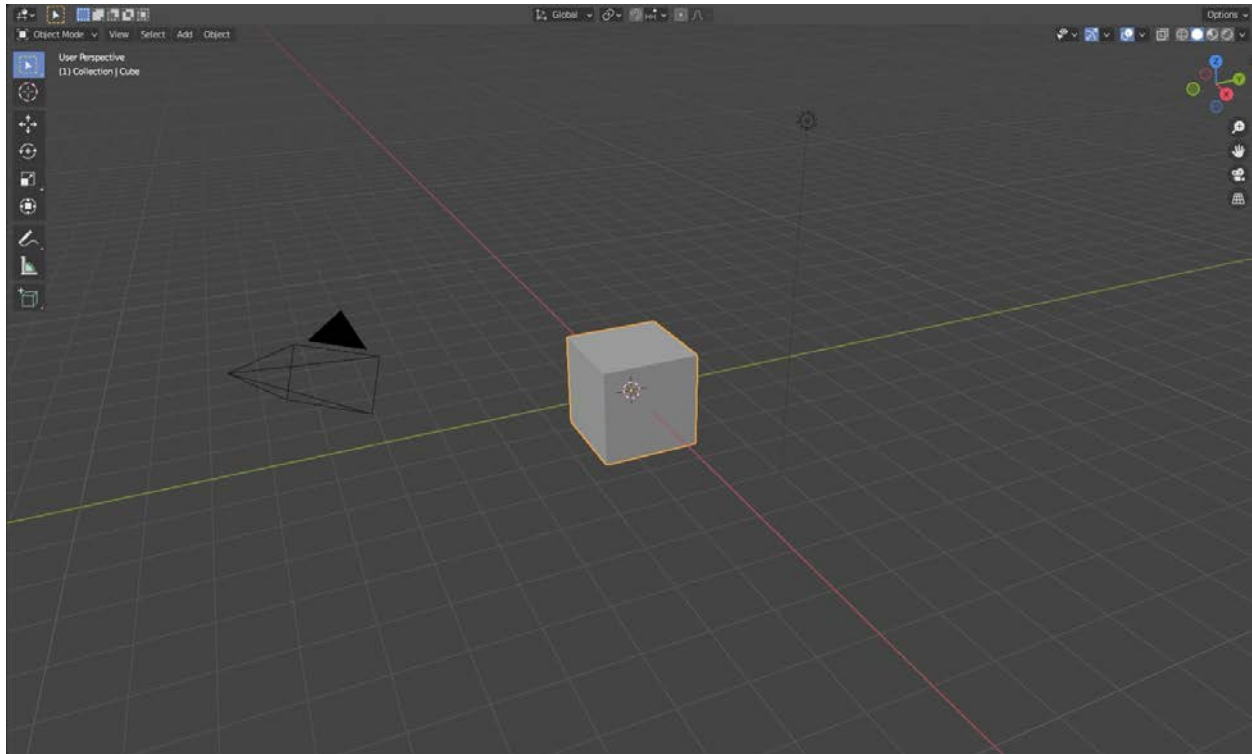


# 3D Drawing in Blender

*This tutorial introduces the Grease Pencil tool in Blender and shows how you can create animations out of 3D drawings.*

## Getting Used to the Interface

When you open Blender you'll see a default 3D scene with a cube at the origin. The large window where this is displayed is called the *viewport*.



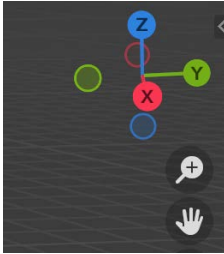
Blender is usually used with a 3 button mouse. However for this tutorial since we'll be doing drawing, a wacom tablet is also essential.

Go to Edit > Preferences > Input > check "Emulate 3 Button Mouse" and "Emulate Numpad." Now holding down "alt" while using the left mouse button OR a tablet pen will be equivalent to using the middle mouse button to navigate. Also now the number keys on your laptop will work as numpad keys (good for shortcuts we'll be using later on).

### Navigation Shortcuts:

- **MMB** (middle mouse button) drag to orbit around the viewport
- **Shift + MMB** to pan
- **Mouse Scroll / Ctrl + MMB** to drag up and down: zoom in and out
- **~ (tilde) + Click on "View Selected"** in the menu that pops up to center on the selected object. If your machine has a numpad you can also just press "." (period key)

- You can also navigate by mousing through these icons in the top right of the viewport (try it):



What can we do with the cube in the scene? If you look on the upper left corner of the viewport you'll see these buttons



corresponding to move, rotate, scale, transform (all 3 combined. However it's easier to just remember the following shortcuts:

#### Moving, Rotating, Scaling Objects:

- **G** to “grab” or move things around
  - Pressing x, y, or z while this tool is active snaps the object to the x, y, or z axes
- **R** to rotate
- **S** to scale

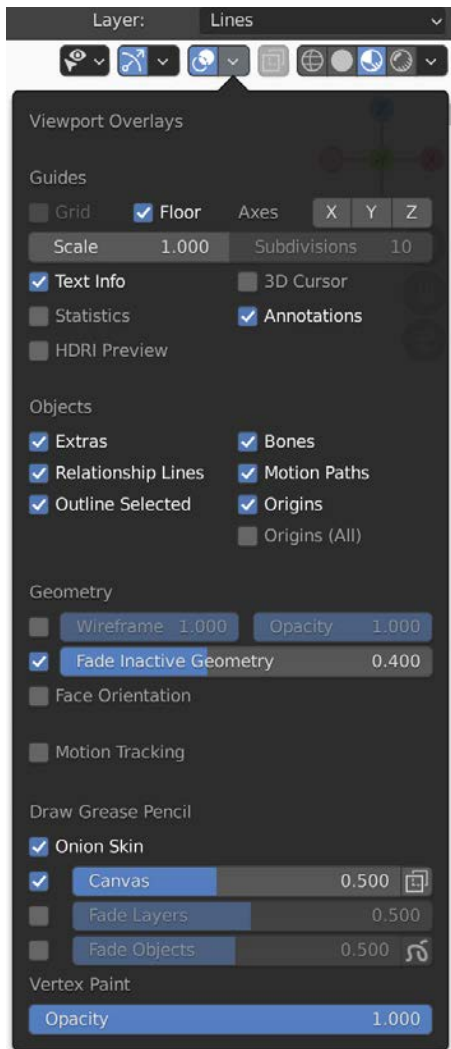
Here's a [PDF of all shortcuts in Blender](#)

### **Learning How 3D Drawing Works**

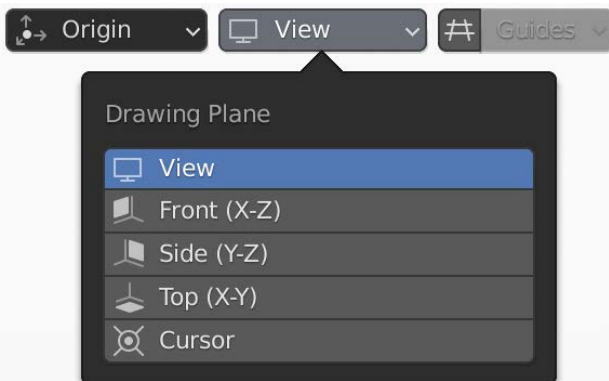
*Project File for Reference: diorama.blend*

Go to File > New > 2D Animation to create a new scene.

To understand 3D drawing in Blender, we'll create a simple landscape “diorama.” First, enable canvas overlay in the viewport overlay options.



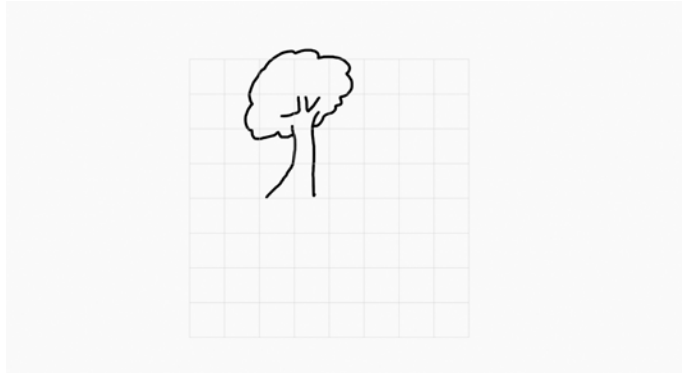
This canvas is the invisible plane on which we're actually drawing. Notice the Drawing Plane menu, where you can decide which plane you want your lines to be drawn on.



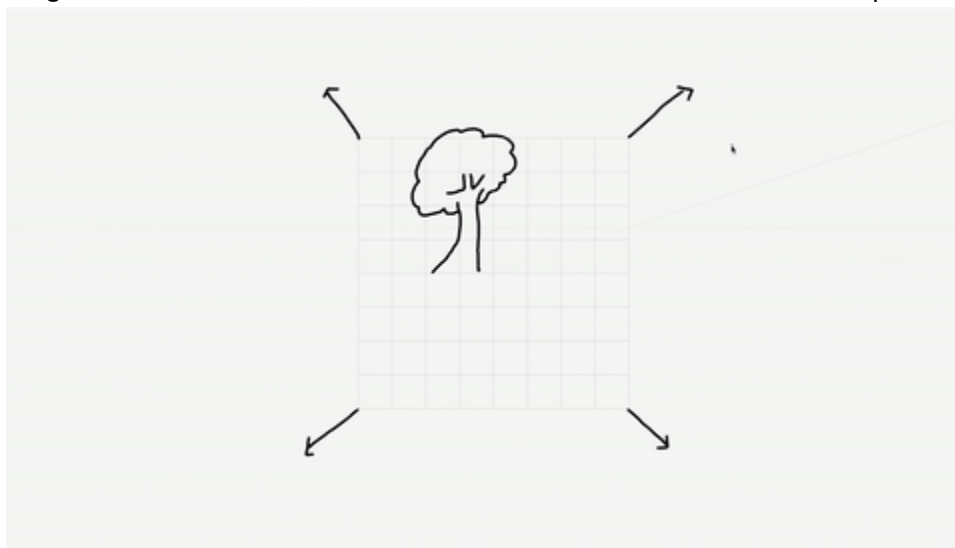
- “View” the the canvas will be oriented to face you whenever you rotate around the scene
- “Front” - the canvas will face the front always
- “Side” - canvas is perpendicular to the front view

- “Top” - canvas faces the sky

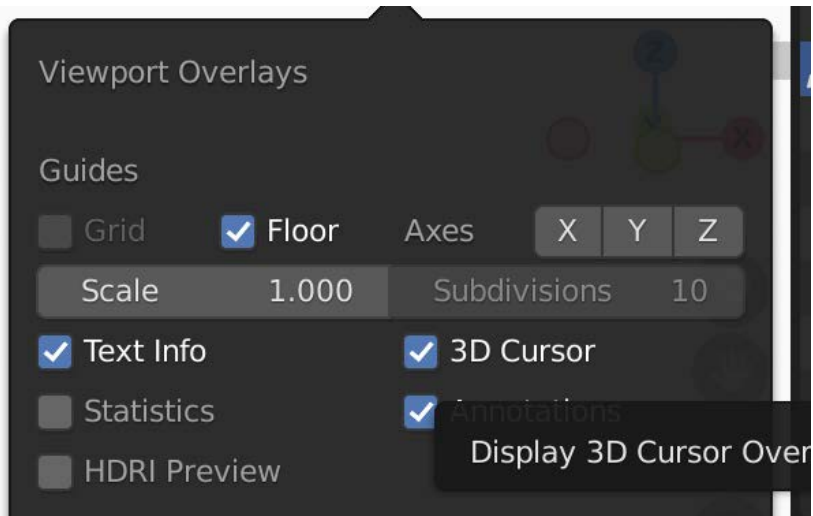
You can go back to the camera view at any point by pressing 0.



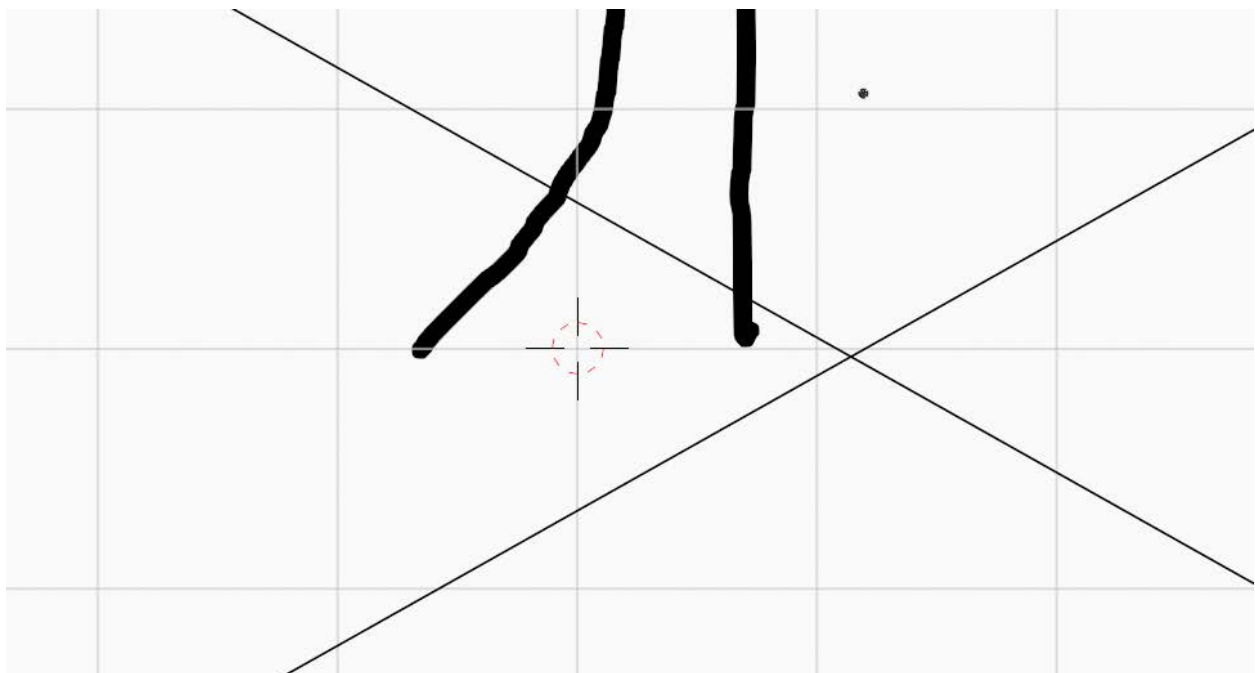
If we draw a tree right now with the “front” drawing plane selected, the tree will be front-facing. What happens when we choose the “view” based drawing plane? Notice that the canvas no longer sticks with the arrows here, since it rotates to face our viewpoint.



Now we can try using the “top” drawing plane to create a river on the ground plane. Before we do this, we need to learn how to use the 3D cursor tool. Enable it in the scene under viewport overlays.

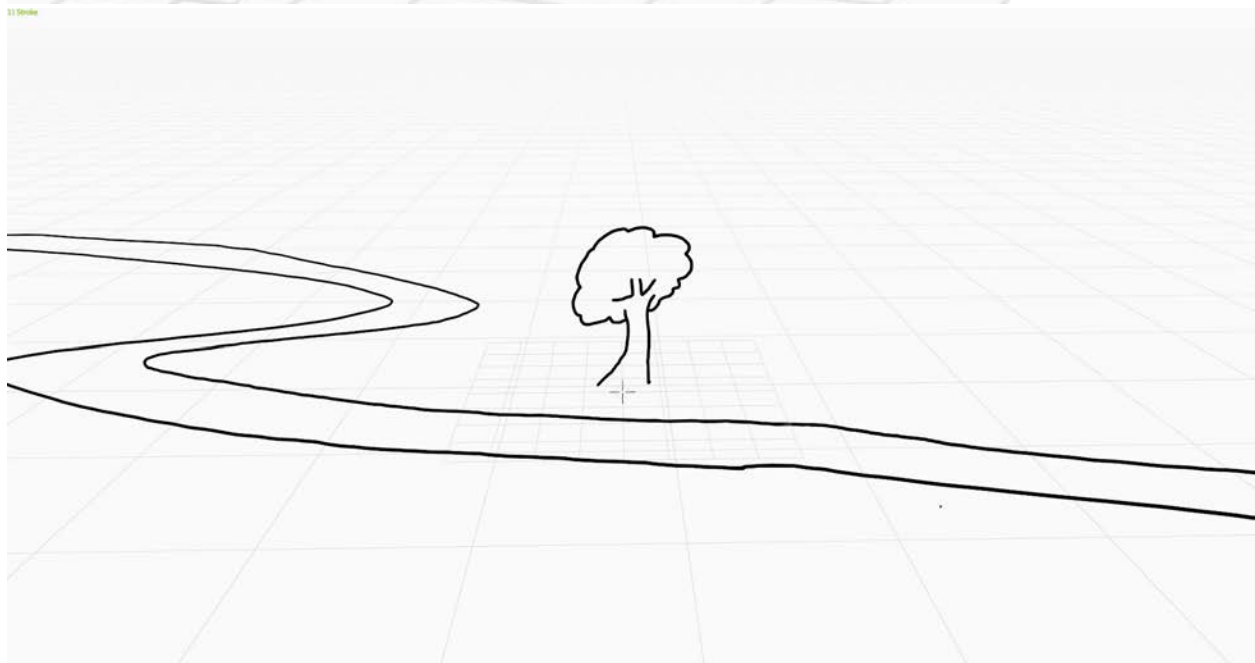
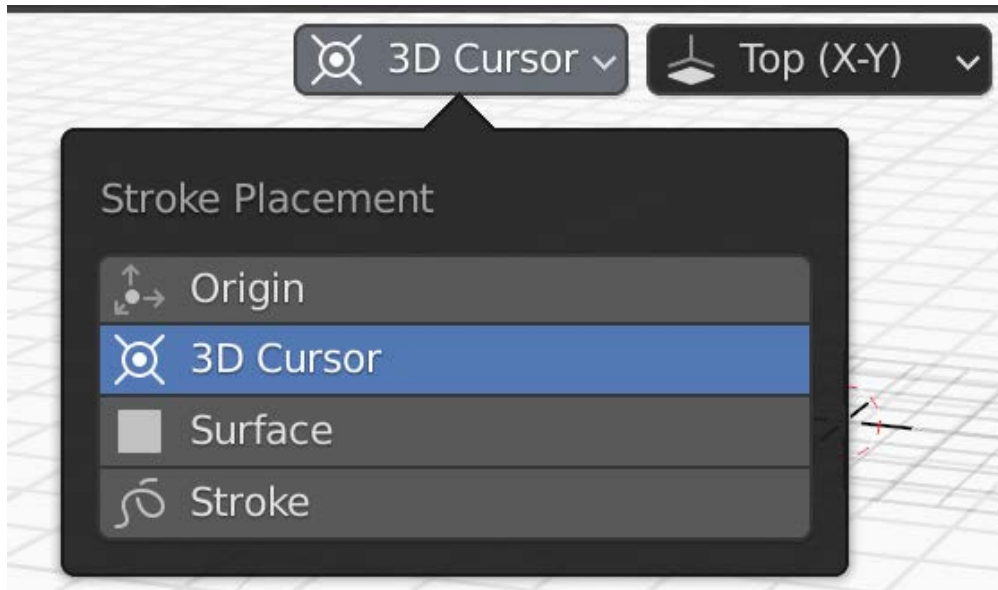


The 3D cursor essentially tells Blender where to create new objects in 3D space. So if we put the 3D cursor at the base of the tree, new grease pencil lines are created with respect to the 3D cursor.

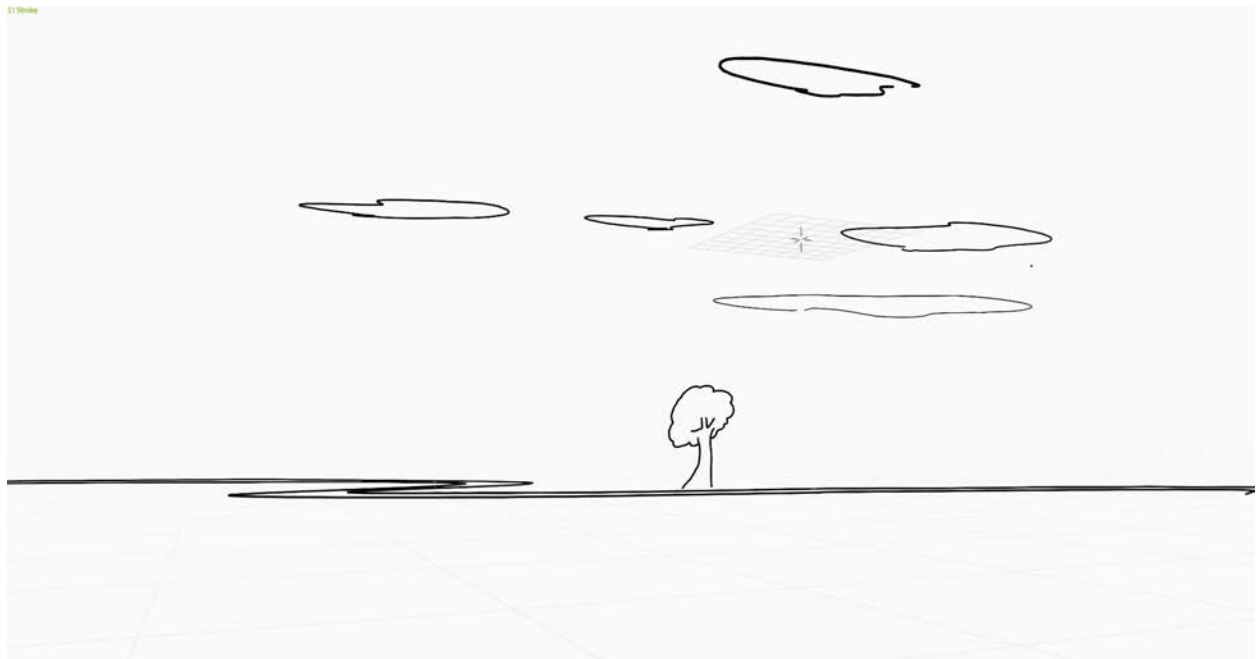
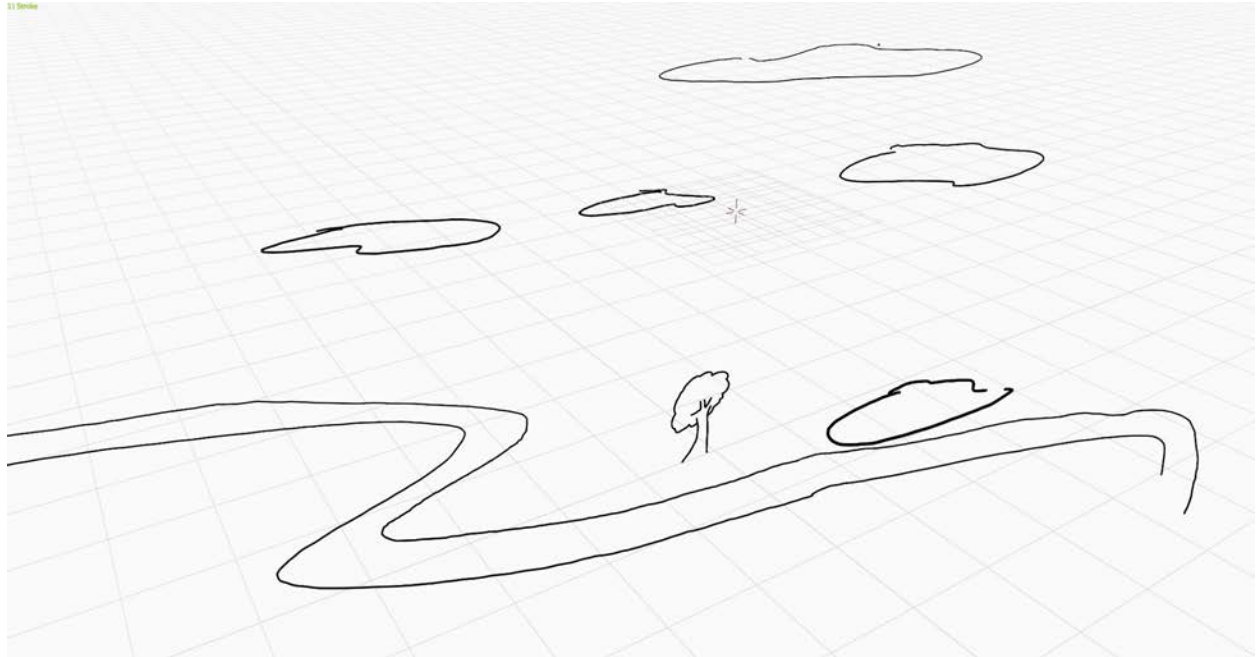


To move the 3D cursor, hold Shift and right click anywhere in the scene.

Set the 3D cursor to be at the base of the tree. This can be done more precisely using orthographic views (refer to the PDF for the numpad shortcuts). Change the drawing plane to “top” and set stroke placement to 3D cursor. now any curve you draw will conform to the ground.



We can create clouds in a similar way. Move the 3D cursor to be above the tree. Now when you draw clouds they will appear above the tree rather than at the origin.

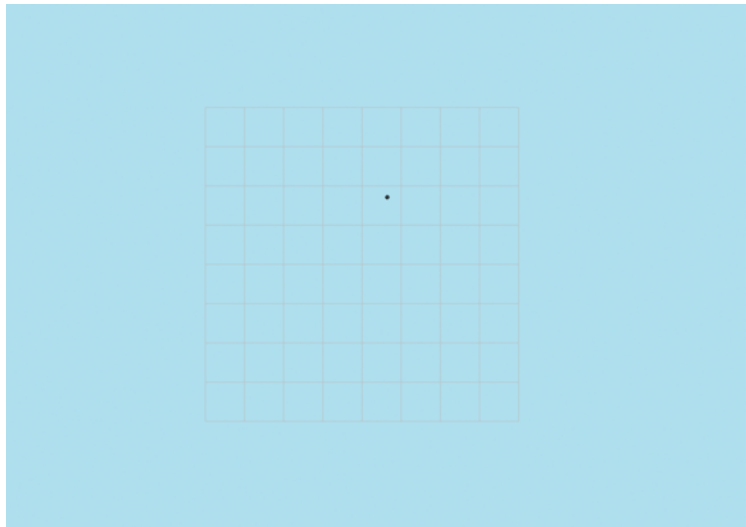


At any point, you can use the shortcut **Cmd + option + 0** to set your current perspective to be your camera view.

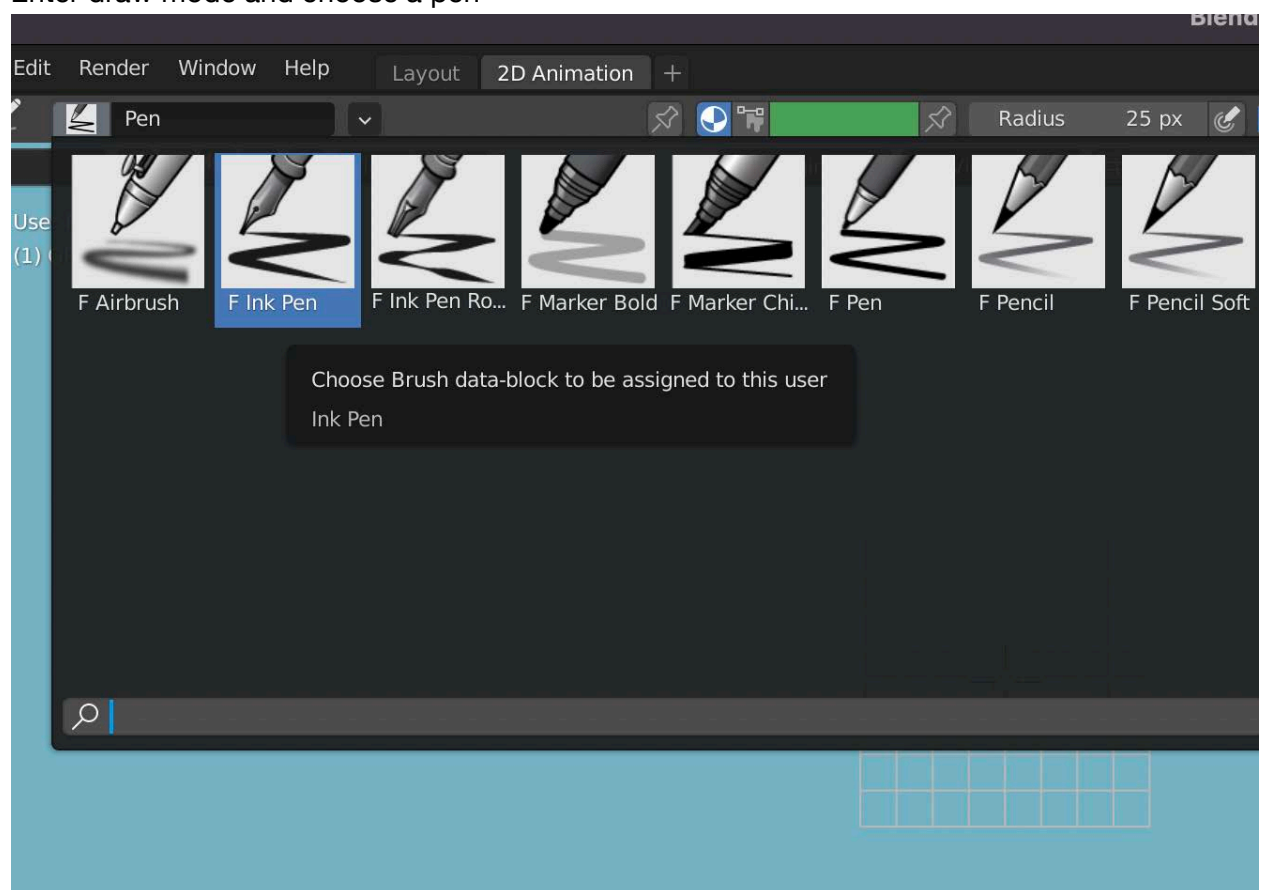
### **Creating a 2D Animation using 3D Drawing**

*Project File for Reference: jellyfish\_animation.blend*

Start from a blank scene with the canvas enabled.



Enter draw mode and choose a pen

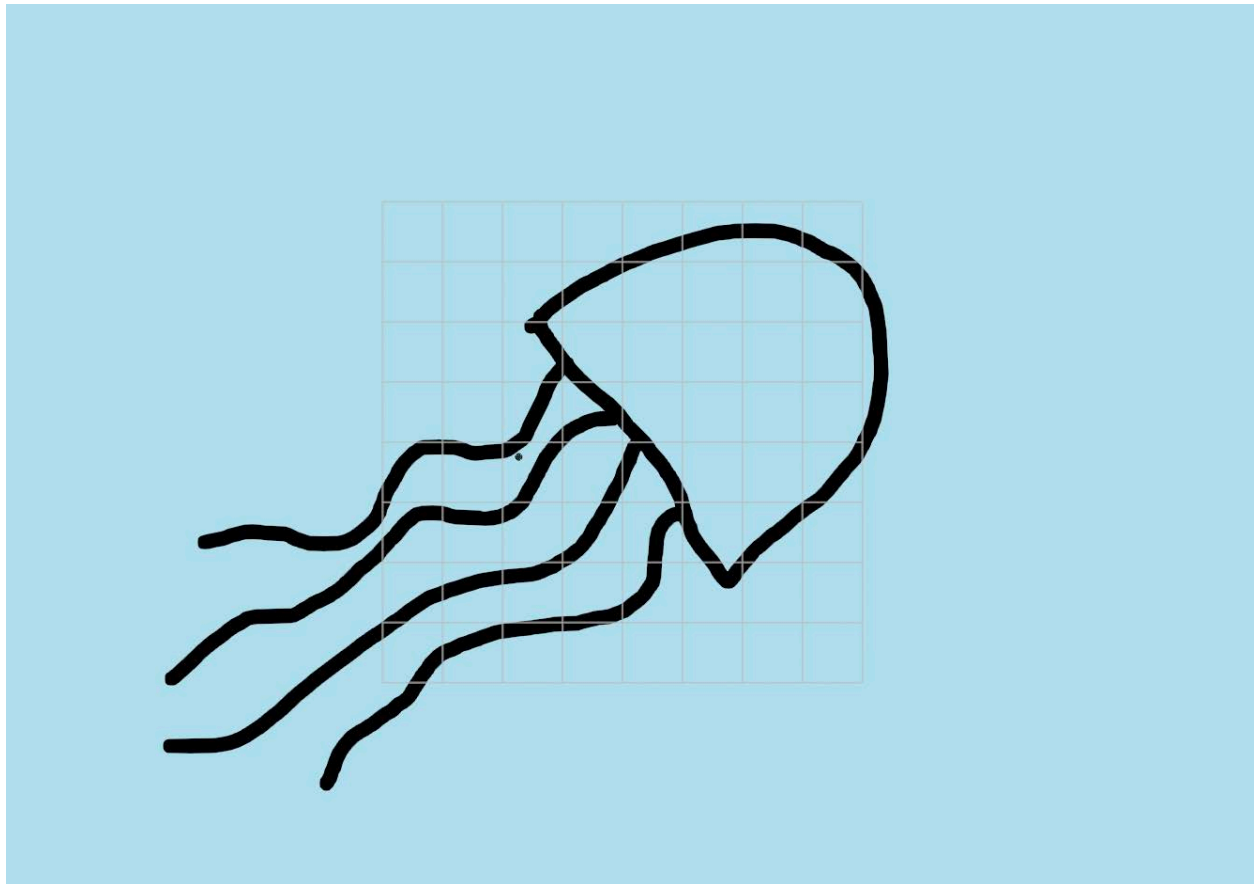




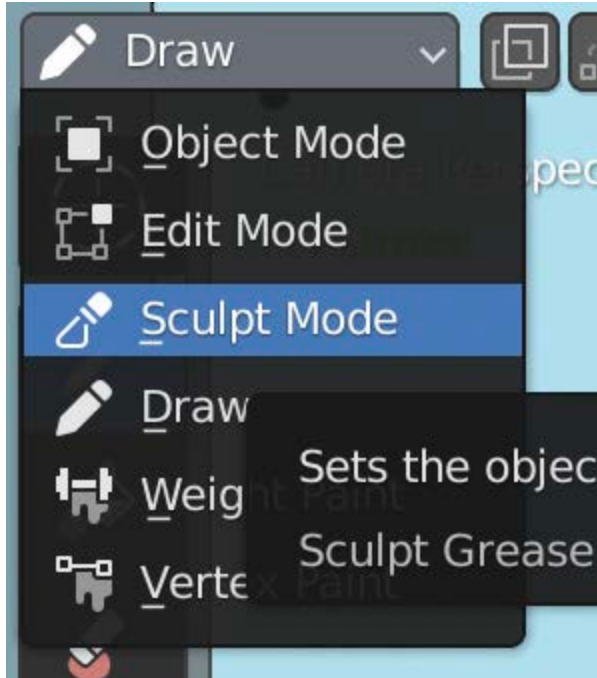


Here you can change your brush properties. The little symbol to the right of each setting is a toggle for whether or not you want pressure (if you're using a drawing tablet) to affect the brush strokes. In this case I left it unchecked.

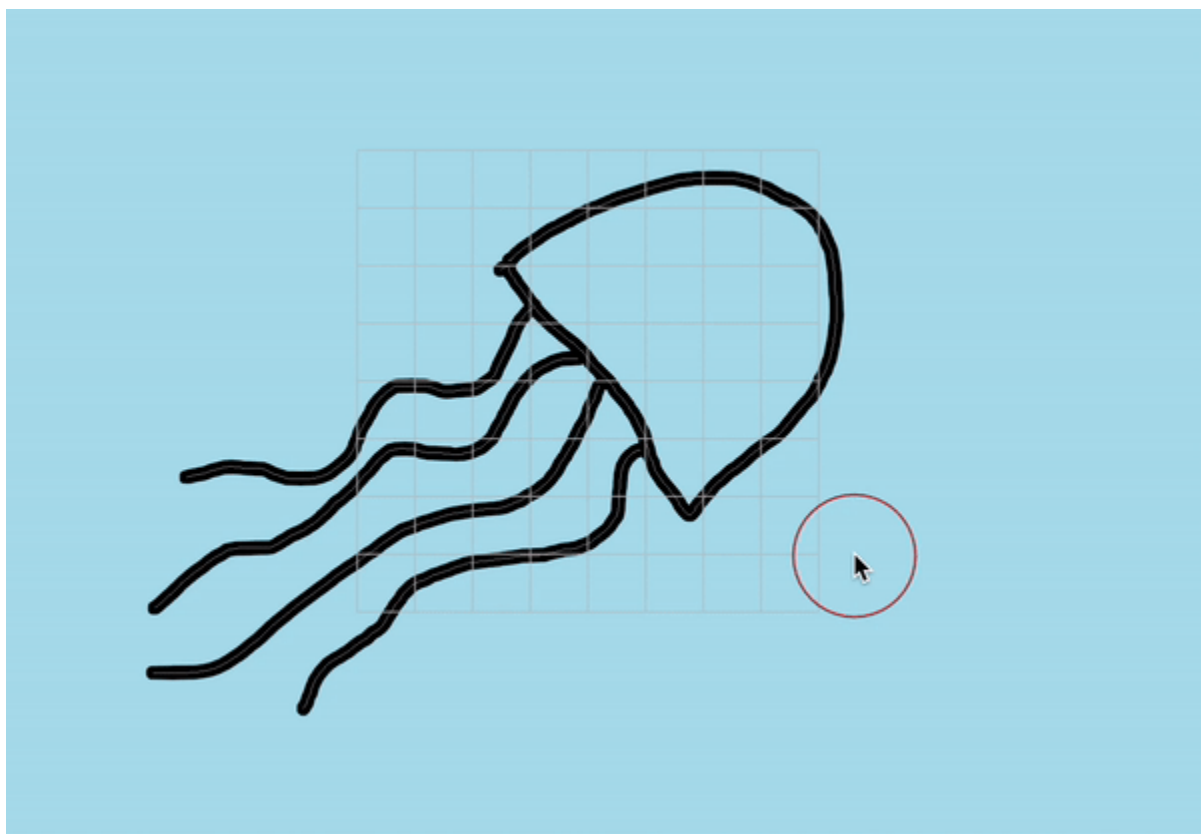
Draw a simple jellyfish.



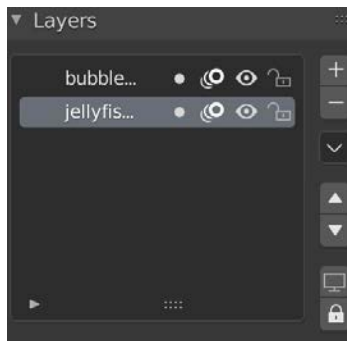
If you're not fully satisfied with any of the shapes, you can go into **Sculpt Mode** to make tweaks.



This opens up a variety of tools for “sculpting” your grease pencil outlines. Here I’ll use the grab tool to touch up the jellyfish outline a bit. You can press “F” and move your cursor left/right to change the sculpt radius.

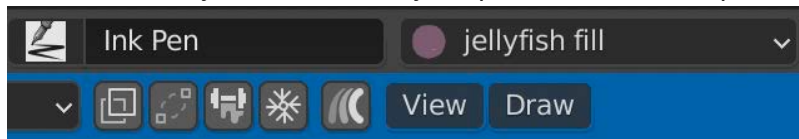


To keep things organized I'll rename this layer to "jellyfish"--this is important if we want to have additional scene elements that are animated separately. Now I can add a layer called "bubbles." We'll draw the bubbles later.

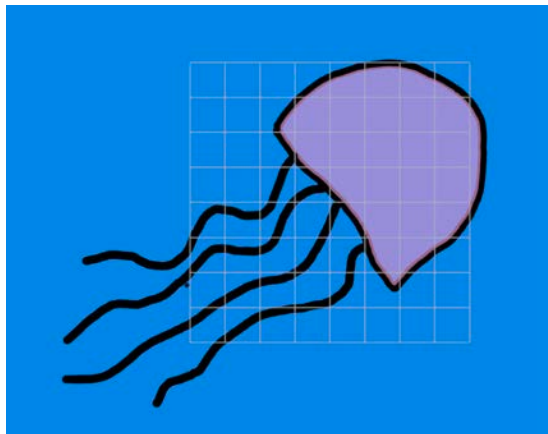


Let's add color to the jellyfish. Go to the "material properties" tab and add a material. Name it appropriately. Uncheck "Stroke" and check "Fill" (since we want a simple fill color without outlines). Pick a color. I picked a shade of pink and lowered the alpha value since I want a semi-transparent jellyfish. Don't worry if you change your mind later, you can always come back to edit the color of a material, and it'll update everything in your scene attached to that material.

Note that now you can access your palette from the top menu:

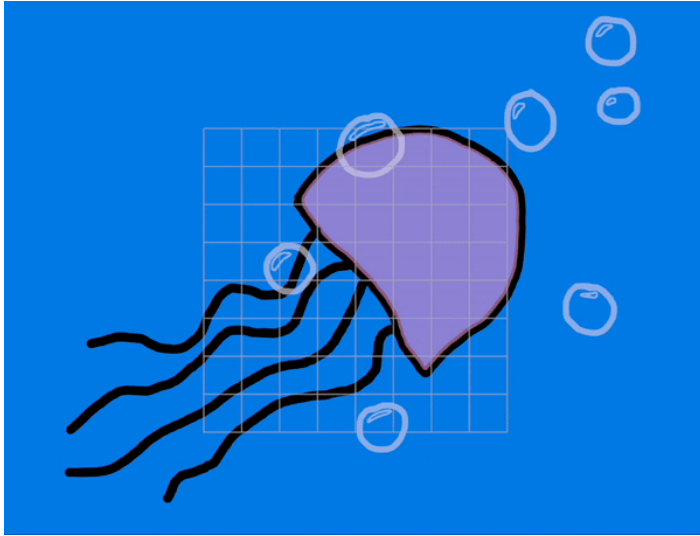


There's several ways to paint colors into our shapes. First, you can simply use the pen tool. Easier would be to select the "Fill" tool bucket symbol on the left and click inside the jellyfish.



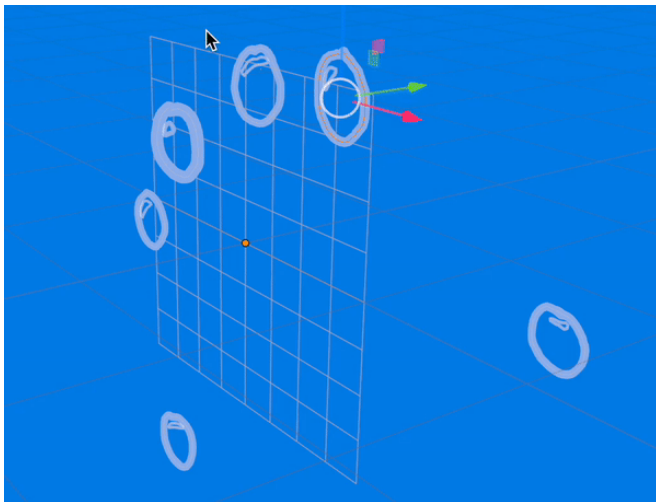
Now I'll draw some bubbles. First I'll make a new material for the bubbles. This time I want it to be a stroke, so I'll check "Stroke" instead of "Fill." I chose white with a low alpha value.

Now in the bubbles layer I'll draw the bubbles.



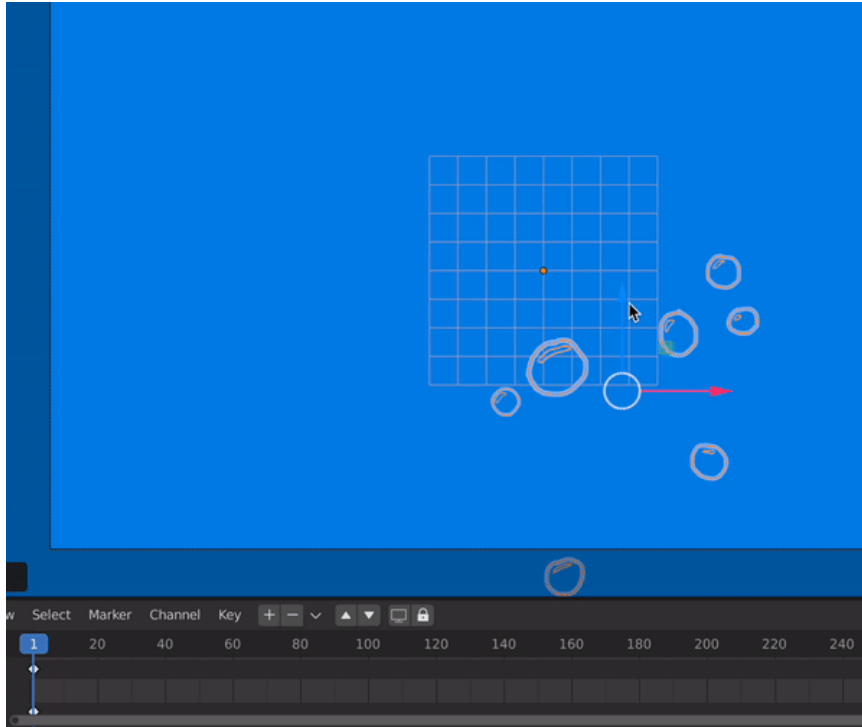
It'll seem like the bubbles and jellyfish strokes are overlapping. This is not a problem since they are in separate layers! You can easily hide one of the layers and see that the other is unaffected.

I'll offset the bubbles in the y-axis for some interesting depth that'll look cool when we animate this. This is done by going into **Edit Mode** and selecting the individual bubbles.

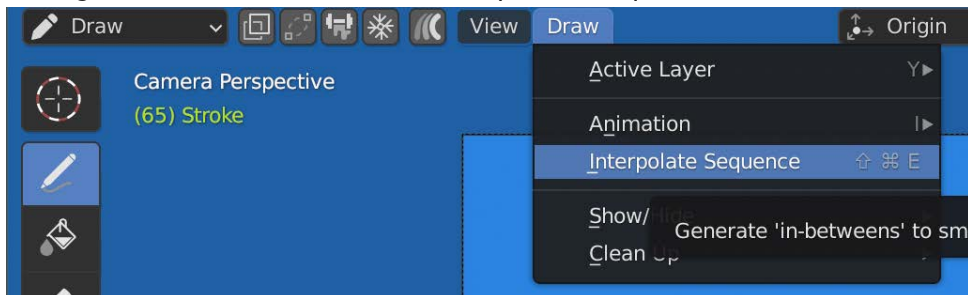


Now let's animate this scene. First hide the jellyfish layer and go to Edit Mode. At the bottom of the 2D Animation window should be a timeline. Make sure the time slider is at 0. Marquee select the bubbles and move them down to a starting position. This will set a keyframe at time 0.

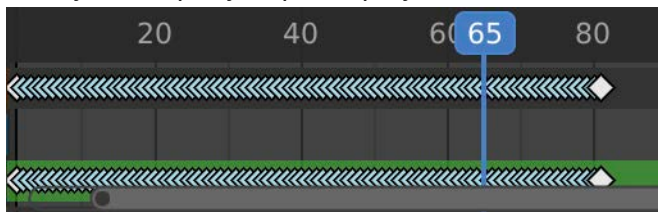
Now drag the time slider to a later time, I chose 80. Drag all the bubbles up a bit. This will set the ending keyframe for the bubbles.



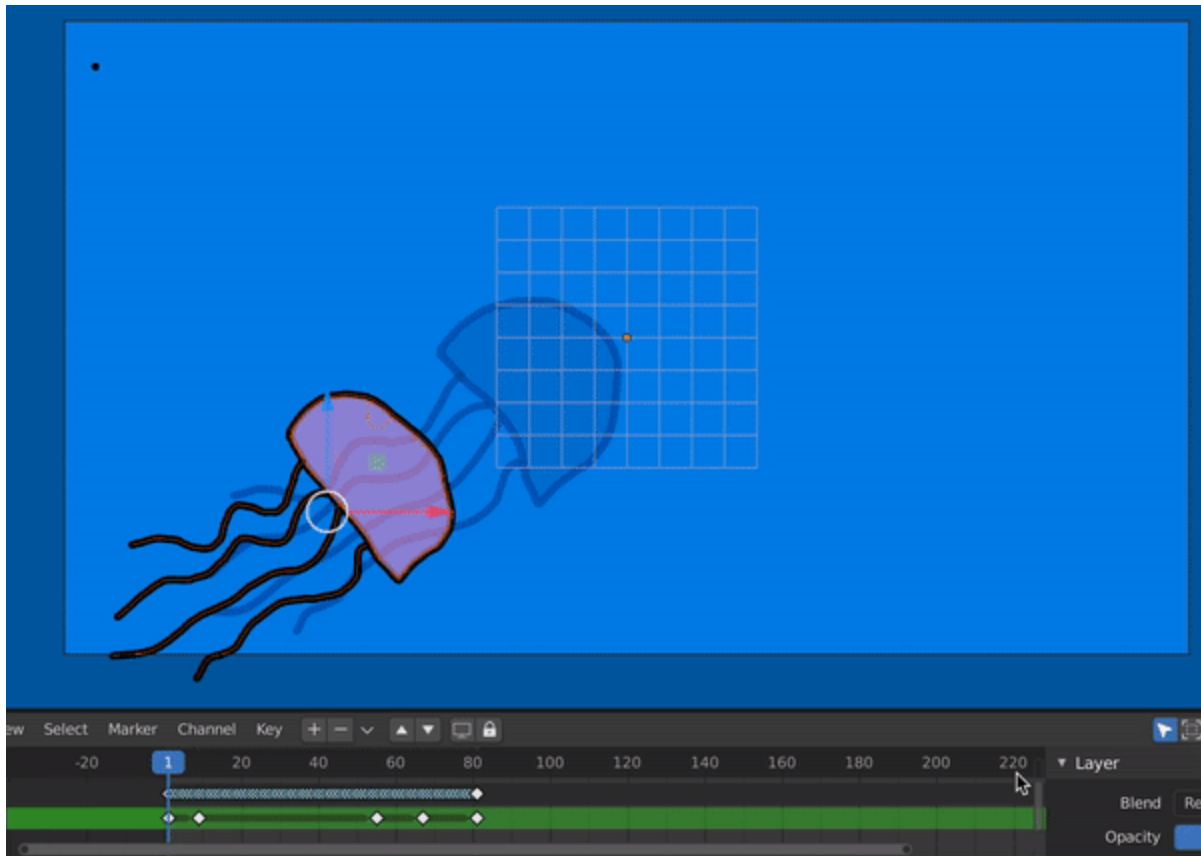
Now go to Draw Mode > Draw > Interpolate Sequence



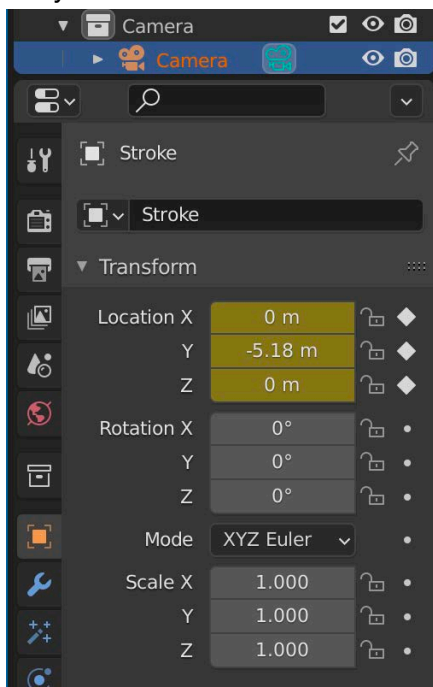
This automatically fills in keyframes between the two we manually set. The bubbles should slowly float up if you press play.



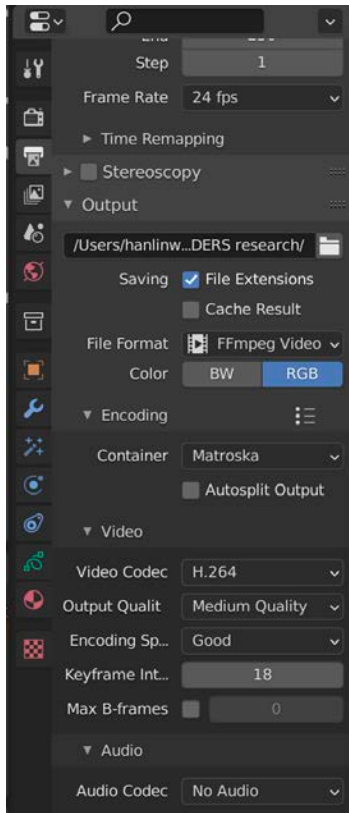
To animate the jellyfish I manually set keyframes for the most important positions (when the jellyfish is at its most contracted and most expanded). I first set keyframes for the jellyfish's shape, then I set keyframes (at the same locations) for the jellyfish's position (using the sculpt mode > grab tool and the edit mode > move tool). Enabling onion skins is very helpful for viewing the previous positions.



I also went ahead and animated the camera itself. I did this by selecting the camera, going into object properties, and setting 2 keyframes at different y-axis distances. This emulates a slow dolly.



To render this, first configure the export settings. Then go to Render > Render Animation.



The final result:

