PROJECTION MAPPING DEMO

General considerations:
- Software
- video, motion graphics, sound media
- Projector
- Surface/environment to project imagery onto

Mapping/creative Projection software:
/ Video timeline editor (premiere Pro, After Effects, resolve, FCP)
/ Resolume
/ MadMapper
/ VPT
/ HeavyM
/ Millumin
/ Touchdesigner
/ LPMT

Video, Motion graphics, Sound media strategy
/ Abstract, narrative, commercial
/ Audio reactive
/ Live performance or standalone
/ Interactive

Projector considerations
/ What is the native pixel resolution?
/ Small objects in dark spaces: 1000 - 2000 Lumens
/ larger sculptures in low light: 2000 - 3000 lumens
/ Side of a building: 5000 lumens min (will override the original surface color)
/ Where will the projector be placed?

Surface/environment Considerations
/ Single or multiple objects
/ surface color and quality (white base color with flat finish will yield the best results).
/ maximum depth distances between object surfaces
/ surface sizes
/ get an accurate reference photo of the surface from the projector.

Instructions for a standalone looping video map

1. **Position the projector**
   / Turn it on, position to where the projection imagery covers your intended surface appropriately.
   / Adjust zoom and Focus
   / Take precise dimensional notes of location/distance/angle to projection surface.
2. **Shoot a reference image**
   / Get a clear undistorted photo from the same position/angle of your projector lens.
   / make sure the projector rectangle boundaries are visible and centered in-camera.

Setup your Video in software
   1. Open your Video software (Adobe Premiere Pro CC for our Demo)
   2. Add a sequence to the project: from the top menu go to file>new>Sequence.
   3. Click on the settings tab
      a. Editing mode: custom
      b. Under video:Frame size: (the native resolution for our projector)
         i.   1024 horizontal
         ii. 768 vertical
      c. Pixel Aspect Ratio: square pixels (1.0)
      d. Fields: No fields
   4. Click on OK.

Import your reference Photo and any other media
   1. Go to File>Import
   2. Select the folder of media, or individual files, that include your photo reference image and press the "Open" button.
   3. Your image is added to the "Project" panel in the upper left. Now click and drag the photo reference file into the sequence panel at the bottom of the interface. The photo now appears program window (your video preview window) and is represented as a colored bar in the timeline.
   4. Now Adjust the scale of the image and center on screen to where the boundaries of the projection rectangle in the photo reach the black composition window edges
      a. Switch the workflow button at the top to "Editing"

b. In the effects control panel that appears in the upper left, click on the rectangular icon for "motion" (this will pop up control points around your image in the preview window).

c. Click and drag on the outer points to resize the image. Click and drag inside the border of your image to reposition the your image.

5. In the timeline, change the duration of the reference photo by clicking and dragging on the left side of the clip. (this way the image is visible underneath other tracks for drawing masks to map imagery to.)

6. You can follow steps 1 -4 for adding any other video/audio/image files to your layer/timeline panel to use in your project. Make sure to keep the reference photo on the bottom video track by itself. All other videos or other media can be stacked above it using other video tracks.

Creating layer masks

7. Import a video to your timeline and place it above your reference photo layer

8. With this video track selected, Turn off the eyeball for it in the timeline.

9. Switch to "Editing" workflow at the top.

10. In the effect controls panel, click on the white arrow for "Opacity" to show properties for that effect.

11. Select the pen tool from the drawing tool icons.

12. In your video preview window, Carefully draw an accurate perimeter around the entire surface area in the photo where you want to map imagery from the video onto.

13. Make sure to close the shape by connecting the endpoints together.

14. You can adjust and reposition the anchor points to refine the mask by clicking on them to select and then click and drag to move.

15. In the control panel, You now have a *Mask(1)* property listed under your opacity effects:

a. Set mask feather to '0'

16. Turn the eyeball for your video video track back on. And now your video is isolated to only showing through the layer mask you created.

17. You can select and delete masks that you do not want from the effect controls panel as well.

18. You can also create more layer masks on a single video clip if you want the clip to show on more areas of the projection.

Basic timeline editing
1. After dragging and dropping some videos, and other visual media into the composition, you should see some long colored bars stretching across the timeline area of the panel.
2. The bars represent the duration for each layer.
3. You can click and drag on them to change a clip's respective start time, and stacking order.
4. You can also trim down the duration of a clip by clicking and dragging on the ends of the bars.
5. When timeline bars are stacked on separate tracks and they overlap each other, then those clips are going to play at the same time.
6. You can hold down the Alt/Option key while clicking and dragging on a clip to duplicate it in the timeline.
7. You can press the "Spacebar" key on the keyboard to watch the playback preview of the timeline. You can also click and drag the blue playhead at the top of the timeline to quickly browse through parts of your timeline.

Creating Animated color effects
1. create a color matte clip to the scene for animating color changes on:
    a. From the top menu select: File>New>Color Matte
    b. Click OK
    c. Select a base color for the matte, and click OK.
2. You can name it "animated matte 1"
3. Switch to "assembly" workflow at the top
4. Click and drag your animated matte clip over from the project panel and drop it into the timeline onto its own track.
5. Now switch back to "effects" workflow
6. have your animated matte clip selected in the timeline
7. In the effects panel on the left, click on the video effects folder and then click on generate.
8. Double click on the paintbucket effect. This will add the effect to your selected clip.
9. Now click on the Effect controls panel to the right
10. Expand the paint bucket effect properties
11. Where it says "color" you can click on the color swatch there to override the color of your affected layer.

12. To animate the color change we need to activate keyframing for this property by clicking on the little stopwatch icon to the left of the color property.
13. Once clicked, you should notice to the right in the mini clip timeline a small diamond icon has appeared, this is the animation keyframe.
14. To make the color shift over time we need at least two keyframes in the mini clip timeline. Click and drag the mini playhead forward 1-2 seconds.
15. Now change the color setting to a new color. A new keyframe automatically generates inline with your playhead to record the property change.
16. Pullback the playhead to see the changes. You can add as many keyframed changes as you like.
17. You can follow the steps for adding a layer mask to this layer and adjust it in the timeline as you like.