

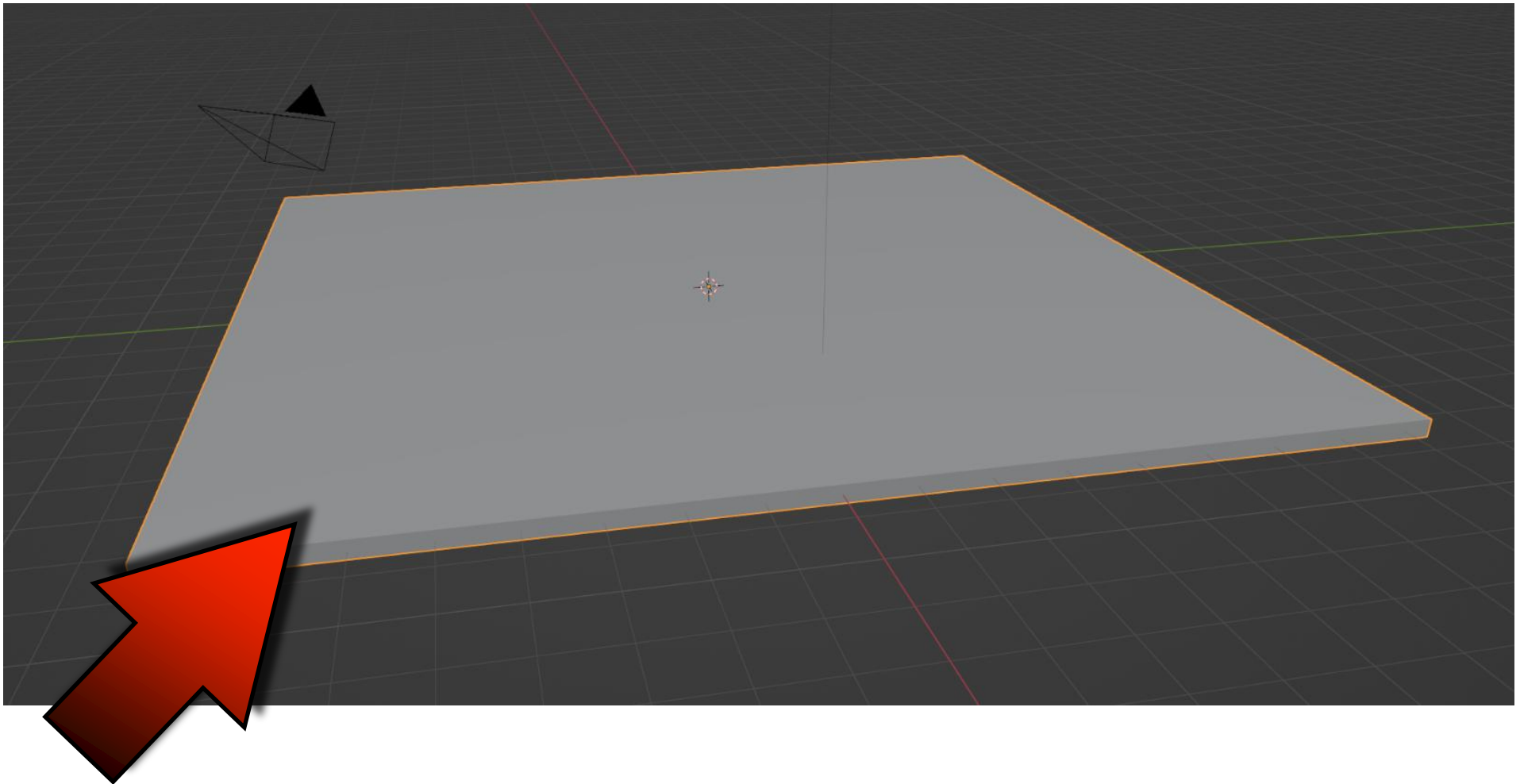
DESTROY



**Co-funded by
the European Union**

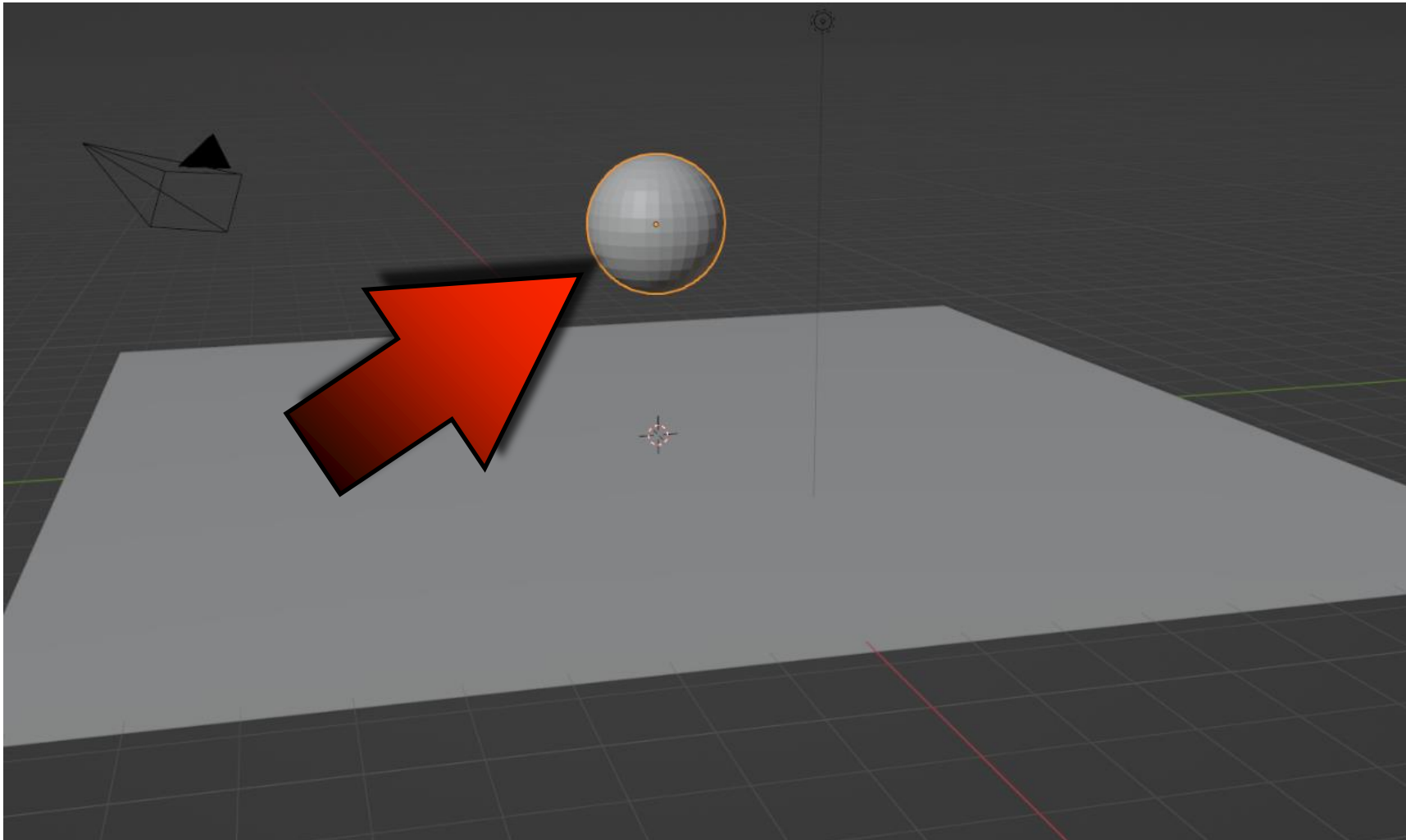


INSERT **CUBE** AND **SCALE** IT LIKE ON SCREEN



DESTROY

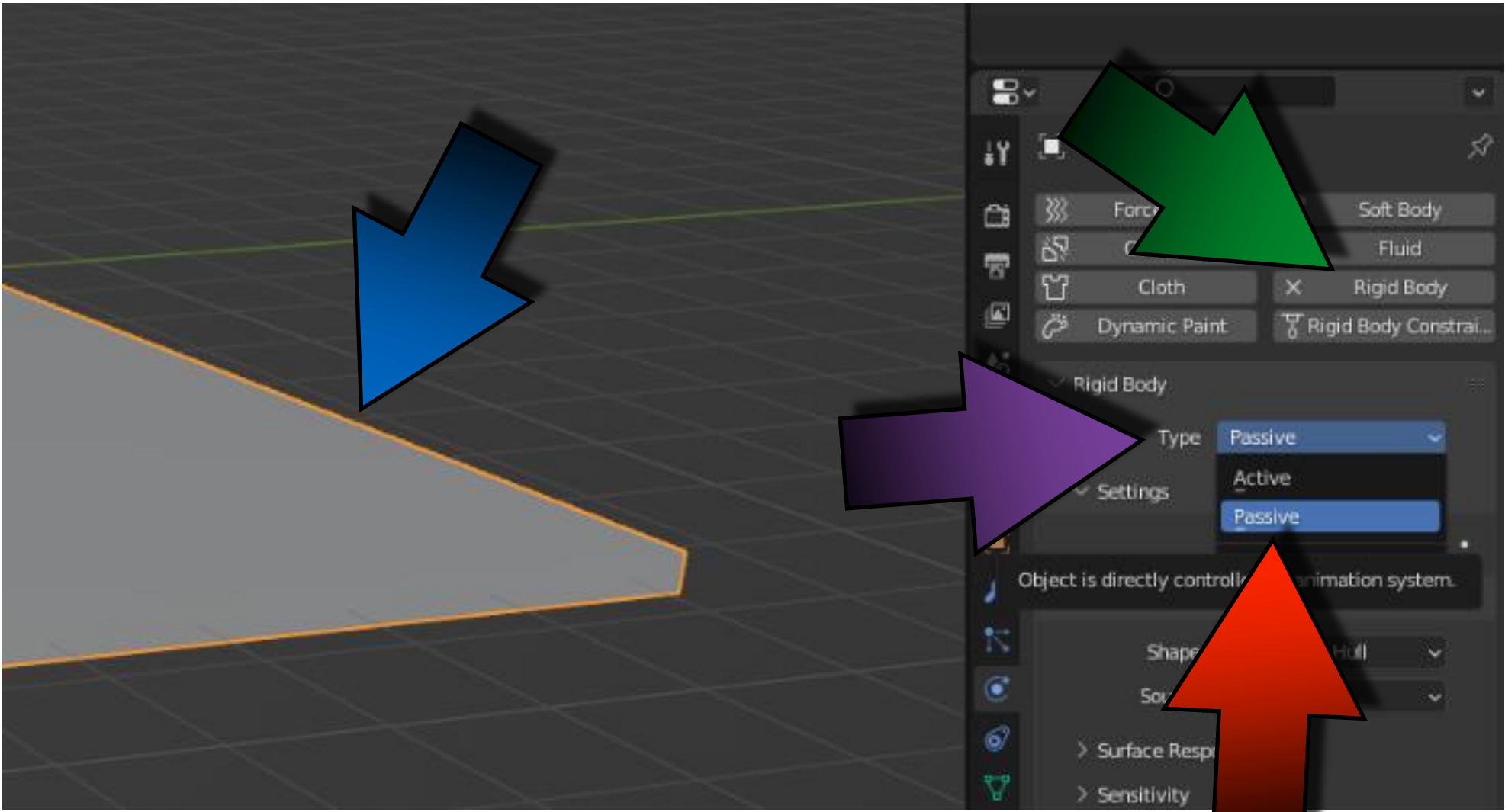
PUT **UV SPHERE** ABOVE CUBE



DESTROY

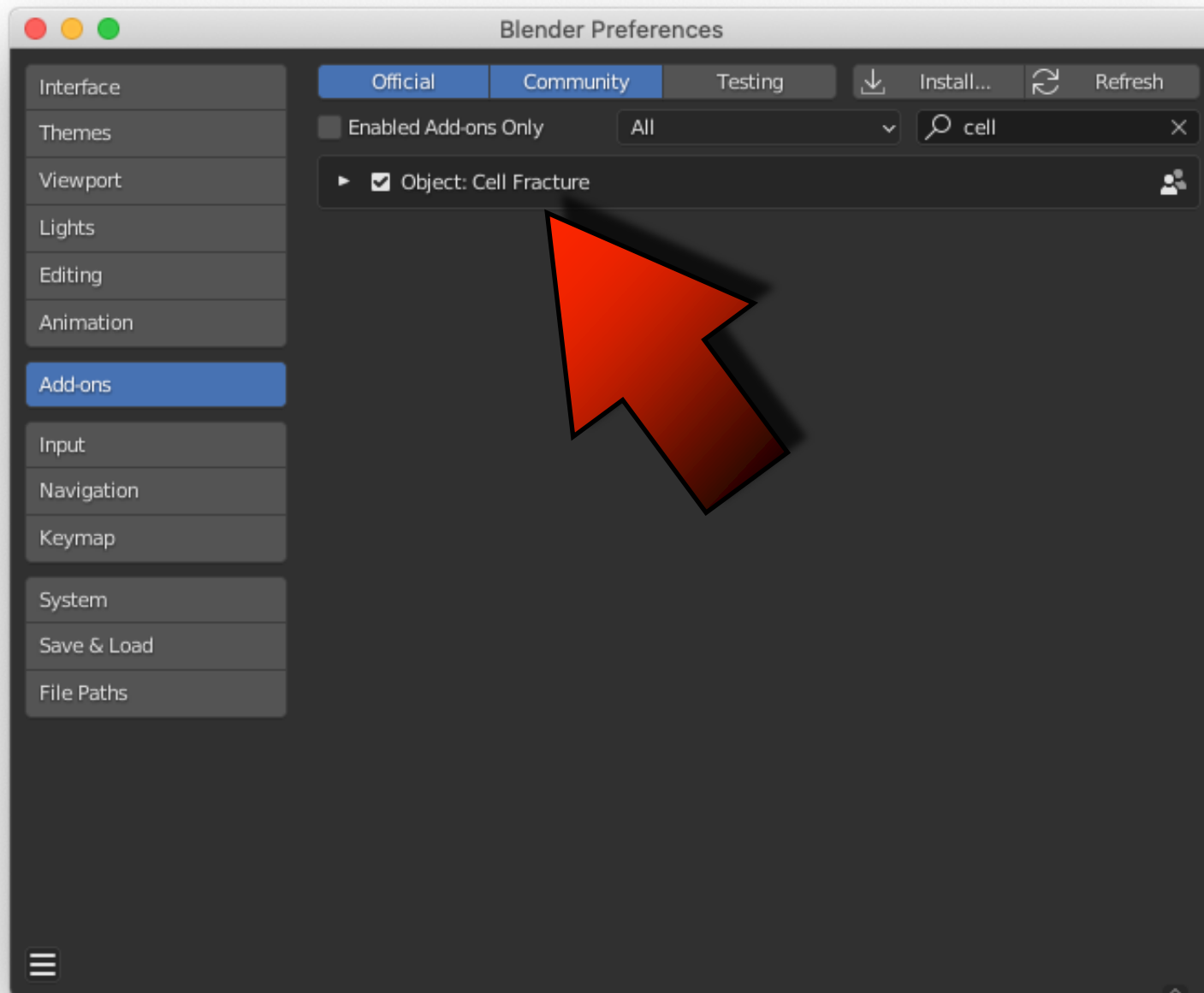
POWER OF AR AND VR

FOR CUBE SET RIGID BODY TYPE PASSIVE



DESTROY

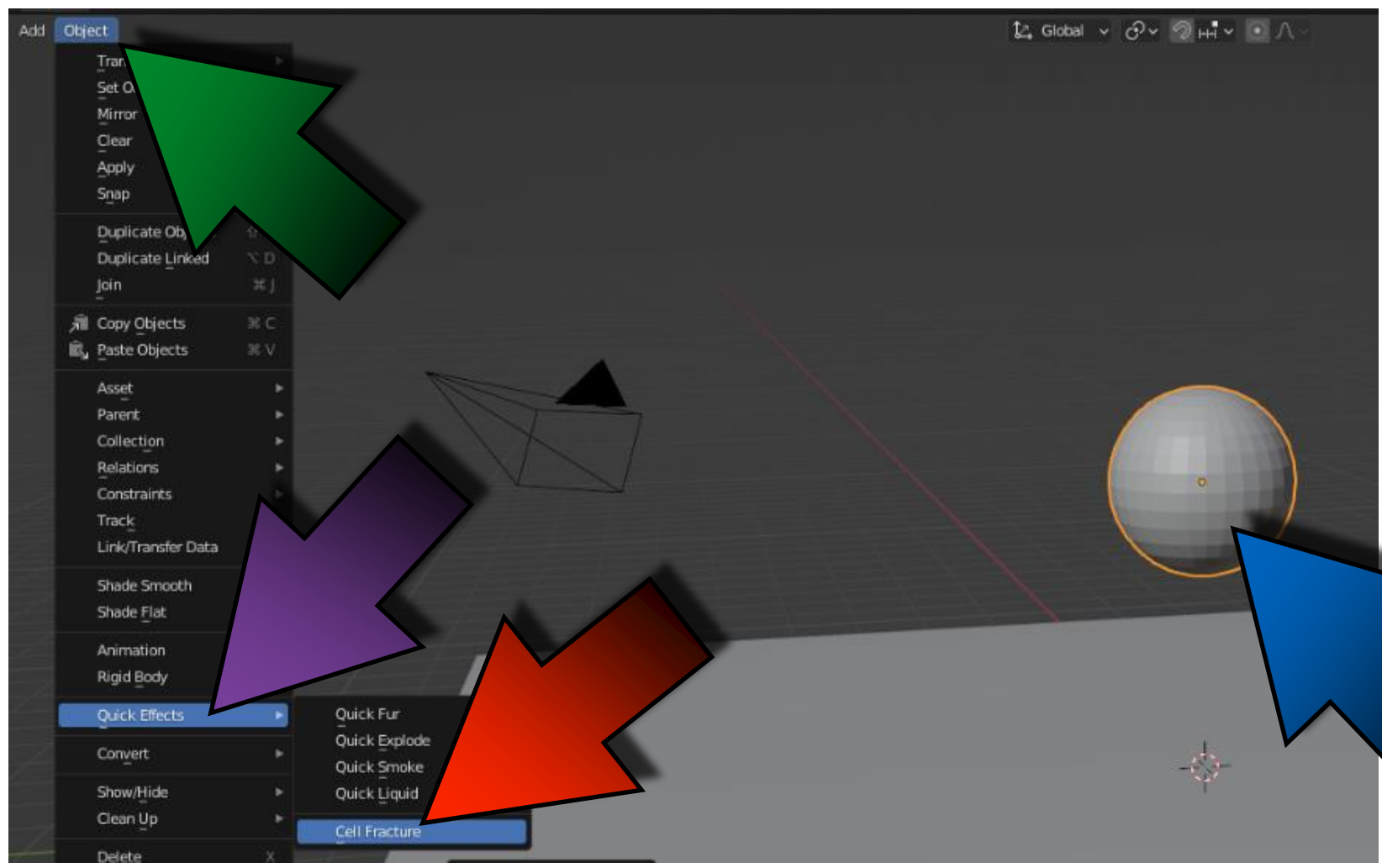
ADD **CELL FRACTURE** IN PREFERENCES



DESTROY

POWER OF AR AND VR

SELECT CUBE AND CHOOSE CELL FRACTURE



DESTROY



POWER OF AR AND VR



PRESS OK

Cell fracture selected mesh objects

Operator Presets ▼ + -

Point Source

Own Verts	Child Verts	Own Particles	Child Particles	Annotation Pencil
Source Limit	100	Noise	0.00	
Scale:	1.00	1.00	1.00	

Recursive Shatter

Recursion	0	Source Limit	8	Clamp Recursion	250	
Rando	0.25	Random	Small	Big	Cursor Close	Cursor Far

Mesh Data

<input type="checkbox"/> Smooth Interior	<input checked="" type="checkbox"/> Sharp Edges	<input checked="" type="checkbox"/> Apply Split Edge	<input checked="" type="checkbox"/> Match Data		
Material	0	<input type="checkbox"/> Interior VGroup	Margin	0.00	<input checked="" type="checkbox"/> Split Islands

Physics

Mass Mode: Volume ▼ Mass 1.00

Object

Recenter

Scene

Collection:

Debug

Show Progress Realtime Debug Boolean

OK

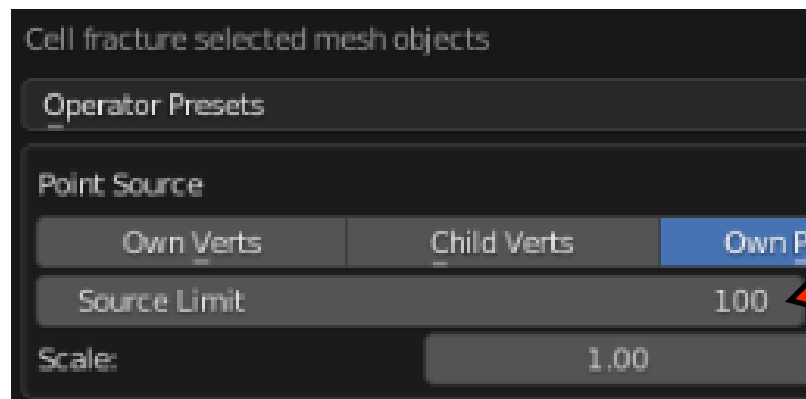
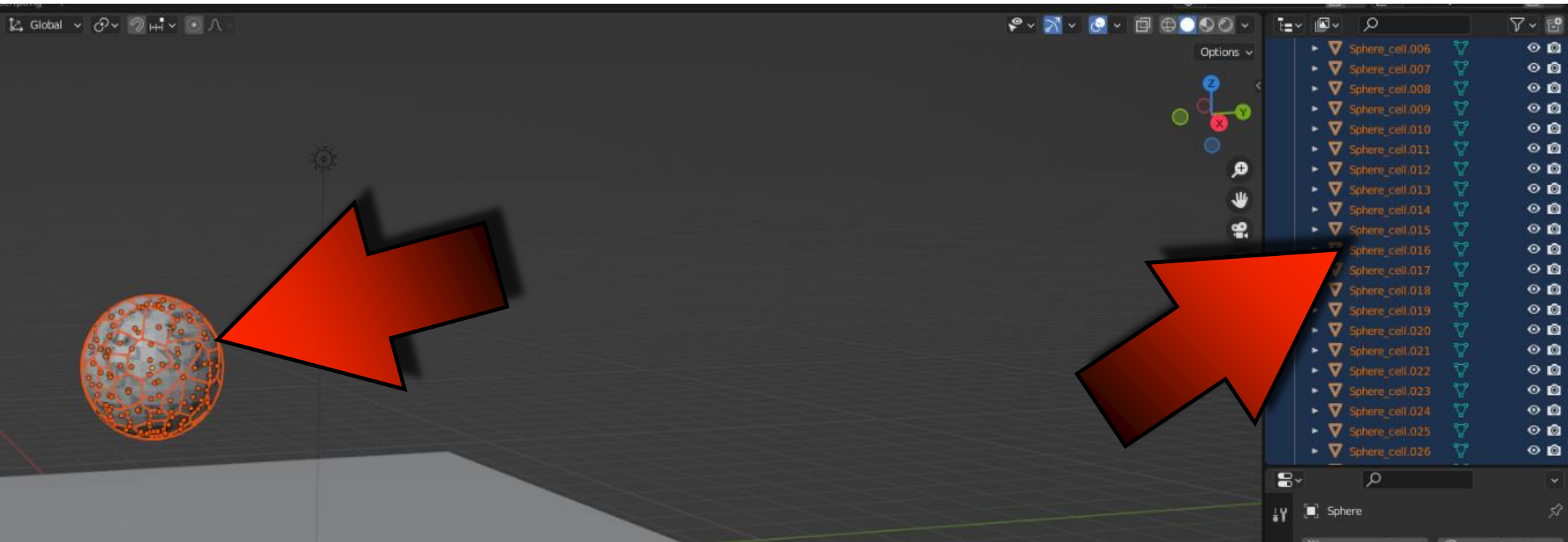
DESTROY



POWER OF AR AND VR



THE CREATION OF 100 ELEMENTS



DESTROY

**PRESS THE SPACEBAR
AND SEE THE ANIMATION**



**WE ADDED RIGID BODY ONLY TO UV SPHERE
AND NOT TO ANOTHER ELEMENTS**

<https://youtu.be/qLml6JrgLYE>

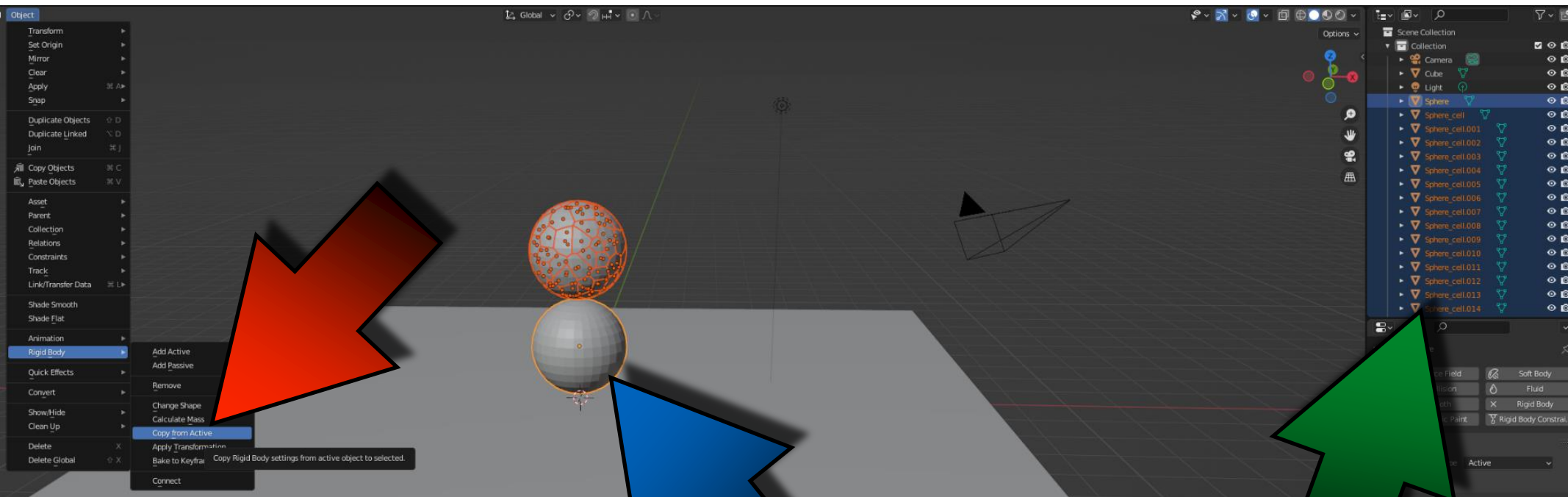
POWER OF AR AND VR

FIRST LET'S **SELECT UV SPHERE**

AND THEN

WITH THE SHIFT KEY ALL ELEMENTS

AND CHOOSE COPY FROM ACTIVE



DESTROY



POWER OF AR AND VR



**PRESS THE SPACEBAR
AND SEE THE ANIMATION**

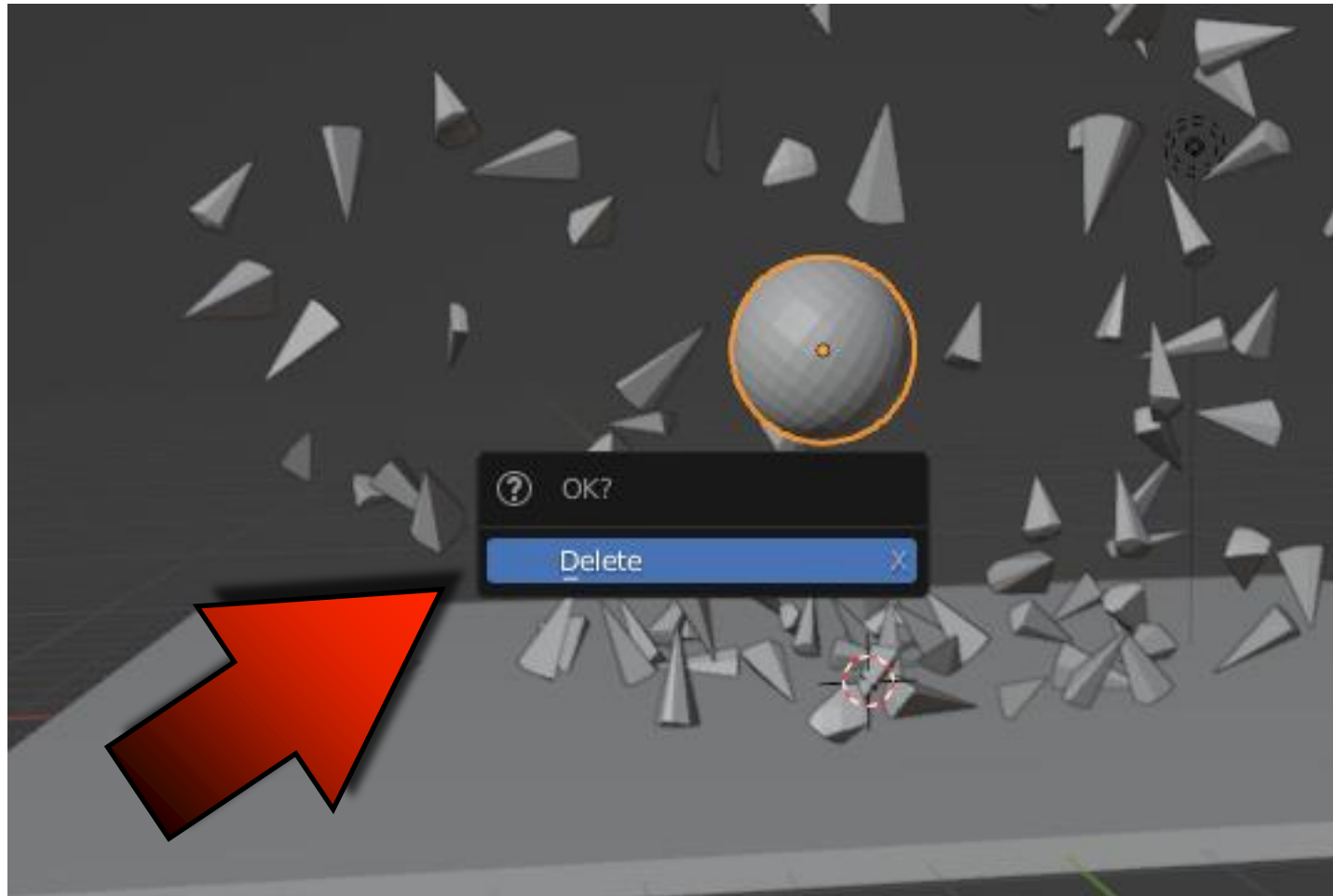


**RIGID BODY UV SPHERE AND ELEMENTS
AFFECT THEMSELVES**

https://youtu.be/A6IM1lw_PvM

DESTROY

DELETE UV SPHERE



DESTROY



POWER OF AR AND VR



**PRESS THE SPACEBAR
AND SEE THE ANIMATION**



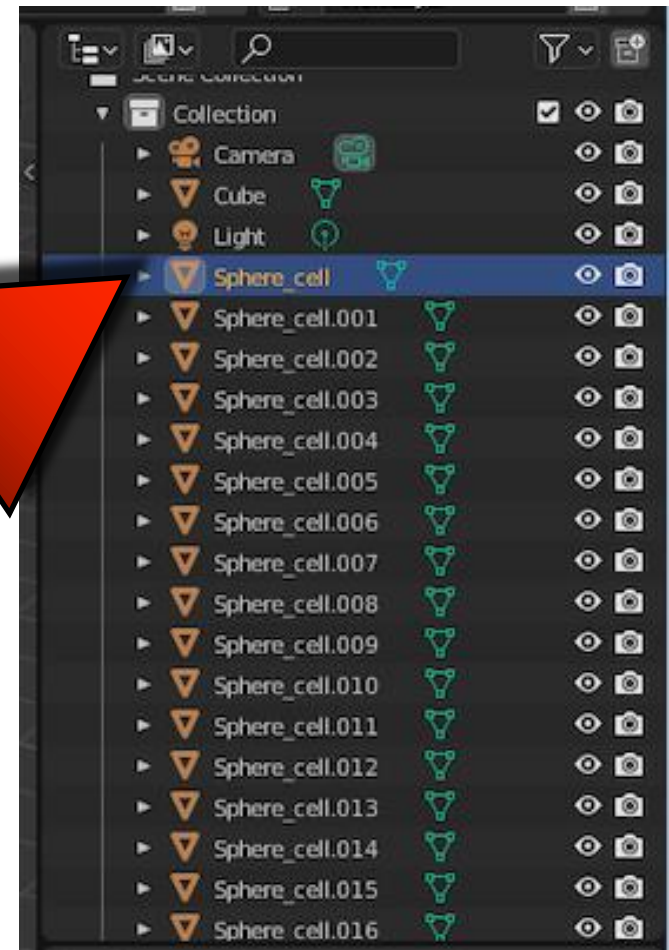
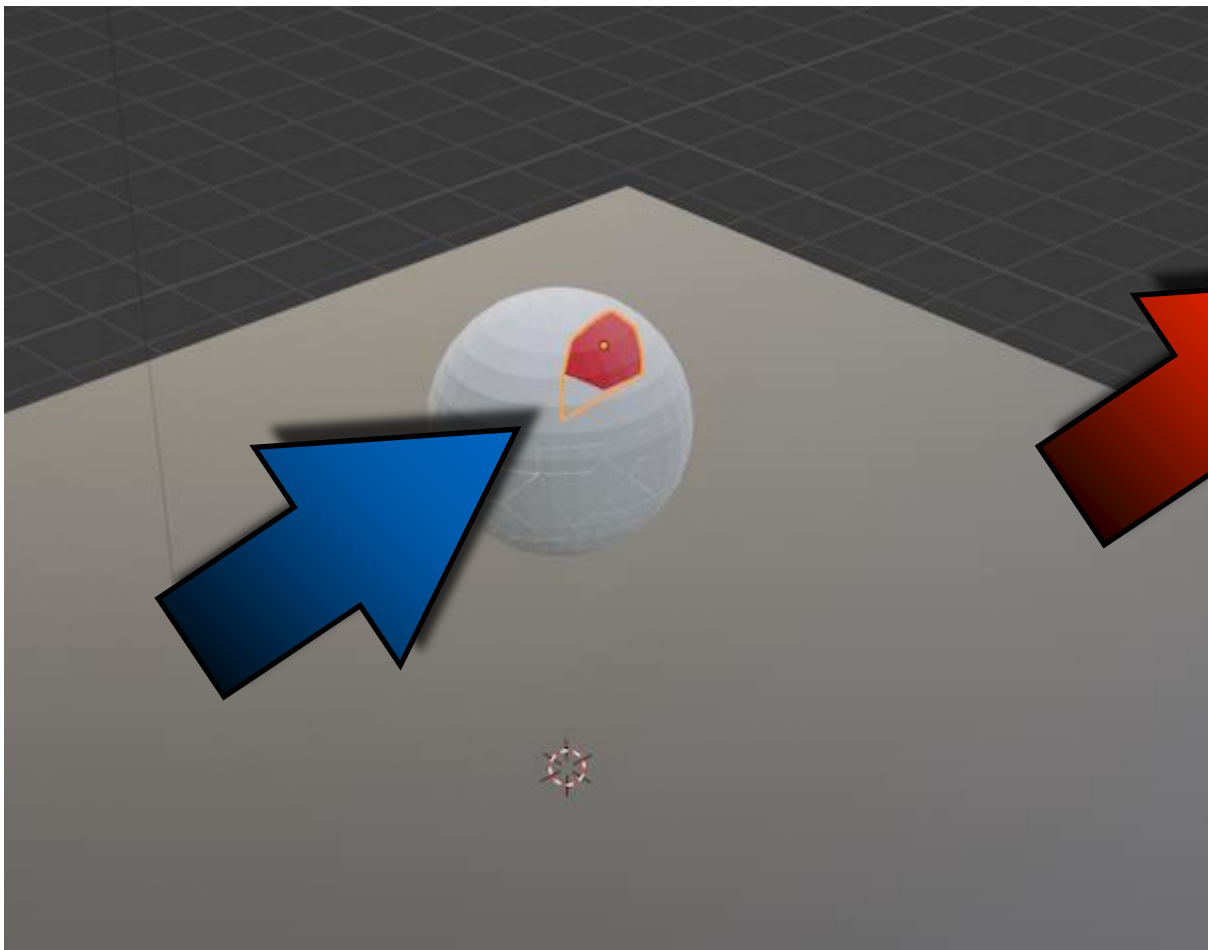
ONLY ELEMENTS HAVE A RIGIB BODY

<https://youtu.be/cVj306R8Z44>

DESTROY

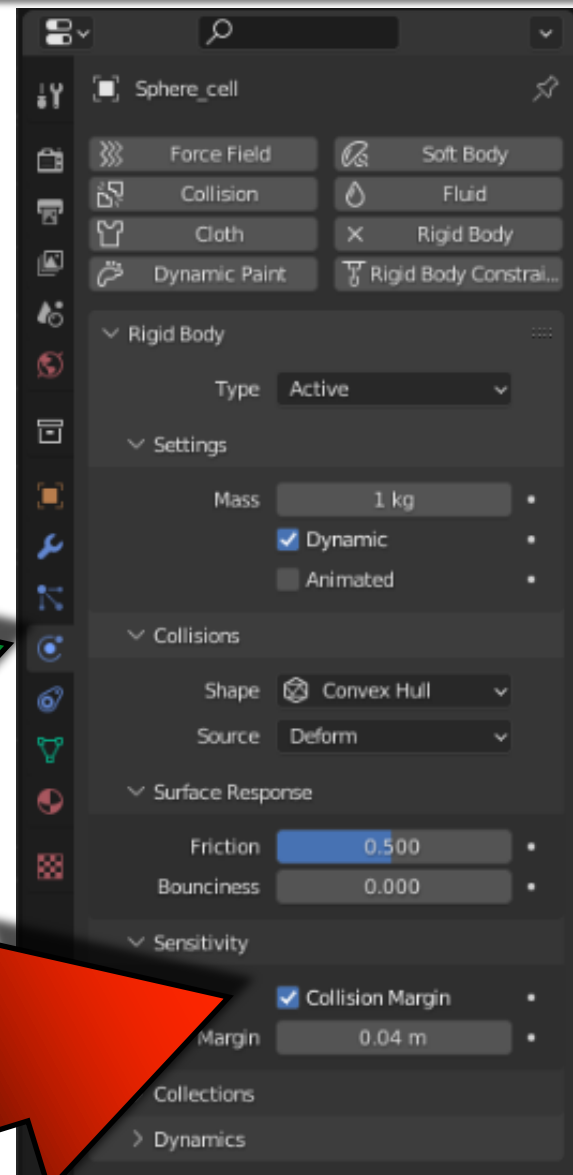
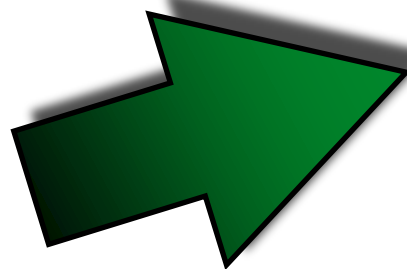
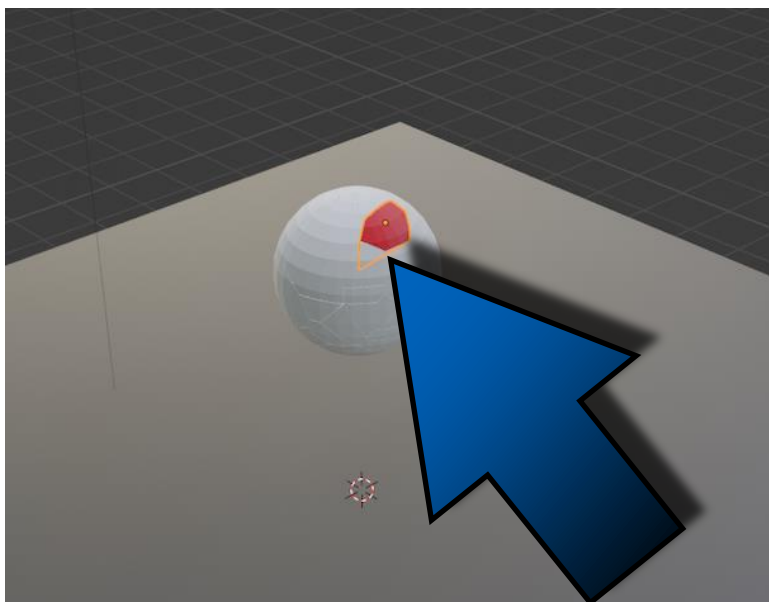
POWER OF AR AND VR

ADD MATERIAL ON THE FIRST ELEMENT



DESTROY

TURN ON COLLISION MARGIN FOR FIRST ELEMENT



DESTROY

**PRESS THE SPACEBAR
AND SEE THE ANIMATION**

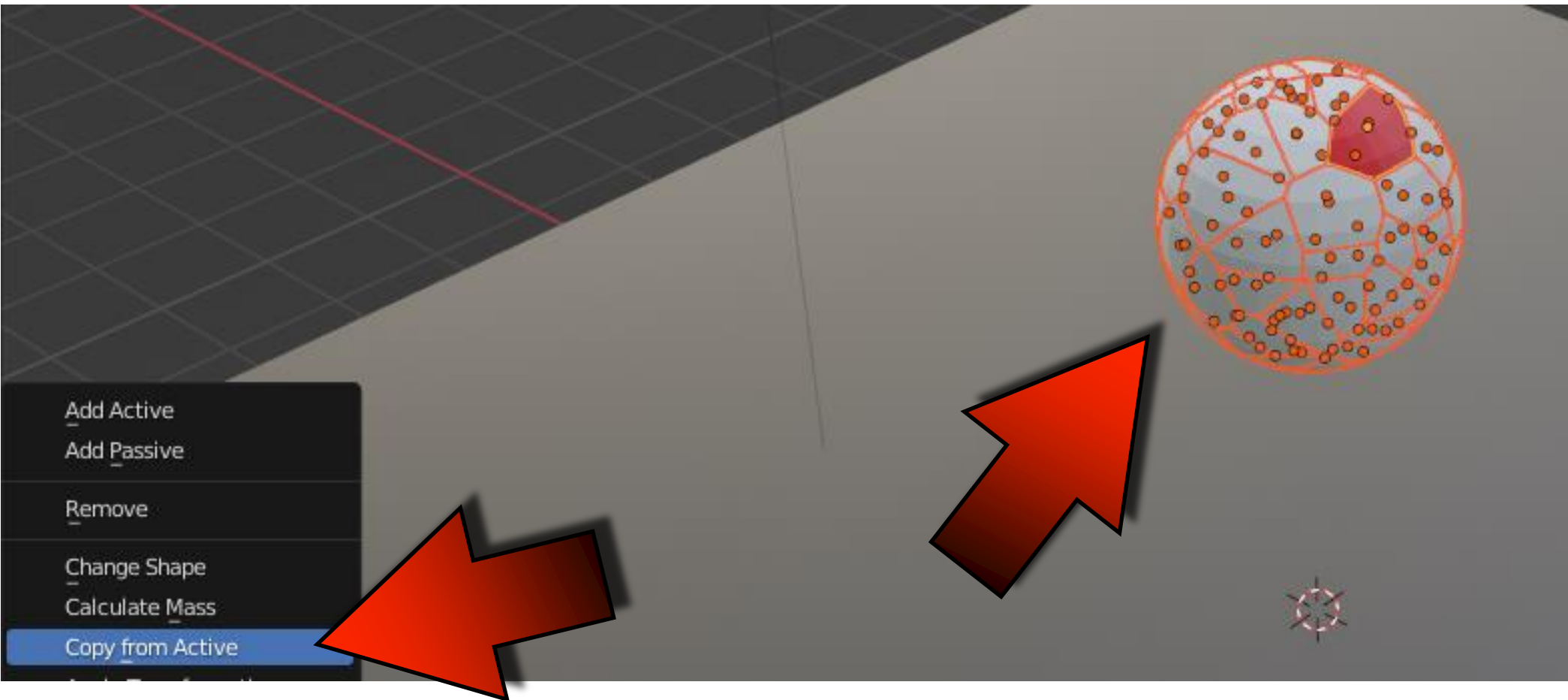


ITEMS ARE PUSHED FROM IT

<https://youtu.be/5Hdu6-rdlic>

DESTROY

COPY PROPERTIES TO OTHER ITEMS AS BEFORE



DESTROY



POWER OF AR AND VR



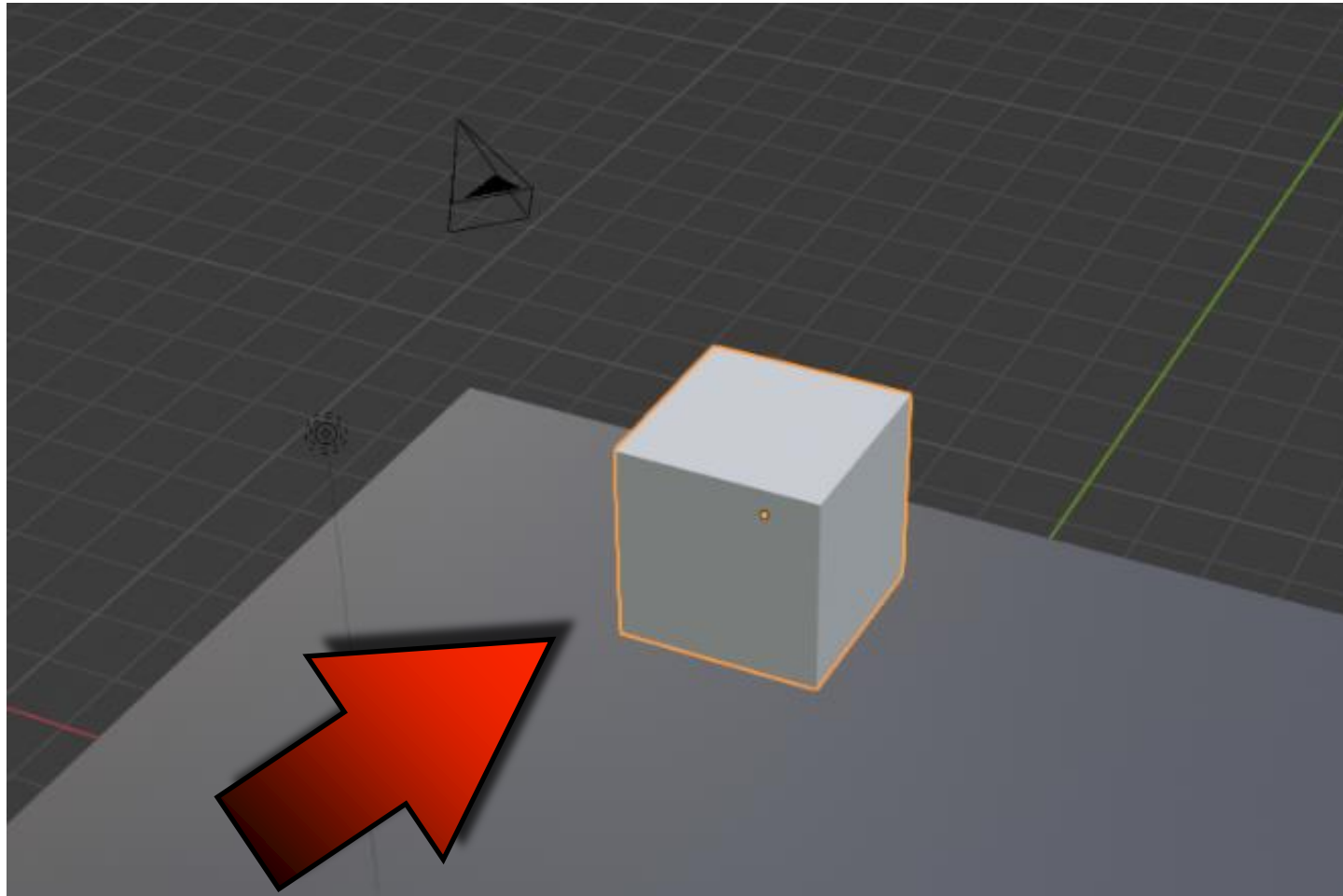
**PRESS THE SPACEBAR
AND SEE THE ANIMATION**



<https://youtu.be/yuk1LEA-HF8>

DESTROY

DELETE UV SPHERE AND
INSERT CUBE AND MOVIE IT LIKE ON SCREEN

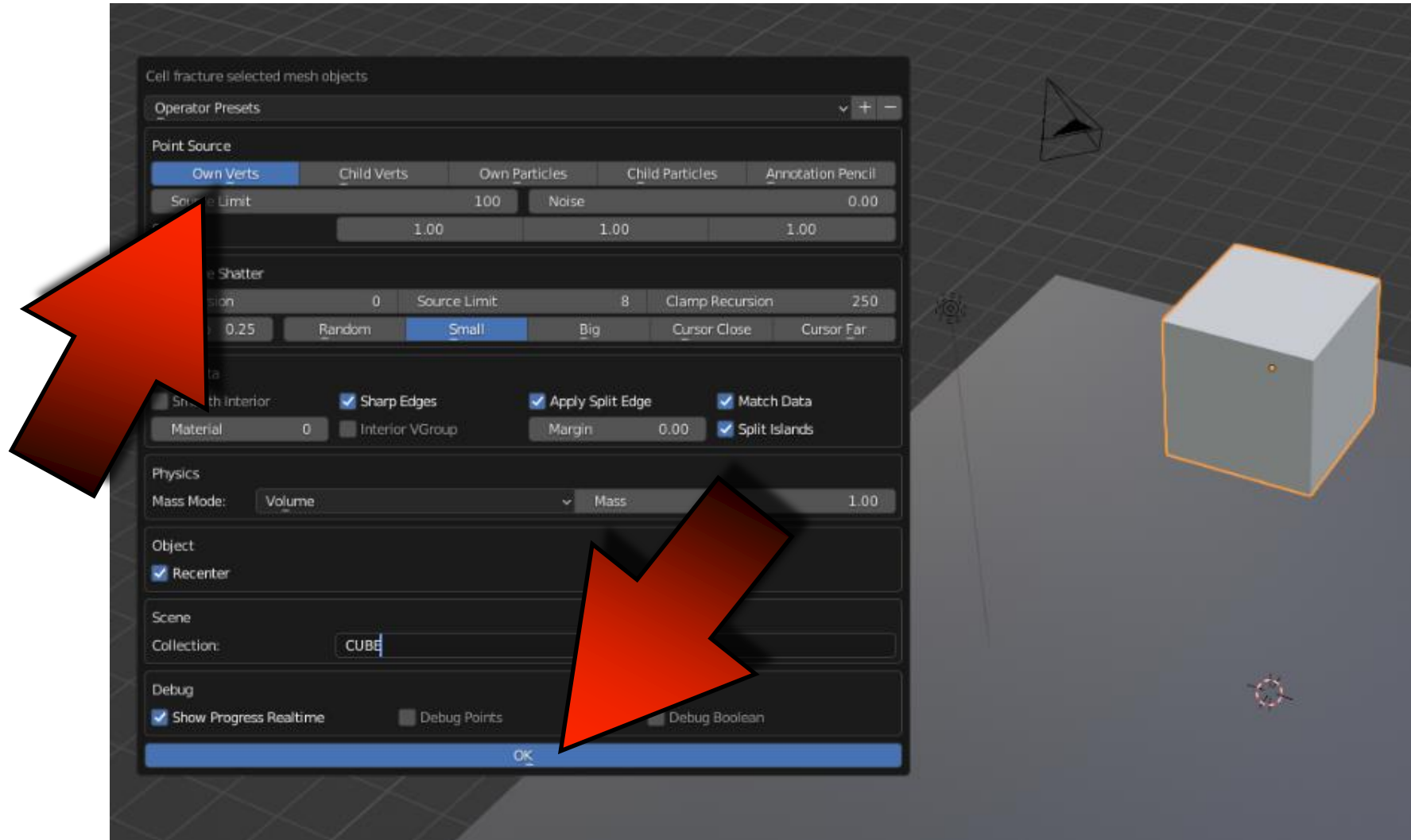


DESTROY

POWER OF AR AND VR

GO TO **CELL FRACTURE**

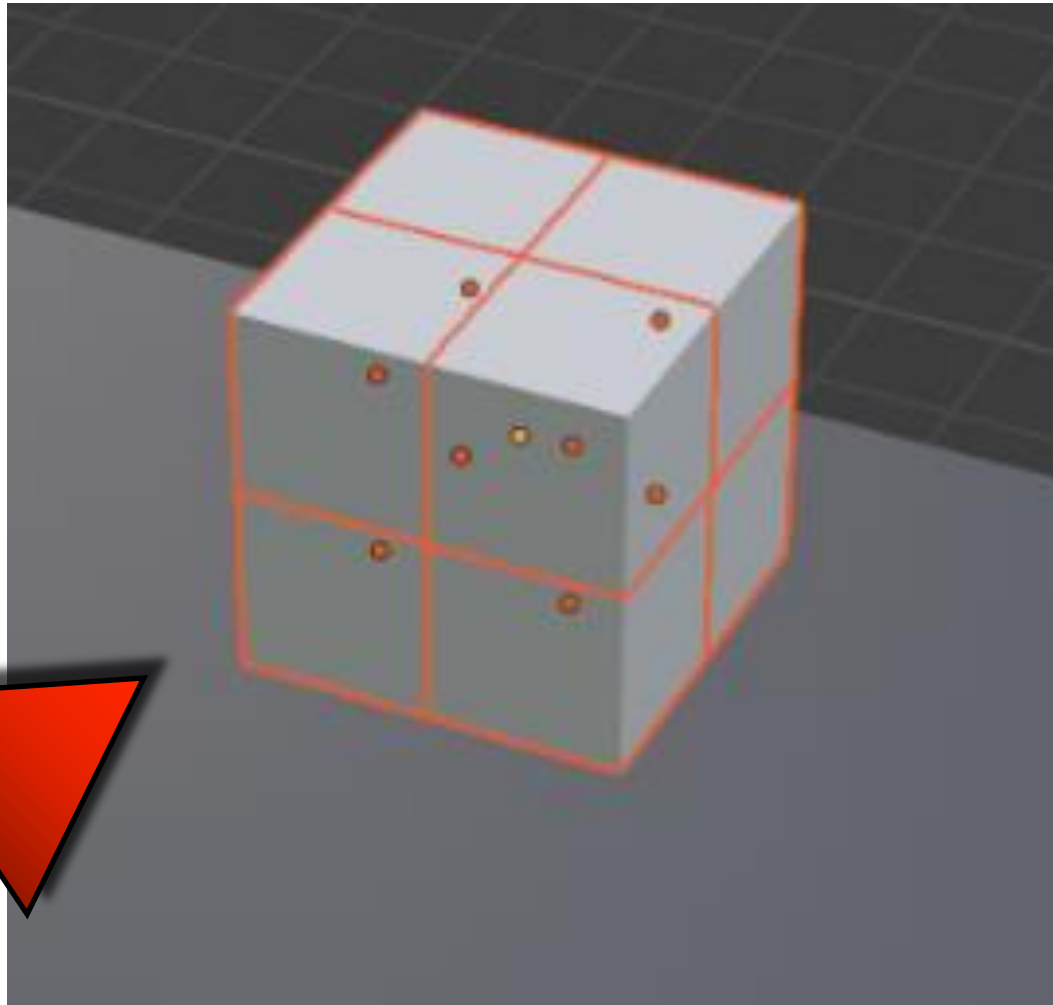
SELECT **OWN VERTS** AND CLICK **OK**



DESTROY

POWER OF AR AND VR

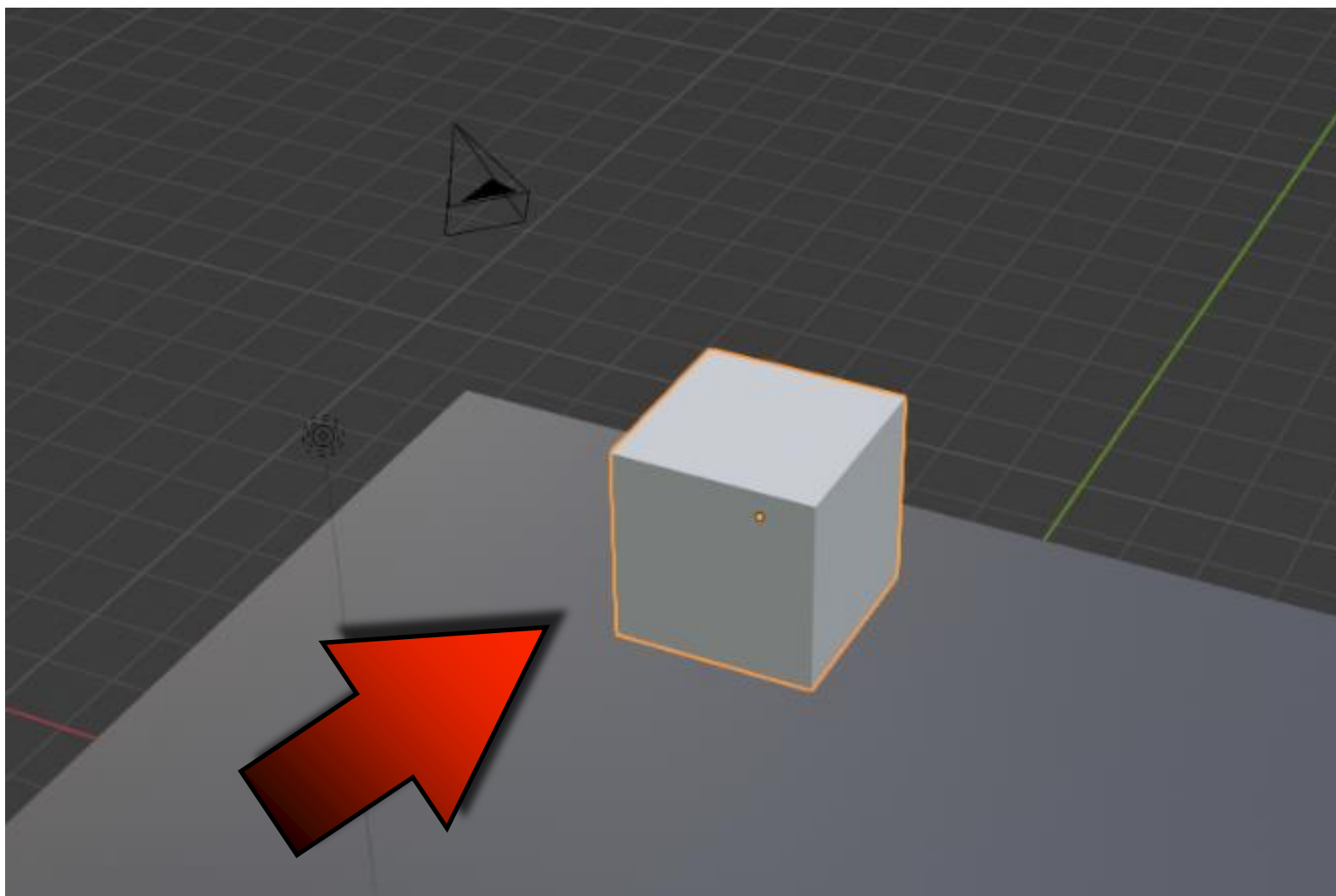
**CUBE WILL BE DIVIDED INTO
AS MANY PARTS AS IT HAS VERTEX**



DESTROY

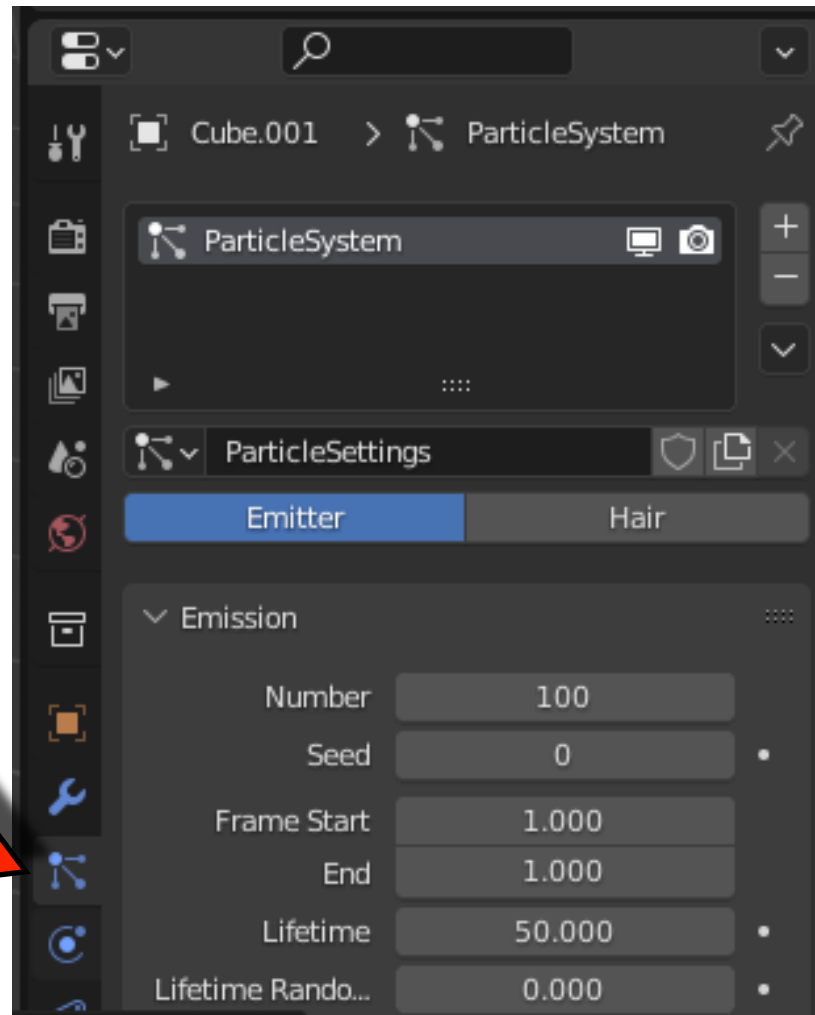
POWER OF AR AND VR

INSERT NEW CUBE



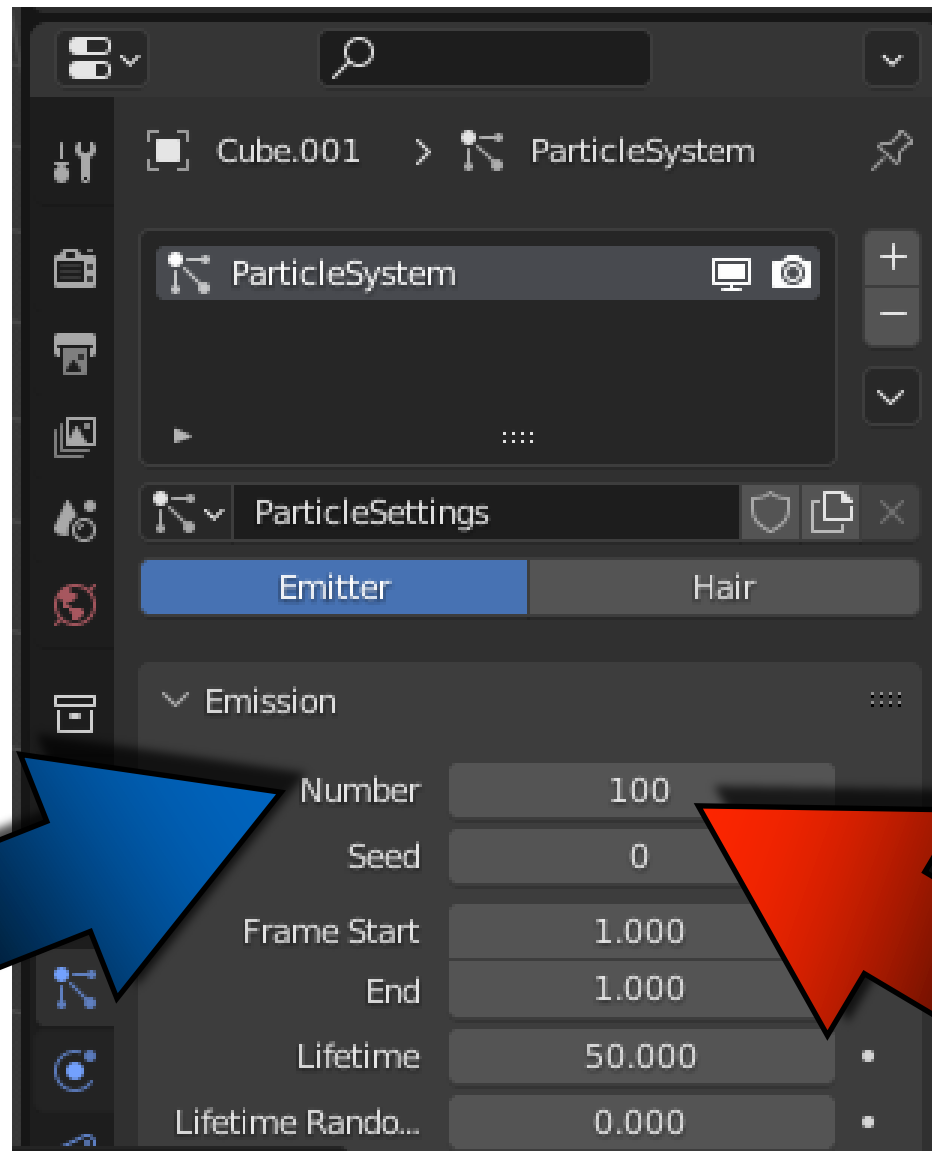
DESTROY

ADD PARTICLE SYSTEM



DESTROY

SET NUMBER ON 100



The screenshot shows the Unity Inspector for a ParticleSystem component. The 'Emission' section is expanded, showing the following settings:

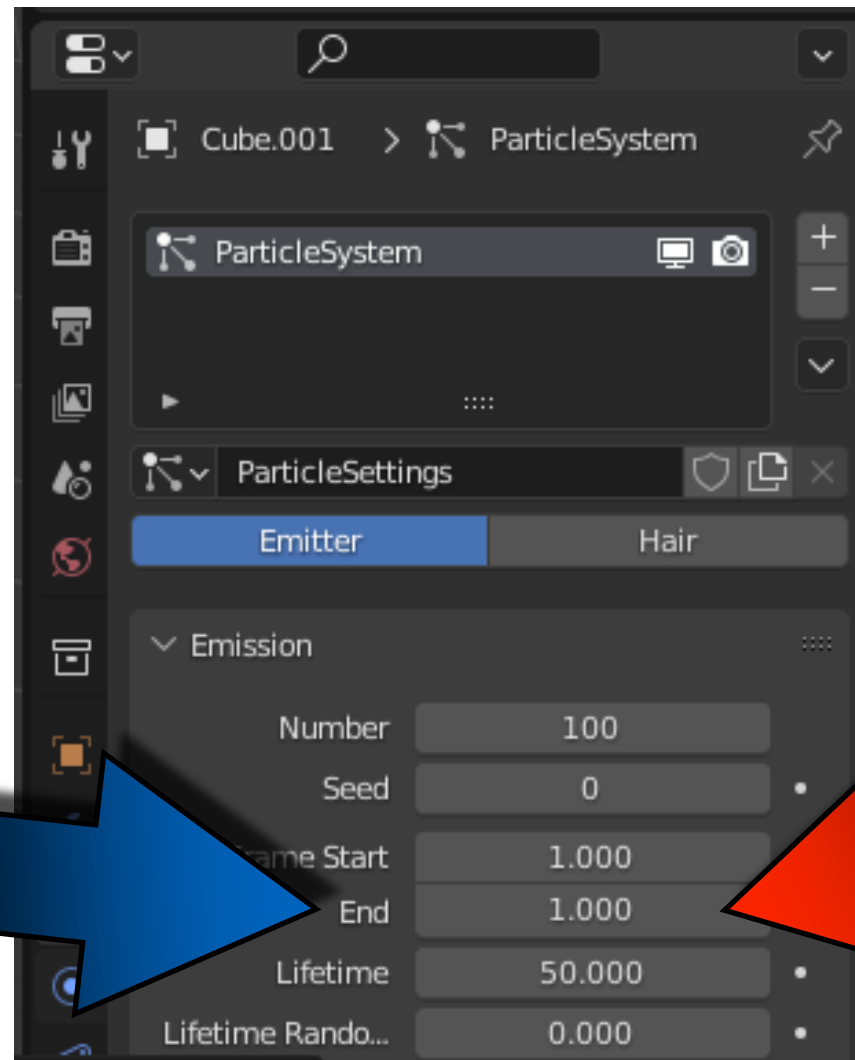
Number	100
Seed	0
Frame Start	1.000
End	1.000
Lifetime	50.000
Lifetime Rando...	0.000

A blue arrow points to the 'Number' field, and a red arrow points to the 'Lifetime' field.

DESTROY

POWER OF AR AND VR

SET END ON 1

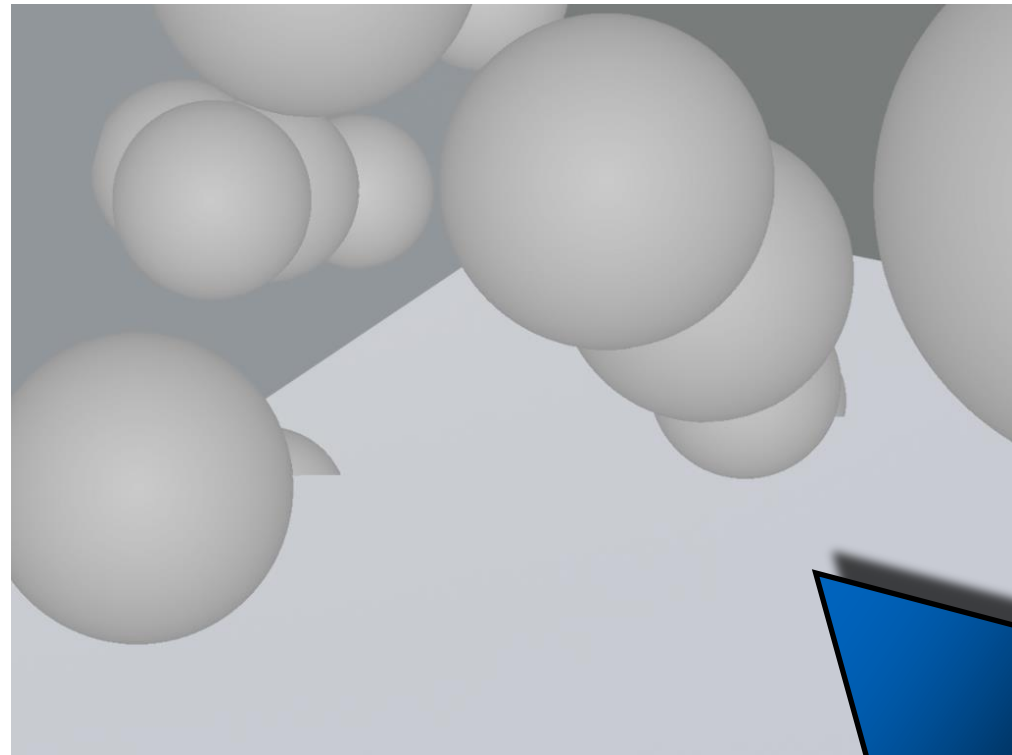
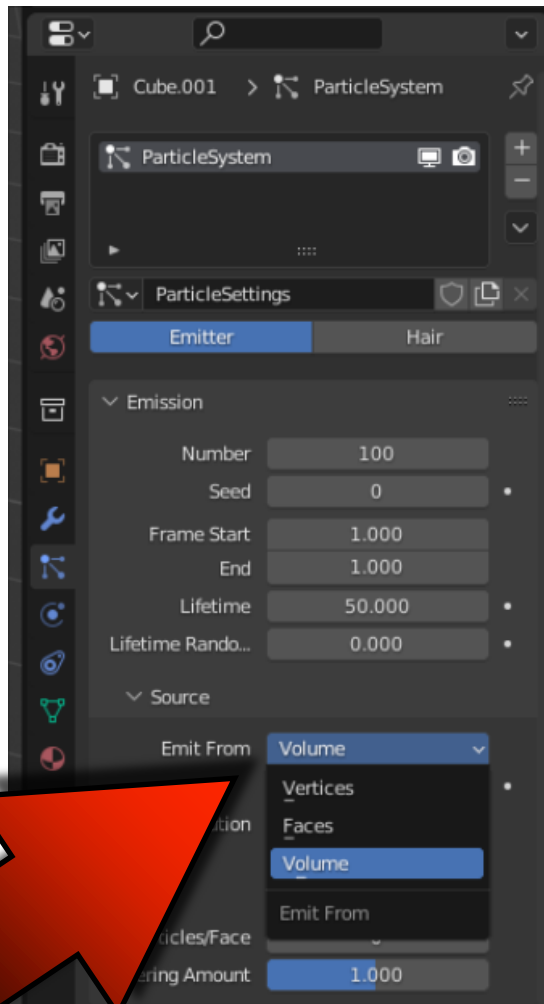


DESTROY

POWER OF AR AND VR

EMIT FORM ON VOLUME

THIS CAUSES THAT THE PARTICLES WILL BE APPLIED **INSIDE THE CUBE AND NOT ONLY ON ITS SURFACE**



DESTROY



POWER OF AR AND VR



IN CELL FRACTURE CHOOSE OWN PARTICLES

Cell fracture selected mesh objects

Operator Presets [v] [+ -]

Point Source

Own Verts	Child Verts	Own Particles	Child Particles	Annotation Pencil
Source Limit	100	Noise		0.00
Scale:	1.00			1.00

Recursive Shatter

Recursion	Source Limit	Clamp			
0	8	250			
Rando 0.25	Random	Small	Big	Cursor Close	Cursor Far

Mesh Data

Smooth Interior Sharp Edges Apply Split Edge Match Data

Material 0 Interior VGroup Mass 0.00 Split Islands

Split sharp hard edges.

Physics

Mass Mode: Volume [v] Mass 1.00

Object

Recenter

Scene

Collection: [text box]

Debug

Show Progress Realtime Debug Points Debug Boolean

OK

DESTROY



POWER OF AR AND VR



**ENTER THE NAME HERE FOR
ALL NEW ELEMENTS TO BE SAVED IN
A SEPARATE COLLECTION**

Cell fracture selected mesh objects

Operator Presets

Point Source

Own_Verts | Child_Verts | **Own_Particles** | Child_Particles | Annotation_Pencil

Source Limit: 100 | Noise: 0.00

Scale: 1.00 | 1.00 | 1.00

Recursive Shatter

Recursion: 0 | Source Limit: 8 | Clamp Recursion: 250

Rando: 0.25 | Random | **Small** | Big | Cursor Close | Cursor Far

Mesh Data

Smooth Interior | Sharp Edges | Apply Split Edge | Match Data

Material: 0 | Interior VGroup | Margin: 0.00 | Split Islands

Physics

Mass Mode: Volume | Mass: 1.00

Object

Recenter

Scene

Collection:

Debug

Show Progress Realtime | Debug Points | Debug Boolean

OK

Scene Collection

Collection

PARTICLE

- Cube.001_cell
- Cube.001_cell.001
- Cube.001_cell.002
- Cube.001_cell.003
- Cube.001_cell.004
- Cube.001_cell.005
- Cube.001_cell.006
- Cube.001_cell.007
- Cube.001_cell.008
- Cube.001_cell.009
- Cube.001_cell.010
- Cube.001_cell.011
- Cube.001_cell.012
- Cube.001_cell.013
- Cube.001_cell.014
- Cube.001_cell.015
- Cube.001_cell.016
- Cube.001_cell.017

DESTROY



POWER OF AR AND VR



PRESS OK

Cell fracture selected mesh objects

Operator Presets

Point Source

Own Verts	Child Verts	Own Particles	Child Particles	Annotation Pencil
Source Limit	100	Noise	0.00	

Scale: 1.00 1.00 1.00

Recursive Shatter

Recursion	0	Source Limit	8	Clamp Recursion	250	
Rando	0.25	Random	Small	Big	Cursor Close	Cursor Far

Mesh Data

<input type="checkbox"/> Smooth Interior	<input checked="" type="checkbox"/> Sharp Edges	<input checked="" type="checkbox"/> Apply Split Edge	<input checked="" type="checkbox"/> Match Data		
Material	0	<input type="checkbox"/> Interior VGroup	Margin	0.00	<input checked="" type="checkbox"/> Split Islands

Physics

Mass Mode: Volume Mass 1.00

Object

Recenter

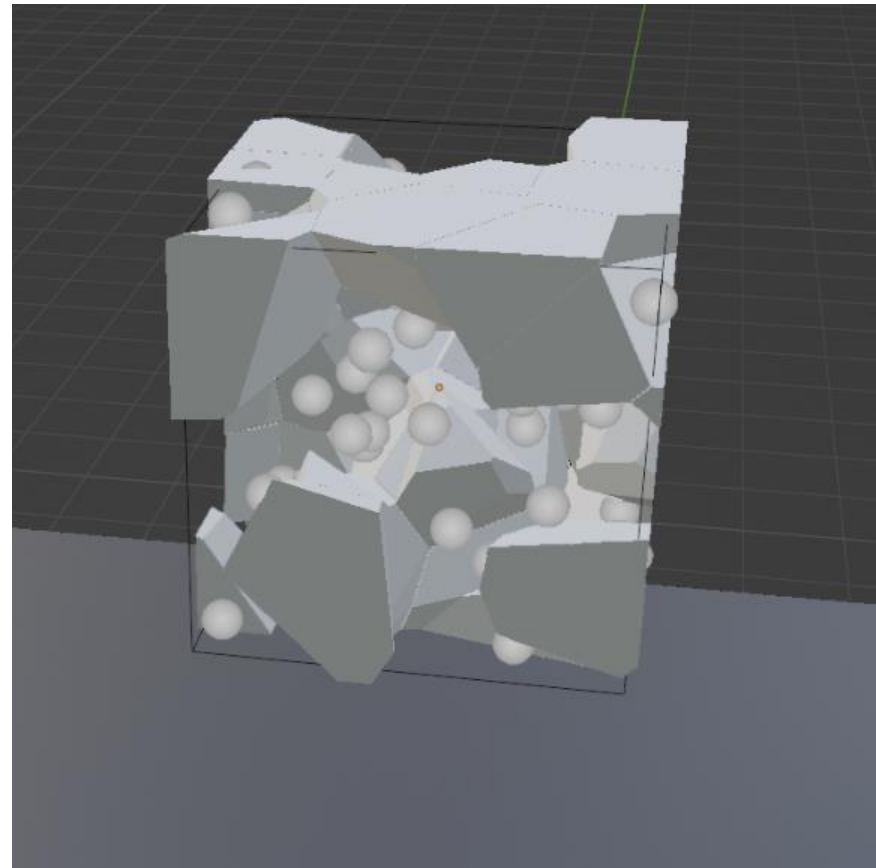
Scene

Collection: PARTICLE

Debug

Show Progress Realtime Debug Points Debug Boolean

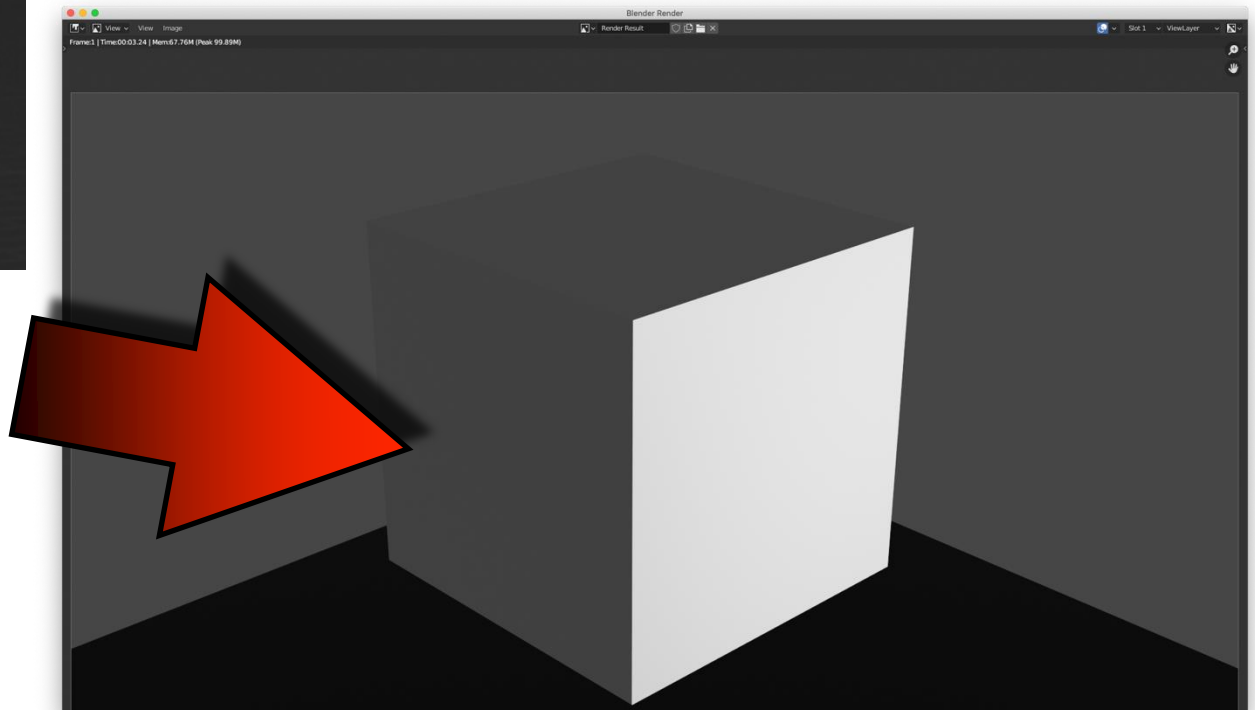
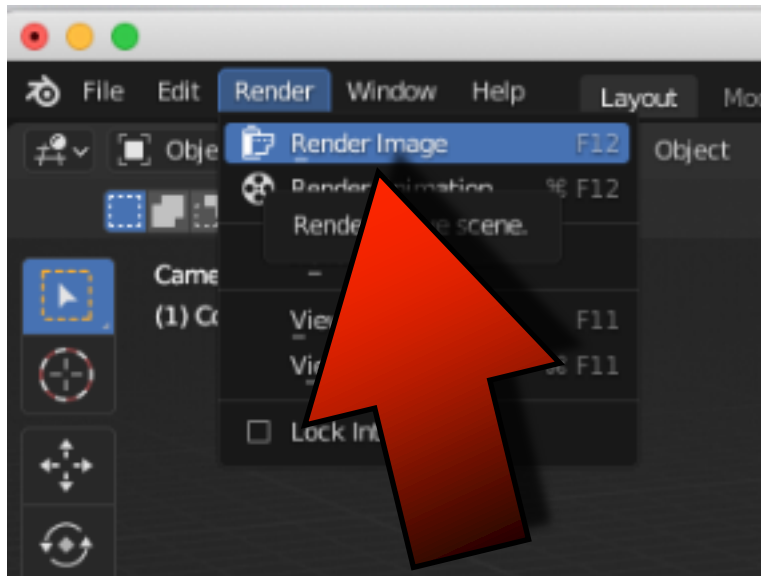
OK



DESTROY

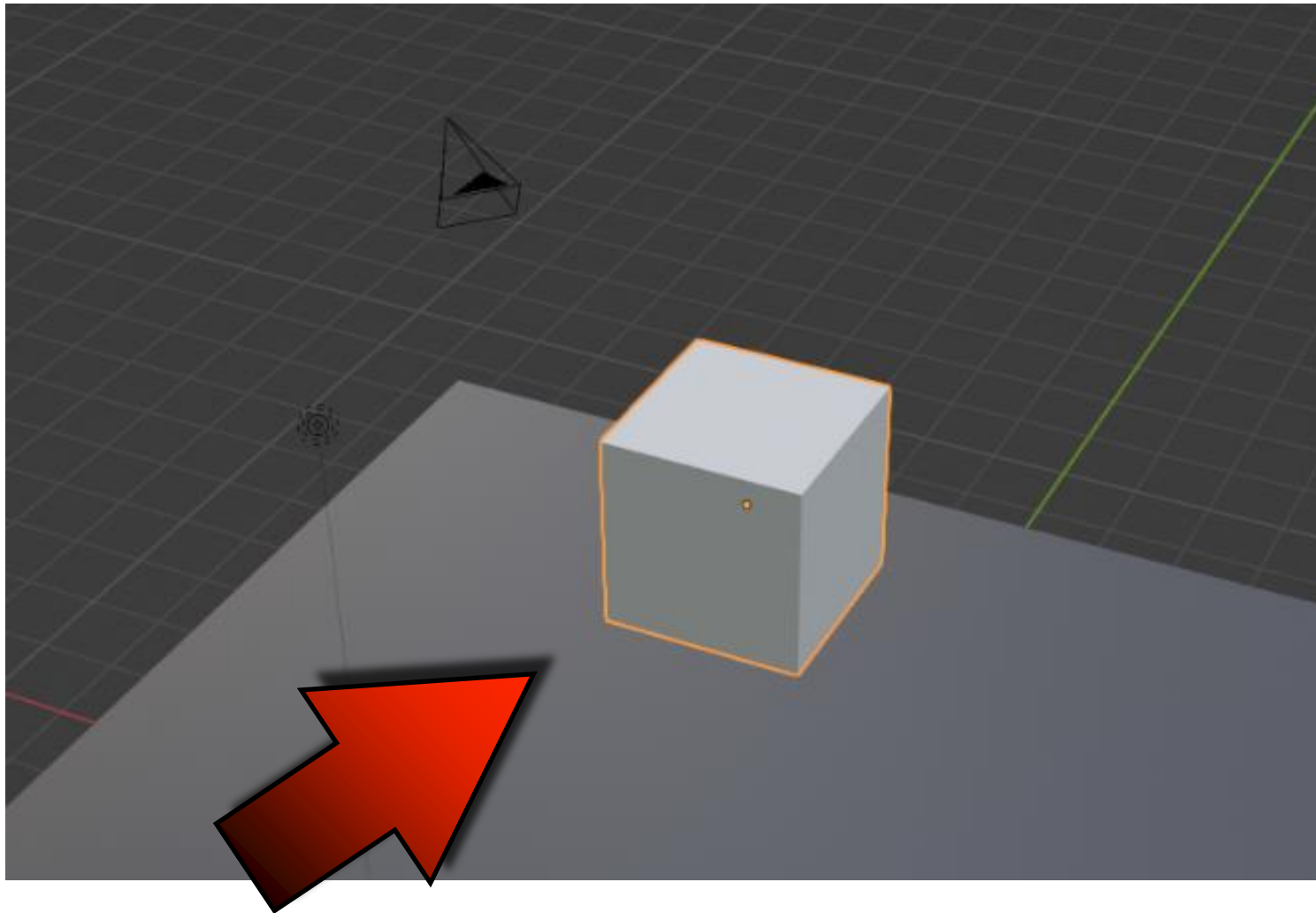
POWER OF AR AND VR

NO PARTICLE SYSTEM SHOWN ON **THE RENDER**



DESTROY

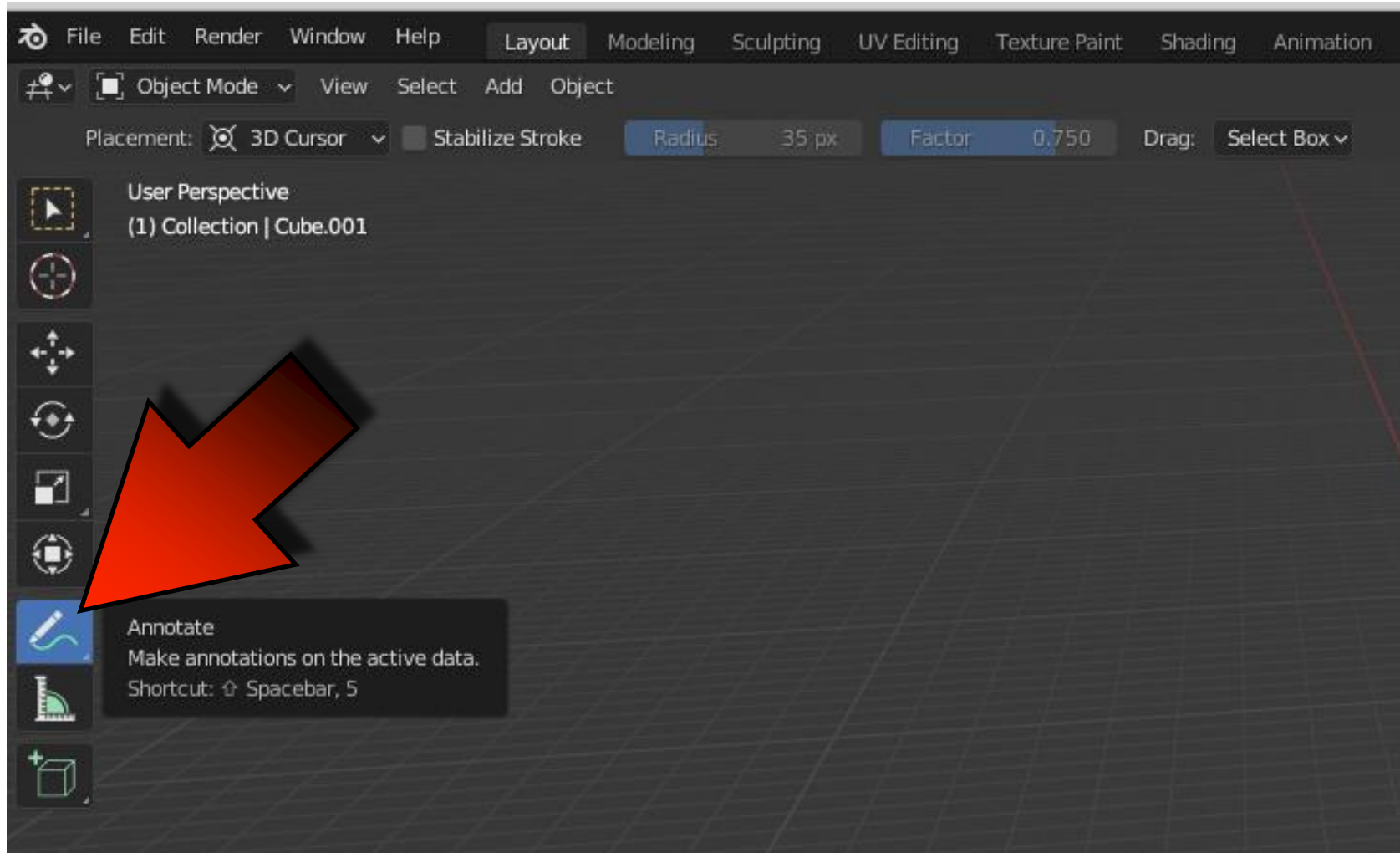
INSERT NEW CUBE



DESTROY

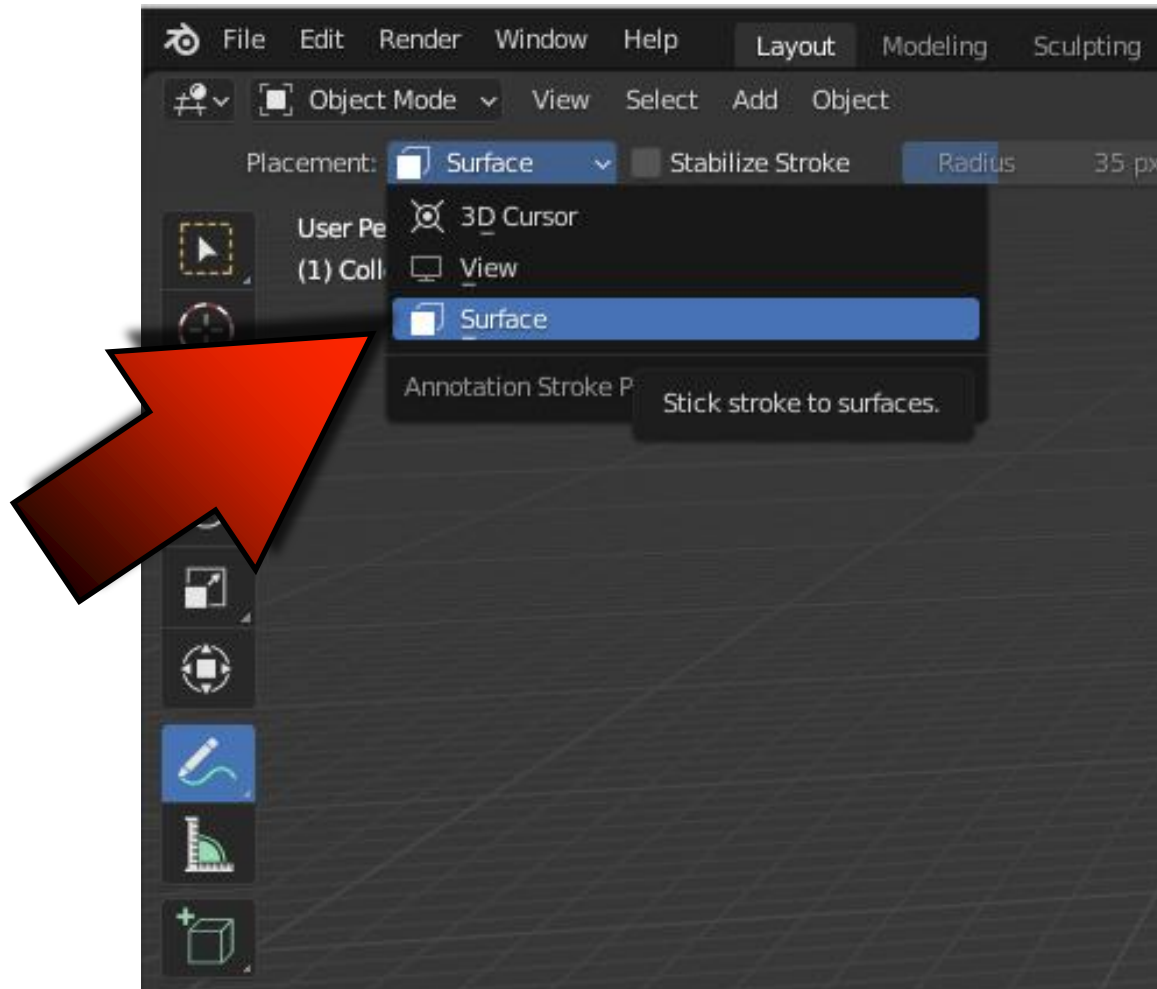
POWER OF AR AND VR

CHOOSE **ANNOTATE**



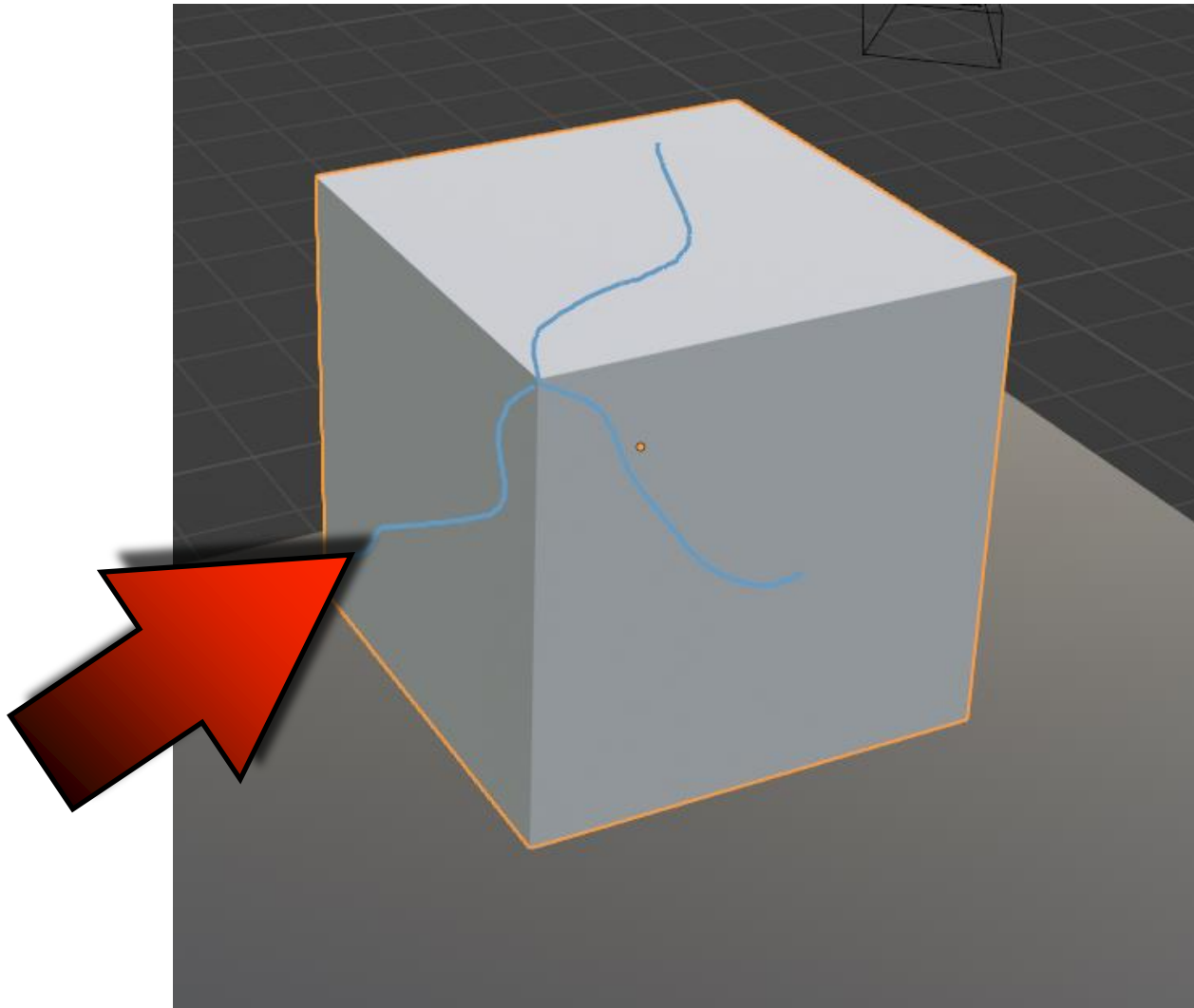
DESTROY

THEN CHOOSE SURFACE
TO DRAW ON THE SURFACE OF THE MODEL



DESTROY

DRAW SOMETHING LIKE THE SCREEN



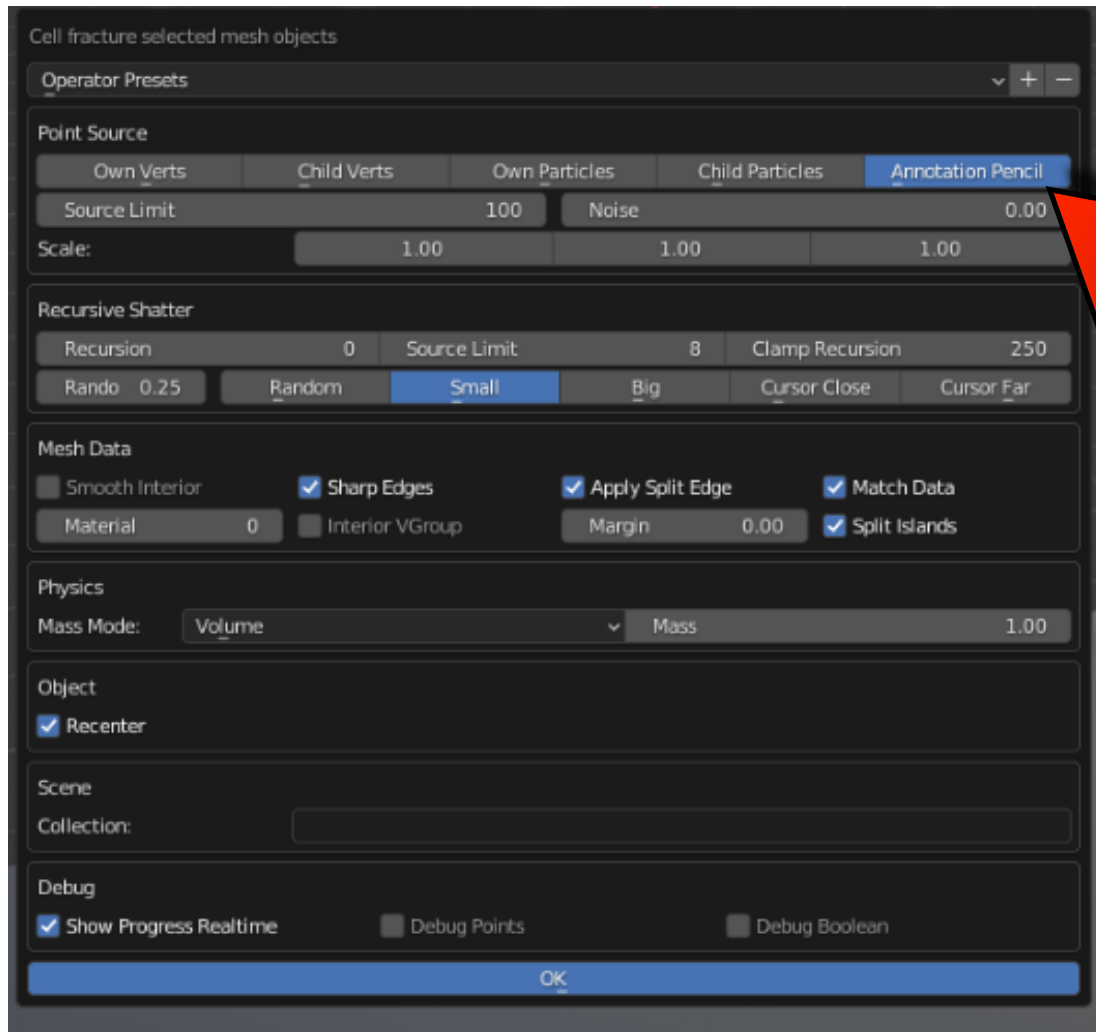
DESTROY



POWER OF AR AND VR



CHOOSE ANNOTATION PENCIL



DESTROY



POWER OF AR AND VR



PRESS OK

Cell fracture selected mesh objects

Operator Presets + -

Point Source

Own Verts Child Verts Own Particles Child Particles Annotation Pencil

Source Limit: 100 Noise: 0.00

Scale: 1.00 1.00 1.00

Recursive Shatter

Recursion: 0 Source Limit: 8 Clamp Recursion: 250

Rando: 0.25 Random Small Big Cursor Close Cursor Far

Mesh Data

Smooth Interior Sharp Edges Apply Split Edge Match Data

Material: 0 Interior VGroup Margin: 0.00 Split Islands

Physics

Mass Mode: Volume Mass: 1.00

Object

Recenter

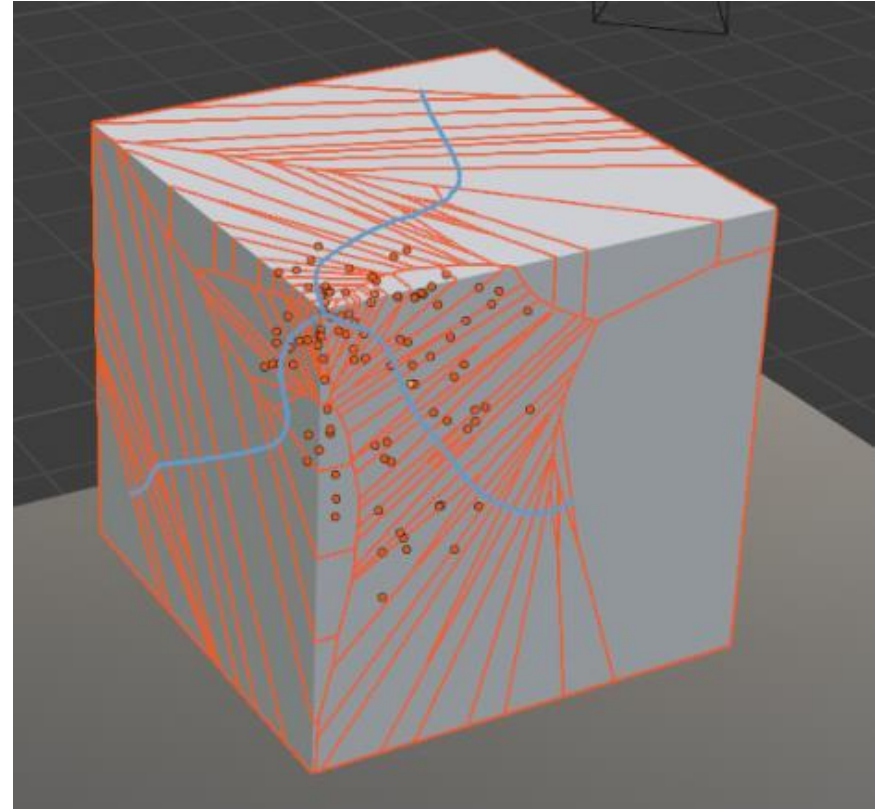
Scene

Collection:

Debug

Show Progress Realtime Debug Points Debug Boolean

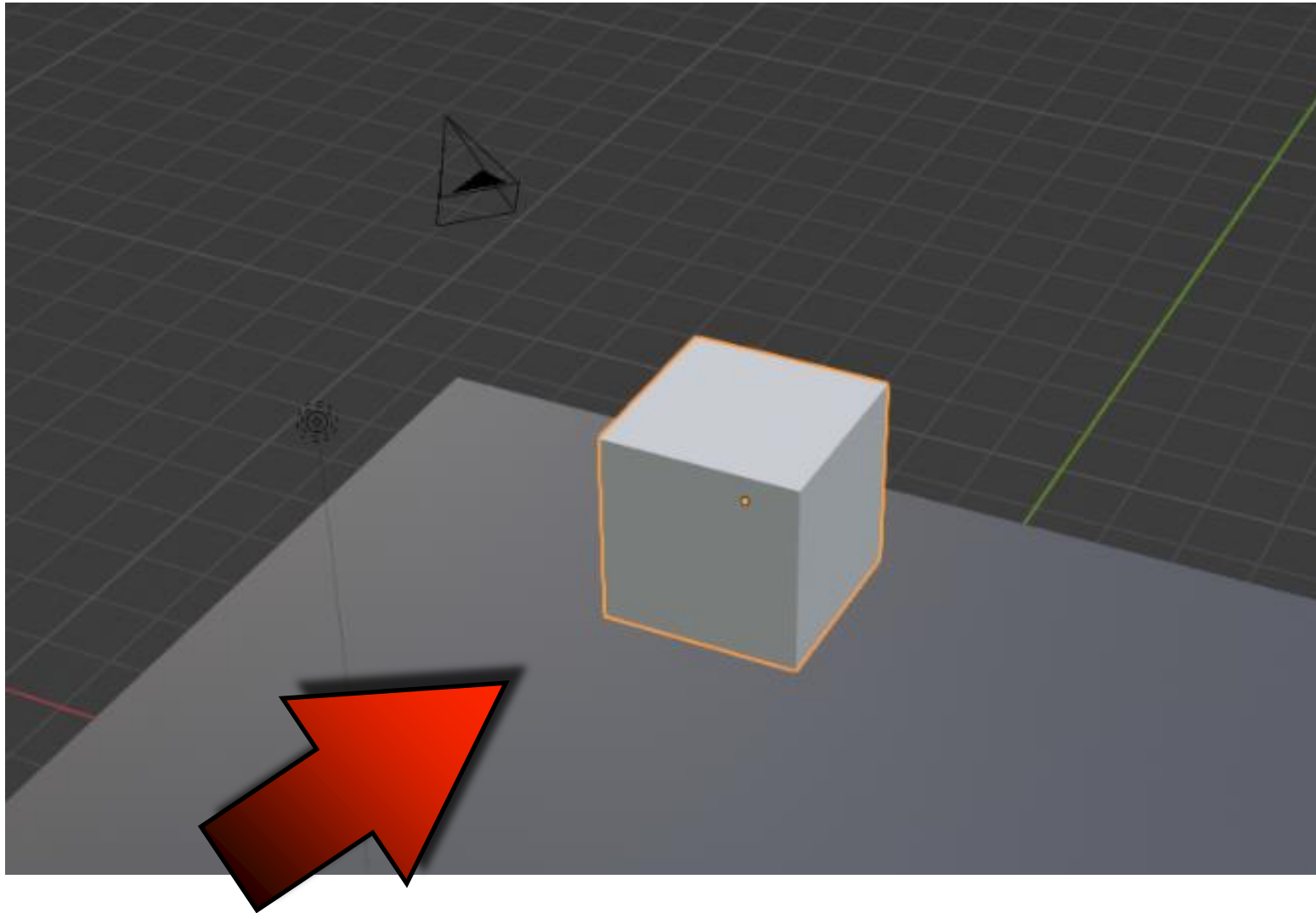
OK



DESTROY

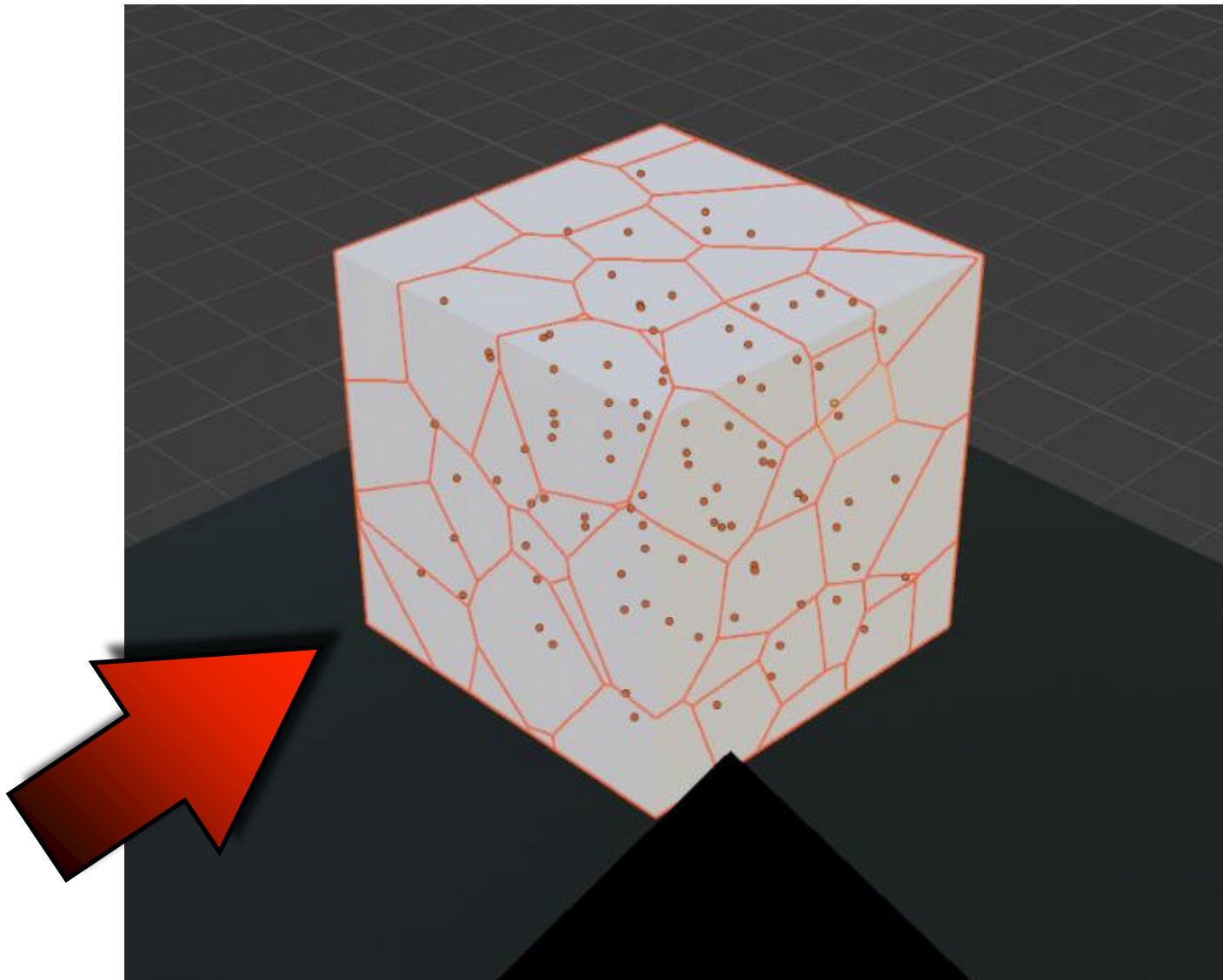
POWER OF AR AND VR

INSERT NEW CUBE



DESTROY

SHARE IT LIKE THE BEGINNING



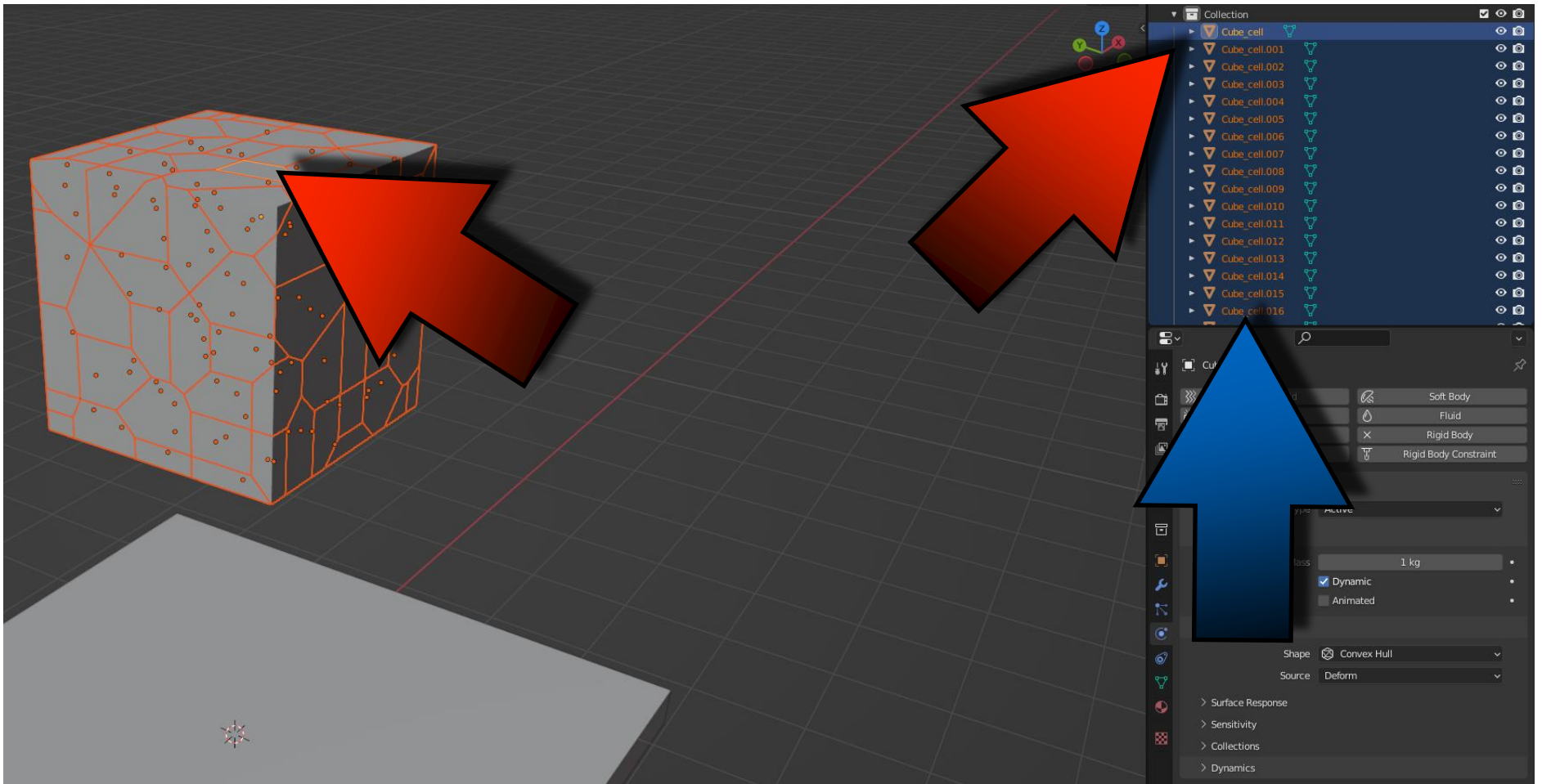
DESTROY



POWER OF AR AND VR



SELECT FIRST ELEMENT AND THEN WITH SHIFT KEY OTHERS



DESTROY

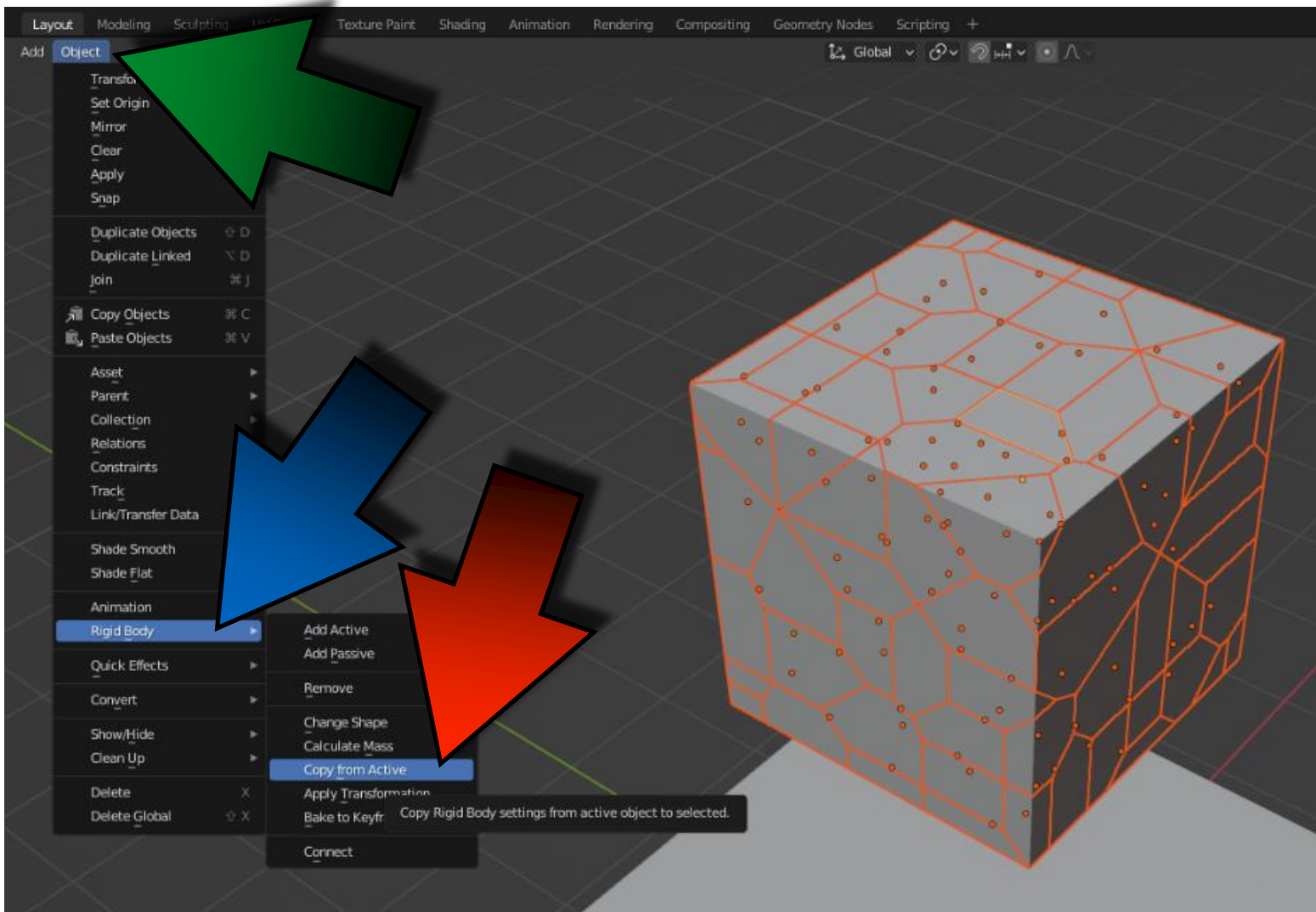
**PRESS THE SPACEBAR
AND SEE THE ANIMATION**



**IN THIS CASE, AS WE ADD A RIGID BODY,
IT ONLY WILL RECEIVE IT ACTIVE ELEMENT**

https://youtu.be/uXONRXYO_JA

CHOOSE COPY FROM ACTIVE



DESTROY



POWER OF AR AND VR



**PRESS THE SPACEBAR
AND SEE THE ANIMATION**



https://youtu.be/DEE4_TD2prM

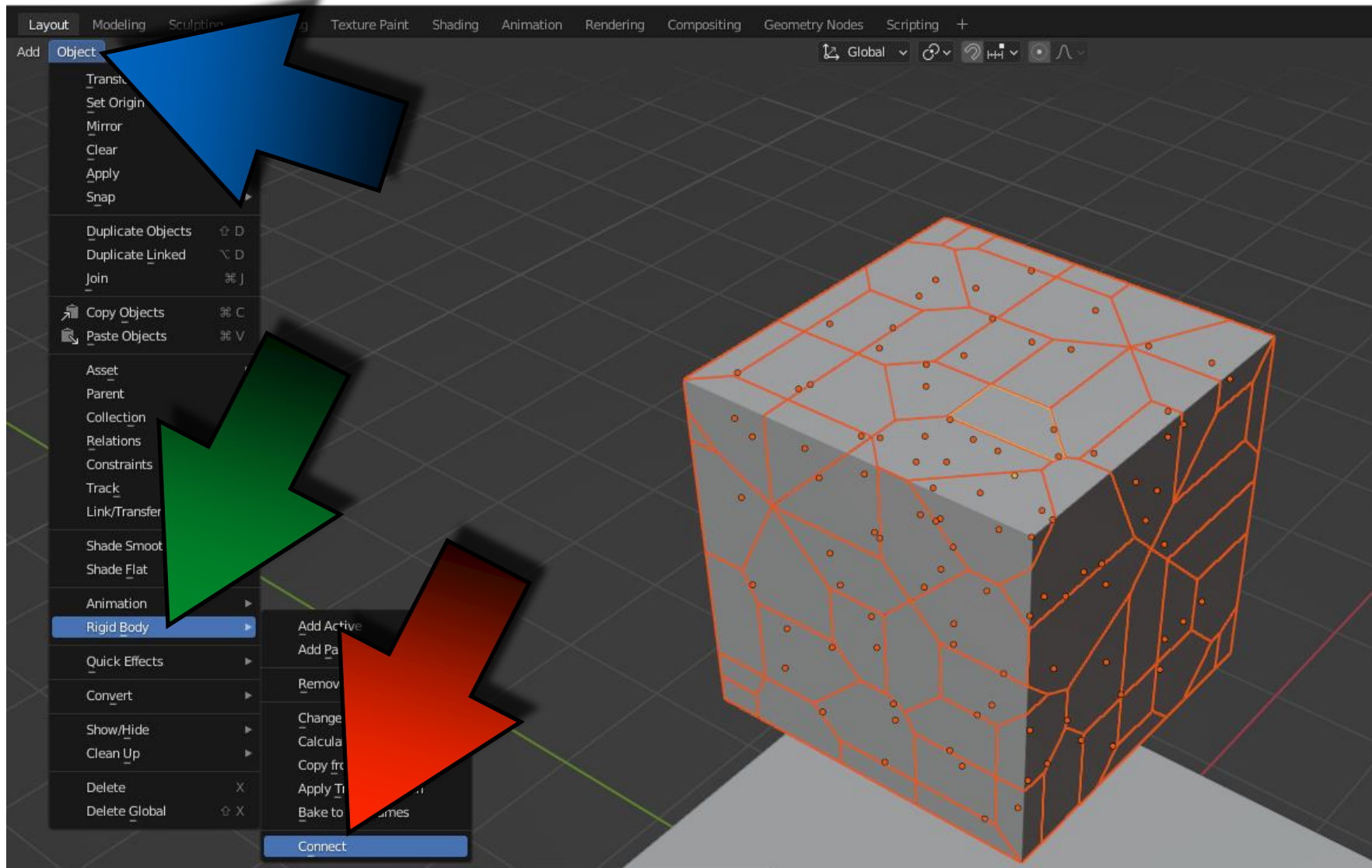
DESTROY



POWER OF AR AND VR



NEXT CHOOSE **CONNECT**



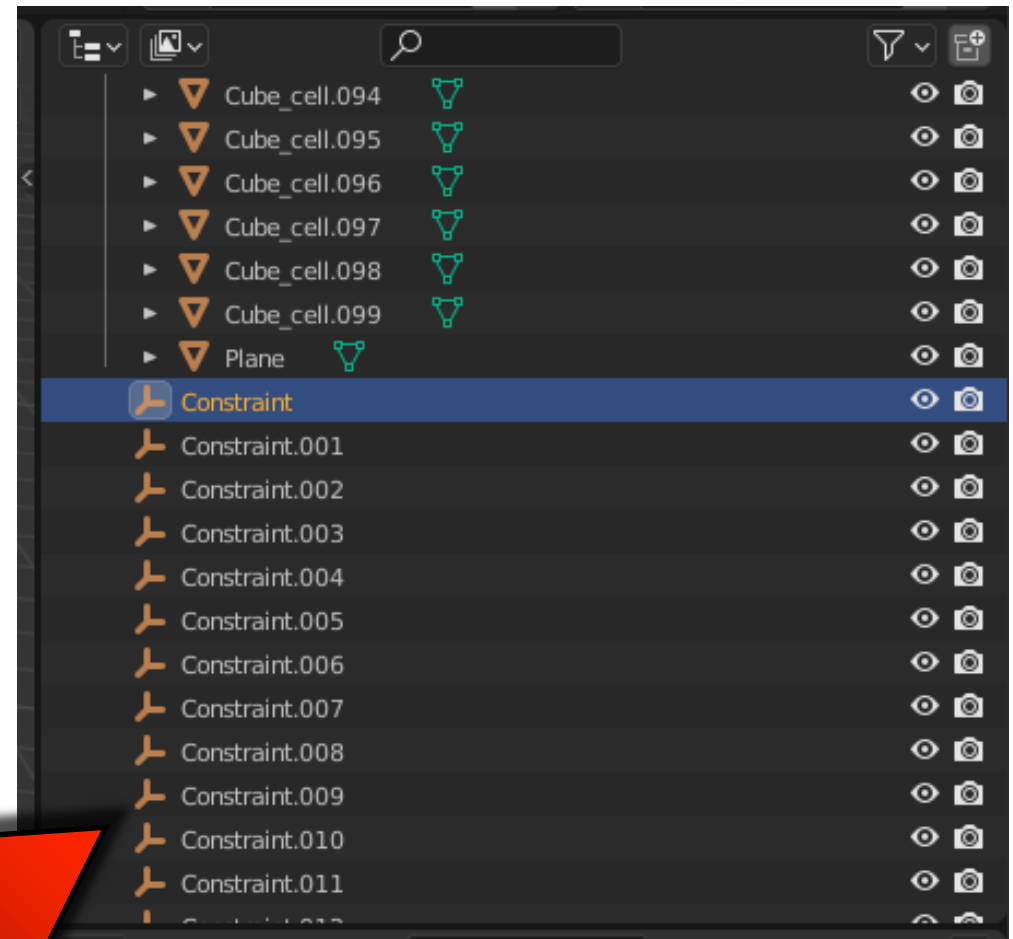
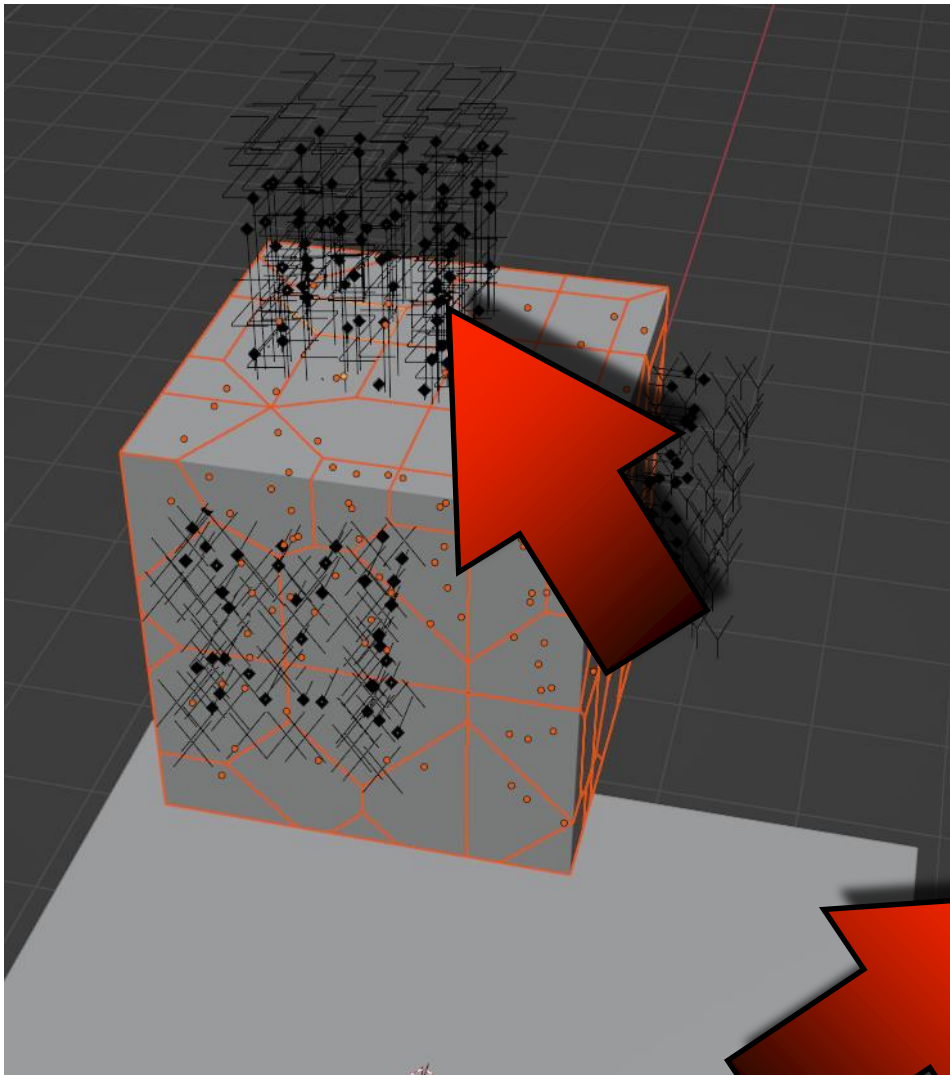
DESTROY



POWER OF AR AND VR

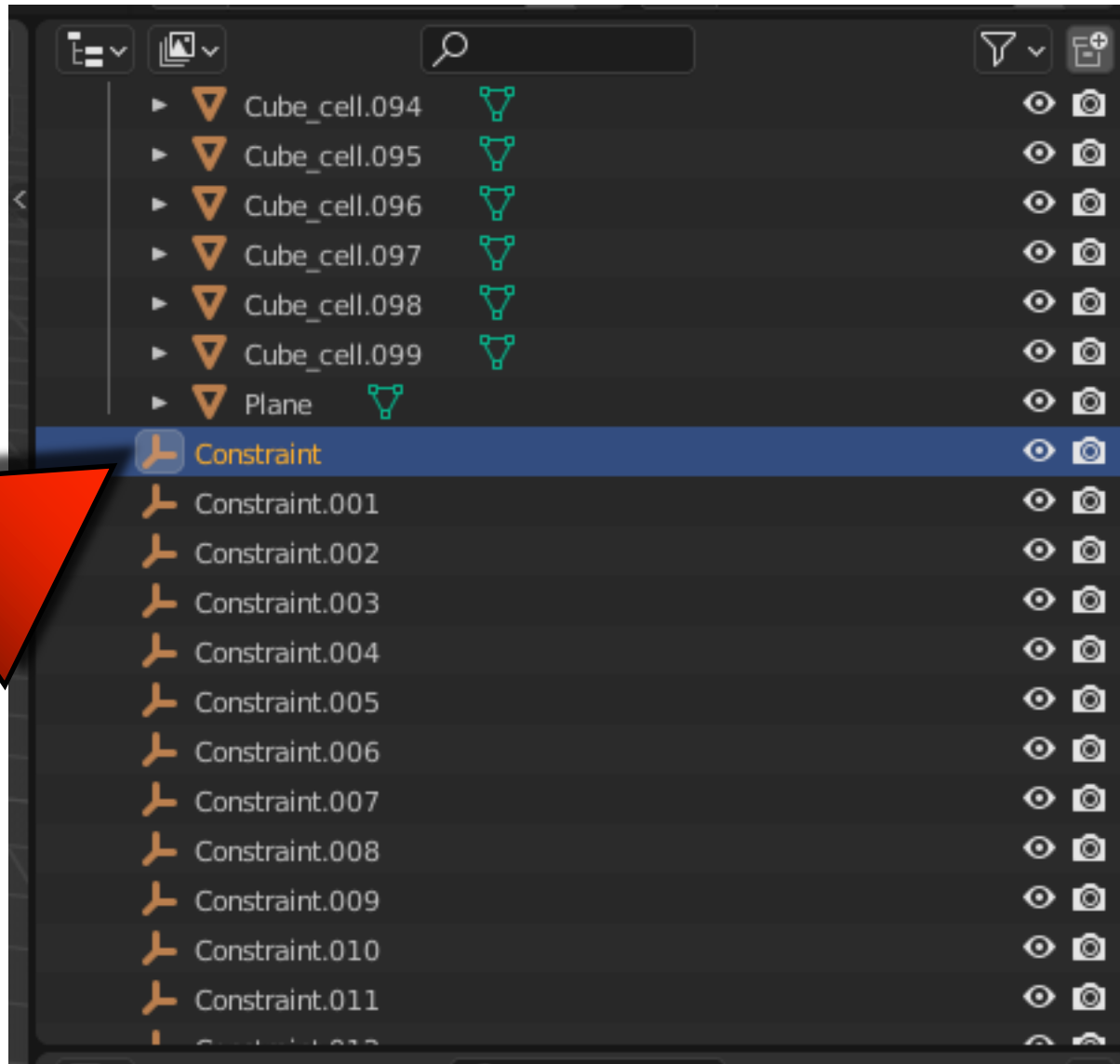


WE WILL SEE CONSTRAINTS



DESTROY

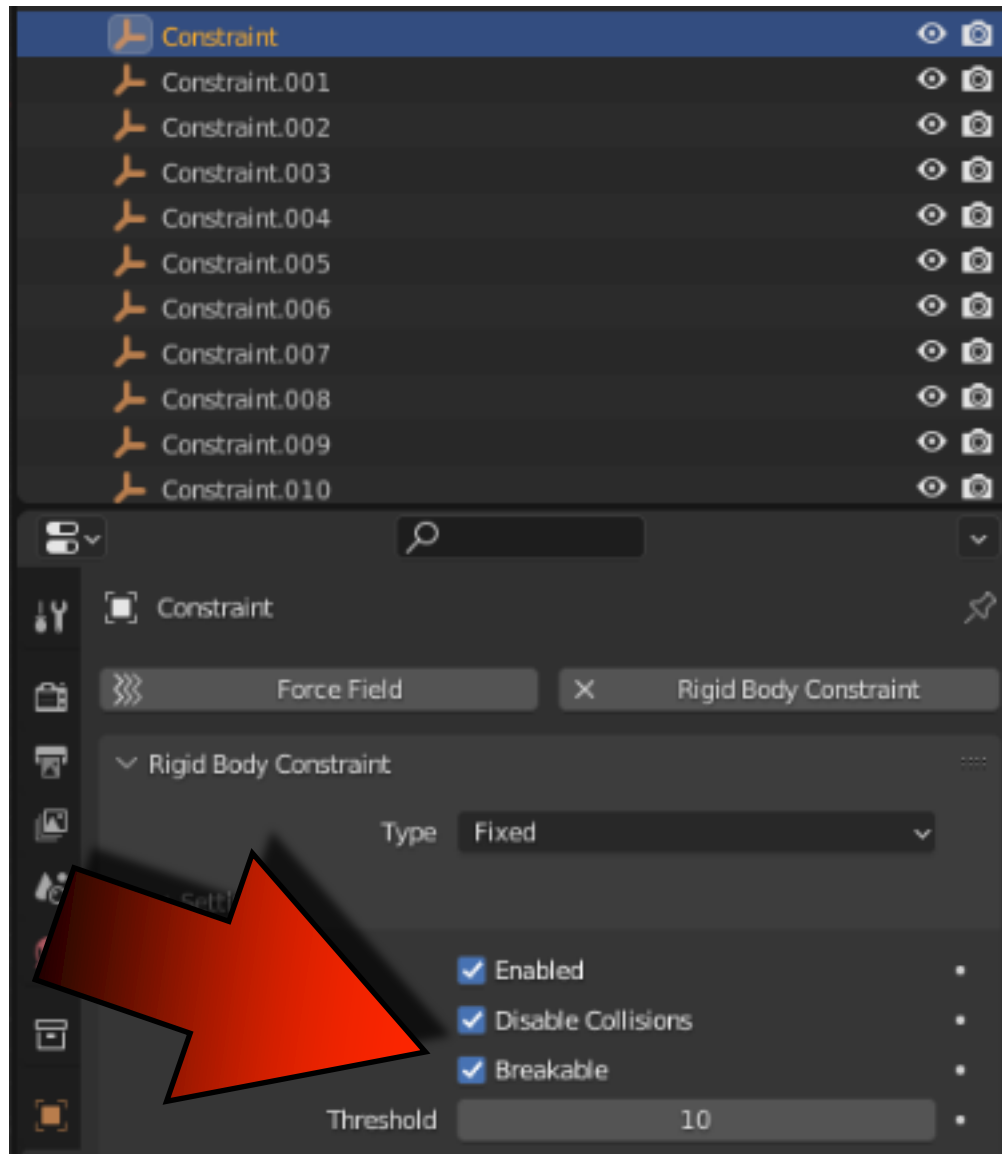
SELECT THE FIRST CONSTRAINT



DESTROY

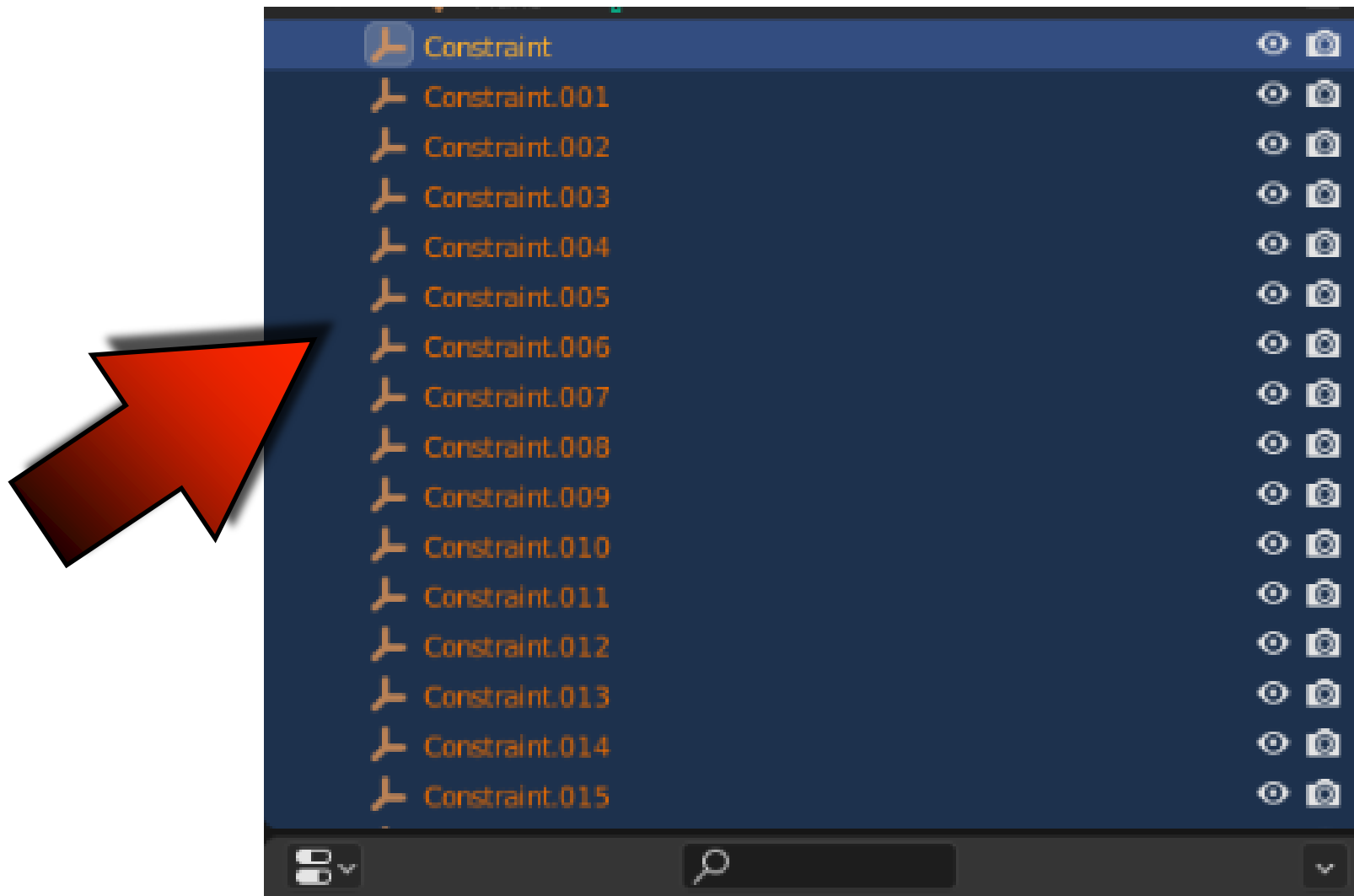
POWER OF AR AND VR

SELECT **BREAKABLE**



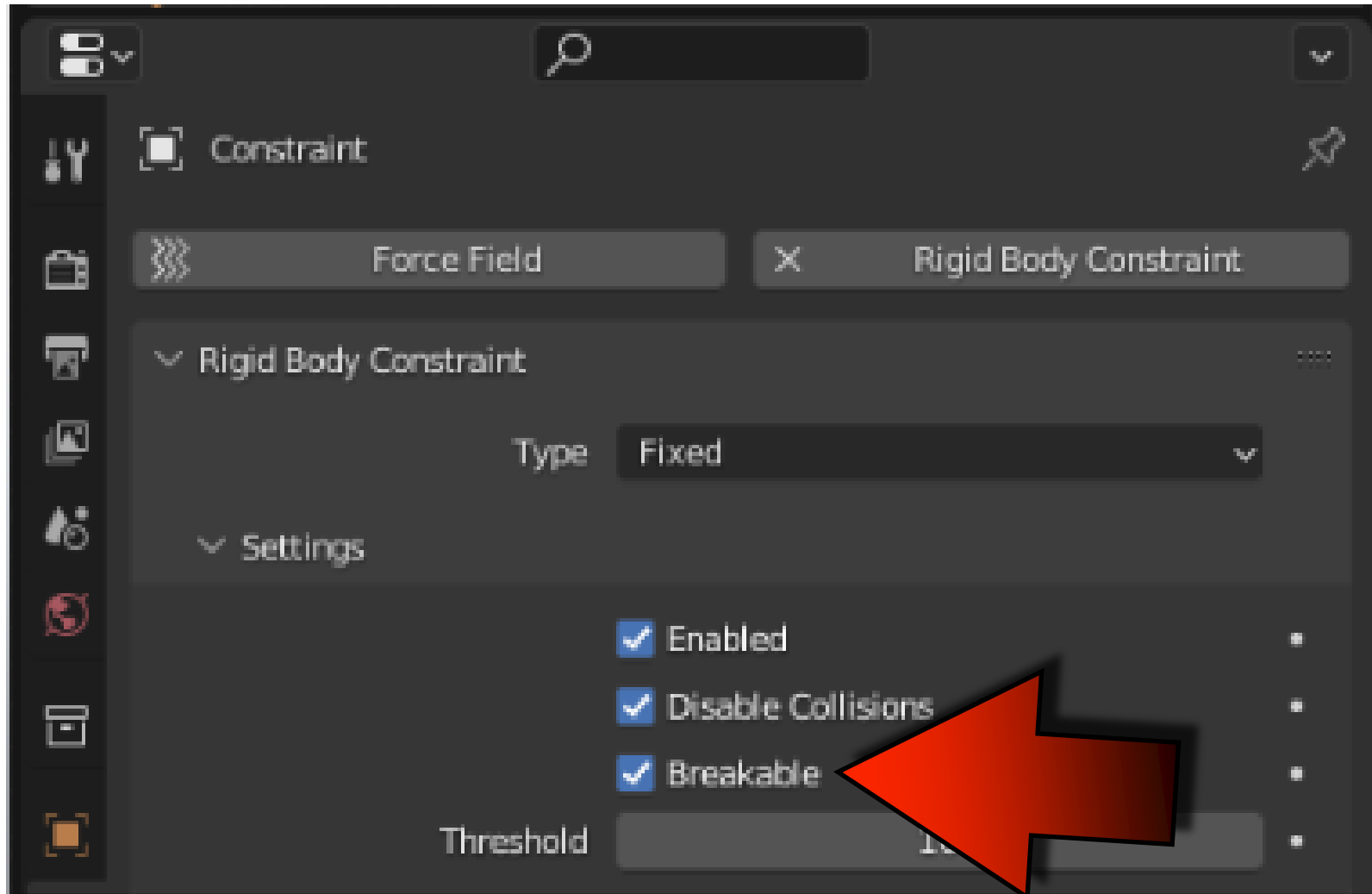
DESTROY

WITH **SHIFT** KEY **SELECT** OTHER



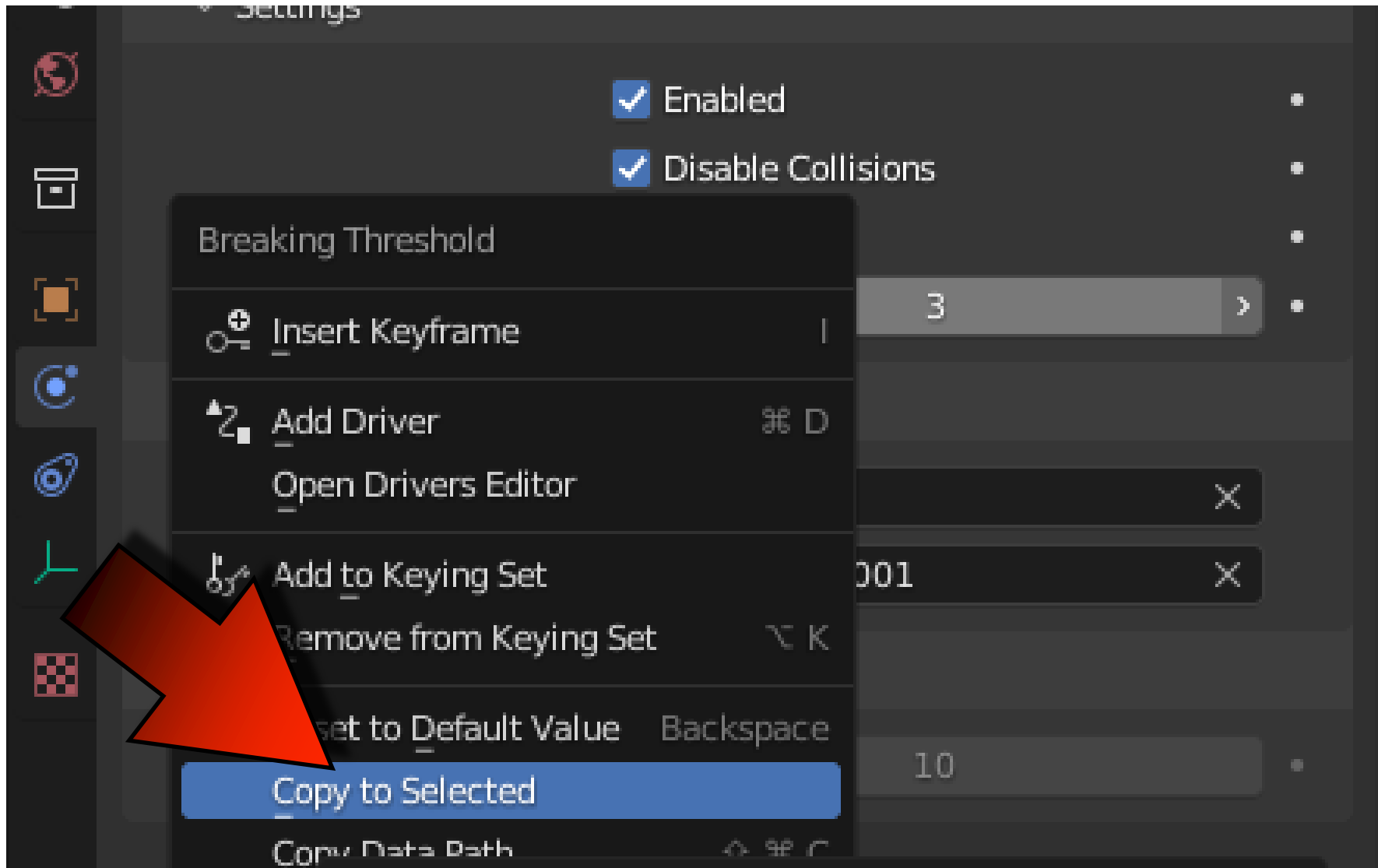
DESTROY

CLICK WITH THE RIGHT MOUSE KEY ON **BREAKABLE**



DESTROY

AND CHOOSE **COPY TO SELECTED**



DESTROY



POWER OF AR AND VR



**PRESS THE SPACEBAR
AND SEE THE ANIMATION**



https://youtu.be/wL7_dVRwKG4

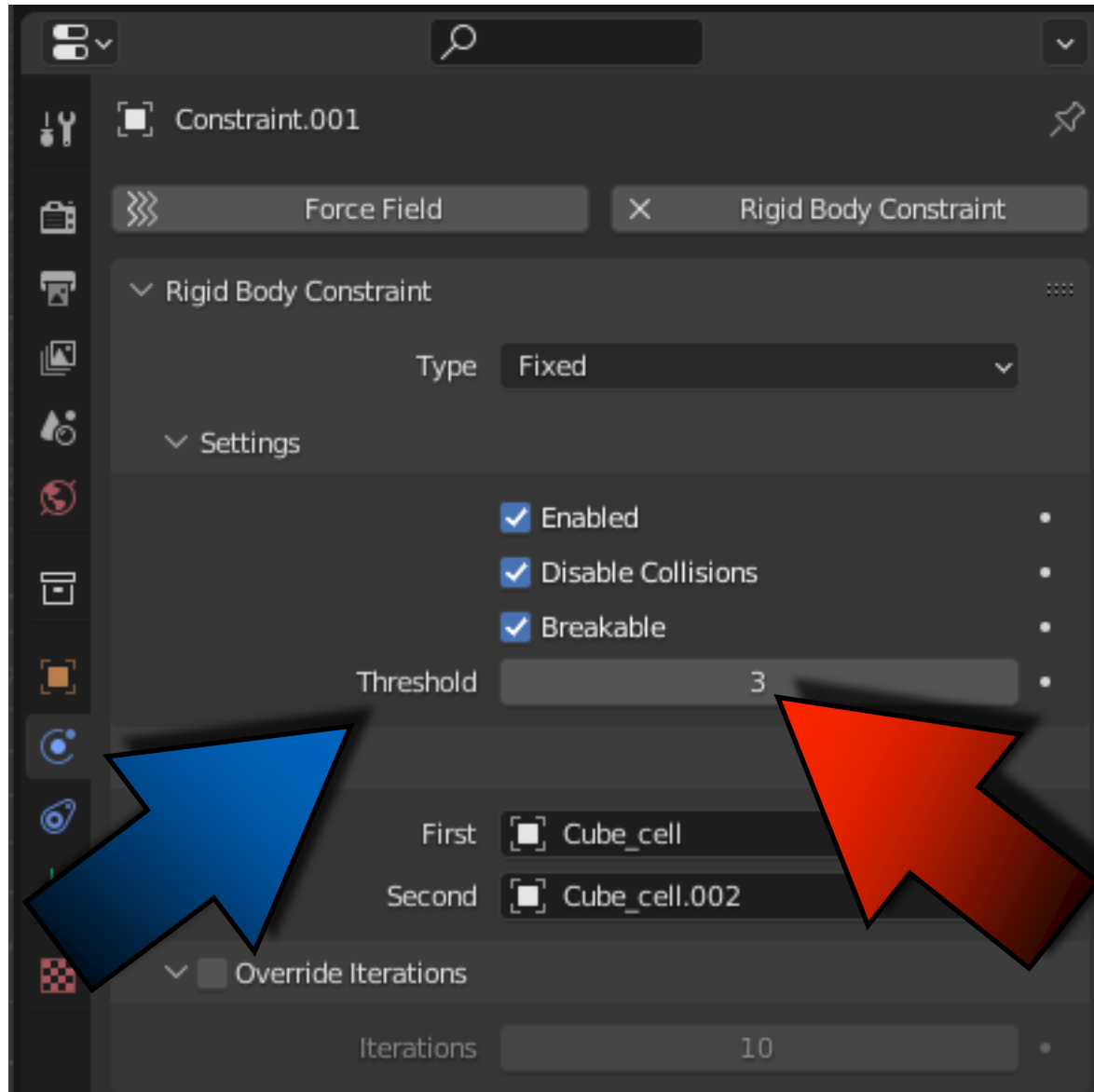
DESTROY



POWER OF AR AND VR

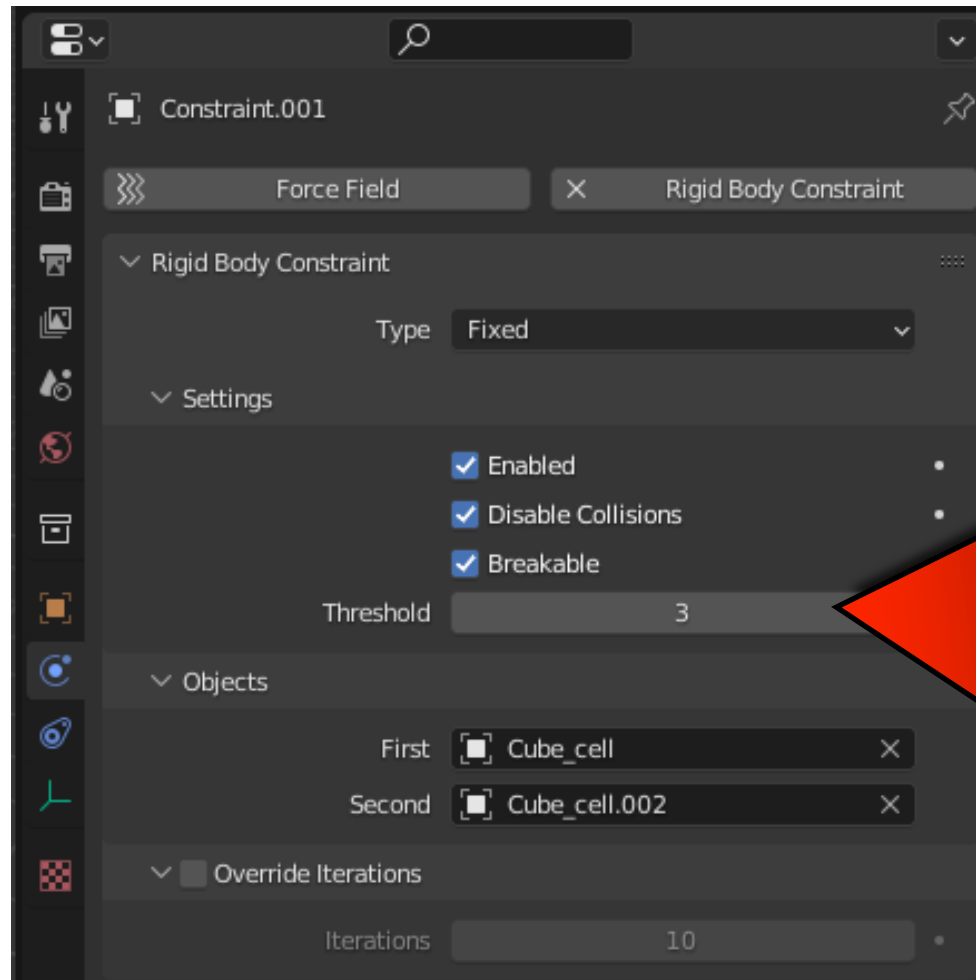


IN TRESHOLD ENTER 3



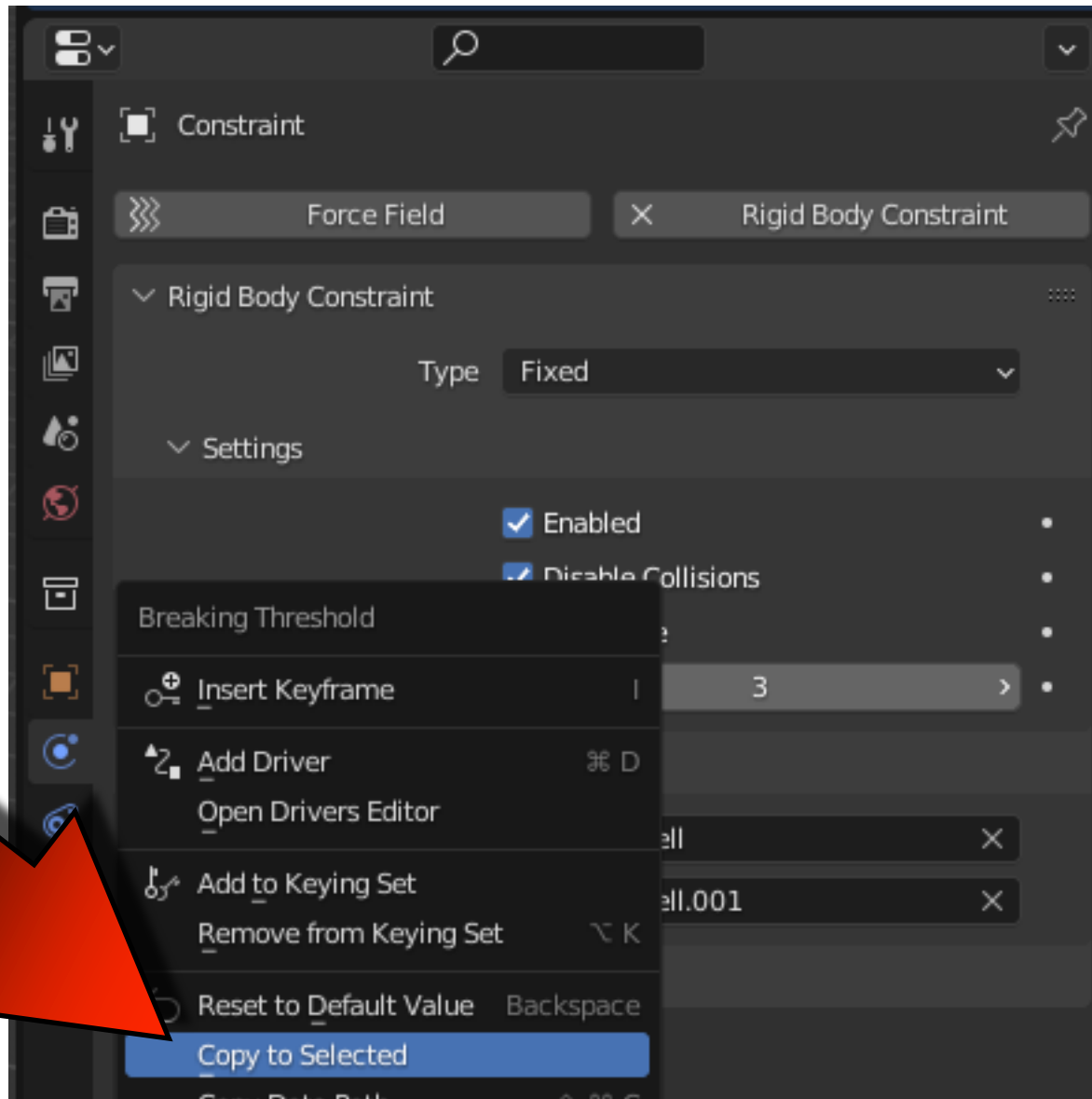
DESTROY

CLICK WITH THE RIGHT MOUSE KEY ON **THRESHOLD**



DESTROY

AND CHOOSE COPY TO SELECTED



DESTROY

**PRESS THE SPACEBAR
AND SEE THE ANIMATION**



TRESHOLD = 3

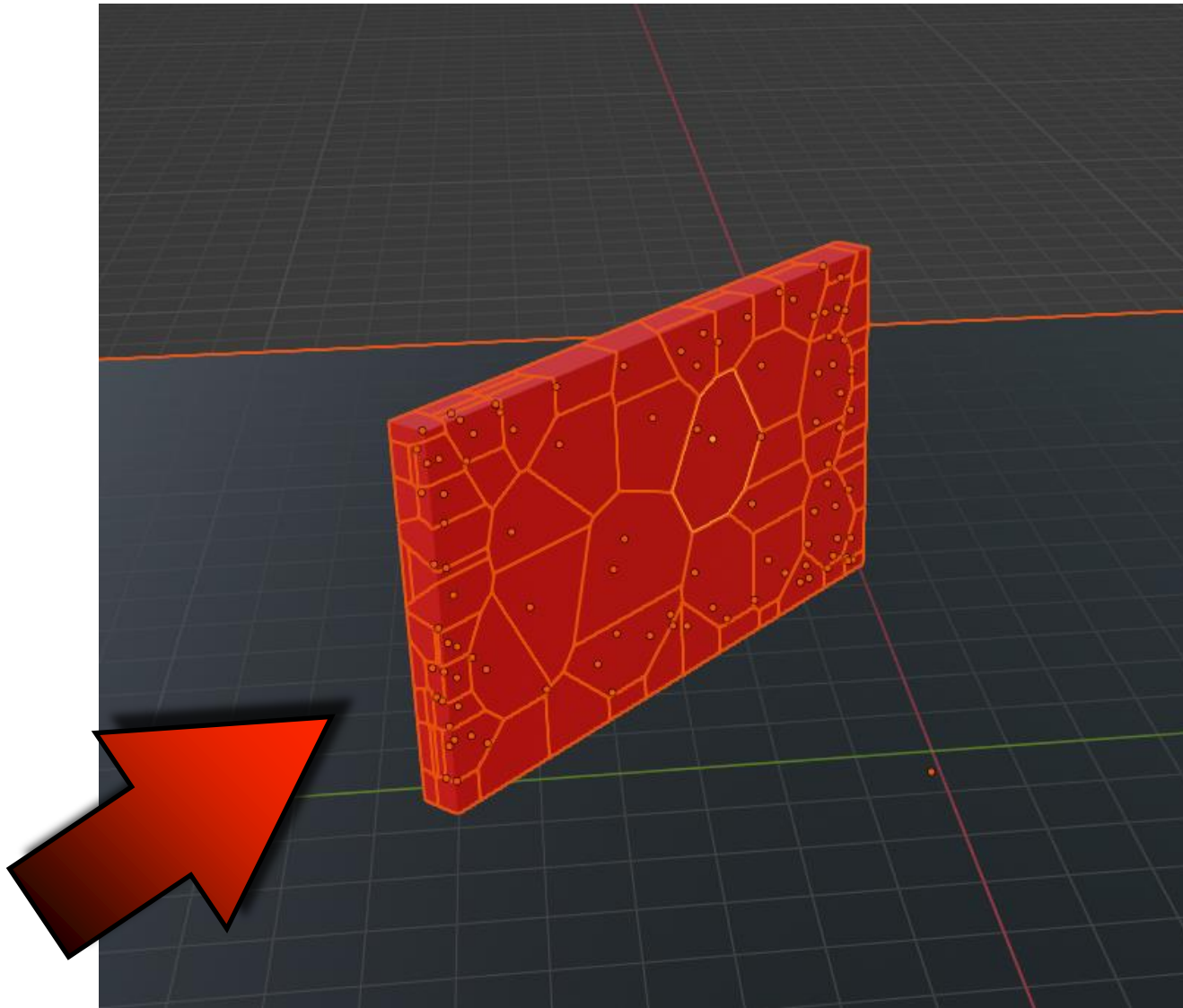
TRESHOLD = 5

<https://youtu.be/7iRC7-f9q0M>

<https://youtu.be/fN0yetDqyIA>

DESTROY

CRERATE FILE FROM CUBE LIKE ON THE DRAW



DESTROY



POWER OF AR AND VR



**PRESS THE SPACEBAR
AND SEE THE ANIMATION**



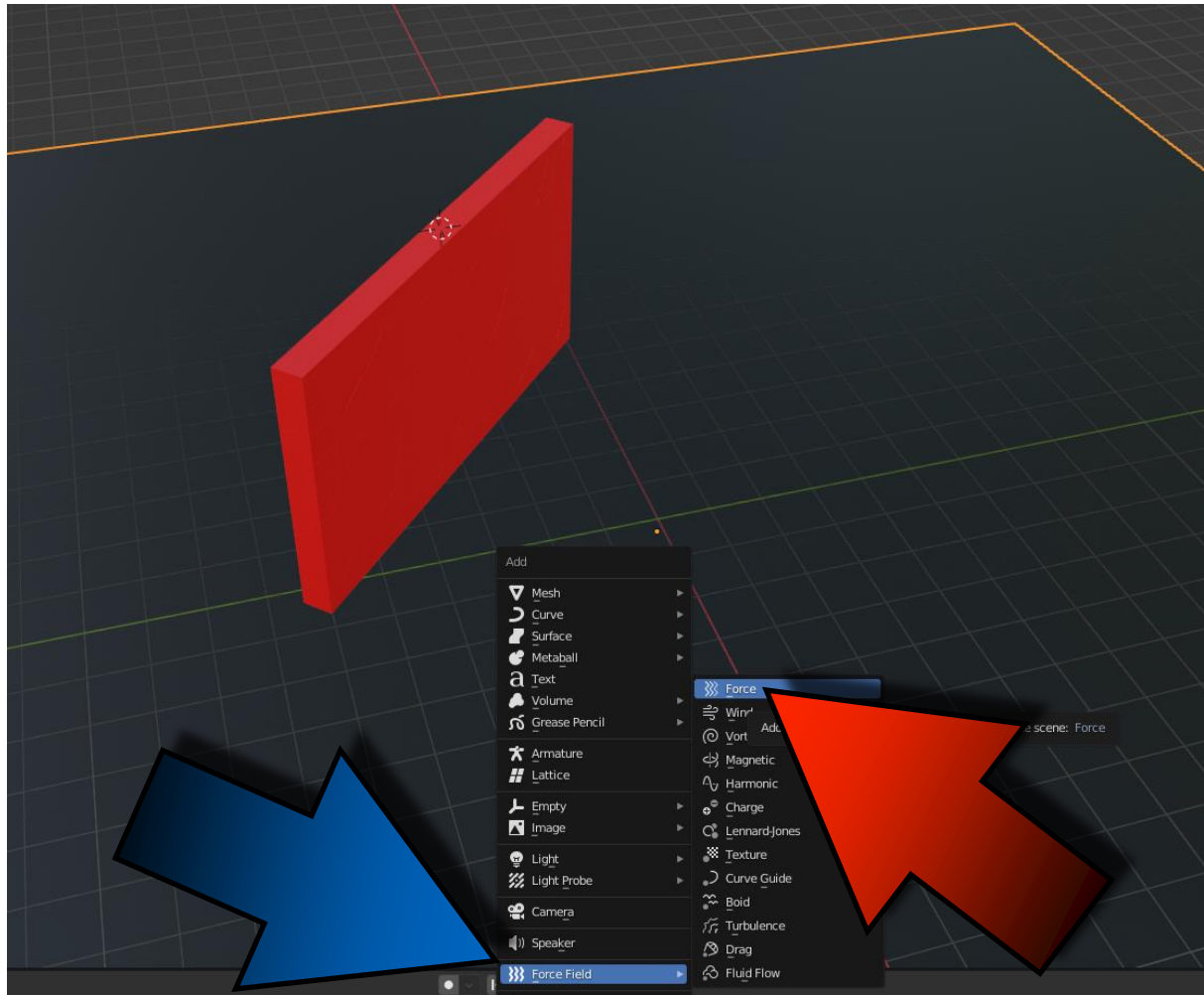
IF YOU RUN ANIMATION WALL STANDS

<https://youtu.be/riDgEUzmDsc>

DESTROY

POWER OF AR AND VR

INSERT **FORCE**



DESTROY



POWER OF AR AND VR



**PRESS THE SPACEBAR
AND SEE THE ANIMATION**



NOW THE WALL IS COMING DOWN

<https://youtu.be/i5FrgH0hozC>

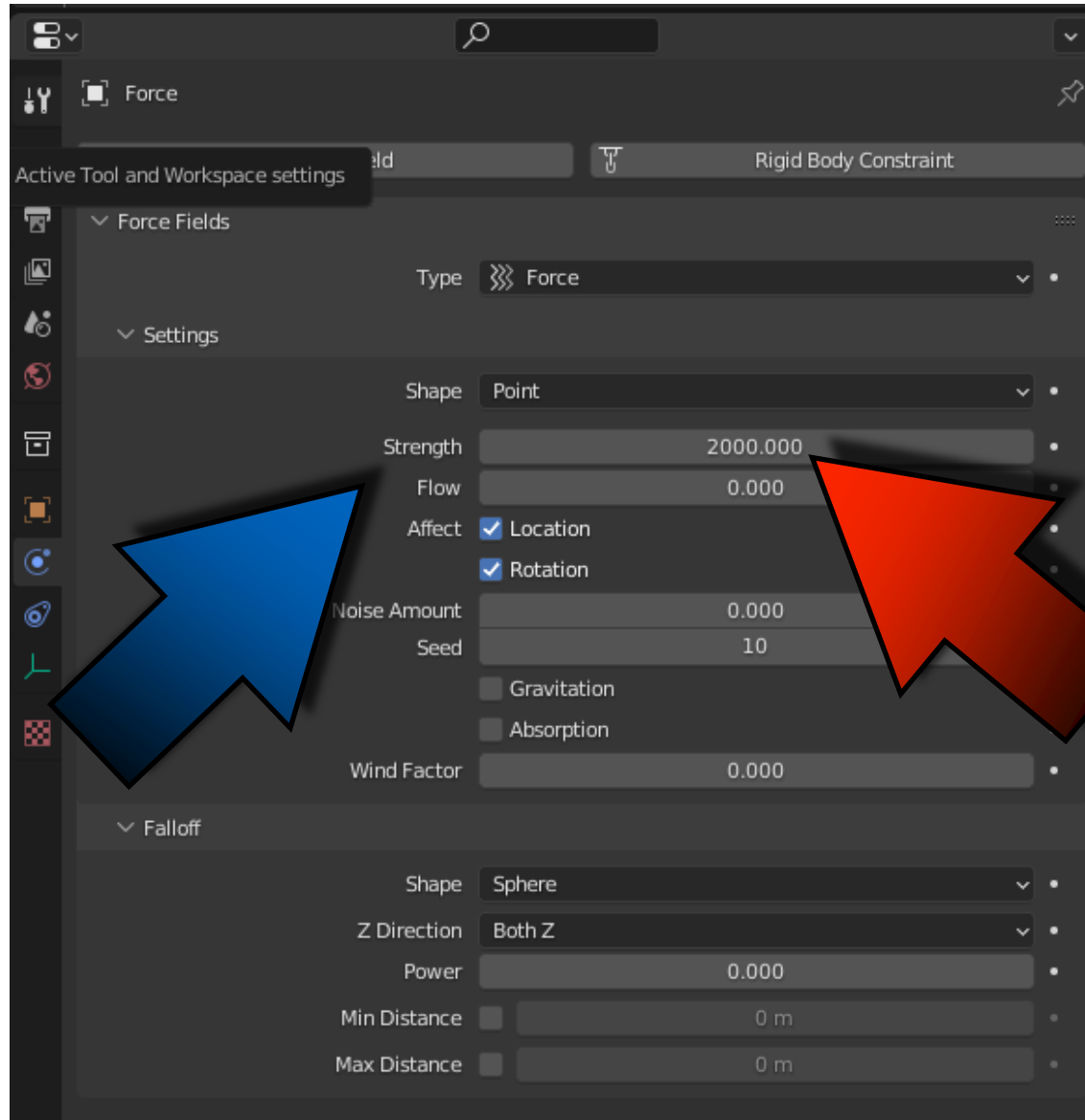
DESTROY



POWER OF AR AND VR



SET FIELD **STRENGTH** TO **2000**



DESTROY



POWER OF AR AND VR



**PRESS THE SPACEBAR
AND SEE THE ANIMATION**



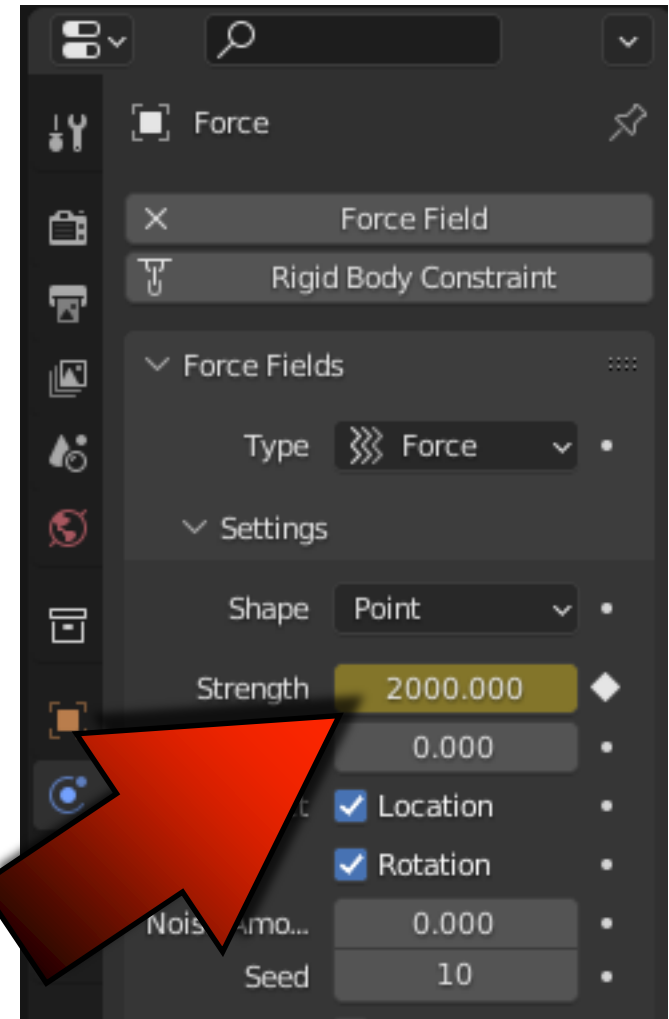
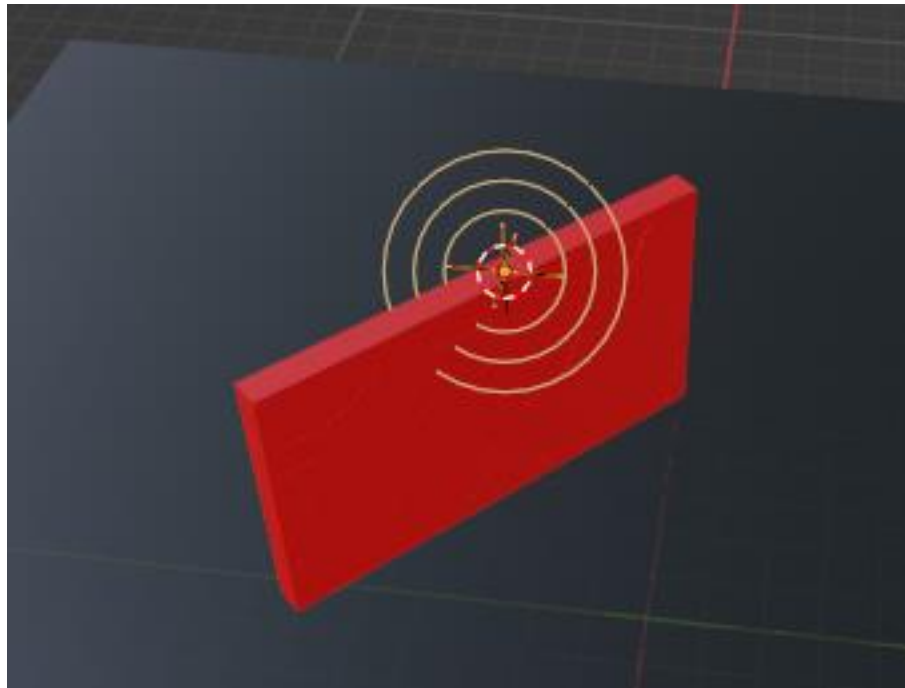
THE FIELD WORKS STRONGER AND ON A LARGE AREA

<https://youtu.be/HkhsMC6yA9o>

DESTROY

WE WILL REDUCE THE FIELD IN TIME

SAVE FIELD STRENGTH FOR THE FIRST FRAME OF ANIMATION



DESTROY



POWER OF AR AND VR

SAVE FIELD STRENGTH = 0
FOR THE 40 FRAME OF ANIMATION

The image shows a Blender 2.80 interface. In the center 3D Viewport, a cluster of red, irregularly shaped objects (debris) is scattered on a dark grey grid floor. A yellow target reticle is positioned above the debris. On the right side, the Properties panel is open to the 'Force' tab. Under the 'Force Fields' section, a 'Force Field' object is selected. The 'Strength' property is highlighted in yellow and set to 0.000. Below it, the 'Location' and 'Rotation' checkboxes are checked. At the bottom, the Timeline is visible, with the current frame set to 40. A large green arrow points from the frame 40 marker on the timeline towards the 3D scene. A large red arrow points from the 'Strength' value in the Properties panel towards the 3D scene.

DESTROY



POWER OF AR AND VR



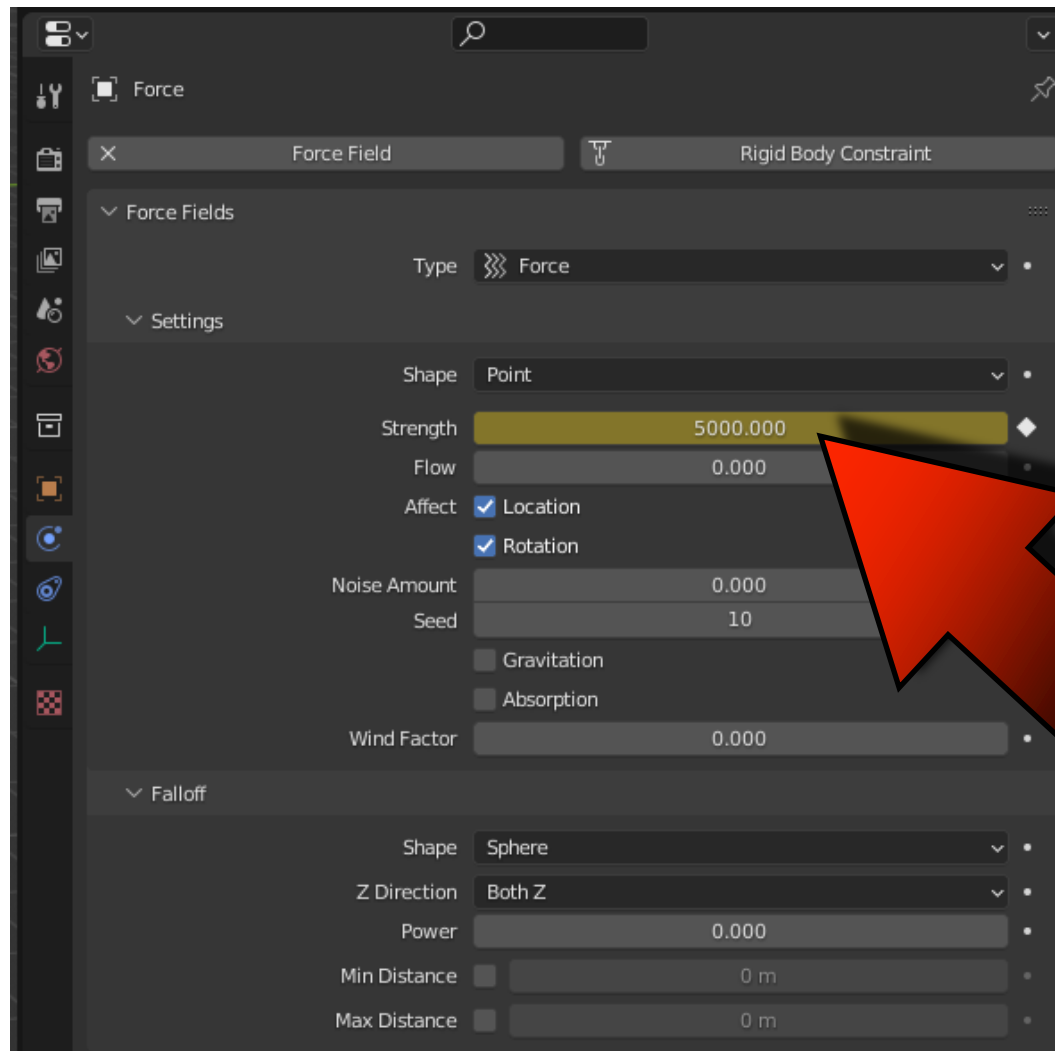
**PRESS THE SPACEBAR
AND SEE THE ANIMATION**



<https://youtu.be/GF1v18PChnk>

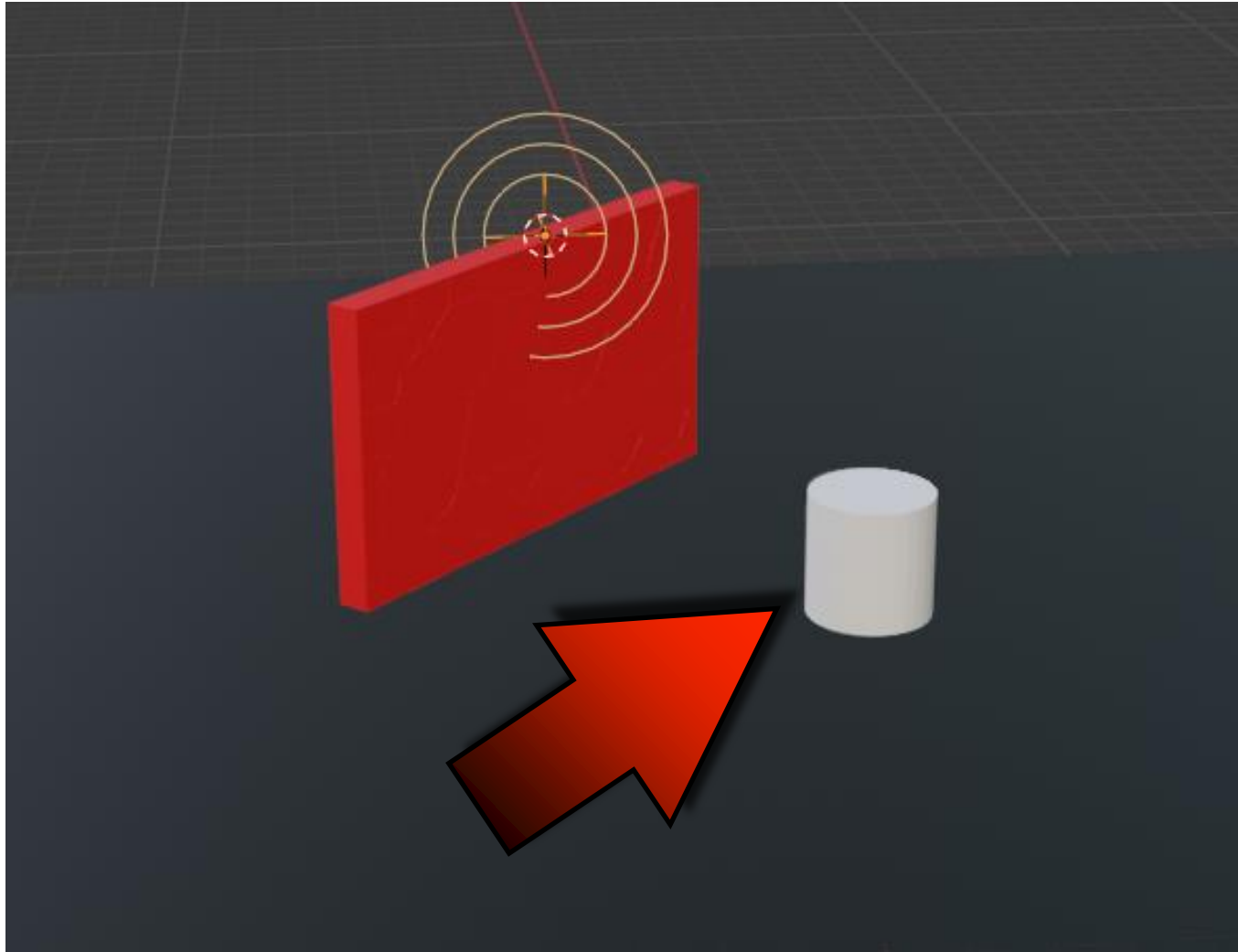
DESTROY

INCREASE STRENGTH TO 5000 AND SAVE THE FIRST FRAME OF ANIMATION



DESTROY

INSERT **CYLINDER** AS ON SCREEN



DESTROY



POWER OF AR AND VR



GIVE CYLINDER A RIGID BODY ACTIVE

The screenshot shows a 3D software interface with a cylinder object on the left and a properties panel on the right. The cylinder is highlighted with a green arrow. The properties panel is titled 'Cylinder' and includes several sections:

- Force Field:** Soft Body
- Collision:** Fluid
- Cloth:** Rigid Body
- Dynamic Paint:** Rigid Body Constraint

The **Rigid Body** section is expanded, showing:

- Type:** Active
- Settings:** 1 kg, Dynamic, Animated
- Collisions:** Shape: Convex Hull, Source: Deform
- Surface Response:** Friction: 0.500, Bounciness: 0.000
- Sensitivity:**

DESTROY



POWER OF AR AND VR



**PRESS THE SPACEBAR
AND SEE THE ANIMATION**



<https://youtu.be/30kWWwOQ0JI>

DESTROY



POWER OF AR AND VR



FOR A POWER FIELD MAX DISTANCE SET AT 5M

The screenshot displays a VR environment on the left and a settings panel on the right. The environment features a central red point with concentric circles and a red diagonal bar. The settings panel, titled 'Force', shows the following configuration:

- Type: Force
- Shape: Point
- Strength: 5000.000
- Flow: 0.000
- Affect: Location, Rotation
- Noise Amount: 0.000
- Seed: 10
- Gravitation:
- Absorption:
- Wind Factor: 0.000
- Falloff:
- Shape: Sphere
- Z Direction: Both Z
- Power: 0.000
- Min Distance: 0 m
- Max Distance: 5 m

DESTROY



POWER OF AR AND VR



**PRESS THE SPACEBAR
AND SEE THE ANIMATION**

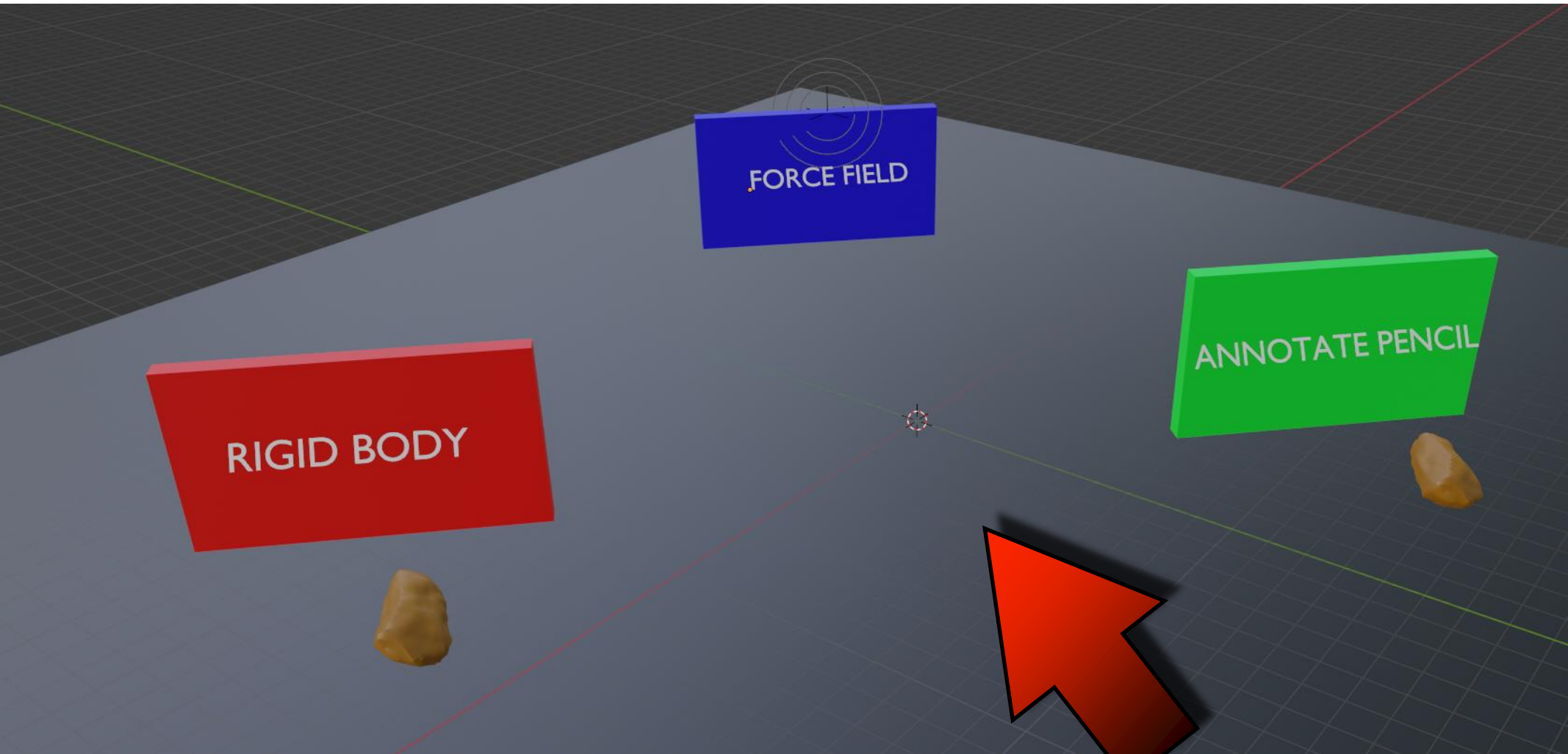


<https://youtu.be/4Kpn-i02B40>

DESTROY

POWER OF AR AND VR

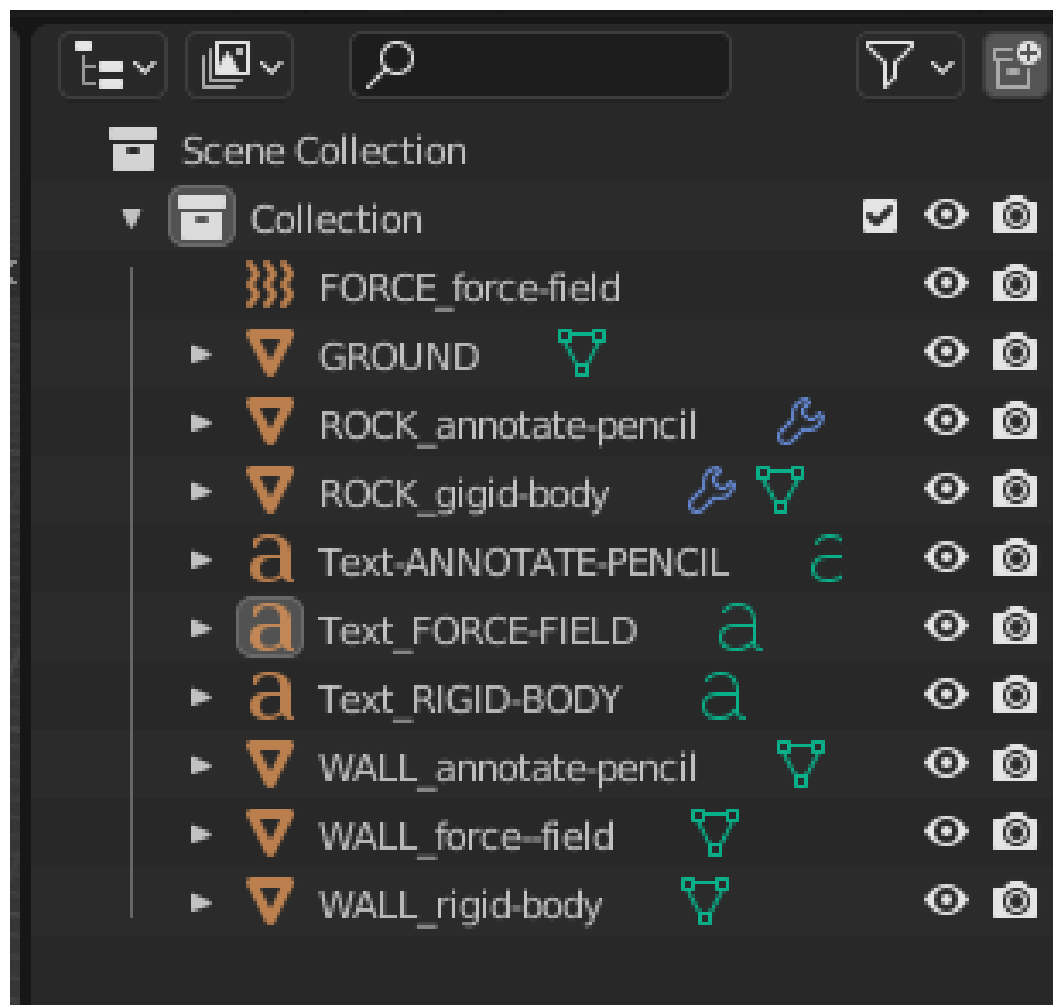
CREATE SUCH A FILE AND USE THREE WAYS TO DESTROY IT



DESTROY

POWER OF AR AND VR

APPLY KNOWN WAYS OF ANIMATION CREATE ELEMENTS IN SEPARATE COLLECTIONS



DESTROY

EXAMPLE OF USING **CELL FRACTURE** IN OUR PROJECTS



<https://youtu.be/WPX7RSiMY6c>

POWER OF AR AND VR

THANK YOU FOR YOUR ATTENTION



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JACEK KAWAŁEK