HOW THIS DOC WORKS

What is this doc? This doc is a collection of information I have gathered as an 2d/3d artist in art school.

This doc uses tabs: click hamburger on the left and select the tab of the desired program. (mobile- click arrows at bottom of doc)

Programs Shortcuts/Tips/tutorials include: 2-D tips, Autodesk Maya, Blender (for maya users), Zbrush, Adobe Substance, Adobe Media Encoder, Adobe Premiere Pro, Adobe Animate, Krita

Fill free to contact me if you have any questions: https://linktr.ee/mvision_art

USE CTRL+F: to search things by name!!

Helpful sites for content creation:

- **Youtube video and audio downloader: (**with any yt link) https://tuberipper.cc/56/
- **Tiktok Audio ripper:** https://ssstik.io mp4 videos: https://musicaldown.com/en
- For references, check **my pin boards** (great texture collection): https://www.pinterest.com/mvision_art
- For **Human poses sites** check:
  - https://www.mixamo.com/#/?page=1&query=jumping&type=Motion%2CMotionPack: offers different models, click the animation tab and can apply any type of animation to a model u selected.
  - https://www.posemaniacs.com/poses: large poses collection
  - https://posemy.art/app/?lang=en : 3-d poser, make ur own poses, limited uses.
- Free PNG websites:
  - https://www.freepik.com/search?format=search&last_filter=query&last_value=bark&query=bark (download limit)
  - https://www.pngegg.com/en/png-dkyfi/download
  - https://icons8.com/icons/set/artstation-logo--white
- Free website builder for portfolios: WordPress (with 2 G of storage, twice as much as wix, less glitches)
- Free link pages or cards: linktree, https://guns.lol, https://carrd.co
- Need audio?Images?Programs? Check Internet Archive! https://archive.org/details/image

General Windows PC tips:

- For monitors with more then 60 hz: make sure to change the fps in settings. Settings- system- advanced display- choose refresh rate (set dropdown to highest)
- For good monitors: check to see if you can turn hdr on. Settings- display- hdr
- Download 7zip to unzip compressed files (window 11 wont cant unzip .z01, .z02 files)
- Download jdownloader to mass download links (some sites will get u a link for all the download links)

Where to buy/find 3-D assets stuff:

- General 3d assets (all programs): https://www.artstation.com/marketplace/game-dev?page=2
- General 3d assets (all programs): https://gumroad.com/discover
- General 3d assets (all programs): https://www.fab.com/search
- Ripped assets (Use to study):https://p3dm.ru
- Free furniture models https://free3dbase.com
- Game assets / 3d tools: https://sfmlab.com
- Retro game assets: https://models.spriters-resource.com
- 3D character models library (have to credit not for commercial use. Maya and blender): https://agora.community/assets

- Blender addons: https://superhivemarket.com
- Vrchat stuff
    - Free Vrchat models: https://vrcmods.com/search
    - Free assets/ Vrchat avatars: https://www.vrcarena.com

- Materials: https://ambientcg.com/list?sort=popular
- Gaea: mountain maker https://quadspinner.com/Gaea/
- Free mountain pack: https://www.thepixellab.net/120-free-gaea-3d-terrain-files

Links to Art Book References:

- My concept art doc/drive: https://drive.google.com/drive/folders/16TVuTHR6F4KMb1i-tAotcxhrpKvh77lR?usp=drive_link
- Art book Mega Drive: https://drive.google.com/drive/u/0/folders/177WyD_3uoUQzHfBDflxDw2oGilSwI5UH?fbclid=IwY2xjawIo_MNleHRuA2FlbQIxMQABHesq4WOIjJkaIpZjqURCVTVEW-0MOHBHNT3V1vj86K4WqzbJ3q4VRaXbjA_aem_I7IJkj5EFjgGp5YQjez2KA
- Library of free virtual books: https://anyflip.com
- Internet Archive has a lot::
    - How To Draw Drawing And Sketching Objects And Environments From Your Imagination: https://archive.org/details/how-to-draw-drawing-and-sketching-objects-and-environments-from-your-imagination-pdfdrive.com/page/n65/mode/2up
    - The Art Of Arkane (v1.2): https://archive.org/details/Art-of-Arkane-v1-2/page/n33/mode/2up
    - The Art Of Assassin's Creed Valhalla: https://archive.org/details/the-art-of-assassins-creed-valhalla/page/15/mode/2up
    - Art tips collections: https://archive.org/details/art-tips-collection-by-miyuli/page/n15/mode/2up

Popular free/good programs:

- Krita (in place of Photoshop)
- Infinite Painter (in place of procreate)
- Paintool sai https://www.reddit.com/r/PaintToolSAI/comments/is8j2z/how_do_i_download_sai_2/ (simple/nostalga 2-D)
- Davinci Resolve (in place of Premiere pro)
- Toonboom (in place of Premiere Pro)
- Toon Boom Harmony (Adobe Animate but 1 time purchase, Klaus was made with this and Toon Boom's Storyboard Pro)
- Blender (handy dandy 3-D everything)

Want to make this your job??

Advice:

Choose a specialty/niche- research it, be the best, and apply everywhere. **BUT-**

Reality is, sometimes your best isn't enough

A large part of getting work is networking/connections and being lucky.

Good news! U can increase those chances! Post a lot, especially on ArtStation. Interact and make friends in the industry- join communities. For example, some ppl make fan art or a post on ArtStation, and it gets traction- then they get reached out to, but remember it isn't easy, and you should have a part-time or backup plan to make money in between gigs.

Communities:

Game Jams

- https://globalgamejam.org/games/2026
- https://itch.io/jams

Discords:

Blender community: https://discord.gg/qepwWJ6E

Unreal source: https://discord.gg/unrealsource

Abe lead 3D(YT): https://discord.gg/hcwWvbK7Xz

Jhill (YT): https://discord.gg/artofjhill

Light box expo: https://discord.gg/lightboxexpo

Game dev: https://discord.gg/reddit-gamedev

Gamedev.tv (course site's discord): https://discord.gg/X59VdVEwK7

Hidden dev- Roblox: https://discord.gg/hd

Art club (2-D art, beware of drama): https://discord.gg/artist

Ethan Becker:

Tutorial channels:

Digital painting:

- https://www.youtube.com/@BIRDFALL (profiles)

Character modeling:

- Abe Lead 3D: Basically all industry programs: Zbrush, substance,
- Michael Pavlovich: Zbrush
- Jhill: industry interviews
- Maya Xgen and Marmoset materials: Adam Skutt https://askutt.gumroad.com/l/pDpQi
- Zbrush- Warframe like models: https://www.youtube.com/@KeosMasons
- NPR Maya preview course: Mani Salguero
- Zbrush- FiberMesh: Paul Gaboury

Blender channels:

- PixelicaCG (hard cards, eyes, sculpt)
- Abe Leal 3D (zbrush, substance, maya, unreal)

- Royal sky (rigging goat, animating, speed tutorials, unreal)
- PIXXO 3D (understanding nodes, keyframes, shorts, etc)
- Flycat (Full blender pipeline, great Scults)

Recommended Online learning programs for 3-d and 2-d:

- Gnomon workshops ($57 a month all the industry stuff & offer student discount)(example)
- Coloso https://coloso.global/en
- Cgcircuit: https://www.cgcircuit.com
- Udemy classes (research teacher beforehand):
- Artstation classes (Examples)
- Pixel fondue: (example)
- Game dev (indie) focused course: https://gamedev.tv
- Individual's popular courses:
    - Jhill
    - Abe lead
    - Elementza

Mentorship programs:

- Warrior Art Camp (like a mentorship, research teacher beforehand): https://www.warriorartcamp.com
- Project City: https://www.projectcity.tv/sprint/content
- Artstation classes (Examples)

Shut down/downgradded but can still find the old workshops in the right communities:

- CGMA (like a mentorship, research teacher beforehand): https://cgmasteracademy.com
- FlippedNormals (although some got taken down you can still find them)

Freelance Job Platforms

1. Upwork
2. Fiverr
3. Freelancer
4. ArtStation Jobs
5. Behance Job Board

Job Postings:

- https://www.artstation.com/jobs/all
- https://remotegamejobs.com
- https://www.workwithindies.com
- https://gamejobs.work
- https://animatedjobs.com
- JOB Posting Spread sheet https://docs.google.com/spreadsheets/d/1eR2oAXOuflr8CZeGoz3JTrsgNj3KuefbdXJOmNtjEVM/edit?gid=0#gid=0

- https://careers.animationmagazine.net/jobs/view/3d-environment-artist/ba5122c0-24913878996/?keywords=3D+environment&pos_flt=0&location=&location_completion=&location_type=&location_text=&location_autocomplete=true&radius=320
- https://jobs.motionographer.com/jobs/search?q=3D+Environment+artist&l=&lat=&long=&d=

Job Niches: *Consider a technical position or a boring position that most companies need and no one wants to do (remember that your fav artist prob started doing something completely diff then what they do now).*

Technical artist position (artists don't like the boring stuff but they pay well)
here are three main types of tech artist (reddit user) seen:

- First is pipeline and tools. This tech artist will focus primarily on streamlining the art pipeline and building tools to save time for the rest of the team.
- Second is characters. This tech artist focuses primarily on character rigging and skinning in preparation for animation. Sometimes they will also do a bit of shader work.
- Third: I'm just going to call generalist. This type of tech artist covers a variety of issues from art asset issues, performance overviews, shaders/materials, rendering budget, lighting and more.

Technical artist specific positions:

- VFX (all simulations/fx stuff: smoke, fire, explosions, water, and debris simulations, often using Houdini.)
    - Destruction Artist (Specializes in breaking structures, shattering glass, and crumbling buildings (often within games)
- Groom/CFX (simulating the, fur, hair, feathers, clothing, and muscles for 3D characters and creatures) Demoreel: https://youtu.be/TMg5RsmDyYc
- Texture/material creation artist: this is usually a tech artist position and they may get you to do other positions as well, like a mixed position.
- Lighting & Rendering: These artists ensure the 3D elements match the lighting of the live-action footage. Usually "compositing" positions are tall about this. Places digital lights in the scene, setting the mood and ensuring 3D elements blend with the scene's lighting
    - Compositor (Comp Artist): Combines CGI, live-action plates, matte paintings, and lighting passes into the final image.
    - Roto Artist (Rotoscoping): Traces around objects to isolate them from the background, creating alpha channels.
    - Paint Artist: Removes unwanted objects (rigs, wires) from the footage and repairs backgrounds.
    - Matte Painter (DMP): Creates detailed, photorealistic 2D background environments (digital matte paintings)
- Render Wrangler: Manages the rendering farm, ensuring that computer-generated images are rendered properly and managing technical errors.
  Compositing & 2D Effects
- Ui design

Industry 3D programs+ pricing (please make 3d friends if you cannot afford any of them, ALSO dont pirate the foundry Mari or Nuke)

- Program pricing alternative: (Maya offers a $300 Maya Indie license for those who make under $100,000 a year). G2A website is a “gray market” marketplace, G2A lets third-party sellers list keys rather than selling directly from the developers. These sellers can get keys from many sources that Autodesk didn’t authorize.
- Main modeling programs
    - Maya, **$1,785 license, $300 Maya Indie license for those who make under $100,000 a year**
        - Xgen (hair)-built into maya
        - Yeti (hair)- **$300**
    - 3ds Max **$1,875/year**
    - Blender **Free**
- Specific:
    - Marvelous Designer (clothes) **$280/year, or $39/month for individual**
    - Topogun 2 (retypology/baking) **$149.99/Perpetual**
    - rizomUV (uv) **$160/Perpetual**
    - Speedtree or TreeIT (Foliage creation UNITY) **$19/monthly**
    - Meta Human(photo-realistic humans) **Free**
- VFX
    - Houdini (procedural workflow) **Indie $269/year**
    - Nuke **free personal**
- Sculpting
    - Zbrush **$400/year, $900 perpetual**
    - Mudbox **$100–$160/year**
- Texturing:
    - Substance Painter
    - Substance 3D Designer (material creator)
    - 3D Coat **$400 Perpectual**
    - Mari (face projection, nodes) **Free non-commercial**
    - marmoset toolbag 3 (rendering, baking, texturing and presentation) **$400 Perpectual/ $1/monthly**

  Game engines:
    - Unity
    - Unreal Engine
    - Godot (indie)

Studios (by publisher and parent company)

Game studios:

PlayStation (Sony)

- Naughty Dog (USA): "The Last of Us," "Uncharted"
- Santa Monica Studio (USA): "God of War" series
- Sucker Punch Productions (USA): "Ghost of Tsushima," "Infamous"
- Insomniac Games (USA): "Spider-Man," "Ratchet & Clank"
- Media Molecule (UK): "LittleBigPlanet," "Dreams"
- Bend Studio (USA): "Days Gone"
- Bluepoint Games (USA): "Demon's Souls" (remake) [1, 2, 3]

Activision Blizzard (Microsoft)

- Infinity Ward (USA): "Call of Duty: Modern Warfare"
- Treyarch (USA): "Call of Duty: Black Ops"
- Sledgehammer Games (USA): "Call of Duty: Advanced Warfare"
- Raven Software (USA): "Call of Duty: Warzone"
- Beenox (Canada): "Crash Team Racing Nitro-Fueled"
- High Moon Studios (USA): "Transformers: Fall of Cybertron"
- Demonware (Ireland/USA): Online matchmaking tech backend

Electronic Arts (EA)

- Respawn Entertainment (USA/Canada): "Apex Legends," "Star Wars Jedi"
- BioWare (Canada/USA): "Mass Effect," "Dragon Age"
- Motive Studio (Canada): "Dead Space" (remake)
- Criterion Games (UK): "Need for Speed," "Burnout"
- Ripple Effect Studios (USA): "Battlefield Portal" infrastructure
- Maxis (USA): "The Sims," "SimCity"
- Full Circle (Canada): "Skate" (upcoming revival)
- Cliffhanger Games (USA): Marvel's "Black Panther"
- EA Vancouver (Canada): "EA Sports FC," "NHL," "UFC"
- EA Orlando (USA): "Madden NFL," "College Football"
- Codemasters (UK): "F1" series, "EA Sports WRC"
- Metalhead Software (Canada): "Super Mega Baseball"
- PopCap Games (USA): "Plants vs. Zombies," "Peggle"
- Playdemic (UK): "Golf Clash"
- Capital Games (USA): "Star Wars: Galaxy of Heroes"
- Firemonkeys Studios (Australia): "Real Racing 3" [1, 2, 3, 4, 5]

Ubisoft

- Ubisoft Montreal (Canada): "Assassin's Creed Valhalla"
- Ubisoft Quebec (Canada): "Assassin's Creed Odyssey"
- Ubisoft Toronto (Canada): "Far Cry 6," "Splinter Cell" remake
- Red Storm Entertainment (USA): "Tom Clancy's Ghost Recon"
- Blue Mammoth Games (USA): "Brawlhalla"
- Ubisoft Singapore (Singapore): "Skull and Bones" (English-medium business hub)
- Ubisoft Reflections (UK): "Driver" series physics [1, 2, 3, 4]

Epic Games

- Epic Games HQ (USA): "Fortnite," "Gears of War"
- Psyonix (USA): "Rocket League"
- Mediatonic (UK): "Fall Guys"
- Harmonix (USA): "Rock Band," "Fortnite Festival" [1, 2]

Riot Games (Tencent) [1, 2]

- Riot Games LA (USA): "League of Legends," "Valorant"
- Riot Games Sydney (Australia): Server network engineering

Xbox Game Studios (Microsoft) [1]

- Halo Studios (USA): "Halo Infinite," "Halo: Combat Evolved"
- The Coalition (Canada): "Gears 5," upcoming "Gears of War: E-Day"
- Playground Games (UK): "Forza Horizon 5," upcoming "Fable" reboot
- Turn 10 Studios (USA): "Forza Motorsport" series
- Rare (UK): "Sea of Thieves," "Banjo-Kazooie"
- Obsidian Entertainment (USA): "The Outer Worlds," "Avowed"
- InXile Entertainment (USA): "Wasteland 3," "Clockwork Revolution"
- Ninja Theory (UK): "Hellblade: Senua's Sacrifice"
- Undead Labs (USA): "State of Decay 2"
- Compulsion Games (Canada): "We Happy Few"
- Double Fine Productions (USA): "Psychonauts 2"
- Mojang Studios (USA division): "Minecraft" world ecosystem
- World's Edge (USA): "Age of Empires IV"
- Bethesda Game Studios (USA): "The Elder Scrolls V: Skyrim," "Starfield"
- id Software (USA): "Doom Eternal"
- Arkane Studios (USA division): "Deathloop"
- MachineGames (USA division): "Indiana Jones and the Great Circle"
- Zenimax Online Studios (USA): "The Elder Scrolls Online" [1, 2, 3, 4, 5]

Nintendo

- Retro Studios (USA): "Metroid Prime" series
- Next Level Games (Canada): "Luigi's Mansion 3"
- Shiver Entertainment (USA): "Hogwarts Legacy" Switch port
- Nintendo Software Technology (USA): "Mario vs. Donkey Kong" (remake)

ZeniMax Media (microsoft)

- Bethesda Game Studios: Located in Maryland, Texas, and Montreal, and known for *The Elder Scrolls*, *Fallout*, and *Starfield*.
- id Software: Located in Richardson, Texas. *DOOM* and *Quake* franchises.
- ZeniMax Online Studios: Located in Hunt Valley, Maryland. *The Elder Scrolls Online*.
- Arkane Studios (Lyon): France, English-first/bilingual *Dishonored* and *Deathloop*.
- MachineGames: Uppsala, Sweden, but developing games entirely in English, *Wolfenstein* and *Indiana Jones*

Indie/ independent studios:

- Supergiant Games (USA): Stylized 3D-to-2D models (*Hades*, *Hades II*)
- Toys for Bob (USA): Stylized 3D character sculpting and animation (*Crash Bandicoot*, *Spyro*)

- Unknown Worlds Entertainment (USA): Sci-fi creatures, underwater environments, and hard-surface props (*Subnautica*)
- Keywords Studios (Ireland/Global Hubs): Global outsourcing network with major studios across the US, UK, and Canada
- Virtuos (USA/Canada Divisions): Co-development studio with large art teams operating out of North American offices
- Room 8 Studio (USA/UK Divisions): Global production house with primary business and art leadership hubs in English-speaking markets
- Moon studio: ori will of wisp
- Blue twelve studio: stray

Animation Studios

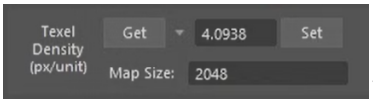
- Pixar Animation Studios
- DreamWorks Animation
- Blue Sky Studios
- Illumination Entertainment
- Sony Pictures Animation

Additional Industries

- Advertising Agencies (e.g., Ogilvy, BBDO)
- Virtual Reality Companies (e.g., Oculus, HTC)
- Educational Institutions (for teaching roles)

Terms/ Industry stuff:

- **DCC:** digital content creation (platform so like maya, 3dsmax, and blender)
- **PBR** (physical based rendering): it uses albedo, roughness, reflectiveness, normal, detail maps.
- **Real time rendering VS offline renderers:** PDR is real time rendering and happens in engines like Unreal Engine and Unity. Offline rendering is like- Vray, cycles, arnold, redshift are all render engines that need time.
- **Level of detail**: Each game has different poly/texture sets limits. Some have LOD(level of distance) creation, which is stages of the same asset for high/low poly/texels. (EX: fps games have high resolution on hands because they are closest to the camera.) Main characters can have up to 200k tris, while side characters can be 30k tris. Usually will have to alter low poly models for riggers deformation and make multiple UV maps for stuff like VFX.
- **Texturing:** Creating Material definition (texture details in high poly sculpt or materials) and color blocking: to have colors bring attention to areas of interest like the head
- **Look development:** critical look at textures in engine and changing engine shaders or materials for the final look. This is the last stage of the development process, usually some parts are redesigned if it isn't fitting.
- **Texel density** (texture density): https://www.beyondextent.com/deep-dives/deepdive-texeldensity measurement of how many texture pixels (aka texels: stands for TEXture pixEX or texture element) are mapped onto a specific physical area of a 3D model. The equation is based on three factors: texture resolution, 3D object scale, and UV mapping space. A GPU (Your Graphics Card in your PC) takes these texels and projects them onto the pixels on your screen through texture mapping (This is why we have UV's). You can calculate the texel density in the UV editor in maya.
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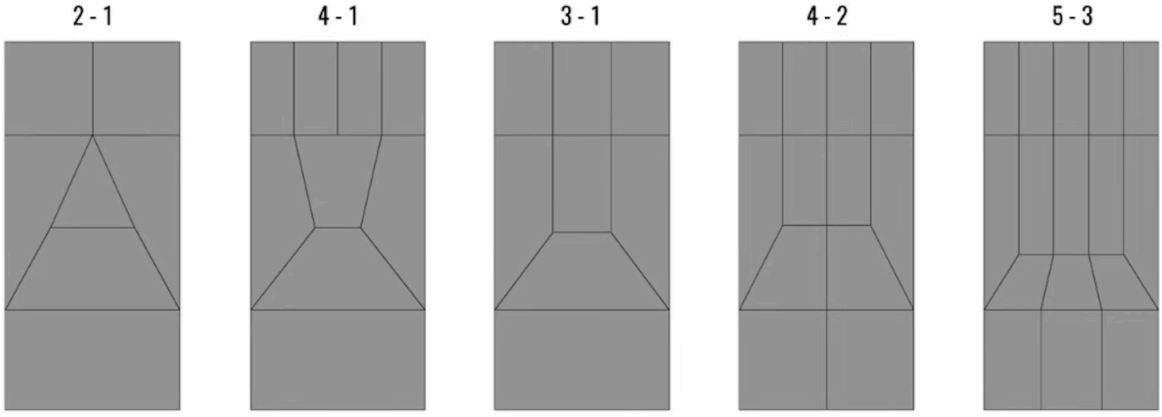
    - Example of UDIMS: After object is scaled, modeled and UVed (where uses are straightened in same direction)
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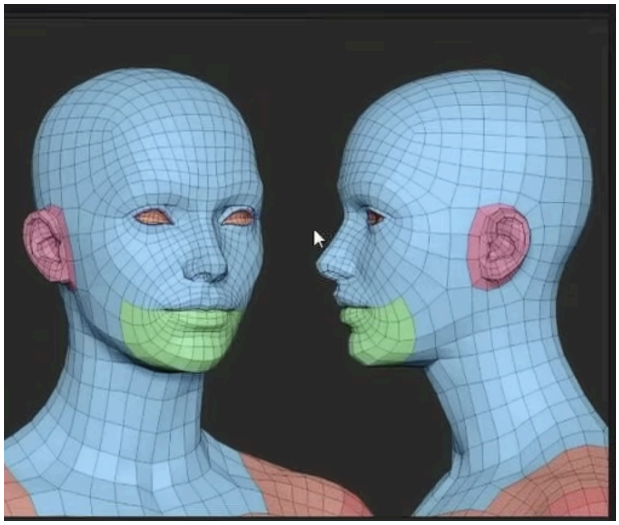
This is the base texel density for a UVmap with 2k resolution. In layout settings, changing the padding an tiles x4
    - **UDIMS:** https://youtu.be/-7_EIwMrRuM?si=ZdzJeLrFF_LjFt6Y UDIM stands for U-Dimension. It is a UV mapping and texturing system that allows you to spread a 3D model's UV layout across multiple side-by-side texture tiles instead of being restricted to just one. Each tile uses its own separate image file, but the 3D software reads them all together as a single unified texture. Used to make super high resolution like 8k maps, mostly used for cinematics not games.
    - Trim Sheets: texture maps containing prefabricated details arranged in rows or sections that you can repeatedly map onto different parts of a 3D model. Instead of uniquely texturing an entire object, you unwrap its faces directly onto these pre-made rows to instantly apply details like bevels, vents, pipes, or panels.
- Color space
    - ACES:
- **Look development:** critical look at textures in engine and changing engine shaders or materials for the final look. This is the last stage of the development process, usually some parts are redesigned if it isn't fitting.

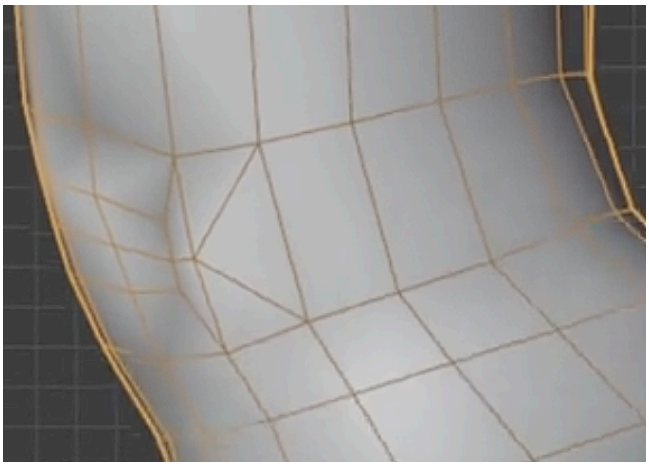
Retypology:

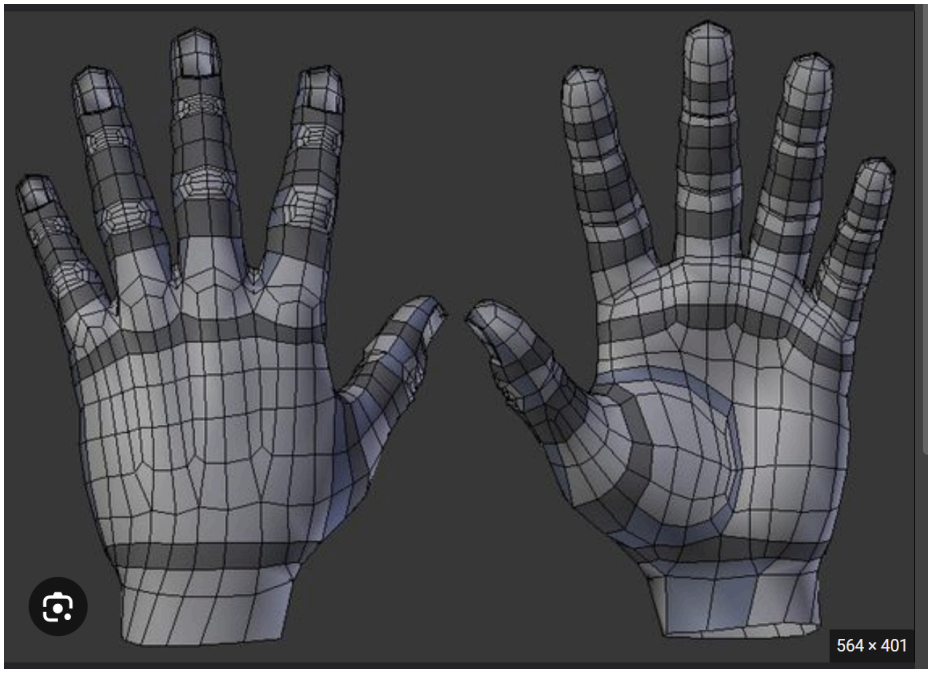
- **Typology in professional examples (games, VFX, animation industry):** https://youtu.be/t_geunQnPT0?si=J9ubfmIOffF99yZr
- **Understanding Typology:** reference pic (https://youtu.be/HGL6QpVRyXk?si=qpi_COuNDTqjP-bG)
- **Understanding Joint retypo short:** https://www.tiktok.com/t/ZP8D9bhWX/ (circle inset at knee/shoulder/elbow, 2 triangles on sides with point towards circle)

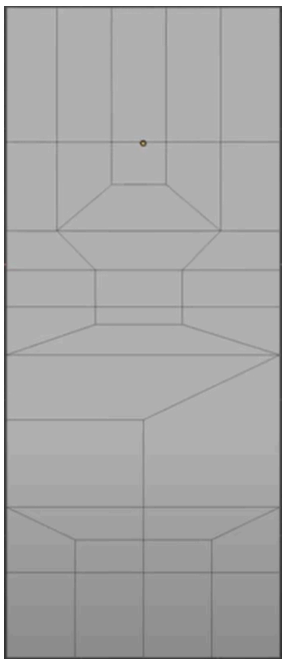
- **Retypology:** for games- silhouette is king, For animation- deformation drives the typology, For VFX- fidelity(loyalty to form) drive typology. Some game studio(like last of us) make more edge loops than needed because of a shader that uses vertex blender for stuff like brick, dirt, most, etc. Typology breakdown into:
    - Edge flow
    - Localization of typology
    - Triangles are a tool
    - Floaters/trim sheets/decals
    - High to low poly workflow
- **Triangles are a tool.** Use them in specific areas of a model.

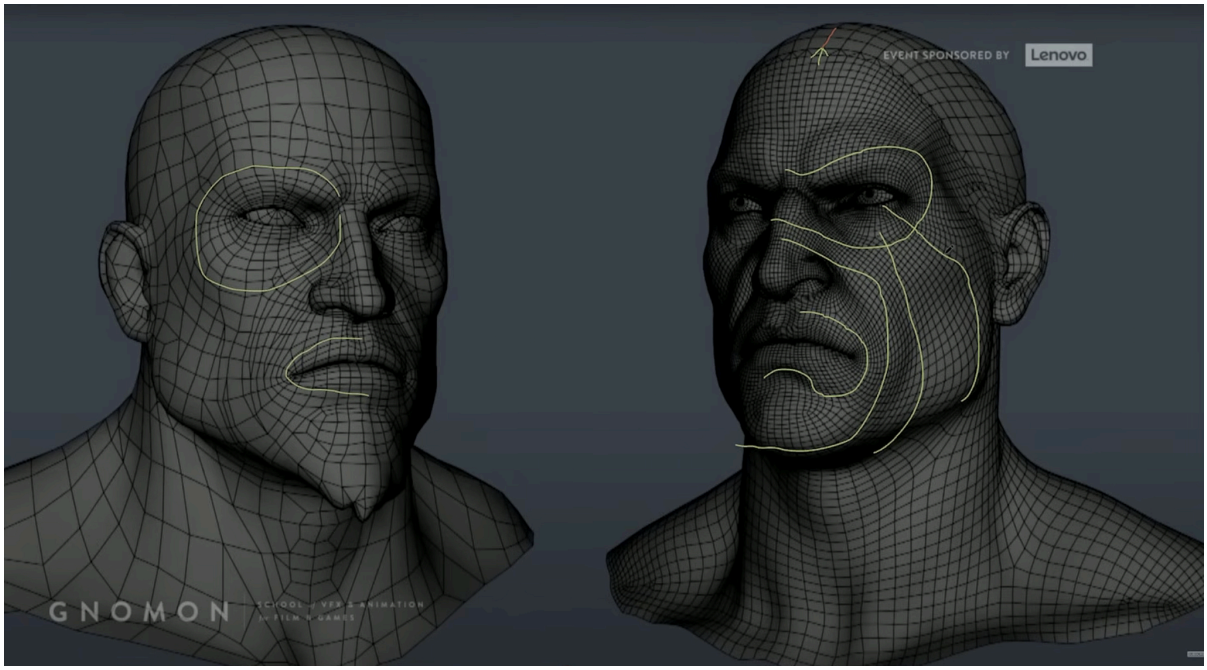

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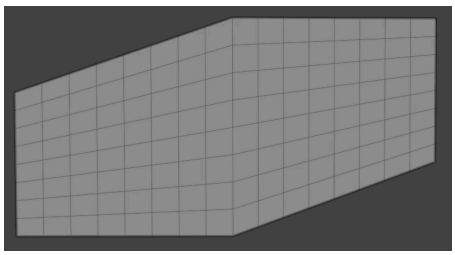


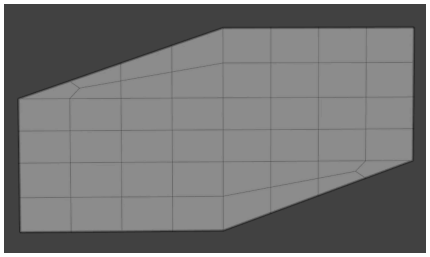



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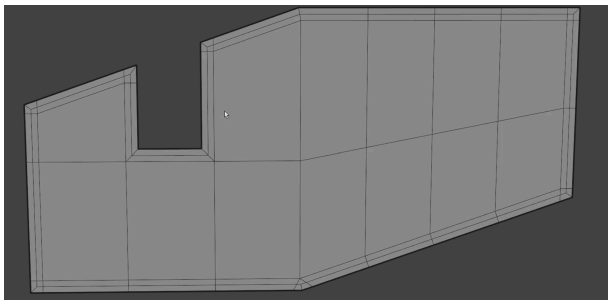


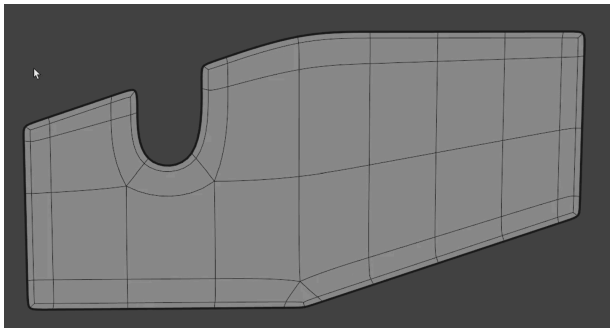




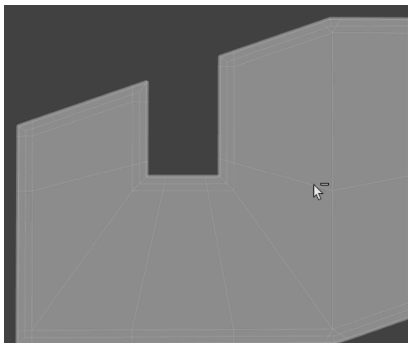
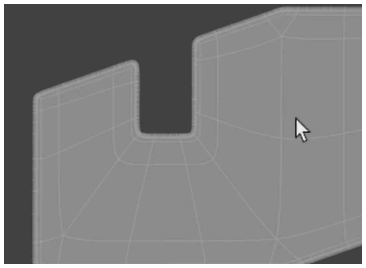
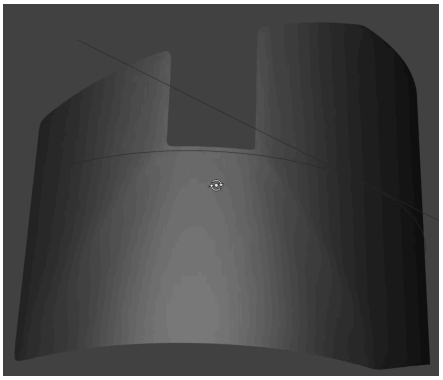


1. Ideally this is the best solution, dependable. 2. For specific panel or silhouette or direction (like a window in the middle)



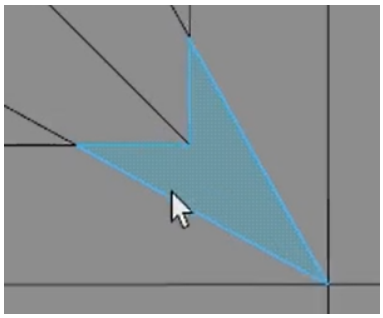


For sub-D workflow: Add corner cut for supportive edges(in this case corners) so that “smooth” preview keeps corners sharp

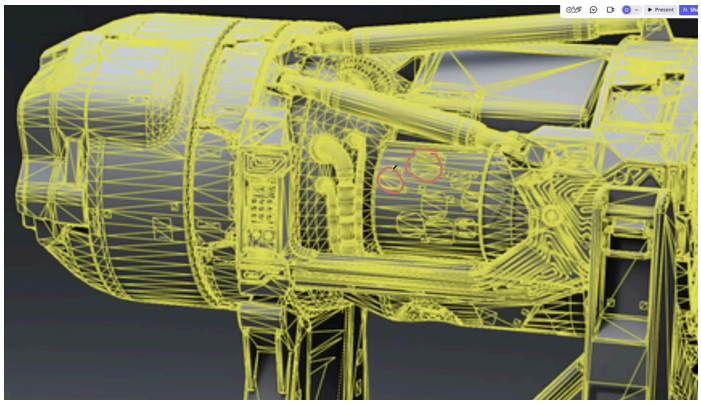




Some people add these sorts of cuts for sharp edges, but not idle bc redirects edgeflow, causing pinching with materials when curving mesh.

Avoid Paperplane typology, causes lots of issues later



Use floaters for detail: this is a cyberpunk 2077 model made in cad but used floaters for detail

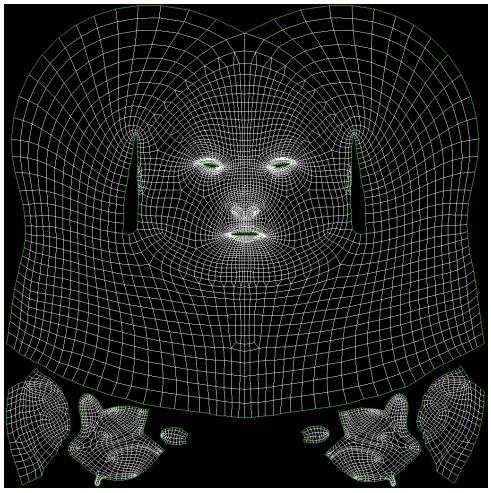


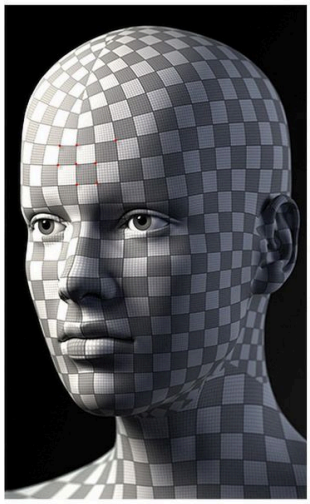

UVs:

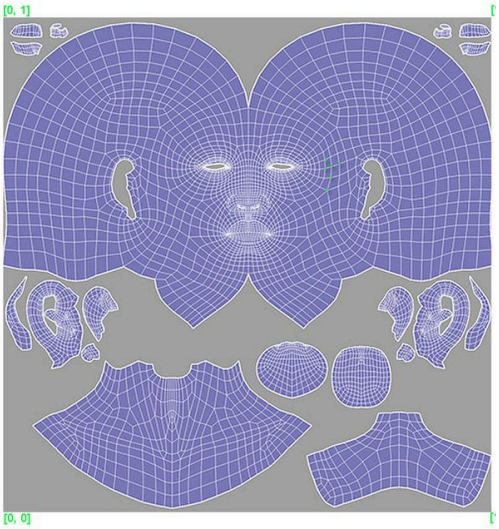
Face uv:

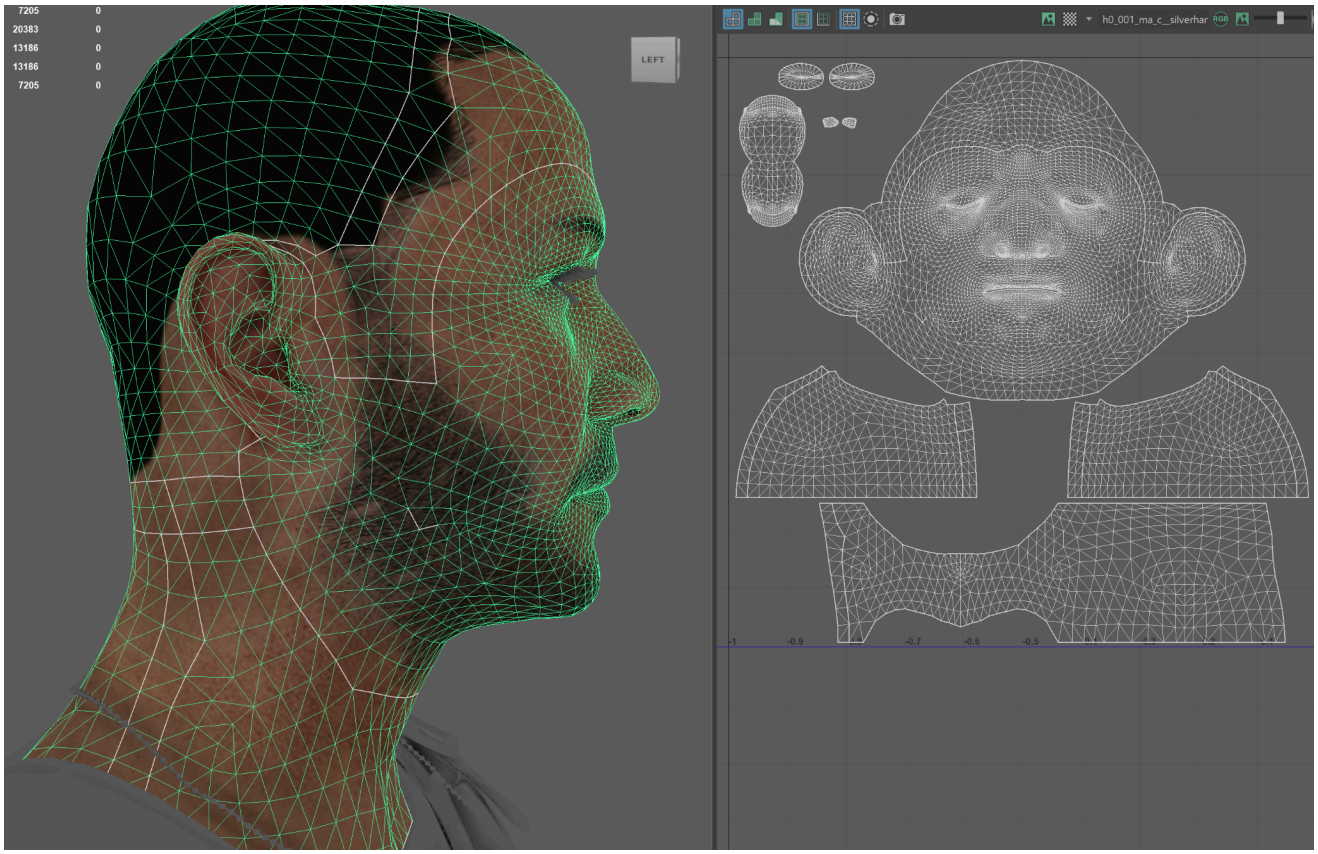
https://youtu.be/-PlP0phqTqY?si=lzLqhKX6dwZqcP6m uV head (8mins)

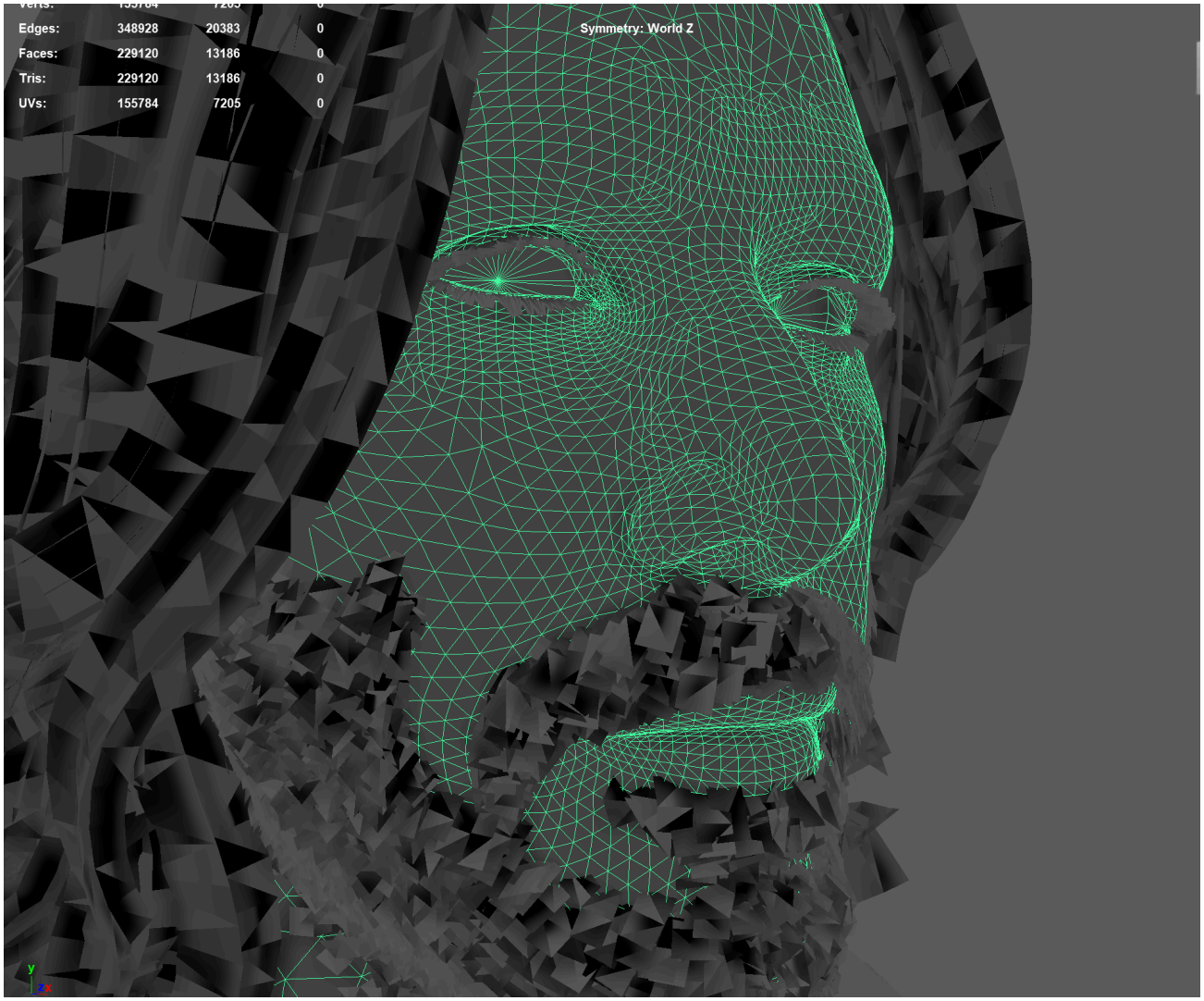
-eyeholes, mouth, nose, ears, neck seam and hairline

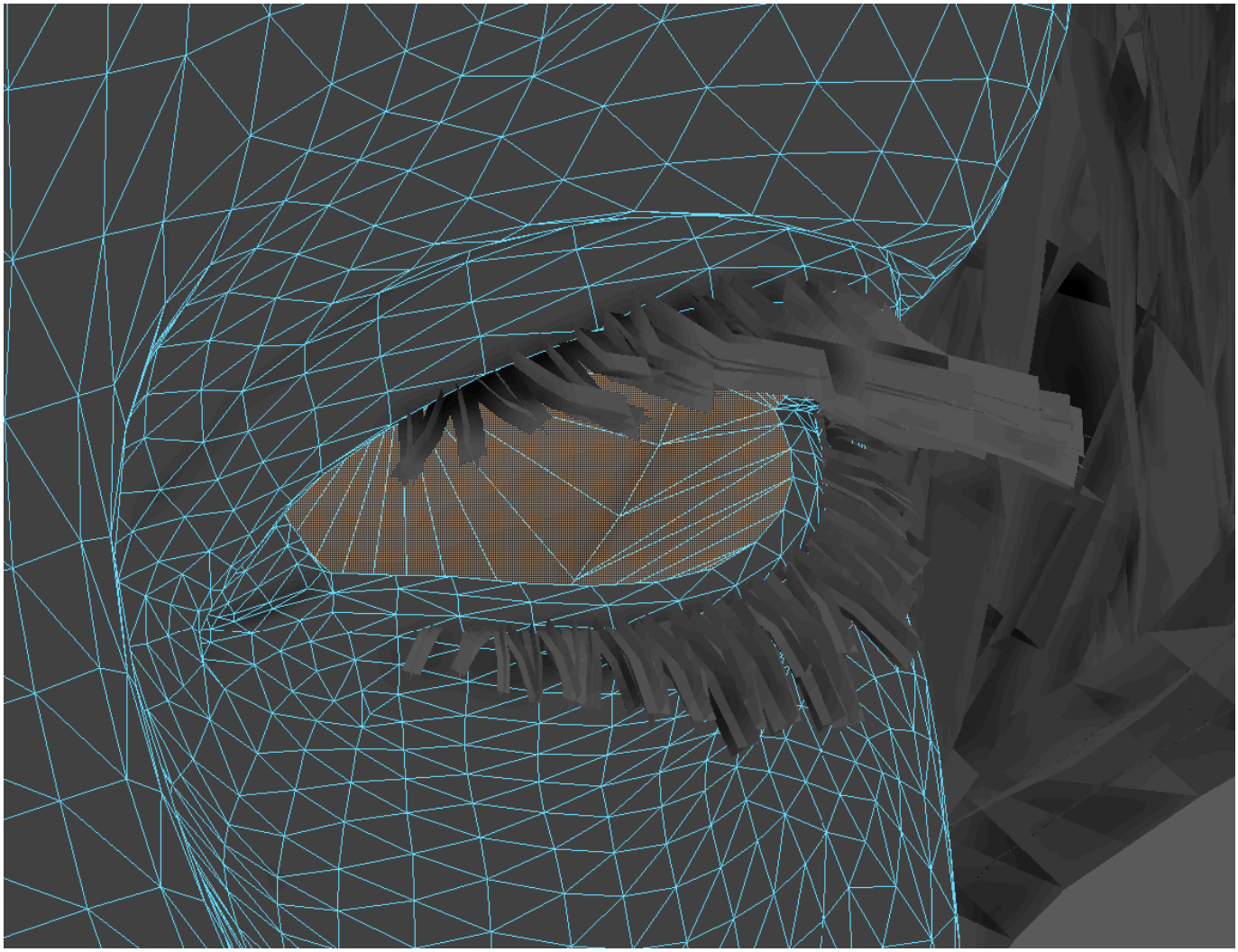


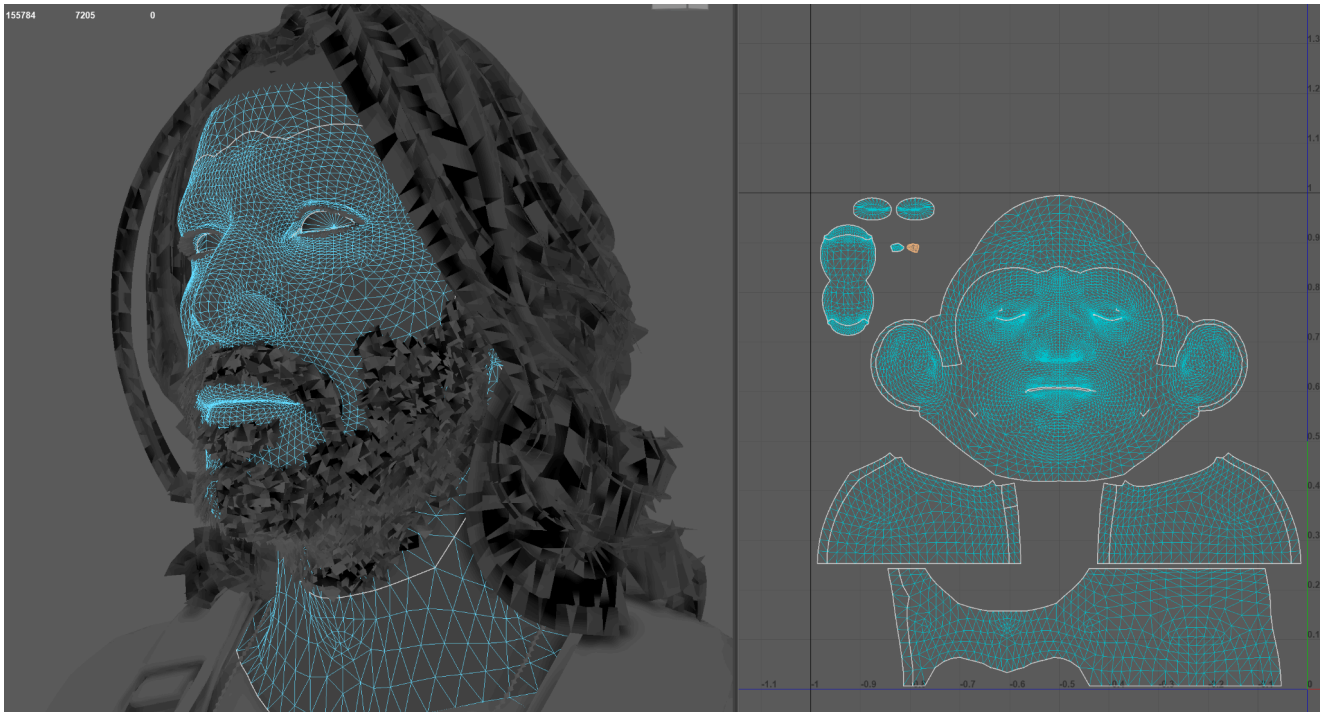


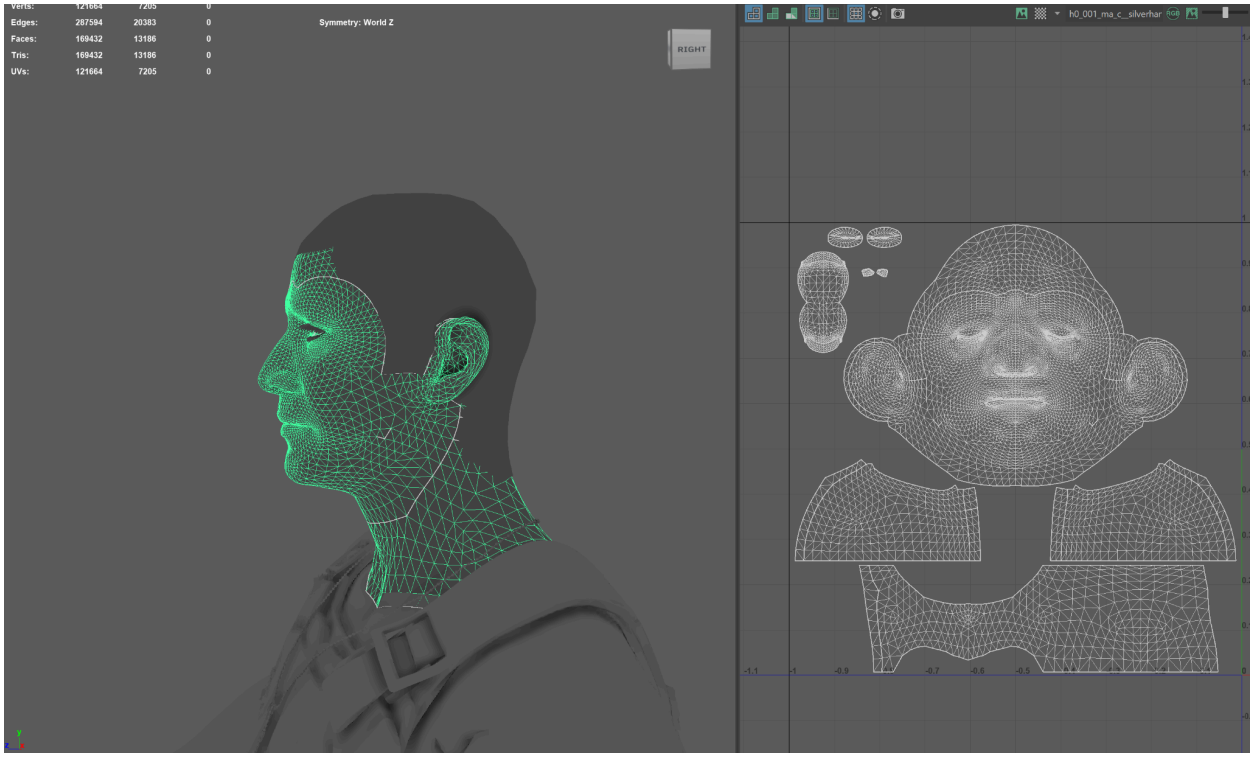

[0, 1]
[0, 0]

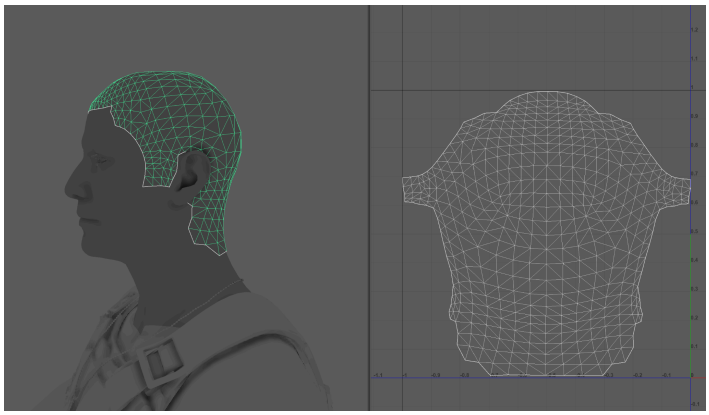

7205 0
20383 0
13186 0
13186 0
7205 0
LEFT
h0_001_ma_c_silverhar
-1
-0.9
-0.7
-0.6
-0.5

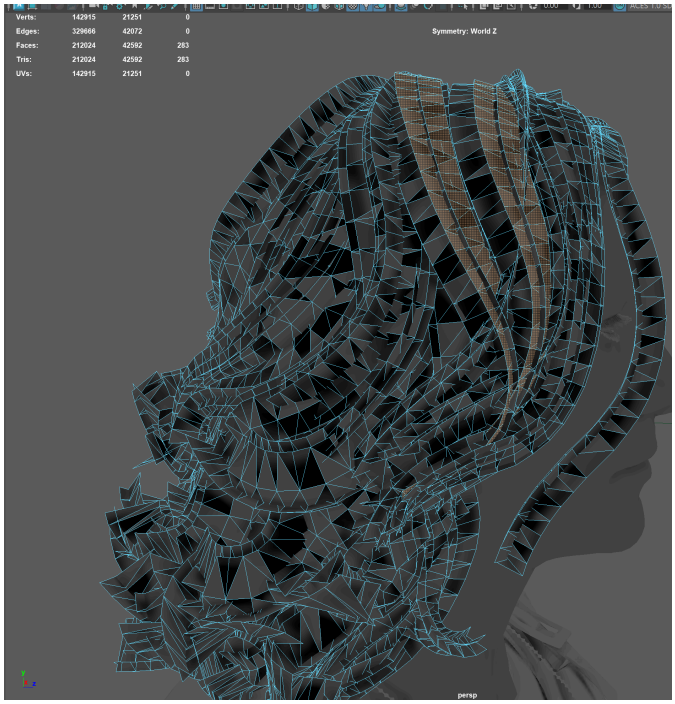

Edges: 348928 20383 0
Faces: 229120 13186 0
Tris: 229120 13186 0
UVs: 155784 7205 0
Symmetry: World Z

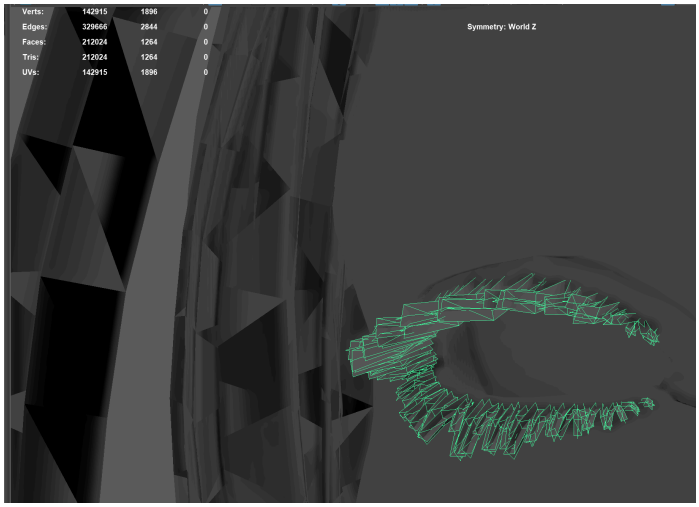



155784 7205 0

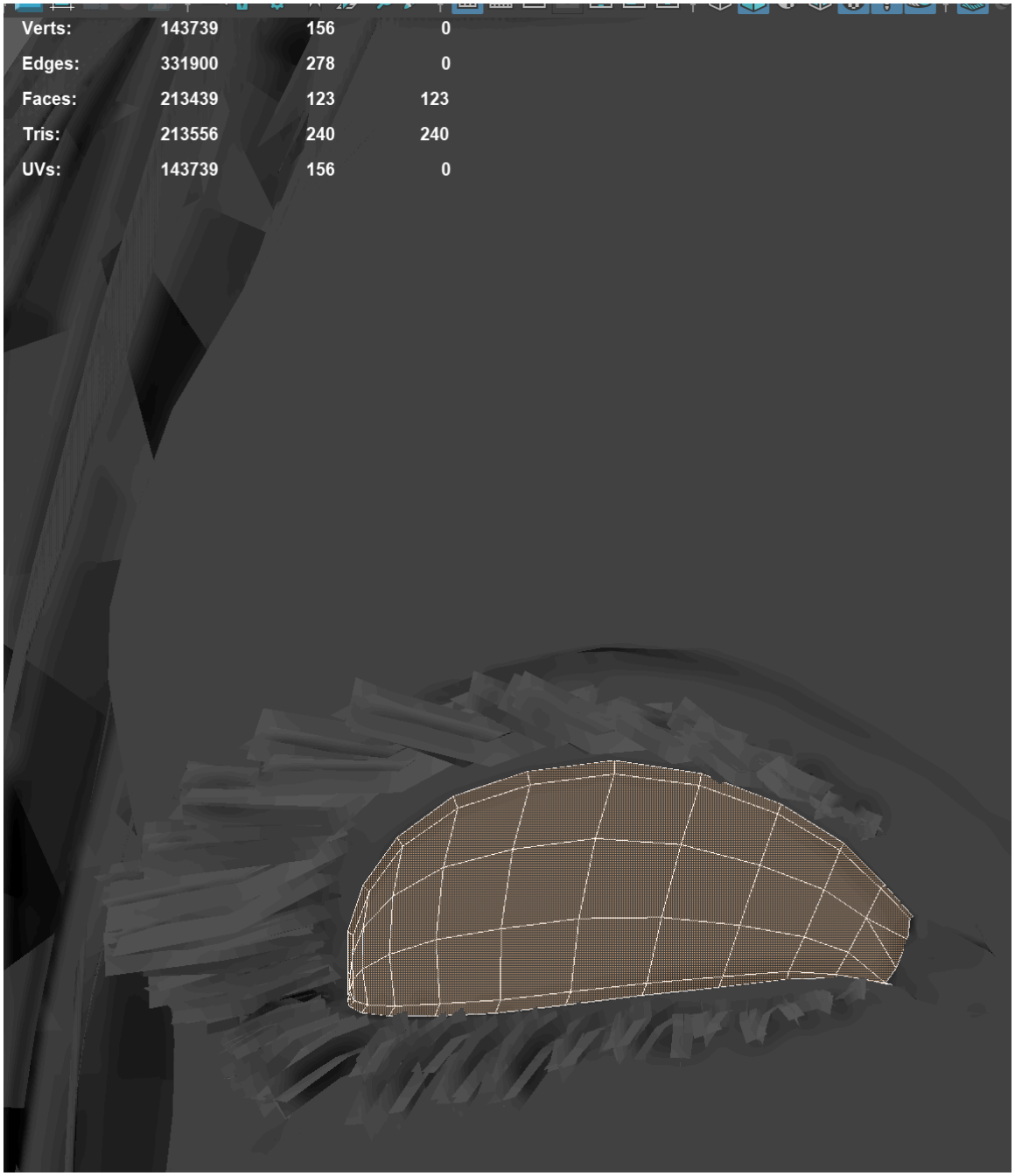

Verts: 121664 7205 0
Edges: 287594 20383 0
Faces: 169432 13186 0
Tris: 169432 13186 0
UVs: 121664 7205 0
Symmetry: World Z
RIGHT
h0_001_ma_c_silverhar

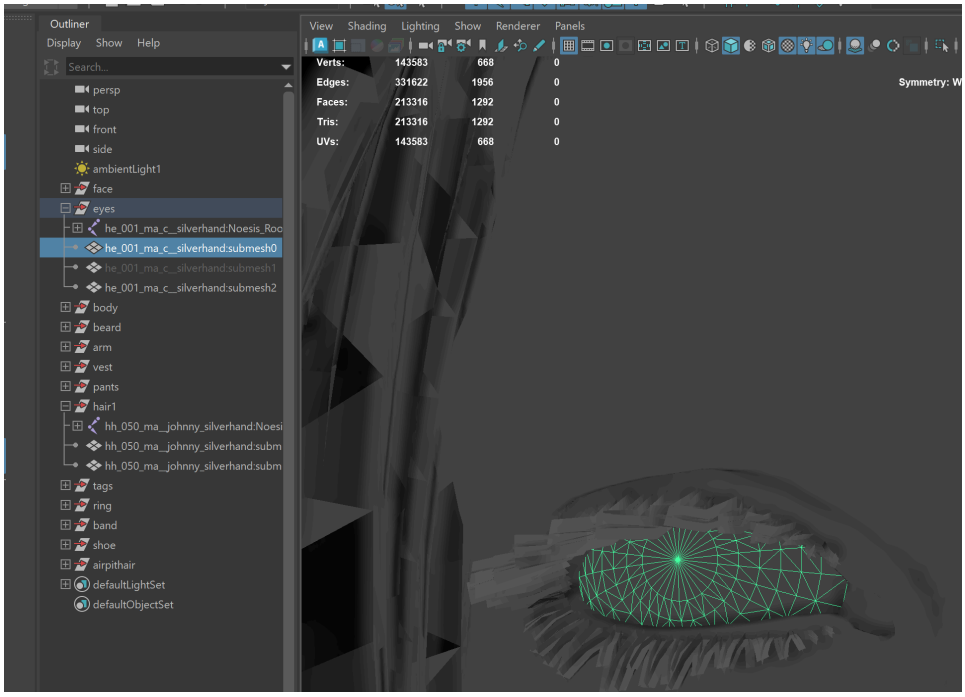


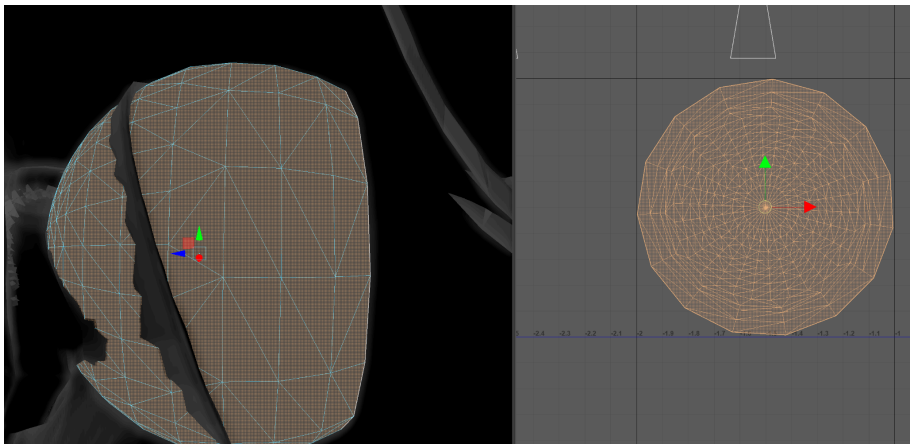

Verts: 142915 21251 0
Edges: 329666 42072 0
Faces: 212024 42592 283
Tris: 212024 42592 283
UVs: 142915 21251 0
Symmetry: World Z
persp


Verts: 142915 1896 0
Edges: 329666 2844 0
Faces: 212024 1264 0
Tris: 212024 1264 0
UVs: 142915 1896 0
Symmetry: World Z


Verts: 142915 6644 0
Edges: 329666 18693 0
Faces: 212024 12057 0
Tris: 212024 12057 0
UVs: 142915 6644 0
Symmetry: World Z
persp


Verts: 143739 156 0
Edges: 331900 278 0
Faces: 213439 123 123
Tris: 213556 240 240
UVs: 143739 156 0


Outliner
Display Show Help
Search...
persp
top
front
side
ambientLight1
face
eyes
he_001_ma_c__silverhand:Noesis_Roo
he_001_ma_c__silverhand:submesh0
he_001_ma_c__silverhand:submesh1
he_001_ma_c__silverhand:submesh2
body
beard
arm
vest
pants
hair1
hh_050_ma__johnny_silverhand:Noesi
hh_050_ma__johnny_silverhand:subm
hh_050_ma__johnny_silverhand:subm
tags
ring
band
shoe
airpithair
defaultLightSet
defaultObjectSet
View Shading Lighting Show Renderer Panels
Verts: 143583 668 0
Edges: 331622 1956 0
Faces: 213316 1292 0
Tris: 213316 1292 0
UVs: 143583 668 0
Symmetry: W



Blender

Blender Tutorials and Addon's in SPREADSHEET:

https://docs.google.com/spreadsheets/d/19GwkAbRc3mfvepVfRDaib5C3iC5k-2TdHIuPPC7ZBxc/edit?usp=sharing

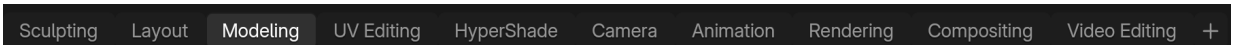
If you can't install an addon/error popup: run Blender as administrator

- Some addons cause lag, like blender kit. Download it, but disable it when not using
- Some addons like Rigify need auto-script enabled to work: edit-preferences-save and load- checkmark autorun scripts

My layout and keymap: For layout- open blender layout file: file- defaults - save startup file. For keymap- edit-preferences- keymap- import. https://drive.google.com/drive/folders/1cW-SJuOE_fTazUVAQ6cq1frSScxaxjoy?usp=sharing

Layout changes I made:

- In outliner change "scenes"  to  "view layer"
- Rclick on the Blender version in the bottom right- checkmark statistic and memory (shows face count n stuff of objects)
- Add a layout menu with the plus at the end of the tab
- **To change/move windows (top right bottom switches any window type):** grab edge of window to move, grab coner to drag out duplicate, l-click corner to manually delete a window.
- In hypershader set files to where u save all art/3d stuff
- I make my top tabs look like this:



To save layout by: file-defaults-startup file

Preferences changes (top bar: edit-preference):

- For some addons to work, like Rigify I had to go to preferences- save & load and checkmark "enable autoscript"
- To up max undo amount: preference- save & load- Undo steps (default 32, up to 256 as max). But set it according to how much ram you have, I have 64 so mine is on max amount
- The discontinued MAYA config addon has some broken keybinds like "W/E/R" keybinds do not work for rigging and curves. To manual set a key look up the command and identifier (ex for changing transform movement): Change command to wm.tool_set_by_id. Below that, set the identifier to builtin.move)
- I also found someone who made themes and uploaded a theme pack to make my blender pink!

Always save preferences at bottom left or wont be there on the next launch.

General Modeling (Maya addon exclusive hotkeys/menus are in Purple):

Windows and shortcuts MAJOR tip:

- *when performing ANY shortcut make sure you do it with the mouse hovering in the correct window. (ex: clicking "I" to keyframe only works when mouse in timeline or on slider in , "U" unwraps in UV editor but brings up UV menu in viewport.)*

Tabs (file/edit, etc and workspaces)

File export/import:

- **To export standard mesh from Blender:** Select mesh- export as fbx- checkmark desired on right side (ex: "Selection Only")
- **How to export blend file with textures:** file- external data- automatically pack resources

- **How to import another blend file's nodes/texture/objects into another:** file-append-double click onto .blend-object-shift select desired objects.

Windows Editor Type Explained: (sectioning)

Outliner: Outliner uses collections for grouping.

- Top left of the outliner, change "scenes"  to  "view layer" to see the object in the collections and the check mark.
- Use the eyeball to hide collection
- Use checkmark to disable collections (it forces everything to unhide when checked back on)
- **. (click once)**: opens all folder leading to an active selection
- **shift+A:** (toggle) expand all and collapse all (Home: (button) Expand All, but diff)
- **Ctrl+click:** select multiple individual
- **Shift+click:** range selects
- **B or lclick drag:** box select (hold shift to extend, **alt** to subtract/deselect)
- **Ctrl+double click:** rename (hover over name)
- **H:** hides, alt+H: unhides
- **X**: deletes
- **F2:** batch rename (shift select desired batch- F2- set to "set name", "new" to rewrite old name"

If ctrl+z isn't working: for when u delete collections make sure ur "global undo" is checkmarked on in preferences-system.

Top Bar of viewport Explained: *must be in "layout" workspace to see some of these)*



changes object interaction mode's (dropdown changes depending on selection (ex: mesh's show sculpt mode/ weight painting, armature show pose mode)

Viewing methods

-  X-ray shows the wireframe of the mesh ur selected (shows wireframe through other meshes and keeps mesh solid visible)
-  wireframe mode, shows wireframe of all meshes visible
-  solidmode, base mesh no materials
-  material preview
-  shaded (basically live rendering)

:  play with these 3 to change what ur viewing in the viewport, can disable grid/floor/axe's/



(in edit mode): symmetry

 (in edit mode): auto-merge, used for typo, set the radius in the "options" dropdown

General Modeling Shortcuts:

Ctrl+z: undo

Ctrl+shift+z: redo

Ctrl+s: saves

Alt+L click: rotate around the object

Alt+R click: Zoom in space

Alt+middle click: Move in space

- **W:** Move (select object)
- **E:** rotate tool (select object)
- **R:** Scale tool (select object)
- **Q:** box tool (B: box select, but with lines)
- **V:** lasso select
- **C:** brush select (circle select)

Left+click (aka, Lclick): selects

- **A:** selects all
- **L**(while hovering over sections): link select (dropdown appears in bottom left, set to normal to select meshes not merges, or seam/ sharp for sectioning a mesh)
- **Shift** (Hold while Lclick): selects more than one thing.
    - "**Pick shortest Path" menu** will appear in the bottom left- change the drop-down to the desired effect and Ctrl-click once in 2 different spots, and it connects them. (great for uv seam/marking sharp)
    - **Shift double-click**: selects loop (direction is based off what edge u are close too)
- **Ctrl** (Hold while Lclick)**:** deselects
    - **ctrl+double-click:** deselects loop
- **Ctrl+shift** (Hold while Lclick)**:** batch select (corner to corner- good for faces)
- **Ctrl+ side mouse button 1:** select more
- **Ctrl+ side mouse button 2:** select less

Shift+Rclick (hold, in editm mode edge/vert/face): Special tools menu. pops up diff menu when selected on a edges/vertex/faces and holding shift+Rclick.

Lift+click hold: quick pie-menu

- Edit mode and object mode. (switch between the two options, but auto switches to edit mode for vert/face/edge)
- edges/vertex/face
- isolates: isolates mesh (toggle) Also **Alt+E** triggers this.
- Smooth and flat mode (but only works in object mode, changes object shading, use shift-special to mark edge as sharp)

Space Hold: View snapping pie-menu

- All snap to left/right/top/bottom/front/back perspectives (works in ortho and persp modes)
- Perp/ortho: toggles between perspective and orthographic
- Quad view: splits screen into 4 perspectives (toggle)

Escape: cancels most actions

X: delete

- **Ctrl+x**: dissolve delete (good for deleting edgeloops and not having verts remain or holes in mesh)

F: refocus on mesh

H: hide

- **alt+H:** unhide

N: opens sidebar (right)

- To **mirror action LIVE** (no modifier, good for animating): in edit mode- n - tools- options- enable axis of editing (wont work if not perfectly symmetrical and dont have mirror typology check)
- To **up clipping distance** (for small objects of large scenes):): n - view - change clipping start (for small) and clipping end (for large stuff) (too small of clipping may cause some artifacts or somethin)

T: opens Toolbar (left side) (shift+space to open toolbar menu)

- *If triangle on bottom side of tool in toolbar- hold down while hovering on tool to bring up other tool options (use mostly box select and lasso)*
- **w/e/r**/q/v/c(when on tool): switches out of whatever tool mode
- **Ctrl+E:** extrude (**alt+ E** to see extrude menu options)
    - Shift (hold): slow mode (precision)
    - Right click: to stay in place
- **I:** inset face (like a inward extrude but no overlapping faces) (hold ctrl to invert direction)
- **Ctrl+R:** shrinking/flattening (direct drag out from face, good for circles)
- **S:** knife tool (toggle)
    - S: to finalize action
    - Esc: to cancel tool
    - Shift (hold): snap verts to center of face
    - Ctrl: ignore vertex snapping
- **Ctrl+S**: edge loop (scroll will up to add multiple loops, click drag to move loop)
    - **Alt+S:** drag edge loop
- **Ctrl+b:** bevel (move down+plus l+click to change thickness)
- **Ctrl+T:** tilt

Shift+z: toggle wireframe
Alt+z: toggle X-ray
Ctrl+tab: object interaction mode pie-menu

Shift+a: add object
Ctrl+a: apply menu
Shift+s: snapping pie-menu (Easy snapping between two objects/points on mesh trick: On first object/part of mesh: shift+s- Cursor to selected. On second object/part of mesh: Shift+s -selection to cursor)
Shift+d: Duplicate (right click to keep in place, pops up in outliner in object mode, stays in object in edit mode.)
Shift+r: Repeats last action
Shift + tab: toggle Snapping (aka live, extra option at top bar, *mostly use snap to normals*, sometime verts)
B: toggle Proportional editing (aka. soft select, extra falloff option at top bar, *checkmark connected only to only effect loose meshes*, Scroll wheel up or down to see the affected area (can only see the circle WHILE moving stuff)
Ctrl+J: join
P: separate menu **(**unjoins selected mesh, or based off materials or loose parts)
Y: split selection (splits faces in a selection, duplicated edges/verts)
Ctrl+I: Invert selection

Shift+V: slide selection (in vertex or edge mode it slides between the connecting parts at any angle)
Ctrl+V: rip (like splitting but with verts/edges)

- **alt+V:** rip (and keep connected) (right click to keep in place, and shift v to slide for creating new quads in a face)

M: merge menu (usually select at center)

- At center: everything selected into one single point
- At mouse: use scroll wheel to select
- Collapse: geometry touching each other merges into center point

Shift+N (edit mode): recalibrate normals
Ctrl+T (selected on faces in edit mode): triangulate (beauty)

- **Ctrl+shift+T:** triangulate (evenly)
- **Alt+J:** tris to quads

Ctrl+r: to remesh (mostly for sculpting)
Ctrl+(1-5): add subdivision (F3-convert to-mesh, when done to apply subdivision)

F9: brings up object added properties menu after you click off
1st Side mouse button (Custom bound this for me, you have to set this urself): Quick Menu. (Quick menu is a menu u can make by right click any action and "add to quick menu") Mine has bridge edge loops, grid fill, merge by distance, automerge toggle, Looptool addon stuff(since addon dont work for my keybinds).

Curves:

- W/E/R all function the same
- **F**: Connect Ends (Select two endpoints)
- **Alt+r:** scales mesh attached to a point
- **Ctrl+t:** tilt (works well with proportional editing.
    - alt+T-clear tilt
- To Delete/unlink connected curve: select 2 points- x- delete segment (or dissolve vertex to keep the curve together)
- F3 or side mouse bottom: subdivide (select at least 2 verts u want a subdivide between)

How-to Basic things:
To add image: shift+a- image - reference.
If gizmo not on object: object mode- f3- set origin to geometry
To use Bool tool Boolean: Shift + Ctrl + B - Brush Boolean - Slice
To fix messy typology:

- select messy verts- hold shift- smooth vertex's. And Shift+r (repeat action on till smooth)
- Or click "smooth" tool on toolbar and drag out yellow circle left or right till correct (for retypology, make sure u apply a shrinkwrap modifier after)

To check for ngons: f3-"Faces by Sides" - set to 4 and change drop down to "greater then (also can check for tri's by change to "less then")
To fix overlapping verts: select all verts- F3- merge by distance
To scale individual faces in one selection:  top of viewport, change to individual origins.

To copy modifiers from one object to another: select the unmodified ones, shift select the one with modifiers (active) shift+L - copy modifiers.
To curve a mesh with an array modifier onto a curve: draw out curve, apply rotation and scale and make sure its origin point is on one of the ends. Line up the mesh to the curve end(where origin is) and add the curve modifier below the array. Select curve and axis- also may need to select all curve verts and use tilt tool to rotate in same direction as array axis (make sure array is multiplying in the current axis direction)

Errors/Cleanup:

If applying the modifier is bugging: make sure to apply scale/ transformations first
If duplicated and applied transformation: but you what to return to the previous size. Select the original, edit mode-a- Shift+s - curser to selection. Selected changed one- edit mode-a- Shift+s - selection to curser.
To help clear blender load/lag:

- Purge data (like unused materials, images, or textures in the file even if they aren't assigned to anything. File > Clean Up > Purge Unused Data (or search for "Purge" in the top-right menu).
- Cleaning Simulations (Bakes, physics, fluids, cloth, fire), Blender saves cache files. Go to the Physics settings and Delete/Clear Bake.
- Undo History. You can increase the number of steps in Edit > Preferences > System > Memory & Limits

If viewport clipping object out: click n- view- up clipping distance for large scenes, lower for small objects.
If normals look shaded weird/fucked: f3-recalibrate normals. Then, in object mode- go to data -geometry data- clear custom normals. Also try using the “weighted normals” in modifiers.
If you joined a mesh and some mesh/materials disappear: data- UV map- rename both objects to have the exact same UV map name
If textures are not working right:

- data- texture space - checkmark auto-texture space ON.
- apply all transformations (for some textures f3-set origin to geometry)
- For a lot of textures they are dependent on scale, go into geometry nodes and adjust scale in “mapping” node. (usually generated is best, but some textures only work on object or UV)

How to transfer modifier / uvs / data /etc from one object to another: select the ones that have no modifier and select the one with modifier. Ctrl+L - copy modifiers.

UV:

- Mio3 plugin (to straighten UV’s: https://youtu.be/FOB7r5BG9EY?si=FgrZf78H1MD69pkF (I use gridify for straightening a mesh and flip tool for rearranging)
- **Tutorials: Basics:** https://youtu.be/XleO7DBm1Us?si=ZgrhQqj1e7AjwjlO
    - **Understand texel density:** **https://youtu.be/2-mIY87314g?si=LcEJI-rQBBc1zn_n**

U: UV menu (in modeling viewport)
U: unfolds (in uv editor)

UV steps:

1. Apply scale. **If see-through faces:** flip the normals by selecting all faces and shift+N and checking “inside”.
2. Click A (Select all faces)- U (in modeling viewport)-project from view.
3. Mark all Seams (select edges, hold Ctrl (brings up edge menu)-mark seam

- After marking a seem the “**Pick shortest Path” menu** is in the bottom left, change the drop-down to “tag seam”. Now every time u hold ctrl and click 2 different edges it will auto-mark the seam and connect the seams between them
- **To select a UV shell:** select shell vert and click **L**.
- **Marking Seams shortcut trick (if u have object with sharp edges):** at top of modeling viewport- select- select similar- select sharp edges. shift hold-mark seam

4. Now unwrap- A - U (to unwrap, in uv editor)
5. Now manually fix ur UVs, use mio3 to flip them a gridify(straighten). Then in uv editor under- click “UV” at the top, and first average island scales (it resizes any UVs you have changed since the first unwrap). Go back to the UV tab- “pack Island”, keep default settings, it will layout/optimize ur uv space.

To see UV Stretch Map/weight map: Near the end of the UV editor(drag out the UV editor)- click the double/half-transparent circle and checkmark UV stretch

To Add UV grid in UV editor: top of UV editor- new-image- name and change the dropdown to grid. (this makes a new “Image” u can use for a material like a reference image)

To view UV grid in modeling viewport: Make a new material- set base color to image- select UV grid u made in the dropdown.

To link ur highlighted selection of UV and viewport: Toggle  in top left of UV editor

Materials:

Enable Node Wrangler: edit-preferences-extention- search node wrangler and install

Blender to Substance set up: https://youtu.be/TN9hEomsWL4?si=aY_xupNenBAZtQ_i\

- In blender: Make sure all the asset you paint is unwrapped on the same UV plane.
  - **To make separate layers for substance:** In vertex paint mode- set paint color- paint- set vertex color
  - Export as FBX- check “visible only” and in geometry make sure RGB is on
- In substance: select file, set material to blender asset- set document resolution (4K), set
  - Go to bake(crossont) set material output to 4k, In “ID’ tab set color source to “vertex color”
  - Export textures: set to Blender material

To import texture maps: Select principle BSF material- Ctrl+shift+T- shift select all materials- import

- if error than maps are named wrong,
- if already image textured something then the generated maps from same image liek with https://cpetry.github.io/NormalMap-Online/ it will import based on the image textures position in uv, but if u change original image uv position, u have to delete and reimport

To repath all image links in Blender: go to File > External Data > Find Missing Files and select the new directory

**** If you notice a vertex out of place or something wrong with ur model while painting, fix the model-re-export** the mesh, and drag it into the already made substance layer, and it will apply those layers onto the new model, even if your UVs moved**

Rigging and Weight painting:

Tutorials:

- Series for rigify:
  - Pt 1 using rigify: https://youtu.be/MhQMLMQMZJ0?si=6AsD-8HEqQPd2mQn

    - Pt 2 shape keys and drivers: https://youtu.be/6M4bkaavT6c?si=YDi4LIk07MbFrgSo
    - Short on rigify human rig: https://www.tiktok.com/t/ZP8D9Cexu/
- Short on Hair rigging: https://www.tiktok.com/t/ZP8D9HLha/
- Series for autorig pro!!
    - Playlist (how to rig human 40 mins, really helpful, and in depth on face rig at bottom): https://youtube.com/playlist?list=PLdcL5aF8ZcJuHJFQgb4altQWs-RCKA7Bq&si=JQVmvsSCyyTKRpCv
- Series for Vrchat rigging (manual)
    - Playlist: https://youtu.be/6WqCUdilzS8?si=mx43vcEqhKOFezr

Parenting: Like a "parent" and "child," the child follows the parent. Select the child first(mesh) and then the parent(one) for character parenting. The mesh is the child since they follow a bone(the parent).

Set Up:

- Apply transformations (sometimes f3- set "origin to geometry"): ctrl+A-apply all
- Apply all modifiers
- Select on main body- Properties window- object- viewport display- check wireframe (to align bones)

Rigging:

- **Order of modifier:** Always have an armature modifier above others, like subdivide.
- **Manual:**
    - shift A- Make bone. Properties window- Object- viewport display- check "in front"
    - Arrange bones like a puppet, **shift+A** to add bones to the armature (while in edit mode for the same armature), and **Ctrl+E** to extrude from a bone.
    - **For symmetrical thing:** select bones you want to mirror- top bar- armature- symmetrize
- **Rigify** (enable Rigify as an addon in preferences, make sure edit- preferences- save & load- check Auto run scripts or wont generate):
    - Shift A- armature- metahuman rig
    - Scale and delete unnecessary bone
    - To snap bones into place(highly recommend for accurate deformation):
        - On mesh-edit mode- select edge loop(ex: elbow loop). shift+S- Cursor to selected
            - On amature- edit mode- select bone joint and switch to Shift+s -selection to cursor
            - Some joints are disconnected, like the spine meets the neck, knucks, and hip- these should still be aligned on top each other, so make sure to shift select both when moving them. For hip up bones- have touch front skin
    - Selected on armature in object more- data- Generate rig (dont parent before this)
- **Autorig Pro:**
    - Follow alignment video: https://youtu.be/nvjq7C9BbAQ?si=yW2-GUIY5qJ-wzFZ
    - N- ARP- under rig tab: Auto-rig Pro Smart - select base and click "get selected objects" (make sure to join most cloths)
    - To change see bone and edit after generated- rig-"edit reference bones. Once finished "match to Rig"
        - **To add hair rig**: under rig tab- "edit reference bones" then "add limb"- tail. Position new chain in hair
            - use "limb options" to add more bones AND NAME them (or wiggle bones break), change root from tail to head.x . If need to delete a bone always use "disable"

        - For a ponytail/braid that is centered, keep limb option “middle” default setting, For side of hair like front strands, change to left or right in limb options, can also use duplicate mirror for symettircal hair strands.
    - Select top bone(root bone) and go to properties- bone- under relation ship tab change parent to head.x. Now generate rig and test in master cntrl works properly, may need to select armature, shift select hair mesh and under bind- checkmark selected bones- and bind (now hair has weightpaint but may need to hand fix parts)
    - Install wiggle 2 addon. Select each hair cntrl individually and N-animation- wiggle 2- checkmark “tail bone” for each ctrl except the one that top bone.
        - With bones made from tail rig- on each ctrl go to properties-bones constraint (at bottom) and delete master rig completely (hide master rigs after this)
    - Click play on timeline and scrub through to see physics, (don't bother with colliders they r fucked, just keyframe ctrls that go into mesh)

Pose Mode **(check rig in pose mode):** select armature - **ctrl+tab** OR - change top bar “object mode” dropdown to ”pose mode”

- **To Reset pose:** top bar- Pose - Clear Transform - All. To change individual transformations: select bones/ ctrl’s in pose mode and Alt+ R,G, or S (r, rotation, G is location, S is scale)

Weightpainting:

Change to layout mode. (to see brush options) in sidebar- tools. Keep wireframe showing (weightpainting effects vertices so wireframe is important)

Painting tip: Also paint while the model is posed for accurate deformation. Also start with some sort of automatic weights and fix broken parts. Block out areas in red and then smooth

To switch weight paint: select armature (parent) and mesh (child)- **Ctrl+tab**. Or switch top “object tab” to weight paint

Weight paint brush stuff:

- **In brush setting:** make sure to check “auto-normalize”, just trust- it keeps ur vertex to add up to 1, lock all the vertex groups that are deforming correctly (so the auto-normalize effects the bad groups only)
- **Ctrl+l-click:** to select bone
- **Brush base settings:** Keep weight on 1 or 2, and just use strength to toggle the amount of influence. For lowpoly brush: set falloff to the last option “constant” to have strength on from fully applied.
- : at right of top bar is ur preview best-friend, I recommend turning wireframe on, and setting zero weights to “active” to see black in no affected areas.
- **F:** scale brush size**, F+shift:** scale strength
- **To mirror brush:** Top bar- - click axis. OR N-tool- brush settings- symmetry- check axis (character has to be aligned with world origin)
- **To paint through mesh:** brush- uncheck front faces only. Falloff menu- change “sphere” to “projected.”
- **To smooth:** top bar - weights- smooth (great for problem areas- block out in red and ur smooth on each bone)

To weight paint by vertices (use for typology thats faraway/cant click with brush): switch to edit mode- select verts. Data- vertex groups. Select the vertex group. Change the weight slider and assign.

Binding mesh to armature/ automatic weights:

- **Rigify recommended Weightpainting:**
    - Once finished, select mesh first, then armature, and **Ctrl+P- with automatic weights.** This adds vertex groups in the data tab and an armature modifier to the mesh. It also made some automatic weights (if u alt+P-empty groups. It will make vertex groups, but there will be no weight painting on them)
        - **Alt+p:** to unparent, make sure to delete vertex groups as well by clicking - on the left side
    - **To apply automatic weights after parenting:** select the bone (or vertex group in data tab). Top menu: weight- assign automatically from bone
    - Now switch to weightpaint mode in the left tab. In the data tab, you can switch between bones in vertex groups
- **Autorig-Pro:**
    - Instead of automatic weight through blender: after rig is generated. Select all meshes first, then armature- (change to "skin tab in ARP)- First try engine as heatwaps (base blender autoweights) for rig with joined cloths switch engine to "Voxelized", check "scale fix" and bind (now tets i pose mode)
    - **To transfer weights:** select pre-weighted base mesh, shift select bad mesh (that needs weights)- switch tab to weight paint. Top bar- weights- transfer weights
    - To fix autoweight issues
        - Manually paint parts: in weight paint mode- **ctrl+l-click** to select bone

Animating:

Intro short: https://www.tiktok.com/t/ZP8D9HNsq/
Animating breakdown: https://www.tiktok.com/t/ZP8D9sn2w/
How keyframes/timeline works: https://youtu.be/Pb8kLcHOQzY?si=W5hLntTD_1-hHlNN
To pick up object: https://www.tiktok.com/t/ZP8D9DVNW/

To see live playback (real-time): on timeline- playback- change sync dropdown to "syce to audio" or "frame dropping"
I: keyframe
alt+i: clear keyframe

Remapping with Autorig pro: https://youtu.be/HHnt-3uLSUo?si=2dP11DMLp_xF-ROu

- Select the **animated rig** and set as "**source**", select the unanimated character and set it as "target"
    - "Make bone list" to start matching bones
    - Match bones, unbind bones that break
    - Select animated rig and- Reset Rest Pose (at bottom)- now align the bone as best as u can or will be unaligned in remap. For multiple remaps: Pose > Apply > Apply Selected as Rest Pose.
    - Note: This will likely mess up your existing skinning/weights unless you unbind and re-bind the mesh, so use caution
- "Re-target" to remap!
    - **To minimize remapping lag:**
        - Set up mesh, optimized by deleting hidden parts, apply transformation (make sure not shader nodes are broke- if so apple scale & rotate and set origin to geometry instead)
        - Change to wireframe mode
        - Disable "global undo" (re-checkmark it after done remapping)
    - To remap in sections or multiple animations:

    - ARP names its baked actions something like rig_retarget. When you run it again, it wipes the data in that specific action slot.
    - After your first bake, go to the Action Editor (part of the Dope Sheet).
    - Rename the current action (e.g., Part_01).
    - Click the Shield icon (Fake User) to ensure it isn't deleted.
    - Now, when you retarget the next 300 frames, it will create a fresh action without deleting Part_01.

When recording mocap fushion:

- Check the framerate its exporting with

Sculpting:

Dynamic sculpting (adding faces like Zbrush): https://www.tiktok.com/t/ZP8D9mNSR/

How to sculpt: select a mesh and switch to the sculpting tab. If you switch to the sculpting tab and tools do no pop up then you are not on a mesh (for example, “add-meatball” would not show up in sculpt, you would have to convert it to a mesh)

F: scale brush size

Ctrl+r: **To remesh/dynomesh**

- **R:** scale grid to show how many polys in remesh

Main brushes: clay strips, snake hook, elastic deform

Brush hotkeys:

- **Hold Ctrl:** invert brush
- **Ctrl+m:** to mask area
- **Ctrl+i**: to invert mask
- **alt+m:** to clear mask

If sculpting is going through (back face masking): checkmark “front face only” in advanced in brush settings.

Retypology:

Types of retypology (addons): https://youtu.be/sCdhkLUCV8A?si=RfxXTL92wO6wCJpP

Basic of typo, no addons: https://youtu.be/X2GNyEUvpD4?si=FXxl_ZW97x9mkaTK

- Step 1: sculpt model
- Step 2: Inable free addons: “sb” “loop” “f2”
- Step 3: switch to layout tab, enable automerge at top and play with threshold
- Step 4: Initialize bsurface

Retypoflow4 Addon ($80): https://youtu.be/3DPOtKDDH9M?si=ZDdLkDrtNvsh8WpT

- Install addon
    - enable automerge at top and play with threshold.
    - checkmark retopology mode in  at top and turn up threshold
- Shift+ A: mesh-retypology from active. (new mesh appears in outliner and new tool options in toolbar)
-  PolyPen Tool: **Hold ctrl+ click:** start drawing tris/quads.
    - Triangles made while active will turn into quads is not deselected.

-  Polystrip: Hold ctrl- drag out
    - Hold F: adjust radius size
-  Stroke: Select vertes, draw out stroke like polypen but bigger group
-  Contour: Ctrl+drag: drag 1 line and then another to connect a loop
-  Tweak brush: Moves verts around like brush
-  relax: Smooths verts. Works when holding shift on any of the other tools.

Grease Pencil:

2-d outline short: https://youtube.com/shorts/z5sWD5MxYbU?si=GmKMY-qEW5CtGzMK

Rendering:

To set the camera: https://youtu.be/FApegTD0a5M?si=2F5fFcGDf2rczU_T

To render stills quickly: https://youtu.be/kkwmdb9iLME?si=ahq_SwC3MSRyxclw

- To hide/unhide objects when rendering, make sure u click the camera beside the eyes on a object in Outliner
- Just change the resolution, not the aspect, because it stretches your image
- Ctrl+alt+0 to set camera where viewport is.
- hold space- “cam to view” , to set camera where viewport is (Ctrl+alt+0). Also “active cam” to snap viewport to active cam’s view
- To change active cam: under render settings, click “scene” and switch cam at top
- To make first person in camera setting same focal length as unreal engine- change drop down on lens Unit from millimeters to "field of view” set to 90*

Rendering for free: https://www.tiktok.com/t/ZP8D9sKW1/

If render is showing hidden layers or wrong materials: make sure u have hidden or unhidden the camera and not just the eye in the outliner

Butterfly tut tips (blend shape and particle system):

Make butterfly with image “project from view”.

- In data- shape keys. Click plus to make basis (default position, and have the wings slightly down) click plus again and position wings up (adds a shape key, slide it underneath to check how its warping)
- In graph editor- selected on key- click modifier tab -add modifier (dropdown to noise)- up strength till full wingspan
- Duplicate the moths like 6 times and offset the noise on each in modifier settings)
- Make a collection out of those moths (make the basis not too low or warping with the shape key)

Make a cube with an emitter particle system outside of the collection

- Emmision Amount:

        - Amount to 100
        - Start and end should be 1 (or will spawn more moths in)
        - Lifespan 1000(or will deswawn on timeline)
- Render:
    - As collection
        - Set scale according to scene/moth size (I did 0.1)
    - Collection- instance collection- set as moth collection

- Physics- physic type- boids.
    - Movement type
        - Physics- Boid brain-
            - Have separate above follow leader (click plus on right side) and no flock for it to follow a leader
                - Make a leader (I used shift a-empty- cicle) and Keyframe leaders movement
        - Alternative
            - Physics- Boid brain-
                - Keep separate (top) and float (below)
                    - Change boid size again
                - Keyframe emitter for movement
    - Tweak these settings (a lot #paininthebutt)
        - Make mass super low
        - physics-movement - Tweak speed, space, velocity, add collision collection of scene objects

Cloth/cape simulation (cloth physics): https://youtu.be/1cXyIjaFxXY?si=PenaWWAq6XrOVJ4q

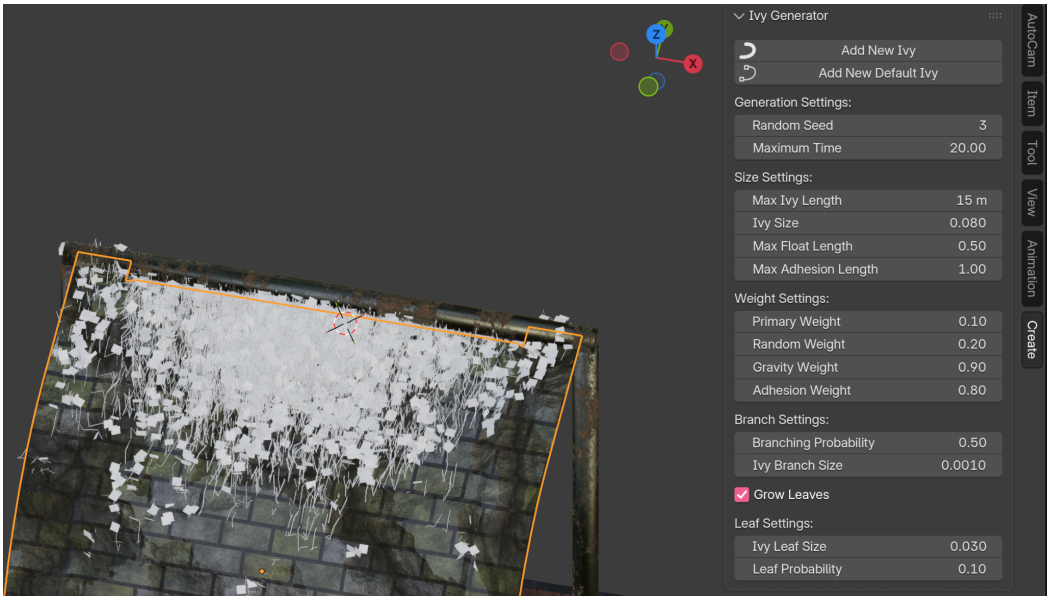
physics-cloth

- Cloth presets are top right corner
- Catch will bake it
- Shape pins clothing (using vertex groups)
    - In edit mode. Data-vertex group- add vertex (while selected on desired pins)
    - Physics- shape- add vertex group to pin

Ivy gen Tips:

Genertatoion settings:

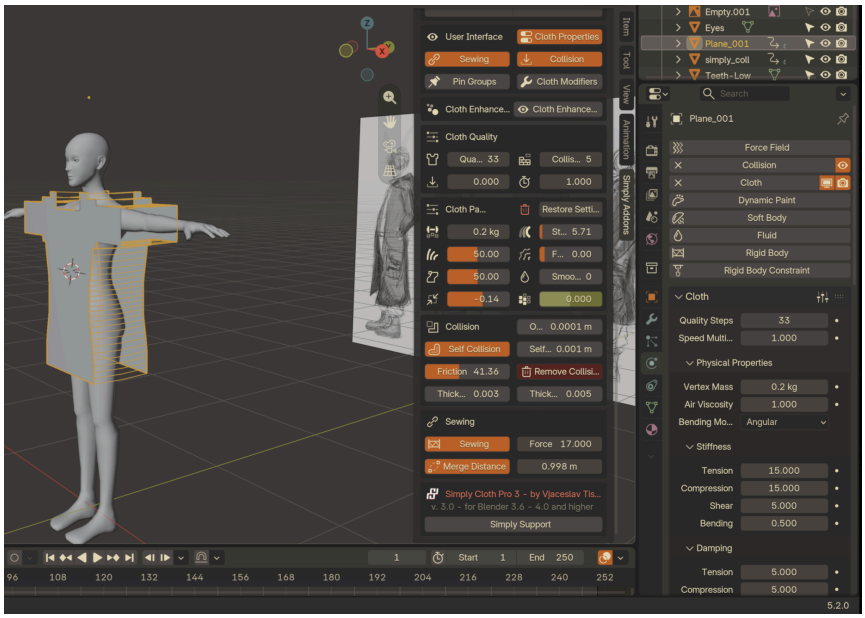
- max time up for growth/length. ivy size for width and max ivy length for distance (but other stuff has to be correct for it to grow
- change primary weight and gravity a lot for diff lengths/direction. too high of gravity will cause it to go through mesh, too low of adhesion makes it float up
- Branching and leaf probability for the density of leaves to increase.
- Here's an example:

- 

After gen tips:

- **If too many leaves**: separate the part of the mesh thats to thick. In edit mode. Got to top tab- select- select random- x. Repeat to thin out.
- **To scale individual faces in one selection:**  top of viewport, change to individual origins.

Simply Cloth pro Addon




Scripting
Scene
ViewLayer
Search
Options
Simply Cloth Pro | 3
Create Simply Cloth
Collision
Friction 28.000
Thick... 0.003
Thick... 0.009
Sculpting
Sculpt Cloth
Cloth Sets
Draw Cloth Sets
Skin Tight
Simply Skin Tight
Cloth Enhance...
Cloth Enhance...
Attaching
Attach to Cloth
Simply Cloth Pro 3 - by Vjaceslav Tis...
v. 3.0 - for Blender 3.6 - 4.0 and higher
Simply Support
Item
Tool
View
Animation
Simply Addons
Empty
Empty.001
Eyes
Plane_001
simply_coll
Teeth-Low
Search
simply_coll
Force Field
Collision
Cloth
Dynamic Paint
Soft Body
Fluid
Rigid Body
Rigid Body Constraint
Collision
Field Absorp... 0.00
Particle
Permeability 0.000
Stickiness 0.000
Kill Particles
Damping 0.000
Randomize 0.000
Friction 0.000
Randomize 0.000
Softbody & Cloth
Damping 0.100
Thickness O... 0.009
Inner 0.003
Friction 28.000
Single Sided
Start 1
End 250
204
216
228
240
252
5.2.0

Autodesk Maya

Color code:

- Pink: tips
- **Purple:** custom hotkey (usually has default beside in parentheses)

Tips, aka understanding how maya works:

- **Navigation**: There are 2 main navigation/workspaces tabs, the top left(the primary one that changes the options at top) AND the top right (workspaces)- professionals don't use workspaces much and just use hotkeys to bring up needed panels.
- Axis: Y is Green, X is blue, Z is green
- **History/non-destructive workflows**: Maya keeps a history of everything unless you manually clear it, if you don't clear it every now and then, u will crash! This is how maya's "non-destructive" workflow works, it is why when you do something like combining two objects they make a third object that is still linked to the original. The attribute editor has the stacked history in nodes- clicking select on that node tabs it out (and then you can delete, and it keep the edits after)
- Starting out?: Enable autosaves and change ur hotkeys to stuff u use frequently!

Files/ file type/ exporting files:

To export asset: Select objects- file- export selection-(choose file format)

- **FBX:** most common file format for 3D asset exchange (exporting to diff programs). Carries meshes, UVs, materials, skeletons/rigs, skin weights, animation curves, blend shapes, and cameras/lights, all in one file.
    - **If FBX option is not there to export or import**: windows-settings/preferences- plugin manager. Search fbx- check fbxmaya.mll. Refresh.
- **OBJ**: simpler, just geometry/UVs/materials (no rigging or animation), still used for static meshes or quick asset transfer.

When exporting mesh to blender: Scale: 0.01, Apply Scalings: FBX Units Scale, Forward: -Z Forward, Up: Y Up, checkmark apply unit, checkmark apply transformations (optional but checkmark "selected only")

To import UE Asset: first change the working unit to centimeters by windows-preference- setting- unit dropdown to centimeters. File-import (make sure import setting is set to fbx) select file and in FBX settings, under "file type specific options- advanced options-Units- uncheck automatic

Settings:

Plugins: windows-settings/preference-plugin manager. Loaded means loaded on this file, autoload means will load every time you start maya.

Make sure to enable autosaves: windows-settings/preferences-preferences. In files/projects- checkmark "autosave" and "limit autosaves" (set to like 5). Set intervals and destination to project (aka where u save original file at), save at bottom.

To change hotkeys: windows- settings and preference- hotkey editor

- Change "edit hotkeys for"- editors: to rebind existing hotkeys or actions
- Change "edit hotkeys for"- custom script:. for an action hotkey that doesn't exist. Or use
- To start personal keybinds click the setting wheel and "duplicate" and name new behind set.
    - Keybinds to not bind: Ctrl+r- this is industry used to opens the reference editor pipeline.
    - Sub D: 1,2,3 keybinds https://youtu.be/E5QzZ2qlK4U?si=PPx7XlToev1sQn7J

To save the setting for when you open a new maya file: New file and make needed changes. File- Save Preferences

When exporting mesh to blender: Scale: 0.01, Apply Scalings: FBX Units Scale, Forward: -Z Forward, Up: Y Up, checkmark apply unit, checkmark apply transformations (optional but checkmark "selected only")

To save bookmark folders (in maya files): drag and drop folder into bookmarks

General Hotkeys:

Saving:

Ctrl+S: Save Scene

shift+alt+S: delete all history

shift+alt+D: delete selected object's history
Ctrl+Z: undo
Shift+Z: redo

Outliner hot keys: be hovered in the outliner when performing these
MMB Drag: Move or re-parent an object. (use in combination with shift to select range or ctrl to select individuals)
Shift + LC: Select more
- **Ctrl + LC:** deselect

Double+LC: rename
Ctrl+g: groups objects objects in outliner
P (when shift selected on group): parents
- **shift+P:** unparent/ remove from hierarchy

Alt+G: Select Hierarchy
F (while selected on object): find object, expands the parent folders its in
Shift+C: collapse all folders

To batch rename: select meshes- modify- search and replace names.

Navigation/panels:
F1: search (can search any action you can't remember/find, default assigned to Ctrl+f)
F2-F5: The 5 different Workspace UI's
Ctrl+A: attribute editor (click again for channels editor)
Shift+A: channel editor
Alt+A: hypershader
Alt+R: Render panel
Alt+V: Render image
double+RC- on system icon: open setting

Modeling Hotkeys:

Moving:
Alt+LC(left click)**:** rotate around the object
Alt+RC(right click)**:** Zoom in space
Alt+MMB(middle mouse button)**:** Move in space
W: translate/move (select object)
E: rotation tool (select object)
R: Scale tool (select object)

Selecting:
Q: box select/Clear active tool.
- **Double LC** (in face/vert mode)**:** select all (edge mode: selects edge loop)
    - **Shift+DoubleLC** (in face/e/v): select starting face and shift double LC to select inbetween

    - Edge mode: doubleLC to select edge loop.
    - **Tab** (hold)**:** brush select
- **Hold Shift:** multiselect(click again to deselect)
- **shift+</shift+>:** select more or select less
- **Ctrl+i:** Invert selection (originally ctrl+shift+i)

Tab (hold): brush select

L: lasso select (doesn't tweak, aka individually select so click Q again)

Viewing:

F: Focus on selection

- **A:** frame scene

Space bar(in the viewport): Quad View (hover over window+space to fullscreen)

Ctrl+Spacebar: Toggles Full Screen mode

1: normal preview (added script bc the shader works differently from 2 and 3)

2: smooth 1 (added a script to only show current wireframe without the smooth wireframe)

3: smooth 2 (added a script to show no wireframe in edit mode, so you don't have to click off)

4: wireframe preview

5: Shaded preview

6: Shaded with Textures

Ctrl+2 (toggle): Xray mode

Ctrl+3 (toggle): Face Centers (only in edit mode)

Ctrl+4 (toggle): Grid

H (toggle)**:** hide the selected object

- **Alt+H:** unhide all

Shift+I: isolate selected (50/50 it works correctly, maya likes to break, pair with invert select(ctrl+i) to hide faces))

alt+P (toggle)**:** orthographic view switch and locked (of ur perspective view)

Marking Menu's:

rc: Component Marking Menu

W/E/R+lc: Transform Tool Marking Menus

Shift +rc: The Contextual Tool Menu

- In viewport (while selected on nothing): Create Primitives Menu
- In Object mode: Polygons Menu
- In edit mode: Operations Menu
- In UV panel: UV Marking Menu

Ctrl+rc: selection Conversion Menu (use in edit mode, selection options and conversion)

Ctrl+shift+rc(hold)**:** Modeling Toolset Menu (symmetry, snapping, Selection constraints,)

Spacebar: The Hotbox (everything menu, try to avoid)

- Rc(hold) on "maya" to get left/right/top/bottom perspectives.

Modeling action's Hotkeys:

Ctrl + Shift + MMC drag (hold)(edit&transform): Surface Slide constraint (slides on nearest vert/edge/face)
Ctrl+MMC drag (hold)**:** on r to twist, W to move along normals, r to scale on normals.
MMB+ tab name: repeat last command from that tab (ex: snapping tool)
double+RC- on system icon: open setting
X: delete (old keybind- delete/backspace)

- **Ctrl+X:** delete w connecting verts (ctrl+delete/backspace)

Ctrl+d: Duplicate

- **Shift+d:** Duplicate+ repeat (moves based on preview movement)

Shift (hold)**:** extrude (no menu popup, move the pivot point to change insets,etc)

- **Ctrl+e:** extrude

Ctrl+b: bevel (MMB (hold)+slide left or right to add/delete bevel fraction)
D (toggle): move gizmo origin (hold V to snap to points)
B (toggle)**:** soft select (hold b+MMB drag to change the scale of effect)
G: repeat the last tool
V (Hold): Snap to Points (Vertices, curves, etc.)
J (Hold): Intervals (snaps in specific 15 degree during WER)

- **ctrl+shift+X** (toggle): Snap to Grid (old is X+hold)
- **shift+C**: Snap to Curves / Edges (old is C(hold))

C: Multi-cut

- hold ctrl to loop cuts and shift to snap
- Select a vert- ctrl+shift: to create 90/45 degree cuts

T: target weld (verts/edges)
Alt+d: Division (aka subdivide)
Alt+s: smooth (smoothed subdivide)
Ctrl+J: Combine
Alt+J: Separate
M: merge verts to center

- **Alt+M:** merge by distance

Shift+N: reverse normals
Ctrl+F: Fill Hole
Alt+a Alt+S Alt+D

<u>Rigging/animation/FX hotkeys:</u>
Alt+F: Freeze Transforms
Alt+C: center pivot
Ctrl+B: Bake Pivot
P: Parent

- **vShift+p**: unparent

Alt+V: play animation
S: keyframe
Shift+W/E/R: Sets a keyframe strictly for a single channel (WER)

K+LC: drag: scrub timeline (in viewport)
Alt+, and alt+.: prev/next frame
Ctrl+shift+C: create camera from view

Modeling Errors/Tips:

If the object wont move/edit:

- If edges are yellow, soft select is on. To fix: click b
- If wont edit/move: constraint like “border” may be on. To fix: ctrl+shift+rc-selection constraints-off
- if it's green in outliner, it is live selected. To fix: uncheck the magnet at the top toolbar.

If Maya is crashing on startup and says “loading plugins(cache Evaluator)”:

1. Option 1: Navigate to your Maya installation folder, typically located at: C:\Program Files\Autodesk\Maya<Version>\bin\plug-ins\cacheEvaluator.mll. Rename the file (cacheEvaluator.mll.) to cacheEvaluator.mll.disabled. restart maya but if it still isn't launching and now say a different plugins loading and isnt launching try option 2.
2. Option 2: Open your Windows Command Prompt (search bar on windows) and run as an Administrator. Copy and paste this and hit enter: "C:\Program Files\Autodesk\Maya2025\bin\maya.exe" -noPlugin -noDefaultMel , and rename ur file path to ur maya version.

Cleanup tricks:

If normals look weird:

- Sometimes normals “lock” after actions. to fix: select object in object mode- mesh display- unlock normals
- If some edges/faces are hard looking: Applying a smooth will “soften” edges but new geo won't be smooth:
    - Manually select edges and shift-rc - soften/harden edges- soften edge. Or the opposite to harden edges.
    - Full normal reset: mesh display- unlock normals. mesh display- set to face (hardens all edges and manually select edges and shift+rc to soften again.

If mesh clipping out of view: click on persp camera- attribute editor- change “far clip plane” to be higher.

- **If mesh has black faces clipping through:** persp camera- attribute editor- change “near clip plane” to be smaller. If distance is too much, near clip start clipping faces through, so up it instead, to match the scale of perspective.

To fix black faces (reversed normals): select faces- shift+rc- face normals- reverse normals.
To check double faces/overlapping verts: Display-polygons-face centers. It will show color on the verts of the overlapping faces on edges.
To check for messed up normals: Display-polygons- face normals.
The face has positive normals on both sides (extrude is messing up and sliding): those r lamina faces. To fix: mesh-cleanup. Uncheck everything in tessellation and check “lamina faces.”
To check for ngons: Mesh-clean up-select by faces-4-sided faces (selects faces)
To fix small ngons (not recommended for big fixes): select face- triangulate- quadrangulate
To fix overlapping verts: For exactly lined up verts- select verts- shift-click- merge (this is merge by distance, set threshold). For manual fixes- select the 2 verts- Shift+click merge to center, select next and click g repeat action

Modeling tricks:

To align verts on axis: select vert+ r (drag axis inward to flatten on axis meeting point)

To make gizmo bigger or smaller: use the - and + on your keyboard
To even the verts from an extrude: directly after extruding while multi-gizmo is there- select edges and drag inward to even them to each other.

To make drag out actions less or more fast: click the circle (pie) beside action header 

To flip a mesh: freeze transformation. Select object- channel box- scale: -1 on x
To lock objects: Channel display- Layers: create layer- rc+ add a selected layer. To lock: Channels-select all-right click: lock
To center an object to world origin: center pivot in mesh(alt+C), toggle grid snap (alt+x) and snap to origin.
Alternative to shrink wrap (Interactively with UV's): align the meshes. Freeze transforms. Transfer attribute-"vertex Positon"-on, and sample space- UV. Transfer. Move projected mesh in UV editor.
To "smooth" section of verts or without using smooth action: select vertices- shift+rc -average verts (u also can just select the face- ctrl+rc- convert to verts and then average)

To make hypershader faster: toggle 

(material previews) to off

To make viewport faster (when lagging): toggle  (top beside render) to pause viewport

<u>Modeling basics:</u>
To drag select and not select faces on back of mesh: in edit mode- shift+ctrl+rc- select-camera based selection.
To change view: in viewport tabs- Panels- orthographic-side/top/front
To add image: in viewport tabs- View-image plane-(add in side view not perspective view to be able to move plane-like object)
To see through meshes for typology/bones: in viewport tabs- shading (enable xray or xray joints)
To fully merge objects: Mesh-combine (duplicate result and delete old objects) then use mesh-merge to fully combine.
To add harder parts/edges in smooth preview: Mesh tool-crease-MMB drag
To make a smooth preview real: Mesh-smooth (add more segments for more points)
To make typology fewer faces: Mesh- reduce (check mesh-clean up afterward to ensure no ngons formed)
To poke a hole with Boolean: select both objects- Mesh- Boolean (creates a new object in outliner), click delete all by types-history, and/or Duplicate new object to finalize.
To edit a meshes shape after made (like liquify): Deform- lattice (edit section amount)- select verts to move. When finished, delete All by type-history.
Curves:

- **To Use curves to make curved tubes:**
  - Method 1: create a curve. Create (top tab)- sweet mesh, change in attribute editor- sweepmeshcreator, scale and interpolation to be higher
  - Method 2: draw out a curve, generate (top bar)- curve utilities- attach brush to curve. In the attribute editor change sample density in "stroke shape. And in default brush changes brush size. After done- go to modify-convert- paint effects
- **To extrude a section of faces along a curve:** select faces first, (have the curve end lined up touching the face) then select faces and extrude. Add divisions
- **To use Curve to path an object (bookshelf handle demo):** make a curve, line up an object at the bottom of the curve in the same direction- select mesh- shift+rclick curve . extrude+add divisions- duplicate and delete old to finalize.

- **To use Curve tool-Loft (Scroll demo):** create-curve tool- cv curve- (draw scroll side view)- Duplicate - drag parallel to scroll length. Select both curves- surfaces- loft. Better lighting, lighting- 2-sided lighting(in perspective view). Modify- covert- nerd to apply (quads setting) - drag out to side- retopologize (around 1000). Edit mesh and extrude (hold ctrl for more control).
- **To use the curve tool-Revolve (candle holder demo):** Create-curve tool-cv curve (draw half of what you want to circle around). Surfaces- revolve (can alter how its revolved in revolve settings, creates a nurv mesh). Modify- convert- nurvs to poly(drag new mesh out). Mesh-clean up-select by faces-4-sided faces (selects faces) Mesh-fill hole. Mesh-retopology (setting matches original quads).

Workflow tips:

- When making railing/connecting cylinders: select faces on ends of cylinders, bridge and increase divisions (adding a material to fix green color)
- Splitting

Retypology:

- Step 1: Select sculpt mesh and click  to make the sculpt "live"
- Step 2: Select new plain- shift+rc- Quad-draw. Blockout in the lowest ploy you can, focus on the edge flow (making circles around stuff that deforms)
    - Draw (annotate) points, and shift+click (inside points) to make quads.
    - Hold shift and draw to smooth.
    - Told tab to extrude
    - Hold tab+MMB drag out the edge
    - Hold ctrl to loop cut
    - Shift+right click- mirror
- Step 3: Finish by applying 1 smooth, then mesh-conform (while magnet/ live is activated, so it re-snap's to original details)

UVs: (switch to UV workspace at top right)

UV basics:

- **Delete history+ freeze transforms first**
- Select mesh- create(top panel in UV tab)-create camera based- to generate fresh UV.
- **Select edges- cut. After cut, unfold**
- **Shift +rc:** UV marking menu (mouse in UV panel)
    - Can Unfold, Layout, etc
    - *When selected on edges- "moves and sew edges" to snap too edges and sew them together*
- **To organize:** select shells and "orient shells(orient by axis) and layout. Flip shells and stack to stack identical shells (or enable rotation/stacking in layout options)
- **To check UV checkered Texture:** toggle is checkerboard in the right corner (click 6 if needed)
- **To check distortion**: hit 7 on keyboard (red is bad)
- **Ctrl+1:** to isolate UV shell (while selected in in uv editor)
- To straighten UV: after cut and unfolded. Select "unfold along u" and again with the v. Then click "straighten UVs"

- For curved circular UVs that won't straighten: select shell- create- "cylinder". With gizmo- hold j to rotate projection in increments. Align the cylinder up with a curve of mesh. The unfold along U and V, straighten if needed.

- **If Unfold/layout weird: m**ake sure u have unfold 3d installed, and shift click unfold to bring up settings (make sure you are on Unfold3d not legacy)
- **If UV is not exporting to substance right:** May have 2 uv sheets, at Uv (top bar in UV panel)- at bottom should list the sheets for asset, click one and delete in same menu.

<u>Materials:</u>

- **How to add regular material:**
- Click the blue ball (hypershader), choose the material (standard surface), rename, and add color/set roughness, etc.
- **To assign materials:** Right click hold (while selected on object or faces)- assign existing material (at bottom, or create one)
- Hypershader:
- **To open material node tree:** Right click (on material) - graph editor
- **Maya to Substance set up:** Assign different materials to the faces/objects you want as diff layers in Substance. All UV's still have to be unfolded in one UV square or artifacts will appear on overlapping uvs. Export fbx
- **Substance textures to Maya:**
- load substance plugin. windows- setting/preferences-plugin manager- search substance- check all- apply.
- Substance appears on tabs: in substance Click  "apply workflow to mask"- select all texture files for one material section- apply. (click 5 and 6 to toggle lights)
- If it's still not there- update autodesk,
    - if still not there try deleting the preferences folder in maya,
        - if still not there do a hard reset on it and reinstall maya).
- Substance tab appears at end: Click  "apply workflow to mask"- select all texture files for one UV- apply. (click 5 and 6 to toggle lights)
-
- **If Error pops up after clicking import through Substance:** windows- setting/preferences-plugin manager- search mtoa.mll (the Arnold plugin for Maya)- apply.
- **If textures lost:** Windows- General Editors- File Path Editor. Select - Select all. Repath Files. Browse -> click on material file. Check Subdirectors and Repath Currently resolved Files. Repath Files.
- **If importing substance material and height/displacement map is fucked:** click on displacement map and lower the scale to .5, .02, or .001.

To add cell shading:

- Open render settings- Under Arnold Renderer, find the Filter section and change the Type to Contour (set outline thickness)
- Right click object (you want outline on) Assign new material- shaders- aitoon (can create a hand-painted color in substance and manually plug in, specular/normal maps don't mix well with toon shaders sometimes)
    - Edge detection, adjust angle Threshold- usually 10-15 (normal is best on smooth)
    - Silhouette makes an extra outline on the inside
    - Base- primary colors and cell shading (use a color ramp and change interpolation to none for hard cell shading
- Pixelate renders: render settings- Arnold- AA- set to -1 (or higher for less pixels)

My keybinds for maya 2025

Custom scripts:

What does:	script	Keyind
Sub_D view 1	setDisplaySmoothness 1; displayPref -wsa "full";	1
Sub_D view 2	setDisplaySmoothness 2; displayPref -wsa "none";	2
Sub_D view 3	setDisplaySmoothness 3; displayPref -wsa "none";	3

Isolate Zbrush like custom (invert hide+ works with edit mode and quad mode)	string $selected[] = `ls -sl`;
	int $isIsolated = `optionVar -q "isolate_active"`;
	if (!$isIsolated && size($selected) > 0) {
	select -all;
	select -deselect $selected;
	HideSelectedObjects;
	select $selected;
	optionVar -iv "isolate_active" 1;
	} else {
	showHidden -all;
	optionVar -iv "isolate_active" 0;
	}	

X-ray toggle	string $currentPanel = `getPanel -underPointer`;
	if ($currentPanel == "") {
	$currentPanel = `getPanel -withFocus`;
	}
	if (`modelEditor -ex $currentPanel`) {
	int $xrayState = `modelEditor -q -xray $currentPanel`;
	modelEditor -e -xray (!$xrayState) $currentPanel;
	}	

Face centers toggle	int $state = `optionVar -q "faceCenterToggle"`;
	if ($state == 1) {
	polyOptions -displayCenter false;
	optionVar -iv "faceCenterToggle" 0;
	} else {
	polyOptions -displayCenter true;
	optionVar -iv "faceCenterToggle" 1;
	}
		ctrl+3

		ctrl+1
		ctrl+2
Delete All History	DeleteAllHistory;	alt+S
Unhide all	ShowAll;	alt+H
Merge vert center	polyMergeVertex -d 0 -am 1 -ch 1;	M
Merge verts by distance	polyMergeVertex -d 0.001 -am 1 -ch 1;	alt+M

(Change ur workspace's to)

Rigging:

Helpful Links:

- Character rig cookbook (riggin intro info): https://youtu.be/RlgLSq-GsVg?si=65kpe4CRnrdWpWk9
- Rigging info website: https://www.3dfiggins.com/writeups/paintingWeights/
- AntCGi rigging biped tutorials and Cult of Rig youtube series
    - https://youtube.com/playlist?list=PLgala72Uap1rYD3m7Z6BpzNpdIQzgVtsM&si=arJYclHcuZgTyyA3
    - https://youtube.com/playlist?list=PLsqgT4YprqtxoZvYdR4dZTlQN1w7PG7sB&si=hnXcfvwOdaB055YG

Things to know:

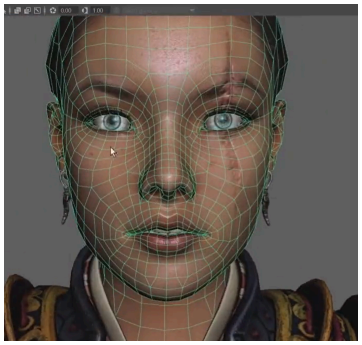
Naming conventions: Focus on clarity and consistency. (3 main source files: Maya file, source asset file .fbx, in-engine asset .usset.)

- Character_Master_rig.ma (animating rig) Character_Walk_F.ma (walking animation forward),
- Character_skeletalmesh.fbx (animating rig) Character_Walk_F.fbx (walking animation forward)
    - SKM_charactername.fbx
- A_character_walk_F.a (animation) AM_Character_Walk_F.usset (Montage animation)

Reference files: core to pipeline, because the rig changes frequently. File-reference editor-file-create reference. Similar to GOZ live link.

- Can't rename reference files; only used for animation
- Click reload in reference editor to update file (change mesh in reference file and it updates, but keeps the animations in main file.

Human meshes set up: freeze transform, separate all pieces and name them. Good edge flow and no triangles. Keep eyes as spheres so we can snap the bone in the middle. Make ribbons/tails stick out straight.



What game engines can read: Joints and blend shapes (morph targets)
Joints: should always have 0 rotations, so freeze them by clicking values in the channel box- RC-freeze-rotate .

If the gizmo is too small or large: hit plus or minus- on the keyboard or
If joints display too small: (on joint in Outliner) channel box- radius or Display-animation-joint size (something like .5)

Making skeleton:

- stay in orthographic mode (split view) and in viewport-shading tab- checkmark "xray Joints." Also toggle on ctrl+x (or x in default maya) to toggle grid snapping on (to line up the spine with the z axis)

- Start from bottom up for spines. Select the side joint tool and select joints to start adding joints connected to the one u made. (can always drag a joint into joint group to connect)
    - For mirror limbs name “R_” on all the one u want to mirror, select top joint u want to mirror and click “skeleton” tab. Open “mirror joints” menu and search for “R” replace with “L”
    - For tails- select the hip spine and go the opposite direction
- **Joint orientation:** Now click f8 and click the “?” at the top, should showthe x, y, z view of the joints. Search for rotation tool and set to “relative” and 45* increments. Click on the joints in this mode and rotate so that the “z” faces up the spine from the base and the “y” faces the back of the spine
- **IK handles:** Click f8 (exit component mode) and go to skeleton tab and open Ik handles (or look in tool menu)
    - **For arm Ik handles:** create Ik handle (open menu and set dropdown to single chain solver). Select shoulder and then wrist: rename handles in outliner.
    - **For leg Ik handles:** create Ik handle (open menu and set dropdown to Rotate-Plane Solver and enable Sticky**)**
        - Select Leg_Ctrl & move the pivot to the back of the ankle (geometry)
        - Hold D to move Pivot, V to Snap to Points
        - Parent Ankle_IK to Leg_Cntrl
        - Create a Pole Vector Constraint from Knee_Ctrl to the Ankle_IKHandle
        - Constrain>Pole Vector
        - Create an Aim Contraint between Knee_Ctrl & Leg_Ctrl
        - Select Leg_Ctrl then Knee_Ctrl
        - Contraint>Aim>❒ Enable Maintain offset
    - For tail/tenticals: https://youtu.be/bRzcdpn7m2A?si=6iT0ceI6INAWrtVI
- **To create controllers:** make numb circle- place on wrist- modify tab- **Freeze transformations.** Select CTRL circle then Ik- constrain tab-parent

Weight paint: (apply interactive skin binding first then fix some parts with skin weight painting)
- https://youtu.be/cuaXDkbg4QA?si=OkpnF6Q6IXoEXerE
- Skin weight painting: 1 adds, 0 influences
- Skinning- Using the interactive skin binding tool the red means more sensitive and the blue is less sensitive and yellow/orange is medium sensitivity.

Eye tutorial: Create- locator- place in front, place in outliner group with meshes. Modifier- freeze transformations. Select locator and eye base- constraint- aim constraint (settings)- reset setting and set Aim Vector fields to 0, 0, and 1

(Change ur workspace’s to)

Animation and Cameras:

To add keyframes: Select channel values + right click- key all keyables OR click S

Graph editor: can shmoosh and edit multiple frames at once by opening the graph editor, toggle this on  and drag select sections of points.

To edit frames on the timeline: Shift drag across
To add camera: create-camera- camerazz
To edit camera view: click split view. Panels- persp-select camera

To get the camera to focus on one thing while moving: selected on camera, hit T..
If animation playback is too fast: right click on timeline. Playback speed- set to real time

(Change ur workspace's to)

FX:

Enabling Bullet, bifrost, and mash and it should appear as option at the end of the FX tab

Fluids: https://www.youtube.com/watch?v=0FD8EoWV3qk
Particles intro: https://www.youtube.com/watch?v=bPoHHRSN61U
Preferences: time slide- playback speed- play every frame (so it can calculate accurately)

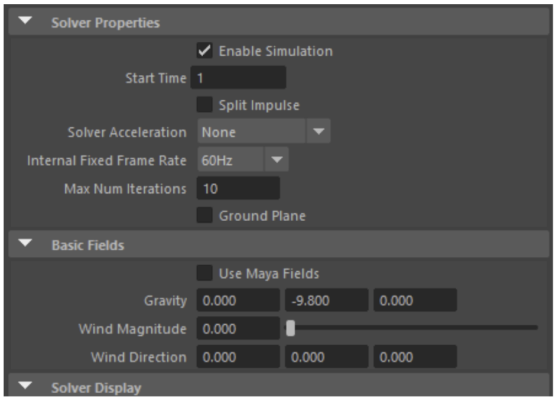
Bullet Sims:
Windows>Settings/Preferences>Plug-in Manager, Find Bullet.mll and enable

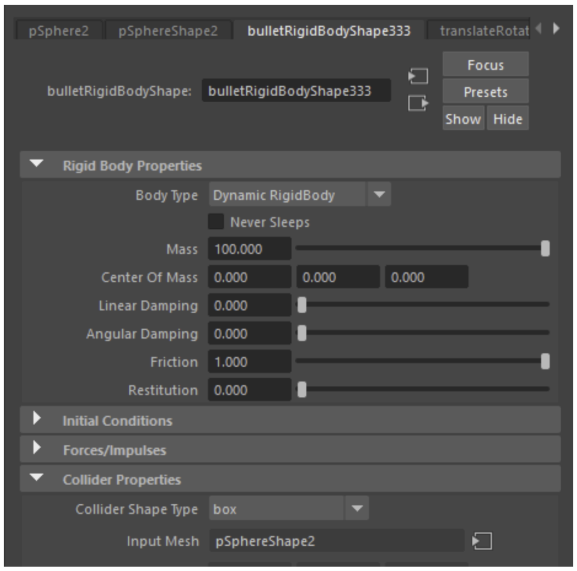
- Appears in fx like substance

Rules of FX:

- Duplicate ur file
- Fuck groups, manually select every mesh
- Freeze transformations on everything before add a simulation to it
- Multiple simulations kind just hate u so just start a new file after doing one sim

Select all the cubes.

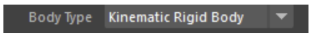
- Under Bullet, apply an Active Rigid Body
- This applies a Rigid Body Shape to all our bricks as well as spawns in our Bullet Solver
- Our Bullet Solver has a few different fields, but we primarily want to be aware of the Start Time of our simulation and the Basic fields
  - By Default, the simulation starts on frame 1 and has a default downward gravity of -9.8, about Earth's gravity.
  - 

  - If we press play on our timeline though, all our bricks simply fall through our plane! Let's fix that
- Select our Plane
  - Under Bullet, Select Passive Rigid Body
    - Try pressing Play on the Timeline
      - You should see the bricks fall and collapse ontop the plane!
- Try a the brick again. In the attribute editor, find the Bullet Rigid Body Shape
  - Here you can further adjust the Mass and Center of Mass of your objects. If these were heavier or lighter than other objects also being dropped.
  - Rather than manually adjust our bricks, let's add a few spheres into the scene and play with the mass on those objects
- First, Raise the brick wall well above the plane
- Create two spheres, one small and one large
  - Apply a Active Rigid Body to both
    - Keep one sphere's mass at default
    - Make the other's mass 500
  - First thing you'll notice is a collision issue. Our sphere's have a collider shape of a box!
    - You can adjust the collider shape under the attribute editor too!
  - 

  - Set the Collider Shape Type to sphere for both our spheres and press play
    - Notice how both objects react differently due to their mass.

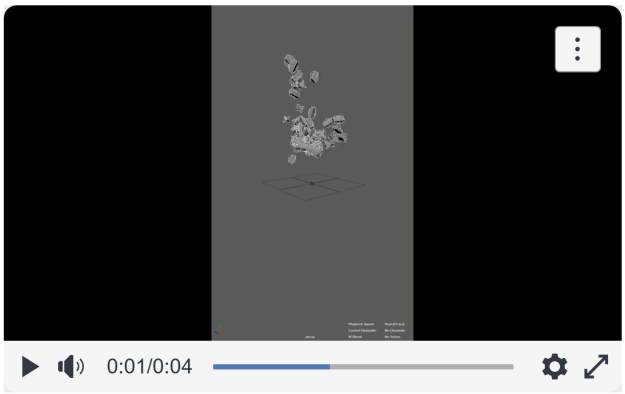
yblast this sequence before we move on!

Breaking a Wall with a Keyframed Object

- Instead of creating an individual dynamic body for every brick, we can also use Dynamic sets.
  - First, unhide one of your brick walls. Move it to be as level with the Maya grid as you can.
  - Select every brick and **Freeze the Transformations**
    - **Center Pivot**
  - **Delete any other bulletSolver in the scene**
  - Select all your bricks and under Bullet, select Rigid Set
  - Find you new bulletSolver
    - Under the Bullet Solver enable the Ground Plane
    - Set the Internal Fixed Frame Rate to either 120Hz or 240 Hz
  - Find the SetInitialState in the Bullet Solver in the attribute editor
    - Find the Initial Conditions menu and enable Initially Sleeping.
      - Now, this set won't move until an outside force acts upon it. So let's make an outside force
- Create another Polygon Shape. The shape doesn't matter.
  - When creating a rigid body, open the options before applying it to your object
    - We want to apply a Kinematic Rigid Body so we can add Keyframes
    - 

    - You can also change the Collider Shape here!
  - Key your object at Frame 0,
    - Move the object through the wall, then key again.
    - Press play on your timeline.
      - Try playing around with:
        - When you place the keyframes
        - Where you place the object/Keyframes
        - The Rigid Body Properties of the Sphere (Under RigidBodyShape)
          - Friction
          - Mass

Using Maya's Fields with Bullet

- Using our last Brick wall, let's try using Maya's Field Solvers with the Bullet System.
  - Create Active Rigid Bodies using your Brick wall
  - Under the BulletSolver, enable the Use Maya Fields option under Basic Fields (Attribute Editor)
- Now, let's try out all the different fields
  - First, Find the Fields/Solvers option
  - Once you know where the Fields are, **select all your cubes**, then add a Field
    - You may need to increase the Magnitude and Attenuation
- Playblast your scene with Multiple Fields active at the same time
  - 

Enable xgen addon

Model requirement before groom:

- UVs (painting on maps so fixing UVs are a pain if not final) and typology finalized, history deleted/freeze transforms
- Work in Real-world scale
- Y up, z forward. (mirror on works on x axis)
- Final Mesh name (if u rename the mesh- xgen will not find the mesh)

(Change ur workspace's to)

Rendering:

Lighting/ materials(shaders) and rendering is dependent on what render engine you are using.

Know the different renderers: default, arnold, and redshift (used by zbrush/ and gotta have maxon subscription). Different lights/materials are used for each renderer. Default is all maya, arnold uses special light/materials that have "ai" in front of them. Redshift materials have rs in front of them. Both arnold and redshift can use default arnold lights/mats but aren't encouraged because they can wash out there own lights.

General:

To see the lights wireframe in viewport: show(top bar in viewport)-viewport-checkmark "lights"

To add light: click ur render engine tab name- lights- select one

- **To edit lights:** go to the attribute editor and click light shape tab
    - **To add light gradient:** click checkerboard beside color in attribute editor and select Ramp (option for gradients is called ramp)

To add hdri: add a skydome (or rsdome) light, in attribute editor, shape tab upload the hdri to the folder

- **To make hdri background invisible in renders:** selected on dome light- in attribute editor under shape tab, contribution- slide camera to 0.

To add volume or atmospheric volume: For arnold renderer: environment- atmosphere (click checkered box)- click add atmosphere. For redshift: render settings- advanced-globals tab- environment - click checkerboard and add redshiftvolume.

- **To edit atmosphere:** find it in ur hypershade list- go to attribute editor and change volume slider.
- **For lights not to show up but effect object:** in lights attribute editor- shape tab- contributions- turn volume to 0.

To render sequence: Frame/animation ext:- name#.ext. frame range- start frame and end frame set to what camera amount your rendering. Renderable camera- select camera u render. Set exr for high quality and fast renders (but must assemble it in something for it to play). Test renders first by playing with render settings and checking render time in render preview. Make sure 1 frame time is between a 1min-3min per frame. Select the workspace mode to render. Make render folder in files. Render- render sequence (click box/setting). Current camera- select ur camera. Alternate output file location(select folder)-select a new render folder. Render sequence (have render folder up to check process)

Another render tip video: https://www.youtube.com/watch?v=nqorMCXo6Hc

Redshift: Make sure to use redshift lights (add from redshift top tab) and materials (Substance plugin has a import option for "workplace" dropdown change to redshift and will import and redshift mat).

https://www.youtube.com/watch?v=GT9P4Cy-ssk (30 mins)

To enable redshift renderer: make sure to download redshift from maxon (if you have zbrush subscription) and go to windows-preferences-plugin manager. Search redshift and enable. In render setting, switch render using to redshift.

Render settings: Change renderer to redshift

- Disable Default Lights: In the render settings- common- Misc section, uncheck Default Light (washs out your custom lighting)

Material import/settings:

- Generally export all ur maps from substance as standard PBR. When importing into maya, use substance plugin- change workspace to "redshift" and make sure all the maps are selected.

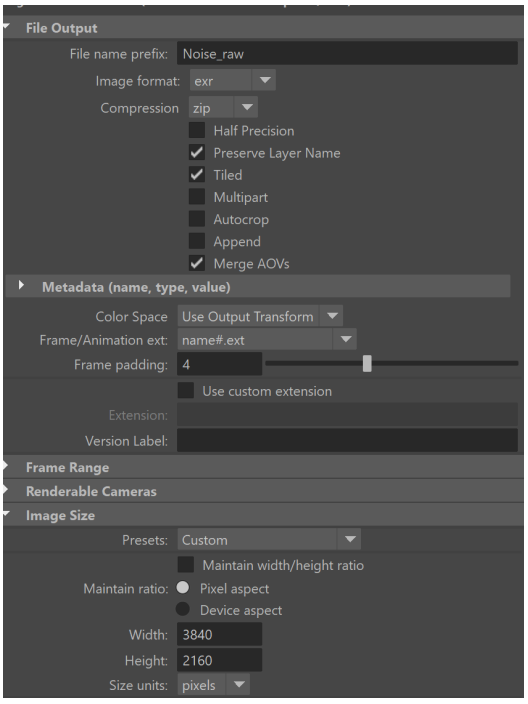
- Height Maps: rendering as is will usually have the height exploding/puffy- go to material (RC hold- graph network, then click the left node “placed 2d texture”- and click  - this should then show the displacement map- go to “rsDisplacement” node and change the “scale” down till the correct height (usually .1, .01, or .001, check with IPR rendering).
- For standard non-glass materials, switch the BRDF model to GGX and set the Fresnel type to Metalness for modern.

Adding Redshift HDRI: redshift-lights- add dome light. Scale up, the in attribute editor under light shape, plug in hdri into the “texture” (dont add into color or will notwork)

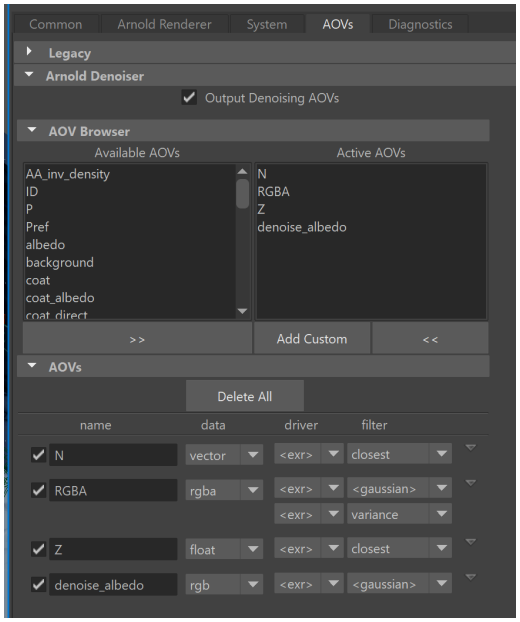
- To hide in camera, attribute editor- lightshape-contributions-slide camera to 0

Interactive Rendering (IPR): Click Render and doc in scene(or click IPR render). In renderer click tab “IPR” and select the camera you want interactive rendering on (Usually set up your camera shot first).In render settings, basic- switch rendering mode to “ live”

Render Settings for Denoise Arnold: To render sequence with ARNOLD Denoise:
https://www.youtube.com/watch?v=YSAcFE_x-Ds
(How to run the sequence for Denoise): https://www.youtube.com/watch?app=desktop&v=0xPCF0EGJhQ
Common Tab; image format to exr; check preserve layer name;

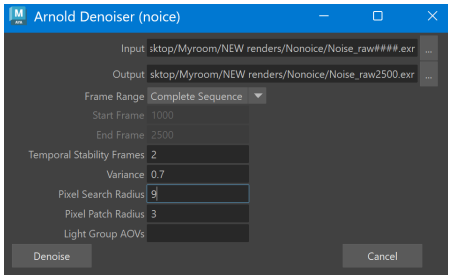


Arnold renderer tab- Filter- Type- set to gaussian (sequence) or Box (single frame);
AOV Tab: Select these AOVs: (On RGBA, add extra exr and set to variance or denoice may not work)



Render sequence.

To run through Denoice: Arnold- Utilities-Arnold Decoise. Select a frame that starts the sequence, output- select a frame that ends the sequence.



Should render the denoise version in the same folder with “_denoice” added beside the new frames files

Use Adobe Media Encoder to assemble it. Premiere may be able to if u just “as a sequence.”

Zbrush

Tutorials:

- **intro tut:** https://youtu.be/pCjzgYuS6WQ?si=oyDrZm1GVAKrKcvD
- **Dynomesh basics:** https://youtu.be/hsVUr3vm6-k?si=4wqVP3mjxXpfKG6C
- **Face (polygroups explanation):** https://youtu.be/LtGvVqEVScs?si=vEoDIt9jmSyAWNSB
    - **Hard surface/armor:** https://youtu.be/S1HHFhdUi4o?si=UdulrGE9FnBqD2Cf
    - **Necklace, shoe lace, earring, button:** https://youtu.be/U9MvJ5R3eQk?si=MDrez34Dbo8pEKzj
    - **Clothes:** https://youtu.be/ZX1W17_SPas?si=-nI7iufYUhVCEdqZ,
    - **Short:** https://youtube.com/shorts/rwTHR0umNpg?si=tFBN-Ym7P6BdZQX2

Zmodeler (5 mins): https://youtu.be/belKzqiUYfQ?si=tyGNfaO5vkvA7mqs

Michael Pavlovich- zmodeler (20 mins): https://youtu.be/UJ1-UfKfzh0?si=rnKlUePmW7vqdllp

Understanding zremesher: https://youtu.be/-ZPH8bBfz0w?si=gYcMG90VYBY-sR7J

Horizon AAA game modeling tips (creating curve brushes, hard surface bashing together, alpha brush library for hard surface) https://youtu.be/MKkI8DWHwm4?si=3OJVLlGQA_pjGQdX

Making/ using Alpha brushes (add, etc)(14 mins): https://youtu.be/ReJsURX2L-k?si=Wd0-U2BCHH4DT5E2

5 useful zbrush tools: https://youtu.be/QpsVNlelMgk?si=wjDeg1wcXW17MIEM

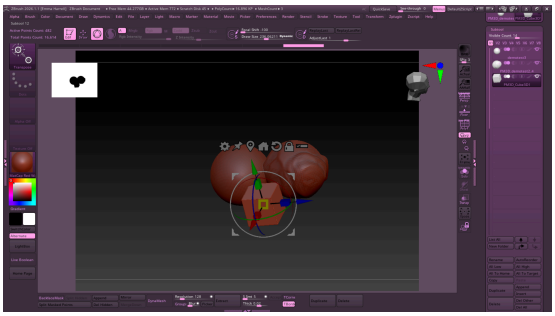
Posing Characters using transpose master+Zspheres): https://youtu.be/oJKIOWMjB20?si=naJH_aVRe_YvL5BS

To customize ZBrush:

- To change UI:
    - For words & icon size: Preferences- interface- UI- change slider (auto saves, restart to see change, doesnt effect config)
    - For colors/ scene changes: Preferences- config- toggle on enable customization. After any changes: toggle enable customization off, save config to files (for zbrush glitches/updates), and clip **store config** to save changes for next launch
        - To move icons: Clicking on them- hold shift+alt+ LC drag to new location, drag into viewport to delete them
        - Preferences- Icolor: customize color palette
- To change hotkeys:
    - hold **Ctrl + Alt** while clicking on an icon (like brushes), then press your desired key. To keep hotkey changes for new startup: Preferences - Hotkeys - Store. Also your keymap saves separated from ui config so: Preferences- Hotkey- upload- save.

- **My set up:** My zbrush UI and hotkeys is uploaded here, Good for small tablets (13 inch wacom movink). Has my heavily used actions saved to bottom tab (must be in 3d mode to see them), a smaller viewport top bar/side bar clutter, and brush hotkeys for 1-7 (zmodeler, move, claybuildup, damstandart, Trimdynamic, pinch, inflate, polish and standart)

- https://drive.google.com/drive/folders/1cW-SJuOE_fTazUVAQ6cq1frSScxaxjoy?usp=sharing



Files:

To export Zbrush to blender: https://youtu.be/PNmgJa9ZgeQ?si=8VrhmkAJBFQJmEPv Top bar- zpluggin- fbx export/import. Select settings like visible or selected and export. Use zpluggin- decimation master to reduce polycount. (make a duplicate tool or file before doing this)

To export from zbrush to maya using GOZ (The 1 click bridge): tool (top right bar)- Goz, click through steps. May need to enable Maya's GOZ plugin or restart zbrush. WHatever subtool is show should automatically pop up in maya or launch maya for you.

To export from To maya to zbrush using GoZ (The 1 click bridge): maya- plugin manager, search Goz and enable. New tab at end like substance plugin does, Select meshes- click GoZ button and will open in zbrush as new subtool.

- **If imported mesh has weird shading or neon yellow faces**: click "make polymesh 3d" in tool. Or assign new material/color in zbrush and make sure in make to assign a material and mesh display- normals "set to face"

Before you start, Important tips:

******Hold Ctrl and hover over any label to view the tool description. ******

Understanding Subtools/tools(outliner): Zbrush works through "tools", one zbrush file can have multiple "tools", these are like separate files within the file. Under "subtool" (right bar) is like your outliner, When selected on a subtool layer it will ALWAYS show the layer you are selected on, even if hidden with the eye tool. Use "visible count" slider at top to show more in the list.

Saving/files: Every hour get into the habit of clicking ctrl+S and have multiple versions of the project files (.zpr) because the massive amounts of data tends to corrupt files. Usually I put V1 and V2 at the end and sometimes I have a backup file that I just overwrite every now and again. Set up your quicksave (aka **autosave**) preferences (top bar)-quicksave- set duration to like 30 mins, disable "skip history" and enable "optimize."

When starting a file:

- Close lightbox (toggle button), click document (top bar)- new- save (this will fullscreen the layout, this DOES NOT save the file, just is like a screenshot).
- **Ctrl+S**, or under tools (top of right side)- save as- the file type dropdown should be "all project files" aka .zpr.
- Tool (right bar)- simple brush- select a starting object circle, LC drag in tool- click **F** to fit to screen
- Tool (right bar)- make Polymesh3D (simple brush tools are 2.5D primitives and aren't real 3D until this)
- Click T (switches from 2.5D to 3D) Now u can use the brushes to draw on mesh and start! (Clicking T again will make u ctrl+N(clear screen) and redraw in a tool (can glitch and make a permanent preview overlapping the screen, you will need to close & reopen zbrush)

Standard workflow for zbrush to maya:

- Blockout every muscle group with Zspheres or circles+move brush+ append and use polygroups when merging.
- Start super low poly, use dynomesh for roughly blockout and merging.
- Use 'zremesher guides' brush to draw desired loops or use polygroups (Use "smooth groups slider for smooth loops, freeze edges are for baking), Run zremesher 3-4 times till decent polycount. May need to clean up using zmodeler.
- Use "divide" at top of geometry to add subdivision levels (u can edit each level and it will effect other levels, basically you can keep ur low poly mesh and actively work on the high poly) Keep "smt" on so that the subdivide applies a smooth
- Zrememsher loves making spirals so may need to use quad draw/ manual retypo for professional work.

Lowpoly to highpoly workflow (no typo needed!):

- USE divide and GOZ!
- GOZ bridge: basically just links the two assets in each program. So clicking GOZ in zbrush updates the original asset in maya and same thing back (just click the GOZ button once and it updates the maya original assets, handy for fixing holes or overlapping verts, and creases).
- Divide method: similar to the "smooth" preview in maya but allows for multiple division AND sculpting, it basically a LIVE bake. U can edit each layer of the divide individually and it changes the verts in the upper and lower layers (just use the slider below the divide button to slide through the layers). When u export the zbrush asset with divides to maya, it only exports the bottom layers typology but keeps the upper layers in the asset data for when it goes back to zbrush (to get the high poly FBX for substance just duplicate the subtool and delete the lower layers). I have a small section in my Zbrush doc that explains some tips for it

Zbrush practice options:

- try no symmetry
- Try sculpting from reference but make it upside down (same principle from 2D practice)
- Focus on hard things like: Faces,animal/creatures, body part breakdown with polygroups, clothing.
- Hard surface

General:

Ctrl+S: save as

ctrl+Z: undo

Ctrl+shift+z: redo (set mine to **shift+z** like maya**)**

LC(left click) in viewport: rotate (hold shift to snap)

alt +LC: Move in space

- **alt +LC + let go:** Zoom in space

W/E/R: transpose master, use to move/rotate/scale

- Hold Alt to move the gizmo
- Top bar above gizmo
    - Gear: deform actions
    - pinpoint: resets gizmo location
    - Home: moves mesh back to world center

Shift+S: makes a 2.5d snapshot of scene and can be positioned anywhere for reference

Ctrl+N: clears canvas (lclick drag subtool back in, will keep floor/ref pic scale and everything)

Hold space: edit brush size (brush options)

T: edit mode (2.5 to 3D)

To begin sculpting: click “Make Polymesh”

F: refocus

X: symmetry tool

P: toggle between orthographic and perspective view

Shift: Smooth

Alt: invert brush (while on brush)

D: toggle dynamic subdivide preview

Ctrl+D: divide

Ctrl+E: merge down

Ctrl (hold): mask (on mesh its a brush, dragging of mesh is box select mode,

- **Ctrl+alt:** erase mask

- **Ctrl+ RC drag off** mesh: clears mash
- **Ctrl+alt:** erase mask
- **Ctrl +LC (Hold) on** mesh: soften mask edge
- **Ctr+Alt(Hold) + LC on** mesh: sharpen mask edge

Ctrl+w(after Masking): Polygroup (for sectioning meshes inside a subtool)

- **Ctrl+shift+ RC** on mesh: isolate polygroup
- **Ctrl+shift+ RC off** of mesh: shows all polygroups
- **Ctrl+shift+LC drag on** mesh: isolates all meshes in dragged box
- **Ctrl+shift+ RC drag off** of mesh: inverts isolation (ctrl+shift click on poly to hide it too
- **Ctrl + Shift + X / Ctrl + Shift + S:** to grow/shrink view while selected on a polygroup

- **To see polygroups (by color):** Click “polyframe” on right bar
- **To make merged subtools into polygroups:** polygroups- autogroups (use for auto polygrouping after merging multiple subtools before u remeshing so u can reseperate them if needed)
- **To switch to lasso select:** when Ctrl+shift (hold)- change the action tool (where ur “brushes” are should now show a set of active brush)
- **To separate polygroups**: isolate polygroup- ctrl drag to mask full thing. Subtool-split-split masked points
- **To smooth a polygroup edge(for extract/inset):** lightbox-brushes-smooth-select “smooth groups” brush and draw on edges of polygroup to smooth

Alt+D: delete mesh
Duplicate mesh,
Delete hidden
Solo Mode
alt+F: toggle freeze subdivisions
Alt+S: Custom menu 1

- Sdiv level, reconstruct subdiv
- Mirror and weld, mirror
- Delete hidden
- Close holes
- Split Hidden
- Groups Split
- Split masked points



Alt+A: Custom menu 2

- Panel loops
- Deformations

Local symmetry
Floor ref settings

To re-open a doc (or if you click T and switched modes): (toggle lightbox off) hit C+N(wipes canvas), LC-drag in object, F to fit to screen (If not showing latest version of mesh, you might be on wrong tool, just look through your tools to file the right one in file)

To upload Reference/ Orientation: Toggle floor grid on (or wont see reference). Draw (on top bars)- click top left circle to add tab on right. Scroll down to the floor section and look for front-back or left-right, click map 1- import image and same for map 2 for the back, for no custom back ref just upload the same image and click “flip”. Use “adjust to crop an image” and the scale/offset sliders to position it where mesh is (if imported mesh). Beside the floor (in draw settings) Change the “fill mode” slider to change floor transparency, toggle “front” to overlay the image on top.

To Dynomesh: geometry (right side)-dynomesh- tweak resolution and position in world (Dynomesh is a TOGGLE,)

- **Hold Ctrl- click drag outside of mesh:** re-run dynomesh.

To Dynamic subdivide: clicking divide, added divided but u cant edit polygon underneath/make many changes. So use dynamic subdivide (press D to toggle preview). It activates a preview of the divide so you can crease, cut holes, snap verts on original mesh but preview the smoothed version.

To add a new part on mesh: subtool(right bar)-append- select a simple brush meshes, W/E/R to move it. If imported a mesh or lightbox mesh- go to the imported tool and select the wanted layer, switch back main tool ur using and subtool- append, that layer should top show in top list of most recent tool selections listed, just click to add)

To use zsphere's (vines, cords): click append/insert (in subtools) and choose zsphere (located in tools palette).

- Q (LC drag on sphere): Draws out a sphere (autosnaps if transparency isn't toggled), also can click into a sphere chain in this mode
    - Shift (hold): matches the size to the previous one.
    - (LC on sphere): To delete
- W/E/R + LC (drag up or down, change "draw size" for affected area) : to move,scale, and rotate the spheres
- A (click): toggle on subtool-adaptive skin. Drag dynomesh resolution slide down to preview simple typology (turn polyframe on). Once resolution is decided- click "make adaptive skin" and then append (click same mesh) to finalize. Ctrl+D + smooth as needed.

To pose character in zbrush:

- Zpluggin (doc it)- transpose master- enable "zsphere's Rig. " (have multiple subtotal on)
- Click TPoseMesh. Now in the new zsphere subtool. Use zspheres to draw out a basic skeleton.
- Tool-rigging- enable "bindmesh."Use R to pose (drag on the bones not joints at diff angles). Disable bindmesh to change skeleton.
- Zpluggin-transpose master- click "Tpose SubT" to finalize pose
- To make symmetry work again: transpose- "use posable symmetry" to fix

To mirror: Zpluggin (top bar)- subtool master- mirror

To merge: select top layer, subtool- merge- merge down (dynomesh to full merge)

To separate or split parts: Mask part wanted to separate, subtool-split- splitmasked points. (If can't split masked: You may have a division on, go to geometry- (at top) sdiv (slide to 1), or click ":del higher" or toggle freeze subdivision.)

To hide parts/ see through mesh: use the solo button(transform-solo) to isolate the subtool. Use the Transparent (transform-activate) button to see through (also toggle ghost for a edge gradient view of that).

To add holes/ To boolean: toggle "live boolean" on (boolean preview is now on). In subtool layers- change the circles above subtool name (subtract/union/etc), make sure it's in the same folder. Click the arrow beside to make a "start" group, used for layering booleans, start groups the subtool under until the next "start".

To thicken a mask/ make clothing: Mask selection- subtool- extract (change thickness slider)- extract again to finalize (makes new subtool).

If mesh is too thin and draws on backside: brush (top bar)-automasking- enable backface masking (enable again whenever switching between subtools)

To change symmetry axis or muli-axis symmetry: transform (top bar)- symmetry- select axis's

To smooth topology with border: brush-smooth brush modifiers- slide the min connect up

To create a custom alpha stencil from picture:

- First Make a black and white square image for stencil (black is non-stincle/ the void)

- In brush- standard brush- clone. Change to drag react (to drag on stencil). In alphas(in lightbox)- stencils- double click image)

To create a custom alpha stencil from sculpt:

- Subtool- create plane3d and sculpt a pattern. Exit edit mode, subtool- mRGBGrabber- hold shift to make square and drag square around section. Should create an alpha.
- In brush- standard brush- clone. Change to drag react (to drag on stencil). After dragging out will have a thick layer, to fix: alpha-modify- change mid value (like 100).

To make curved shape blockout shapes/ how to use Bend Curve Deformer: Select a primitive- make polymesh 3-d. Shape it (to make a tub, select sphere, Initialize (bottom of right side): Set Y res (slide to 1), click QCYL Y. Then scale or go to geometry- size- slide up Y. Finish with Crease and divide and del lower division). W- click gear above gizmo- “bend curve”, drag the cones at top left (set axis on inner cone and amount of resolution on outer cone, needs enough edgeloops to work.) click gear again and click apply to finalize.

To use curve brushes: select a subtool to draw a curve on, in brushes, select "curve tubes” or a curve brush.

- LC drag to draw out a curve from mesh. Its size is based on draw size, LC on curve to update thickness. When the curve is live you can switch to other curve brushes and LC on curve to update. Being near the end of a curve will continue to draw out from that end point (to change how close the snap is got to: stroke-modifiers- curve snap distance- and change the slider)
- Hold shift to loop curve around mesh. Alt + dragging on curve deletes it. Ctrl+ LC on curve to twist it (controlled by draw size, brush outline should be blue)
- Shape: Stroke (top tab)- curve modifiers- toggle size on and change falloff below so that ramp controls the start/ end thickness when drawing out.
- Transforming/moving curve: Grab beginning of curve moves whole thing, grabbing end moves like a snake, grabbing anywhere else moves it based on draw size. Stroke- curve- toggle as line to draw out as lines, toggle elastic to extend in straight lines, toggle liquid to extend/shrink curve smoothly, lock end/start when freeze them. Stroke-curve functions- click smooth to smooth curve line (LC on curve to update it), or hold down shift and draw over it. Use the transpose tool and shift-drag the line to edit sections of the curve (Hold shift while dragging your curve brush to lock the stroke into a straight line).
- Auto curve outline trick: stroke-curve functions- frame mesh (choose polygroup, crease or border) and it generates curve around those areas.
- To draw into the surface instead of on top: brush-depth- drag circle down a bit.
- To make your own curve brush: have a loop-able shape isolated as a tool. B- “create insertmesh” (at bottom)- new. Then stroke-curve- toggle “curve mode” on

Material/Color

1. Make sure to turn on the paint brush icon on the subtool layer or cant see material/paint
2. On subtool, enter draw mode. Click the “mrgb” at top to set the color and material (change the color/ material on right side)
    a. To fill color and material: Make sure to clear all masks, click “color” at top tab then” fill object”

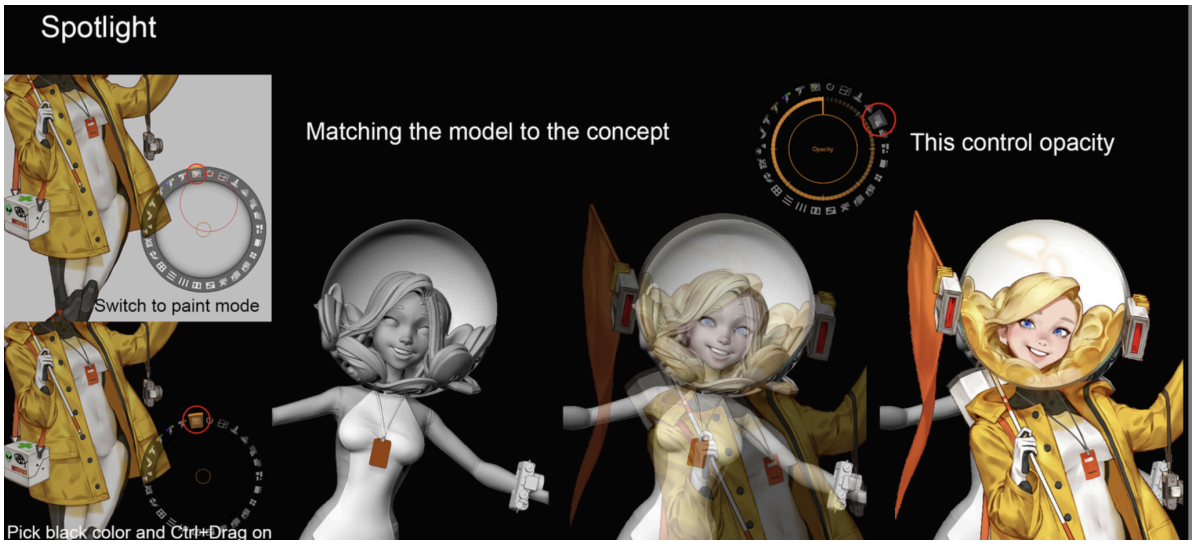
b. To paint Color: change “mrgb” to “Rgb” to just paint color and not material. Toggle “zadd” (top bar) off to stop adding/editing the mesh and only paint.
c. Switch to “paint” brush in brushes. Use **C-** eyedropper

IF PROBLEMS:

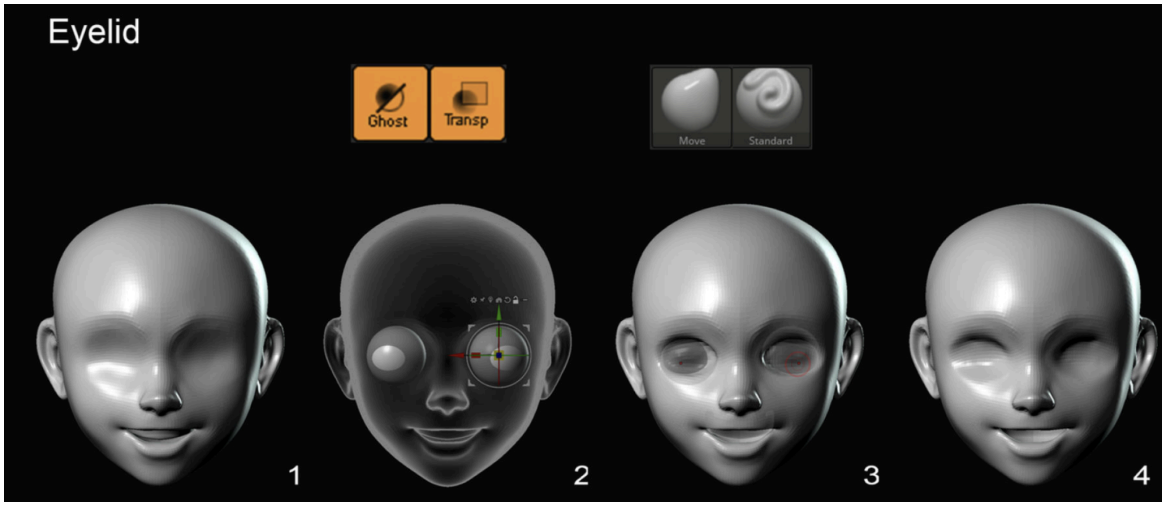
Reference Upload: Draw(at top expand tab, scroll down to front and back, click map 1- import image, map 2- import same image and flip it. Make sure to have the grid/floor enabled to see it.
If tablet pen pressure isn't working: Preferences- Tablet and ensure the tablet is detected. Mess with these settings: Switch the Tablet Driver API from "Wintab" to "Stylus", or disable "Windows Ink" in your Wacom Tablet Properties. Restart.
If sculpt on screen not moving/glitch: ctrl+N (clears screen), redraw subtool in (usually happens when u leave draw mode and return to edit mode, have to clear screen and redraw subtool, if screen doesnt clear restart zbrush). Also might have locked stool- click W- above the gizmo theres a lock, click again to unlock.

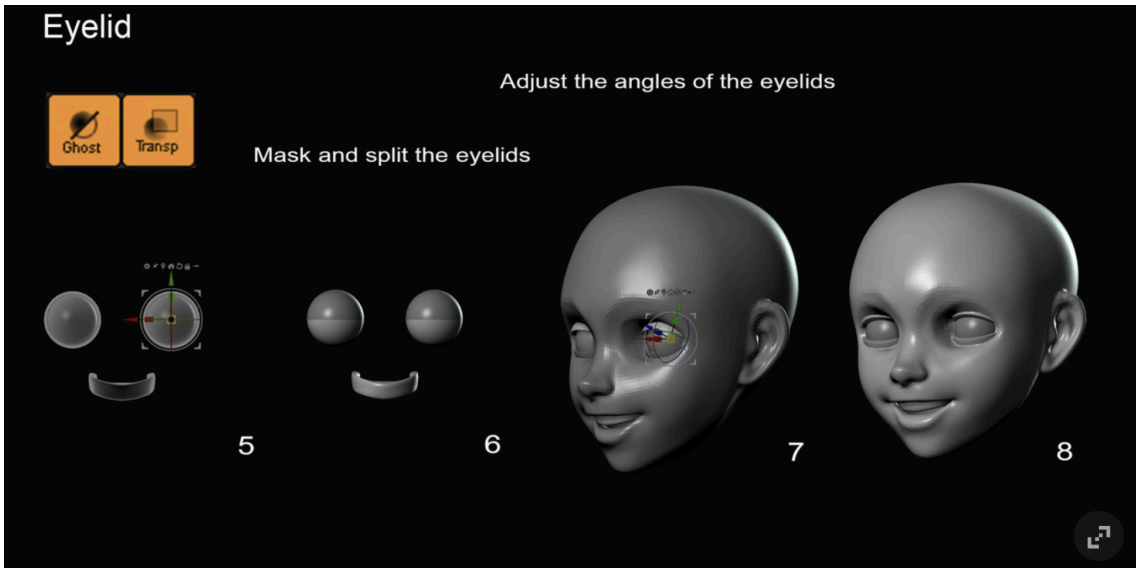
If all parts are moving: w(move tool)- above gizmo- turn the hamburger off 
If rotate/scaling gizmo is twisting subtool: set focal shift to -100, transpose is controlled by draw size
If can’t dynomesh: may have a mask on (ctrl click drag off mesh), dynomesh is toggle
If cant view or see All Appends: in subtool- Move Slider on left to scroll down and change slider at top to change the Visible Count, be on V1 at top.
If the subtool is not smoothing when clicking divide, or crashing: Make sure there are no creases (if you toggle polyFrame on you can see some edges have double dotted lines, so creased- To clear all creases, go to geometry-crease- clearall . toggle “smd” on. Under geometry- meshintergrity- first click check mesh, then if issues are found click “fix mesh”. Also make sure you have enough memory for dividing.

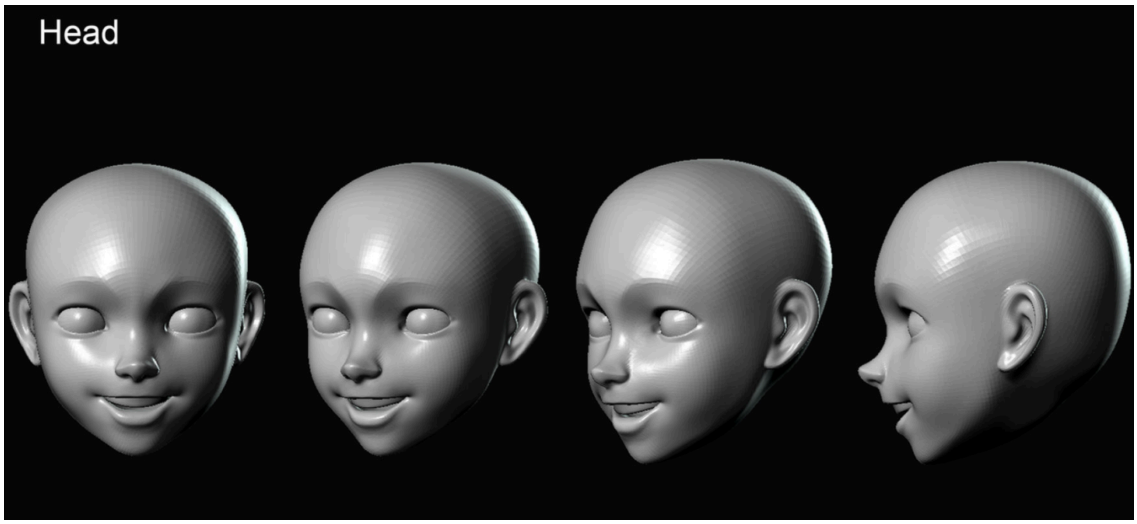
References:



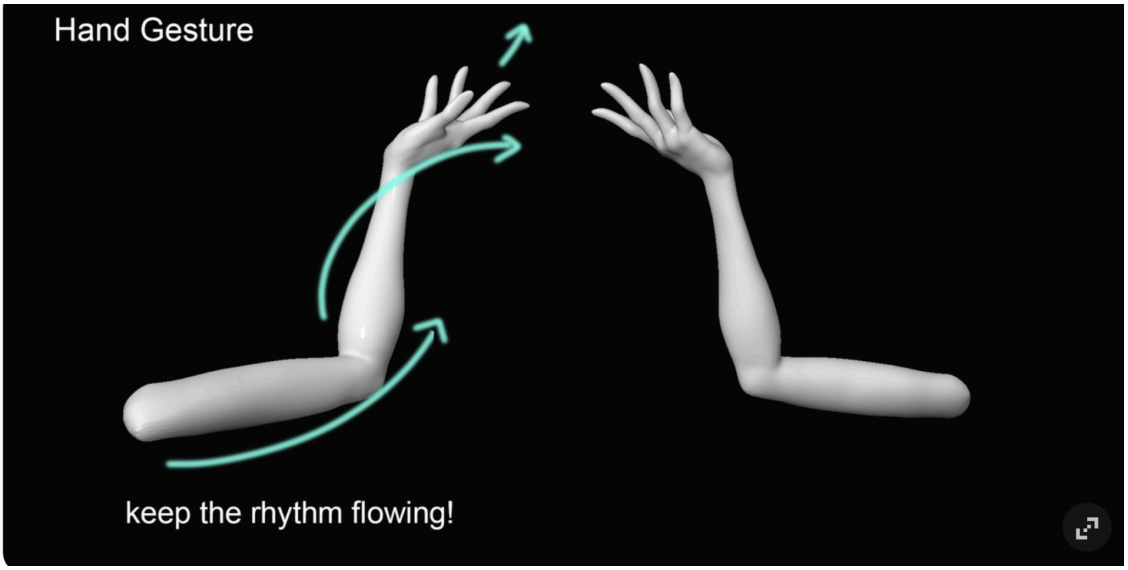
Eye placement tip:





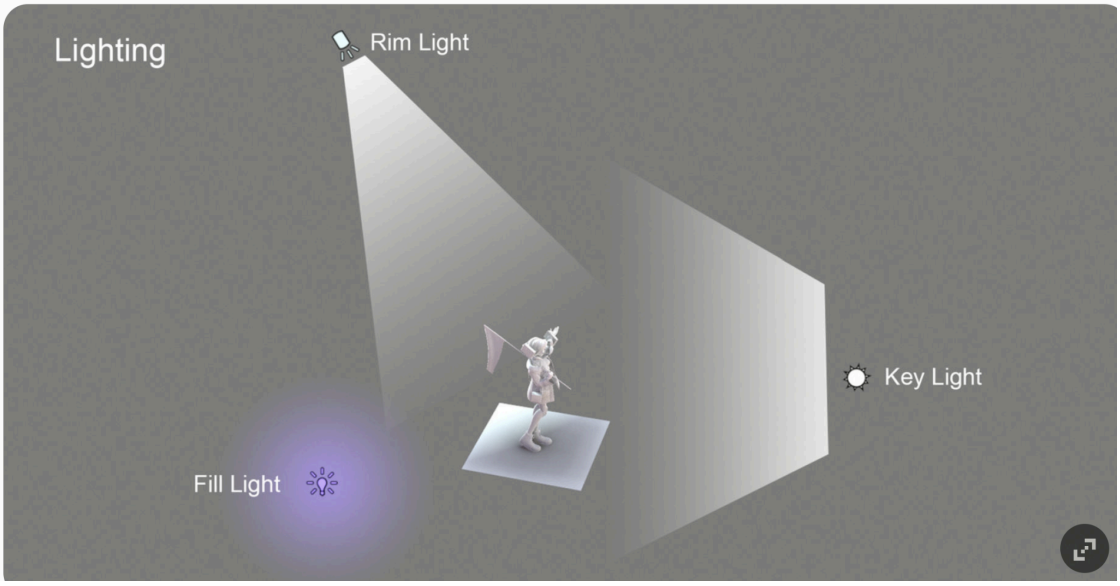


Recommended to pose characters using a combination of the Gizmo and Transpose Master.
https://youtu.be/T-kRILnndyI?si=7I___DHrmPZST6dx



Lighting tips:

Three-Point Lighting:



Adobe Substance 3D Painter

Before opening substance: make sure to assign diff material to sections of the model u want in different layers in substance. Substance makes diff materials diff layers (Recommender for parts that will use completely different materials, ex: face, gums, teeth should all be diff layers)

File-new: document resolution: 2k option(2048) or 4k, select fbx file to work on, unselect auto unwrap and camera, template- metallic roughness

To bake high poly onto low poly (https://youtu.be/i1akrT8cm2k?si=LzpXWuhUQpcRj_JE **):** (be on low poly file when making substance file). click croissant, select file- find high poly fbx- adjust parameters.

- Tweak: Ambient occlusion, Curvature, and thickness- turn up secondary rays (126).
- Finalize by click bake selected textures

Better baking (1min): https://www.instagram.com/reel/DQuadn8gLhz/?igsh=cjNpZGpmeDdsZWt4.
Substance to maya workflow(30min): https://youtu.be/ZtEiVa3MPLg?si=8ymuK67UWQ_ESBTQ
5 Hidden Tools That Make Sculpting Way Easier: https://youtu.be/QpsVNlelMqk?si=uPmcmB3d8XFrkwaw

Alt+L click: rotate around the object
Alt+R click: Zoom in space
Alt+middle click: Move in space
To switch to orthographic view: space or click box button at top
To isolate one selection in properties: hold alt+click
To isolate colors: materials- base color
Shift+right click drag: rotate HDRI light
ctrl+shift+E: export texture (recommend png, not jpg bc too compressed

Layers: Layers work like Photoshop (top layer overrides underneath)
To hand-draw colors: Use a base color (deselect everything else) and add a black mask (draw on black mask)
To delete layer: select and click the trashcan above
ctrl+G: add layer group
To add a fill layer: click paintbucket
To apply texture to whole abject: select material- drag onto object
To add a brush layer: click the brush in the layers
To add a generator: click sparkler- add generator.
To invert mask: add levels- invert
To add depth using thickness: add fill-thickness
To add a black mask: Anything painted with black shows what the base color is. ctrl + G to add layers underneath mask in group.
To hide seams from generator: in generator properties click “triplanar blending” to true.
How to import texture/image into substance: file- import resource-add resource- click undefine- texture- import.

- **To move import around:** hold S+(all movement options: rclick,lclick,middle click)

How to import texture/image into substance: file- import resource-add resource- click undefine- texture- import.
How to make texture in a brush layer: add brush layer- add projection(3rd one)- base color- look up texture import.
To add an opacity shader: add new color fill layer(just make sure your not on a smart material. Shader settings- add metal opacity material. Texture settings- channels- “+” - opacity. Properties- toggle op- opacity at the bottom
To create auto shadows with generators, add 2 fill color layers, darker color on top. Select top fill color layer, add black mask, add generator- dirt, add filter blur, add slope blur (change intensity divide for smoother effect)
To add generated brushstrokes: block out colored sections as different color layers with black masks. Group into one folder.select folder- Apply filter (magic wand)- search filter “stylize”. Change dropdown to handpainted

If problems:
If viewing changes suddenly: top corner of viewport- change dropdown in viewport back to material
If everything blue/ on geometry mask: click onto the thumbnail on layers to go back into edit mode

Unreal Engine

Unreal engine 5.8 starting out: https://dev.epicgames.com/documentation/unreal-engine/get-started

Intro to Unreal Engine https://dev.epicgames.com/community/unreal-engine/getting-started (1st hour unreal engine)

Top-Down RPG Template Documentation(300 pages, click hamburger for titles):
https://docs.google.com/document/d/1ght-pspcpe4YV1SOsTi7EQlvmIlutGfRL_NOnIYARxQ/edit?tab=t.0#heading=h.nvafmswp0v1u

Forums board (for help): https://forums.unrealengine.com/categories?tag=unreal-engine

- Foundational knowledge (terminology): https://dev.epicgames.com/documentation/unreal-engine/foundational-knowledge-in--unreal-engine
    - First hour in UE playlist: https://youtube.com/playlist?list=PLZlv_N0_O1gZTBUZfQy0Am9ucvXpOV6Ii&si=CRD5z-BZtl0kEfgG
    - Starter Course (42 vids) 5.8 unreal: https://youtube.com/playlist?list=PLGEDpELN0zHDVBsN0FCZUeqqboxSNt0xm&si=kLPMqSSl-UrI4XXS
- Learning Nodes: Mathew Wadstein wtf is? And HTF do i? Series https://youtube.com/playlist?list=PLSlkDq2rO1t74oyn9YH3CWQxdd54Vx6lc&si=lxJZcMQT7FBguFd1

UE works in centimeters and Z up

Exporting/importing:

To export objects/scene from blender to unreal:

- File-export fbx: Path Mode: set to Copy (and toggle icon on right side), “selected objects”, Under transform; checkmark apply unit and use space transform, -Z forward, Y up, under geometry: change smoothing from normals to faces, checkmark apply modifiers, no rig then disable “add leafbones” and “bake animations”. This Exports FBX with embedded textures.
- In UE- content browser click “import”- select fbx or if textures aren't baked it shift select object and related textures- import all. Click on object and double clink material- link texture maps. Or Export FBX with embedded textures
- Importing an fbx with multiple meshes, shift select and upload, if u shift select all meshes and drag into UE it will keep there together like in blender, and u can also drag them in seperatly
- Blender to UE using polylink Addon: https://youtu.be/NciG6Amf3eg?si=uaNru_XMs9rf9qVx

To export UE5 Basic mannequin out as fbx:

- Content-characters-manniquins- meshes- RC on a mannequin

To import from maya to UE:

- In maya: First Combine and object or will import in pieces- export as fbx.
- In UE:
    - drag and drop fbx into content browser, in import setting: Disable make material for me.
    - Drag and drop texture (some maps might be import as normal, in map setting details change- compression settings to “default (BC-”
    - Make a material- open material graph- drag textures from content drawer into graph editor. Connect
        - Base color file: RGb to Base color

        - Normal map: rgb into normal
        - ORM/Metallic: O (Red) to Ambient Occlusion, R (Green) to Roughness, M (Blue) to metallic.
    - For blend mode change: translucent gray transcendent. Play with refraction
    - For foliage (checkmark 2 sided)

Panels:

Content drawer (ctrl+space): files, meshes, exc
Details: inspector/ details on object/actor
Outliner: organization, all of the “actors” in scene

Hotkeys:

Ctrl+S: to save level at any time
RC(hold)+ W/A/S/D: to fly around space (scroll wheel while moving or top right of viewport to adjust fly speed)

- **MMB scroll:** zoom in and out
- **LC (hold):** backward/forward
- **RC(hold):** look around
- **LC+RC (hold):** pan camera

F: focus on object

- **Alt+LC**(left click)**:** rotate around object
- **Alt+RC**(right click)**:** Zoom in space around object
- **Alt+MMB**(middle mouse button)**:** Move/pan in space around object

W: translate/move (select object)
E: rotation tool (select object)
R: Scale tool (select object)

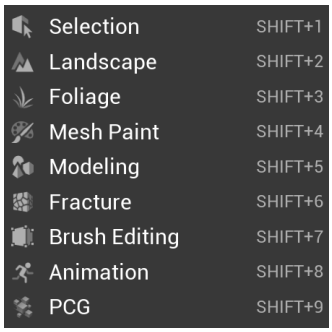
- **Space bar:** Can shift through move, rotation, and scale tool

Alt+p: to play
Esc: exit play mode
Alt+drag: duplicate selection

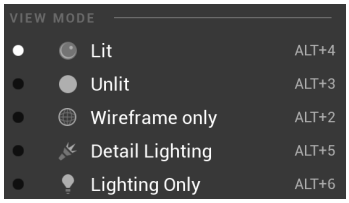
N (while on object): snaps to floor
L(hold)+LC: spawn light
Ctrl+space (toggle): content drawer

- **Ctrl+b:** to bring up the model selected in the Outliner in the Content Drawer

Shift + 1-9: switch modes



Alt+1-6: view modes



Alt+F: toggles the visibility of fog.

Blockout workflow:

- Turn on snapping (magnet on toolbar)- check surface and location (set increments slightly higher for grid placement).
- Keep meshes at a fixed base size, make sure the pivot is centered on the bottom and set material to Prototype or . Try to scale in increments of that unit in details so sizing is predictable.
- Cube Grid tool: Shift+5 to go into modeling mode- Create tab.
    - For the newest version UE5.8, collisions aren't on by default- click the cog beside “Modeling Mode Quick Settings” (at the bottom of the Create menu)- new mesh settings- change collisions to “ Complex Only.” Won't update existing meshes you made, have to exit and re-enter cube grid, and will affect everything you make after changing that setting.
    - **Click+drag:** drag out selection of cubes
    - **E:** Pull (extrude upward/outward from the grid)
    - **Q:** Push (extrude the opposite direction, like carving inward)
        - T: flips selection
    - **Z:** corner Mode (LC drag on verts and e/q)
    - **MMB drag**: on selection to move
    - **Ctrl+E / Ctrl+Q**: increase/decrease the grid's cell size
    - **Shift+E / Shift+Q**: shift your current selection forward/backward one grid cell
    - **Enter**: finalize an action
        - After finalized, **to edit agai**n- selected on mesh- click cube grid, finalize again, and it will update all the duplicates
    - **Assign material:** search proc grid (make sure engine materials are checkmarked) to both element slots

To export blockout to Maya: select all the boxes. Tool (top bar)- search “merge actors”- set folder location. This will combine them all into one Mesh and make a new static mesh in content drawer. RC on mesh in drawer and search export- export fbx and drag fbx into maya. (assign a new material or the material will be black).

To edit pivot point NON-destructively: Pivot Offset it by RC on the actor in the level and Pivot- Set Pivot Offset Here (or drag manually with the pivot gizmo). This shifts the pivot for that instance only, without touching the source mesh. Great for quickly getting a corner or bottom pivot so boxes snap edge-to-edge instead of from their center.

To change Ui to be small or big: Ctrl + Shift + W: pulls up widget inspector- change application scale down.
To change gizmo scale: Edit- Editor Preferences- search bar- type "gizmo"- scale axis line length, line thickness, and handle size.
If collisions not working on static mesh created by modeling mode: ctrl+b to find mesh in content drawer. Double click mesh in drawer, collision tab (top bar)- add bos simplified collision. Save.
If the detail tab disappears (like in the event graph): right side click and drag it back in or windows-details.
To change default startup map: edit-project settings- maps &modes- editor startup map & default map, change dropdown to level.

To change default Character player: beside create at top, - edit game mode- edit- BP thirdperson- under classes change the "default pawn". Also change character controller if you made a different one.
To full delete things: Right-click the level in the Content Browser and use Asset Actions → Reference Viewer to see if anything uses it. Typical culprits are Open Level nodes in Blueprints, a level-streaming setup, or a Game Instance or Game Mode that loads it by name. If something references it, update that first. Delete from the editor, not Explorer. Delete it in the Content Browser, which pops up a dialog listing any assets still referencing it. If it warns about references, cancel and fix those before forcing the delete.
If deleted folder wont delete/disappear: If it's not really empty, a few things can hide inside: Right-click the folder → Fix Up Redirectors in Folder, then delete it. Filtered or hidden items: check the filter and settings dropdowns at the top of the Content Browser, and turn on Show Developers Content or Show Engine Content in case something is tucked away.
To make camera lock to shoulder (3rd person shooters): open BP_characterblueprint- search in details "yaw"- check "use controllerrotation yaw." search "orient" and checkmark "Orient rotation to movement"

<u>If you want the player to go inside your imported mesh</u>

If Unreal Engine 5.8 is treating the whole mesh as one object/collision

- Open CD → Double Click to open Static Mesh Editor
- Search in details panel for 'Collision Complexity'
- Change from **Project Default → Complex Collision as Simple**
- Save [Ctrl + S]
- Close Editor

It should now allow player to go into your imported mesh

Blueprints (BP):

- Click compile at top right to save changes, components work like outliners. Click add to add component and drag it under its parent (camera or character), can also drag components into event graph.
- **Starting a BP:** After creating BP like actor- in its event graph, click on component in list and RC to make a event node. Connect the colors.

Alt+LC (on line): disconnect lines in event graph
B(hold)**+double LC** in background: branch node
Ctrl+LC drag: to get
- **alt+LC drag:** to Set

Q (while on selected nodes): auto-align

To make a new UI (widget Blueprint): rc in content browser folder- user interface- widget blueprint (keep parent class widget). Rename WBP_ (ui name like HUB, heads-up display). Inside blueprint, use palette(top left) to find the content: canvas panel (drag and drop), text (drag into panel). In text details, slot-anchor- choose where ui will stay at.
- Find character blueprint in content drawer- open BP-in initiation section of graph editor- drag output from "set color parameter"- search for "create widget." select widget BP in class, drag out return value- "add to player screen"

)

Animating Camera

- Animate your cameras before you start animating assets!

Cameras + Sequencer/timeline
Sequencer - organizer
Cameras/Timeline view
- Add camera
    - Top left of sequencer - add
    - Create new camera and set as cut
    - Camera is now visible in outliner
        - CinematicCameraActor -> camera added in demo
- Types of cameras (choose from dropdown at top)
    - Perspective - editor camera (default)

Spacebar: preview
Green and red playheads indicated start and end of preview
FPS may be adjusted to desired
- View timeline in seconds
    - Fps dropdown -> show time as -> seconds
    - Adjust working range
        - Bar/numbers at bottom

Transforms
- Camera settings on timeline may be obscured - drag right to see
- Camera will act the same as persp camera in viewport (right click hold + WASD)
- Camera speed may be adjusted in a dropdown at the top (hotkey - rightclick + hold/drag)

Keyframes
- "+" symbol adds a new keyframe - saves given information (such as transform) to one frame
    - Move camera when playhead is on desired frame and save keyframe

- Hold frames
    - Copy the keyframe you wish to stop at and move it further on the timeline

Adding multiple cameras

Close dropdown for first camera to keep organized

- Add the new camera
    - Camera icon on side of timeline will switch between them in addition to the cameras on top
    - Key your frames for the next camera AFTER the first
- Camera Cuts
    - Bindings
        - Add desired cameras with plus symbol

Animations

Edit your pivots BEFORE you key

- Select object to be animated
    - Go to timeline and add actor track
        - Add desired object (will be at top of dropdown if you selected it)
    - Object will function the same as camera - key transformations on timeline to animate

Animated transformations can also be made in details panel

Make sure your pivot points are in the correct spot!

Adjust pivots

- Dropdown menu at top left (should be in selection mode) -> go to modeling mode -> x form -> edit pivot -> center (or adjust manually) -> hit accept on bottom of viewpoint

Cutscene

Level sequencer

Blocking Out Landscape

Remove the floor

Go to the upper left corner where the **Slection Mode → Landscape Mode**

Create New → Enable Edit Layers (to treat terrain as layers

Play around with selection size

Create

Manage Tab- You can add & delete squares of your landscap you don't need

Sculpt Tab- Sculpt by holding left mouse button

Tool Size- Size of hills

Tool Strength- How sharp the hill will be

Fall off will smooth hills/edges

Shift + Left Click: Will take away from sculpt

Shift + Left Click: Will erase (return to flat terrain)

Smooth tool- Any hard edges will be smoothed

Flatten Tool- Create flat terrain on specific areas you want

Ramp- Uses 2 points that you can use to place ramps wherever you need

Erosion & Hydro- Type of smooth that will semi smooth an area

Blue Prints- Used to make procedural generations

- Some good plugins will be landmass & water by [edit → plugins→ search] then restart program

Terms:

- **Objects:** Most basic class in Unreal Engine - in other words, they act like building blocks and contain a lot of the essential functionality for your Assets. Almost everything in Unreal Engine inherits (or gets some functionality) from an Object.
- **Actors:** any object that can be placed into a level, such as a Camera, static mesh, or player start location. Actors support 3D transformations such as translation, rotation, and scaling. They can be created (spawned) and destroyed through gameplay code (C++ or Blueprints).
- **Class:** A Class defines the behaviors and properties of a particular Actor or Object in Unreal Engine. Classes are hierarchical, meaning a Class inherits information from its parent Class and passes that information to its children.
- **Casting**: Casting is an action that takes an Actor of a specific class and tries to treat it as if it were of a different class. Casting can succeed or fail. If casting succeeds, you can then access class-specific functionality on the Actor you cast to
- **Component:** piece of functionality that can be added to an Actor. When you add a Component to an Actor, the Actor can use the functionality that the Component provides. For example:
    - A Spot Light Component will make your Actor emit light like a spot light.
    - A Rotating Movement Component will make your Actor spin around.
    - An Audio Component will give your Actor the ability to play sounds.
    - Components must be attached to an Actor and can't exist by themselves..

Variables: just hold information, actors, collisions, etc. To “get” is about it and “set” is changing it.
Operators: math
Event dispatchers:

- **Enhanced Input Action Mapping** (contentdrawer-content-input, and action): system that binds physical device keys, uses Modifiers and Triggers to shape how an input behaves
    - **IMC** (input mapping content): collection of all input action types. (where u add actions to character under mapping so you can add scripting, and also assign keybind to activate it)
    - **IA** (input actions) are located in the Actions folder, this creates the triggers.

Fab animation assets:

- https://fab.com/s/81a0c7294aae
-

Core terminology

Character Blueprint / Player Blueprint (BP_): the actor that owns the skeletal mesh, movement component, and input handling.

- **Character Movement Component**: built-in component on a Character class that handles walking, falling, jumping physics.
- **Skeletal Mesh (SK_)**: the 3D mesh plus its skeleton (bones), what actually gets animated.
- **Skeleton Asset (SKEL_)**: the bone hierarchy shared across all animations for a character, lets you retarget and reuse animations.
- **Input handling**: logic in the Character Blueprint's Event Graph that reacts to Enhanced Input Action events (bound from IA_ assets) and calls the movement functions above.

Enhanced Input / Input Mapping Context (IMC_): the modern UE5 input system; the IMC maps physical keys to Input Actions.
Input Action (IA_): an abstract action (like "Move" or "Jump") that your blueprints respond to, decoupled from the actual key.
Animation Blueprint (ABP_): the graph that decides what pose the skeletal mesh shows each frame, contains the Event Graph and the Anim Graph.

- **Anim Graph**: inside the ABP, this is where you build the actual pose logic (state machines, blend spaces, layered blends).
    - **State Machine**: a node in the Anim Graph that switches between poses (idle, walk, jump) based on conditions you define.
    - **Layered Blend Per Bone**: a node that blends two poses but only on specific bones, common for upper-body aiming over a lower-body locomotion state.
- **Event Graph**: inside the Anim BP, this is where you read data every frame (speed, is-in-air, aim angle) and store it in variables for the Anim Graph to use.

Different Key Animation Asset Types:

- **Animation Sequence (A_)**: raw imported animations, a single baked animation clip
- **Blend Space (BS_)**: a 2D (or 1D) grid that blends multiple animation sequences based on input values, like speed and direction for locomotion.
- **Animation Montage (AM_)**: a clip or sequence of clips played on demand (not looping automatically), used for one-off actions like a dodge, attack, or reload.
- **Additive Animation**: a clip that stores only the difference from a base pose, layered on top of another animation instead of replacing it (like aim offset).

To create a Animation asset: select on the A_ sequence, rc- create and choose animation type.

- For Blend spaces- Hold ctrl and lc drag to play animation.

Generally making an animation workflow goes:

- Make an Input Action (IA)- Open IMC and add IA in mapping and assign key and modifiers.

    - Open character BP and RC search enhance “IA_name” - add animation montage/bs/etc
- Make ur animation Asset (BS, AM_, etc usually created from a A_)
- In ABP blueprint- In the Anim graph, link the animation via a state machine(locomotion), Aim offsets (like ironsights), or slots (used with montages to organize fullbody/upperbody/ blends). Some animations need to be linked up in the ABP event graph (like falling/jumping) or have the animation class settings changed (for like dodge roll).

Unity

Intro: https://youtu.be/XtQMytORBmM?si=siNjXI1MoIQ7h098

VR Chat Stuff

Addons/tutorials:

VRC optimization addon for Unity: Polytool

- https://markcreator.gumroad.com/l/Polytool?layout=discover&recommended_by=discover&_gl=1*1dwaw24*_ga*MTIzODc5MzgzOS4xNzQ5ODkzMjE5*_ga_6LJN6D94N6*czE3NTA4ODA2MDEkbzEzJGcxJHQxNzUwODgwNjI2JGozNSRsMCRoMA.
- Automatic mesh decimation, Merging skinned and static meshes into a single mesh, Material merging with automatic texture atlassing, Automatic bone reduction and merging, Preserves armatures, blendshapes, animations, UVs, and skinning, Built-in optimization presets for specific use cases like VRChat Quest avatars, Preset editor to make and save custom optimization presets.

Everything vrchat unity stuff: https://vrc.school

Physbone explains: https://youtu.be/VhWnjQY3S4o?si=VOuRWcqXwpEpCQRP

Creating VRC model from scratch!:

https://youtube.com/playlist?list=PL2EEbgwoJzdsC9wfKA2ZO2kAf4HDqC8a8&si=V2uuQt6F6yc1soRl

10 min version(old tut):

https://youtube.com/playlist?list=PL2EEbgwoJzdtnUvwnLEErHmzuM9fbNdwT&si=rgMMwQN6L384ks_O

Playlists:

- Rainhet's Virtual Vtuber and VRchat Avatar: https://youtube.com/playlist?list=PL2EEbgwoJzdsC9wfKA2ZO2kAf4HDqC8a8&si=n0tZXrih3x9IkL05
- Rainhet's Virtual Vtuber and VRchat Avatar 10 min version(old tut): https://youtube.com/playlist?list=PL2EEbgwoJzdtnUvwnLEErHmzuM9fbNdwT&si=rgMMwQN6L384ks_O
- Helpful avatar videos (40): https://youtube.com/playlist?list=PL2EEbgwoJzdv5Js4F6LD_cadrHsHfs2oR&si=W55AtwF1FPhWc7vJ
- Avatar 3.0 basics: https://youtube.com/playlist?list=PLt8qiEFqNHFkPqpKLnVRx-G78mGvjPbFt&si=bLFZBqrzqn0vW2TV
- Avatar creation (more): https://youtube.com/playlist?list=PLPPl7J8pvyClZ9lBVyxzc1kyqRkCTBjIn&si=QSowz7-DKEsKr4q7
- Unity Tutorials 2024 (vrc): https://youtube.com/playlist?list=PLlGqdkHB58RRqw9kF9ykhUwukmAXYpA9-&si=I20PWExjVXi7Ks2o

How to upload avi's?:

- Download Vrchat Creator companion (like a program that uses unity to upload vrchat avis/worlds)
- Open Vrchat Creator companion and go through steps- should ask u to download the latest Unity Hub AND Unity version/editor 2022.3.22f1
- Follow ur avi upload instructions!!!! Generally: In VCC, open a new project, name it, and select Avatar 2022. Open and add all the needed packages (Should have SDK packages already installed, and may need to add VRCFury, Poiyomi Pro, gogoloco, Avatar Limb Scaling, Jerry Facetracking, etc). Then open project and drop the Unity package into it. Double-click the unity symbol that says "open or click me". That will open the model.
- Open the SDK panel, login, set name, cover pic, and click upload at bottom

Vrchat avi requirements

Quest requirement: https://creators.vrchat.com/avatars/creating-your-first-avatar/

File Size: Absolutely under 10MB after compression.

Key Technical Requirements

- **File Size:** Absolutely under 10MB after compression.
- **Performance Rank:** "Poor" or better is required. "Very Poor" is generally forbidden for Quest.
- **Triangle Count:** Recommended under 10,000 (10k), though higher is technically possible if other metrics are low, it will hurt performance.
- **Shaders:** Only VRChat/Mobile/Toon Standard or similar mobile-optimized shaders are allowed.
- **Materials:** Keep mesh and material counts low (try to stick to 1-4 materials).
- **Rig:** Humanoid rig required for standard animations. VRChat +4

Component Limitations

- **PhysBones:** Maximum 8 components, 64 affected transforms, and 16 colliders.
- **Constraints:** Maximum 150 total, with a dependency depth of 50.
- **Lights:** Real-time lights are not supported.
- **Transparency:** Use with caution, as it can be buggy, usually relying on specific mobile particles. VRChat +3

Uploading Tips

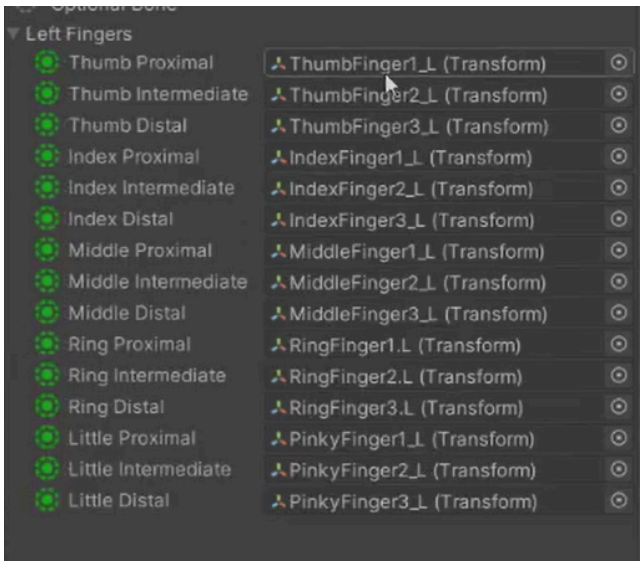
- **VRChat SDK:** Use the Android platform target when uploading.
- **Compression:** Use ASTC compression for textures in Unity for the best quality/size balance.
- **Textures:** Aim for 1k resolution (1024x1024) or lower for most textures, only using 2k selectively. VRChat Ask Forum +4

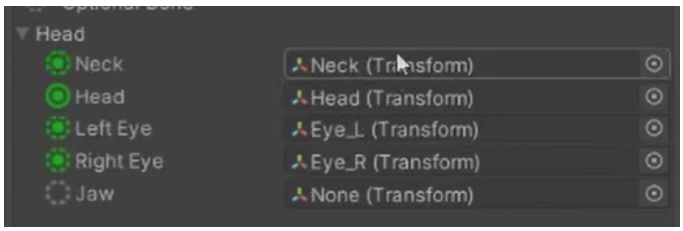
Required Trust Rank: Your account must be at least the **New User** rank to upload content, according to VRChat documentation.

Skeleton (Armature):

VRChat needs a specific set of at least 15 core bones (Hips, Spine, Chest, Neck, Head, and limbs) mapped correctly in Unity. Name the bones clearly (e.g., Hair.01.L, Hair.02.L) so you can find them easily in Unity for phys bones.







- Rigging with Auto-Rig Pro: Use the Smart tool to place markers for the chin, shoulders, etc.. When exporting, ensure you use the Unity preset to keep the hierarchy compatible.
- Rigging with Rigify: Use the Human (Meta-Rig). When you "Generate Rig," you'll get a complex control rig, but for VRChat, you only export the Deform Bones (usually on a hidden bone layer)
- PhysBones: add Secondary Motion: Adds jiggle or sway to non-skeletal parts (hair, tails, jewelry). Allows players to grab and move bones or trigger animations. (they replace the older "Dynamic Bones" package and are highly optimized for performance, especially on Quest.)
    - Phys Bones need an end point to work. A single GameObject is not a bone, it is just the head and/or tail of a bone. This is why, if you have a single GameObject, you need an Endpoint position to make it work, since it's just a head without a tail.
- Colliders: You can add "PhysBone Colliders" to body parts (like hands) so they physically interact with your hair or clothes without clipping. [1, 3, 4, 5]

Textures:

Substance to unity: poiyomi toon shader- https://youtu.be/bKjt3XjmDks?si=JqOe8xzkHwHqHeB8

If Phyics getting stretch when moving around:

https://www.tiktok.com/@samayebae/video/7324552467641912581?is_from_webapp=1&sender_device=pc

In Unity set the mobile type to world experimental, the higher the slider the less it moves, try .5

Adding fitted cloths to a unedited avi in unity:

https://www.tiktok.com/@samayebae/video/7599738213569285383?is_from_webapp=1&sender_device=pc

DaVinci Resolve

13 min tutorial: https://youtu.be/vd2fi_JbKTc?si=FBzRAuHQXQdcTMBt

Master: drag your files.

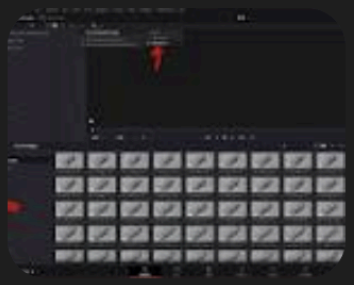
: toggles editor menus

- move/resize
- crops
- speed

To fade audio out: click audio- open inspector- keyframe the start and end of the fade (change the end of the fade to negatives). 

To add motion blur with keyframe tweens:
https://youtube.com/shorts/khglJmXXJfM?si=5dHJ8Qtq5xmXlc-b

To import a image sequence (png sequence from animation to layer affects)



To import a PNG sequence into DaVinci Resolve, go to the Media page, navigate to your PNG files, click the three-dot menu in the Media Storage panel, and set the "Frame Display Mode" to "Sequence". Once this setting is active, simply select and drag the folder containing the PNGs into your Media Pool. DaVinci Resolve will then recognize the images as a single, cohesive video clip, allowing you to drag it onto your timeline and edit it like any other video asset.

Step-by-step guide:

1. **Open DaVinci Resolve**: and go to the Media Page.
2. In the Media Storage panel, locate the folder containing your PNG sequence.
3. **Click the three-dot menu**: (•••) in the Media Storage panel.
4. From the dropdown, select "Frame Display Mode" > "Sequence". This setting will be saved for future imports, according to YouTube.
5. **Drag the entire folder**: containing your PNG sequence from your file explorer directly into the Media Pool.
6. Resolve will import the PNGs as a single video clip.
7. **Drag the imported clip**: from the Media Pool onto your timeline to start editing.

mportant Considerations:

- **Sequential Naming:** Ensure your PNG files are named sequentially and numerically (e.g., `frame_001.png`, `frame_002.png`) for Resolve to correctly recognize them

Man i hate Adobe

Y r u here, click the dropdown in tabs

Adobe Animate

Hotkeys:

Settings:

- **Ctrl+k**: composition settings

Top bar tools:

- **V:** select tool
- **Y:** anchor tool
- **W:** rotate tool
- **G:** pen tool
- **Ctrl + P:** puppet tool
- **Q:** rectangle
- **Ctrl**(hold): snaps
    - Toggle snapping on and off on top bar

Timeline/layers:

- **Spacebar:** to play/pause preview
- **Ctrl+G**: to group a layer (within a shape layer)
- **Ctrl+D:** to duplicate a layer
- **Ctrl+Shift+D:** to split a layer at the playhead
- **Ctrl+Shift+C:** to precompose selected layers
- **[/]:** to move a layer's in / out point to the playhead
- **B / N:** to set work area start / end

Keyframe:

- **Alt+Shift+P:** to keyframe position
- **Alt+Shift+S:** to keyframe scale
- **Alt+Shift+R:** to keyframe rotation
- **Alt+Shift+T:** to keyframe opacity
- **Alt+Shift+A:** to keyframe anchor point
- **U**: shows only keyframed layers (on a layer)
- **UU:** to show all modified properties
    - **P:** to show position
    - **S:** to show scale
    - **R:** to show rotation
    - **T:** to show opacity
    - **A:** to show anchor point
- **F9:** to Easy Ease selected keyframes
    - **Shift+F9:** to Easy Ease In
    - **Ctrl+Shift+F9:** to Easy Ease Out
- **Ctrl+alt+H (on keyframes):** convert holding keyframes (no transitions)

- ➢ **J / K:** to jump to previous / next keyframe
- ➢ **Alt+click stopwatch:** to add an expression

F9(while selected on keyframe): convert to ease keyframes (open graph editor and change curve)
Ctrl+r: toggle rulers (click & drag out from the ruler to draw in guidelines, drag guide back to ruler to remove)
Ctrl(hold): snap
Ctrl + Shift + C: pre-compose (select layers first)

Tips:

- Double click in project window to open import
- Click the square in the timeline to color code layers
- Drawing a rectangle and it auto makes a mask
- **To center/align scene:** in compositing viewport, at bottom click  - select "title/action safe" or "grid"
- **To select all keyframes at once**: click on layer title
- **To squash/stretch multiple keyframes at once:** click layer title to select all keyframes. Hold alt+ click last keyframe and drag inward.
- **To snap things together**: toggle snapping on at top bar
- **For vectors to continuously rasterize:** Toggle the star on, beside the layer name.



Parametric Shapes: using a shape tool and drawing a shape makes a parametric shape, you can edit its point in the layer properties for simple shape animations, for more complicated shape morths- RC layer and convert it to a bezier shape.
Pen Tool (bezier shapes): this will have "path" in their properties layer, make sure to toggle bezier on if using the shape tool.

- **To edit after creating shape:** on pen tool, reselect on "path 1" layer in properties and now can edit points.
  - To move the whole shape without changing its position values: select the "path" underneath that has a stopwatch beside it.
- **To make a point have a curve or point:** RC on path tool at top, select the "convert vertex" and click on points to convert them.
- **To delete points/ open shape path:** select 2 points you want to unlink, RC- "mask and shape" uncheck "closed."
- **To edit path fill/stroke:** click name "fill" or "stroke" to change to transparent and the color to change color.
- To morph a pen tool into another.
- **To export composition with transparent background:** on the desired composition, toggle  at the bottom of the viewport, so that background is now transparent. Select section to export, B to mark start and N to mark end point, name file-export-add to render que. Open output module- change format from H.264 to *quicktime*, change channels from rgb to *rgb+alpha*. Now select output to and save to a location, press play.

Pick Whip Tool/ Parenting (getting objects to follow another): on the children layers- drag the swirly icon(pick wick) onto the parent layer and it parens to it.

Animate shape with anchor point: set anchor point to a side(use snapping), At start of timeline- alt+shift+S to keyframe current scale, move to another part of timeline, scale shape- keyframe again. Select points+ F9 to ease animation

Mask one image layer using another layer: Use mattes, they isolate portion of image, like masks

- *First parent the mattes:* Use the Pickwick, go to the Track Matte column. On the child (image/shape being masked) click drag the spiral pick whip icon directly onto the parent layer (masking layer).
- Now click the square on the child layer (Under the T section, should make a checkered square. Between modes and trackmat sections) to enable transparency.
- Choose trackmatte type with the dropdown:
    - Alpha Matte: Uses the matte layer's transparency (see-through areas hide the layer, solid areas show it).
    - Luma Matte: Uses the matte layer's brightness (bright white areas show the layer, dark black areas hide it)
    - Invert Icon (checkbox/button): Flips the rule so the hidden and visible areas swap

Issues/Lost:

Graph editor looks diff?: click the 3 line picture (bottom bar of graph editor) and change to “edit speed graph” or any other one you need.

Adobe Media Encoder

To put together png video (a Arnold render): default workspace- select “+”- find png file- select all images from sequence- open. Match sourse- high bitrate- Change to - high quality 1080p HD or 2160 4K. Outputs file (link beside)- change name and find the save location. Click green play.

Adobe Premiere Pro

Start: Create file. Skip. Import all media files into the project environment.
To start the sequence with your source videos' default setting: Select video, drag video from source preview onto the timeline.
To clip from source: use “i” and “o” to clip in the source preview. Drag the source timeline onto the sequence timeline.
To add a fade transition: Use effect controls- keyframe by clicking stopwatch (keyframe 2 spots and drag one keyframe to 0% opacity in effects control).
To add blur effects: window-effect. Select the timeline chunk u wish to blur- double click effect- it is now added to effect control (add keyframe to animate like any other effect).
To color grade: pull up: window- effects and windows-effect control. Select timeline chunk- double click on effects to add them to the list on effect control. Add brightness/ contrast and color grading effects.

COLOR GRADING TIPS:

Terminology: Understand first that every color's base hue(hue is the most pigmented version of a color) is a different value. Value is how light(mix hue with white) or dark(mix hue with black) something is.
Tip one: have a goal on the vibe. Ex: If you want something to be spooky, use cool tones and not warm tones. If you are making something realistic, use the full length of the color and value spectrum. If you are making something sad/real feeling aim for desaturation everywhere except focal points.
Tip two: color grading is separated into the rgb of the highlights, midtones, and shadows. Keep in mind the base colors are different values, ex: dark blues or purples is gonna be mostly shadow/midtone and yellow or cyan is gonna mostly be highlight/midtone. When changing the rgb aim for midtones to be more saturated then highlights and shadows (naturally shadows/highlight are mixed with white and black so the midtones are usually the truest version of a color)
Tip three: turn whites all the way up and stop when they overtake the midtones, same with black.

Adobe Animate

Average framerate: 24
To Scale: Modify-transfer-scale
Final preview: click square top right corner
To rotate canvas: clock rectangle top right corner
To play a part of timeline on repeat: click circle arrow on top of timeline, then drag selection of timeline above
To use onion layer: Turn on with circles at top of timeline, adjust amount above timeline.

To delete frame: shift F5
Undo: ctrl+z
Redo: ctrl+y
F5: Extend frame
F6: Add keyframe
F7: Add blank keyframe
Shift + F5: Delete frame
Shift + F6: Delete keyframe
Enter: Play
<: Previous frame
>: Next frame
B: Brush
Y: Pencil
P: Pen
E: Eraser
V: Select
A: Subselect
Q: Transform
Shift + Spacebar: Rotate canvas

If isolated on one object on the timeline: double click off the scene

- **Mostly tips for intermediate artists:** noobs please learn about brushes https://youtu.be/CKs-OeZgxFo?si=hyw4bWSOS76b_6YQ , layers, layer filters, and clipping masks/alpha lock first. Also learn the differences in “value” “hue” and “saturation”- check the terminology used in the “Adobe Premiere Pro” tab.

Free Tools:

- Try Krita, great free 2-D program: https://youtu.be/BTNedwmSKhQ?si=vVC5MpjbuOWAP40t (Has shape fill laso tool, layer style for outlining, perspective grid, invert selection, symmetry, gaussian blue, liquify, recording software, animation)
- For references, check my boards (Collections include: texture, lighting, outfit, portrait, poses, creature, objects, environments, Graphic design, and pixelart): https://www.pinterest.com/mvision_art
- For Human poses check:
    - https://www.mixamo.com/#/?page=1&query=jumping&type=Motion%2CMotionPack: offers different models, click the animation tab and can apply any type of animation to a model u selected.
    - https://www.posemaniacs.com/poses: large poses collection
    - https://posemy.art/app/?lang=en : 3-d poser, make ur own poses, limited uses.

Art Checklist (for rendering): a great video on how to create your own workflow and pipeline depending on what you're creating https://www.youtube.com/watch?v=GQGG8j0fJ40&list=PL9nEPXPX7LpjjPKMMYvoiv9Lfp_5UswD2&index=10

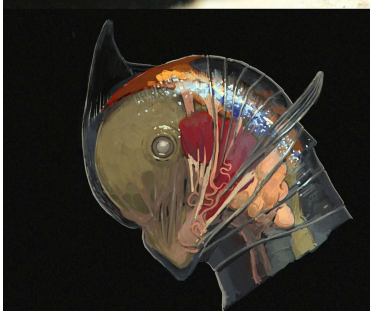
1. **Idea:** flesh out concept, research. Thumbnail concepts, try making silhouettes and adding inside detail after.
2. **References:** take pose shots with video, gather photobashing references, color and theme, etc. Don't spend over a hour collecting, no pinterest doom scrolling.
3. **Compose shot composition:** take time on the sketch, redraw anything that's wonky, make sure everything works well with the angle and references. Flip ur canvas
4. **Light sources:** how is the scene lit? What is the intended use for this image, clarity for concept/ for visuals or a mix. Decide the colors/textures and how they interact with the lighting.
5. **Clean up linework:** every stage should be presentable and clear on how cloths/objects are laid behind parts
6. **Rendering:** block out the base colors you desired first with midtones, then make grayscale and add detail. Then reapply color with a gradient map. Quick process short: https://www.youtube.com/shorts/6ilShEXRPDs gradient maps tutorial: https://www.youtube.com/watch?v=xmYkXNkv2GE
   Gradient maps in Krita short: https://www.youtube.com/watch?v=EB5Ok1uq75k
    a. Lighting tip: https://www.instagram.com/p/DRe4djjkgWb/?utm_source=ig_web_copy_link&igsh=MzRlODBiNWFlZA==
7. **Last touches:** push the values to the limit. Add highlights/shadows/reflections/and rimlights.

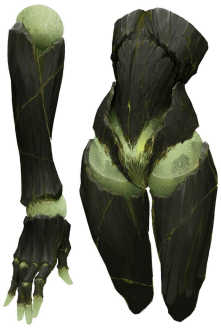
Great Art Studies to Practice:

- Anatomy: break the body into parts, learn differences in age and gender and how to exaggerate for ur art style. Check “art book references” part of intro to doc.
- Shadows: hard light, rim light, color in shadow
- Values: grayscale, focus on light sources and values. Try only uses solid brushes and black and white, no gray, progressively add values after making a black and white version like in printmaking.

- Photobashing: add photos, warp them, apply filters, use their textures to cut out extra work. Make sure to paint over and exaggerate the lighting. Use lots of texture brushes. Tutorials: https://www.youtube.com/watch?v=qTHOFC3FAng krita tutorial: https://www.youtube.com/watch?v=tfuaqwM_3w8 Great example: https://www.youtube.com/watch?v=xOtkBSJ86DM&list=PL9nEPXPX7LpjjPKMMYvoiv9Lfp_5UswD2&index=7
- Expressions: super important for animators, disney and pixar character have great references, try emulating someones style
- Texture: practice drawing textures as a character, like crystals or foliage.

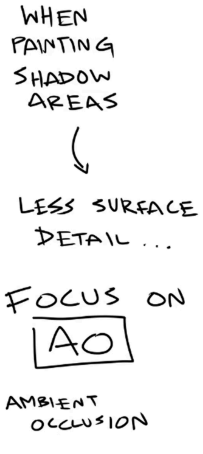


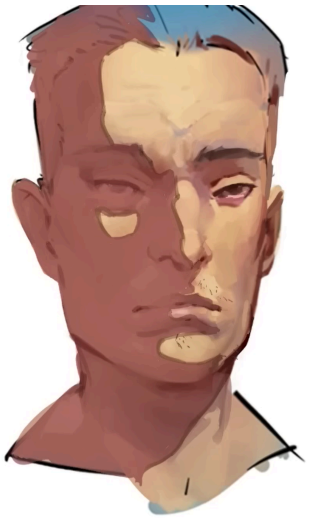
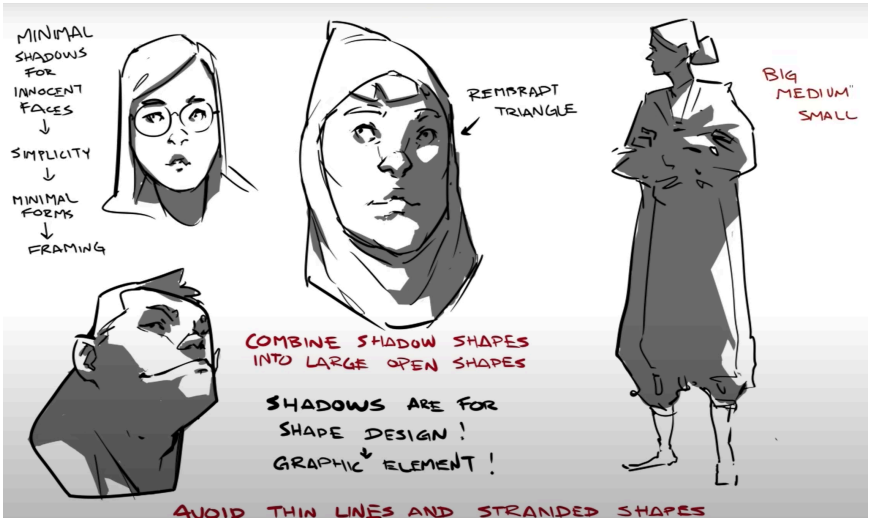


Preference tips:

- Work with 4k canvas's, 3840 x 2160px and always 300 dpi resolution, 8 color depth and rgb is fine. Try and keep the canvas size the same on some projects for future presentation layout
- Have brighter saturation on the most well lit areas(unless it's so bright its glowing white, then add color around the white) AND areas of interest.
- *Optimize your time!!!!* Have LESS detail in shadows, less light= less to see, use that contrast to place emphasis on places of importance.



- Just because it can be, doesn't mean it should be. As an artist you choose what to focus and stylize (making ears bigger, eyelashes longer? Choose ur style). Just because the reference picture has something that's ugly doesn't mean you should include it. Your job is to make it ART not photography.
- Try adding color in shadow! Make ur shadows contrast ur main color, gradient maps can help with this!

]***If keybinds buttons for tablet aren't working: Close krita, install tablet drivers and run as administrator before opening krita.

***If pen pressure isn't work: install tablet drivers. Open krita-settings-configure krita-tablet setting- change api to “windows 8+-restart krita”

Quick Krita tutorial: https://youtu.be/48pwrr4gPOA?si=Ch_JruBi3m3xlofr

Add Pie menus!: https://youtu.be/I8GeZ65sbAU?si=8G4XPFO3q1BtCGxW

Add layer plugin (colors/shortcuts): https://krita-artists.org/t/layer-kit-organize-your-layers-faster/157281

Important tools/shortcuts:

Ctrl+Z: undo

- **shift+Z: redo** (ctrl+shift+Z default)

- **Crtl(hold) & click:** select individually
- **Shift(hold) & click:** select range

A (click)or MMB(hold): hand pan

Z (hold): zoom

B: brush

- **E**: toggle eraser

F: bucket fill

L: lasso selection

- **Ctrl+shift+i:** invert select

Ctrl+R: box selection

T: Move

Ctrl+T: Transform

- **RC** on selection: transform menu

M: flip canvas

Ctrl+enter: search tool (command selector

Symmetry tool (top bar): vertical/horizontal and pattern 

Auto select tool:  (tool options-adjustments- bump slide up 2-3 pixels for clean fill)

Invert selection: Ctrl+shift+i

Merge a layer below: ctrl+e

Change brush size: hold shift

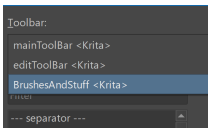
Straight line: hold V

flip selection: right click-horizontal mirror or in tool options- click triangles.

Clipping masks: click on 2 layers- right click- group- quick clipping

How to:

To paint faster (separate colors into their own layer): https://youtube.com/shorts/QlVqSsLkU24?si=wlv10iww9ASJJupJ

To transform a selection in a 3-D space: hold ctrl + l-click drag while on transform
To find what layer a stroke is on: hold R and click the dot/stroke.
To select everything in layer: CTRL and left click on the layer thumbnail
To duplicate layer fast: Drag the layer out of the layer docker to double it.
To transform while keeping proportions: hold shift
To get transform options: while using Transform tool, right click inside the selection
To instantly use Fill: press f
To quick erase: use fill tool and toggle e for eraser
To get extra brushes: select this  in brush window and choose a brush pack.
To create a base layer in a object/character: auto select tool- click space around- in "tool options" bump up adjustment to 2 pixels- invert selection(ctrl+shift+i)
To create outline around layer or brush: right click on layer- layer styles- check "stroke". In stroke panel- change pixel size. Position - outside. blend mode - normal. Save as: to make a outline preset. 10:00 in https://www.youtube.com/watch?v=BTNedwmSKhQ.
To make white paint turn transparent: select layer- filter- map- gradient map- on popup click "choose gradient preset"- select black to transparent. OR Filter>Colors>Color to Alpha. 11:00 in https://www.youtube.com/watch?v=BTNedwmSKhQ.
To make a picture or a sketch to black line art: Filter>Adjust>Threshold
To add extra toggles for any brush: settings-configur tool- select this in dropdown menu 

- search any toggle (for example pen pressure)- select placement in tool bar- select searched item-click right arrow to move it over.
If you want to apply filters/effects to multiple layers: use a filter layer.
To view an image in black and white: create a filter layer. [Adjust>Desaturate]. Select a method. I usually use Luminosity 709. Put filter layer is at the top of your layers, and turn it on or off as you please.
If krita starts lagging at every movement/says updating image thumbnail: Restart krita, copy layer that is causing trouble and paste into new layer (delete old problem layer).

Animation

Tutorial: https://youtu.be/48pwrr4gPOA?si=cuShnd2JZoTr3Iua at 12:00
Use 24 fps
Add these windows: settings- dockers- **timeline**, settings-dockers- **onion skin**, settings-dockers-**animation**

- **Step one:** right click timeline- new frame
- **Step two:** press right arrow for next frame- click **delete**: to wipe canvas (auto frame is on), can toggle onion skin with lightbulb

(it will auto fill with last frame, just press delete to create a new one)
To copy frames: select frame+ hold ctrl and drag to next frame.
To move entire timeline down when extending frames: select frame+ hold alt drag.
To color code frames: right click keyframe

To add audio: click the speaker beside the plus on the timeline. Add audio- scrub through timeline (when animating mouths move all mouth movement 2 frames to the left)

To create animation tweens: https://youtu.be/o4Dge4pm4rU?si=QFv2yeBVj-tuHg7N

- Select layer- add- transformation mask. dockers- animation curves. Select first frame- add point, select second frame- add point- edit second frame to desired transformation

To zoom in and out of timeline: click and drag left or right 