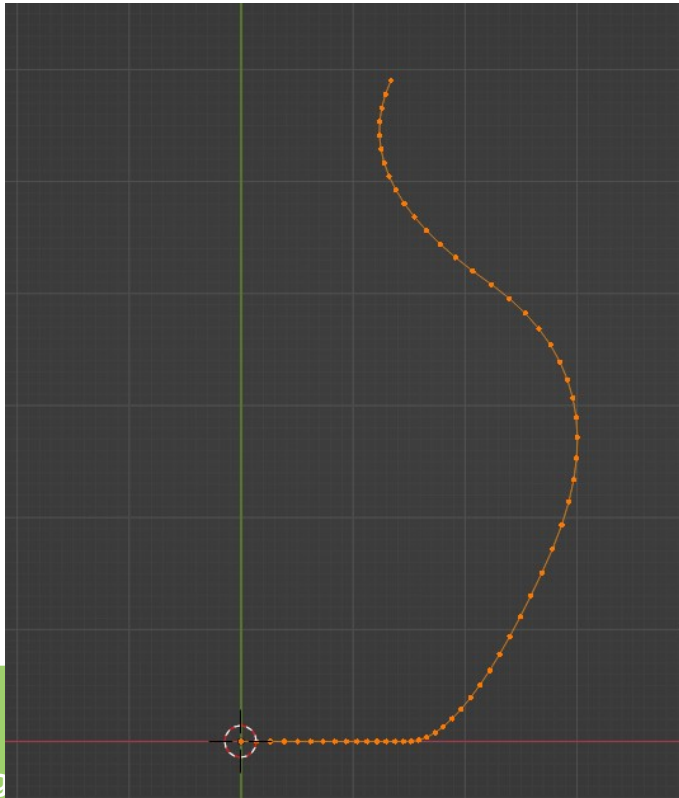
5. เปลี่ยนเป็น Object Mode

6. คลิกขวาที่เส้นเพื่อเปลี่ยนเป็น Mesh

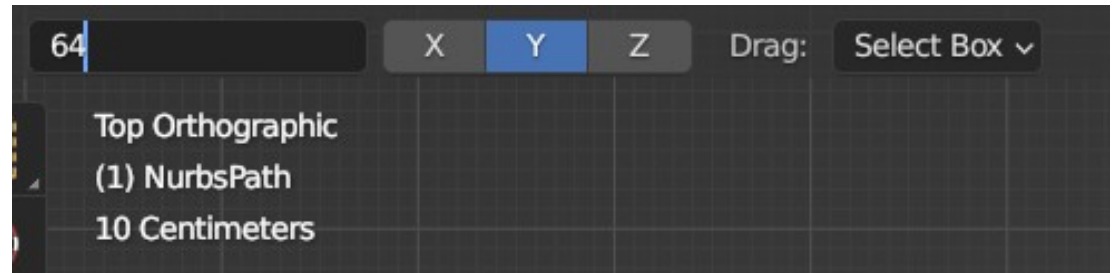


สร้างแจกัน

7. เข้า Edit Mode แล้วกด A เพื่อเลือกทั้งหมด



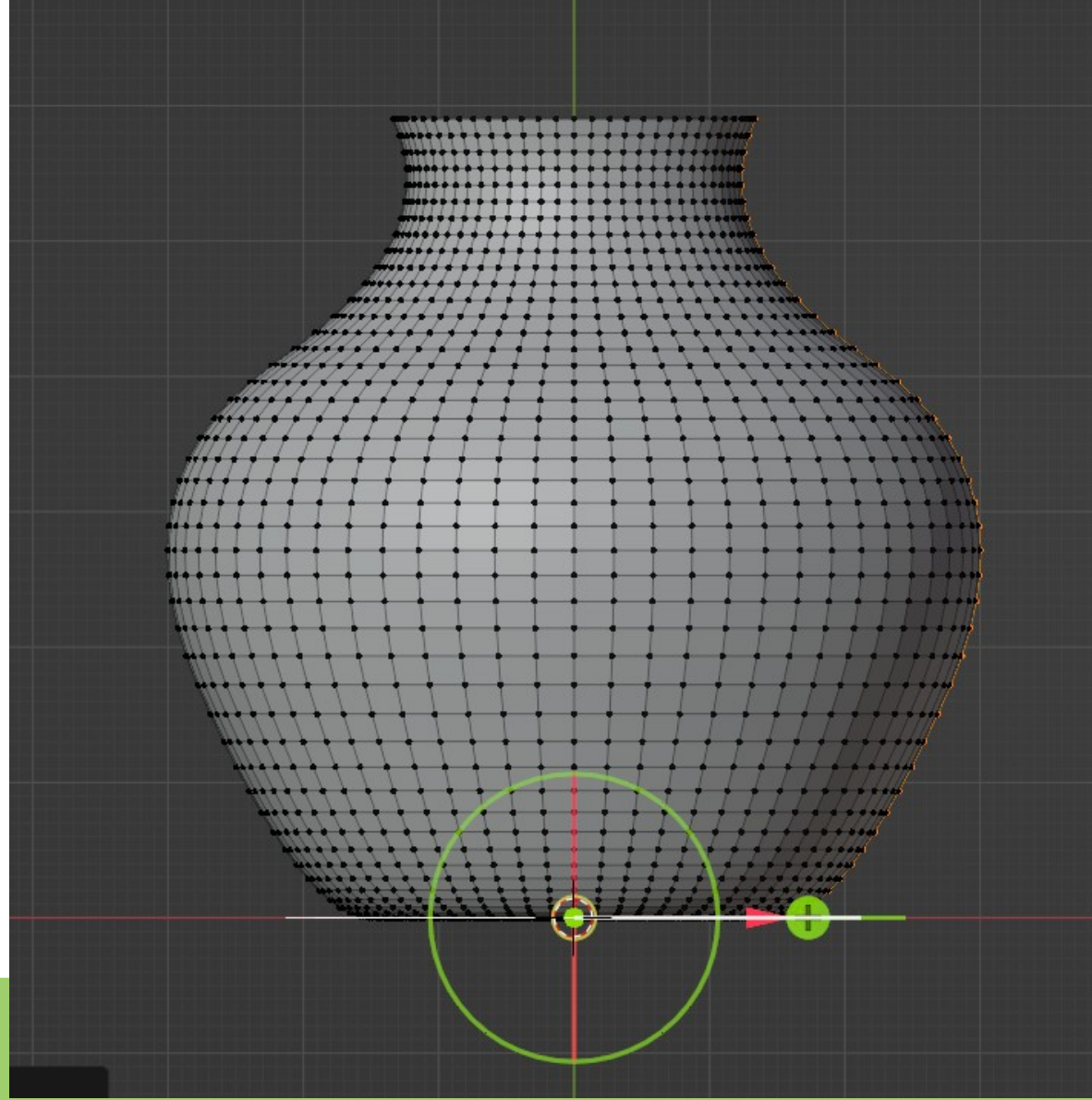
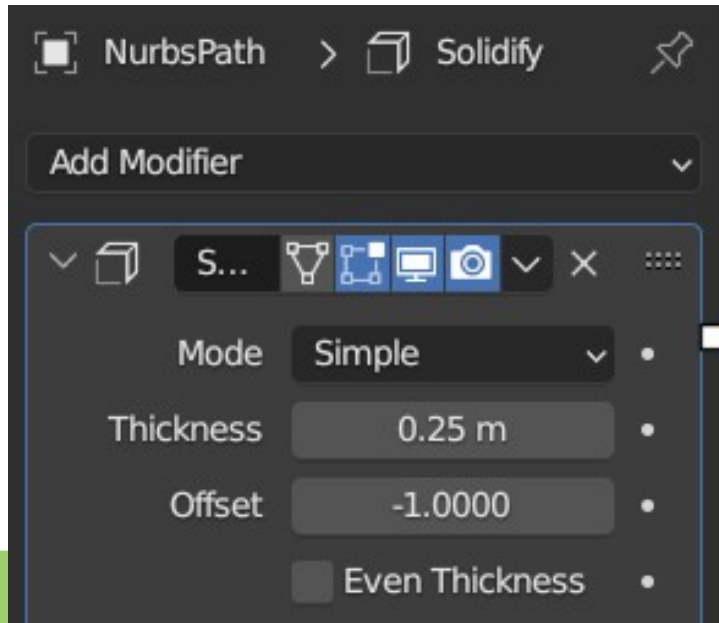
8. เลือก Spin แกน Y และกำหนด 64



สร้างแจกัน

9. คลิก (+) เพื่อสั่ง Spin

10. ปรับความหนา 0.25



สร้างแจกัน

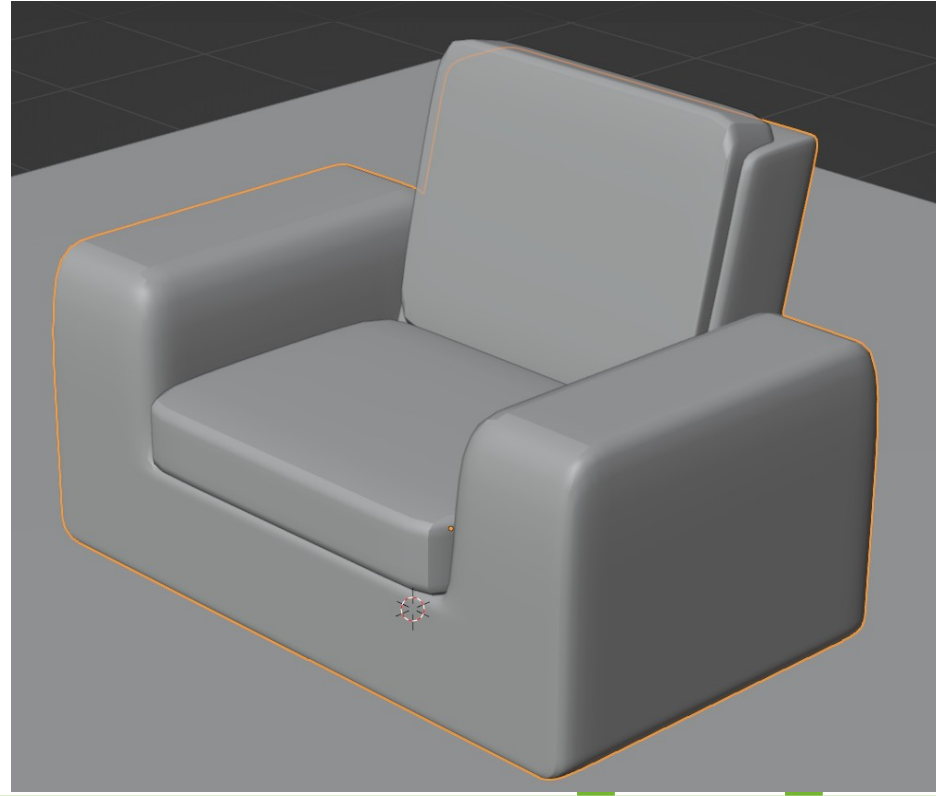
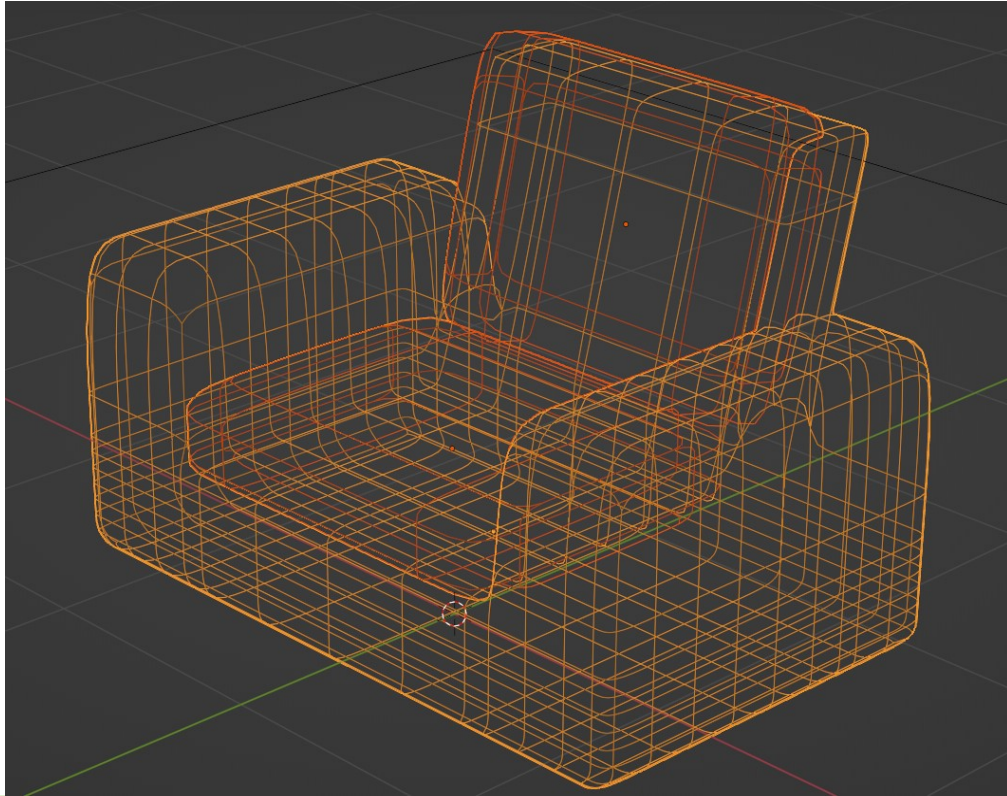
11. ปรับขนาด หมุนแกน และเรนเดอร์

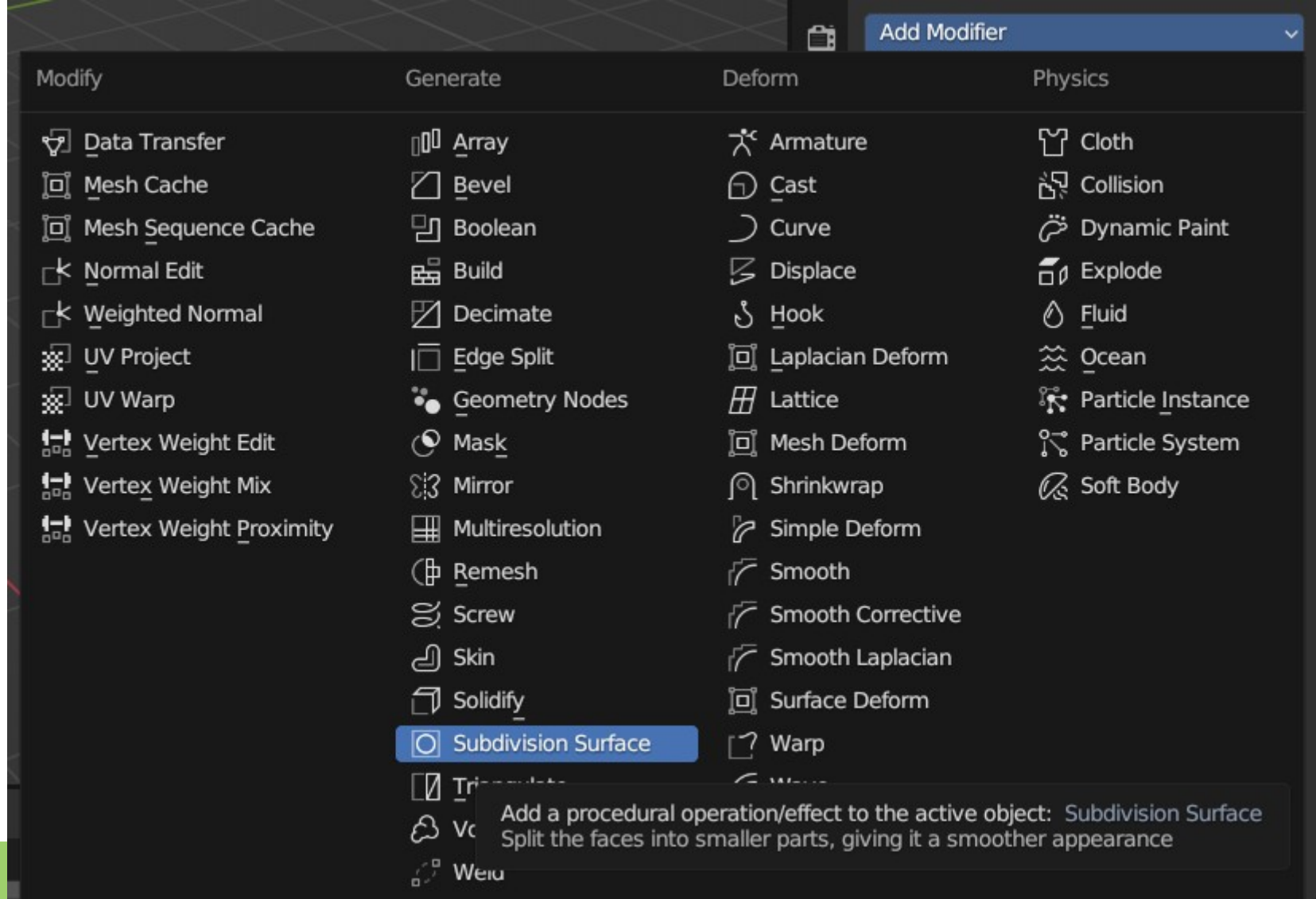


Step3

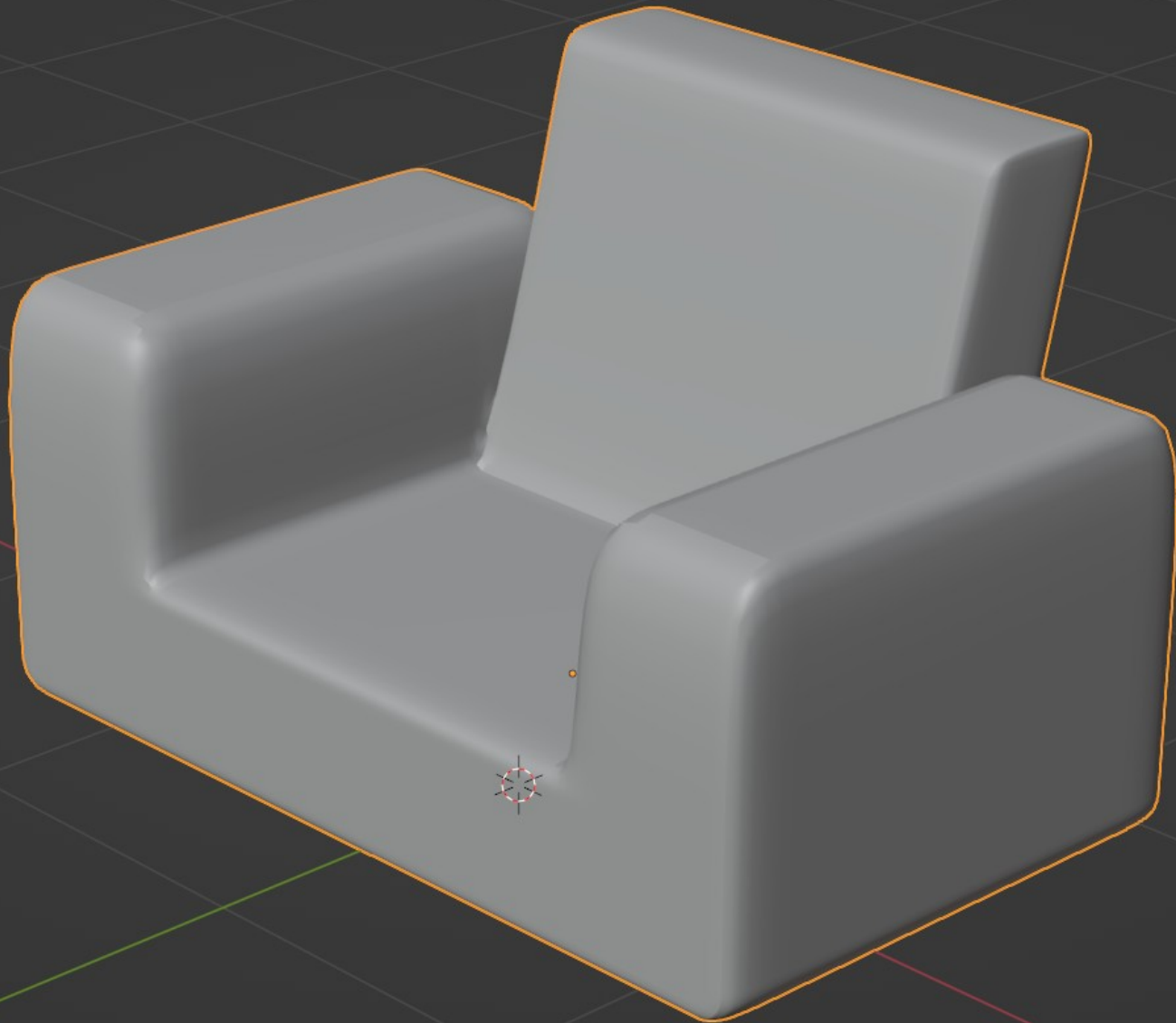


ทำโซฟาแบบ ๓ (Modifier: Subdivision Surface)





ทำส่วนที่นั่ง



ทำส่วนที่หนึ่ง

1. สร้าง cube

2. ปรับขนาดของ cube

3. ทำ Ctrl+R เพื่อสร้างส่วนสำหรับที่เท้าแขน

4. ทำ Ctrl+R เพื่อสร้างส่วนของพนักพิง

5. Extrude ที่เท้าแขน

6. Extrude พนักพิง

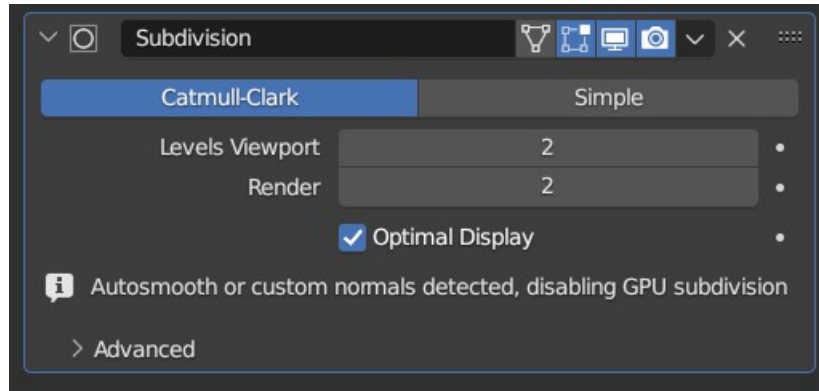


ทำส่วนที่นี้

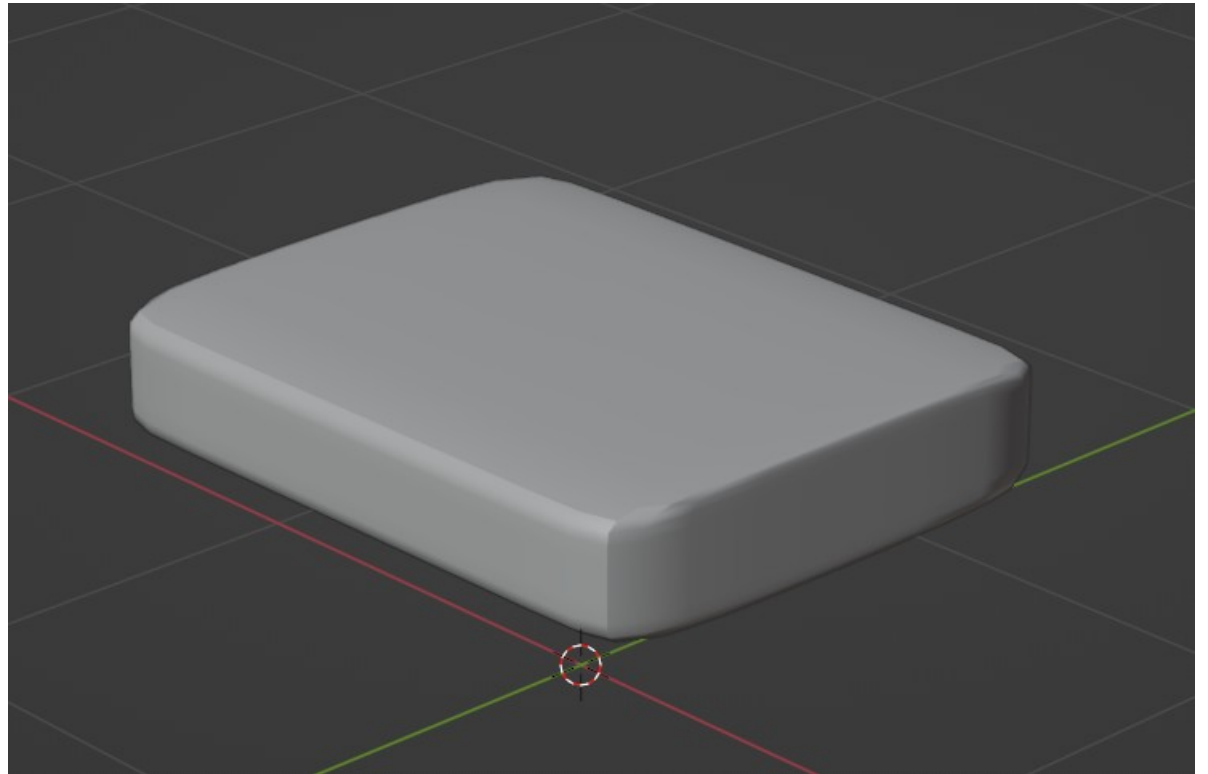
7. สร้าง Subdivision จาก Modifier

8. ปรับส่วน Levels Viewport และ Render เป็น 2

9. ใช้ Ctrl+R สร้างส่วนควบคุมการโค้งมน



ทำเบาะรองนั่ง

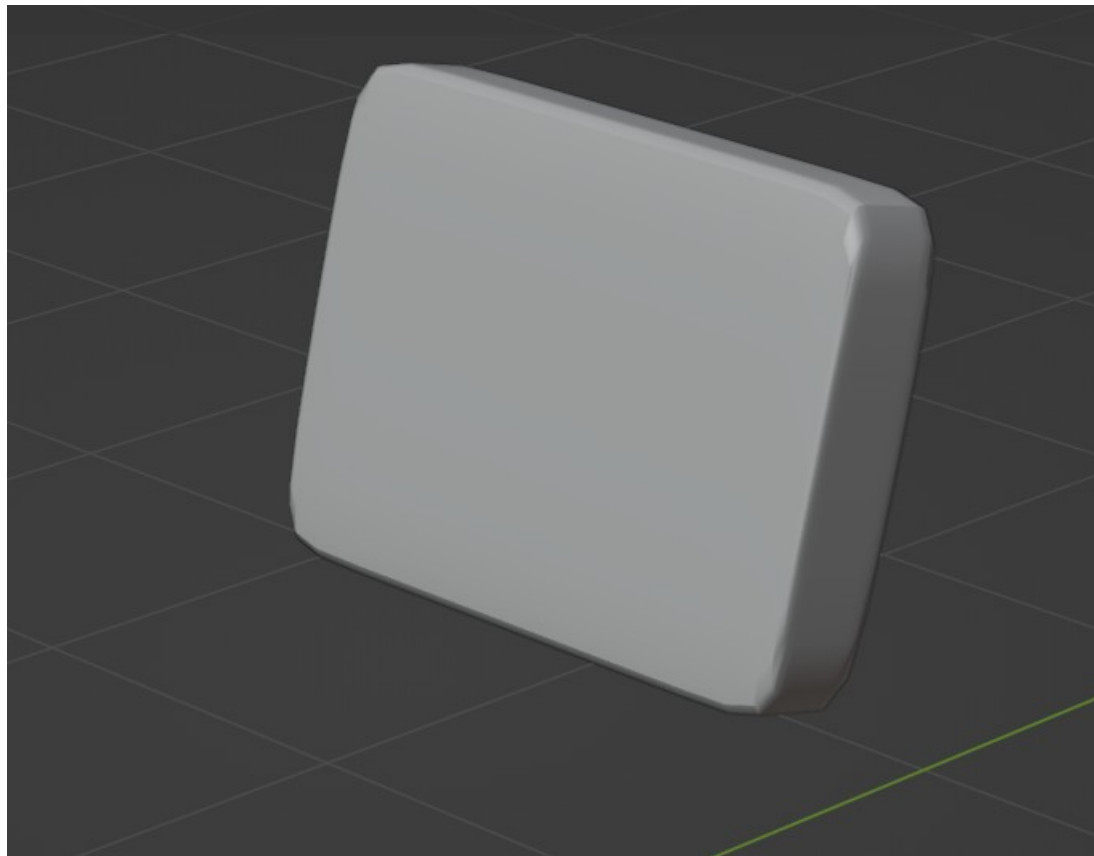


ทำเบาะรองนั่ง

1. สร้าง cube แล้วปรับขนาดให้พอดีกับส่วนที่นั่ง
2. เพิ่ม Modifier เป็น Subdivision
3. ใช้ Ctrl+R เพื่อปรับส่วนโค้งของเบาะ



ทำเบาะรองหลัง



ทำเบาะรองหลัง

1. คัดลอกเบาะรองนั่ง

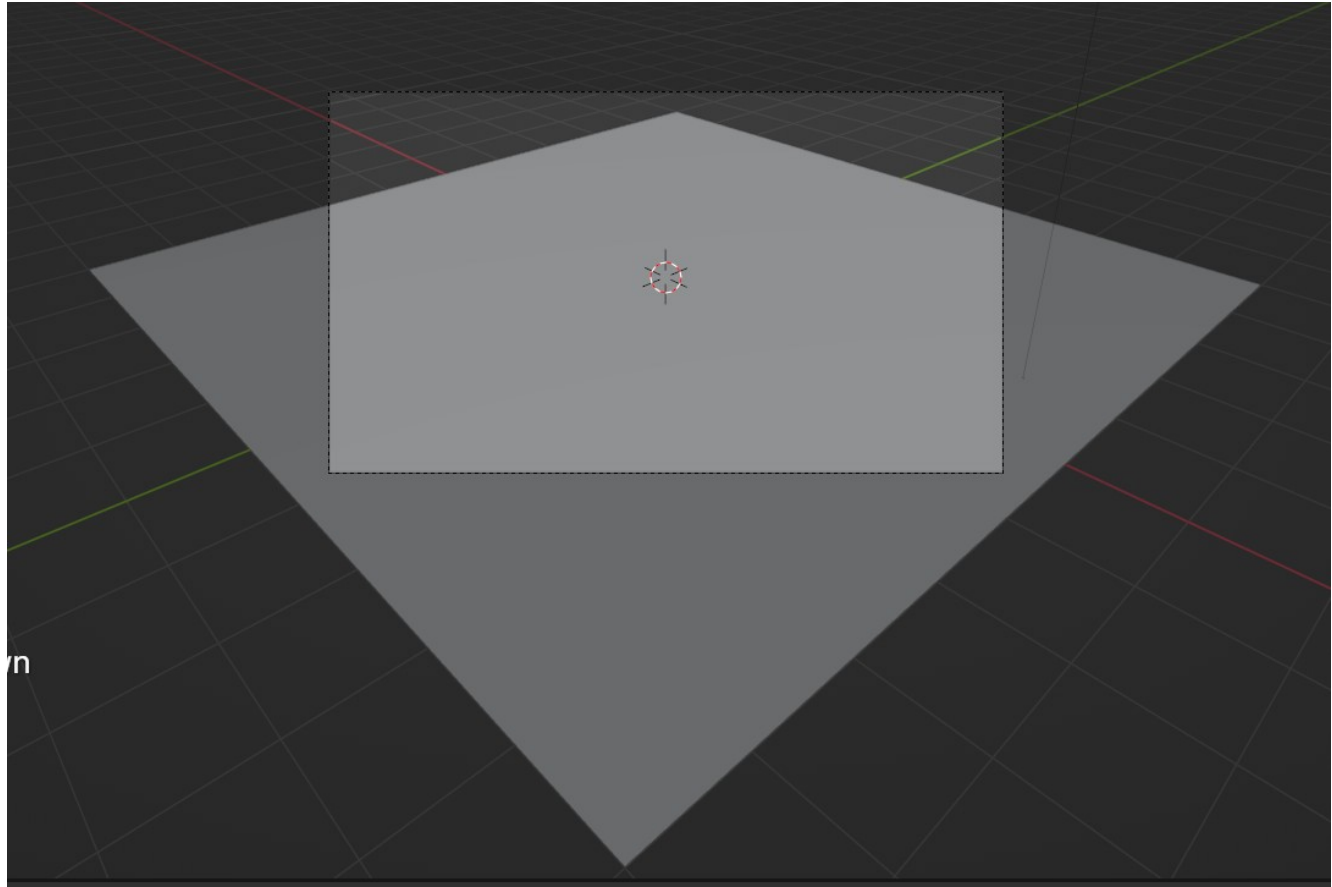
2. ปรับขนาดและหมุนเพื่อให้พอดีกับส่วนที่เป็นรองหลัง

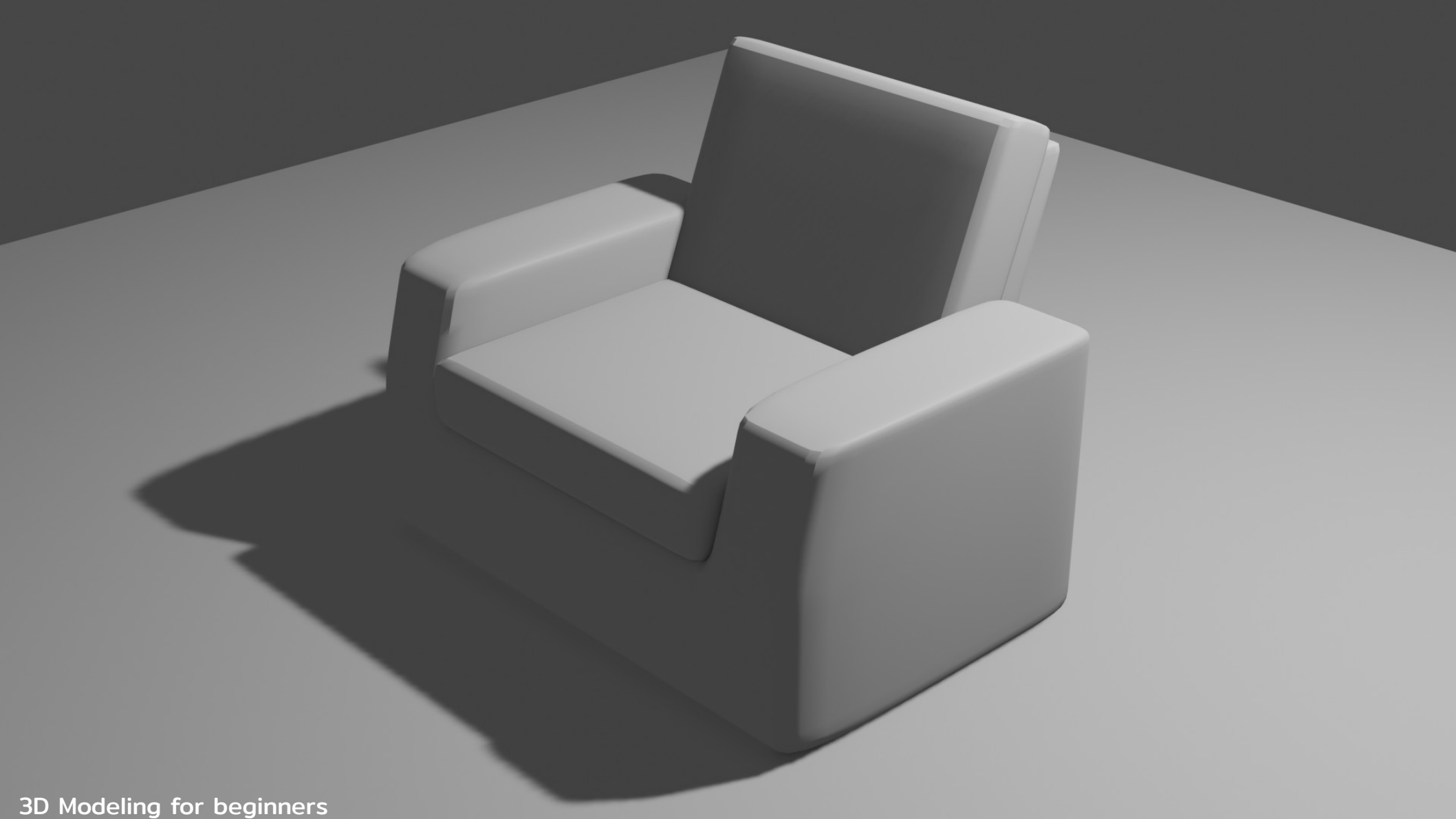


ทำพื้น

1. เพิ่ม plane

2. ปรับขนาด

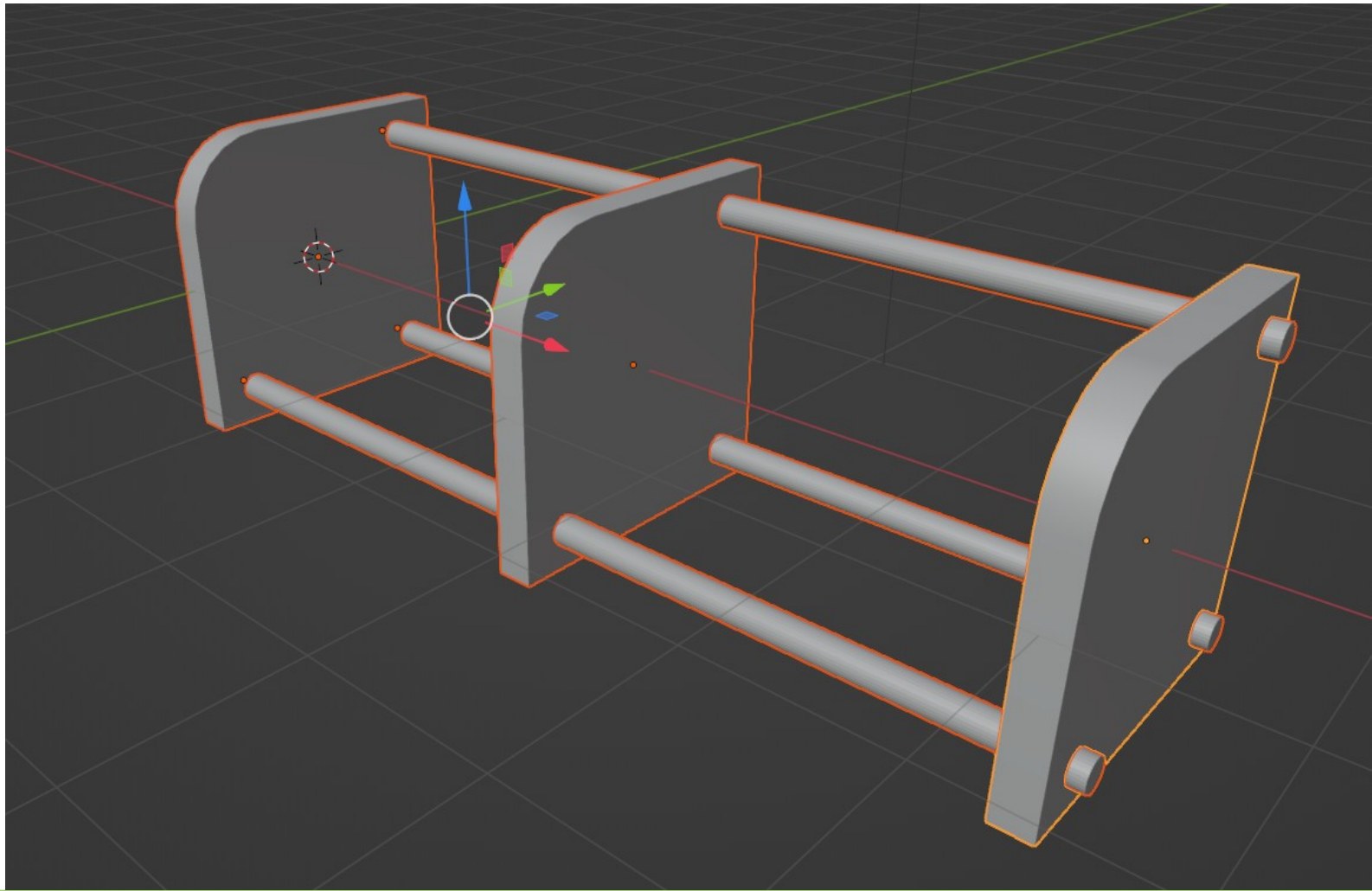




Step4



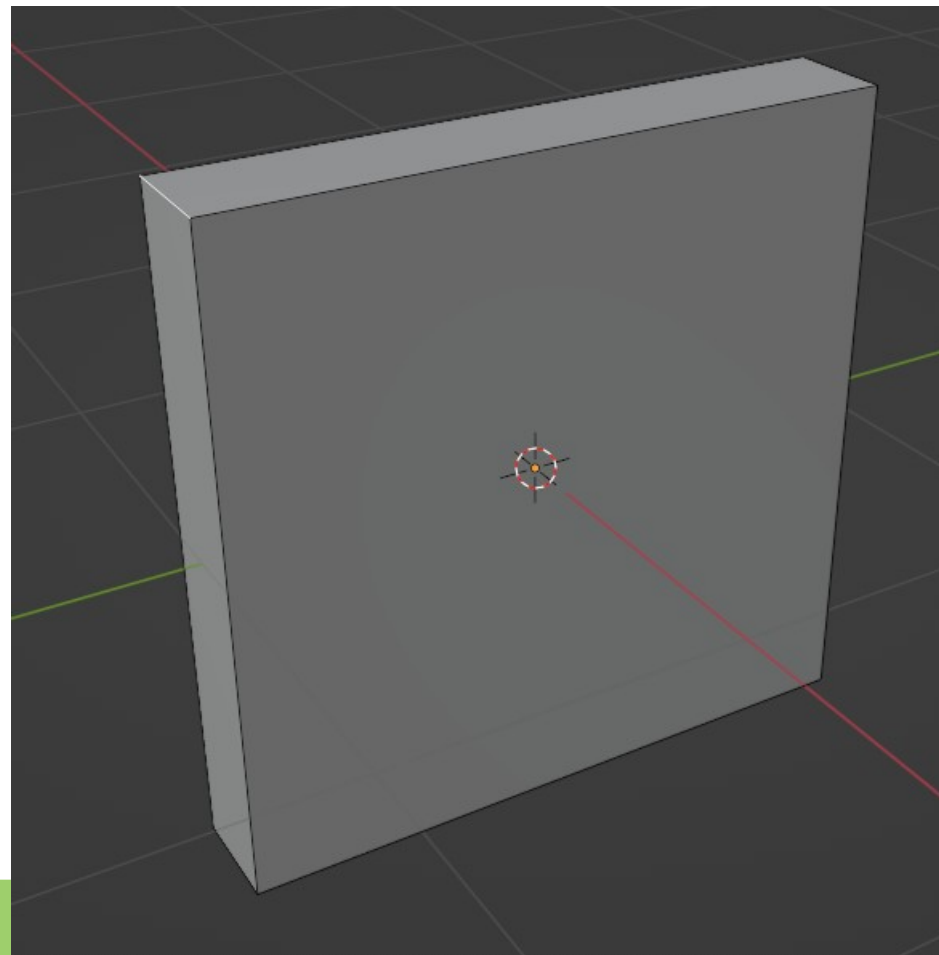
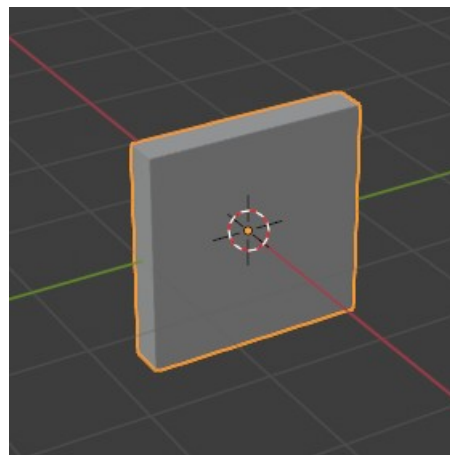
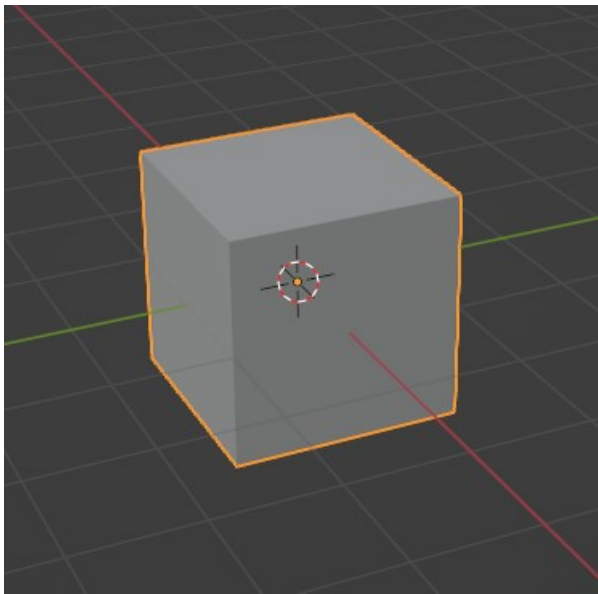
ทำชั้นวางหนังสือ ด้วยวิธีการ boolean



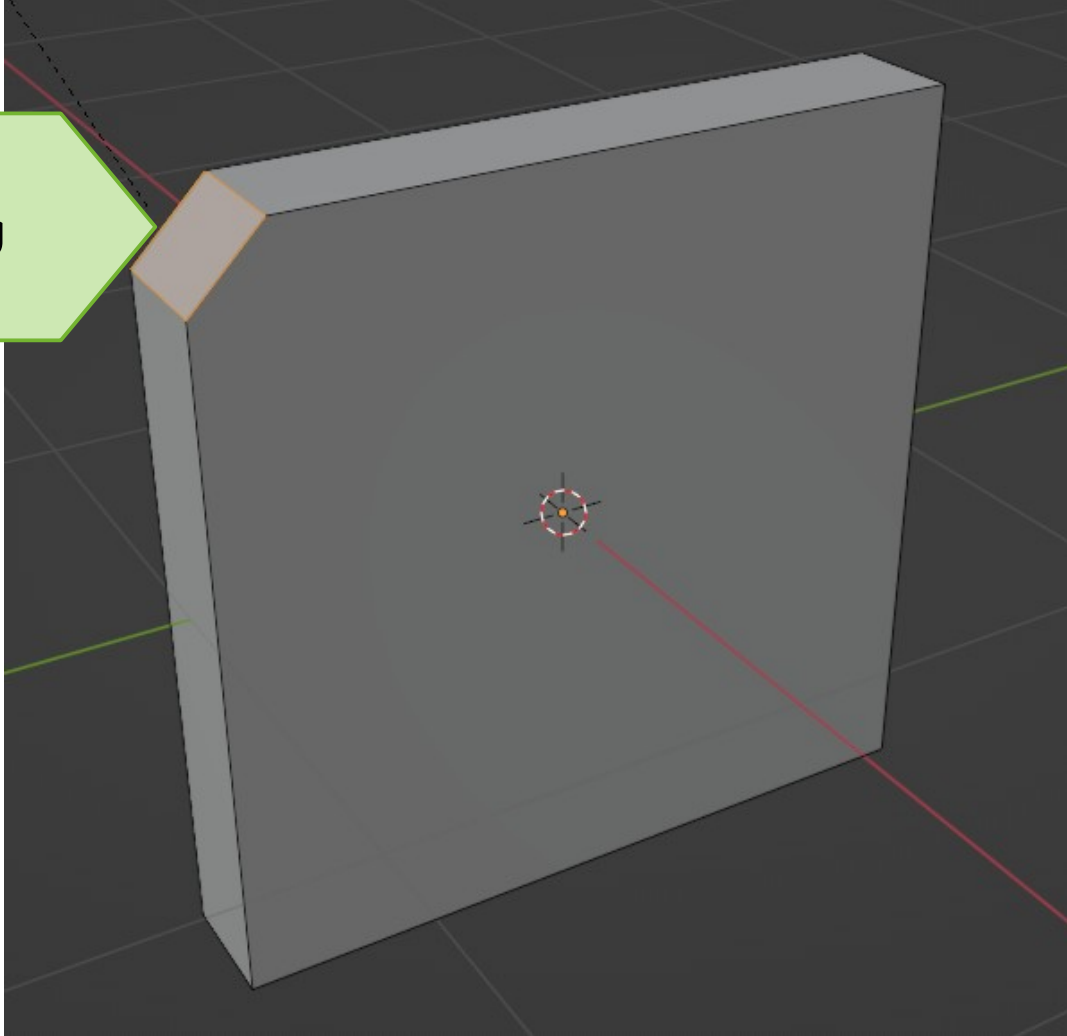
ขั้นตอน

1. สร้าง cube แล้วปรับขนาด
2. เข้าโหมด Edit
3. เลือก Edge ของสันด้านใดด้านหนึ่ง
4. กด Ctrl+B แล้วลากเมาส์เพื่อปรับขนาด และ
สกอร์ลเมาส์เพื่อเพิ่มรายละเอียดของส่วนโค้ง
5. ปรับ Smooth Shader และ Auto Normals

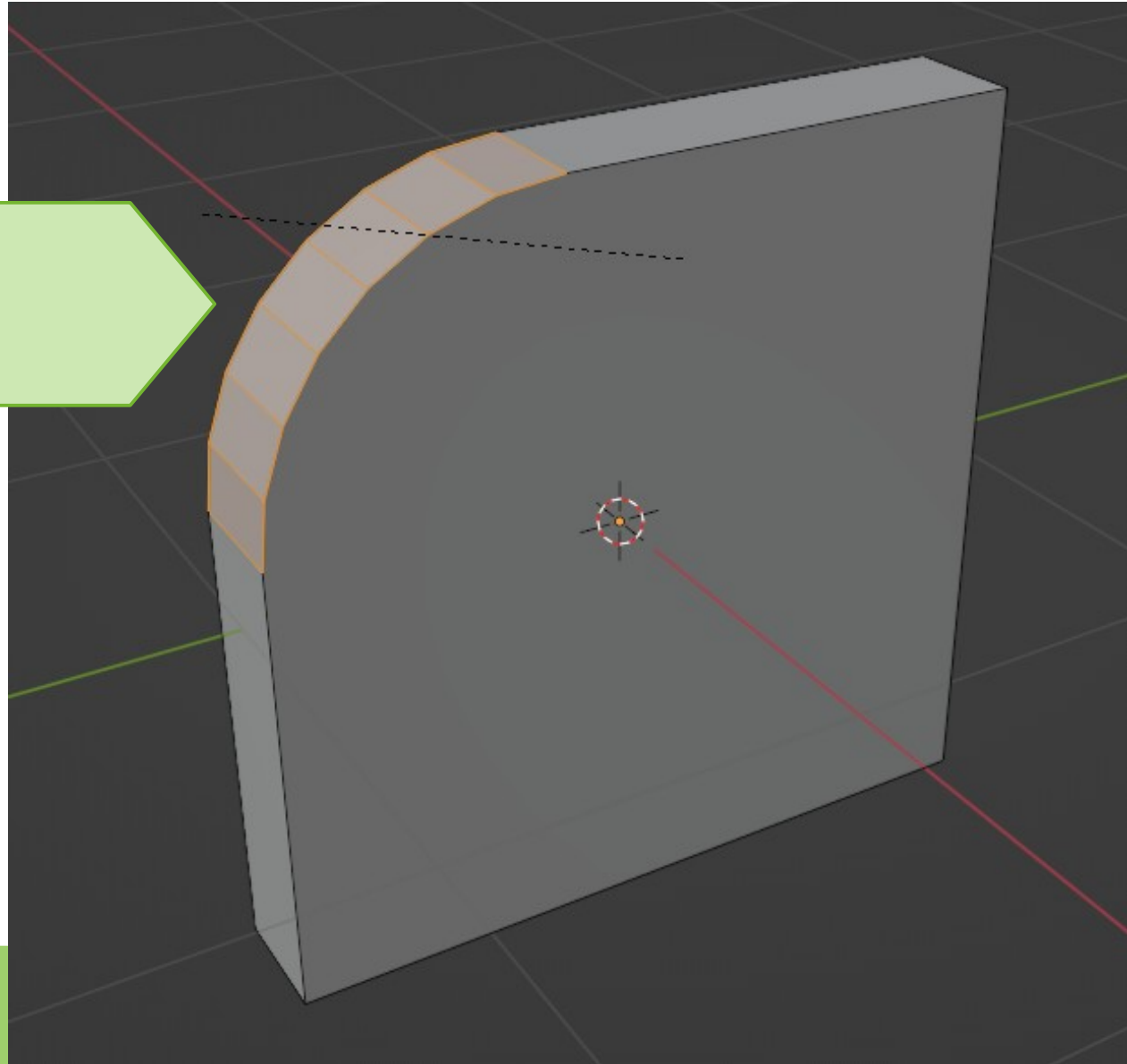




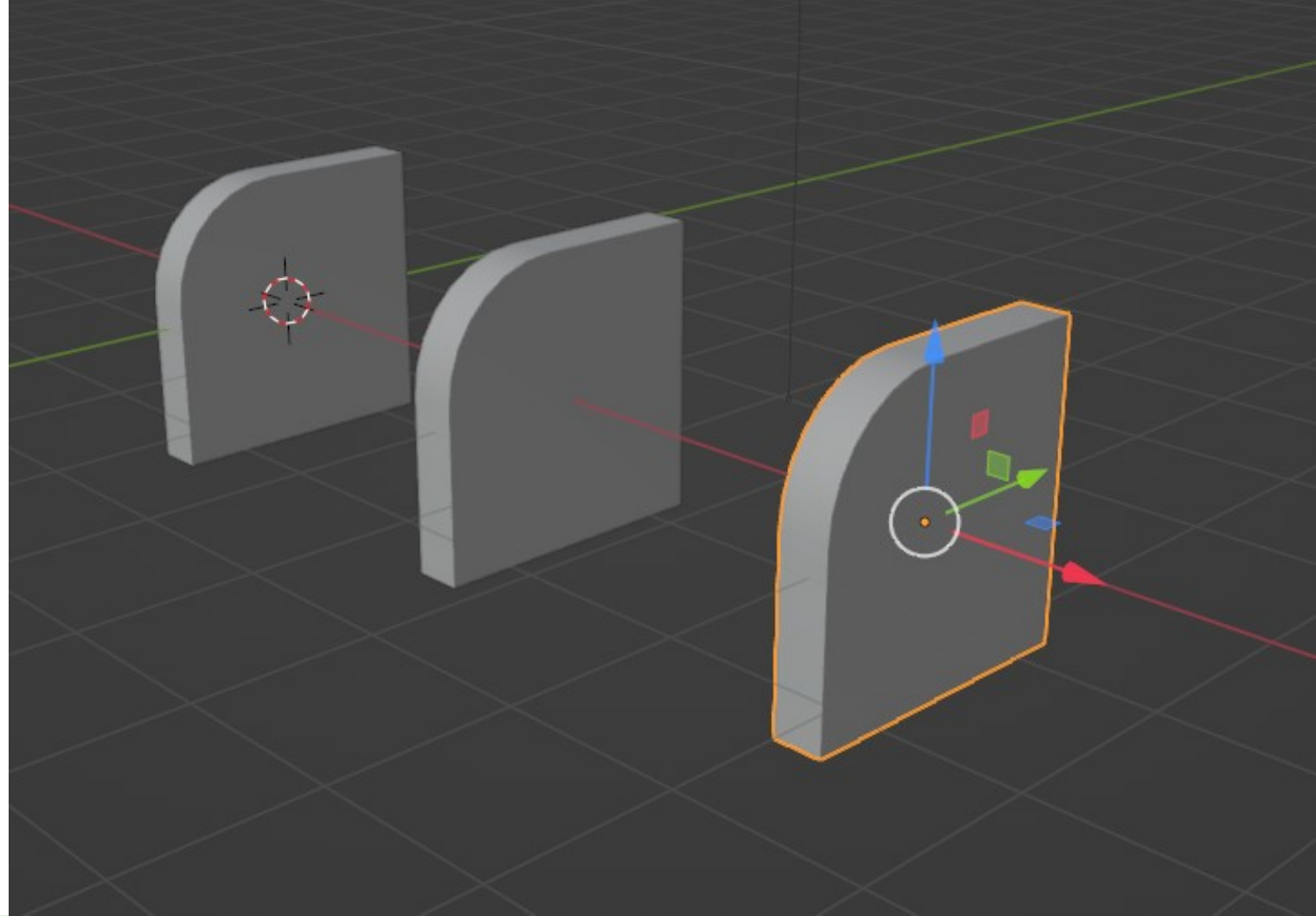
Ctrl+B แล้ว Drag



Scroll เมาส์
เมื่อพอใจแล้วกด Enter



**ขั้นตอน
6. คัดลอก
อีก 2 ชิ้น และ
จัดเรียง**



ขั้นตอน

7. สร้าง Cylinder

8. หมุนให้อยู่ใน

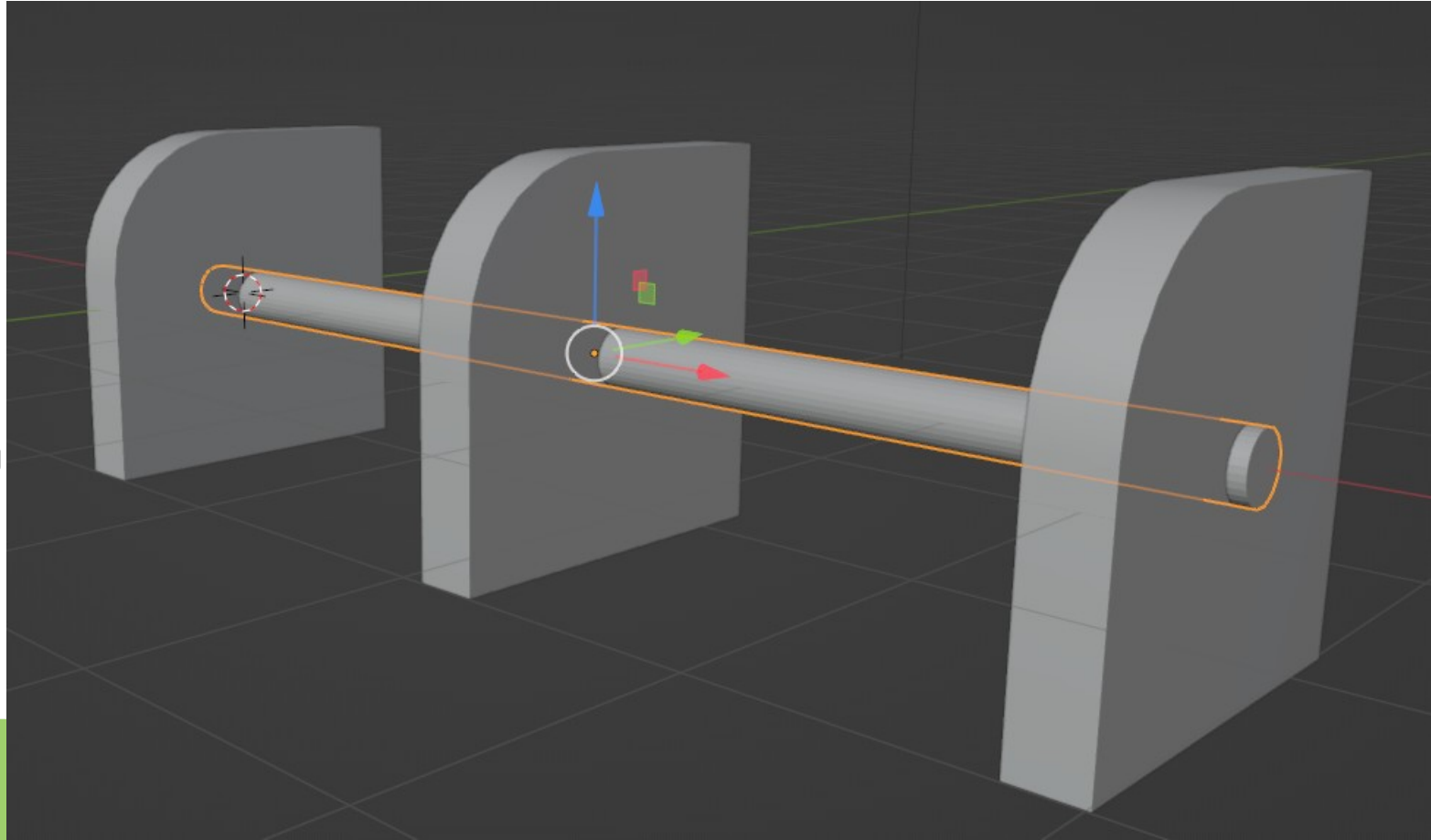
แกนนอน

$r+y+90$

9. ปรับขนาด

ให้ยาวพอสำหรับ

คั่นแผ่นทั้ง 3

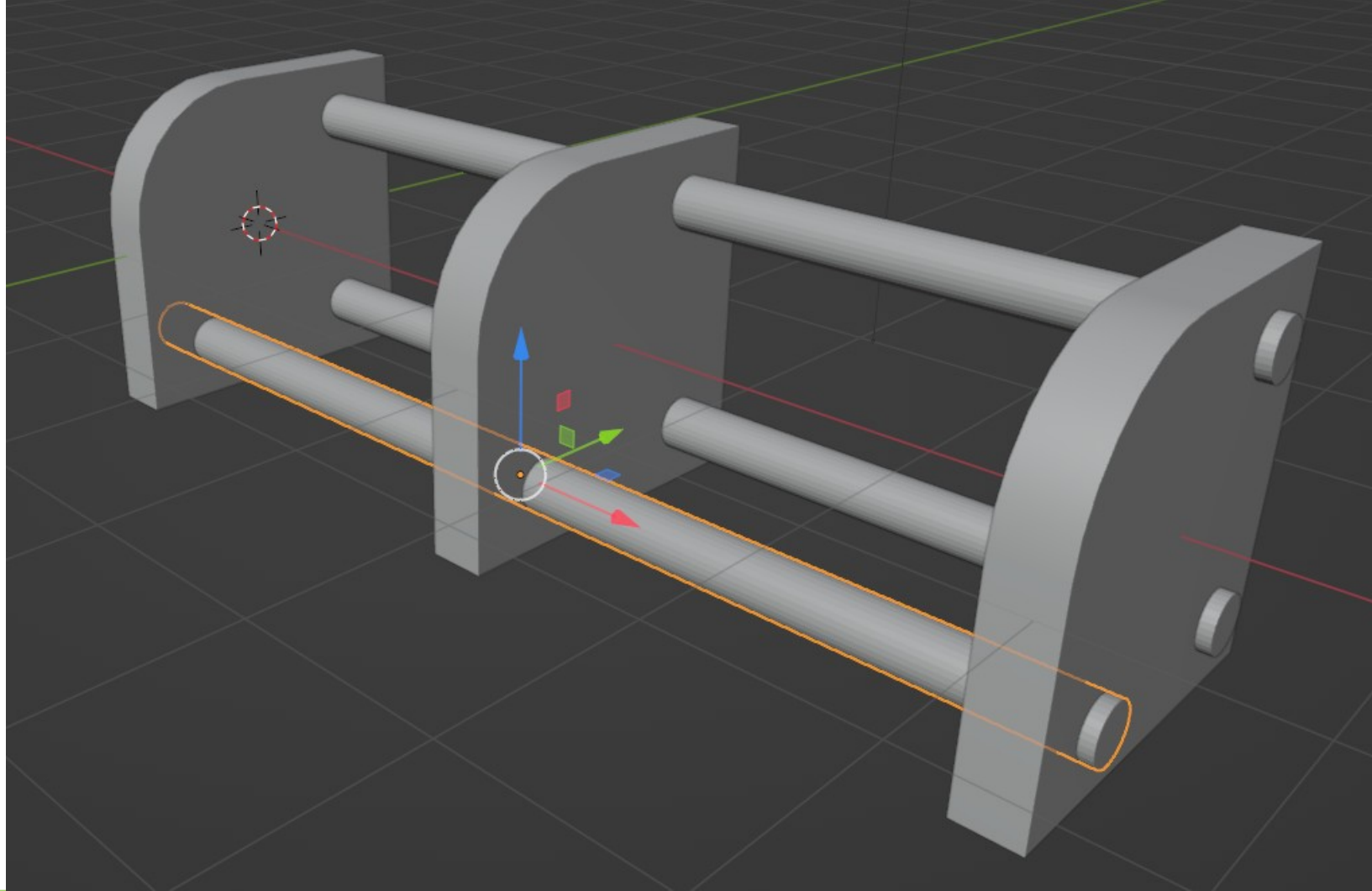


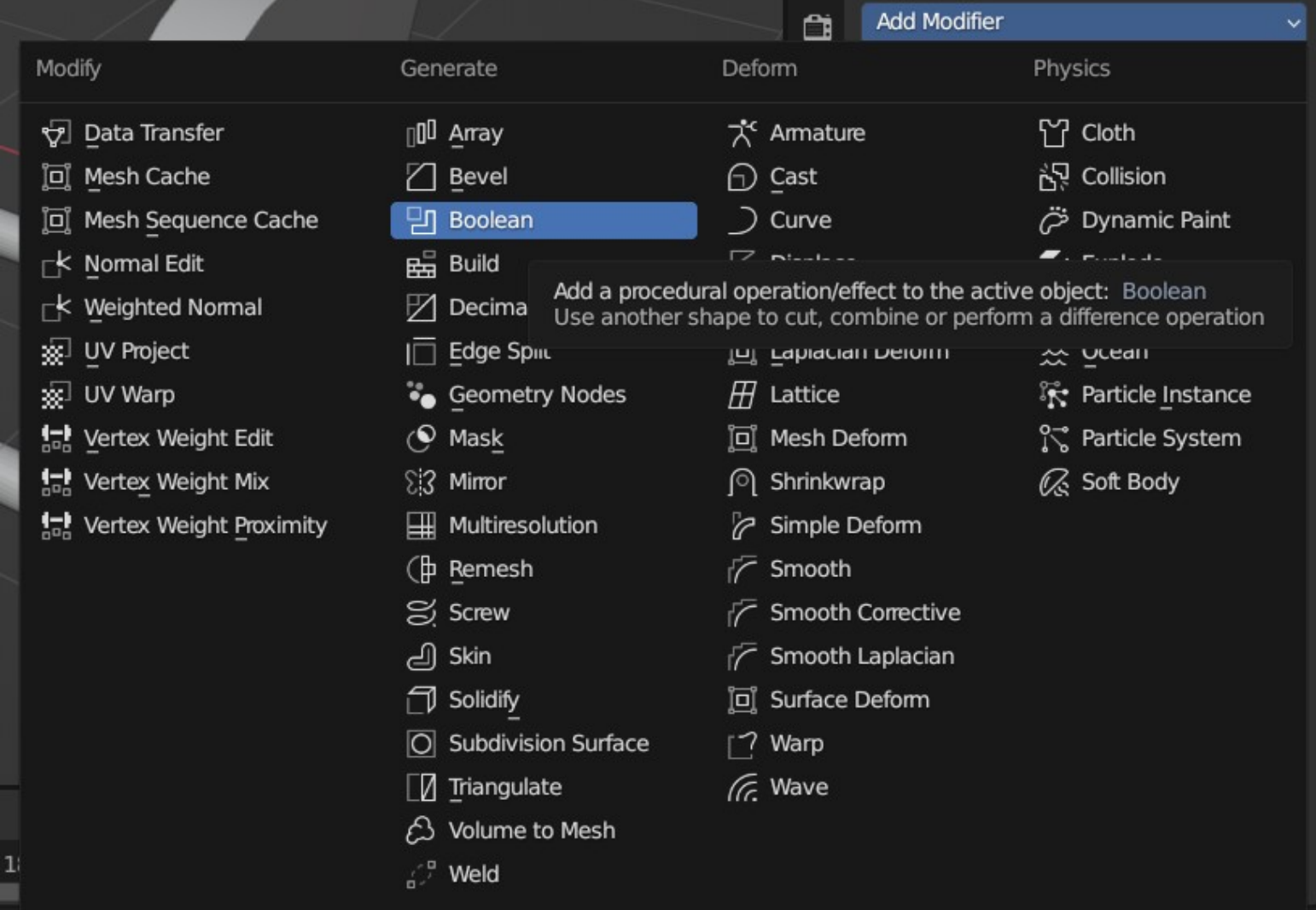
ขั้นตอน

10. คัดลอกอีก

2 ชิ้น

11. จัดวางใหม่





ขั้นตอน

12. เลือกแผ่นที่ 1

13. เพิ่ม Boolean จาก Modifier

14. ที่ Object คลิกไอคอนหลอดดูดสี

15. คลิกที่ Cylinder

16. เลือกโหมด Difference

17. ทำ Apply

18. ทำกับ Cylinder ที่เหลือ

19. ทำกับทุกแผ่น

