

# Welcome to 3D Animation




# **Maya 2019 and Blender 2.8 Download Instructions**

# Go to this link:

<https://www.autodesk.com/education/free-software/maya>

Create your account using your school email:

## Get Education Benefits



Country, Territory, or Region of educational institution

United States

Educational role [WHAT'S THIS ?](#)

Student


Date of Birth

Month Day Year

**NEXT**

ALREADY HAVE AN ACCOUNT? [SIGN IN](#)

## Create account



First name Last name

abc xyz

Email

abc123@student.fuhsd.org ✓

Confirm email

abc123@student.fuhsd.org ✓

Password

.....

I agree to the [Autodesk Terms of Use](#) and to the use of my personal information in accordance with the [Privacy Statement](#) (including cross-border transfers as described in the statement).

**CREATE ACCOUNT**

# Verify your email

Follow the steps to verify your email.

Just one more step



Tell us about your educational institution and how you plan to use your free software.

Name of educational institution

Lynbrook High

Area of study

- Architecture, Engineering & Construction
- Media & Entertainment
- Product Design & Manufacturing
- Others

Enrolled from

August

2019

Graduate in

June

2023

NEXT



# Download

Go back to:

<https://www.autodesk.com/education/free-software/maya>

You should be signed in. If not, sign in and renavigate to the link above. Choose Maya 2019 and start the browser download.

Welcome back, Cheryl L [Sign out](#) [Autodesk Account](#)

Maya 2019 ✓  
Mac OS X ✓  
English ✓

Serial number: 901-46213338  
Product key: 657K1

Authorized Install on up to 2 personal devices usage:

▲ An email containing the license information has been sent to you. If you do not see the email in your inbox, please check your spam folder.  
For other ways to find your license information see "[Find Serial Numbers & Product Keys for Educational Licenses](#)".

- + You are receiving an Educational license [See more](#)
- + Installation restrictions apply [See more](#)
- + Installation includes the Autodesk Genuine Service [See more](#)
- + Managing licenses for multiple campuses [See more](#)
- + Additional steps required for educational institutions [See more](#)

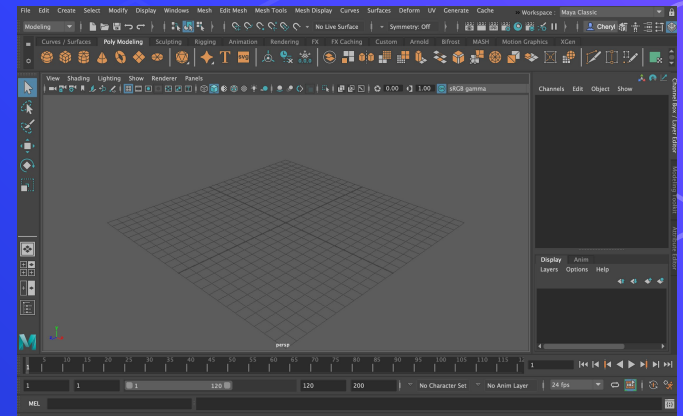
[BROWSER DOWNLOAD](#)

# Installing

Follow the steps on your device to install. After done, open Maya.

**PLEASE FOLLOW THESE STEPS CAREFULLY.**

Maya will tell you have 30 days remaining. **DO NOT PRESS RUN. SELECT ACTIVATE** and enter the serial number and product license that you saved. Follow their directions and Maya should open. You should see a screen like this:



**Maya is installed! :)**

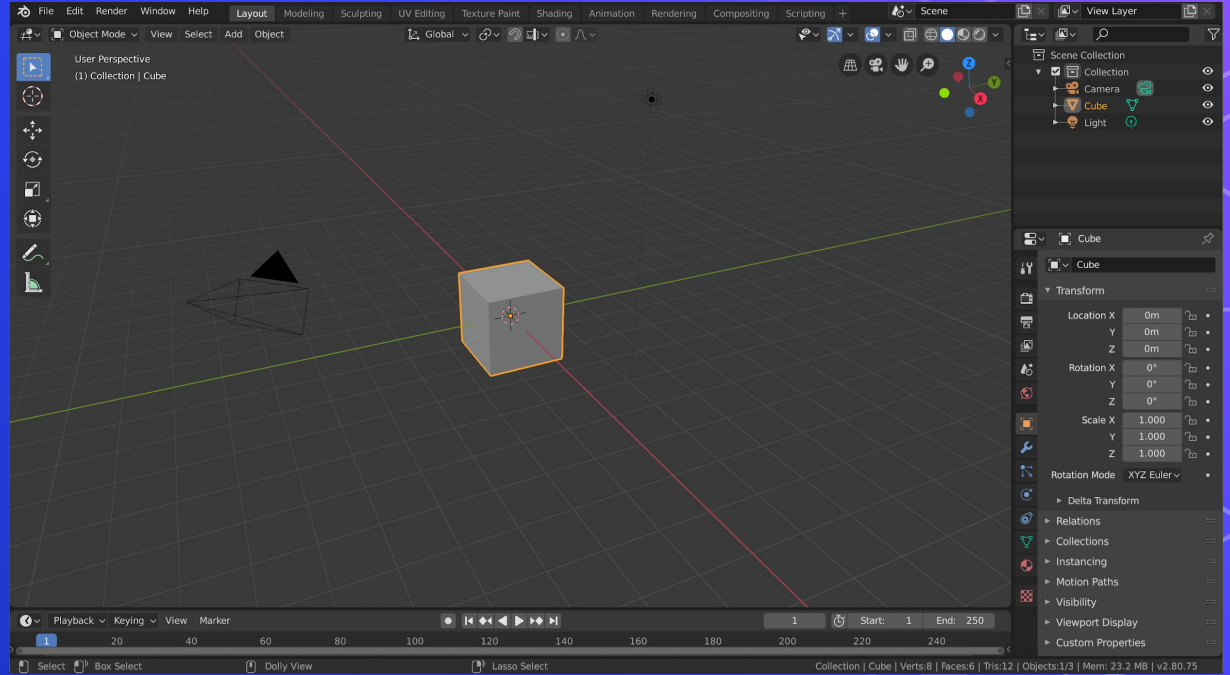
Now to install Blender:

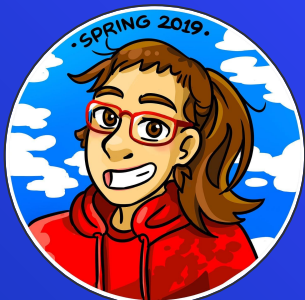
# Download+Installation

Go to:

<https://www.blender.org/download/>

Follow their directions. If you are able to open blender and see this, you're done!





@sheepianna1

**Anna Shaposhnik**

Co-President  
(Director/Teacher)



**Cheryl Lin**

Literally doesn't do anything in  
robotics except animation  
(Teacher/Modeler)



**Vardani Karthik**

Random human  
(Teacher/Modeler)



Day 2

An Off-season Robotics  
Competition



presented by



**Niyaz Baines**  
(teacher/modeler)

# Goals of this Workshop

- Learn the basics of 3D Animation
- Includes: storytelling, 3D modeling, lighting, texturing, rigging, animating
- You won't be a pro right away! (Practice makes perfect)



# Other opportunities

Music!

Sound effects (folley)

2D drawing to augment 3D rendered frames (think Spiderverse)



# Structure

Oct 9	Intro, storytelling, figure out what we will be making, basic blender intro if time HW: blender tutorial
16	Modeling in blender HW: completed model
β0 <input type="checkbox"/>	Texturing/Lighting/UV maps HW: principles of animation video
Nov 6	Principles of Animation Quiz Animation basics. Bouncing ball, path tracing, rigging and animating joints
13	Rendering and creating a video, view and discuss inspiration, start storyboarding animation together
20	Split up into designated groups



# Why Blender

## Blender

Very simple user interface

FREEEEEEEEEEEEEEEEEEEE

Real time render engine

Open source

Easy to download

Lots of resources available



## Maya



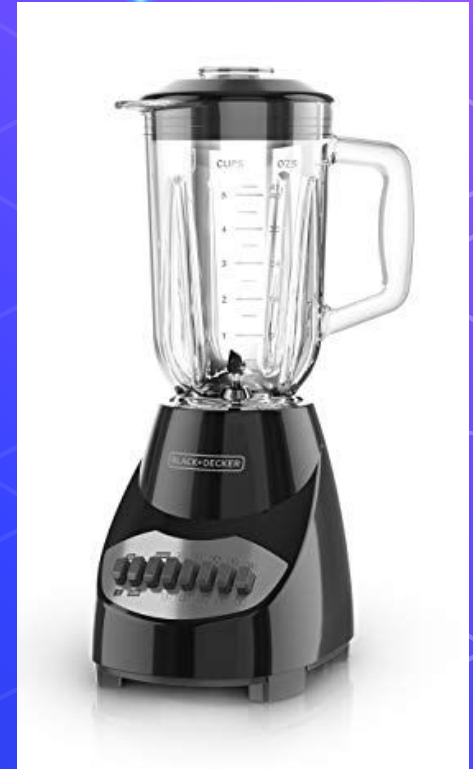
Stereotypically complicated user interface

Not free unless you're a student

Need student account and license

Cannot render in real time

Few tutorials



010



# 2019 Safety Animation



# 2016 Safety Animation





# For the Birds



# Johnny Express



# What we will be doing this year:

We will be entering World Fest (due **Dec 15**) and Teen Animation Festival International (TAFI)!!!!

<https://worldfest.org/> <https://www.waltdisney.org/tafi>

# 1. Storytelling

the core component





# The Core Story

Team 846 believes in project based learning!

We are doing a longer animation this year (3-5 minutes)

- need to come up with storyboard ideas very soon!

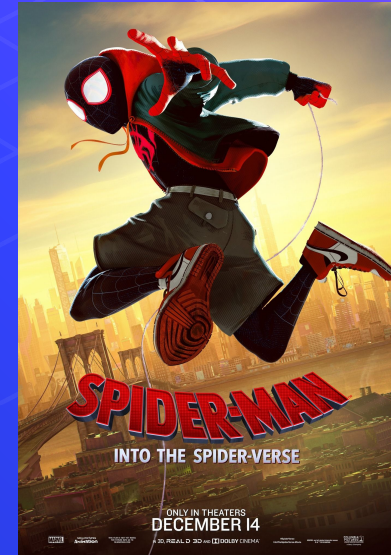
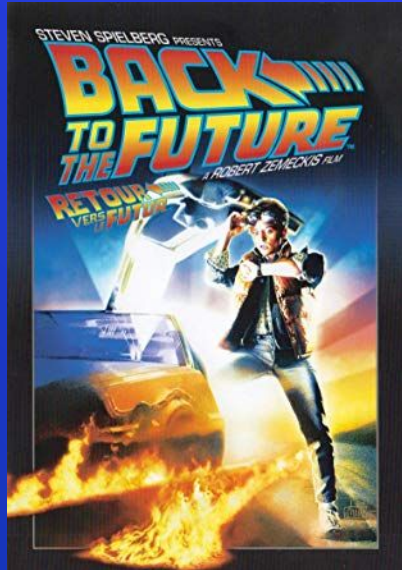
# Activity

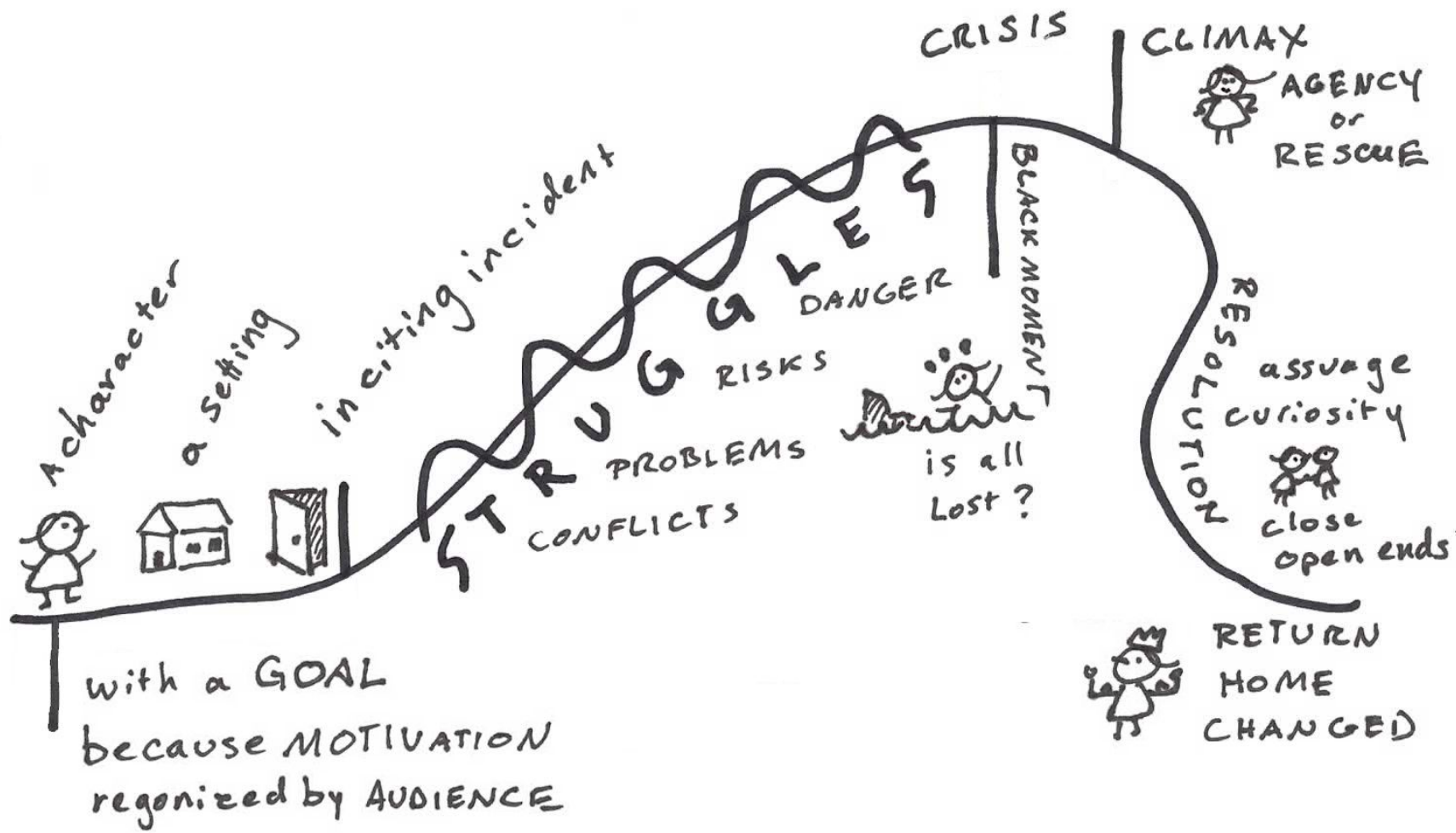
- 1) Think about a memory (anything!) that sparks a strong emotion in you
- 2) Identify the primary emotion(s) - happiness, sadness, jealousy, anger?
- 3) Please share in small groups

# Activity

1) Write down your top 3 favorite movies

Mine are:





# Wants vs. Needs



Wall-E



**Find the beauty.**



Marlin



**Prevent harm.**




Woody



**Do what was best  
for his child.**

- Woody wants to be Andy's favorite toy. Bob Parr wants to be Mr. Incredible again. Joy wants to make Riley happy.
- Wants are often in direct opposition to their true internal goal.
  - Example: Marlin's internal goal is to prevent harm, but his external want, to keep Nemo safe and alive, is actually the very thing harming him and keeping him from truly living. However: *He needs to let go and allow Nemo to be in harm's way in order to give him a life worth living.*





**Discuss in your  
groups, what wants  
do the characters in  
your fav movies  
have?**

ATTAINS  
THE WANT

FAILS  
THE WANT

ATTAINS  
THE NEED

SUPER *HAPPY*  
ENDING!

BITERSWEET  
ENDING

FAILS  
THE NEED

BITERSWEET  
ENDING

*SUPER SAD*  
ENDING



# Obstacles

- Philosophical (character vs. Society)
- External (character vs. other character)
- Internal (character vs. themselves)

# Stakes

- Give audience a reason to root for your character

# How has Miles Changed by the End?

what is the evidence that he is doing Differently at the end that he did in the beginning?





# Hero's Journey

By: Niyaz Baines

## ACT 1:

1. Once upon a time...
2. Every day...
3. Until one day...

## ACT 2:

4. Because of that...
5. Because of that...
6. Because of that...

## ACT 3:

7. Until finally...
8. And ever since then...

The moral of the story is....





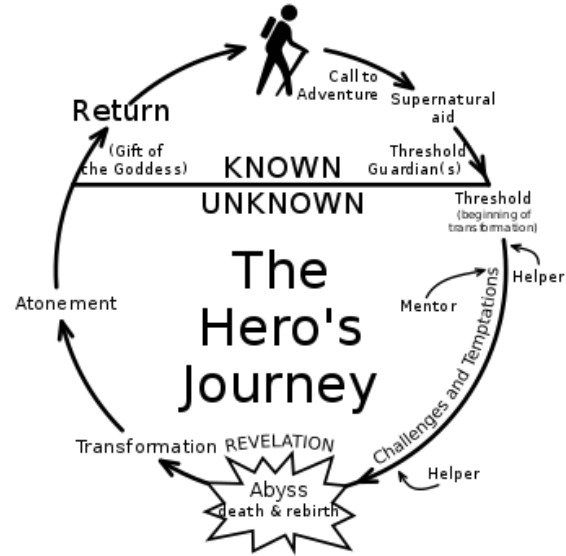
# What is the hero's journey?

- Hero's Journey is about the protagonist changing their ways or learning something new
- The hero is no longer the same after the journey
- It's about overcoming a challenge, discovering something about him/herself, and becoming a changed person
- Hero's Journey in a nutshell: [Ted ed heroes Journey](#)



# Steps

- Known
  - Call to adventure
  - Supernatural aid
  - Threshold guardian(s)
- Unknown
  - Threshold
  - Mentor and helper for challenges and temptations and another helper.
  - Abyss/revelation
  - Transformation
  - Atonement
  - return





# Call to adventure

- The hero wants more than their plain vanilla life
- Something unexpected happens to them
- They realize they have to take action





# Threshold

- A challenge and the main challenge they will face
- Have mentor and helper to guide them



# Abyss

- Realizes who they truly are
- Knows what to do



# Rebirth

- Is a changed man/woman



# Iron Man (MCU)

- Greedy man at beginning
- Gets thrown into conflict at afghanistan
- Learns humility from prisoner
- Breaks out a changed man





# Bilbo Baggins



- Lives a simple life
- Decides to go on adventure after realizing he can't live a simple life
- Comes back a braver man

EMMA COATS  
@LAWNROCKET

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## 22 RULES

1

YOU ADMIRE A CHARACTER FOR **TRYING** MORE THAN FOR THEIR SUCCESSES.

2

YOU GOTTA KEEP IN MIND what's interesting to you as an **AUDIENCE**, WHAT'S FUN TO DO AS A WRITER. THEY CAN BE VERY DIFFERENT.

3

TRYING FOR THEM IS IMPORTANT, BUT YOU WON'T SEE WHAT THE STORY IS **ACTUALLY** ABOUT TIL YOU'RE AT THE END OF IT.

4

**ONCE** UPON A TIME THERE WAS EVERY DAY, ONE DAY, Because of that, Because of that, **until finally**

5

SIMPLIFY. FOCUS. Combine characters. **H O P** **OVER DETOURS.** You'll feel like you're losing valuable stuff BUT IT SETS YOU **FREE.**

6

**now REWRITE.**

What is your character good at, COMFORTABLE WITH? THROW THE POLAR OPPOSITE AT THEM. **CHALLENGE THEM.** HOW DO THEY DEAL?

7

COME UP WITH YOUR **ENDING** BEFORE YOU FIGURE OUT **your middle.** Seriously. Endings are hard, get yours working up front.

8

**FINISH YOUR STORY,** *let go* even if it's not perfect. IN AN IDEAL WORLD YOU HAVE BOTH, BUT MOVE ON.

9

WHEN YOU'RE **STUCK:**

- MAKE
- A
- LIST
- OF
- WHAT
- WOULDN'T
- HAPPEN
- NEXT.

LOTS OF TIMES THE MATERIAL to get you *unstuck* WILL SHOW UP.

**DO BETTER NEXT TIME.**

10

**PULL APART** THE STORIES YOU LIKE. WHAT YOU LIKE IN THEM IS A PART OF YOU; you've got to **RECOGNIZE IT** BEFORE YOU CAN USE IT.

11

PUTTING IT ON **PAPER** LETS YOU START FIXING IT. IF IT STAYS IN YOUR HEAD, **a perfect idea,** YOU'LL NEVER SHARE IT WITH ANYONE.

12

DISCOUNT THE **1<sup>ST</sup>** THING

THAT COMES TO MIND. AND THE **2<sup>ND</sup> 3<sup>RD</sup> 4<sup>TH</sup> 5<sup>TH</sup>** - get the obvious out of the way. **SURPRISE YOURSELF.**

13

Give your characters **OPINIONS.** PASSIVE / MALLEABLE might seem likeable to you as you write, but it's poison to the **AUDIENCE.**

14

WHY MUST YOU TELL **this?** **STORY?**

What's the belief burning within you THAT YOUR STORY FEEDS OFF OF? THAT'S THE HEART OF IT.

15

If you were

16

WHAT ARE THE STAKES?  
GIVE US

# REASON to ROOT

FOR THE CHARACTER.  
WHAT HAPPENS IF THEY  
DON'T SUCCEED?  
**Stack the odds against.**

20

**EXERCISE:**  
TAKE THE BUILDING  
BLOCKS OF A MOVIE  
YOU DISLIKE.  
How d'you rearrange them  
INTO WHAT YOU  
**Do like?**

17

**NO WORK IS  
EVER WASTED.**  
IF IT'S NOT WORKING,  
LET GO AND MOVE ON -  
IT'LL COME BACK AROUND TO BE USEFUL LATER.

your character,  
IN THIS SITUATION,  
HOW WOULD YOU FEEL?  
**HONESTY**  
**LEND CREDIBILITY**  
to unbelievable situations.

18

YOU HAVE TO  
**KNOW YOURSELF:**  
The difference between doing  
your best and fussing.  
STORY IS TESTING,  
**NOT** REFINING.

19

COINCIDENCES TO GET  
characters into trouble are great;  
**COINCIDENCES**  
to get them out of it are  
**cheating.**

21

YOU GOTTA  
**IDENTIFY**  
with your situation/characters,  
CAN'T JUST WRITE 'COOL.'  
WHAT WOULD MAKE  
**YOU**  
ACT THAT WAY?

22

WHAT'S THE  
**ESSENCE**  
OF YOUR STORY?  
MOST ECONOMICAL  
TELLING OF IT?  
IF YOU KNOW THAT,  
YOU CAN BUILD OUT  
FROM THERE.



# How?

- Be genuine: Base theme/characters on struggles/people in your life
- Have a personal voice: what do you want to convey through your story?
- Brainstorm in “what if’s?”
- Theme and moral of story is what makes it memorable > create dramatic tests for realization of character’s “I need to change”



# Veteran Brainstorm Session

what if each locker was a different world?

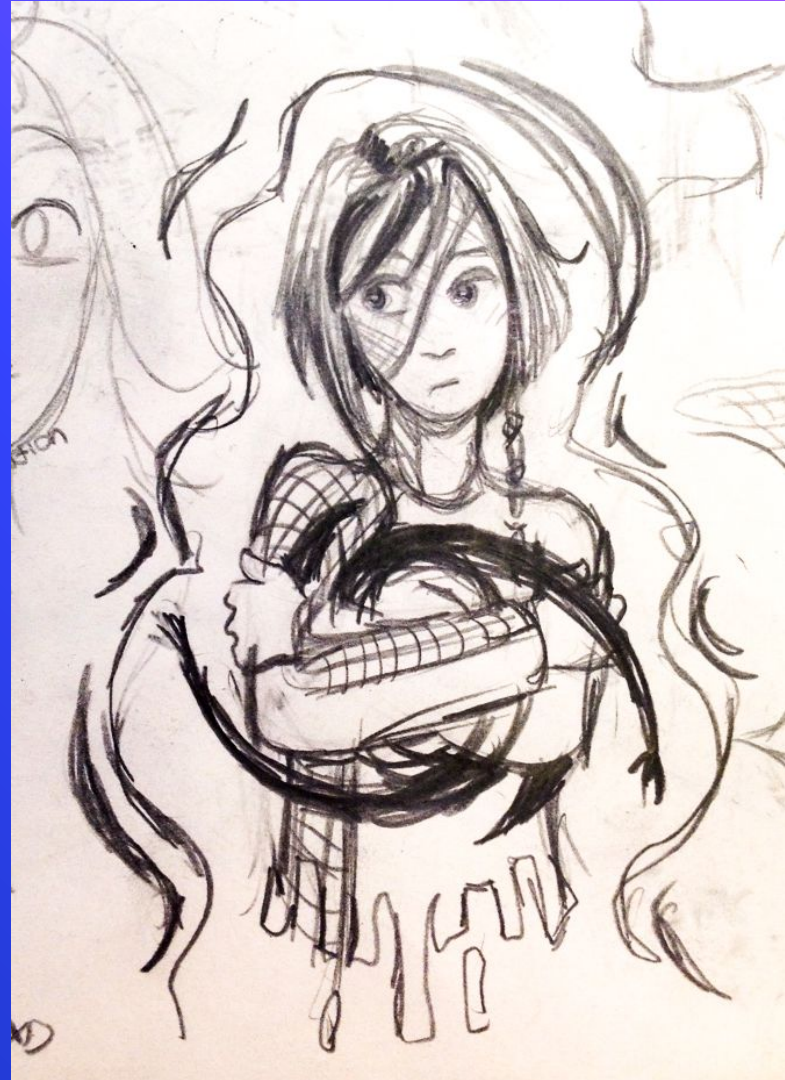
- what if there was a society where all citizens had 0 privacy
- what if there was a society where everyone knew exactly what others were thinking
- what if a part in a robot was sentient and could tell its story (hi I'm a battery, every day I give my all for 3 minute and sub out for my siblings....) (I'm a pulley, long time ago I pulled a gearbox, but since I've snapped, they've replaced me...)
- what if backpacks were actually learning from all the worksheets you put into them every day
- what if by contrast, lunchboxes were always hungry, despite holding all of our food
- what if a character entered a black hole and tried to retrieve the knowledge it destroys
- what if a tumbleweed who's always blown by the wind and never knew how it feels to be still got stuck in a tree

**What we've  
been doing**



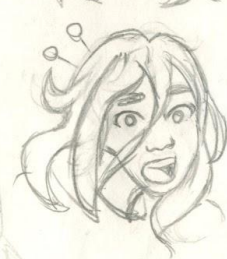


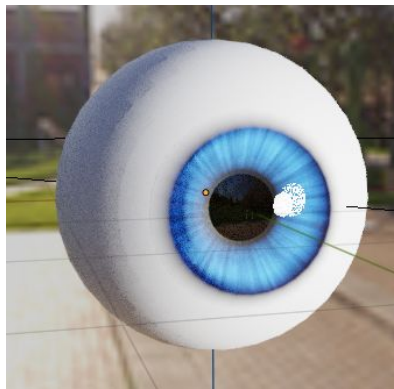
# Character







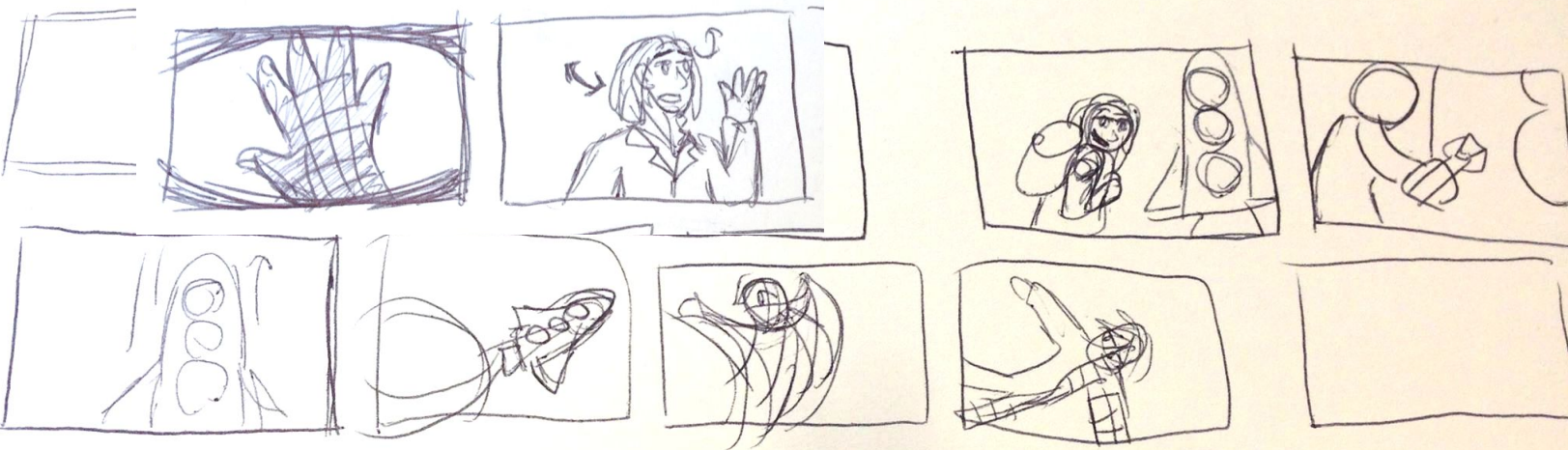




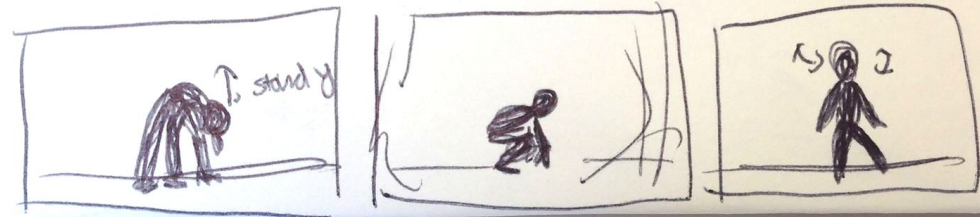
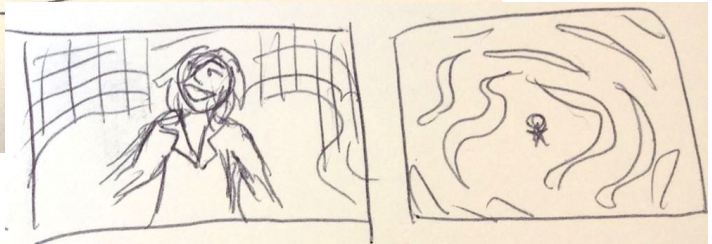
Left to do:

- Hair particle generation
- Blender coloring/texturing
- Lighting
- rigging

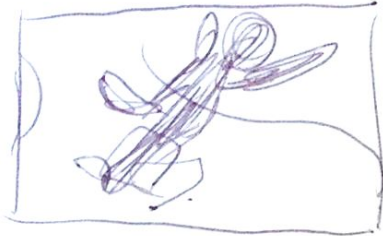




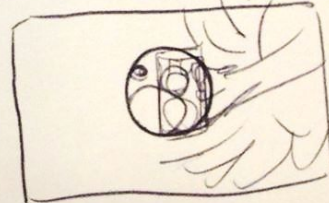
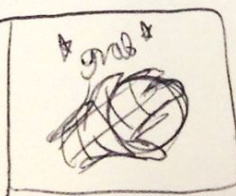
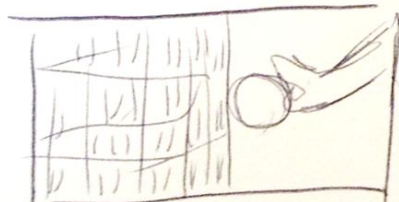
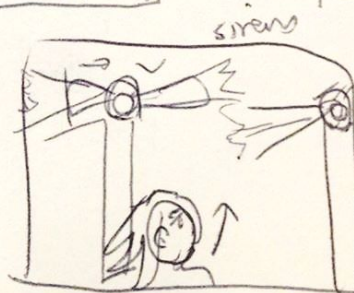
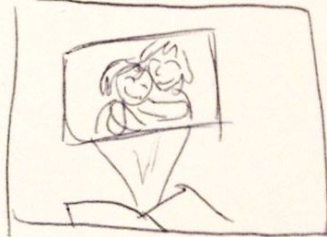
first act

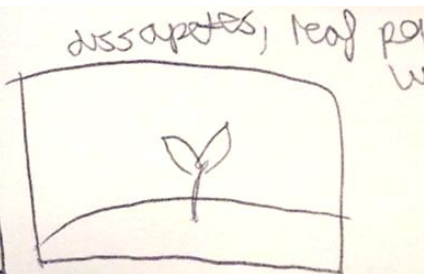
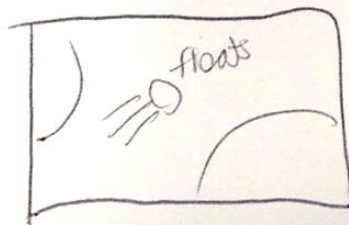
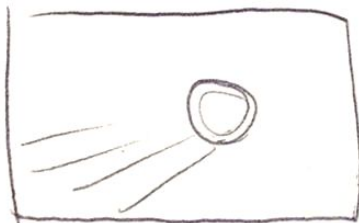






\*trip\*



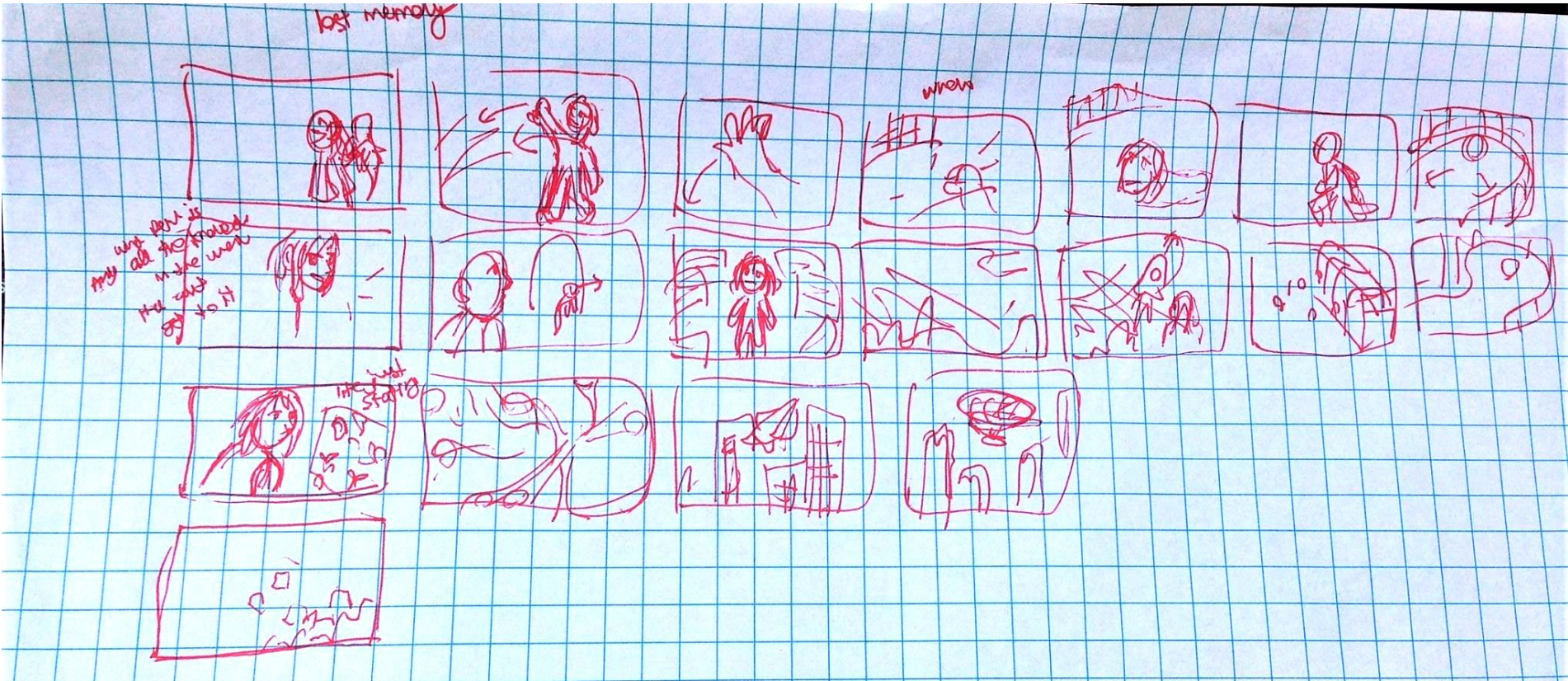


**Theme: Accepting that we individually can't know everything in the world.**

**Want to know everything, need to let go, preserving and sharing info**







Sketching storyboard

a) .682 68.2%

b) 98.75%

c) 97.5% 1.95 zscore  $1.95 = \frac{x - 125}{10}$

25.4 to 144.59

d) 75%  $\rightarrow$  131.74

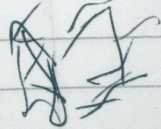
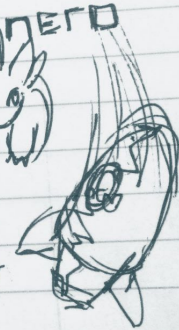
118.25 to 131.74

What point  
is known if you  
don't apply or  
share it



universe knowledge or  
reach

292.7  
after day



apter 5 - Scatterplots, Association, Correlation

share it

relations between two quantitative variables



# STORYTELLING

- o obstacles
  - internal
  - external
  - philosophical

see info in a clip as a way

- o stakes
- o wants vs needs

- o hero's journey

- o theme/moral

storing  
gaming  
sharing  
creating

- transfer conditions? sacrifice?

Karda

- deteriorating (cyclical)

- looks for info b/c planten is dying is she piece of info

computing?

life/line exchange

uniquely *knows* wants to go down

needs cloud friends

choices librarian or not so not worth share but not use info myself

sees his notebook hidden

Known (Comfort)

Unknown (Anxiety)

ephemerality

+ librarian character? meets talks to

to false expectations? aren't fully displayed?

jealous of him because they block him and they have friendships

i'm a cloud

control?

lost and unknown

gets



# Blender Basics

The background of the slide is a vibrant blue gradient. It features a complex network of white lines and nodes, resembling a circuit board or a data flow diagram. Several nodes are highlighted with small blue lights. In the center-right area, there is a large, semi-transparent blue hexagonal shape with a dark blue border, which appears to be a stylized representation of a Blender window or a specific object in the software.

**Know your shortcuts!**

**Today:**

- Navigating camera
- Shift A (create)
- R-S-G
- Edit mode (tab) 1,2,3



# Homework: Khan Academy Pixar Storytelling

<https://www.khanacademy.org/partner-content/pixar/storytelling>



# ANIMATION WEEK 2

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Blender Basics and Modeling



# Blender Basics

- To move around: hold down middle mouse
- To move up and down: hold shift+middle mouse
- To zoom: use the scroll wheel
- Select an object: right click
  - Deselect: click away
- Select multiple: shift while selecting objects
- Select everything: "A"
- Delete, hit x and x again



# Blender Basics

Translating:

- Select object and press “G”

Rotating:

- Select object and press “R”

Scaling:

- Select object and press “S”

To constrain these along an axis:

- Press “X” “Y” or “Z” based on the axis you want to constrict it on AFTER pressing the initial command

Tip: click to place down after moving the object

# Blender Basics

EDIT MODE:

Merging: “W”

Extending: “E”



# HOW TO MAKE A TREE!

Download the zip:

<https://tinyurl.com/anim-tree>

Video I watched:

<https://youtu.be/UQx0eh8z-iM>





# 3D Animation Week 3

modeling/textures



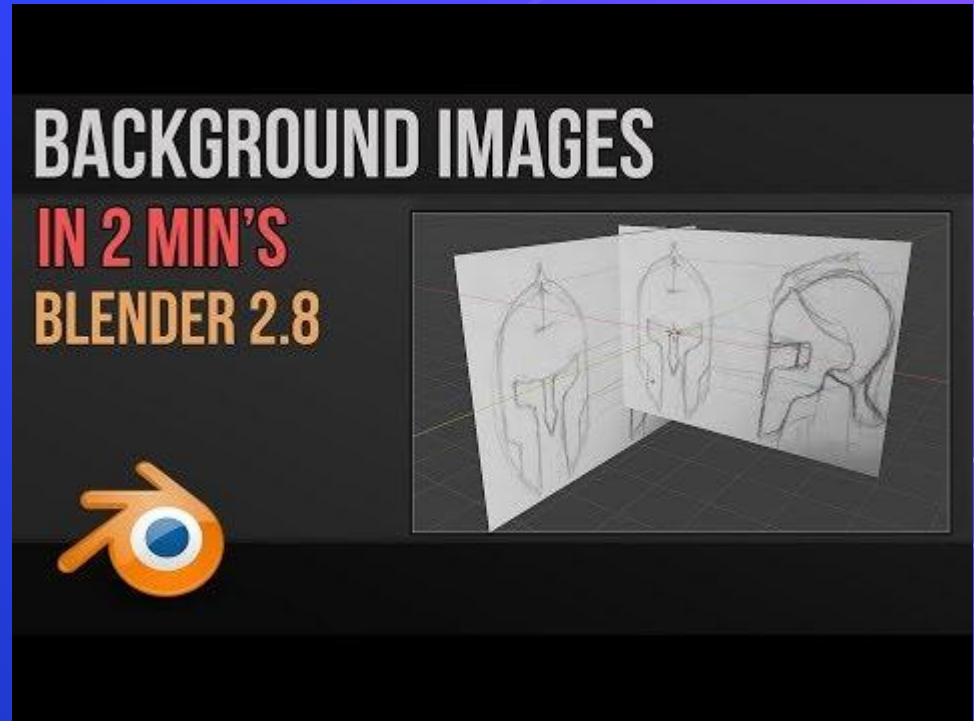
# Important Skills

Adding reference images

Navigate to correct view

Drag the file directly into blender

Move using G, S etc.

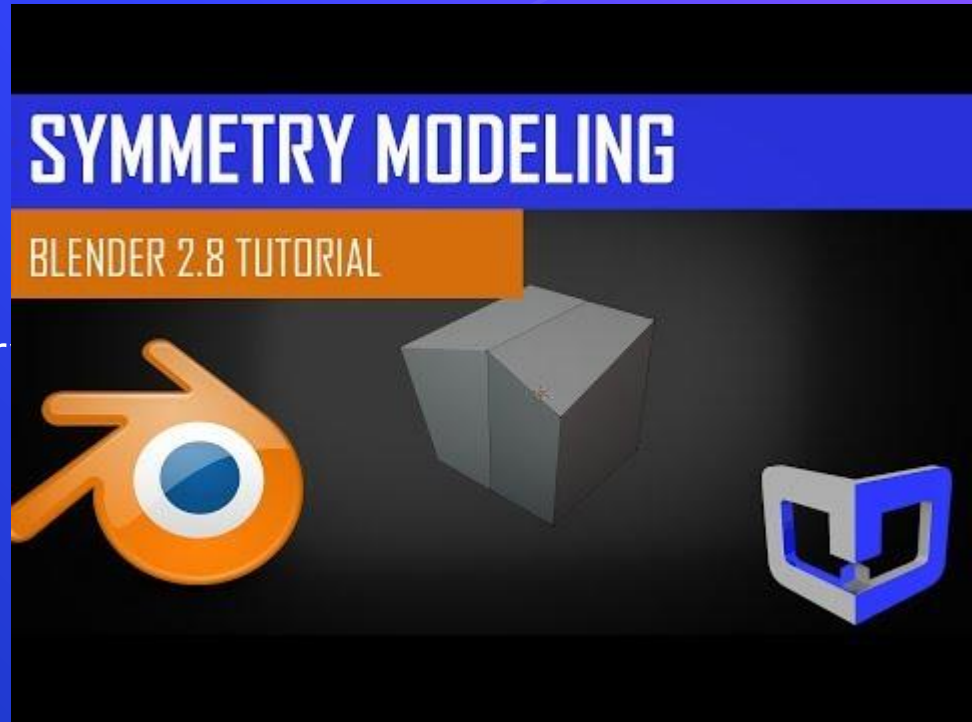


# Important Skills

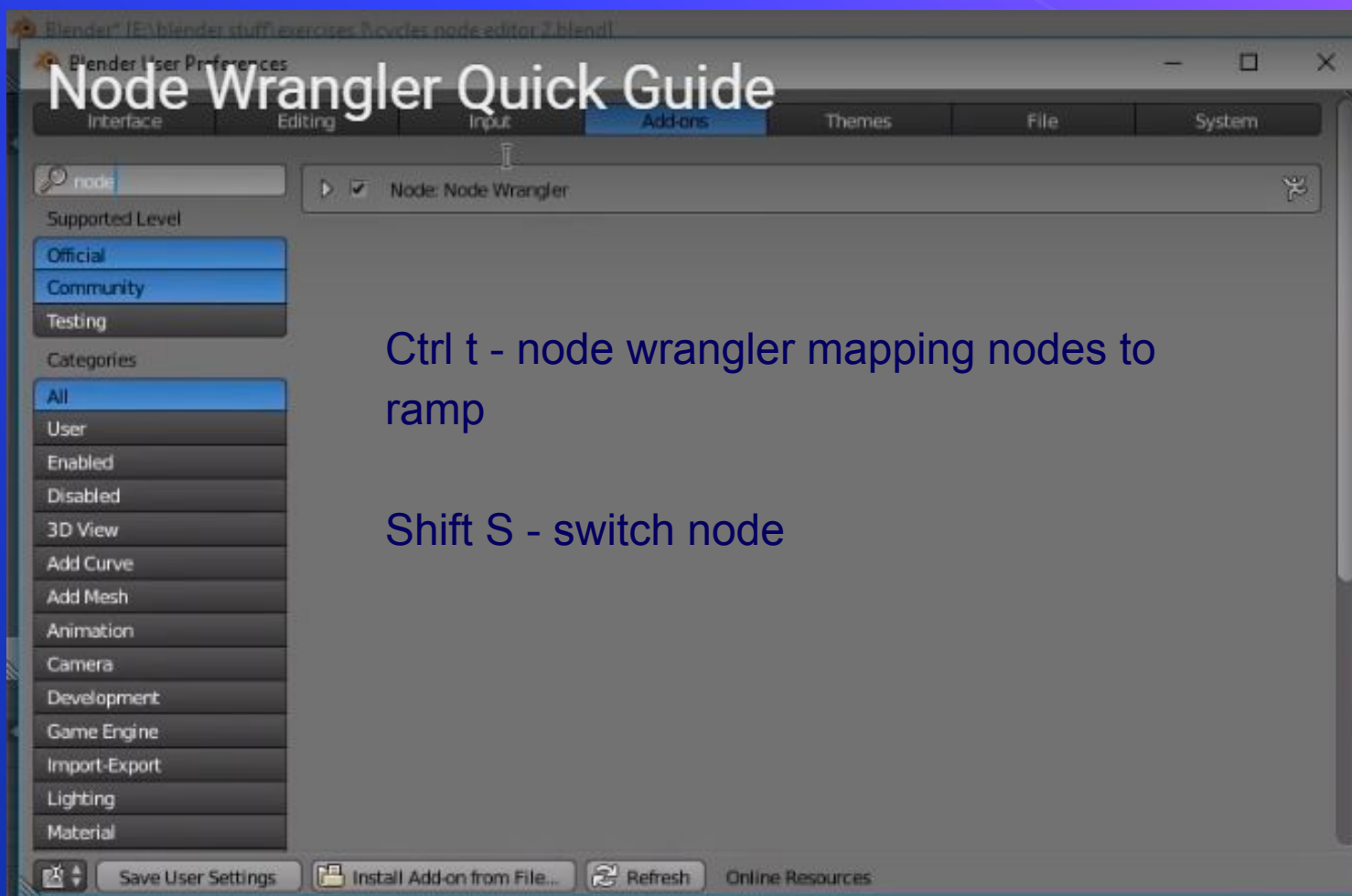
Symmetry

Cut model in half  
(use edge loop)

Then apply symmetry  
modifier



# Node Wrangler Quick Guide



Ctrl t - node wrangler mapping nodes to ramp

Shift S - switch node

# Textures & Materials

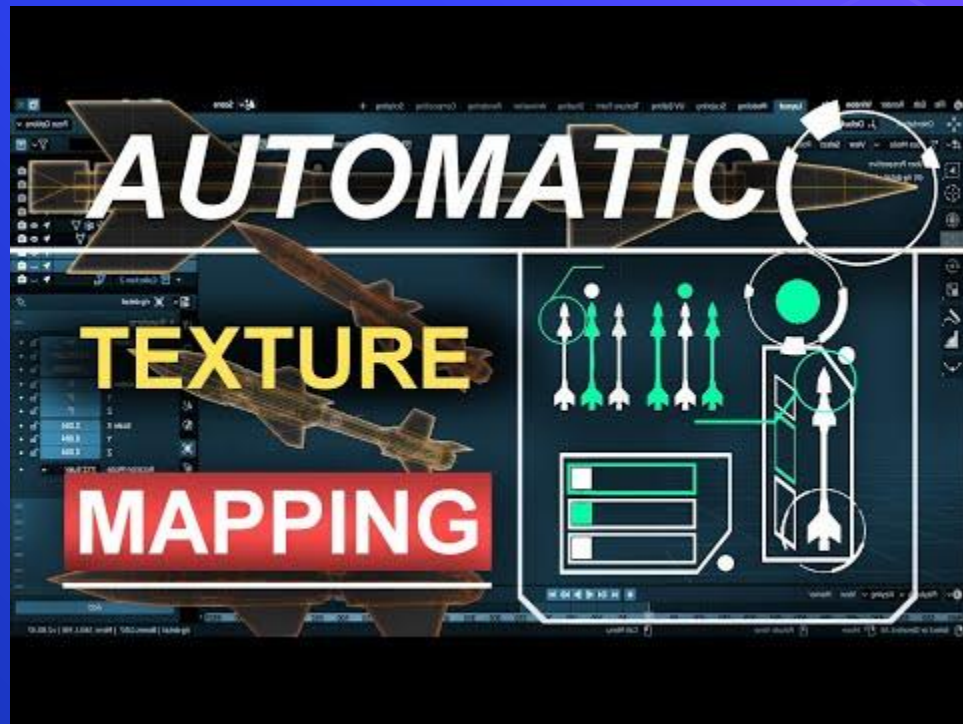




# UV-MAPPING



EXPLAINED















<https://docs.google.com/document/d/1i03QNkyy0W0SqYdVso0oSlqUwupYUiccSEKbkcvJe1g/edit?usp=sharing>

# 3D Animation Week 4

modeling/textures



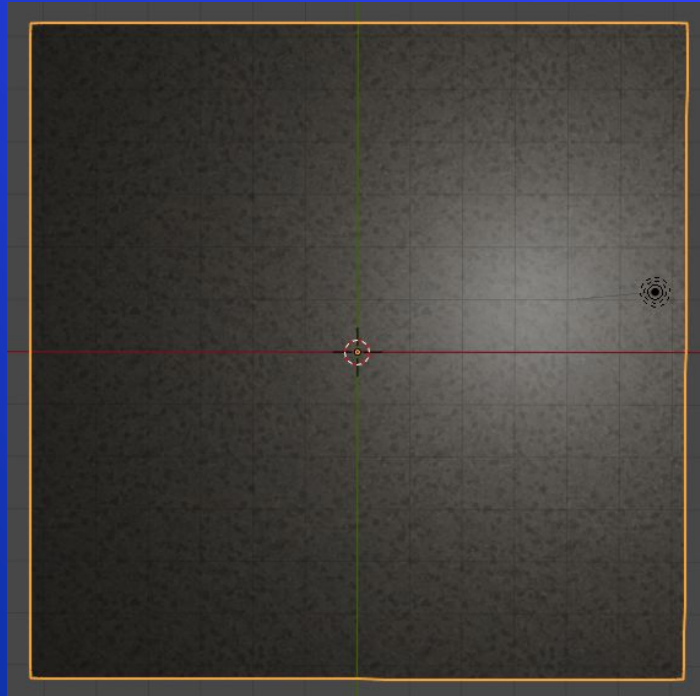
<https://tinyurl.com/846animquiz1>



NOT SEAMLESS

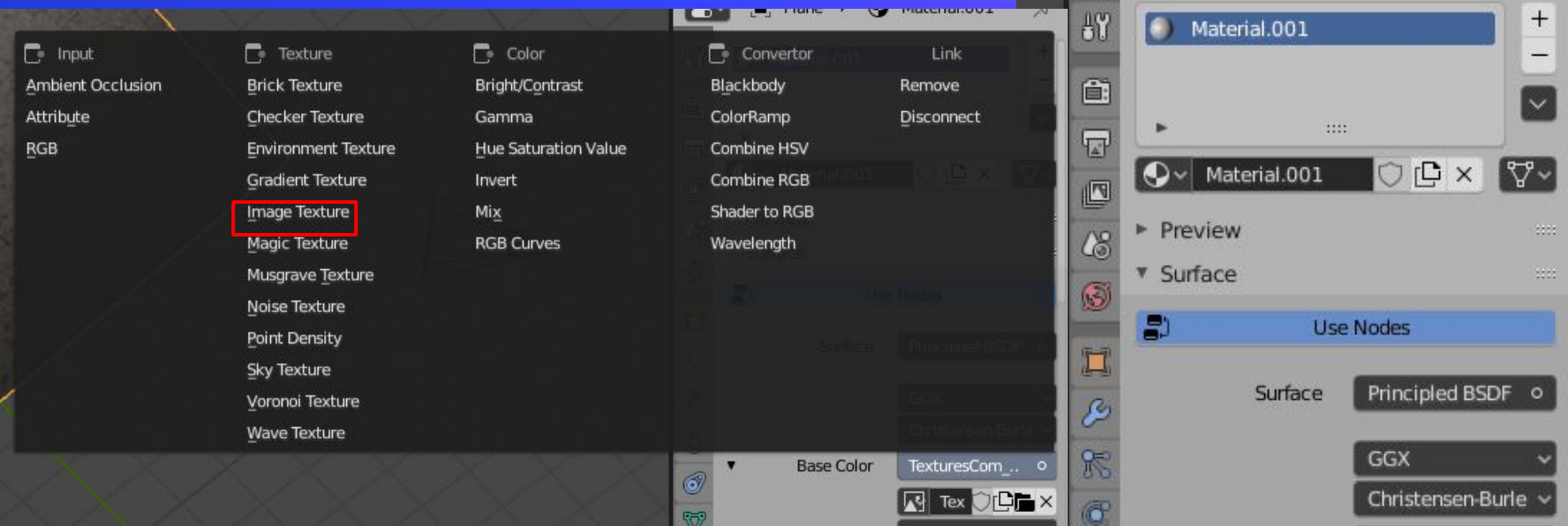


# CGTextures.com



Seamless!

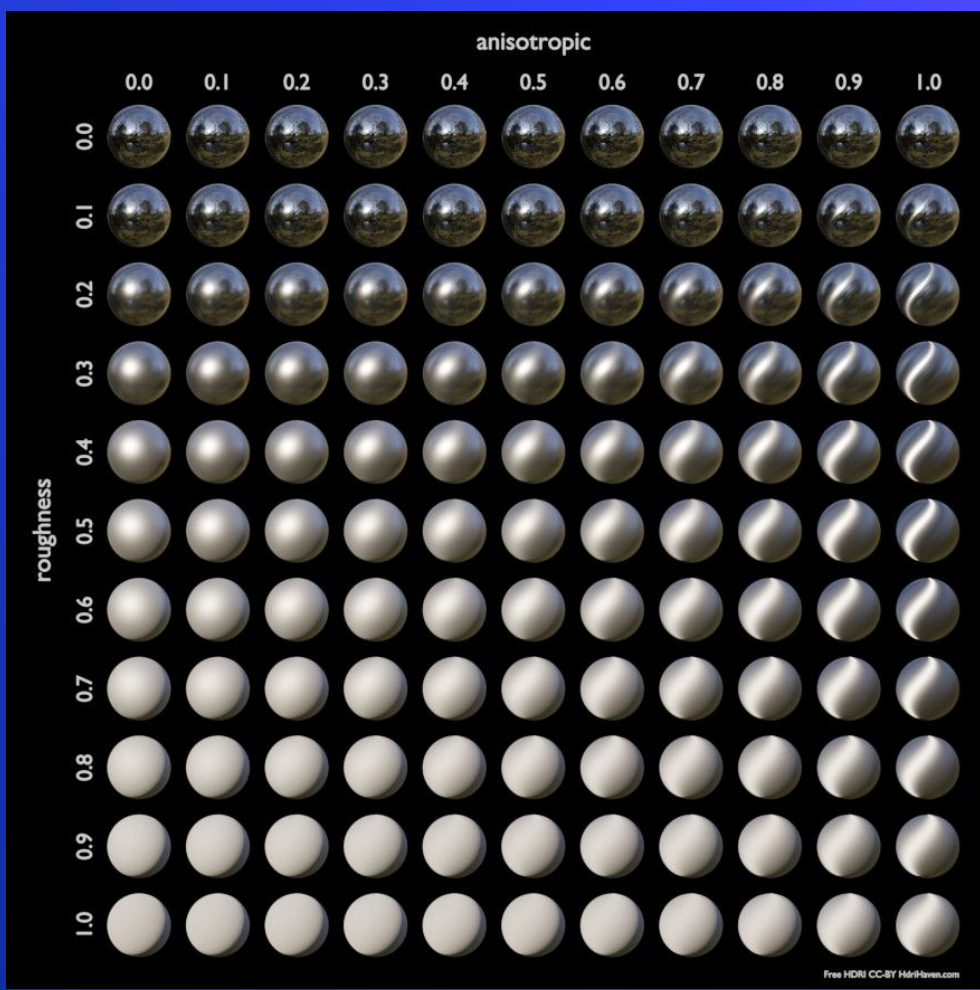
Let's test your  
textures now.



Create a plane, select it, open materials panel,  
click circle next to base color, click image texture,  
locate the image on your computer







**Principled BSDF**

BSDF

Multiscatter GGX

Base Color

**SSS Properties**  
For scattered light rays beneath surface, like skin.

- Subsurface: 0.000
- Subsurface Radius
- Subsurface Color

**Specular Properties**  
For manual tweaking reflections beyond realistic principles

- Metallic: 0.000
- Specular: 0.500
- Specular Tint: 0.000
- Roughness: 0.500

**Anisotropic Properties**  
Stretched reflections, for hair or frying pans

- Anisotropic: 0.000
- Anisotropic Rotation: 0.000

**Sheen Properties**  
Subtle grazing reflections for fabric

- Sheen: 0.000
- Sheen Tint: 0.500

**Clearcoat properties**  
eg. Metallic paint, lacquer

- Clearcoat: 0.000
- Clearcoat Gloss: 1.000

**Standard Glass properties**

- IOR: 1.450
- Transmission: 0.000

- Normal
- Clearcoat Normal
- Tangent





# Textures & Materials



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# Week 5 - Animation

yayayayayyayayaya

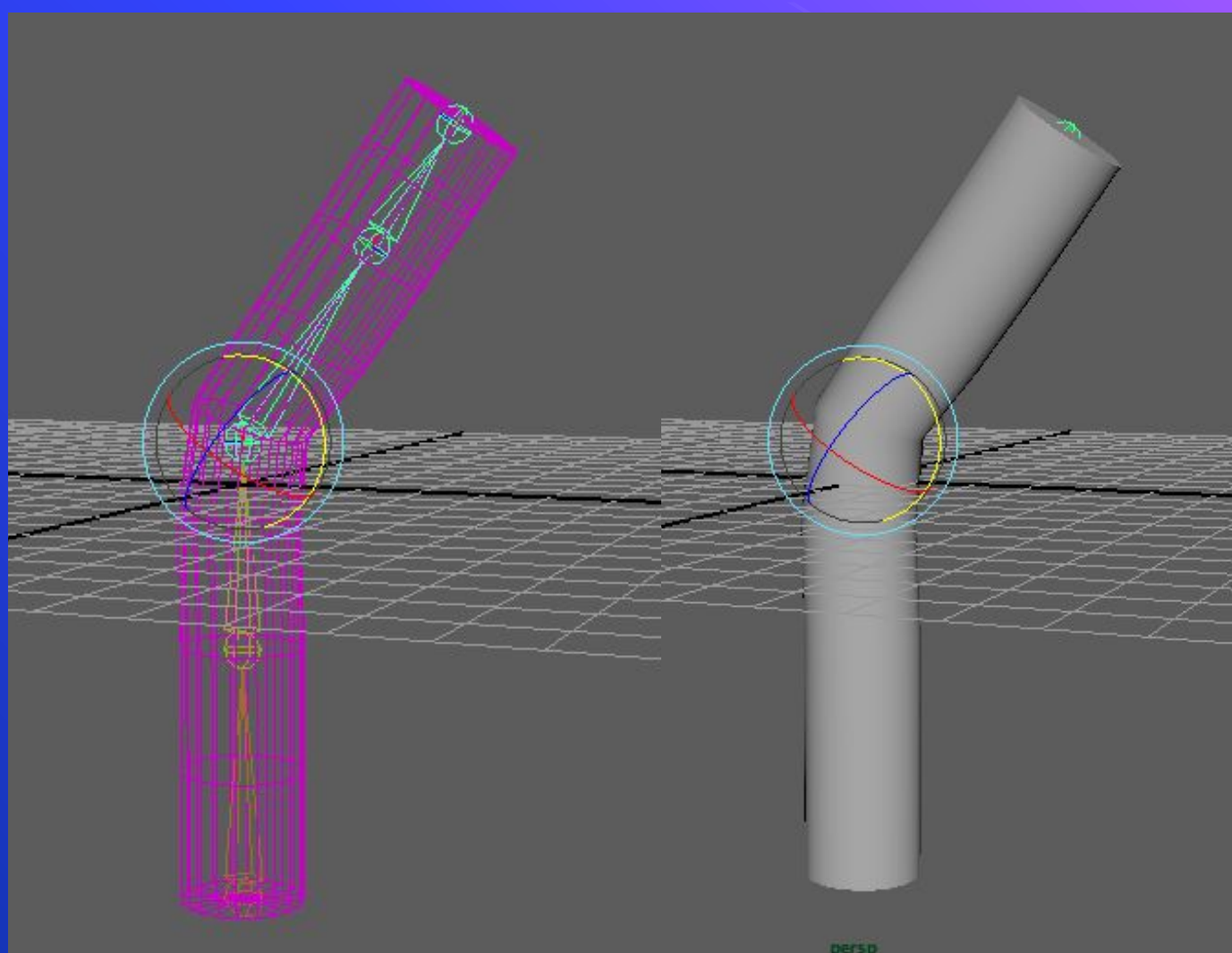
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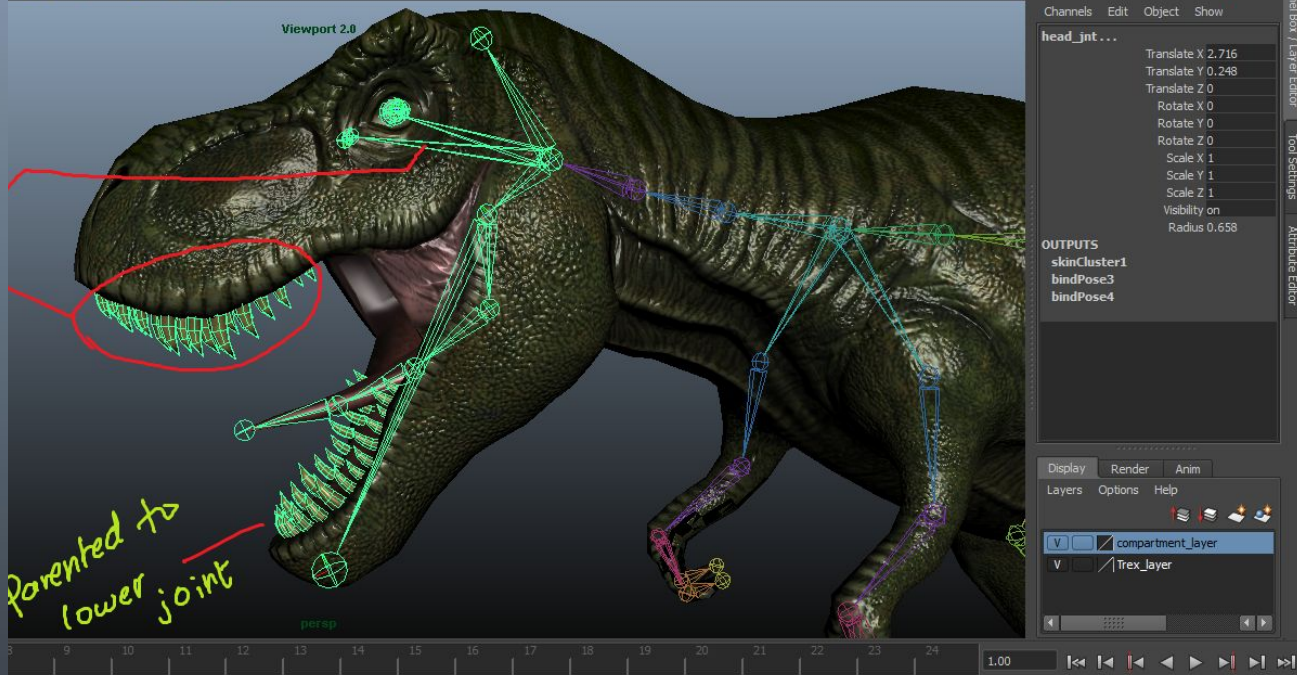
# What is Rigging?

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# Joints



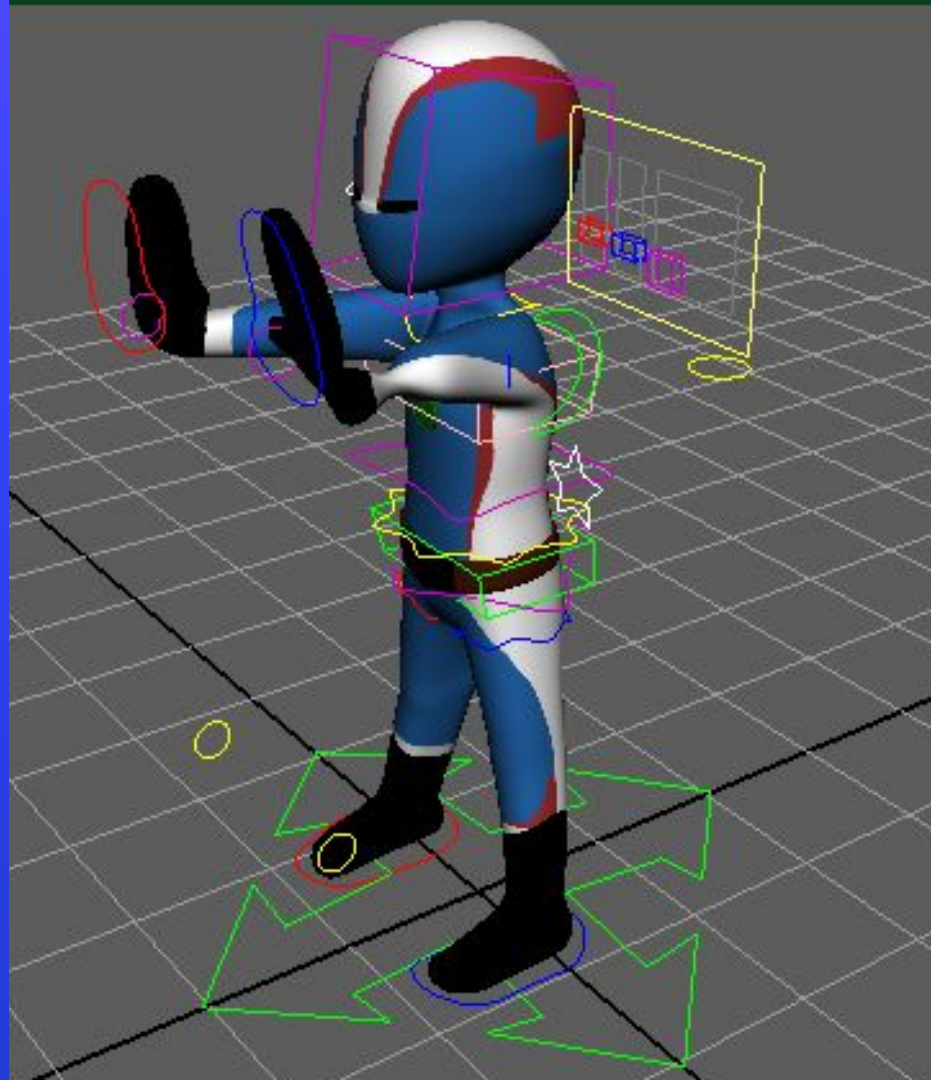




## Install

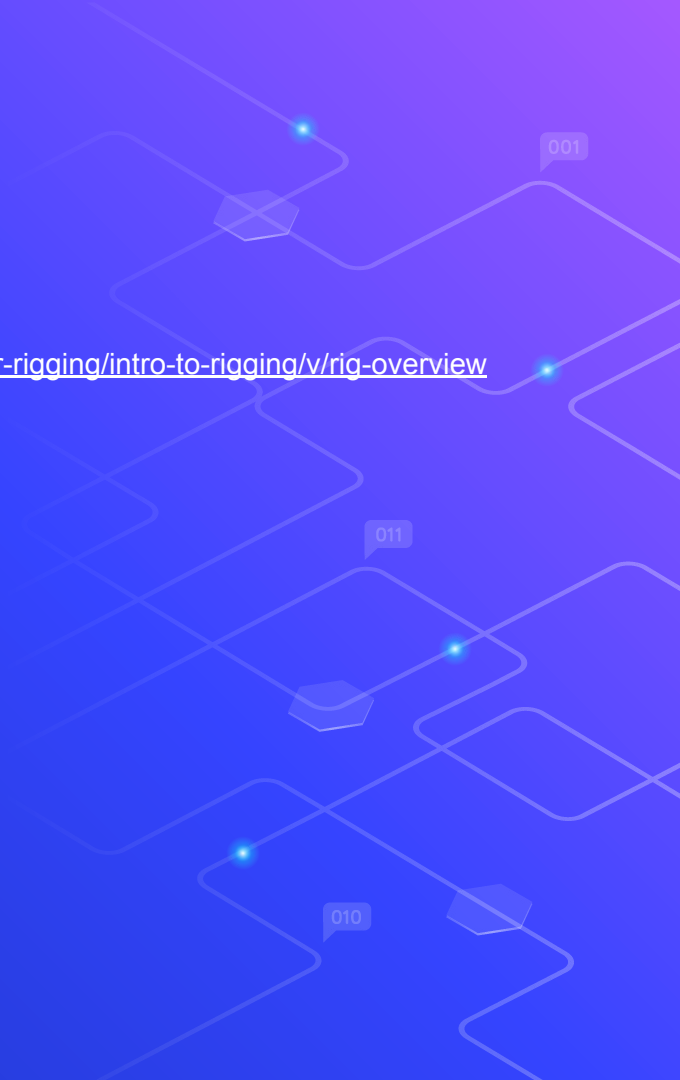
Download the BlenRig .zip file.

Blender allows to install .zip addons easily. Open User Preferences, go to the Add-on tab, and press "Install From File". Then browse to the download directory where the zip is.



# Video

<https://www.khanacademy.org/partner-content/pixar/pixar-rigging/intro-to-rigging/v/rig-overview>



Blender Preferences

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

Official    Community    Testing    Install...    Refresh

All   

- Rigging: BlenRig 5

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