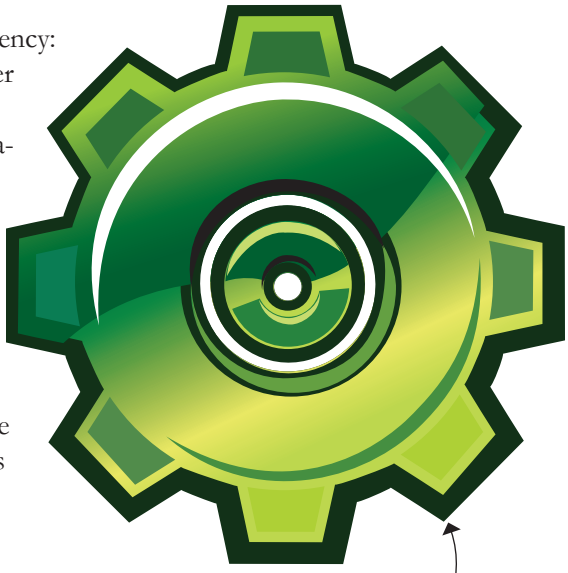
Green Gears - Illustrator

The assignment:

Create the green gears illustration

- trace out the shapes from the bitmap in the provided file, using clipping masks when necessary
- Use the blend tool to create the feathered lines in the background
- Modify the colors to suit your own personal vision



This lesson is based on an illustration I found online at the stock agency: istockphoto.com. You can find it yourself if you go there and enter "high tech" in the search box, with a category of "illustrations". iStockphoto is an excellent resouce for learning how to use Illustrator. You can search for illustrations of whatever interests you (ie: flowers, cars, people) and observe the various techiques artists have used to render real life into vector form.

If something grabs your attention, you can download it for a few dollars and pick it apart, learning the secrets. This lesson will guide you through the process of creating the gears from start to finish. The gears illustration appears to designed as a desktop screen saver, but the techniques used to create it could be applied to anything. To really make it your own, I encourage you to at least change the colors, if not completely redesign it, using the tools you've learned.

STEP ONE: Copy the **green_gears_before.ai** file into your homework folder named after next week's due date. When you open the file you will see that there are two screenshots (bitmaps). One is the overall view, and one is a closeup of the gear. These bitmap screenshots will focus most sharply at a zoom factor of 180%.

STEP TWO: Add a new master layer named **gear one.** Double click the new layer and choose a point color of red; this will help make the points easier to see as you trace the green shapes

STEP THREE: set up your pen tool for no stroke or fill. Trace the **outer dark green gear** with the pen tool. Use sharp corners (click and release) on outer points of gear. Use sharp corners with independent handles (click and pull, add alt key to re-point) on inner corners of gear where it is curved.

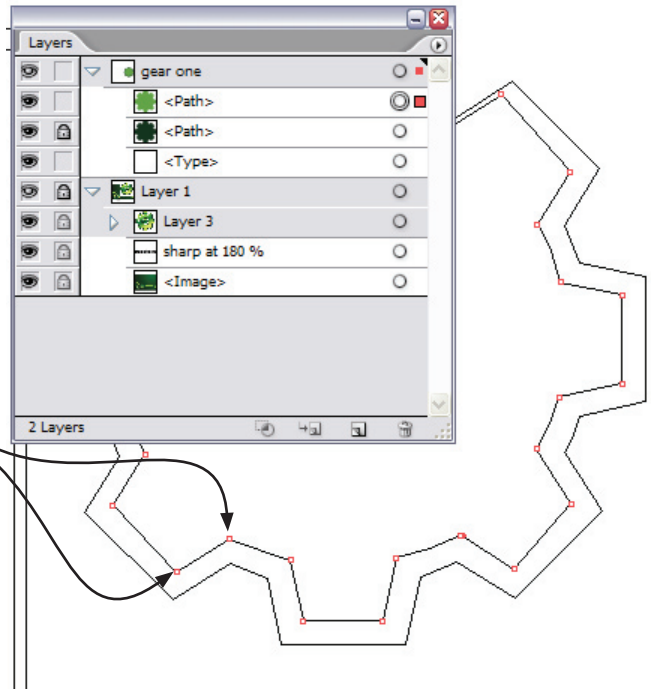
STEP FOUR: Once the path is closed and refined (with the white arrow), bring fill to front and use the eyedropper (while holding shift key) to sample dark green color from screen shot.

Drawing the second gear path

STEP ONE: press **control+C**, then **control+f** to copy the path and paste in front. Lock the original path.

STEP TWO: change the fill color to a lighter green.

STEP THREE: Choose the black arrow and scale it down(hold shift) until it begins to match the screenshot, you are making the inner light green gear surface. Watch the outer edges as you scale down. You'll notice that it got smaller, but the proportions are wrong on the gear tips. We'll fix that next.



STEP FOUR: choose the **direct select** tool (keyboard shorcut: **a**). Working on just the bottom right arc of the gear, **shift+select** an inner and outer point **together** on one of the sloping sides of a gear cog. Grab that line segment and drag it inward until you get the correct spacing. This is precision work, you must compare angles, slopes, curves and parallel lines. Use the nudge keys if you need more precision, or sit at a pc that has a Wacom.

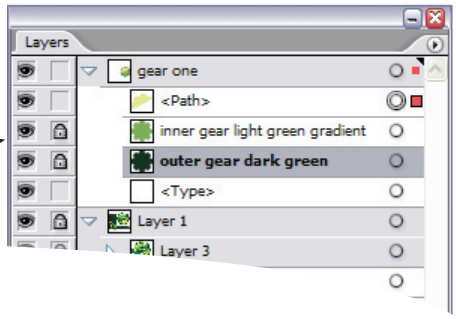
STEP FIVE: Move to the next line segment and repeat, from the 8 oclock to 2 oclock positions on the gear. You do not need to adjust the lines on the other gear cogs as they will be concealed by other artwork.

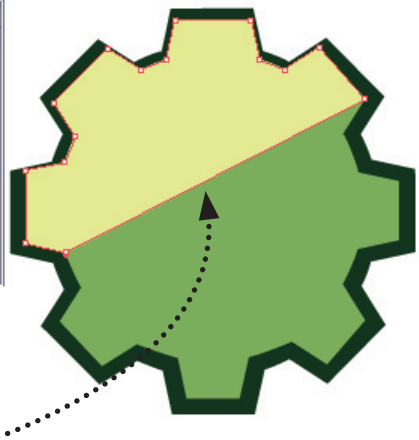
STEP SIX: Name the paths: **outer gear dark green** and **inner gear light green gradient**

STEP SEVEN: Copy the top one, then lock both gear shapes

STEP EIGHT: press **control+f** to paste in front

STEP NINE: Name this third gear layer: **gear top bevel**

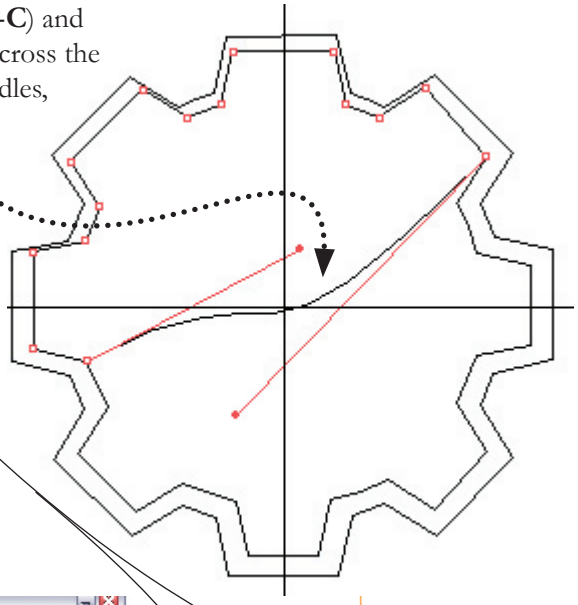




STEP TEN: Change it's color to a light green. Choose the **minus** pen tool (keyboard shortcut: **-**) and delete all the points from 2 oclock to 8:30 as shown.

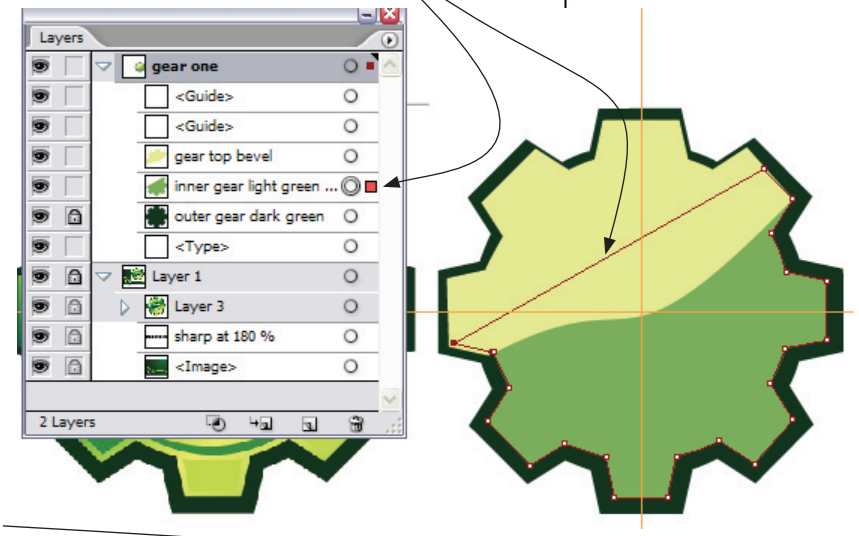
The third gear path

STEP ONE: choose the **convert anchor point** tool (keyboard shortcut: **shift+C**) and pull a fresh set of handles out of the two points that form the straight line across the middle of the top gear shape (**gear top bevel**). As you pull out the fresh handles, take care not not deform the gear cogs.

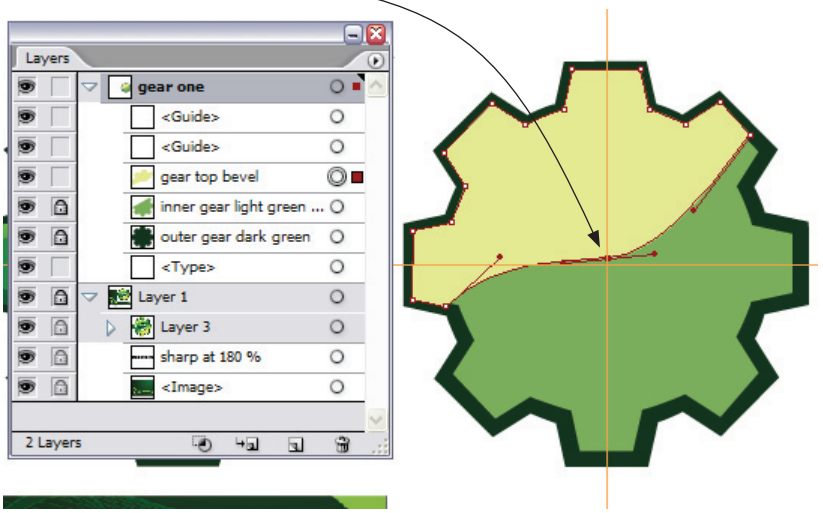


STEP TWO: With the same tool, grab the inside direction handle and pull it toward the middle of the gear as shown. Repeat with the other side until you have the curve shown. This will form the rounded bevel top of the gear.

STEP THREE: Study the screenshot and notice how this top gear shape has thinner margins than the middle shape. As you begin to edit the line segments on this third gear shape (**gear top bevel**), you'll find that the middle gear shape underneath gets in the way. You'll need to delete some points or gear cogs along the top left side of this middle gear shape (**inner gear light green**) to make it only as big as it needs to be. Then you can continue editing line segments on the top gear shape (**gear top bevel**), the one with the long curve.



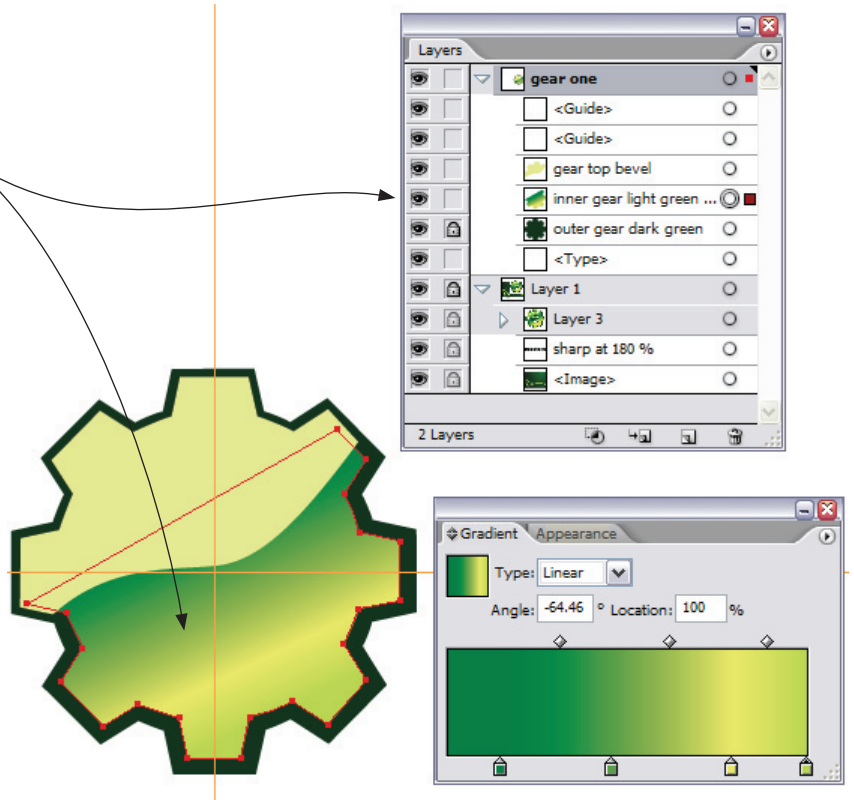
STEP FOUR: I did have to add an extra point to the curve to get the precise shape I was after. Note that I also dragged in guides to better mark out the center of the gear.



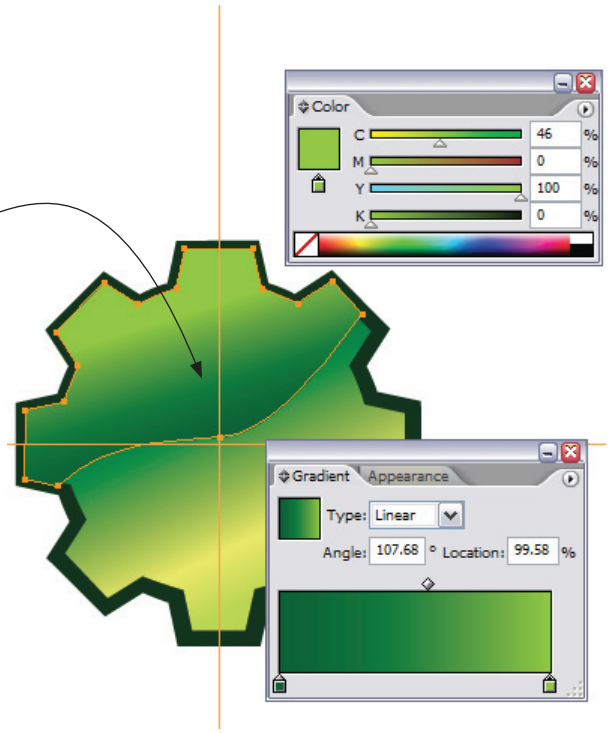
Adding gradients to the gear paths

STEP ONE: Open the swatches palette. I've saved some gradients in the 'before' file to save you some time. Select the middle of the three gear shapes (**inner gear light green**) and click **gradient #1** in the swatches palette. This is a 4 tab all green gradient, but feel free to mix your own colors

STEP TWO: Choose the gradient tool and drag across the path until it looks like the screen shot: light green at bottom.

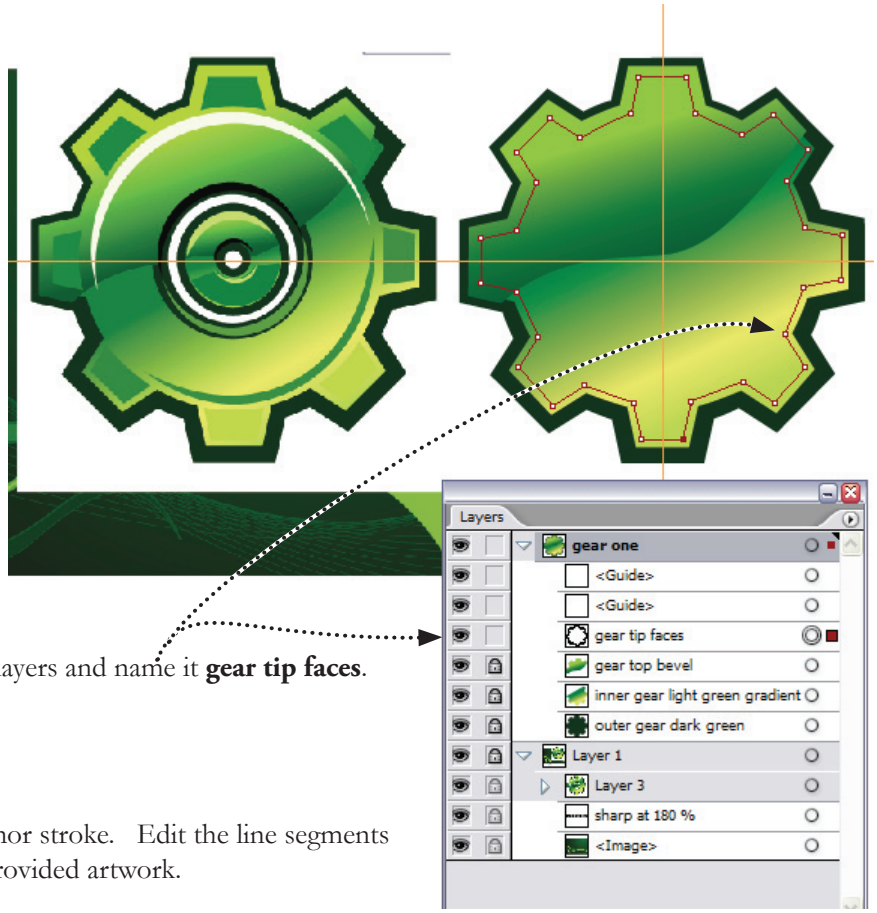


STEP THREE: for the top shape (**gear top bevel**) use a two tab green gradient, (**gradient #2**) in the swatches palette. It should be darker towards the middle and lighter on the outside of the gear.



Building the gear tip paths

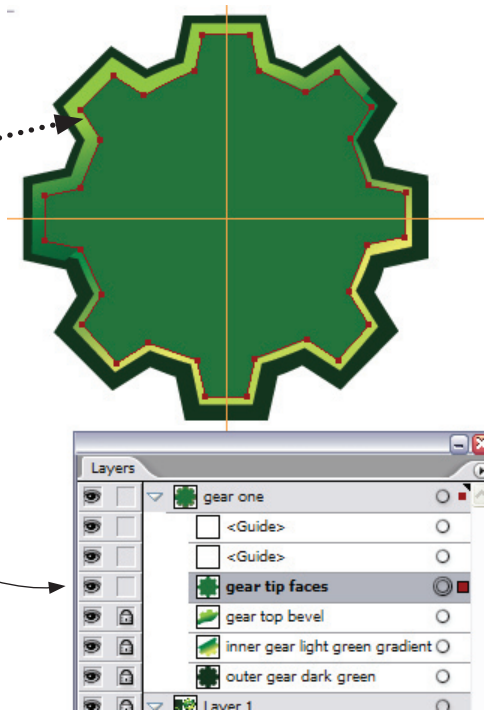
STEP ONE: **copy** the bottom dark green gear (**outer gear dark green**) and press **Ctrl+F** to paste it in front.



STEP TWO: Drag it up to the top of the stack of layers and name it **gear tip faces**. **Lock** all the other gear layers.

STEP THREE: remove the fill so it has neither fill nor stroke. Edit the line segments as before until it matches the screen shot in the provided artwork.

You may want to try the **lasso tool** (keyboard shortcut: **q**). With the lasso tool, you can lasso two points on the side of a gear cog, then, while still using the lasso tool, hold the **ctrl** key down and drag the line segment to the right location for that gear cog, then let go of the ctrl key and lasso the next line segment

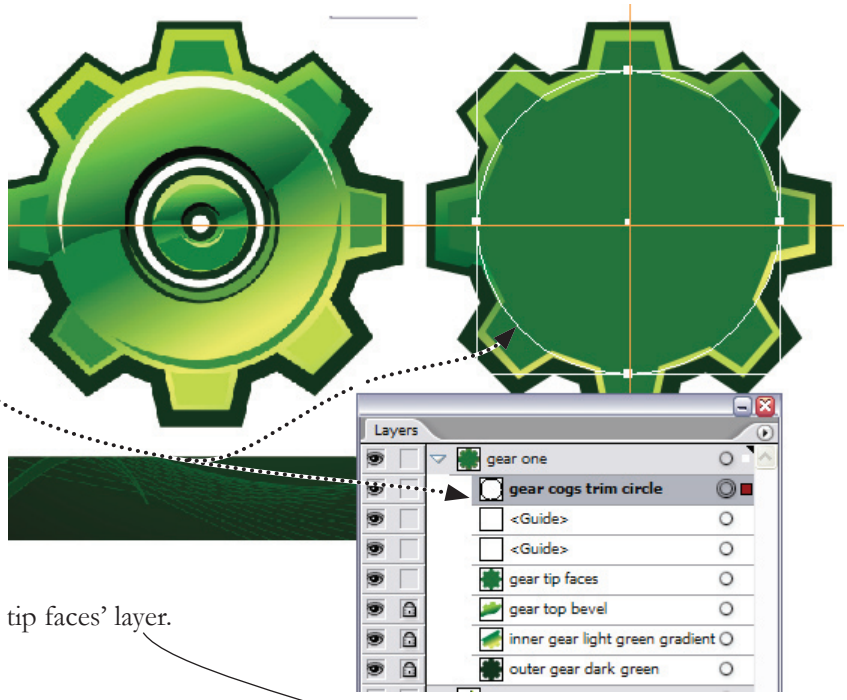


STEP FOUR: give the **gear tip faces** path a fill of medium dark green.

Using Pathfinder to punch out gear cog tips

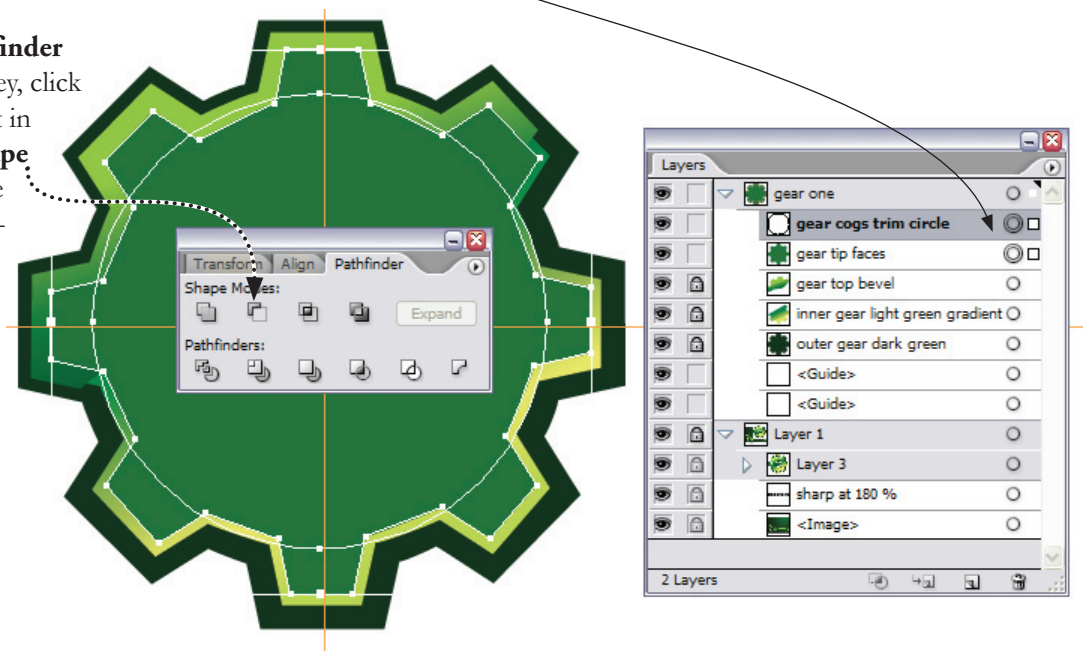
STEP ONE: Hold shift and drag out a circle (no fill or stroke) that **touches the inner curves** of the trimmed gear cogs on the provided screen capture. Remember to hold **space bar,** also, as you drag out the circle to help reposition it's center.

Once you get the circle right, drag it over and set it on your artwork as the top layer, I named it **gear cogs trim circle**



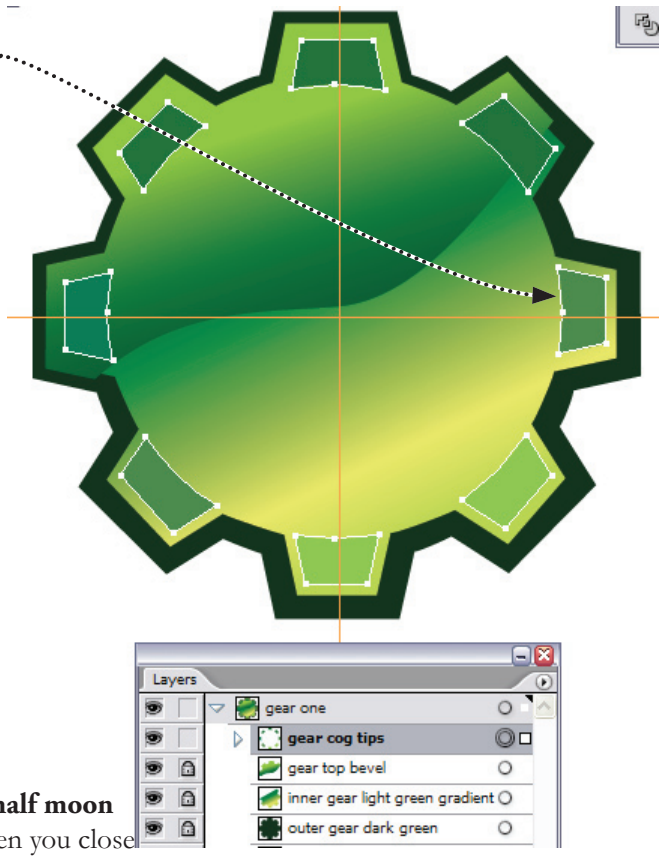
STEP TWO: Shift select both the circle and the 'gear tip faces' layer.

STEP THREE: Open your **pathfinder** palette. While holding the **alt** key, click the second button from the left in the top row: **subtract from shape area**. this will sacrifice the circle to the cut and create 8 individual gear cog tips.

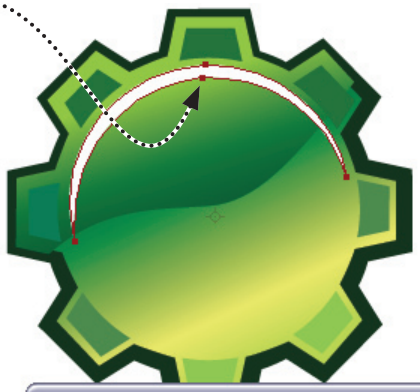


Coloring the gear cog tips

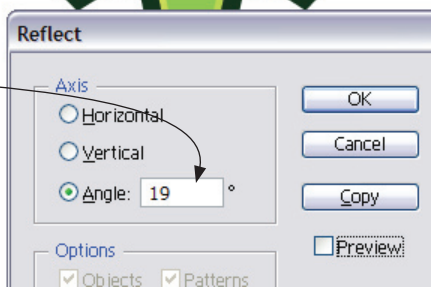
STEP ONE: Hand color the tips to match the gear tips on the screen shot by selecting them one at a time with the **white arrow**. Choose the **eyedropper** tool, hold **shift** and sample colors from the screen shot. You can also mix them by hand with the color palette if you are comfortable with the cmyk sliders.



STEP TWO: while working over the screenshot, trace out the **white half moon** highlight using just **two** points, one at each end, hold the **alt** key when you close the path to make sure there are two direction handles coming off both points. Get the path as close as possible with the the two points, then press the (+) key and add two more points at the top of the curve on either side of the arc, for a total of **4 points** on the path. Adjust handles for a perfect match, then drag it over to your artwork.

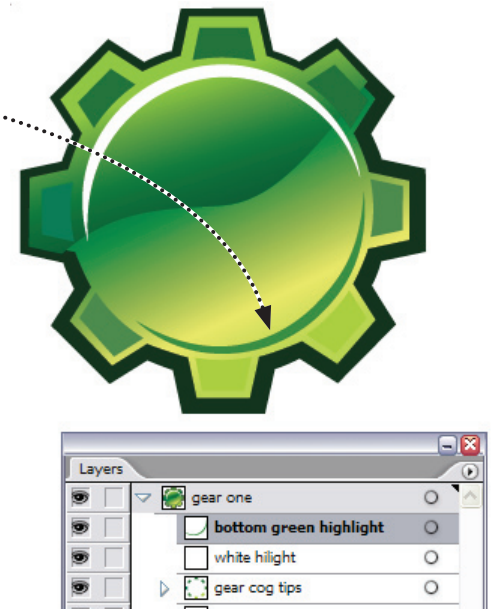


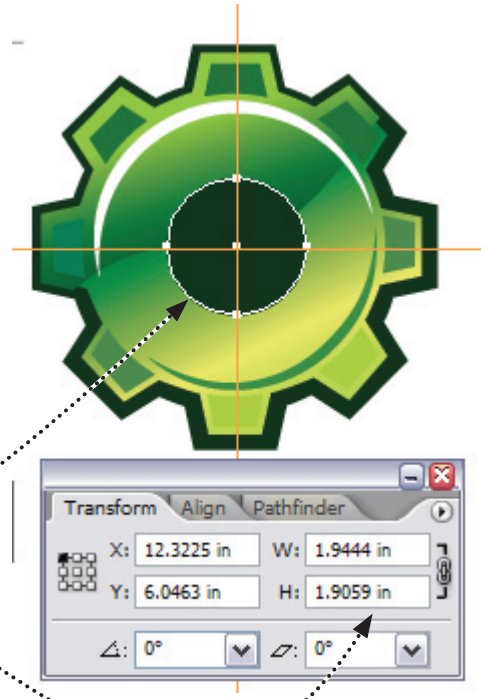
STEP THREE: Choose the reflect tool and **alt** click in the middle of the gear. Check the Preview box. Choose **Angle**, with a degree of **19** and click the **copy** button.



Highlight and shadow paths

STEP ONE: carefully adjust the curves of the bottom highlight shape, and color it green to match the screen shot



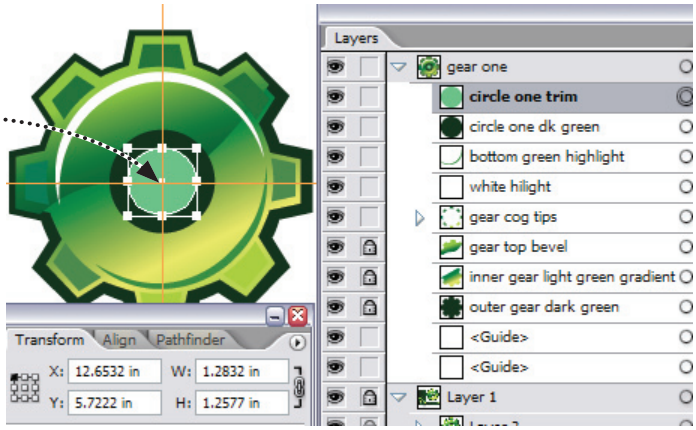


STEP TWO: drag out a dark green circle in the center of the artwork. Make it measure 1.944 in wide by 1.901 high, as shown.

Building the axle bolt with pathfinder

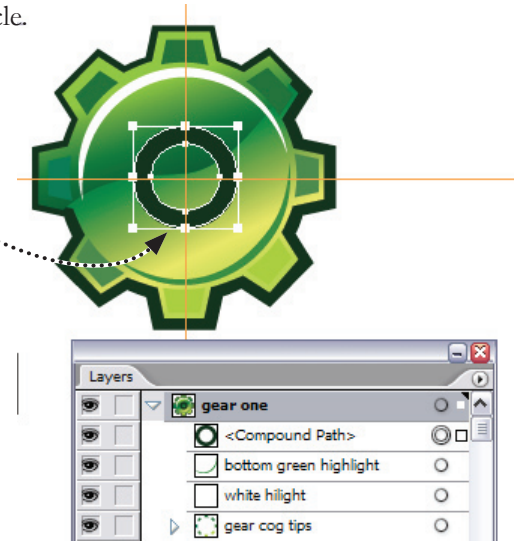
STEP ONE: Copy the circle, then press **ctrl+f** to paste it in front. NOTE: at this point, I've named the layers **circle one dk green**, and **circle one trim**.

STEP TWO: change the fill on the top circle a light green for contrast



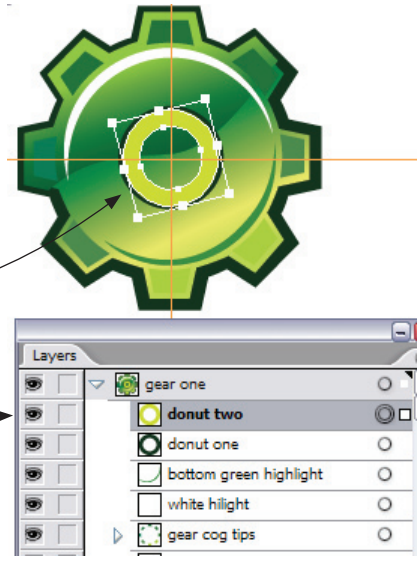
STEP THREE: select the circle with the black arrow. Grab it on the top left corner and start to shrink it while holding **shift**. Add the **alt** key and shrink it down to **1.283in** wide by **1.258in** high.

STEP FOUR: shift select both circles, then use the **subtract from shape area** button on the pathfinder palette to punch a hole in the dark green circle. This should make a compound path, somewhat like a donut



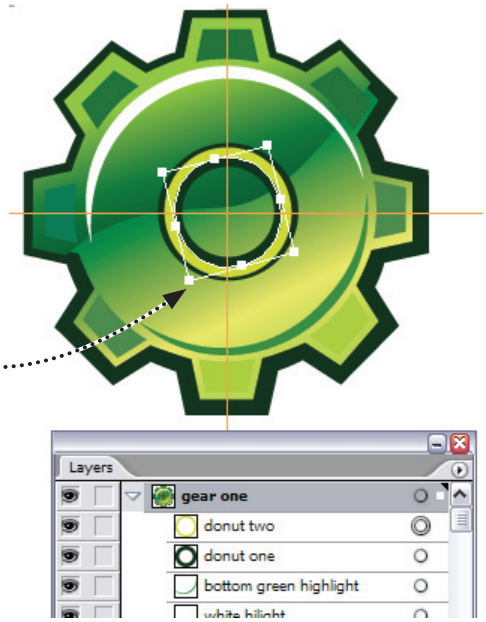
STEP FIVE: **copy** this donut shape, which I have named **donut one**, then paste it back in using **ctrl+f**

STEP SIX: Shrink it down, then rotate it slightly as shown to create a little imperfection.



Bolt details, rings and circles

STEP ONE: choose the **group selection tool** (white arrow with a plus) and click just the **inside** of the **donut two** path.



STEP TWO: Choose the black arrow and **enlarge just the inside** of the **donut two** ring carefully until it looks as shown. We are going to punch a donut with another donut...this is making me hungry.

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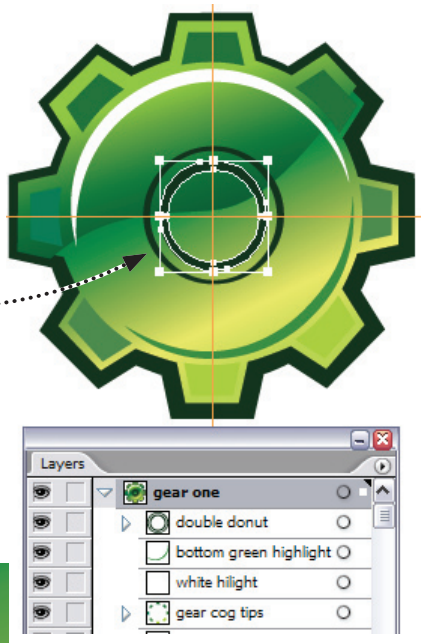
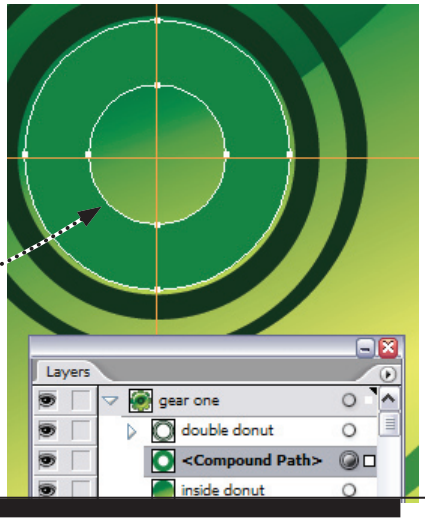


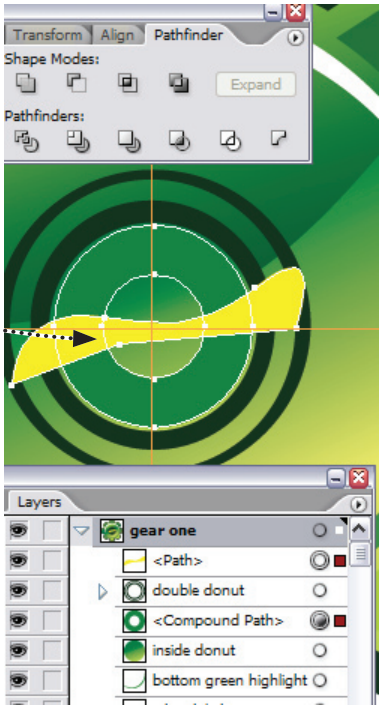
STEP THREE: Shift select both donut rings and use pathfinder (**hold alt**) to punch a hole with one donut through the other



STEP FOUR: drag out a medium green filled circle that is slightly larger than the inner donut rings edge. Drag it under the double donut layer. Use a shrunken duplicate of this circle to punch a hole in the original circle as shown.

Put the bevel in the bold head

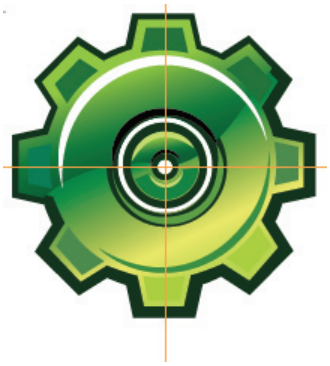
STEP ONE: draw out a 5 point shape similar to the one shown. Shift select both it and the latest donut shape together and use pathfinder to punch a hole in the donut, don't forget to hold the alt key while you punch.



STEP TWO: Add a gradient to the top 'half donut' shape that results from the latest pathfinder cut. Check the screenshot for proper colors and gradient angles.

STEP THREE: Examine the screenshot carefully and add the rest of the shapes using techniques used earlier in this lesson.

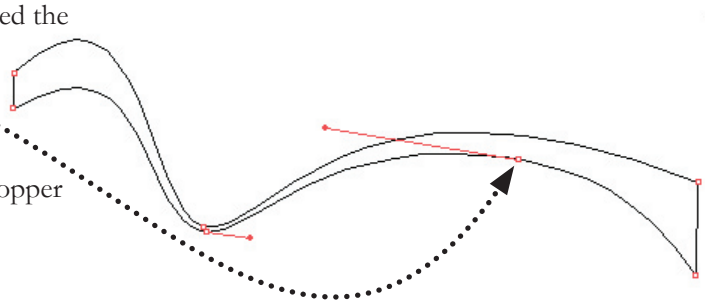
NOTE: If you'd like to have the gear "see through" at the white ring and the white innermost circle, you will have to spend 20 minutes tinkering with the pathfinder and some rings and circles. It's a minor eye candy effect and probably not worth the effort. I spent the time and found myself making duplicates of the white ring and the white circle and hunting through the layers palette for all the paths that need to be punched before the gear becomes "see through" at the white ring and innermost white circle. These 'see through' areas only come into play when you begin putting the gear shapes over the background.



Building the background

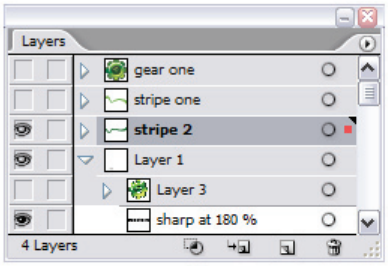
STEP FOUR: the first swoosh shape in the full page background, lets call it **stripe one**, can be drawn with three points on the top curve and four points on the bottom curve, for a total of **seven** points. The fewer points you use, the smoother it becomes. Smoother is better as it is more attactive, easier on your processor and fewer direction handles to manipulate. I drew it first with 6 points, and then added the seventh point after I found I couldn't get the curve I wanted without it.

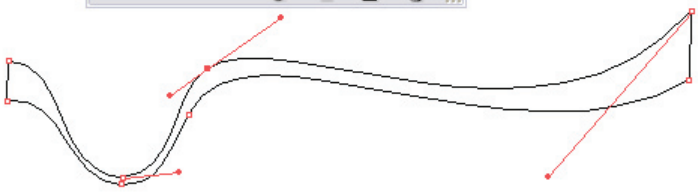
STEP FIVE: I used a 2 point stroke thickness, and sampled the stroke and fill colors from the screenshot by choosing the eyedropper tool and holding shift.



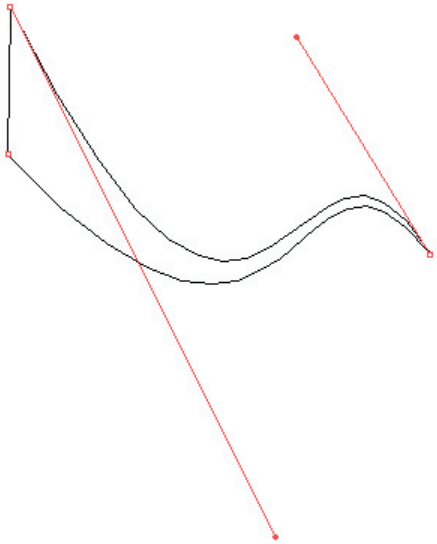
Background stripes and ribbons

STEP ONE: for **Stripe two**, I used the same technique, but because it is a more complex path, I used 8 points, which seems to be the bare minimum for that curve. I created **new master layers** for both curves, drew them, and then dragged them into their respective master layers..





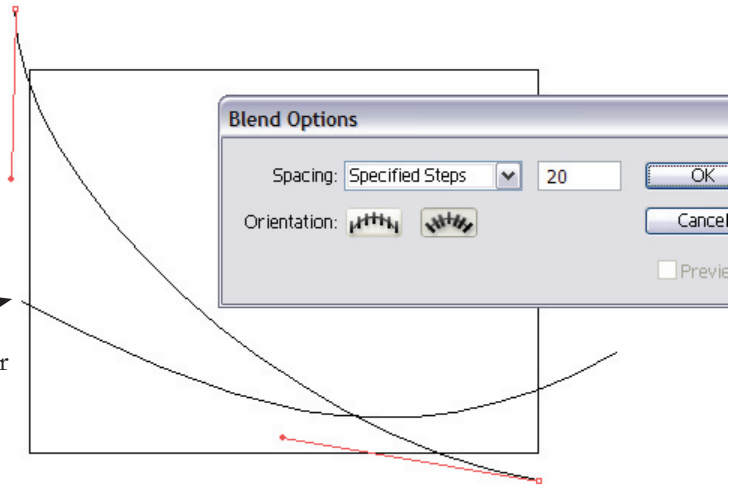
STEP TWO: **stripe three** can be done with just **three points,** though getting the handles just right will be a good test of your pen technique.



Next up is to draw that feathery pattern of 22 lines that creates such a cool background pattern behind the stripes.

STEP THREE: Desect everything (**ctrl+shift+a**). Set your stroke thickness to **0.5**, fill to **none**, and draw a path with just two points that goes from the top left corner of the larger screenshot to the bottom right corner. Sample the stroke color from the screenshot (the feathery lines in the background).

STEP FOUR: Draw another two point path that goes along the bottom of the screenshot as shown. I intentionally made the paths extend out beyond the screenshot. We will trim them later with a clipping path.

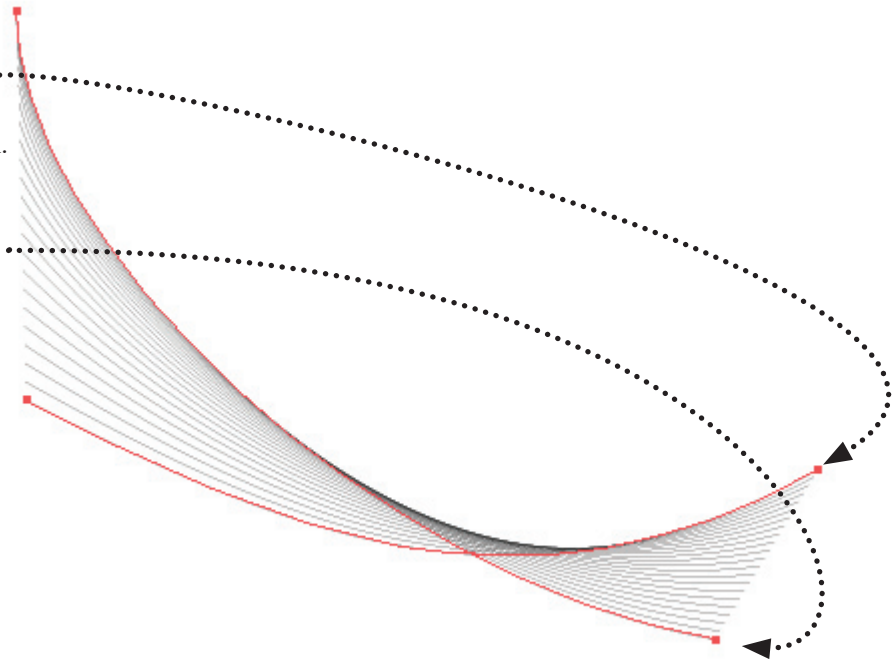


STEP FIVE: **Deselect** and double click the **blend** tool. Set it for **specified steps: 20** and 'align to path'.

twenty two line blend

STEP ONE: Position the blend tool over the end point on the right hand side of one of the paths. Wait for the **blend tool cursor to turn black**, this indicates it is over the point at the end of the path. Click and release on the point.

STEP TWO: Move your cursor over the right hand end point of the other path. When you see the **cursor turn black**, click. This should do a perfect blend and create the pattern of 22 lines. If you need to edit the blend, everything is live. You can move the points, yank on the handles and change stroke thicknesses or color as needed.

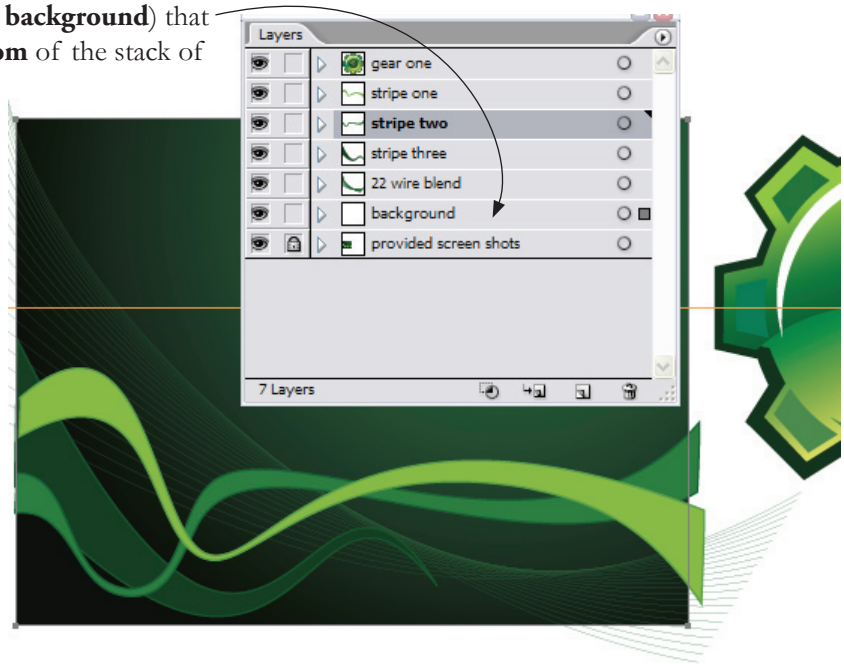


STEP THREE: drag out a green filled box, no stroke, the size of the larger screenshot. Fill it with a radial gradient, medium green to black. You can use the **radial background** swatch in swatches palette.

Adjust the gradient across the rectangle by dragging from the upper right down to the lower left corner. The hotspot of green should be in the upper right.

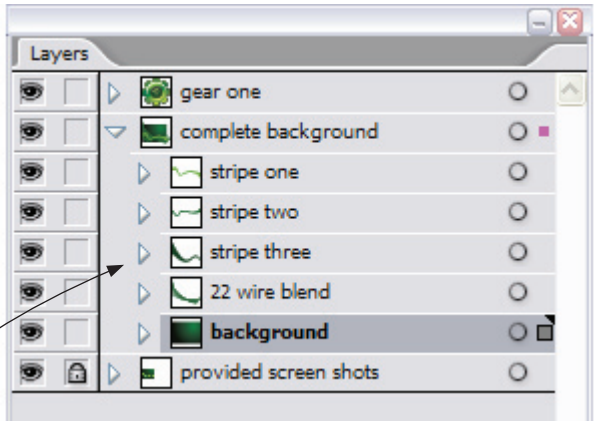
Drag this path down into a new master layer (named **background**) that you'll need to create on the layers palette at the **bottom** of the stack of existing layers.

NOTE: I've organized my layers palette so that all the major elements are on their own master layers.



Setting up to clip the background

STEP ONE: make a **new master layer** called **complete background** and position it below the 'gear one' layer.



NOTE: We need to drag all the background elements (stripes, blends and background) into this **complete background** master layer so that we can crop them with a clipping mask. The tricky part is that they need to stay in the same stacking order after they have been dragged into the new **complete background** master layer.

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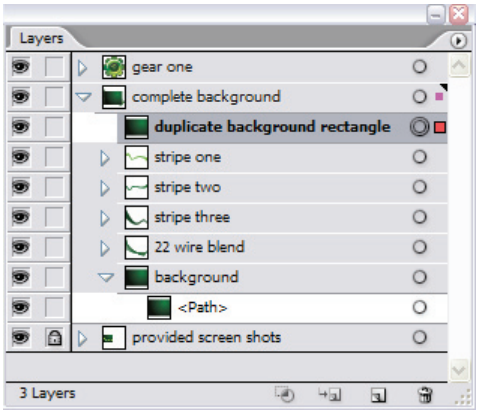
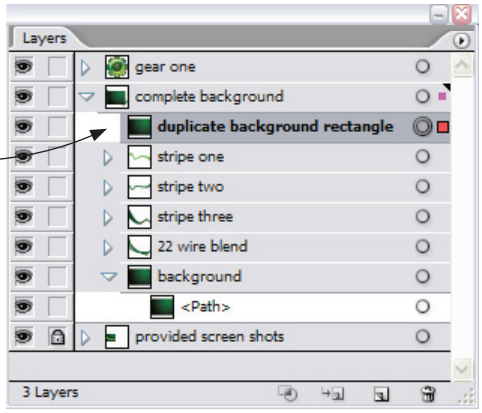
STEP TWO: To make them keep their stacking order, start with the bottom **background** layer first, and work your way up, dragging each layer into the **complete background** master layer. Release them right over the triangle to the left of the **"c"** in **complete background**.

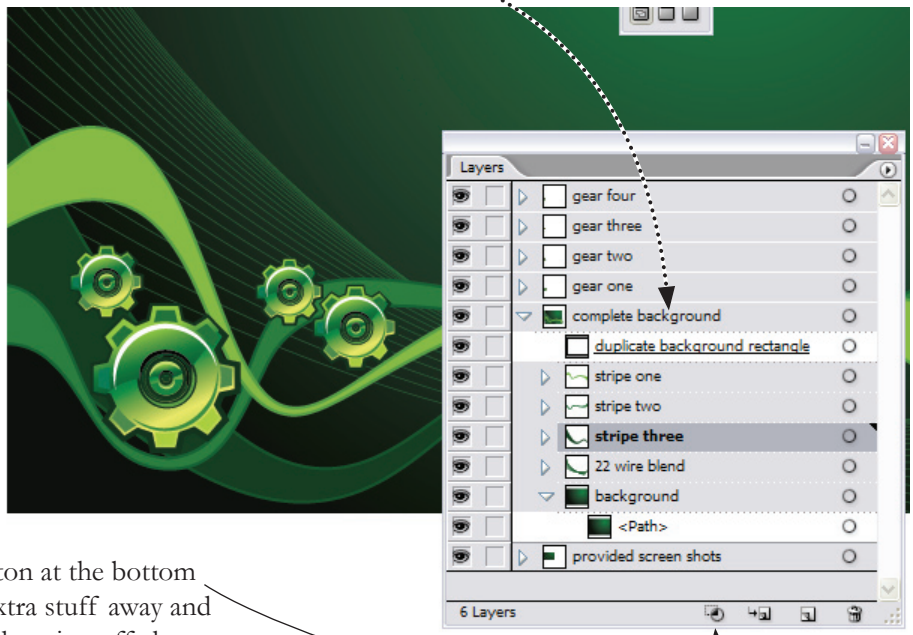


STEP THREE: Copy the **background rectangle**, then 'paste in front' (**ctrl+f**) . Drag this new rectangle to the **top** of the stack of layers within the '**complete background**' master layers.



Final tricks

STEP ONE: click the '**complete background**' master layer to select it



STEP TWO: press the **make clipping path** button at the bottom of the layers palette. This should trim all the extra stuff away and give you a clean background box with nothing hanging off the sides.

STEP THREE: To make the four gears, I selected the '**gear one**' layer, went to the layers palette fly-out menu and chose **duplicate 'gear one' layer**, renamed it as **gear two** and dragged it into place, resizing as needed.

If you wanted to get tricky, you could rotate some of the gears, though this would require recoloring the gear cog tips layers to keep the light direction correct. Another good idea would be to recolor everything in the illustration, maybe choosing a blue or gold theme. Have fun, let your imagination run wild...

what is here

STEP ONE: zz

STEP TWO: zz

STEP THREE: zz

STEP FOUR: zz

STEP FIVE: zz

STEP SIX: zz.

STEP SEVEN: zz.

STEP EIGHT: zz

STEP NINE: zz

STEP TEN: zz

STEP ELEVEN: zz

what is here

STEP ONE: zz

STEP TWO: zz

STEP THREE: zz

STEP FOUR: zz

STEP FIVE: zz

STEP SIX: zz.

STEP SEVEN: zz.

STEP EIGHT: zz

STEP NINE: zz

STEP TEN: zz

STEP ELEVEN: zz

what is here

STEP ONE: zz

STEP TWO: zz

STEP THREE: zz

STEP FOUR: zz

STEP FIVE: zz

STEP SIX: zz.

STEP SEVEN: zz.

STEP EIGHT: zz

STEP NINE: zz

STEP TEN: zz

STEP ELEVEN: zz

what is here

STEP ONE: zz

STEP TWO: zz

STEP THREE: zz

STEP FOUR: zz

STEP FIVE: zz

STEP SIX: zz.

STEP SEVEN: zz.

STEP EIGHT: zz

STEP NINE: zz

STEP TEN: zz

STEP ELEVEN: zz