

## Animating in GeoGebra: A Resource Guide

### 1. Choosing an image:

Find an image(s) that you are allowed to use! The image will be imported into GeoGebra to be a background for your animation. It should be a jpg or a png, at 72 ppi, and no larger than 800 px by 600 px. If you don't have software to resize, you can do it for free at <http://www.picresize.com/edit>.

Photographers make their living selling pictures. Companies pay big money for their pictures. Just because an image is on the internet, it doesn't mean you can use it freely. However, more and more photographers are "donating" their work to be used freely. They contribute to a collection called "Creative Commons," and though there are several categories, all are ok for this project. In addition, images in the "Public Domain" are ok to use because they are either paid for by a government or their Copyright licenses have expired. You can also look for the term, "Royalty Free," but those may have an upfront charge.

Here are some good places to look for images:

The collage consists of four screenshots from different websites:

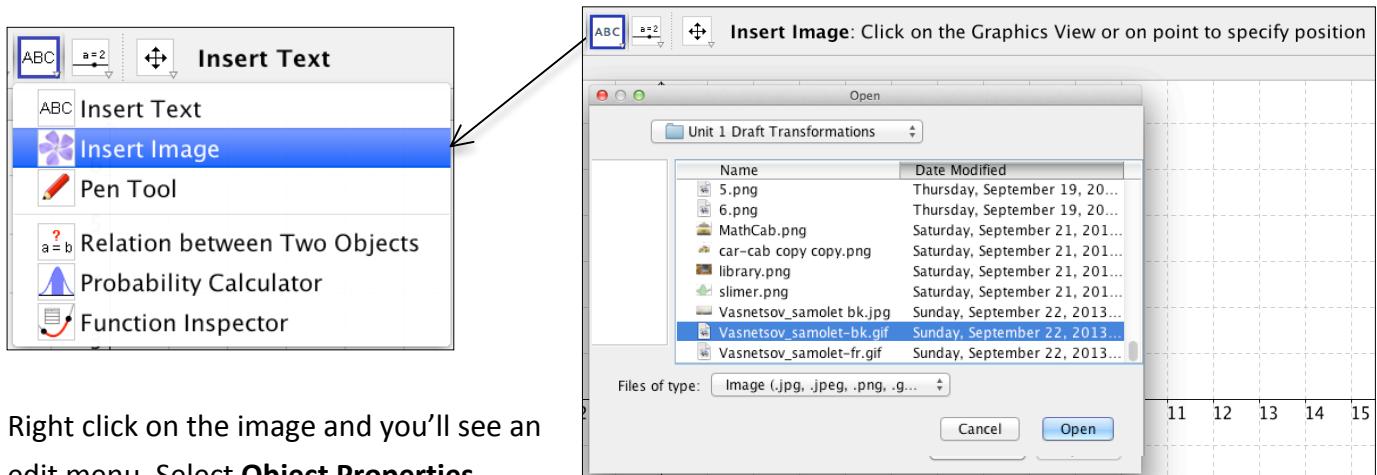
- Wikimedia Commons:** Shows the 'Picture of the day' featuring a bridge at night with light trails. The sidebar includes links like 'Main Page', 'Welcome', 'Community portal', and 'Language select'.
- flickr from YAHOO! Advanced Search:** A detailed search interface with sections for 'Search for', 'Search in', and 'creative commons'. It includes checkboxes for 'Only search within Creative Commons-licensed content' and 'Find content to use commercially'.
- Google Images:** A search results page for 'quadrilateral' showing various geometric shapes. A blue arrow points from this screenshot to the 'Advanced Search' interface on the right.
- iStockphoto Advanced search:** A complex search form with many dropdowns and checkboxes for filtering images by aspect ratio, color, type, region, site, file type, and usage rights.
- freedigitalphotos.net:** A website for free stock photos, showing a grid of images and a sidebar with categories like 'Pictures of Objects'.



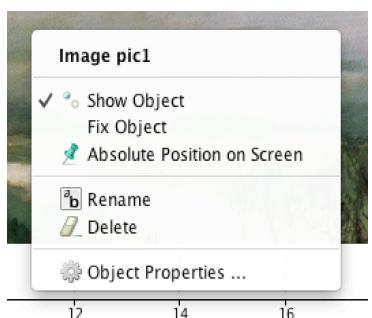
## 2. Embedding an image.

Right click somewhere on the Graphics panel to turn on the grid. Plot a point, not on an axis, I usually use (1,1). This will be the lower left corner of the image.

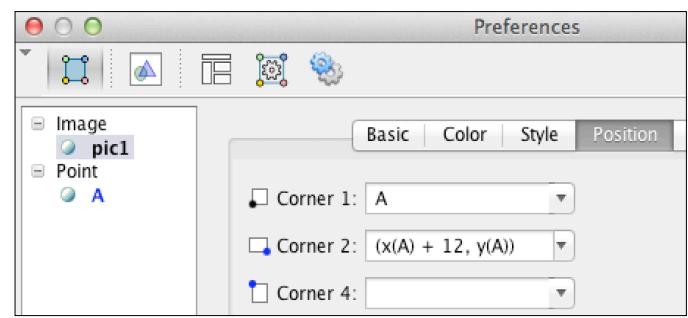
Select the **Insert Image** option from the **Insert** Menu (the 10th icon). Then click on the point where the lower left corner will be. This opens a panel where you choose the image. Use the up/down arrows in the top bar to navigate to place you saved the images. Then choose your image.



Right click on the image and you'll see an edit menu. Select **Object Properties**.



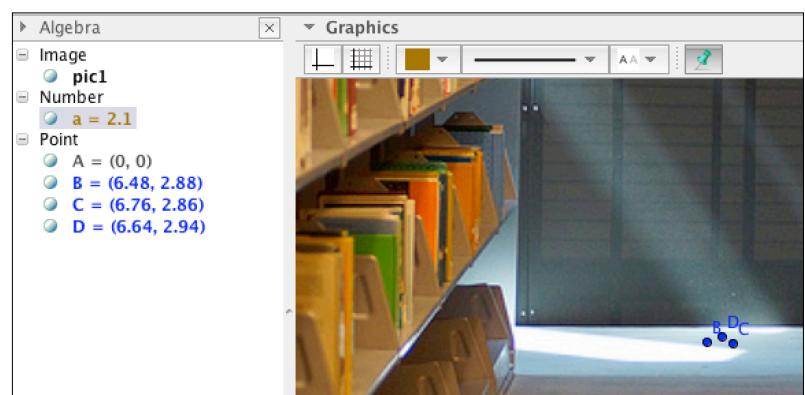
Select **Position**, and type what you see below into Corner 2. This sets the scale and locks the picture to the grid.



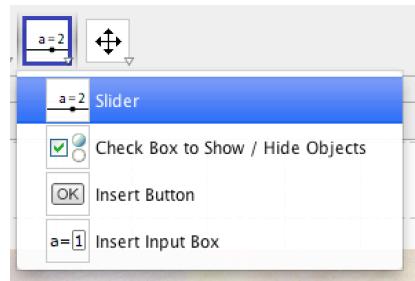
## 3. Embedding a second image for dilation

Plot points for the lower left (B) and right (C) corners of the image. Plot a point (D) for the center of dilation.

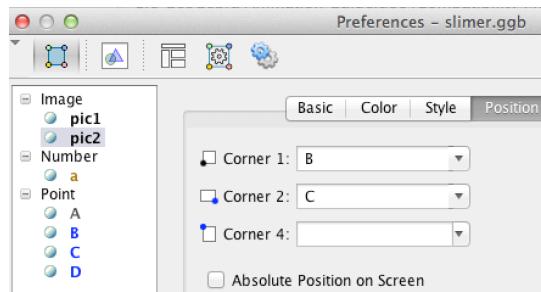
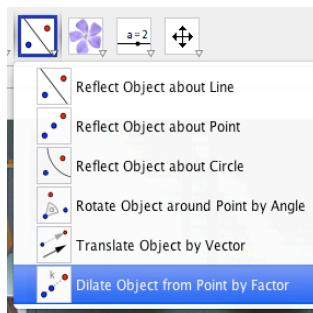
You are going to dilate the image with a center at point D. The dilation factor needs to grow, so you need to make a slider for it. Select the Slider command and then click



on the graphics panel. I like to put sliders in the lower right corner of the background image. Right click on the slider and choose **Object Preferences**. Go to the **Slider** tab. I set it to start at 0.1 and end at 50. An increment of 1 seems to work well. These numbers depend on your image and how you want it to move.



Choose the **Insert Image** command and click on point B. Set the **Object Preferences** for pic2, so the image is sized appropriately. Do that by assigning point C as corner 2.

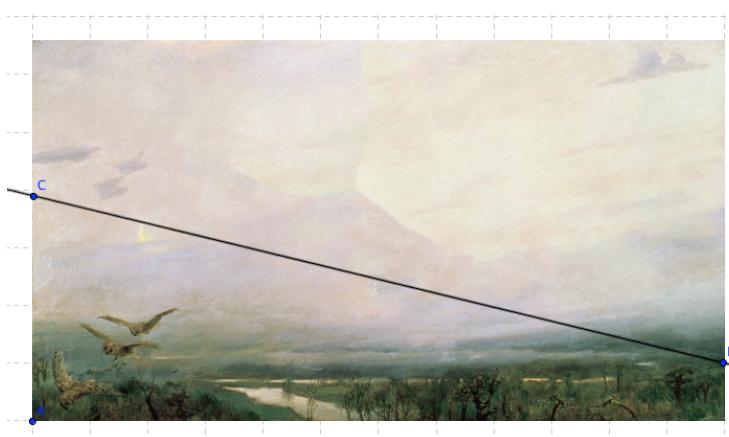


Choose the **Dilate** command from the **Transformations** menu. Click on pic2 (this is easier if you select it in the Algebra panel), and then click on point D. A box will open asking you for the scale factor.

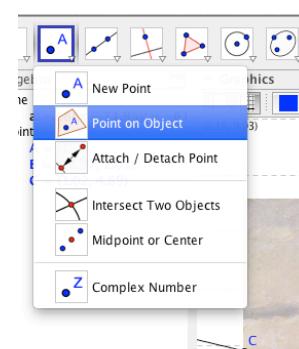
Type in “a” which is the name of the slider. This will allow you to change the dilation and animate it! Right click on the slider to open **Object Preferences** again. Click **Animation On**. Things will start moving! Click on the Pause button in the lower left corner to stop the animation.

#### 4. Embedding a second image for dilation and translation

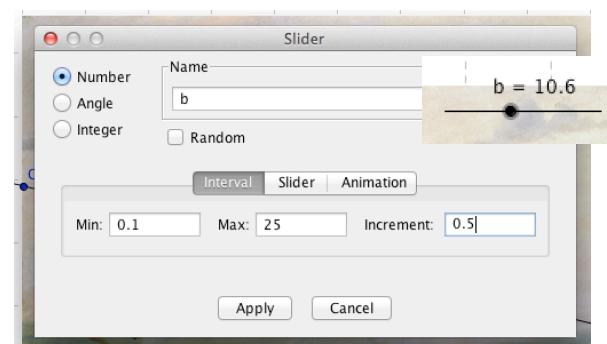
Plot points B and C on either end of the line you'll be using to “steer” the dilation (sort of like a vector).



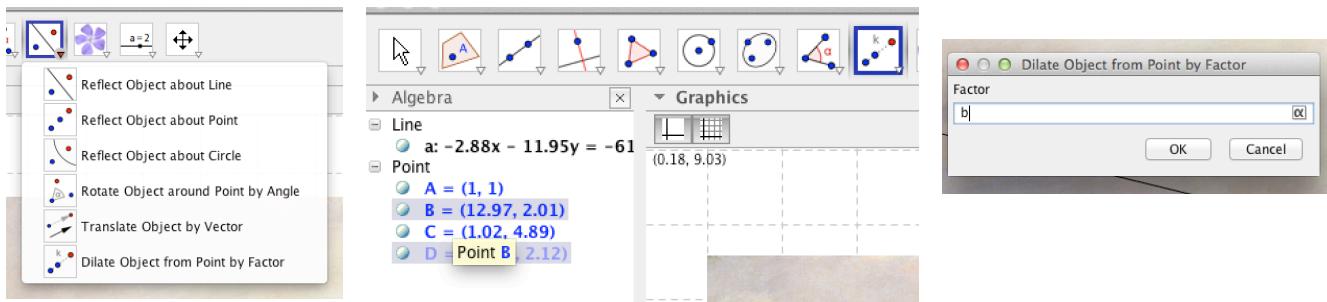
Draw the line. Plot a point on that line, with the **Point on Object** tool in the **Point** menu.



You are going to dilate point D with a center at point B. The dilation factor needs to grow, so you need to make a slider for it. Select the Slider command and then click on the graphics panel. I like to put sliders in the lower right corner of the background image. I set it to start at 0.1 and end at 20 or 25. An increment of 0.5 seems to work well.

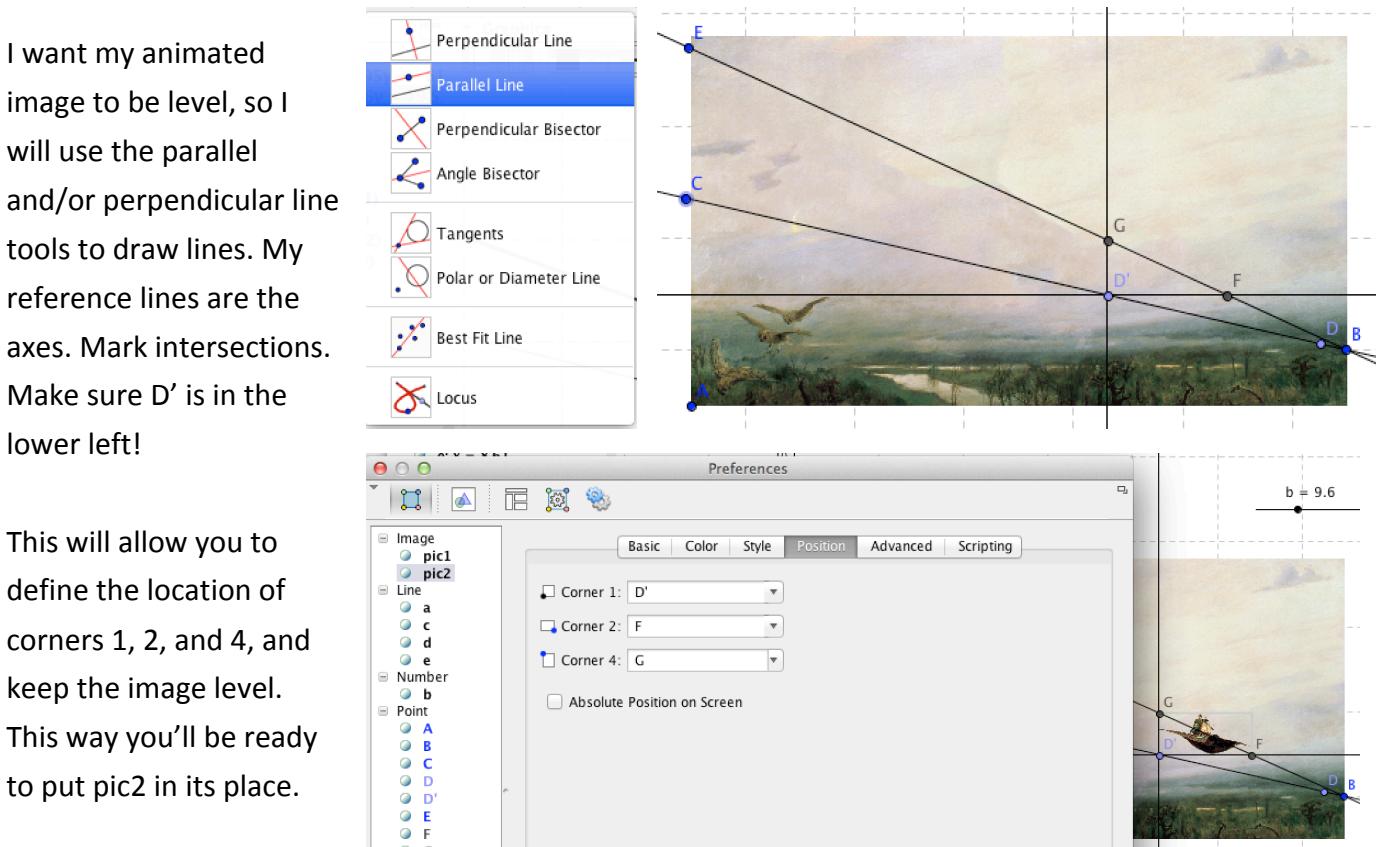


Now you're ready to dilate point D to make your image grow. The command is at the bottom of the transformations menu. Select it, then select point D, and then select point B.



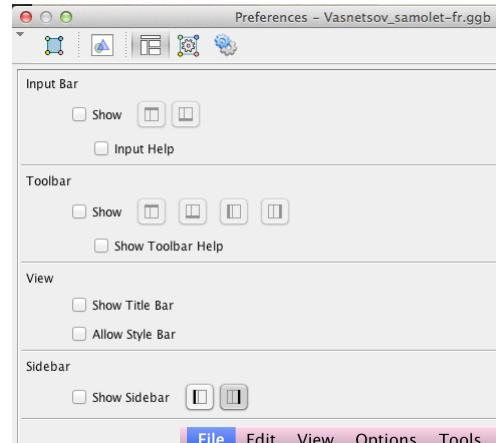
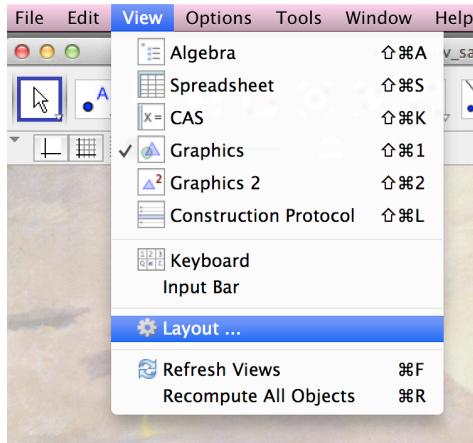
A dialog box will open; type in the name of your slider – that's your scale factor. Move the slider to try it!

Now you need to set the other corners for the animated image. Start with another line through B; plot another point on the opposite side of the image (near my point C) and draw the line.



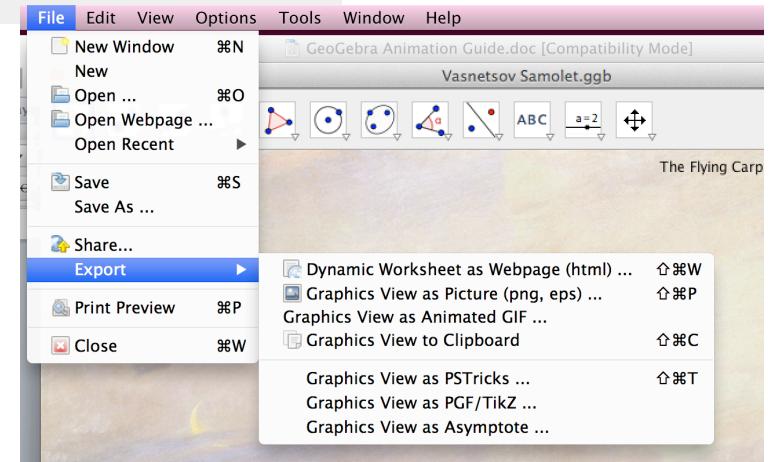
OK, time to bring in the second image. Click on the **Insert Image** tool, then on D', the point being dilated. Choose your second image. Note: it should have a transparent background, so a PNG is the best format. Right click on the new image and use the points you just found with the parallel and perpendicular lines as corners 2 and 4. If that messes-up your aspect ratio, adjust the bright blue (movable) points using the **Move Tool**.

Right click on the slider to turn the animation on. A little arrow appears in the lower left corner – that is how you start and stop the animation. At this point you can start hiding things. Right click on everything but the slider and **deselect** Show Object. Hide the control elements in the layout menu.



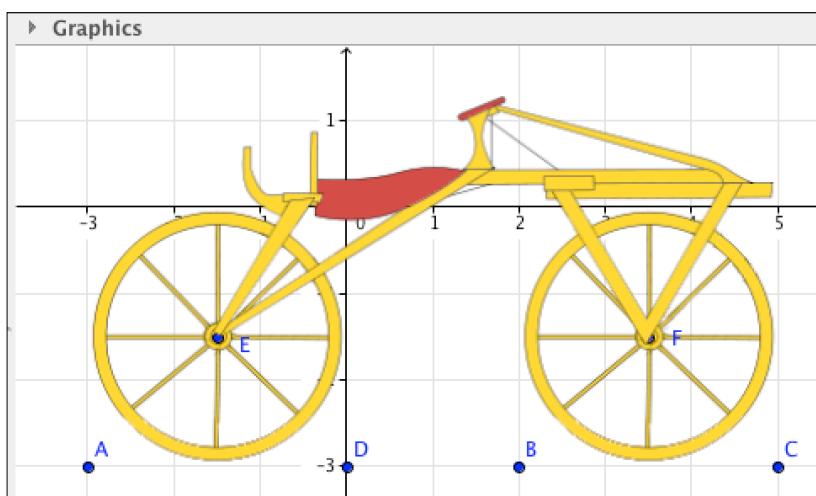
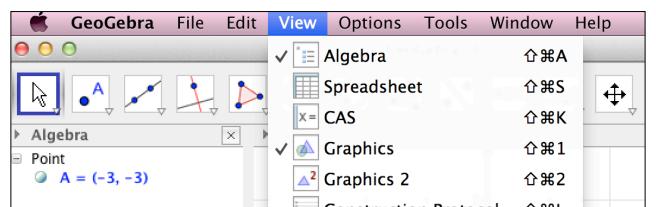
Finally, export it as an html5 file and upload it to your digital portfolio. Or, upload it to GeoGebraTube!

By the way, this is the one I made while writing these directions. <http://bit.ly/1f9cMX0>



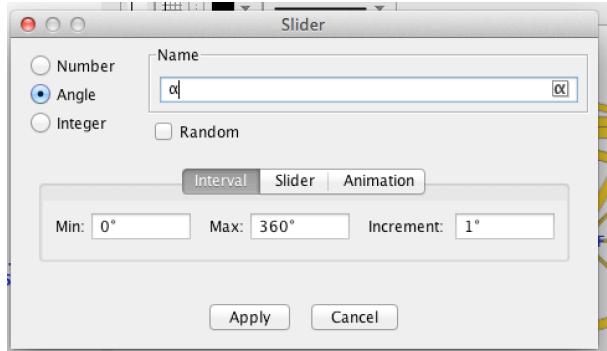
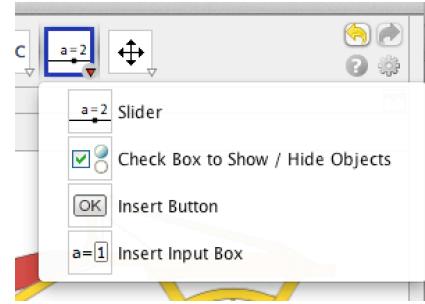
## 5. Embedding a second image for rotation

When you're working with layered images in GeoGebra, it is often helpful to turn on the **Algebra** panel. That will let you select the element you need more easily.



For this sketch, I used the grid to keep the points simple. The wheels and frame are each separate images, points A - D will be the lower corners of each image. Points E and F will be the centers of rotation. Once that's set, you can hide the axes, grid, and A - D.

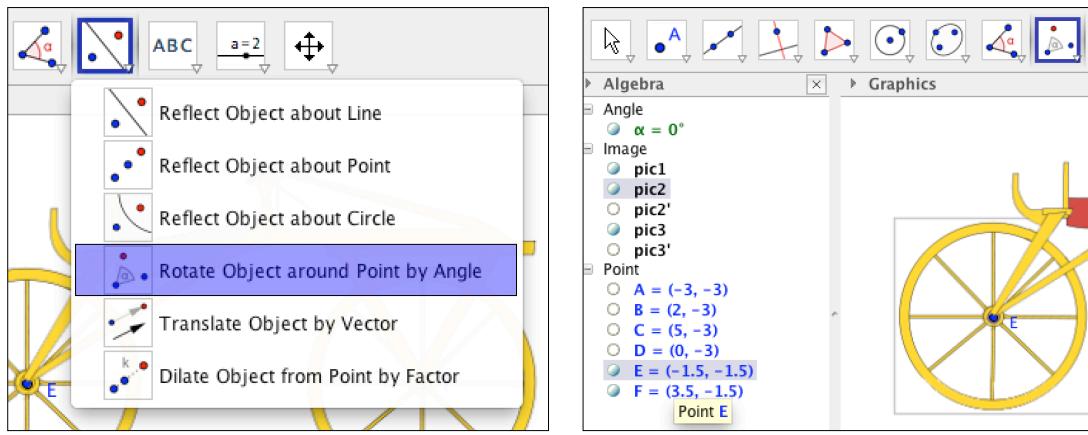
The rotation angle needs to grow, so you need to make a slider for it. Select the **Slider** command and then click on the position you want for it on the graphics panel. A window will pop up with slider settings. Change the selection from Number to **Angle**. The presets are fine to start. Note that GeoGebra names an angle with a Greek letter, in this case, Alpha, the first Greek letter.



(By the way, do you know the second Greek letter? It's Beta. That's where we get the word, alphabet!)

It may be easier to name it "a." Then you don't have to find the symbol.

Choose Rotate Object from the Transformations menu. Use the Algebra panel to select pic 2, then point E.



A box will pop-up asking for the angle measure. Instead of a number, hit the alpha symbol at the end of the entry bar and choose  $\alpha$ .

Turn off the non-rotated images and turn on the animation. Export to html5 or as a GIF and upload it to your digital portfolio.

