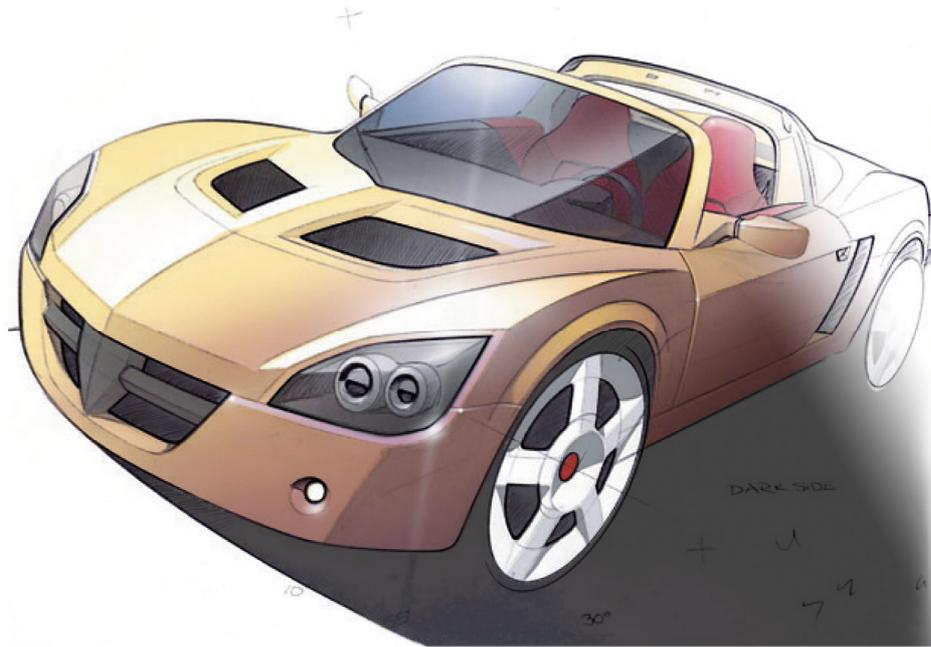


Car design Tutorials



**Tutorial: Rendering with Marker and Airmarker
by Wayne Westerman**

**Tutorial: Full-size side view rendering in Photoshop
by Harald Belker**

**Tutorial: Rendering in Photoshop
by Cor Steenstra**

**Tutorial: Quick Sketch Technique
by Allan Macdonald**

**Rendering Tutorial - Photoshop Alloy Wheel
by Allan Macdonald**

**Quick Sketch Tutorial
by John Frye**

**Rendering Tutorial - Vauxhall VX220
by Allan Macdonald**

Tutorial: Rendering with Marker and Airmarker by Wayne Westerman Introduction



As a designer in the auto industry the majority of my time is spent creating and communicating innovative design ideas for the vehicles you might be driving in 3 to 5 years time. The spectrum of ideas ranges from the sculptural development of completely new exterior form languages through to technical solutions for cup holders.

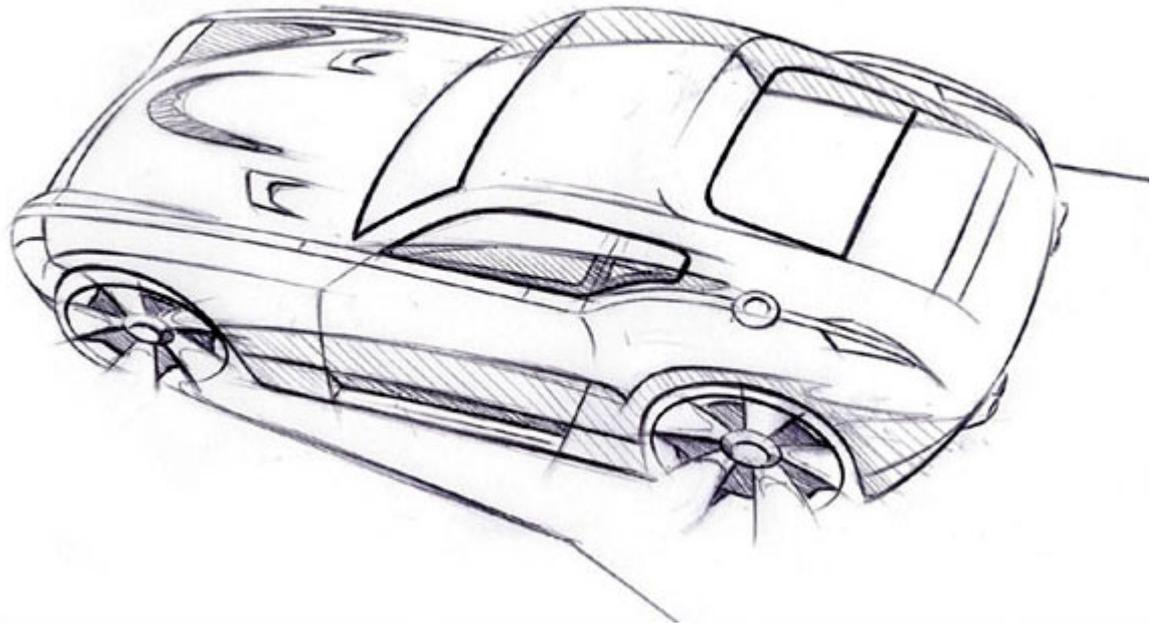


Unlike engineering there are no set formula to solve any of these design conundrums; it simply comes down to creativity and problem solving. Most designers have their own sources of inspiration (architecture, computer games and nature to name a few) and will draw upon them to generate new design solutions, often ranging from the sublime to the ridiculous. Having settled on the most appropriate solution it is the designer's job to present the idea to management using simple sketches, colour renderings and digitally modified pictures.

The following step by step guide explains the basic marker technique I use to illustrate exterior design ideas, 'colour-by-numbers' for grown-ups really!

Rendering with Marker and Airmarker

1: The Underlay

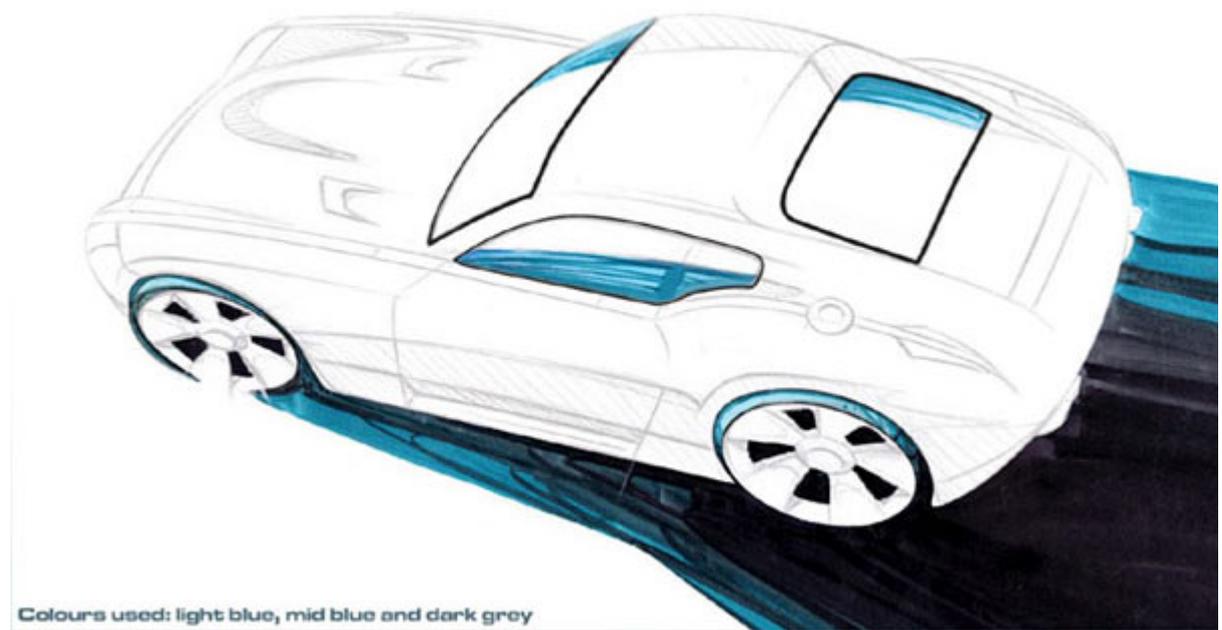


The line work can be either pencil or pen but should be dark enough to show through a piece of marker paper or vellum when placed underneath. The view chosen should clearly show the main design theme, in this instance the chrome strip running along the shoulder of the car.

Lighting and colours

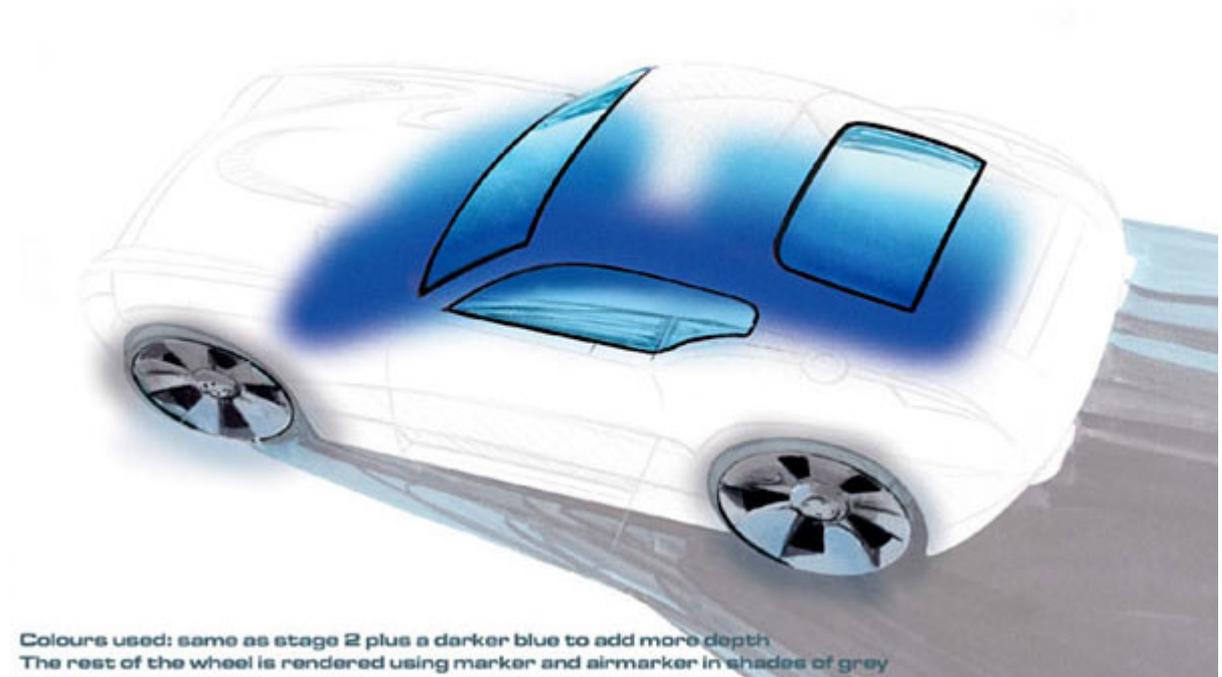
Before starting the rendering try to visualise the finished sketch and decide upon the position of the light source. This will determine which surfaces are in shadow and where the highlights will fall.

2: Marker



Colours used: light blue, mid blue and dark grey

Secure the underlay in position and lightly trace the line work for the wheels and glass areas (DLO: daylight opening). Use either biro or pencil, but choose wisely, some brands of marker will pull the colour of the pencil and make biro lines bleed. So practice on a scrap of paper to ensure your mediums are compatible. Always apply the lightest colour first adding darker shades to create more depth (note: 2 or 3 shades of one colour can be achieved simply by going over the area with the same marker). For reflective surfaces such as glass allow the marker to dry before applying additional layers of colour. This will create more contrast, a characteristic of highly reflective materials. For non-reflective areas such as tyres it is better to keep the colour edge wet while applying darker shades creating a much softer tonal transition.

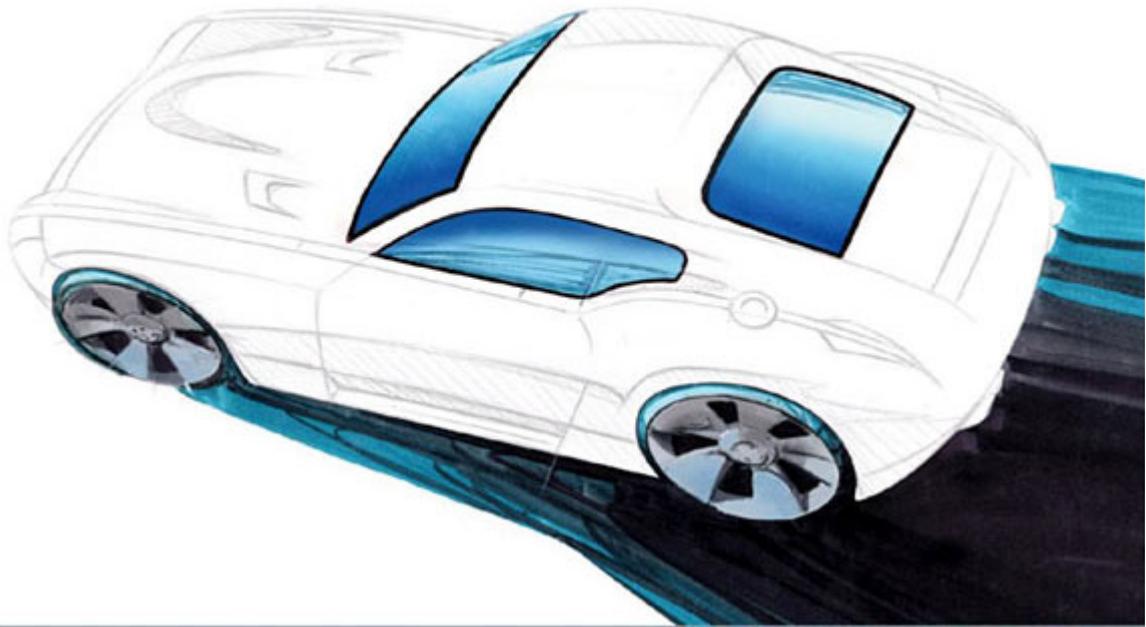


Colours used: same as stage 2 plus a darker blue to add more depth
The rest of the wheel is rendered using marker and airmarker in shades of grey

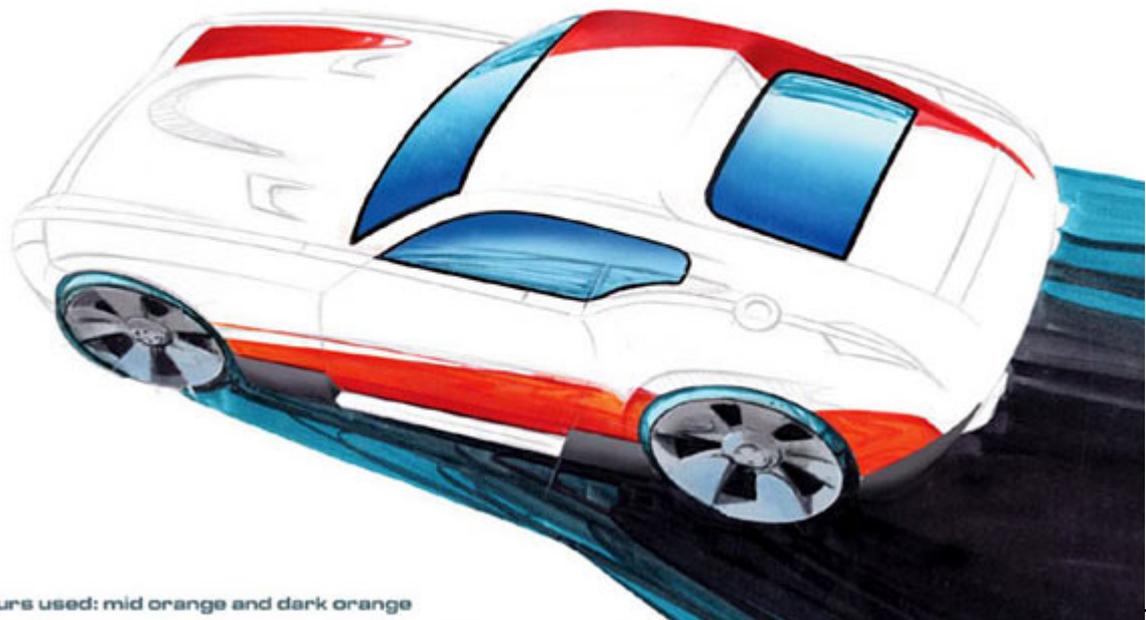
3: Graduated tones - Airmarker/pastel

Air marker is a cheap, quick alternative to an airbrush. Colour is applied by spraying air

across the tip of the marker, creating a targeted mist of ink. Shaved pastels give a similar effect. However, air marker is quicker, creates more intense colour and eliminates the hassle of trying to colour match pastel to the marker as the same marker can be used to apply both flat colour, as well as the graduated tones of the air marker. Place low-tack masking film over the entire drawing and with a scalpel carefully cut around the DLO and wheels. Although different colours will be applied to the two areas the distance between them is sufficient for them to be rendered simultaneously without any overspray from one area affecting the other.



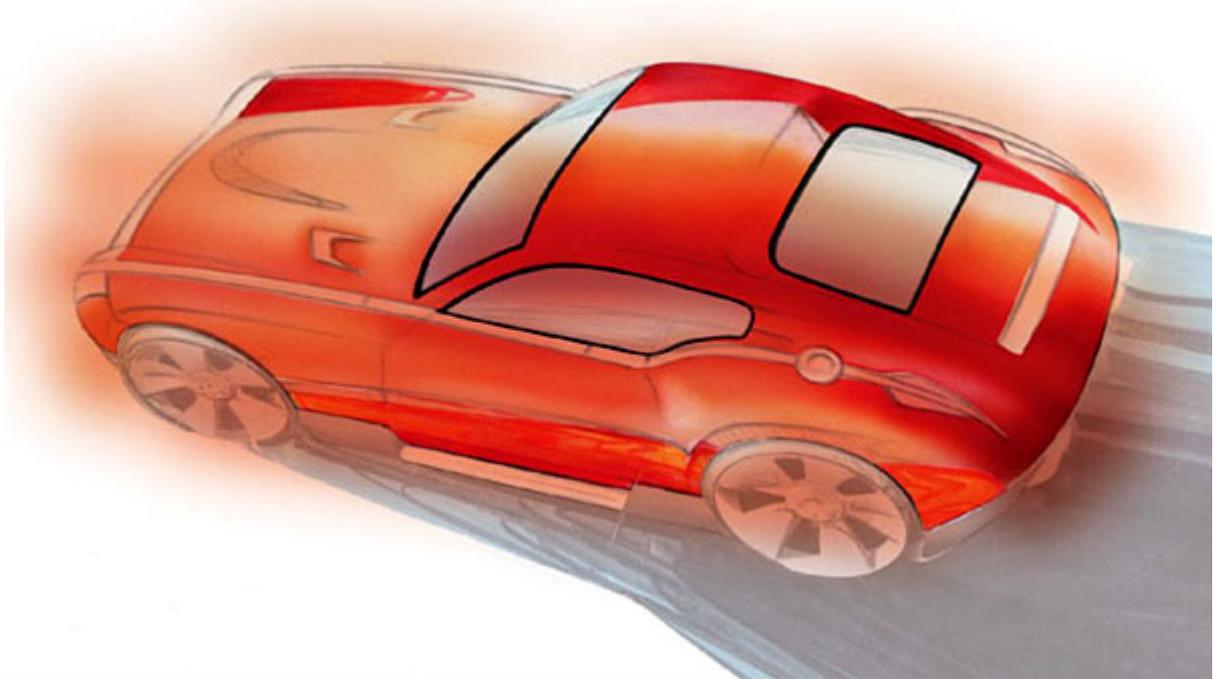
4:
Here all of the masking film has been removed and the drawing can be assessed more clearly. If the graduated tone is not dark enough, re-position the mask and add more colour. Alternatively progress to the next step.



Colours used: mid orange and dark orange

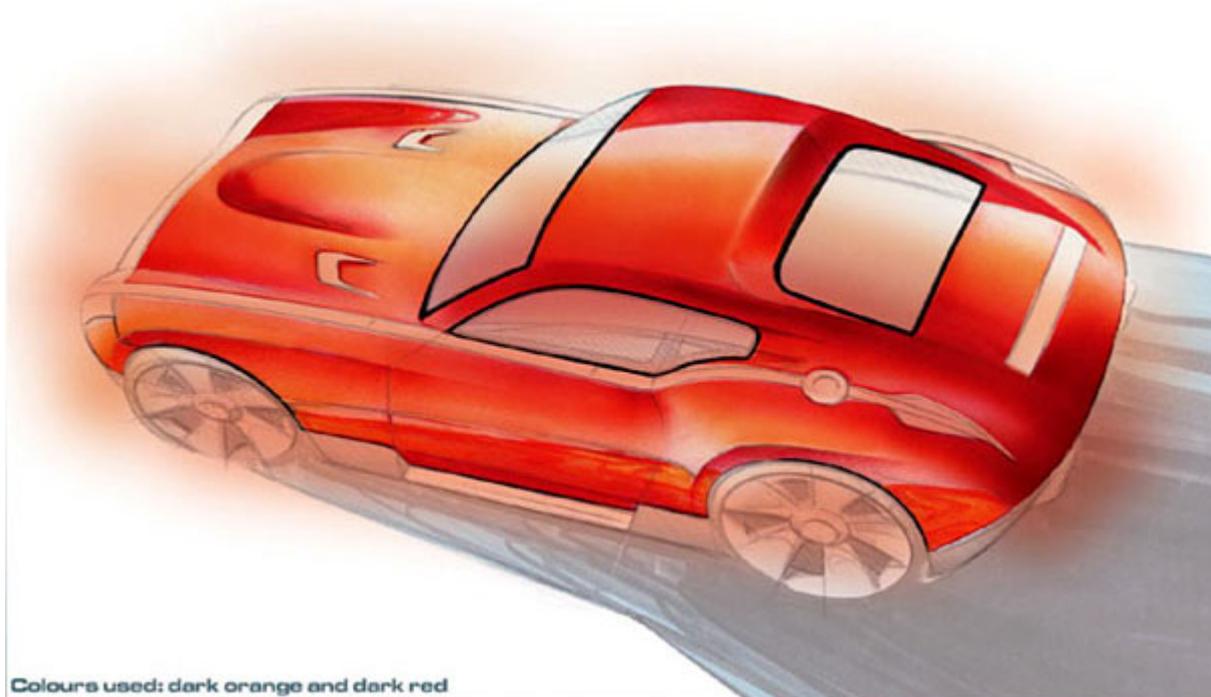
5: Body colour - marker

The technique is identical to that used in stage 2. Remember, always lay down the lightest colour first and because the bodywork is glossy let the marker dry before adding darker tones to create more contrast. This will give the impression of reflections in the paintwork. To achieve a crisp edge it is better to apply the marker in quick strokes – too slow and you will get a wobbly line. Practice first holding the marker just above the paper; only applying the colour when you feel confident your hand is following the line on the underlay. Your confidence will grow with practice. Don't worry if the marker bleeds or the line is wobbly – use a similar colour pencil and a flexi-curve to tidy it up.



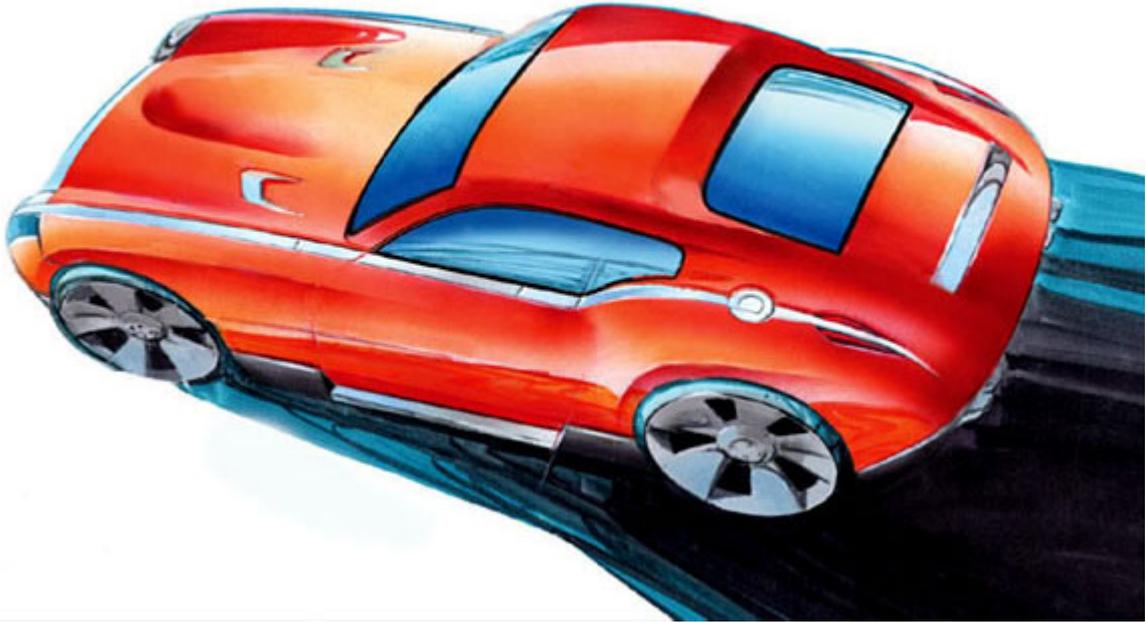
6: Body colour airmarker (stage 1)

Similar to stage 3, place low-tack masking film over the entire sketch. This time using the scalpel to cut and remove the film covering the bodywork. The same markers from the previous stage are used with the air marker to apply smooth graduated tones.



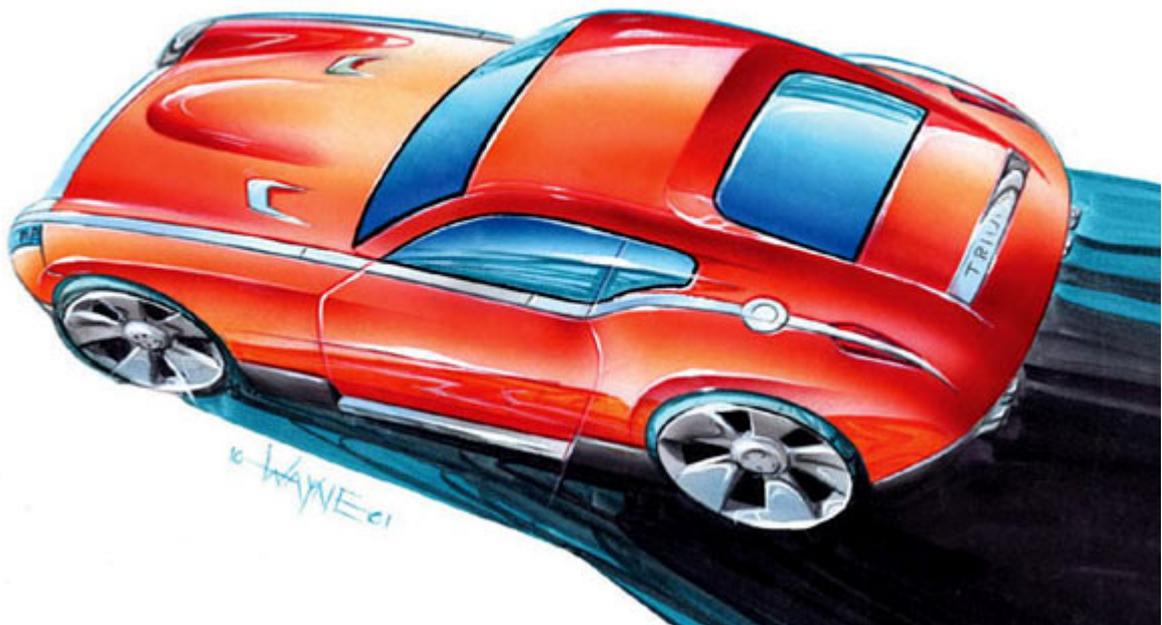
7: Body colour airmarker (stage 2)

Because the bodywork has more complex surfaces than the DLO it may be necessary to cut additional masks to define features such as the wheel arches, power-bulge on the bonnet and depression around the tailgate. With the masking film still in place, cut loose masks from paper and hold in position with your free hand. Working in this manner allows you to quickly lift and replace the paper masks to check your progress.



8: Details and shutlines

Most of the hard work is done at this stage, but care is still needed, as you don't want to make mistakes and ruin all your hard work. The chrome strips running the length of the car and chrome air outlets on the bonnet could be masked and rendered using air marker; this would be quite time consuming and require too much effort for such a small area. The quickest way and just as effective for small details is soft colour pencil – here pale blue was used to simulate reflected sky and dark grey to define the edges



9: Highlights

Highlights really bring sketches to life. But, before you go crazy with the paintbrush and white gouache think about the direction the light is coming from and try to be consistent with the shadows. However this is a sketch so there is some artistic licence. Choose where to place some major accents – dont highlight every edge on the car.

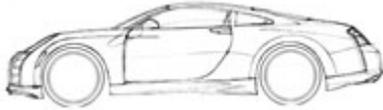
The final sketch

There are many ways to render cars and this is just one of the techniques used in the industry. A similar process can be used with computer packages such as PhotoShop and Corel Painter; the finished results will be slightly different but both techniques will sell the idea. In some instances it is better to present many quick pen sketches as used for the underlay to share your ideas before spending several hours on a full colour rendering. Rendering is after all just an advanced technique of colour by numbers, which most people can learn. The real skill is being able to sketch your ideas in the first place and this just comes down to practise!

Wayne Westerman is a designer in the Advanced Design department of General Motors Europe. He previously worked for Hasbro Europe and is a graduate of Coventry University.

Tutorial: Full-size side view rendering in Photoshop by Harald Belker

Introduction



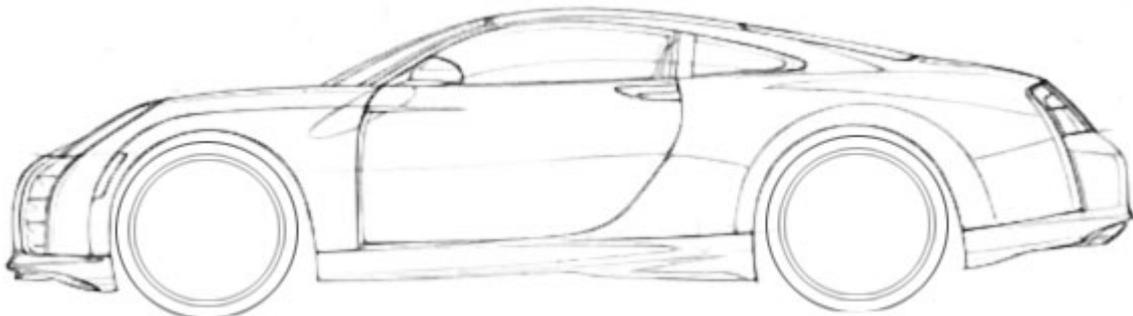
A fully rendered side view of a design is still key for showing off your design and perhaps having it selected to become the project winner and turned into a full size model.



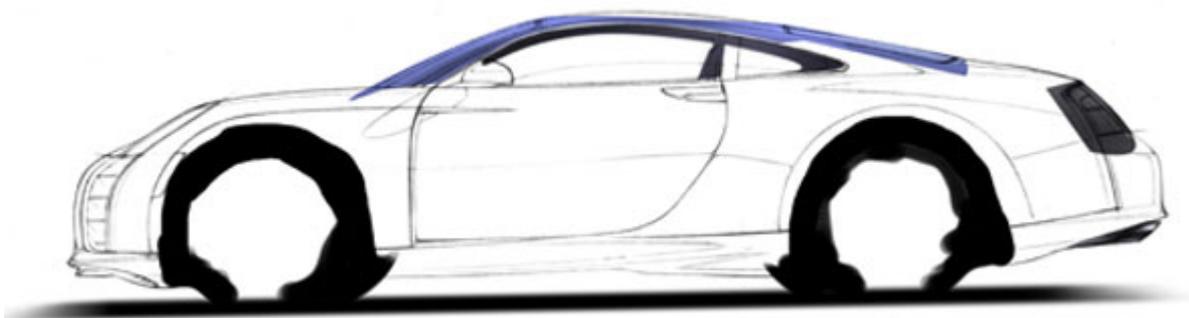
With today's large-size printers, no one should have to go through the pain of producing a full-size, tape rendering, with all the masking and paint spraying. A scanned line drawing of your design is all you need to render your car in Photoshop, and make it look like the real thing. Print it large, hang it up on the wall, and blow away the competition...



Full-size side view rendering in Photoshop

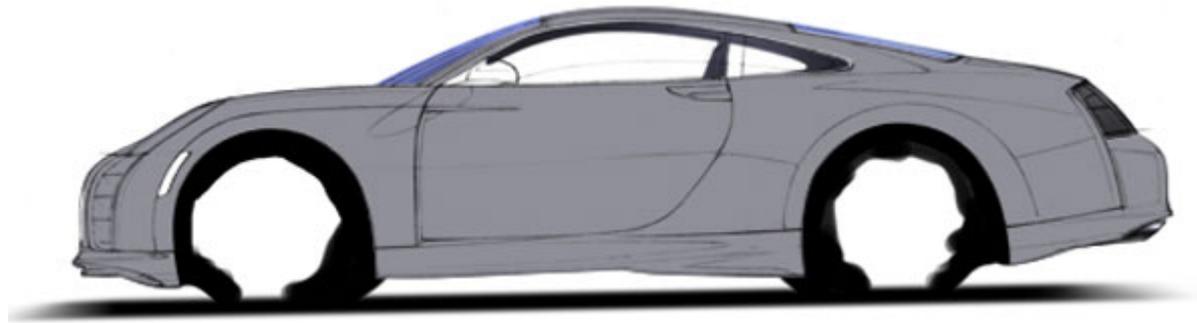


Since the whole image is digital, the resolution can be bumped up later. Your file doesn't have to be much bigger than 100 MB. This will allow you to work at a decent speed on your computer. Put the line drawing onto its own layer and change the layer Blending mode to 'Multiply'. With that you can place the line drawing on top in your layer selection and all your color will go below it on separate layers and not interfere with the line work, while still allowing you to see the original line drawing.



The way layers work, you can paint with broad strokes on elements in the lower layers because the layer above will hide the paint below. That's how I structure my work. Here, I start with the shadow and the tires in black. The shadow is blurred and only the outside of the tires are nice and clean. You can see that I also added some

blue to the glass and hinted at some grey paint for the interior and tail section of the car.



Using the path tool (something you just have to learn because you want the control), I basically cut out the whole body of my design. Silver is always a good color to render because it is neutral and reduces hard reflections that could take away from the design. I picked a medium grey with just a blue hue in it. This layer is on top of the one with the tire and glass color. It is very important to organize your layers. It will make your life easier, especially if you need to do some changes later on.



Now you are ready to sculpt your design. Study pictures or photographs to see how different colors with or without metallic paint reflect the environment. Have a plan of how you want to portray the body and the changes of surfaces on your design. Photoshop is a wonderful tool to allow you to add shadow and highlights to your design. Click on the dodge tool to highlight and use the burn tool to darken your image. You are working with the existing pixels and don't have to worry about masking etc. You can see how I have highlighted the shoulder of the car and put a dark core at the center of the car picking up some light from the ground again. You want to use large, soft brushes and take the time to get it right.



Time to build in some reflections and details. I started with the side glass and pillars, and added a light reflection. You can also see how I played with warm and cool tones. A cool blue hint on top reflects the sky, and a warm beige picks up some ground color. Taillight and signal lights, mirror, tire highlights are all features that will have to be done

right in order to add realism to the design.



If you have the time to design your own wheels, render them separately and import them into your side view. Here, I just borrowed the design from an existing car and tweaked them a bit. Naturally they are a little bit bigger than a production version, but we have seen how big tires are emulating what designers have been doing for many years. You can buy 26 inch wheels these days, wow.

Anyway, showing very little rubber just always looks good. At last it is time to add some highlights. Don't go overboard with it, it can look like pigeon shit very quickly. That's actually an official term. Little white brush strokes should give the car a bit of sparkle. That's all and you are done. Carefully erase some of the line work in areas where it was used to help outline. These don't really exist on a car. Door cuts and grooves should stay.



If you want to put the car in front of a background as I have shown here, you can play with the side glass and make it see-through which gives the car more depth. Place your signature somewhere visible but don't let it interfere with the work.

I hope these steps have helped, and if you are interested in learning more about rendering cars, follow the links listed here and see if there is something that will help you develop your skills as an automotive designer. Good luck.

Harald Belker

(Harald Belker is a graduate of Art Center College of Design. He worked as a designer for Porsche in Germany, and Mercedes-Benz Advanced Design, California, later moving into design for the entertainment industry, designing vehicles and props for movies including Minority Report, Armageddon, Inspector Gadget, Batman & Robin, and SpiderMan. www.haraldbelker.com)

Tutorial: Rendering in Photoshop by Cor Steenstra

Introduction



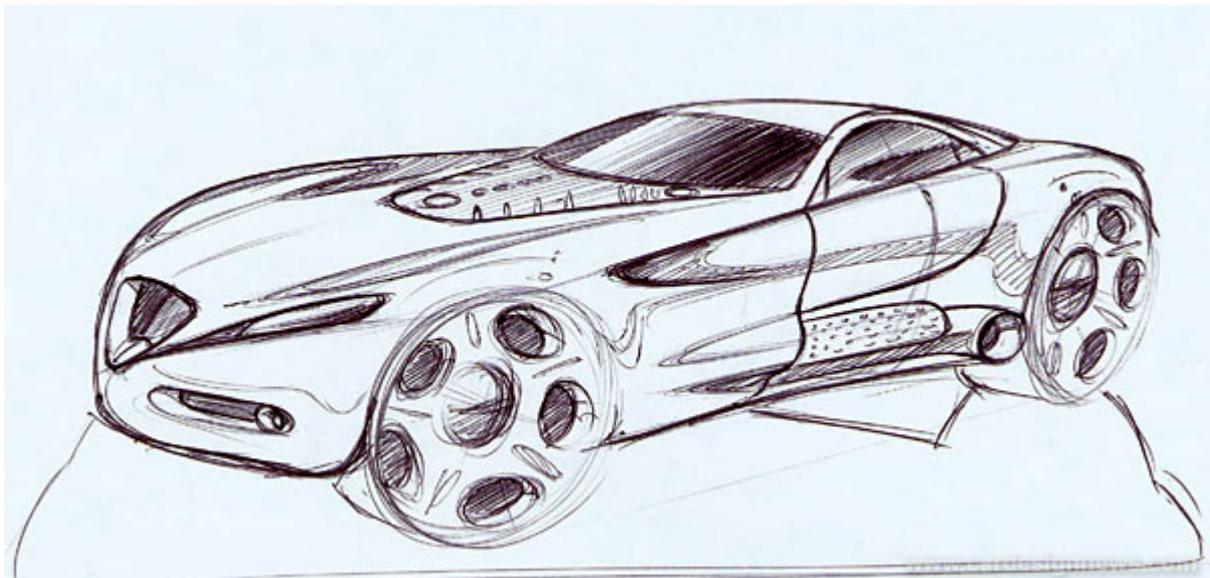
During sketch development I find that I understand what I would like to 'sculpture' in my design from the section lines I draw as a base, as well as from 'leaving out' areas. However, if you want this to come across to the people making the decisions, you need something that stands out and jumps off the wall in a presentation.



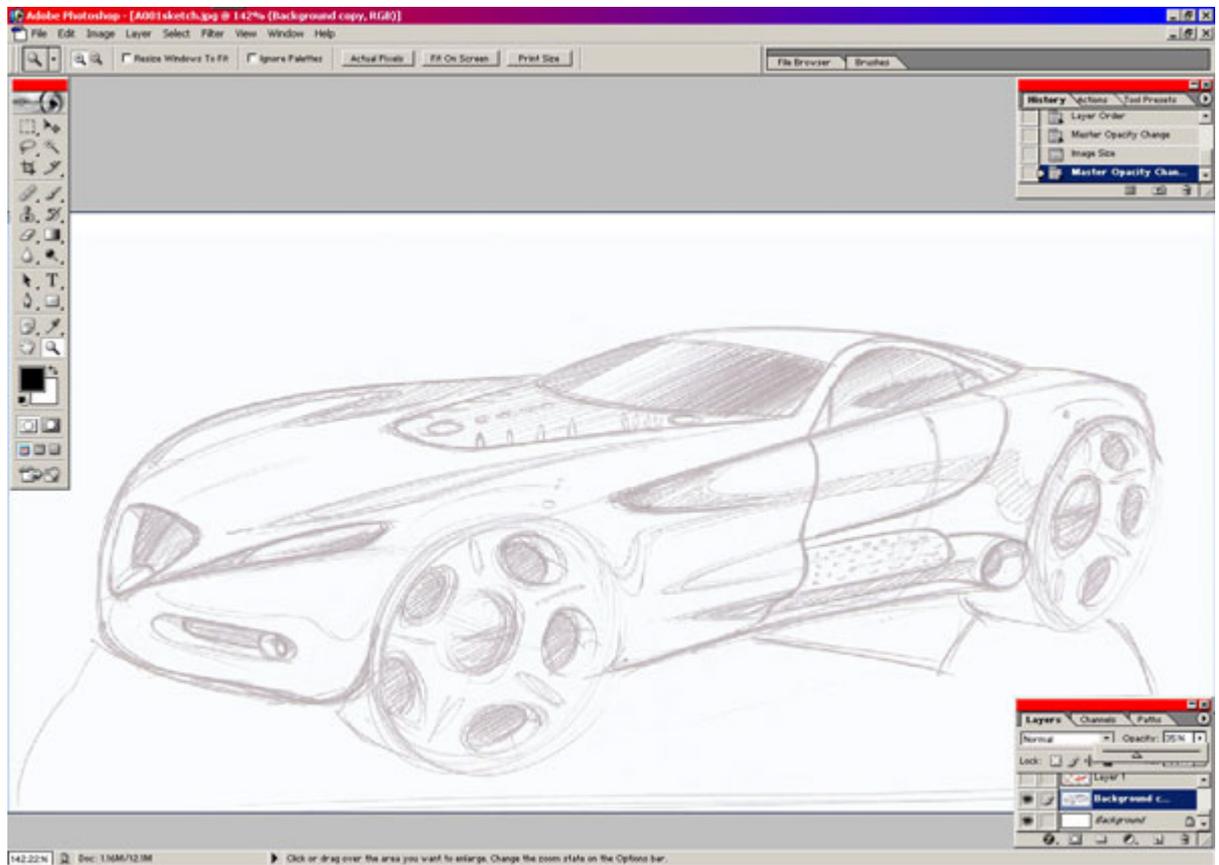
Traditionally I would create presentation sketches by using the base sketch as an underlay, over which I would then draw the clean lines, and would put some marker and pastel on it to express the 3D form. However, if you did this quickly, it would look too sketchy, and if you did it properly it would actually become an elaborate rendering and be quite time consuming. Another risk would be that in 'cleaning up' the linework, some of the character of the original concept sketch would be lost.

Without trying to take any importance away from traditional art methodologies, these days it is possible to use the original sketch to make quick and eye-catching artwork that not only represents the original raw design ideas to the max, but also does the job of jumping off the wall during a presentation. A good sell.

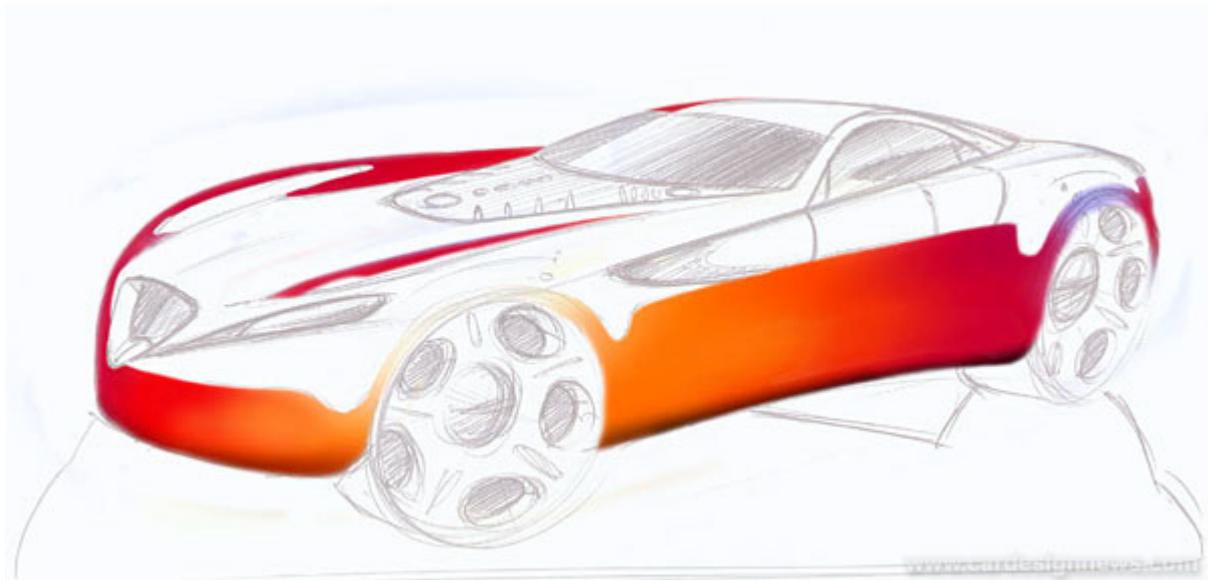
The following pages show a step-by-step process for quickly creating a presentation rendering...



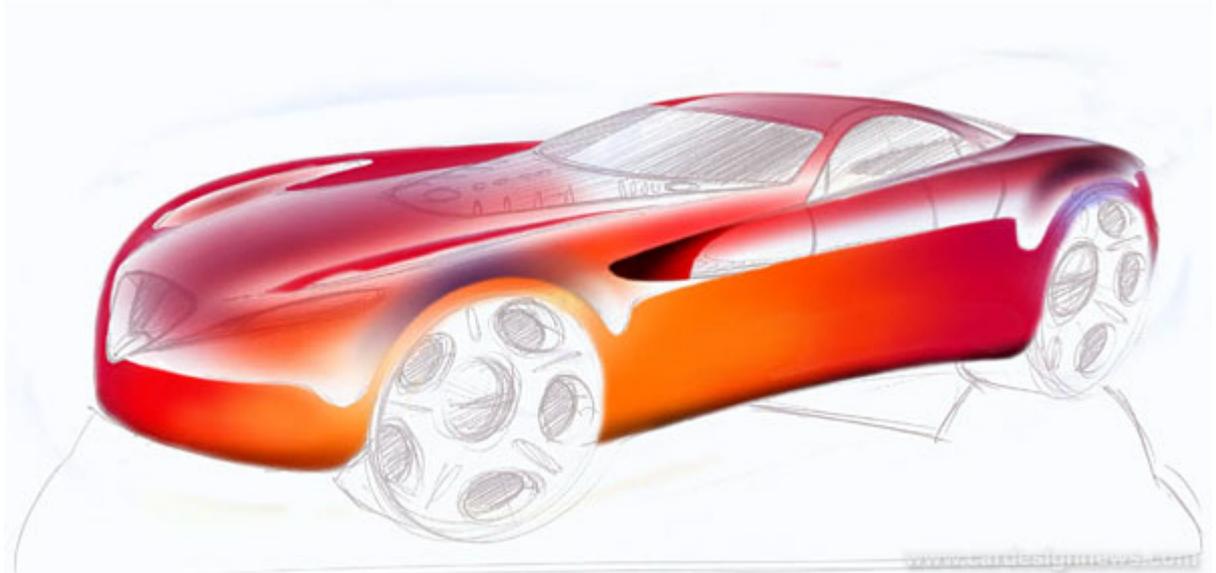
Start by scanning in a sketch that you want to use. The scanner should generally be set to give an image size in pixels of 1024x768 to 1600x1200 (or larger) depending on your working screen size, and planned print size.



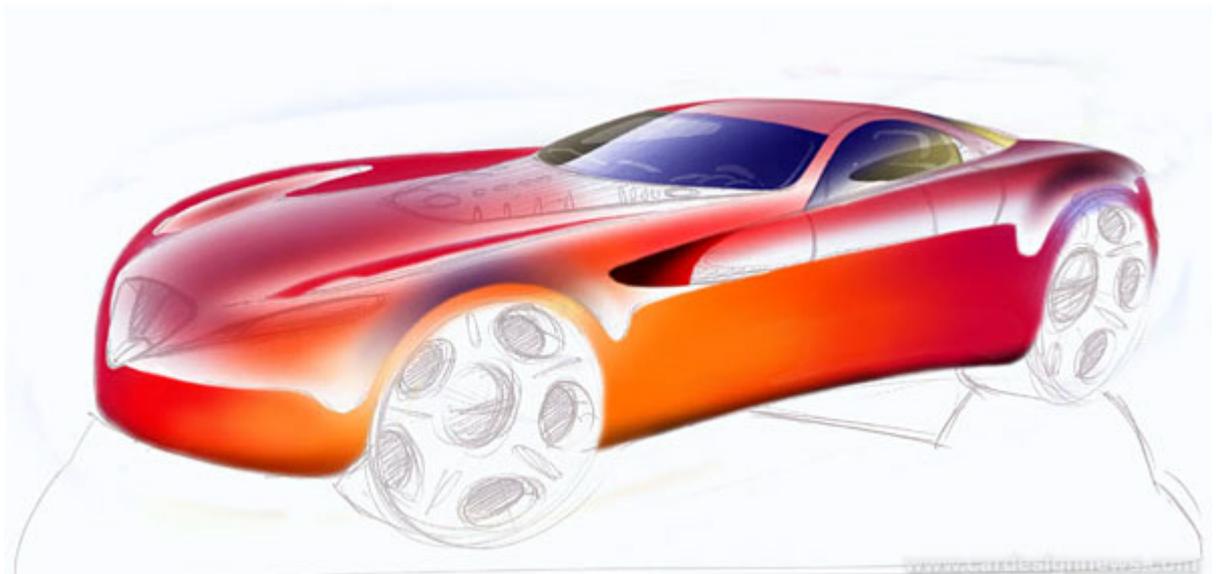
It doesn't matter if the car was sketched on excellent marker paper or on a napkin at 'In-n-Out Burger'. It only needs to be just the thing you like and you want to present. Import the scan into Photoshop, duplicate the layer, clear the background layer, and set the transparency of the copied layer to 35%. This way you can see the sketch, still have a white background, and make the underlay sketch invisible once you're finished.



Block in the basic colors with 200-300 size airbrushes. In this case the car was going to be red, and I like using the warm and cold sides of the real world in my sketches to enhance the sculpture. Apply broad strokes of airbrush, and then simply erase the areas that form the hard reflections manually. This gives a more spontaneous effect and is quick.



On a new layer again quickly airbrush the soft sky reflections, also here using the warm and cold colors. And again manually erase the overflow of airbrush. Set the eraser to Airbrush and use a 65-100 opacity. Working on a separate layer enables you to erase these areas with a large soft eraser brush, while leaving the hard reflection areas undisturbed, and all without any masking.



Similarly build up the warm and cool glass reflections on their own layers, using a large airbrush, followed by a hard-edged eraser brush to redefine the edges. Initially use the colors lightly, then duplicate that layer and erase the highlight parts of the interior off of the first glass layer. This way it seems you can look through the car, which enhances the realism.



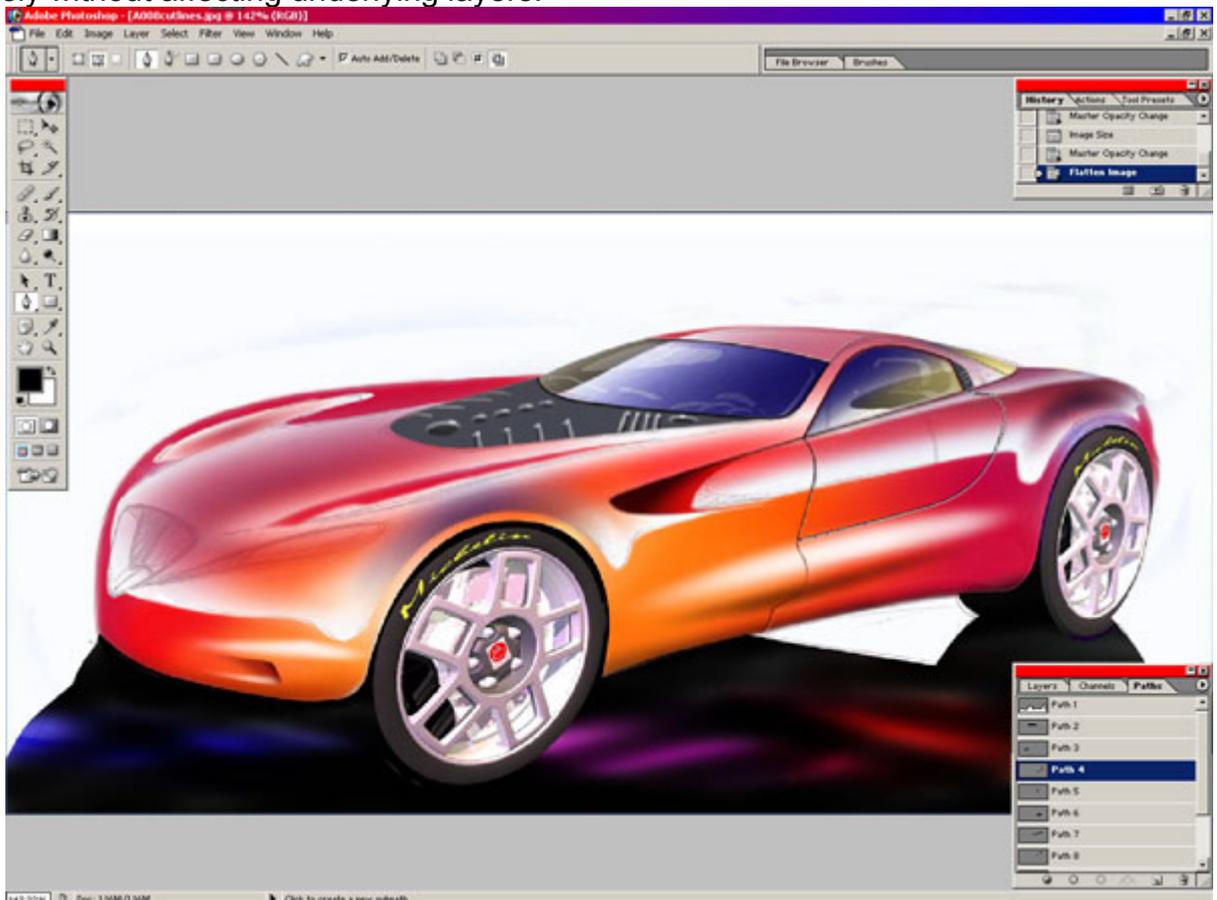
This is the time to put the car on the ground. Make a quick path in the path tools menu, and adjust it to fit the area of shadow marked off in the sketch. In the path menu save this path, go to 'Make Selection' with a zero Feather, and go to the layer menu to make a new layer. On this layer you fill the selection with the background color you want, and here I have added a few brush strokes in different colors to add warmth.



Subsequently put in the wheels, so the car sits properly. You can usually color the wheels you had sketched, but for enhanced realism you can quickly take some wheels/tires rendered in Alias and use these. Also you can use images of wheels/tires from existing cars, but if these are very recognizable or dont suit your overall design it may not help you.



In the lower segments of the body sides and the front you may want to add some soft sculpture to enhance the expression of the vehicle. Simply make a new layer, and play with black and white soft airbrush, then alter the transparency of this new layer to get the desired effect. Again, using separate layers for each of these elements drastically reduces your workload, as no masking is required, and you can experiment safely without affecting underlying layers.



Again use the path tool to draw some clean cut lines on a separate layers.



For this project we wanted to use existing headlights to reduce costs, so you can make several variations with different headlights. On this example they obviously stem from a Mercedes-Benz.



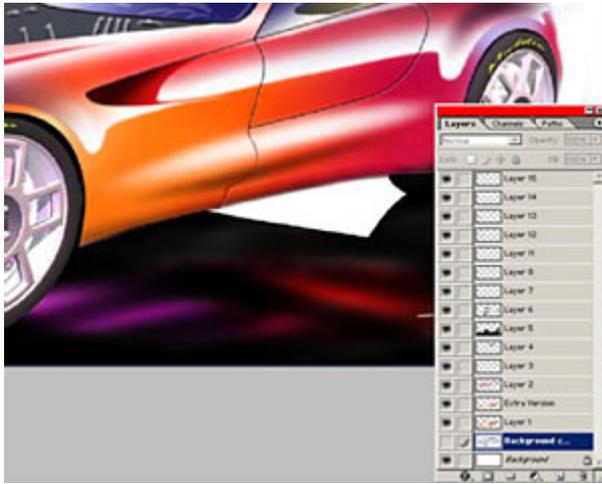
You can also add the grille on a separate layer.



FORESEE
Car Design



And add the corporate graphics to create the final result.



As you can see, it took quite a few layers, but that makes it easy to make corrections afterwards, and eliminates the need for masking. This color sketch took about 45 minutes, but this can vary of course depending on the level of detail.

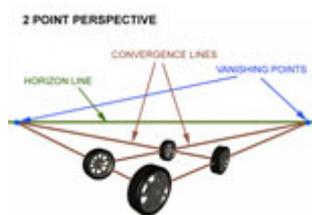
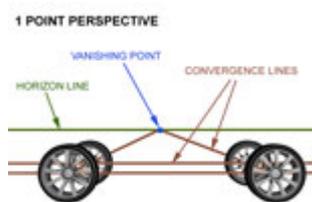
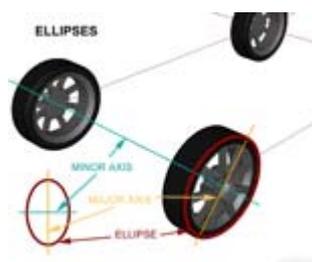
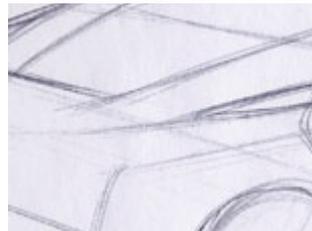
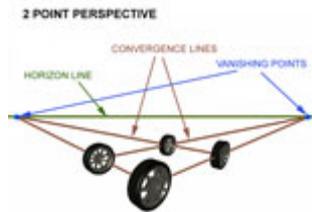
Though I have clearly used the new digital technologies, the technique is built upon experiences I gained earlier in using vellum paper, marker and pastel. I think you have to go through this stage of traditional techniques before you can successfully 'optimize' your digital workflow and not end

up with generic-looking 'impersonal' artwork. In that same respect, I use all of my clay modeling experience in making my Alias models. Again, being familiar with both traditional workflows and the new digital methods is something you 'have' to do to be most effective in your design work.

Cor Steenstra is a graduate of the Royal College of Art, and is Director of Design for Foresee Car Design (<http://4c-foresee.com/>) located in California and Gibraltar.

Tutorial: Quick Sketch Technique

by Allan Macdonald



Introduction

Although we all like to see and admire well crafted illustrations, as a professional designer you will find that these constitute a small percentage of the work you will produce. As a designer

your job is to create many and varied ideas in a short space of time, and to do so in a way that others can see and understand your thinking. A good sketching technique can fulfil both of these. When practicing to sketch it can be very hard at first to know when to stop, and subsequently every drawing becomes a time consuming rendering. It is important to learn not to be overly 'precious' when sketching. By doing so you will produce more and improve much faster.

This tutorial aims to show a good technique for working out ideas in both a fast and readable manner. To be able to produce sketches which read as 3D objects, a basic understanding of perspective is required. For this reason the tutorial begins by giving a brief overview of the rules of one and two point perspective, including wheel ellipses. It then talks through three examples, all using different perspective viewpoints. Each one shows how to build a sketch from a blank page, through the rough line work, and finally simple colouring methods. When drawing, a basic understanding of the rules of perspective is essential if you are to achieve a realistic effect. Only once you have learned these rules you can begin to distort or exaggerate them in order to accentuate elements of your design. There are three basic forms of perspective (one, two and three point).

There are also three main elements present in each of these (the vanishing point, convergence lines and horizon line). This tutorial shows the basics behind one and two point perspective only, three-point perspective being a technique that automotive sketching does not require.

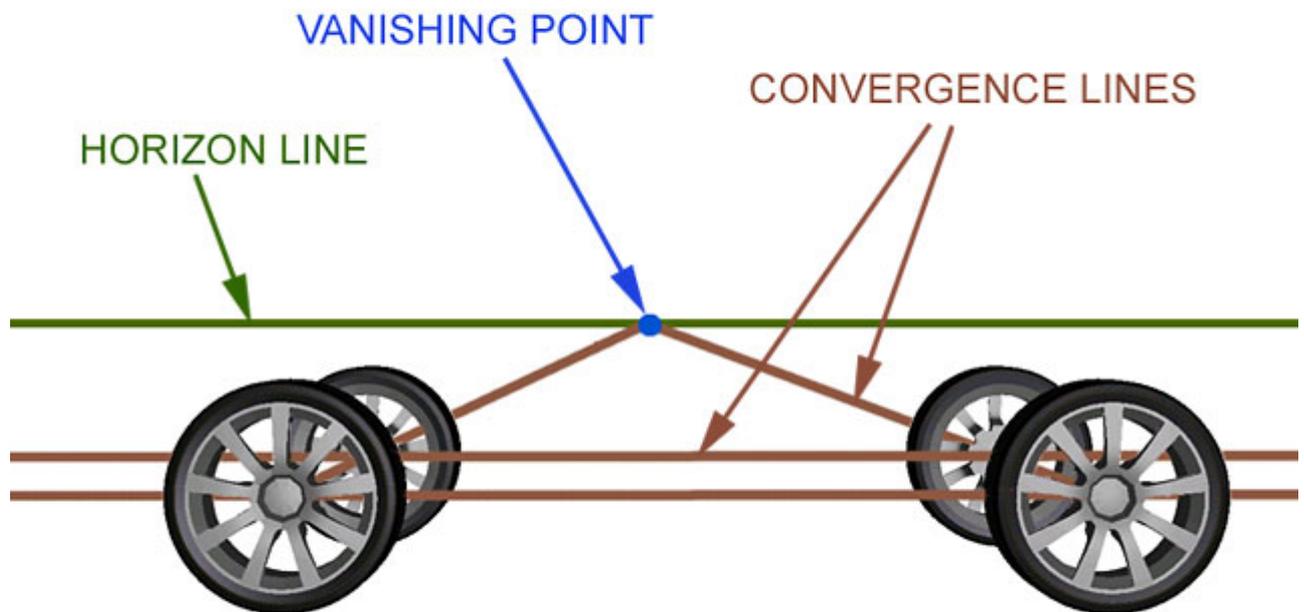
Horizon Line: This line, as its name suggests, describes the horizon, which is always considered to be at eye level. For instance, an object sited above the horizon line is above the viewer's eye level and will therefore show its underside.

Vanishing Points: Sited on the horizon line these are the points where all convergence lines meet. Although always on the horizon, their position on the horizon depends on the viewer's angle to the viewed object.

Convergence Lines: All parallel lines in a scene will always appear to converge to a single point (the vanishing points). The exception to this rule is that lines viewed in parallel or perpendicular to the viewer will not converge. In one and two point perspective you can also consider all vertical lines as non-converging lines.

One Point Perspective: One point perspective is evident when the object being viewed lies parallel or perpendicular to the viewer. This means that only lines travelling towards or away from the viewer appear to converge to a single vanishing point on the horizon. Picture one shows how this makes for a very simple version of perspective, which is especially useful for sketching quick side views of a vehicle.

1 POINT PERSPECTIVE

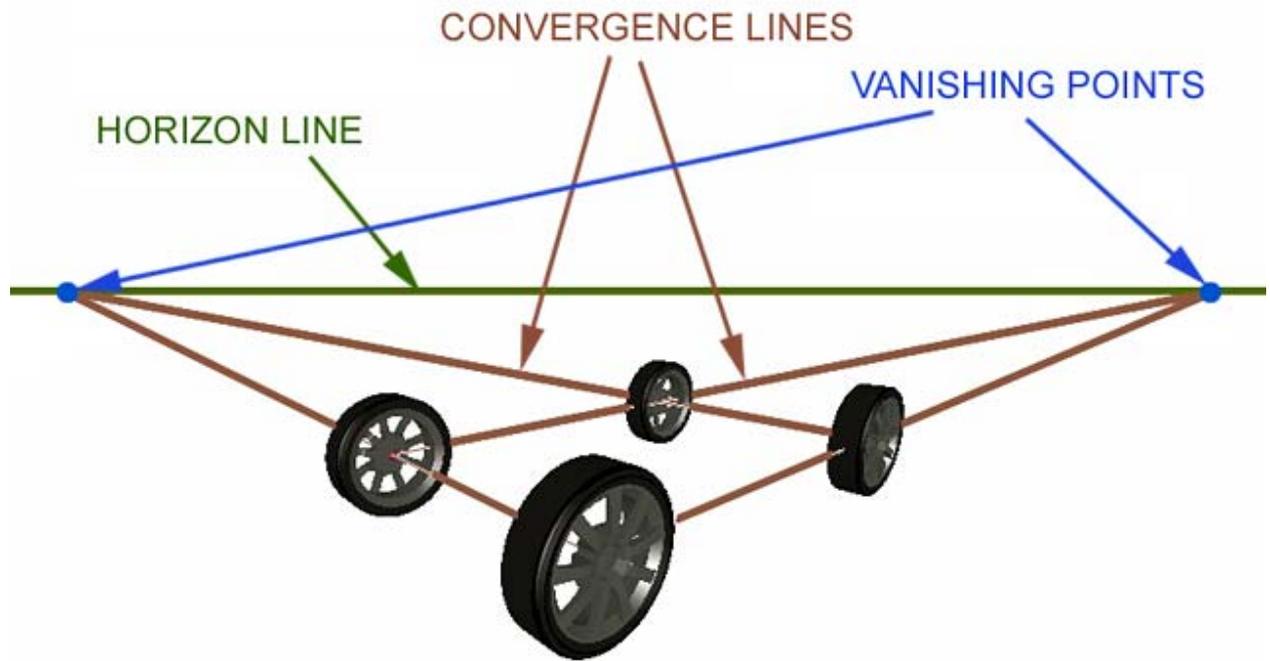


Two Point Perspective: When the object being viewed lies at an angle to the viewer, as in the second sketch example, all the horizontal lines appear to converge. This therefore introduces a second vanishing point on the horizon. Where the vanishing points fall on the horizon line depends on the angle of the object to the viewer. Looking at picture two you can see that if the vehicle were turned so that more of the side was visible, then the right vanishing point would move to the right and out of the image.

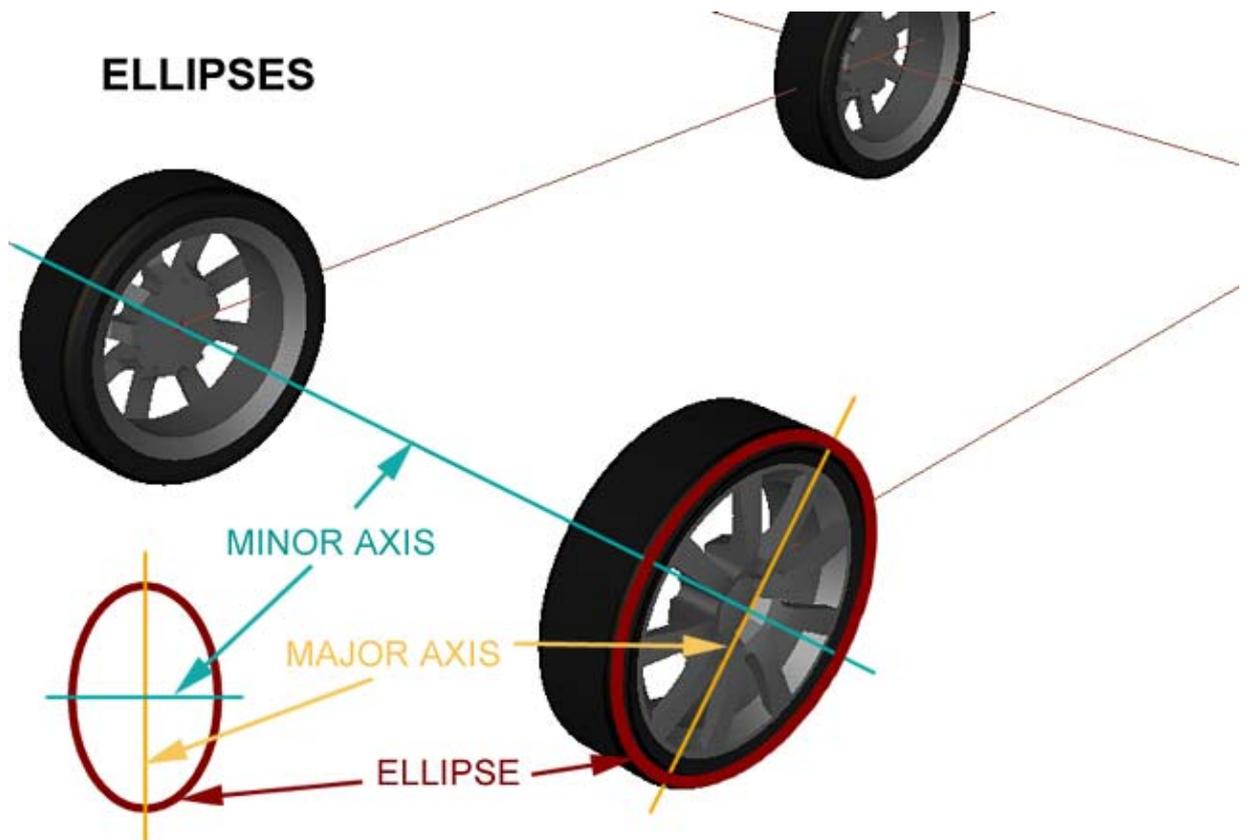
Wheel Ellipses: Getting correct ellipses when drawing a car is probably the hardest part of perspective. Getting it absolutely correct will probably not add anything to your drawing, but getting it wrong however will make your drawing look very odd. If you look at a circle at an angle of 90 degrees then what you see is indeed a circle. Once you start to reduce the angle you view the circle from, it starts to appear to be an ellipse. An ellipse has a Major Axis and a Minor Axis. In picture three you can see where these are situated on an ellipse. The Major Axis divides the ellipse into two equal halves along the longest dimension, whilst the Minor Axis divides the ellipse into two equal halves along its shortest dimension. Although not technically complete (the full explanation is long, more complicated and not generally required when sketching) a good rule of thumb is that you should always align the Minor Axis with the axle of your vehicle. The Major Axis, and therefore the longest dimension of the ellipses should therefore run perpendicular

to your axle line. Finally, how do you ensure that the angle of your ellipse is correct?

2 POINT PERSPECTIVE



ELLIPSES



There is a method using construction boxes, but in practice you should not need this for sketching. If you ensure that you have got all of the above correct then the angle, or width of your ellipse hopefully should be self-evident. The following pages show three examples of sketches based on 1 and 2 point perspective...

Quick Sketch Technique - 1 Point Perspective

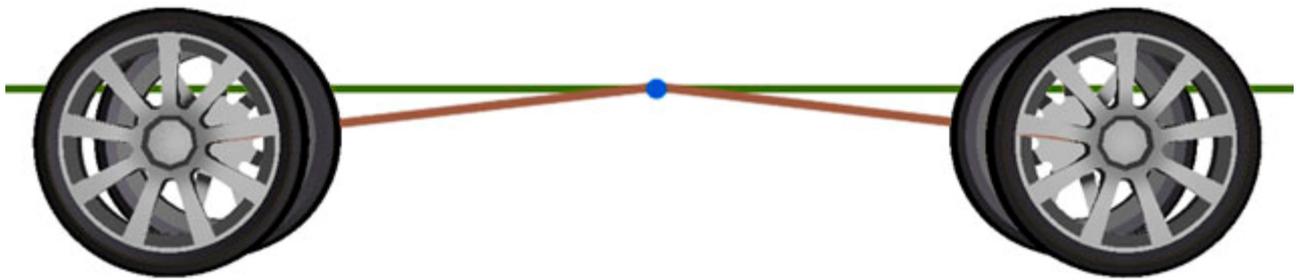
1 POINT PERSPECTIVE

KEY

VANISHING POINTS

CONVERGENCE LINES

HORIZON LINE

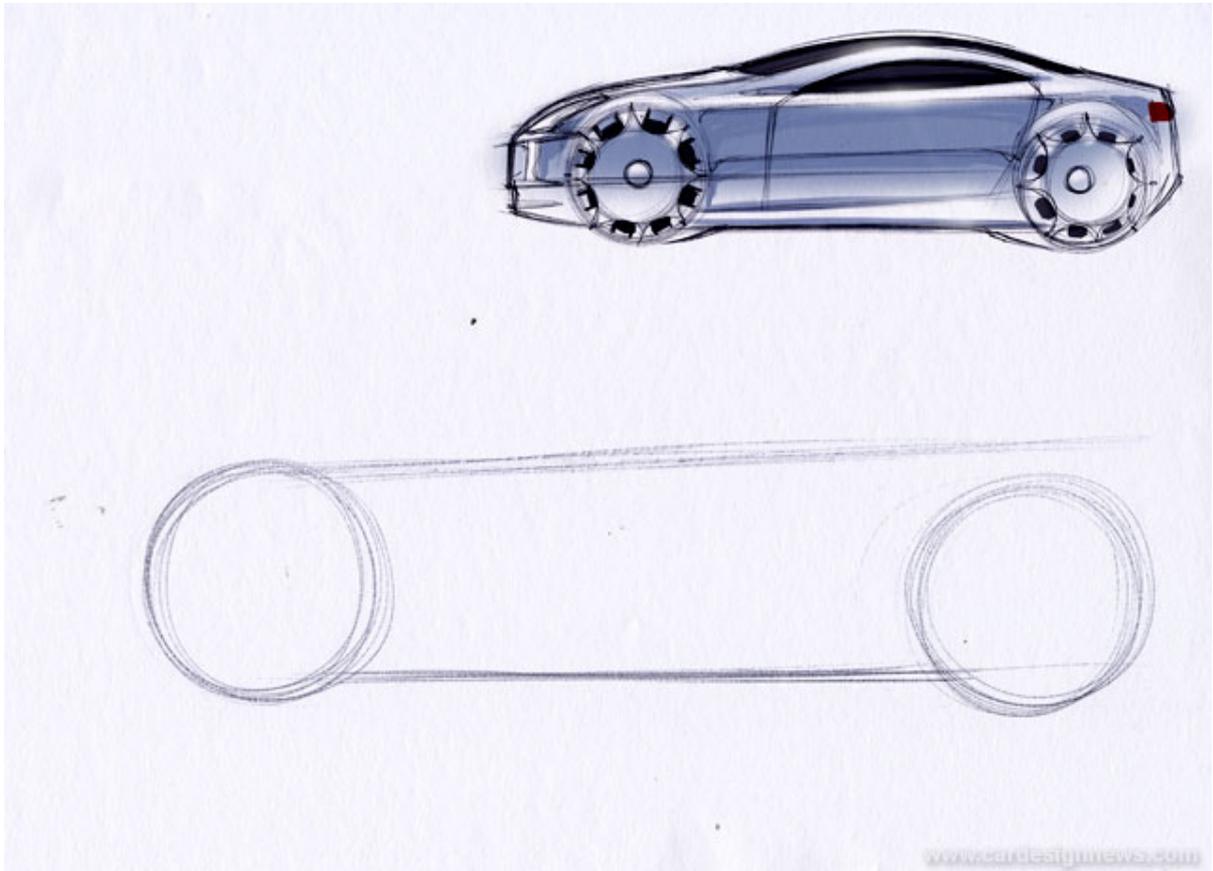


www.carticdesign.co.uk

When I begin a sketching program I almost always start by drawing only in side views. The point of early sketch work is for the designer to 'find' many ideas in a short space of time. By sketching in side view (and usually reasonably small) I can generate many pages of ideas very quickly. This is mostly down to the fact that you need to think about perspective very little, and can therefore concentrate on thinking about ideas. Almost the only element of perspective visible in these drawings is the way that you can see the far side wheels. This is due to the fact that in 1-point perspective the only convergence lines that actually converge are those moving towards or away from the viewer.

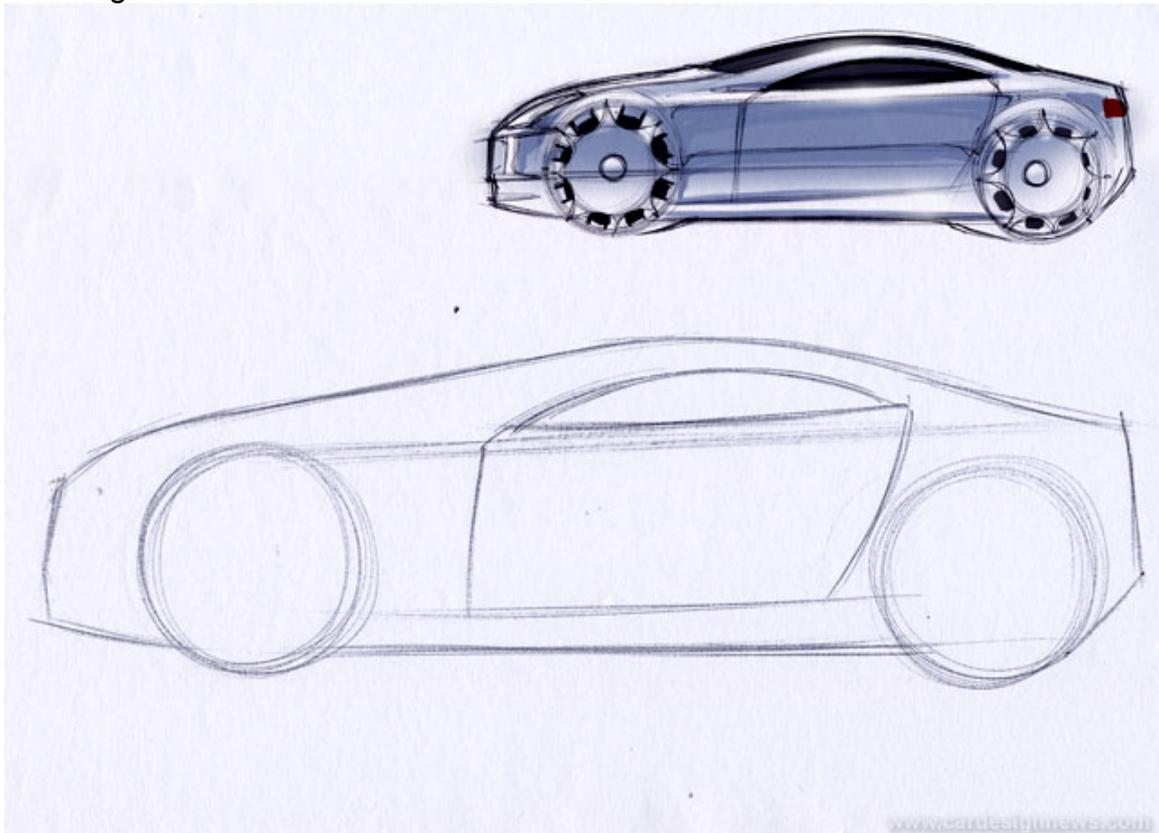
Stage 1

You can see here that I have started by gently roughing in a ground line and two wheel positions. I have also lined in a shoulder height for the vehicle. The important thing to remember here is to keep your line work fast and light.



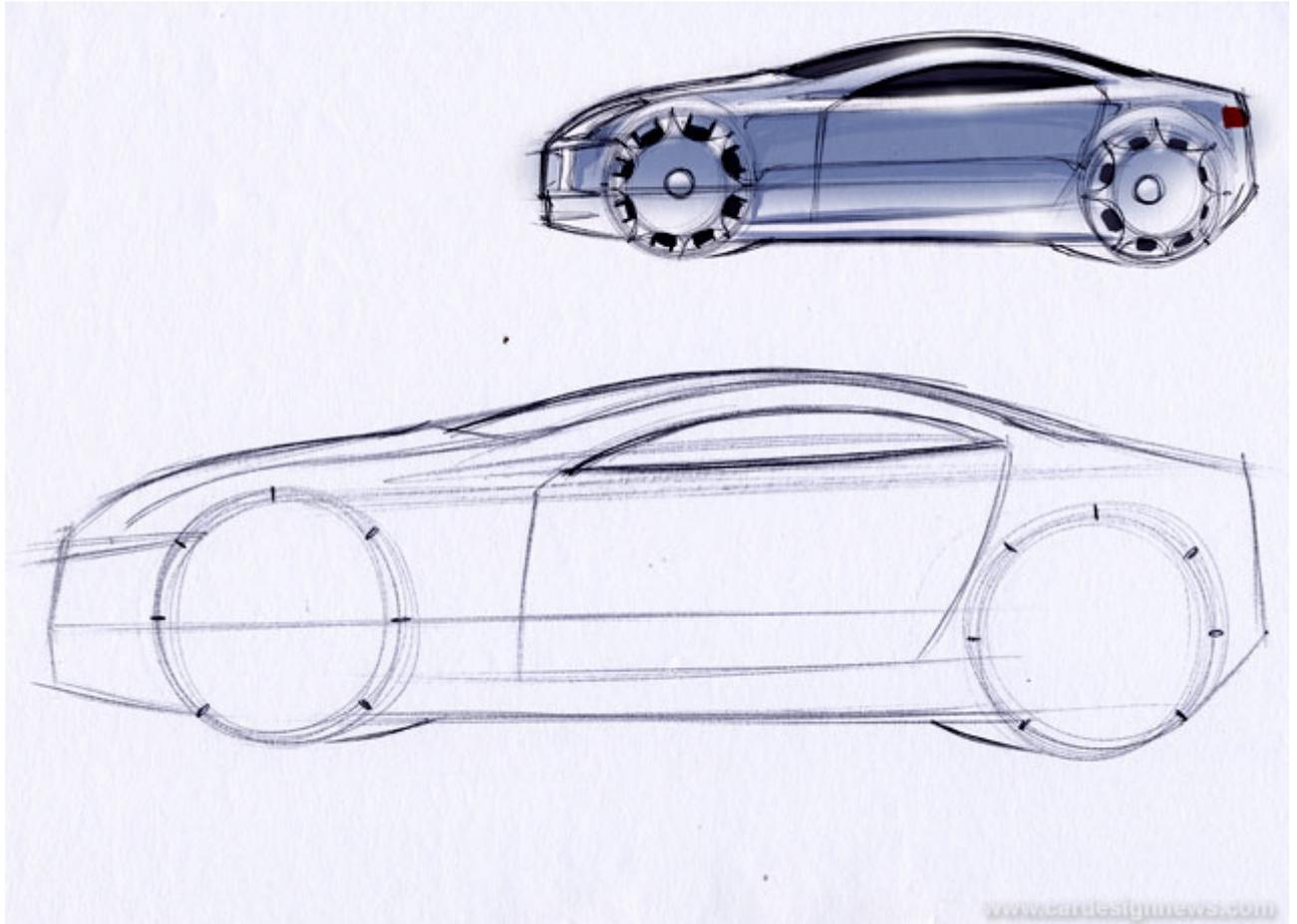
This way you can change and move things around as the sketch progresses. A common mistake when learning to sketch is starting a new drawing when you realise something is out of place. Don't! Continue with the drawing, using the mistake as a guide to amending the problem, increasing the darkness of your lines as you refine the sketch.

Stage 2



Here I have lightly marked in the rough proportions of the vehicle, using a centre line and the window opening. When putting in the centre line try to avoid the temptation to shorten the overhangs too much by bringing the front and the rear very close to the wheels. Look at a photograph of a car in side view and you will see that the corner of the vehicle falls somewhere in the space you are leaving. If your vehicle has a lot of plan shape at the front or the rear then you will have to leave even more space.

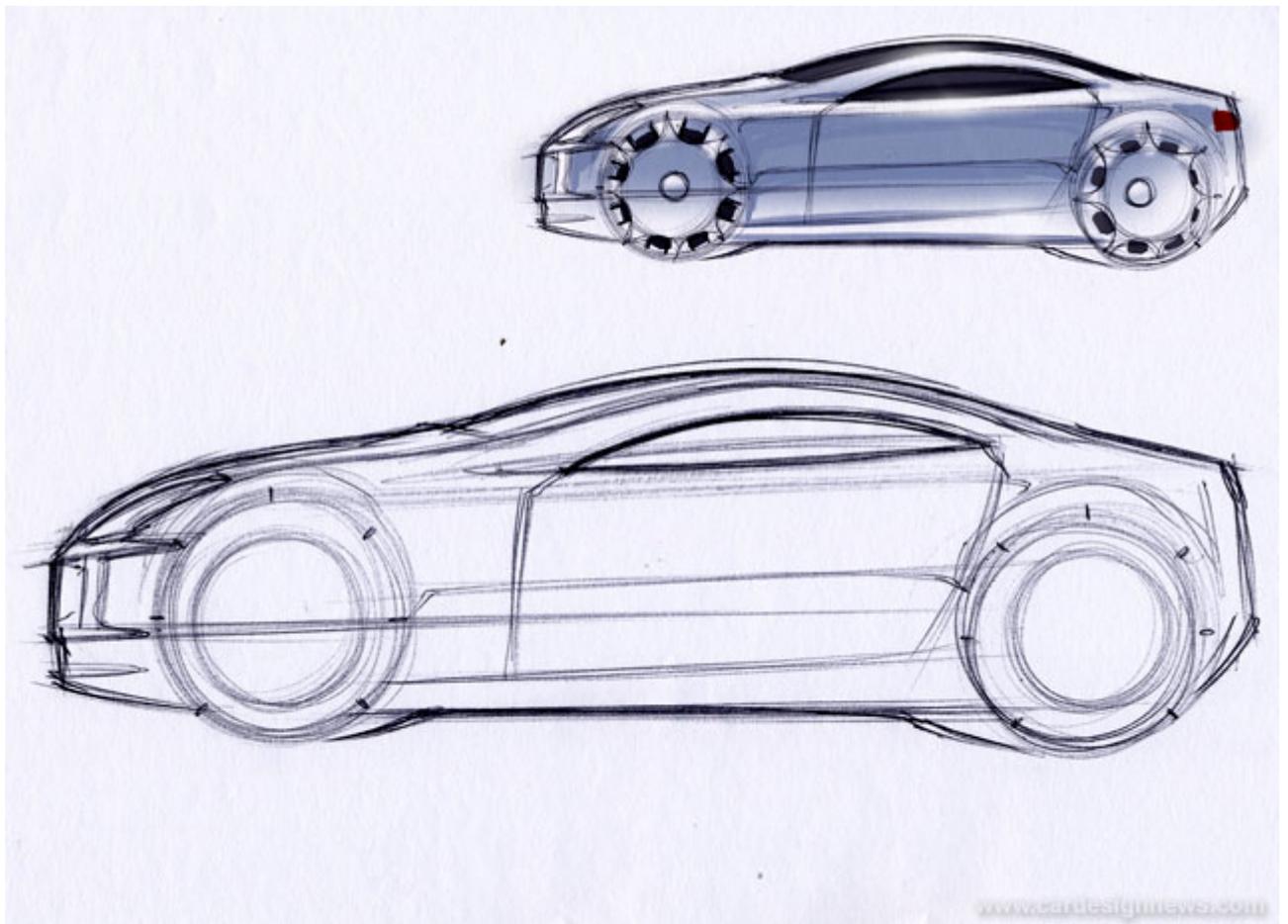
Stage 3



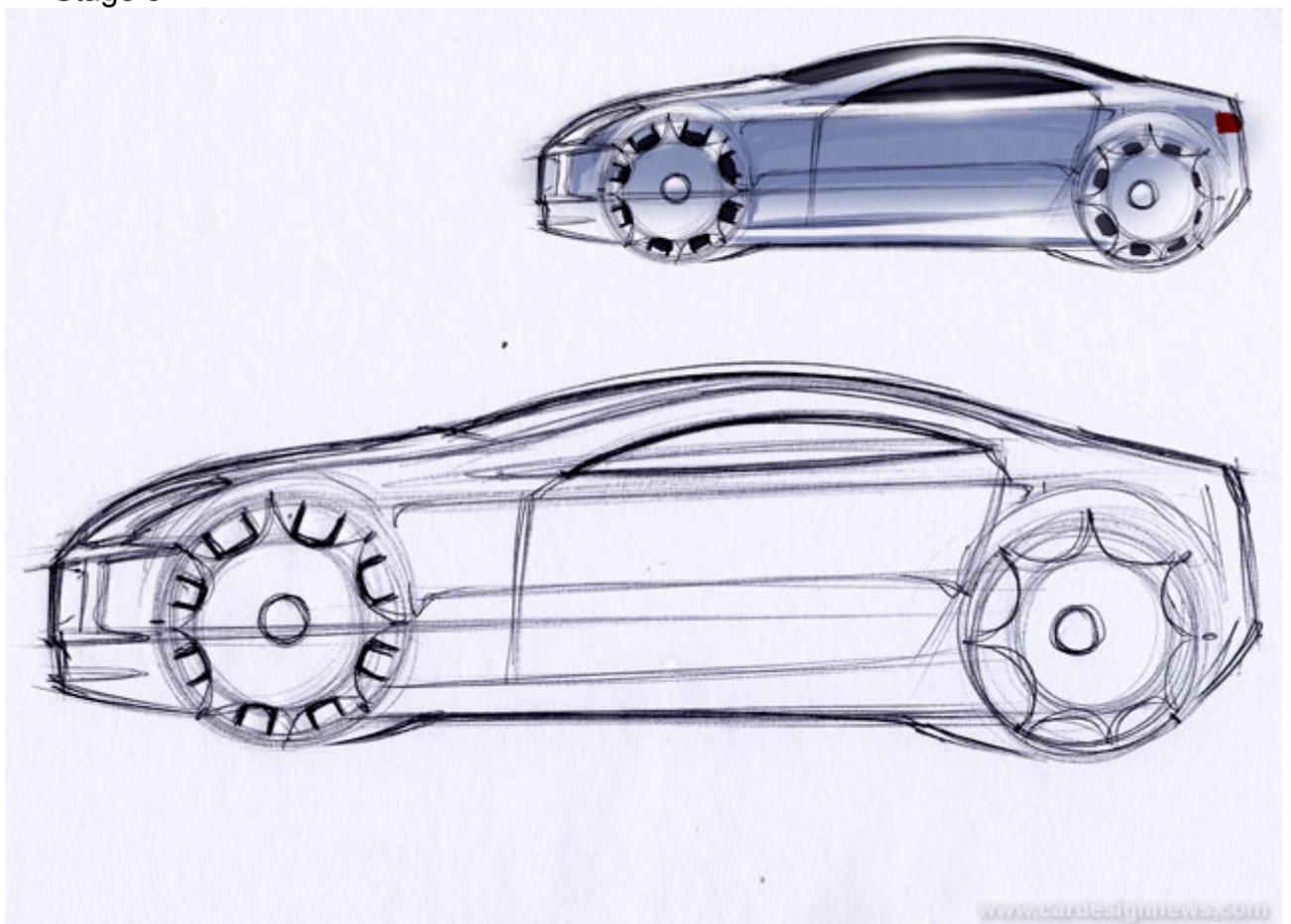
I have now defined the top edge of the bodywork from the rear window, over the roof and down to the front bumper. Remember when drawing this line that it denotes the curvature over the roof and through the two screens (when looking directly from in front or behind the vehicle). For instance you can see that the rear screen has a little curvature, which flattens out into the roof (although not completely flat) and then as the corner surface travels into the windscreen the curvature increases. You can see that the closer the edge line is to the centre line, the less curvature is implied for the surface between.

Stage 4

Once you are happy with the general shape and proportion you can begin to firm up some of the details (remembering of course that it is only a sketch). I have added some light reflection lines in the side window and down the body side. I have also defined the front corner. Again the same rule applies here as when drawing the roof. The further the corner is from the centre line of the front end, the more curvature you are giving the front bumper in plan view (veiwing from above).

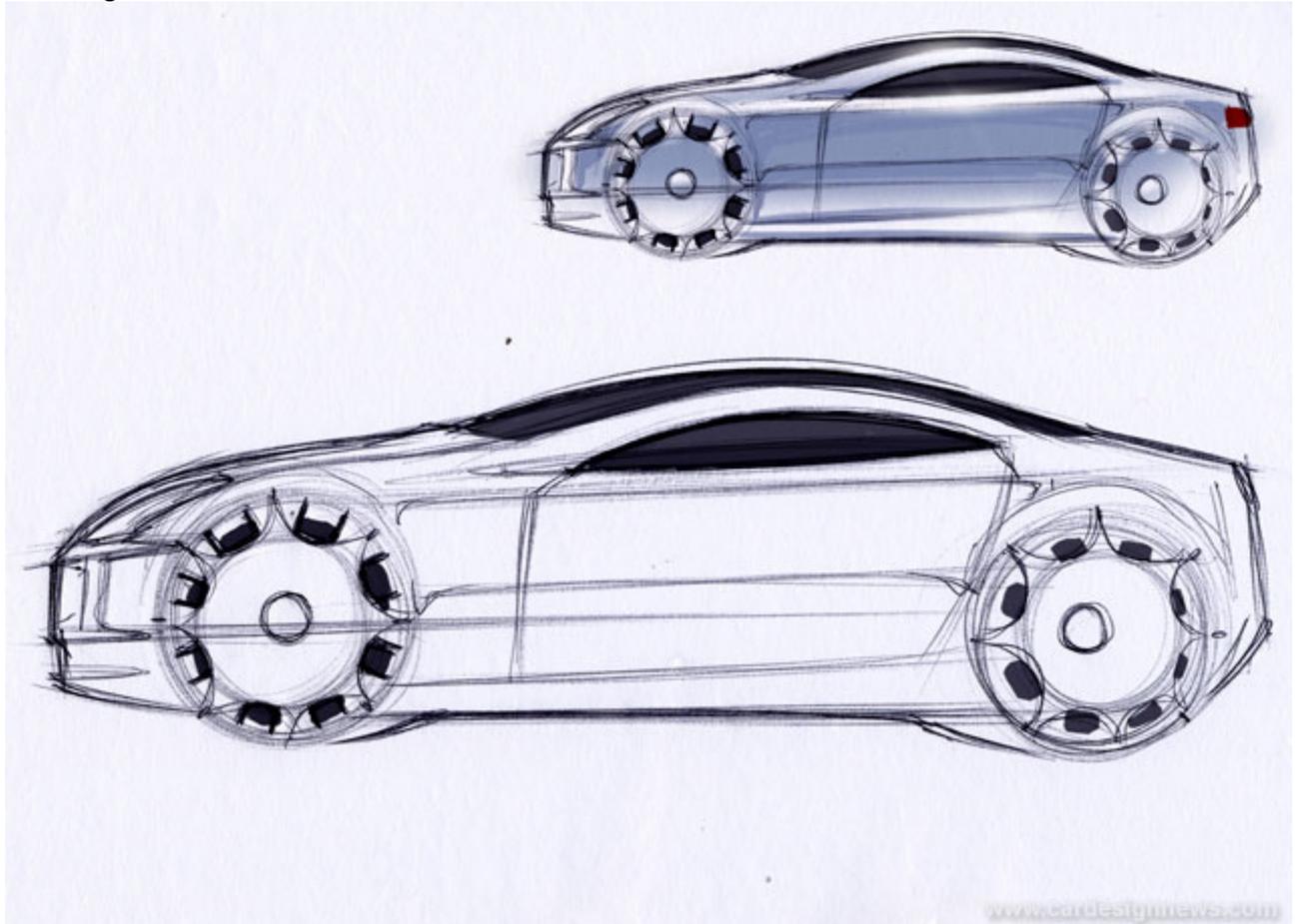


Stage 5



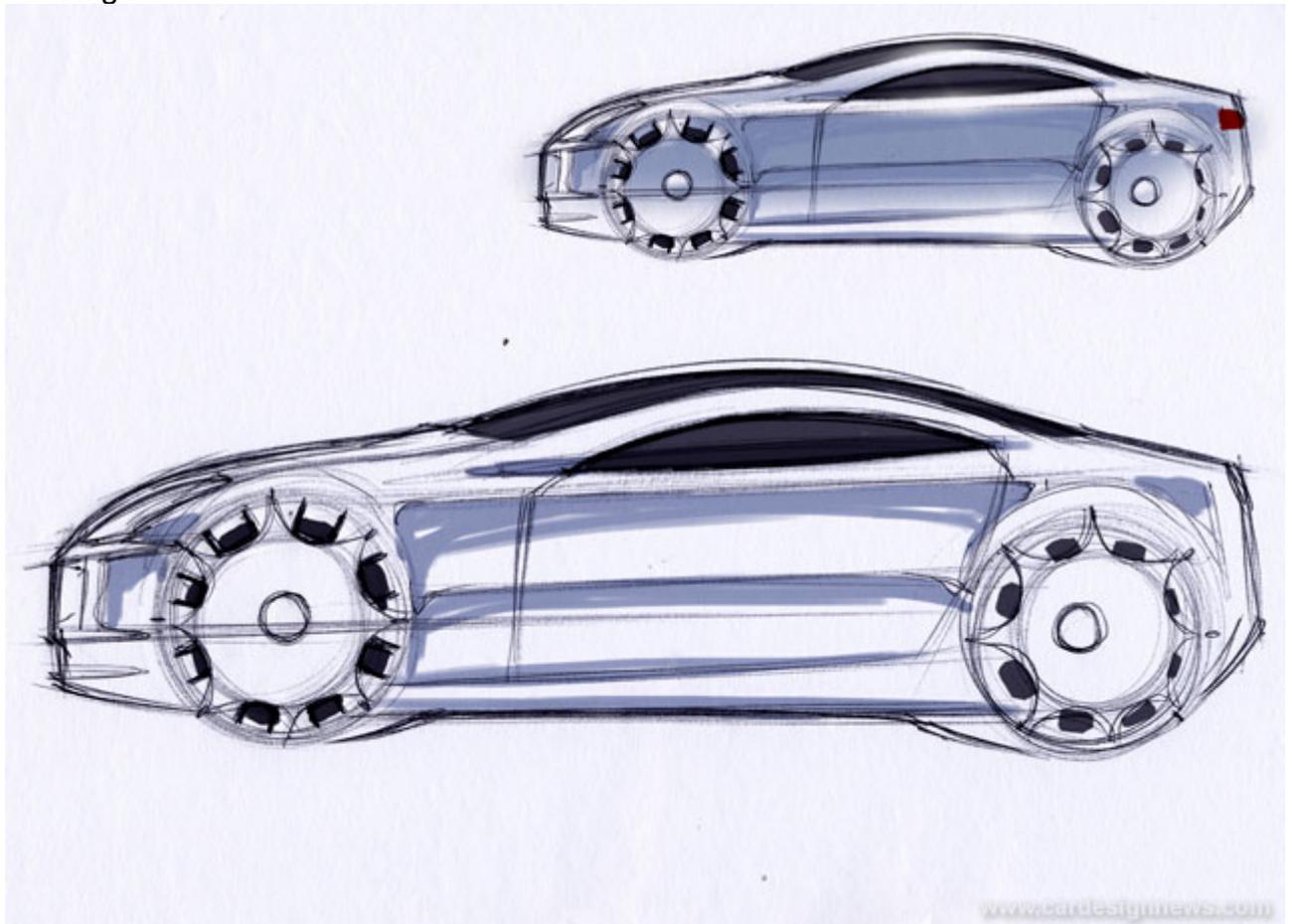
This is the final stage before applying colour. Here you can see I have firmed up all the details I am happy with and added some detail to the wheels. It is always worth putting a little bit of effort into getting the spacing reasonably correct on the wheel details since it will lift the look of your sketch a lot. Also important to note is that the sketch is still very loose and fast in its line work. This will only come through perseverance and practice.

Stage 6



Once you are happy with the general design and proportions you can begin to add colour. Here I have simply shaded the windows and wheels using a dark grey marker five or six. Note that this does not have to be super accurate. I have then further darkened the lower area of the windows and the front wheels, by letting the marker dry and going over the area again. The reason I have only darkened the front wheels further, and not the rears, is to help give the drawing a sense of movement. If you give all areas of your sketch the same weight and level of work then the final result can look very flat on the page.

Stage 7

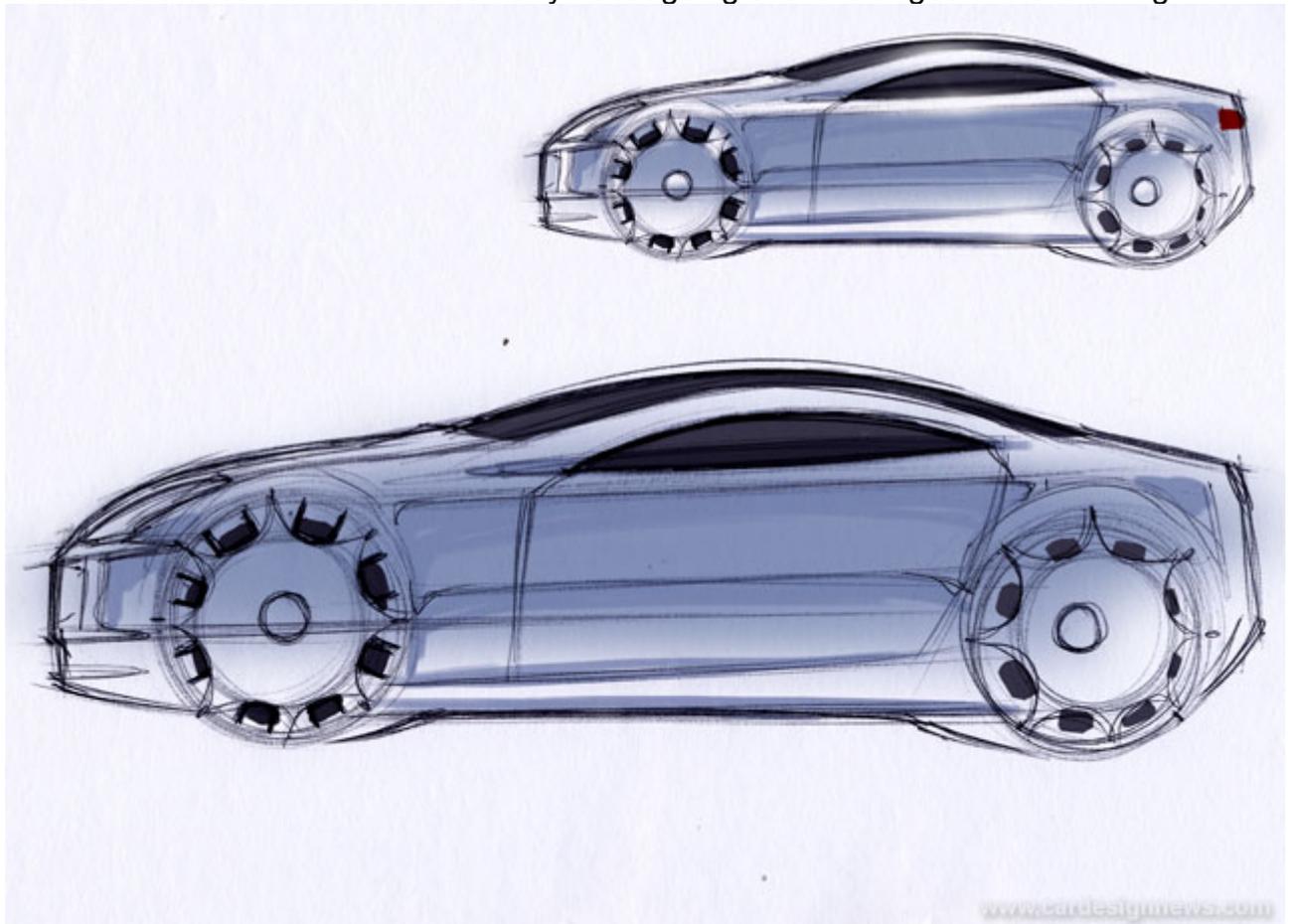


This is the stage where you will have to force yourself to not become 'precious' about your sketch. Hopefully you will now have a nice drawing on the paper, and to attack it in a loose and fast manner with a marker pen is not easy. These lines represent the scenery reflecting in the body side. You can see that I have continued the reflection in the window onto the bodywork and darkened down just beneath the shoulder. The area I have lightly marked half way up the body side actually represents the horizon line, which is reflecting from behind the viewer. The important thing here is to be very loose and to keep your choice of marker very light.

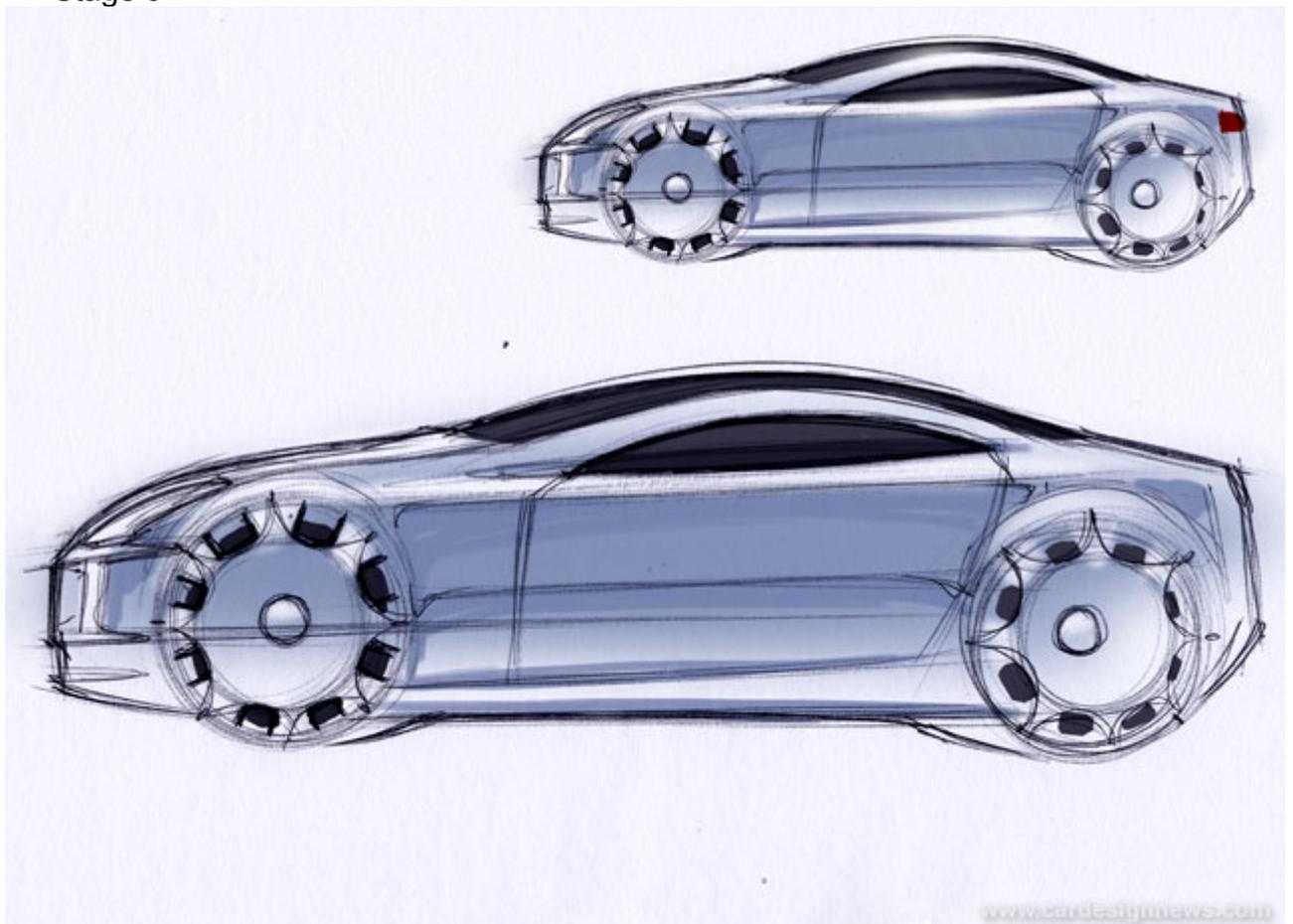
Stage 8

This is probably the simplest part of the drawing, yet the one where you really see your sketch coming to life. Just choose a colour of pastel similar in colour to the previous marker work and apply it along the length of the bodywork, centering just

beneath the shoulder line. Do not worry about going over the edges of the drawing.



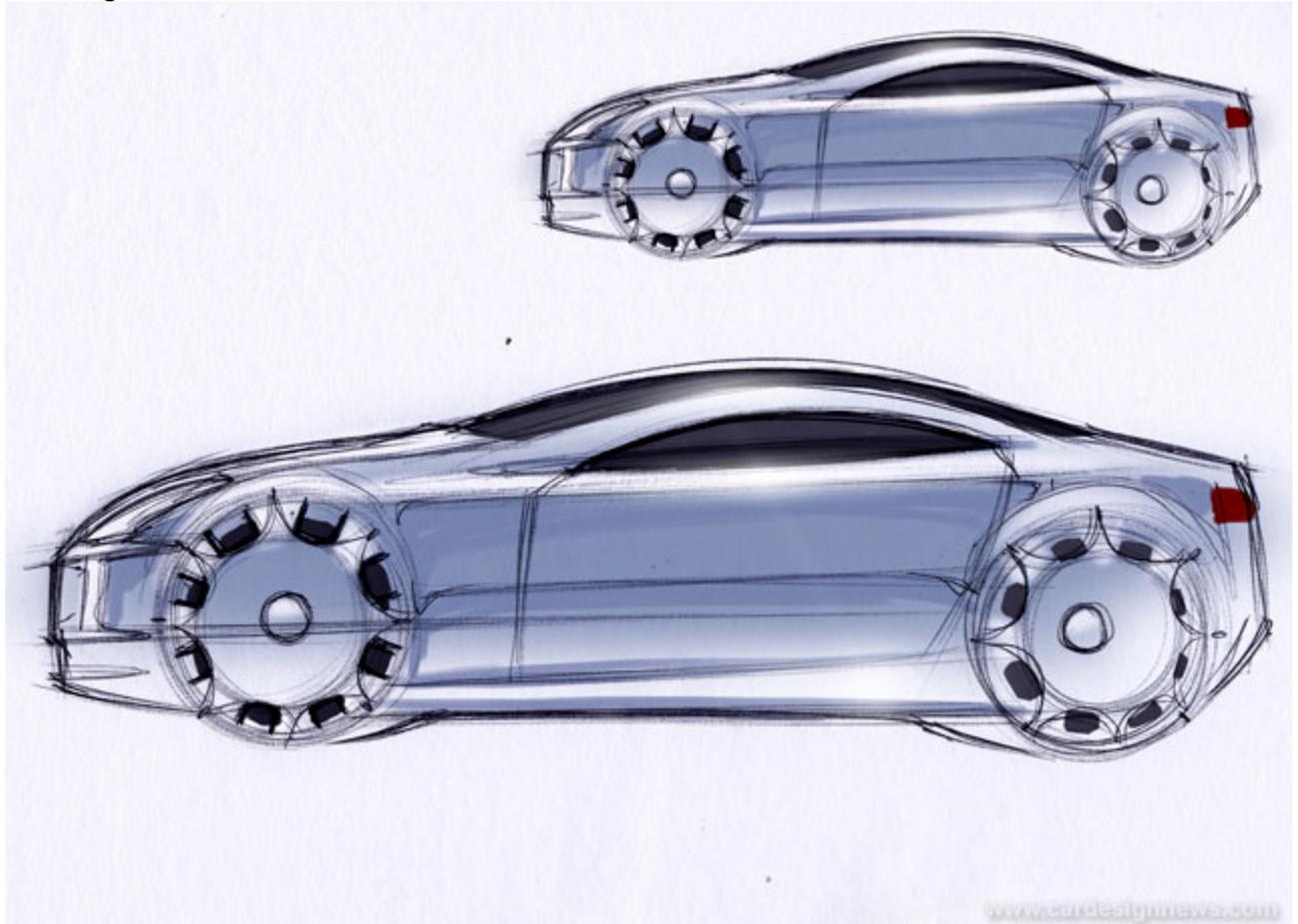
Stage 9



You are now in the final stage of the sketch and really just finishing off. Using an eraser and gently rubbing out all the areas the pastel has fallen on upwards facing surfaces of the car, you can really bring out the 3D form of your vehicle.

This is the point you could actually stop. The drawing is now complete enough that anybody can look at it and get a good idea of the 3D form you are trying to describe. For a little bit of extra sparkle to the drawing however you will probably want to add the smallest hint of highlights.

Stage 10



By using an airbrush (if you are lucky enough this is easiest to do in Photoshop) you can brush a very quick faint line down through the bodywork. Then on all the upward facing surfaces it falls on, you can spray a light halo of white. Remember to be subtle here since you don't want to lose the definition of your surfaces, you only want to add that final bit of sparkle.

Quick Sketch Technique - Flat 2 Point Perspective

2 POINT PERSPECTIVE

KEY

VANISHING POINTS

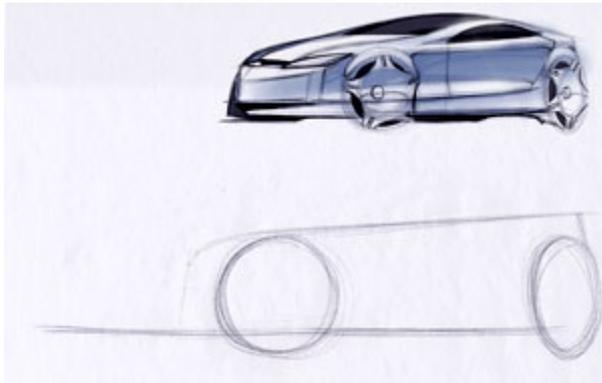
CONVERGENCE LINES

HORIZON LINE



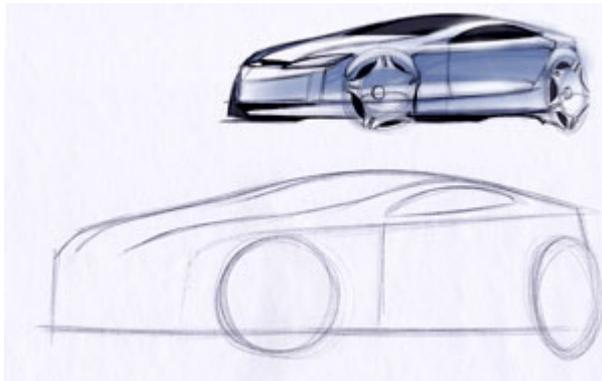
Whilst you are producing the side views you will want to work out what is happening at the front and rear of the vehicle. To do this without resorting to a simple front or rear view, you will now have to begin sketching in two-point perspective. For these early sketches however you will not want to get too lost in trying to draw good perspective. Because of this I like to sketch in a view I call flat perspective. Essentially this is a car

viewed at an angle but from down low so that all the convergence lines fall on the horizon line and through the centre of the vehicle.



Stage 1

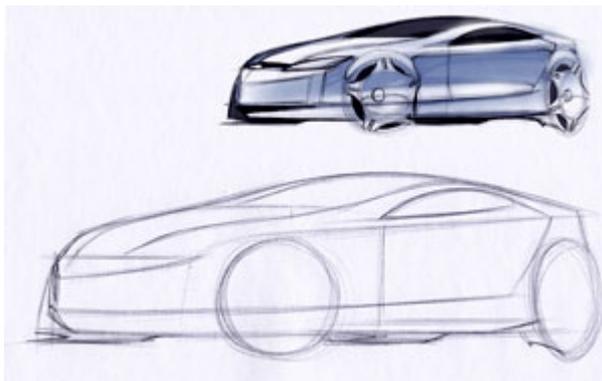
You start this drawing in a similar fashion to the side view, by sketching in a ground line and two wheels. You can see however that this time the rear wheel is at an angle. The more you want to see the front of the vehicle the thinner this ellipse will be. Remember to sketch lightly, since you are now more likely to want to adjust things than when drawing a simple side view.



Stage 2

I have now added the profile of the vehicle. During this stage I am lightly working out the rough proportions and theme of the vehicle. If at this point I want to adjust something such as the position of the wheels, in order to fine tune the proportion of the vehicle, then I can. By sketching lightly at this stage you can make these adjustments without fear of spoiling your

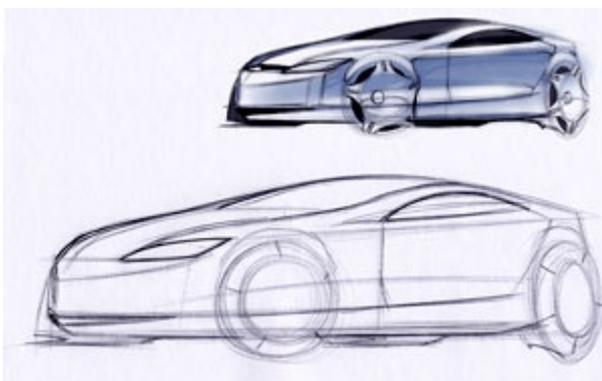
sketch. Take note of the way the centre line is most visible on the more vertical surfaces



Stage 3

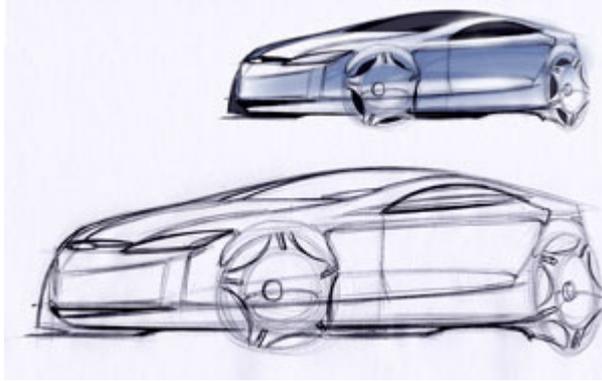
Here you can see that I have added the wheels from the far side of the car. A trick usually employed by designers is to exaggerate the position of the far side front wheel, putting it out in front of the car. This gives a dark background to emphasise the body shape of the bumper against. At this stage I am still working things out and sketching lightly, making changes where necessary. Also of note is the way the base

of the windscreen is not simply horizontal. In fact from this angle you can see the swell of the hood in the way this line climbs towards the centre line and then disappears down the other side.



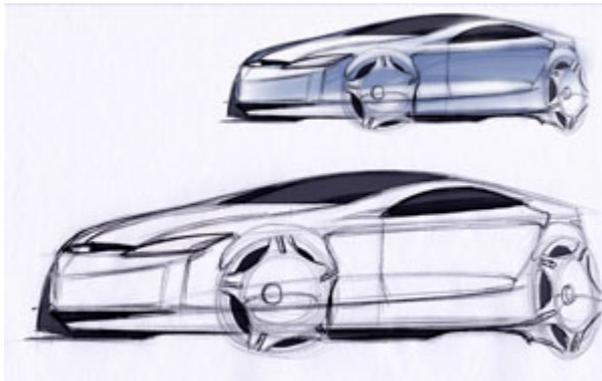
Stage 4

Once you are happy with your design and its proportions you can begin to firm up the lines you want to emphasise. These are usually the lines that represent a strong graphic element of your design. Other lines, which represent changes in the body surface should be left lighter, since you can emphasise these better with the use of colour and shading.



Stage 5

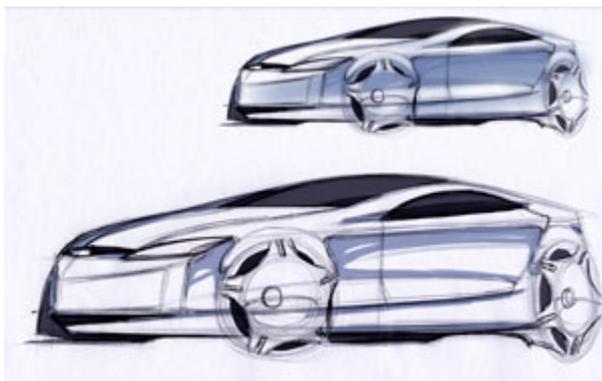
In this final stage before adding colour you can see that I have drawn the final details, and added some more light line work defining my surfaces a little better. Take note of things like how the shoulder highlight runs through the front wheel and down, becoming the corner of the bumper.



Stage 6

Now that you can begin to add colour to the design, the process is very similar to a side view sketch. You can see that I have used a dark grey marker, in a similar manner as the side views, to colour all of the windows. The reason for using such a dark colour on these elements, and a light colour on the bodywork, is that it makes the sketch easier to read. At a glance you can get a feel for

the shape and graphic of the vehicle, because of the strong contrast.



Stage 7

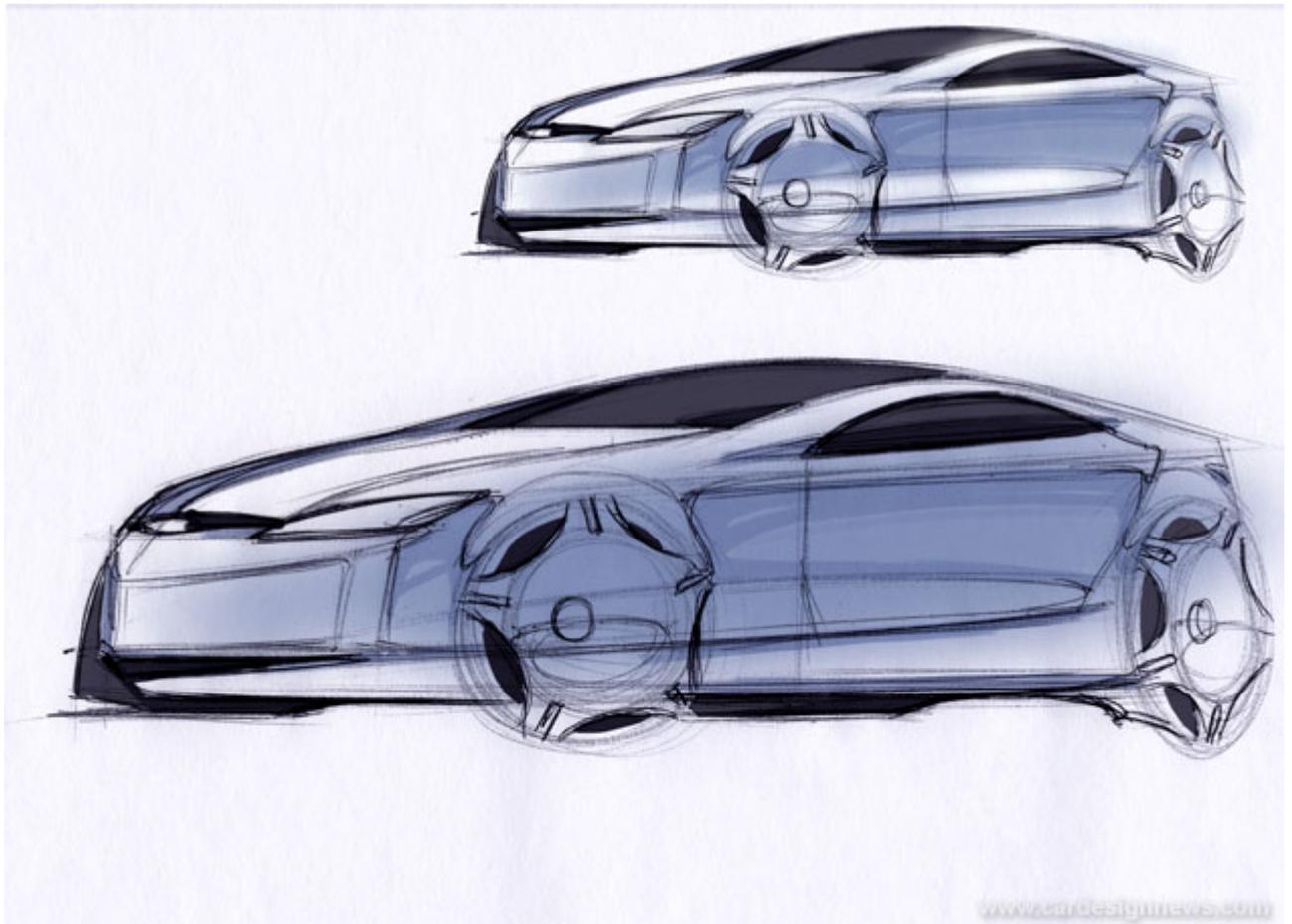
Following the same rules as in the side view sketch, you can now add a little light marker work representing reflections in the body side. Keep these simple and loose without adding too much marker. You can see that I have also shaded everything on the far side of the centre line (with the exception of the upward facing surface on the bumper). This helps to emphasise the curvature of these

surfaces and the general 3D feeling of the sketch.

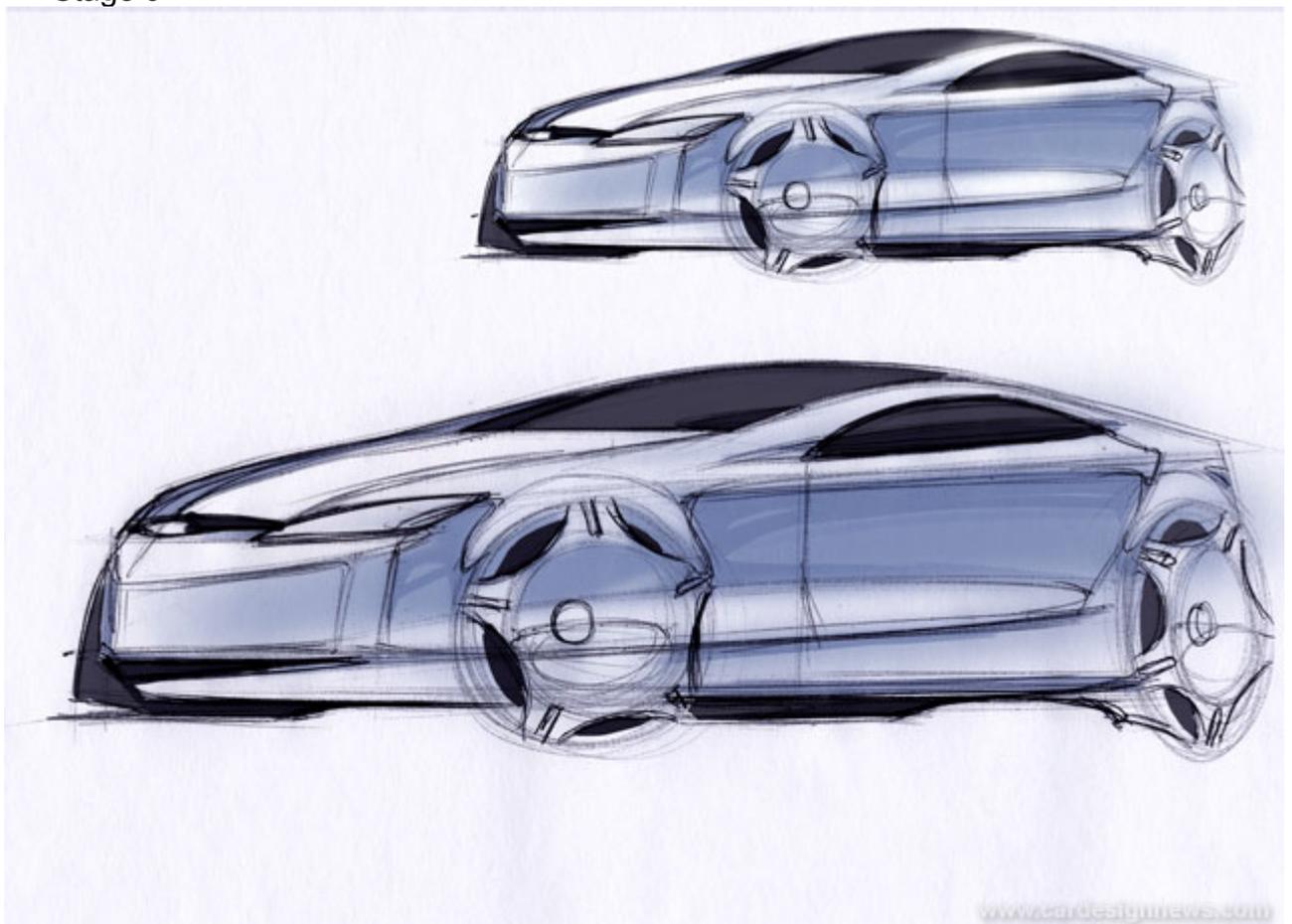
Stage 8

This, as in the previous example is the easiest part of the sketch. Just apply a quick brush of pastel along the body side of the

vehicle.

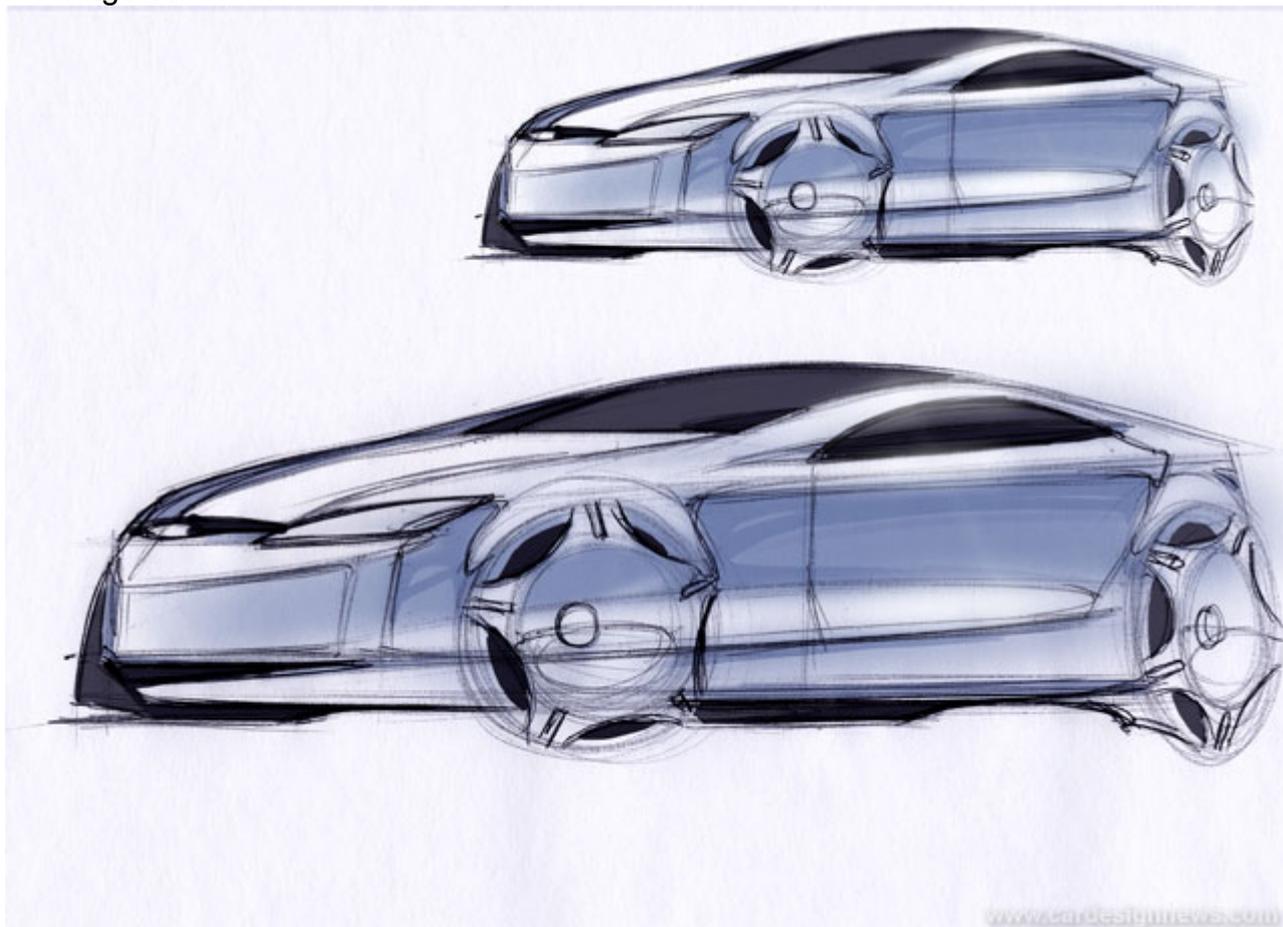


Stage 9



Using an eraser I have now picked out all the upward facing surfaces on the vehicle. This includes the surfaces of the spokes on the wheels. Try to be gentle when erasing against a line that represents a soft change in the body surface, since a sharply erased edge will obviously signify a sharp angle in the body.

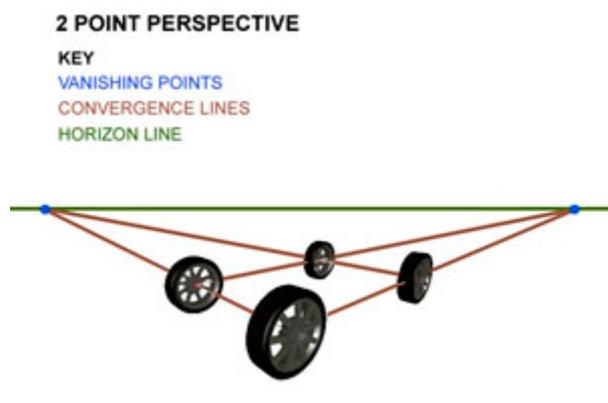
Stage 10



Finally you can if you wish add some gentle highlighting.

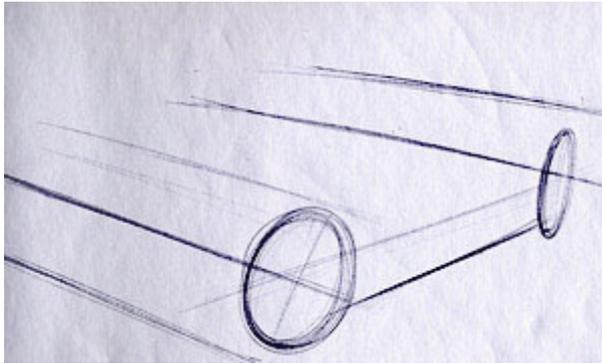
Quick Sketch Technique - Full 2 Point Perspective

Proper two-point perspective is the hardest of the three examples here to get correct. For this reason I usually wait until I have a rough idea of my design before moving to this kind of view. It is however essential that you do learn to sketch using full two-point perspective, since sketching with simplified viewpoints does not allow you to fully resolve all the surfaces in a design. You can see in the graphic on the left that using this kind of perspective means that all parallel lines running both down the body side and across the front or the rear of the vehicle will converge.



This can make it hard to figure out how to draw things such as sloping shoulder lines. A good way to practice to begin with is by sketching a simple cube or rectangle in perspective, and then by adding wheels at each corner. Once you are confident at this

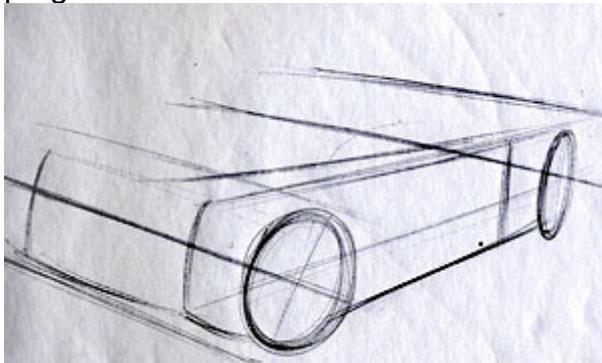
you can begin to add simple forms to this box, building the drawing into a more car like image. From there you can begin to disregard the box and only use the guidelines you feel will help you sketch your design.



Stage 1

I have started this sketch by drawing some simple guide lines, all showing the convergence of the parallel lines. Onto this I have sketched the wheels. You can see that as explained earlier, the major axis of the ellipses are at right angles to the axle lines on the vehicle. Remember to sketch lightly here as it is almost certain you will want to adjust your ellipses as the sketch

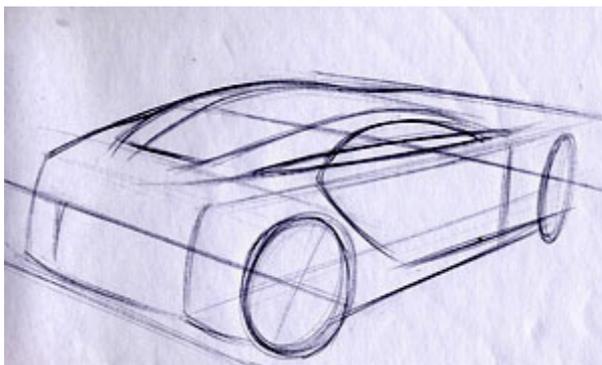
progresses.



Stage 2

In the second step I have built up a simple side surface for the vehicle. You can see how the shoulder line of the vehicle also creates the rear corner, creating a single surface down the side of the vehicle. It is usually easier to work in this way, working out the major surfaces before adding the smaller surface details such as wheel

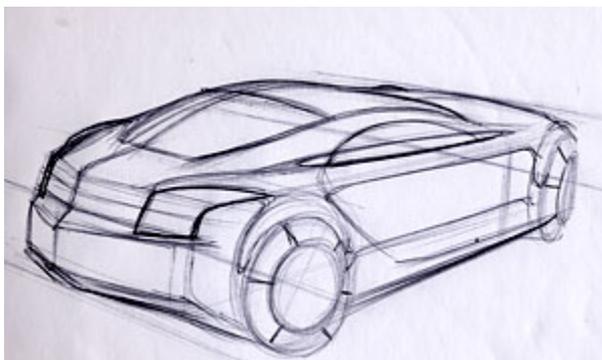
arches. You can see I have also added the front shutline from the door to help me define this side surface.



Stage 3

This stage is the hardest part of drawing in perspective. You must now work out how the surfaces you have drawn on the near side of the vehicle will appear on the far side. There are some very technical techniques of perspective construction grids you could use to do this, but when sketching I prefer to work these out roughly in my mind. The important thing is that you

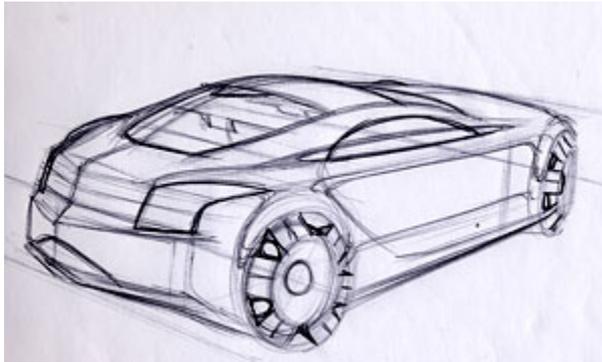
understand the general rules and principles of perspective. From there you should practice sketching using only simple guidelines which will ensure that the sketches remain fast fluid and spontaneous. It is usually helpful at this point to have some pictures of similar vehicles at the same angle of view on your desk that you can look at. As in the previous step you can see that I have worked out all the major surfaces first. Also of note is the way the tumblehome (leaning inwards) of the side windows flattens out the far edge of the vehicle. Again, looking at pictures of actual cars will help you get a feel for this



Stage 4

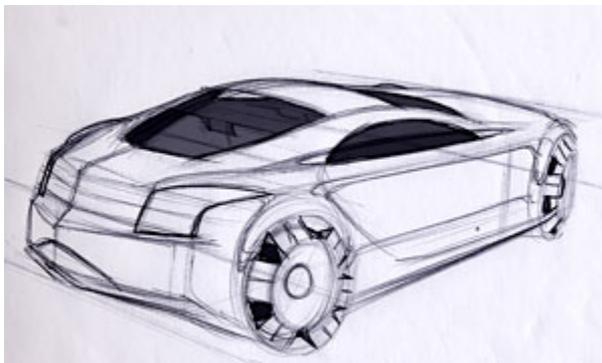
Once you are happy with the rough proportions and are confident you have got

the major elements of the perspective correct you can add the rest of the detail surfaces. Note how the centre line of the vehicle can be used to emphasise the treatment of the surfaces. You can also see that I have exaggerated the plan curve of the rear by putting the far side lamp almost out of sight around the corner of the body.



Stage 5

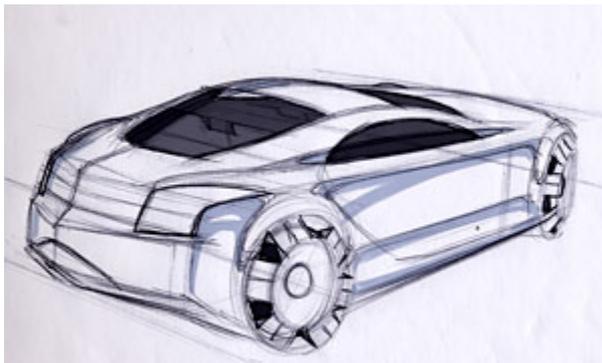
The final pen stage is to add some interior and alloy wheel details to the drawing. When adding the interior details you don't have to spend a lot of time, since all you want to do is give a suggestion of the shapes inside.



Stage 6

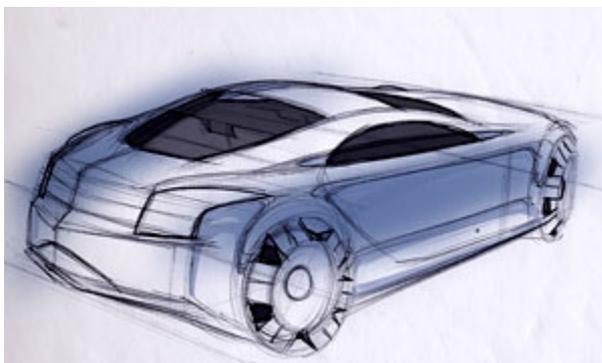
To shade the inside of the vehicle I have used two grades of marker. With these two markers you can achieve four tones of colour. By using only two grades of dark gray you can help keep the change in shades very subtle. If you half shut your eyes and look at the sketch, you should "read" the whole window, and not each separate shade. The same should be true

after you have applied the colour to the bodywork, which is why you should choose a reasonably dark colour for your windows and a light one for the bodywork (or vice versa).



Stage 7

Remembering to keep things simple you can now add a light coloured marker to the bodywork. You can see that I have also added a little marker at the furthest edge of the vehicle. You could also try blocking in every surface on the far side of the centre line except the upwards facing ones, as shown in the flat 2 point perspective sketch

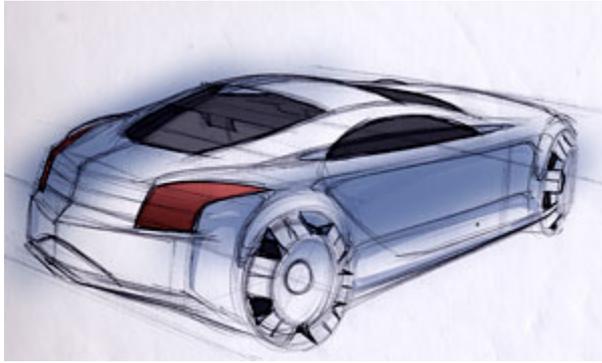


Stage 8

It can be easy to over-complicate the pastel work when shading a 2 point perspective sketch, since you try to 'correctly' shade every surface. I always try to resist this temptation, and try to use only two dominant areas of colour. The first one passes down the body side of your vehicle just as in the side view sketch, whilst the second goes on the far surfaces. This

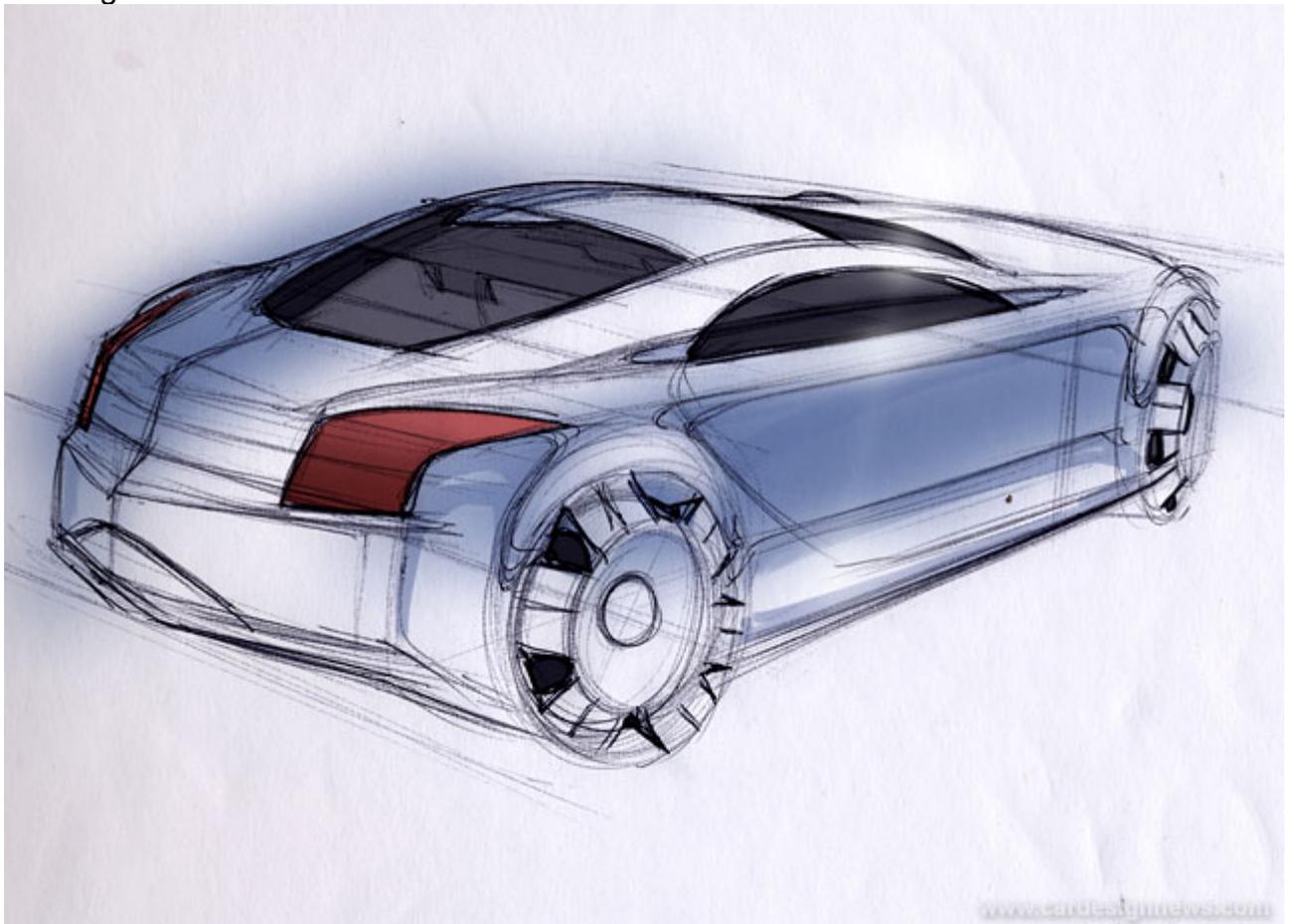
leaves a core of brightness running through the surfaces closest to the viewer, which helps give the sketch a strong 3D feel.

Stage 9



The last two stages are quick and simple. Add a quick bit of red marker or pencil to the rear lights and erase the pastel from the up facing surfaces just as in both previous examples...

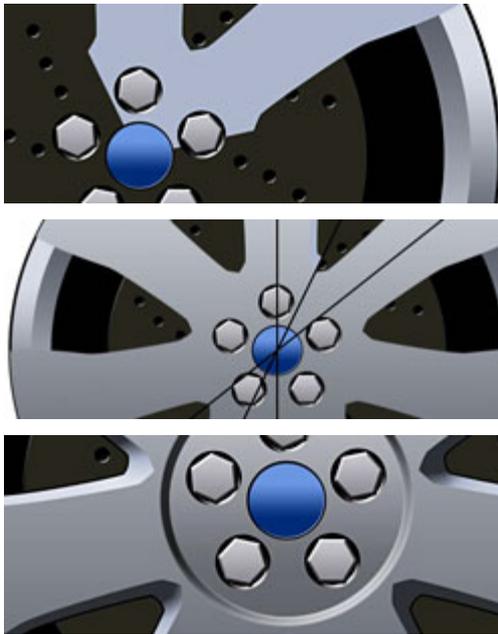
Stage 10



...and finally add the little bit of airbrush shine.

Allan Macdonald is an automotive designer currently at Volvo Trucks. His previous employment included MG-Rover and ARUP Design Research. He is a graduate of the MDes Transportation Design course at Coventry University, UK. Allan's tutorials are also featured in the book *How to Design Cars like a Pro* by Tony Lewin, Motorbooks International, 2003.

Rendering Tutorial - Photoshop Alloy Wheel by Allan Macdonald



Introduction

In a modern design studio the ability to use Photoshop, or indeed any PC or Macintosh based image-editing and rendering package, can lead to faster and more consistent work on a great variety of levels. Tie this with Alias 3D and PowerPoint skills and you become a more employable designer.

This tutorial will guide you through a method you can use to design/render alloy wheels using Adobe Photoshop, and is intended for those with a reasonable understanding of working in Photoshop. This 2D technique can be used to quickly illustrate and explore a range of design proposals, in conjunction with 3D modelling. Along the way you will hopefully learn new tools and techniques that you can apply to your own Photoshop work.

Tools used:
Adobe Photoshop

Stage 1

This stage shows how the basic template of a wheel rendering is created. In this stage you will use the Vector Shape tool and the Layer Style tool.

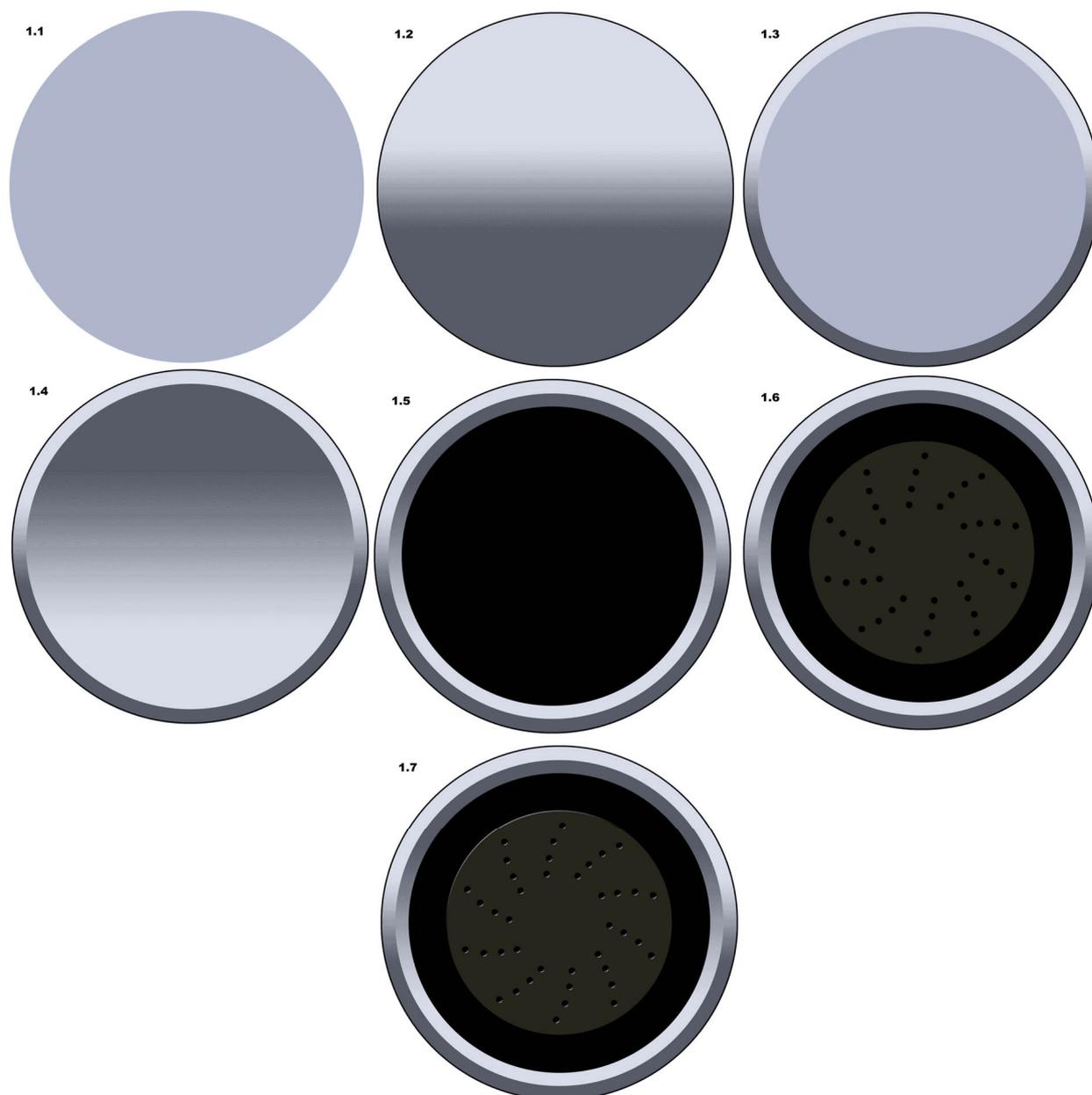
Start by creating a new page at around 1600 by 1600 pixels. Onto this, snap some guides to the middle of the page in both the horizontal and vertical, thus giving you the exact centre of the image. Guides are created by pressing on the rulers at the side of the page and dragging onto the image. Now using the VECTOR SHAPE tool, which you must set to produce a circle from centre, drag a circle, which is almost the size of your paper (1.1). As you will no longer need to alter the size of this shape, you can change it from a vector shape into a bitmap image by Rasterizing the layer. Do this by selecting LAYER, RASTERIZE, SHAPE. Now you can add some layer effects. By double clicking on this layer, the layer style palette will appear. Onto this layer you want to add a GRADIENT OVERLAY and STROKE (1.2). You can do this by selecting the checkbox next to the effect you desire. By touching the text next to the check box you will see many variables you can adjust, related to that particular style. The layer you have now created is the basis for the rim.

Next you need to give the rim some depth. Again using the VECTOR SHAPE tool, drag out another circle, this time a little smaller than the first (1.3). Onto this you again want to apply a LAYER STYLE. This time you only want to add a GRADIENT OVERLAY, and you also want to invert its effect (making the top dark and the bottom light as opposed to vice versa). You can do this by checking the REVERSE checkbox in the GRADIENT OVERLAY options window (1.4).

Now you can quickly create the black circle that will form the hole in your alloy. Do this once again using the VECTOR SHAPE tool (1.5). Now you can create a brake disc.

Start by creating another circle, this time in a dark grey colour (1.6). Then carefully using the erasure tool dot some holes in the layer. Finally go again to the LAYER STYLE window by double clicking on the layer and this time add a BEVEL AND

EMBOSS (1.7). In the BEVEL AND EMBOSS window you may want to turn the depth up to maximum and the size to around "4" in order to get the best effect.



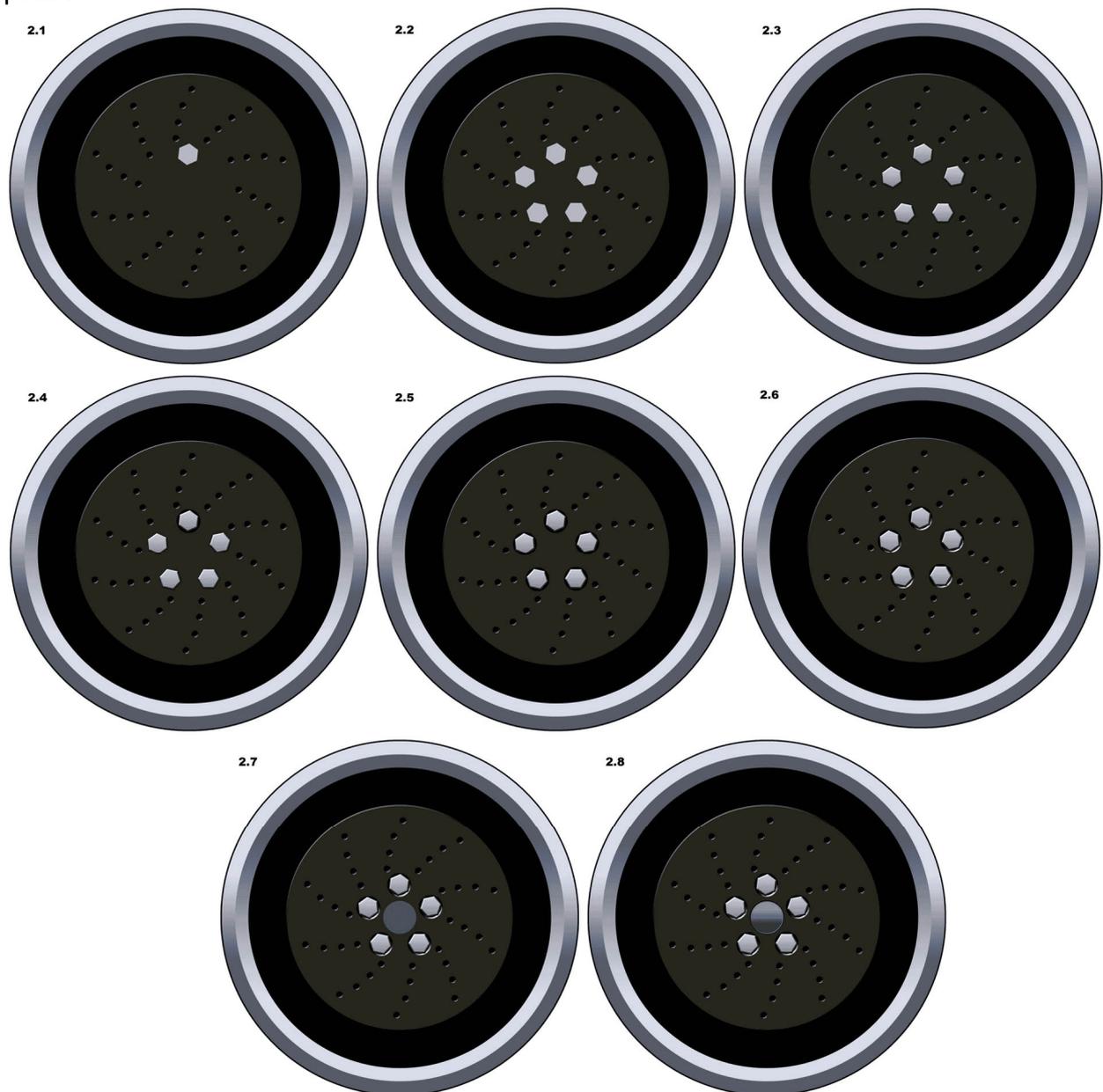
You should now have four layers forming the basic template for a wheel. Since by the end of this tutorial you will no doubt have many layers it is probably wise to put these four into a LAYER SET. It may also be an idea to save the image as a template, meaning whenever you want to design a wheel you just open this and go.

Stage 2

In this stage you will see how to use the ACTIONS menu in order to rotate any details you design (in this case the wheel nuts) in a mathematical manner. Begin by creating a hexagon using the vector shape tool and rasterize this into a bitmap layer (2.1). You now need to rotate this around the centre of your wheel five times.

To do this first create inside the ACTIONS palette a new folder, which you can call ALLOY ROTATIONS. Inside this folder you then need to begin recording a new action. The action tool works by recording any actions you perform on layer, and replicates them whenever you require. As soon as you create a new action the system begins recording what you do. You therefore want to copy the layer containing your stud and then rotate it around the centre point. Do this by pressing CONTROL and T and then

move point of rotation until its snaps to the guides you created earlier showing the centre point.



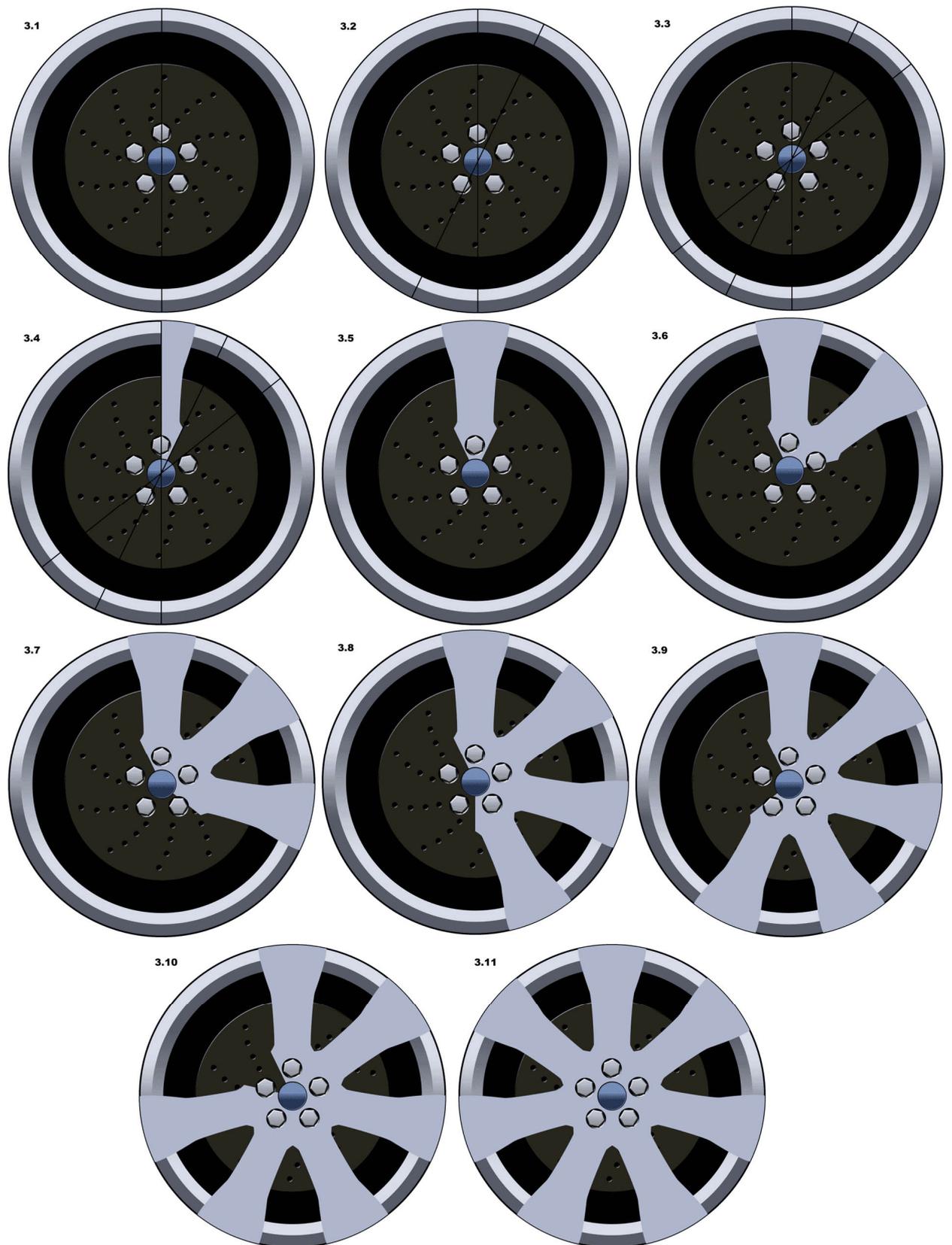
Type the value 72 into the rotation box and hit return. Now remember to press stop in order that what you do is no longer recorded. You should now have two studs. Making sure that you have selected the layer with the second stud, press Play on your newly created Action, and another new stud should appear. Press play twice more and you should now have your full compliment of five wheel studs (2.2). To give these some depth first merge and link all five then use the BEVEL AND EMBOSS tool to give them some depth (2.3).

To now give the studs a hole to rest in you must create a small black circle on a new layer behind the first stud (2.4). Then using the same action you created the studs with, rotate this four times therefore giving you five holes (2.5). You can now give these some depth by again using the BEVEL AND EMBOSS tool, although this time using a DOWN BEVEL AND EMBOSS (2.6).

Finally you may want to add a small centre badge which is a simple task of creating a central circle (2.7), and then adding a GRADIENT OVERLAY, a BEVEL AND EMBOSS and a STROKE. (2.8)

Stage 3

The next stage is to decide how many spokes you want in your design. Once you have this figure you can work out what angles you need to work within.



This example uses seven spokes, meaning that there is 51.4 degrees between each spoke. Since you only need to design half a spoke however you will need to know half this figure, 25.7. In order to create some lines that you can design within, snap a guide to the top and bottom of the entire wheel. Then using the PATH tool, stroke a line

exactly from the top to the bottom of the wheel (3.1) then copy and rotate this twice through 25.7 degrees (3.2) (3.3).

Now using the PATHS tool draw in the design for one half of your spoke, remembering to go right to the centre and to accurately mate the design to the guides you have drawn (3.4). At this point what you are drawing is only the top face of your design. Drawing the depth of the spoke comes later. Now create a copy of the layer with your spoke and mirror it over the horizontal, remembering to move the point of rotation over. Merge and link the two layers and you now have one spoke (3.5).

Using the ACTIONS tool you can now rotate this spoke until you have all seven. To do this follow the instructions as for the studs, except this time rotate through 51.4 degrees. Remember to move the point of rotation to the centre of the wheel (3.6 - 3.11). Once you have done this merge and link each spoke.

Stage 4

Before you start to design the depth part of your spokes you can add a GRADIENT OVERLAY to the top faces of your spokes to give them a bit of shape. Now copy the path you used to create the top faces and modify it to your design for the depth element of your spokes. As before remember to accurately mate your design to the guides you have created (4.1). Now you can mirror this over (4.2) and then using the same ACTION you used for the top faces rotate this layer around until you have completed the circle (4.3). Once you have merged each of these to form a layer containing the depth parts of your spokes you can now add a BEVEL AND EMBOSS. The important trick here is to turn the DEPTH variable up full and then adjust the SIZE variable until the BEVEL AND EMBOSS disappears behind the top faces (4.4). This now gives the impression of being a full three dimensional design. For final effect you can also add a STROKE layer effect just to make your spokes stand out (4.5).



Stage 5

You now have a basic full alloy design to work on. You may want to again save your

design separately at this stage to allow you to produce designs with different finishing details (5.1).

To add some shape to the centre of the wheel you may want to add a centre cap with some depth. You can do this by creating a white circle using the VECTOR SHAPE tool (5.2). Next turn the layer settings of your circle to MULTIPLY. You will find this option at the top of the LAYERS PALLETTE window. This will initially make the circle disappear. Do not worry about this, you must now apply a BEVEL AND EMBOSS to the layer and the effect will appear (5.3).

Another way to add more shape to your design is to add another bend in your spokes. A good way to do this is to copy the layer containing the top faces of your spokes, and then invert its GRADIENT OVERLAY (5.4). Next drag a circular selection from the centre of your wheel using a feather of around 40 – 50. Invert this selection and then delete the outer part of this new layer (5.5). To alter the radius of this bend all you need to do is try different feather values on your selected area.

Having done this you may decide that you want to change the sharpness of the dish in the centre of the wheel. Since every part of your design is on a separate layer this is a simple task. The example shows that by adding a GAUSSIAN BLUR filter to the layer created in 5.2 you can soften off this detail (5.6).



Stage 6

It is also possible to use the methods described in stage 5 to create details on the spokes. Here a triangular detail has been drawn on the top spoke using the VECTOR SHAPE tool. This has then been rotated onto each spoke using the ACTIONS tool (6.2). Once these have been merged and linked you can then change the layer to a MULTIPLY layer. Then, as before, you need only add a BEVEL AND EMBOSS adjusted to your preference to complete the detail (6.3).

You may also want to add a shut line around your centre cap. A good method to achieve this is to create a white circle (6.4) which you then turn into a MULTIPLY layer. Now add a thin STROKE in black along with a very fine BEVEL AND EMBOSS thus

creating the edge of the centre cap (6.5). To create the edge where the alloy meets the cap, copy the layer you have created and set the BEVEL and EMBOSS to an OUTER BEVEL (6.6).

The very final stage you may wish to complete for a more realistic three-dimensional feel is a shadow from the spokes onto the brake disc. This is simple to achieve. First copy the layer containing the depth element of your spokes, then using the BRIGHTNESS/CONTRAST control turn the layer right down to black. You can then nudge this into position, remembering to try to stay faithful to the light source you have applied to the wheel (6.7). It is then a simple task of erasing where your shadow incorrectly overlaps the rim of your design and then adding a GAUSSIAN BLUR (6.8)



Conclusion

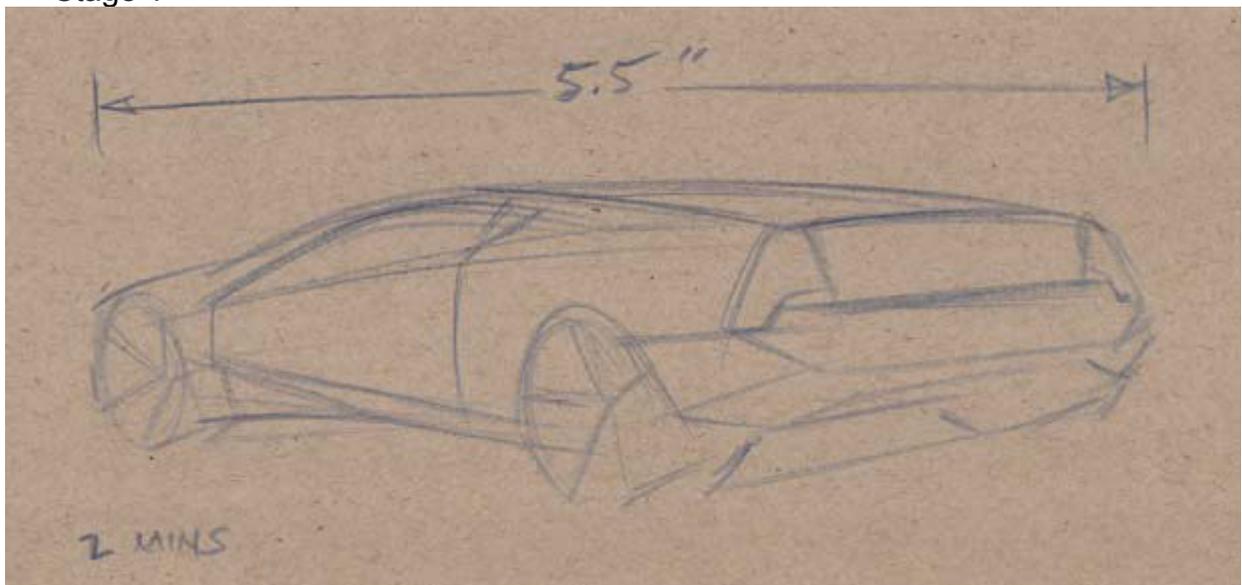
You should now be able to create a very basic alloy wheel design using Photoshop. The techniques you have learned here are simple yet can be combined to produce some astonishing results. The important thing to remember is that when working on the computer, so long as you save regularly and have an UNDO function, you cannot make a mistake. Use this to experiment and explore and you will soon have a whole new set of skills to take to prospective employers.

Quick Sketch Tutorial by John Frye

I start out with an 8.5x11" piece of cover stock weight (takes marker well and holds up to abuse over time) recycled style paper. I buy this in large packages at the office paper supply store (much cheaper than getting a similar paper at an art store). The paper here is Neneh brand Desert Storm. I start out with an erasable blue or regular lead pencil and quickly put the idea down on paper, simultaneously considering the product I am designing, the purpose, it's buyer, current trends, future trends, styling theme, dynamic perspective, realism versus excitement (cheating proportions) and other sketches from the project that this sketch will play off of or create new design directions.

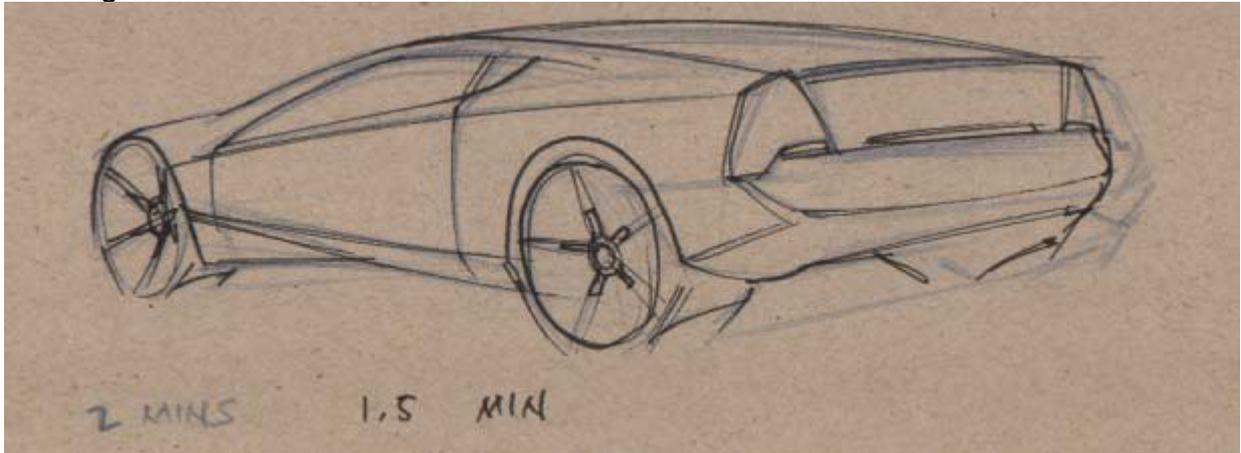
These early sketches need to be free and spontaneous. Too much thought, care, and precision at this point only stifle new ideas and restrict free thinking. Good things can happen by accident if you let things go. As a habit, I tend to draw with too much precision, too much care, so I find it helps to loosen up by drawing very small which increases the looseness proportion versus the size of the sketch (if that makes any sense). Since I have a computer and printer at my disposal to resize and manipulate a series of sketches into the same format later (usually 17" wide), I do not concern myself over the placement on the page or notations or studies around the sketch. This is an extension of the proverbial "napkin sketch" only with better paper and art supplies, but the idea of spontaneity is the same. You could easily crank out a series of sketches on the plane or sitting in a chair with a pad of paper in your lap.

Stage 1



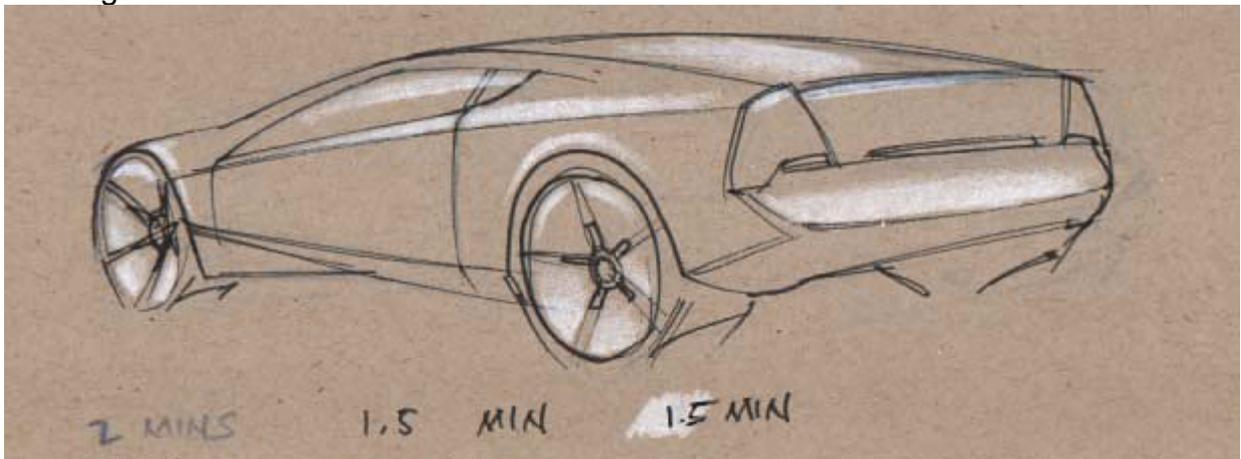
The linework above took less than two minutes and is intentionally rough just to lay in general perspective and proportion. Make sure the linework is light on the paper so that you can erase most of it later. BE SPONTANEOUS! Listen to good music, that always helps me. If you are getting stuck for ideas, it helps to alter an element of the process - maybe sketch with a different tool, try a completely different perspective, different paper, or even go to a different location and sketch. If you do the same thing repeatedly, your mind sometimes learns the process too well and things become automatic - new designs won't come to you unless you throw your brain something new to deal with. This is just my theory, but it seems to work for me. If you are drawing the same car over and over again, quit and move to a different company!

Stage 2



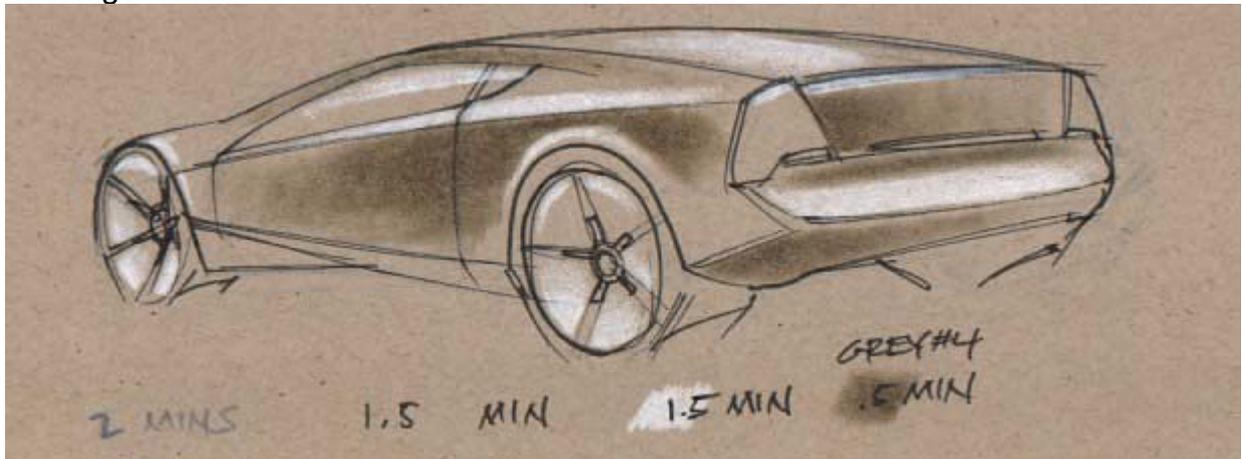
In the next step I have moved to a razorpoint fineline black ink pen and put down more deliberate lines to clarify the design. I use the pencil lines underneath as a rough guide and look to see what is working and what is not - for example, I decided to fix the right rear corner perspective a bit. This step might take longer than the first step of sketching in lines with pencil because you have to take a little more care to get the lines right as there is no erasing from this point forward.

Stage 3



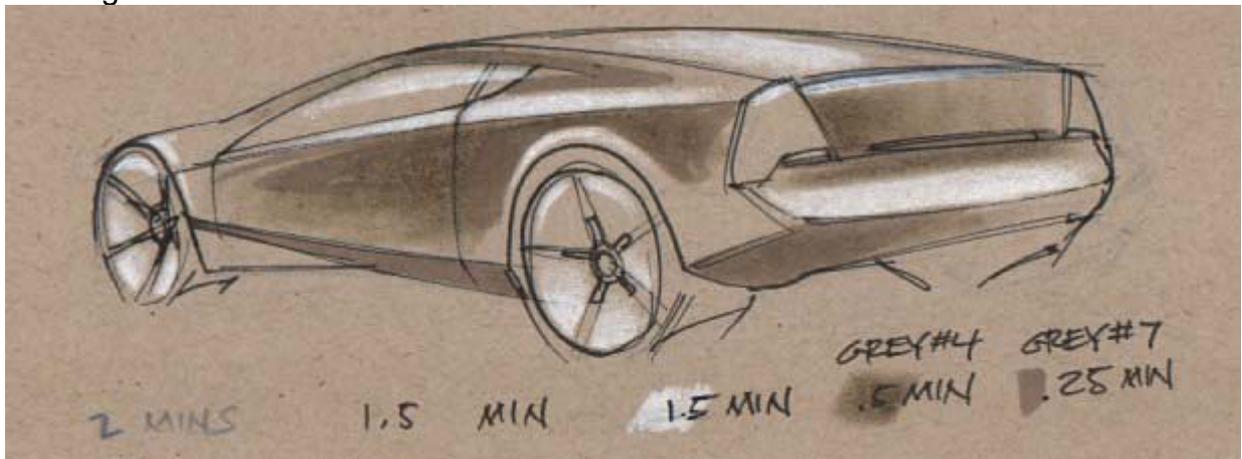
The next step is to begin adding highlight areas with white Prismacolor pencil (if you are drawing on white paper, you can't do this.) But first, I make sure to erase the original pencil lines as they will only get in the way and contaminate the colors that go over them- notice how a little bit of pencil work remaining on the rear decklid has given the white prisma in this area a bluish tint. Where you put highlights is very simple- areas facing up are lighter than those facing down. Don't use too much white pencil - there is often a tendency to try to 'finish' the sketch with every step; it doesn't look done NOT because it needs more white pencil, but because there are steps remaining - if you put down more white pencil, there won't be any room for marker and other colors.

Stage 4



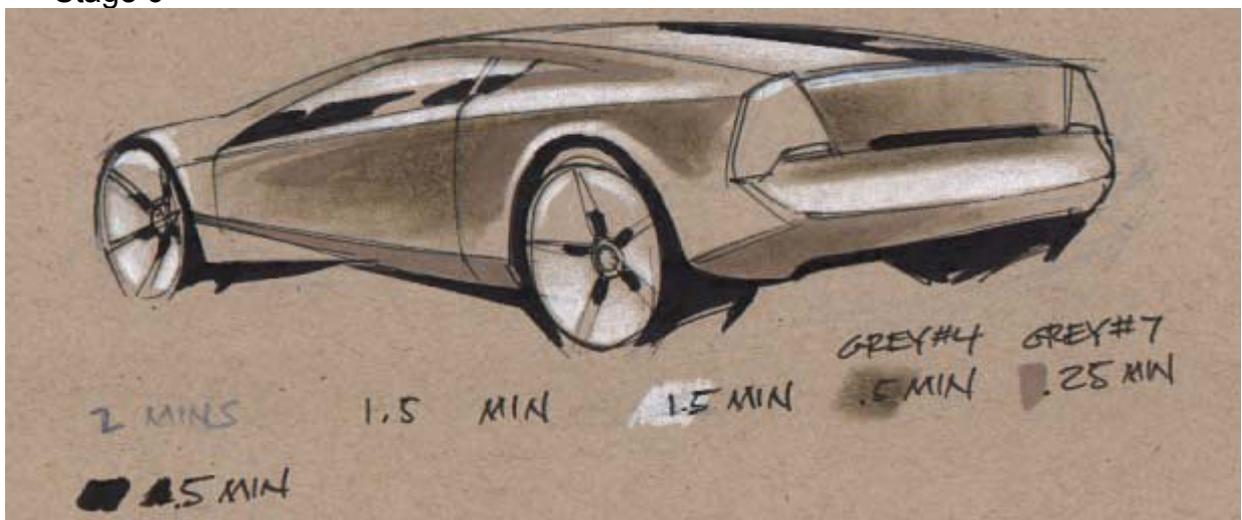
Now I have begun marker work with a medium value (5) warm grey alcohol base marker. This one is on its last legs so it provides for some nice gradations. It goes pretty quick. Keep the same things in mind as with the white prisma- be spare with the medium and don't try to finish the drawing here!

Stage 5



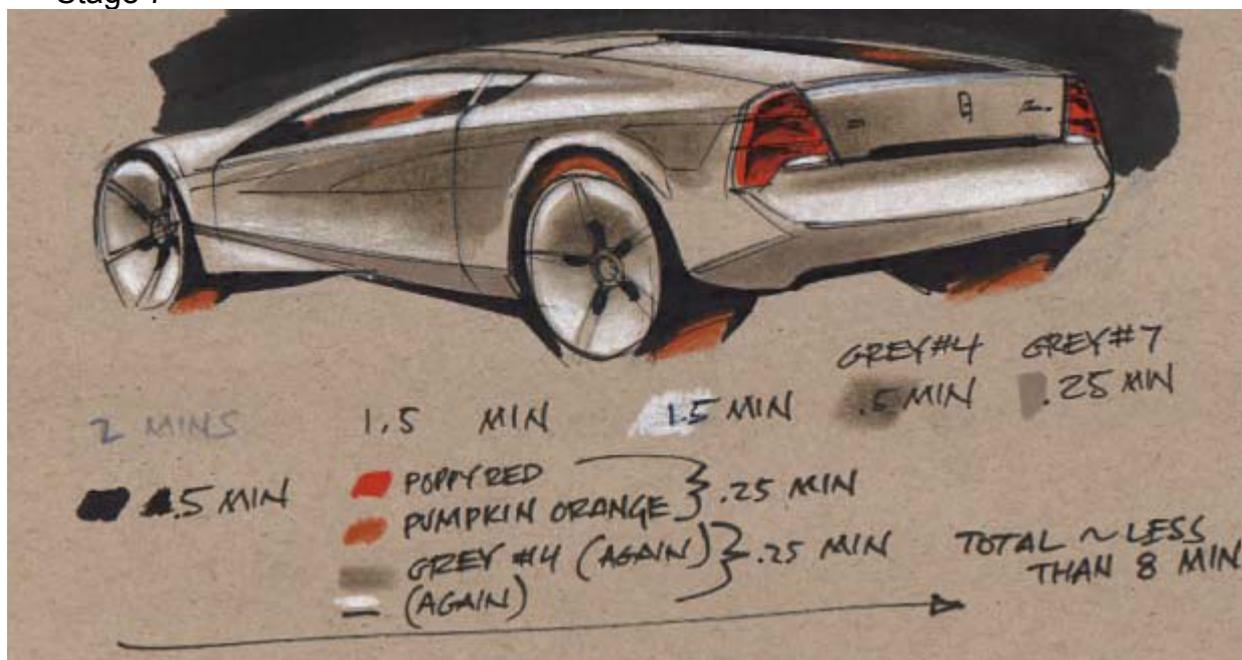
This is a continuation of the marker work with a slightly darker grey- in this case a 7. The marker is of a different brand so it is almost the same value as the previous at its darkest, and the hue is slightly more purple, but it is good enough.

Stage 6



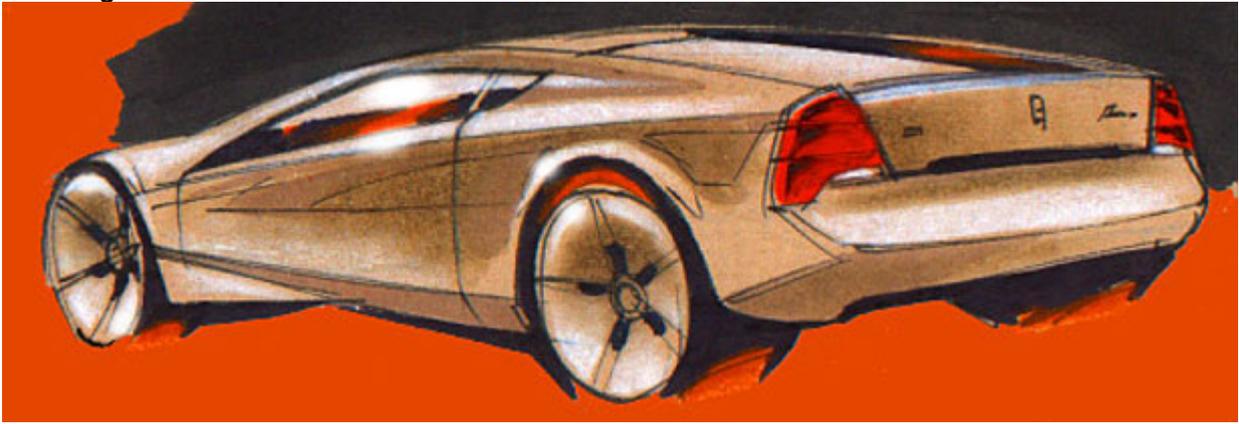
This step adds black with a common Sharpie marker, getting tighter areas may require a finer pen. Now that we have both white and black on the paper, we can see the car much clearer as the complete range in values is now represented. Unless the car paint itself is supposed to look black, I only apply black ink to shadow, tire, and glass areas. The sharp contrast of black butted up against white on the glass helps the mind read the surface as something that is very shiny and different from the material of the paint and body. The eye naturally is attracted to areas where value contrast is the greatest so the viewer tends to look at the glass and tire. Look at the image above quickly and try to be aware of where your eye goes - does it start at the rear wheel then quickly move up and to the left, landing on the glass, perhaps continuing to the front wheel? Careful control of this phenomenon is key in drawing the viewer in and selling your design. On a large presentation, the path of the eye can be controlled to keep the viewer looking at certain elements of your design. On a quick sketch like this, being conscious of this process while sketching will only slow things down, but once you have learned a few dynamic perspectives that work, it becomes automatic.

Stage 7



Once again, I have picked up the Prismacolor pencils to finish things up. Adding areas of detail color to show different materials or finishes. I have also revisited some of the media I used before to tighten up certain aspects of the sketch. I add a couple swipes of black marker to push the background behind the car where it should be, and help define the silhouette of the vehicle. I am done on paper at this point and it has taken less than eight minutes in theory (in actuality it has taken much longer, having had to scan the picture into the computer at every step!). You can see, though, how at this pace, you can get a lot of ideas out very quickly.

Stage 8



The next step for me is to take the sketch (usually I do several sketches on paper first, then do all of the scanning and computer manipulation at the same time) and scan it at about 200-300 dpi and import the image into Photoshop. I usually punch up the contrast, saturation, and may adjust hue and brightness. In this case, I went with: brightness +10, contrast +10, saturation +40. The image may look better on your monitor, but you have to keep in mind how it looks when it prints. It might take some time to get familiar with your printer and how it changes the image. Keep your original image on file in case you need to manipulate some of the aspects and do some tests. The flood fill/paint bucket tool is helpful for making the sketch especially punchy. I grabbed the tire orange color with eyedropper first then flood the entire background area. I also went in with the airbrush tool and pulled out some softer white, red and orange highlights.

That's it! Print it and save it to disk for posterity. Time to move on, there's 20 more sketches to finish by midnight.

John Frye is a professional automotive designer, and a graduate of Art Center College of Design.

Rendering Tutorial - Vauxhall VX220 by Allan Macdonald

Introduction

With this tutorial I am going to guide you, stage by stage, through the methods I use to produce a rendering. I have developed this style over the past couple of years and find it the most simple and efficient way to produce a good drawing. Just remember



however that there is no right or wrong way to render. This tutorial aims only to inspire... not to instruct!

Materials Used

Marker paper - Reduces the bleeding of ink when using marker pens

Black Biro pen - For most line work and preliminary shading

Chartpak Markers - For blocking in the largest solid areas of colour

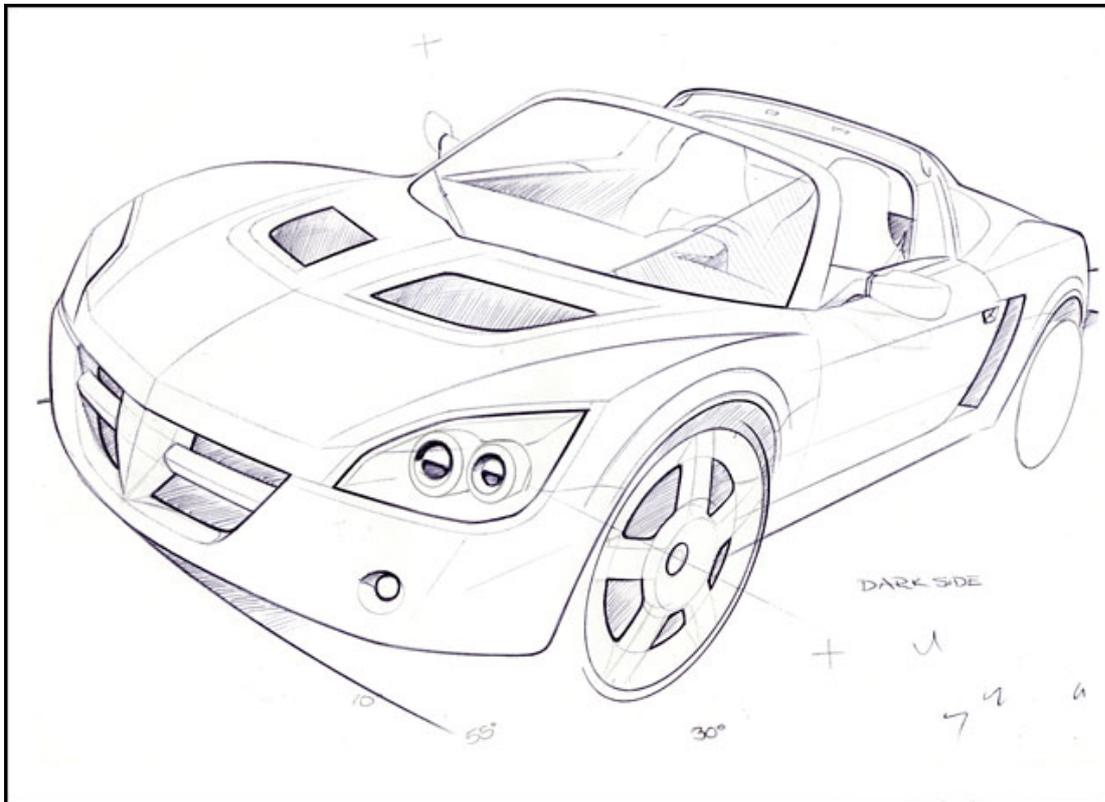
Airbrush - Used to create smooth gradients of colour

Coloured pencils - For final detail finishing work

Bear in mind that this is only a guide so if you feel that you can achieve a suitable result using a different method, then do so. For instance, I have substituted using a real airbrush and coloured pencils for similar tools in Photoshop and a sketch tablet. Using this I am able to achieve very similar results but in a more versatile way. I also find it faster and dare I say less stressful (it's a lot easier to remove mistakes on the computer). The principal for all mediums used is very similar however and throughout the tutorial I will point out how the varying methods compare.

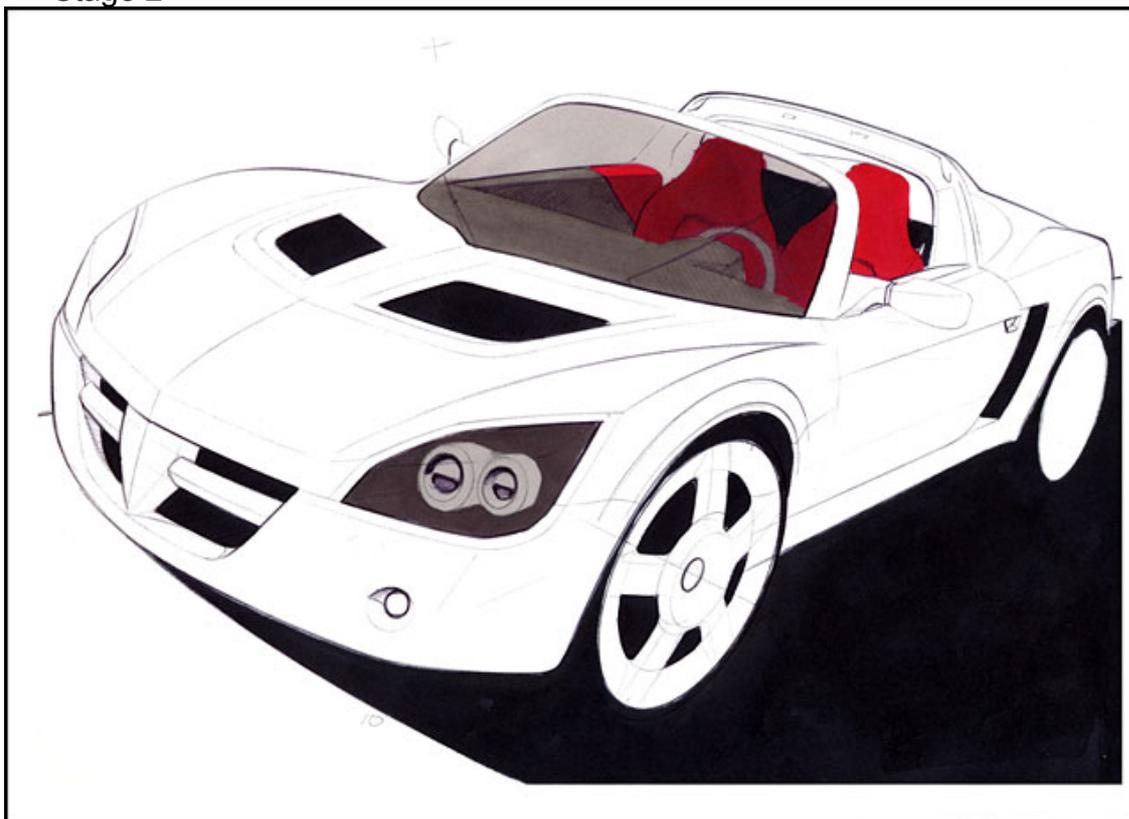
Stage 1

With a normal black biro I have drawn this on marker paper, using a photo as an underlay. At this stage I find it important to think how I am going to colour the vehicle, as this dictates the thickness of the lines. For instance on the body side, where the varying darkness of the colour work will show the body creases, I use lighter lines that will be invisible in the final piece. However, around areas like the headlamps and grill where I know that there will be a high contrast in colour darkness, I have really darkened and thickened my lines. The most important thing is not to trace your lines with no thought. You should try to get what is usually referred to as "quality in your lines".



It's a very hard thing to explain but the more you draw, the more you will get a feeling for what this is.

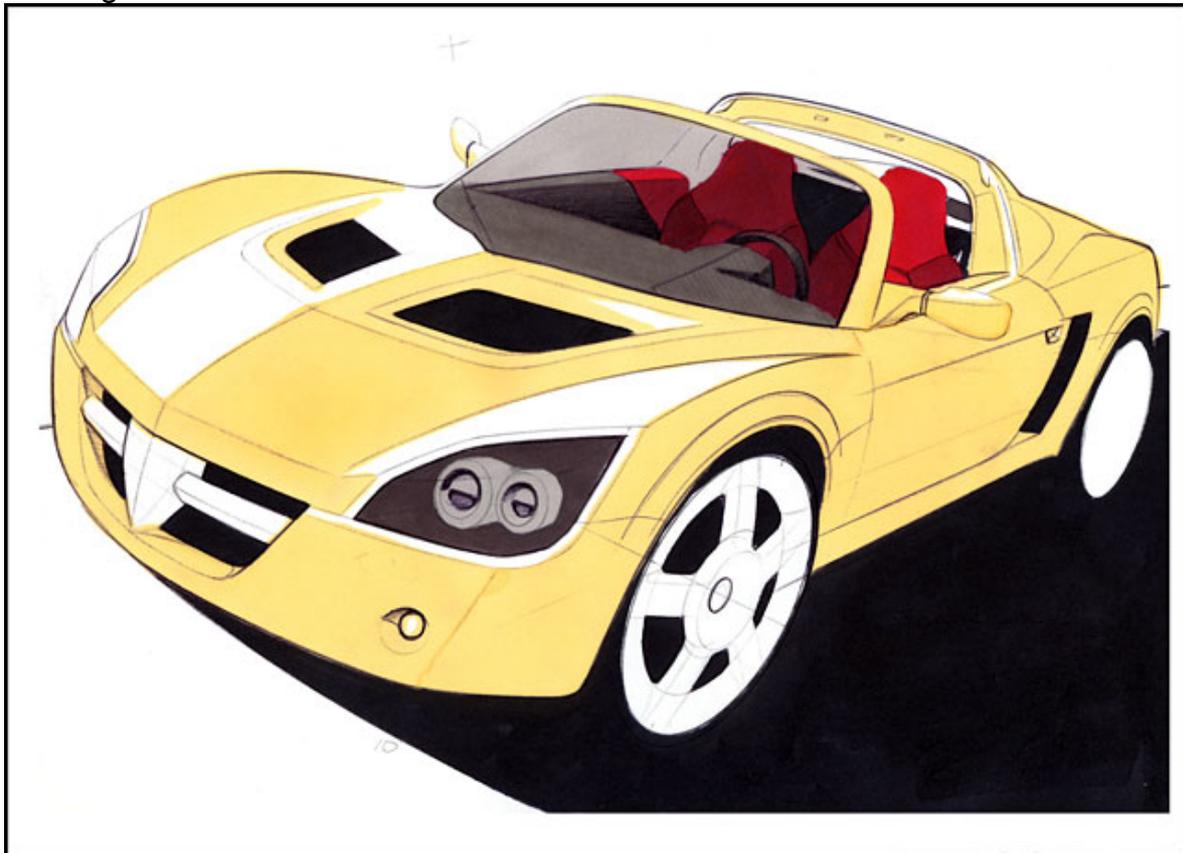
Stage 2



Before starting this stage it is important to decide where you want your light source to be as this dictates where you are putting down the colours. I have decided to use a light source that is just above the horizon at the top left of the page. This means that a

long shadow will be cast, and the visible side of the vehicle will be in shade. Using marker pens I have blocked in the areas I know to be darkest. When colouring I try to aim for a very graphic final look. To achieve this I usually colour the ground, lamps and details darker than the bodywork. I have used Extra Black on the ground and vents, then Cool Grey 6 and 7 along with Ruby red in the interior. Note that on areas of the interior behind the shadowed part of the screen I have used colour shades slightly darker than on the lighter side of the screen. I did this by going over these parts with the same marker again after the page had fully dried. In theory you can reach 3 shades of the same colour using this method. The effect that you should be trying to achieve is that glass reflecting a bright light (the sky) is harder to see through than when it is in shade.

Stage 3

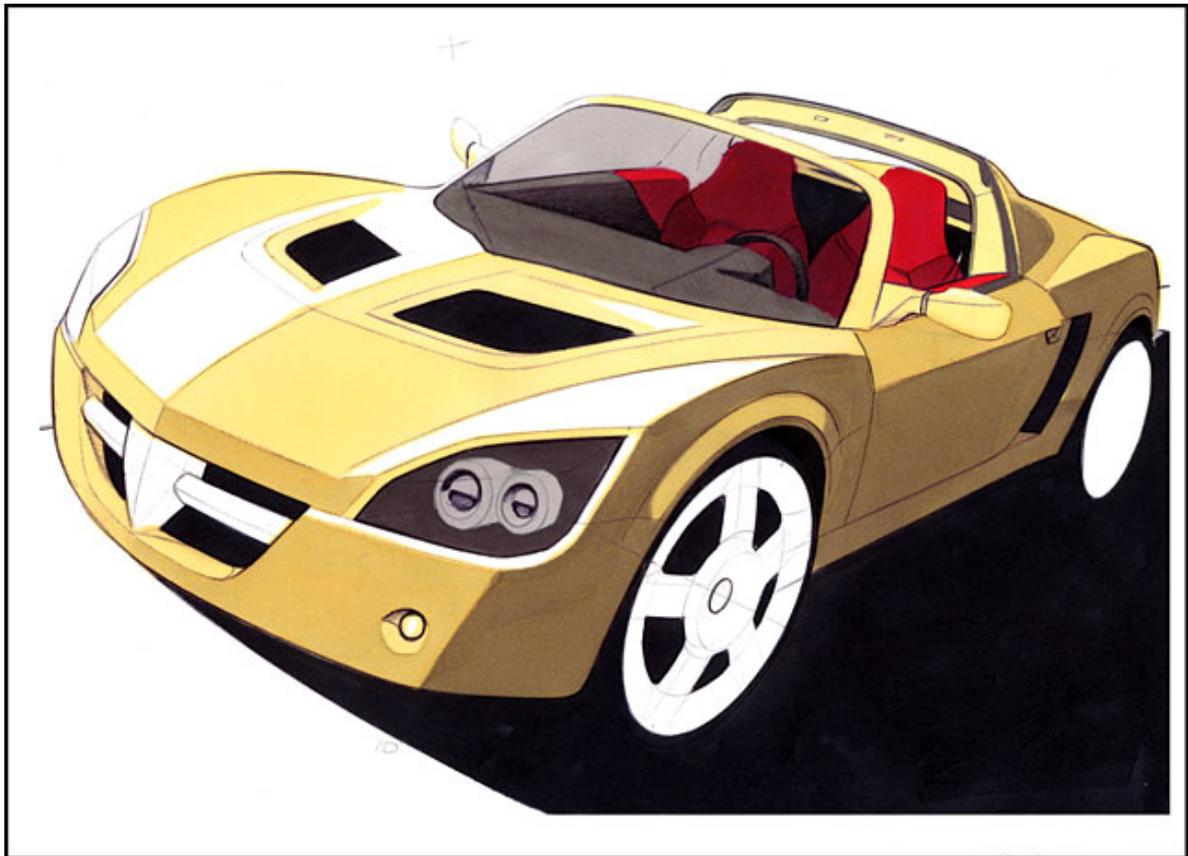


Still using the marker pens I have now blocked in the bodywork using the Cream Chartpak Marker. Note that I have left the surfaces facing in the direction of the light source white. Apart from those two small areas however the rest of the body is coloured. When choosing a colour for this stage, remember that it will represent the lightest areas of your bodywork except white areas, so it is probably wise not to choose too dark a colour. When using marker pens to block in such large areas of colour it is also important not to work too slowly. If you let a part of the page dry then have to go over it again you will be left with a patchy block of colour.

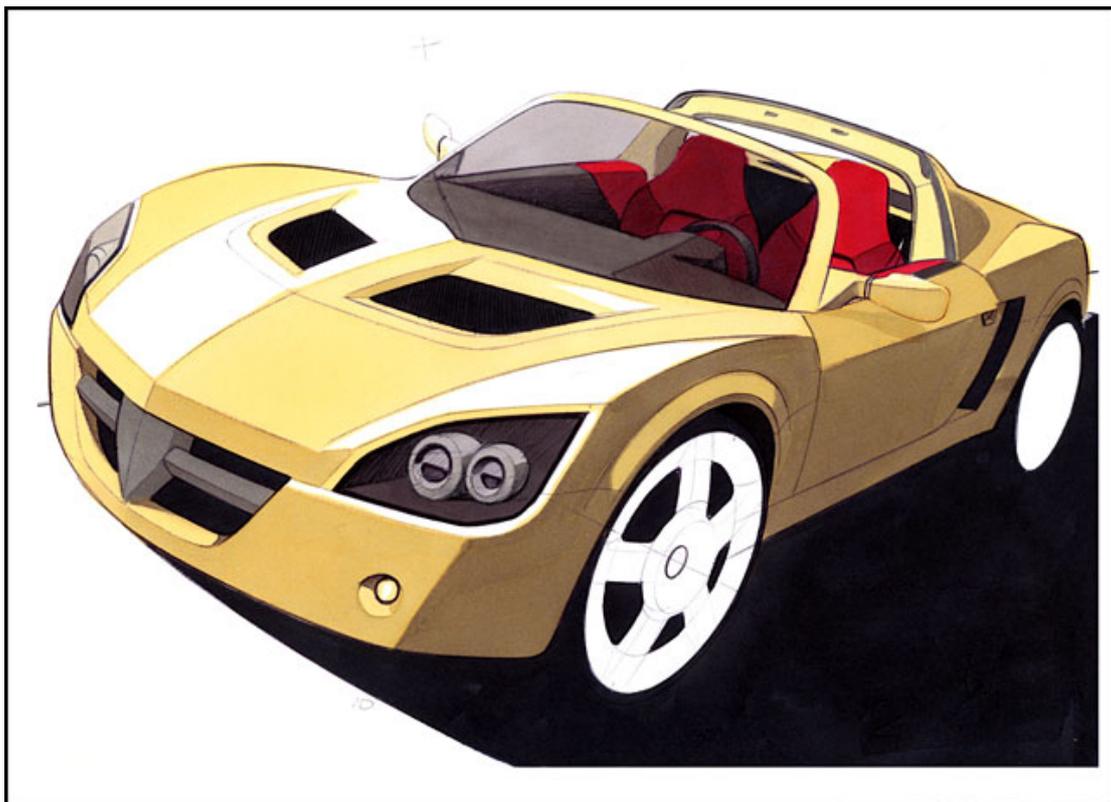
Stage 4

It's at this stage I always feel the drawing coming to life. Using a Warm Grey 7 I have darkened down the areas of the vehicle most in the shade, then a Warm Grey 2 to darken the front slightly. The reason for using grey for the shaded areas is that colour will lose some of its saturation when in the shade. Something to note here is that most other base colours will look better if you use Cool Greys to darken the shaded areas,

although you should feel free to experiment. Remember to shade the small detailed areas too, for instance in the grill and spot lamps.

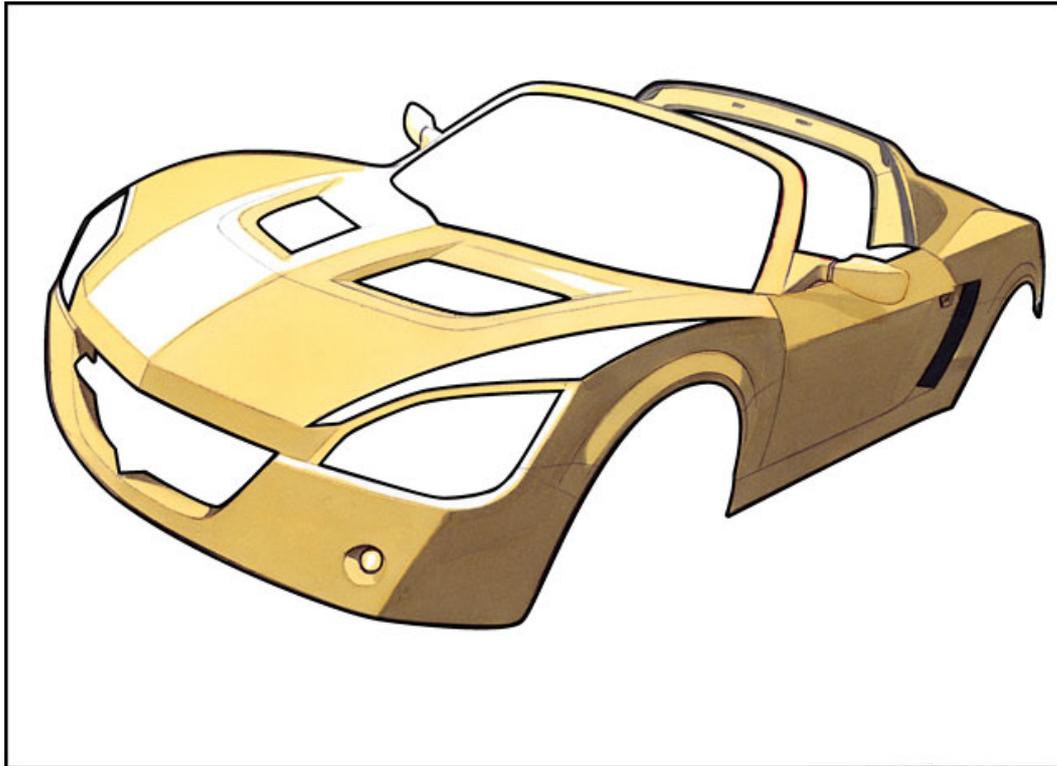


Stage 5



At this stage I usually feel the need to work some of the details back in using a biro. I have sharpened up the details in the lamps for instance. Remember however that as in stage one it is best to avoid building up lines that represent folds in the bodywork. Also try to avoid all lines being of the same thickness. Remember, by adding weight to some lines and keeping others fainter the drawing has more character.

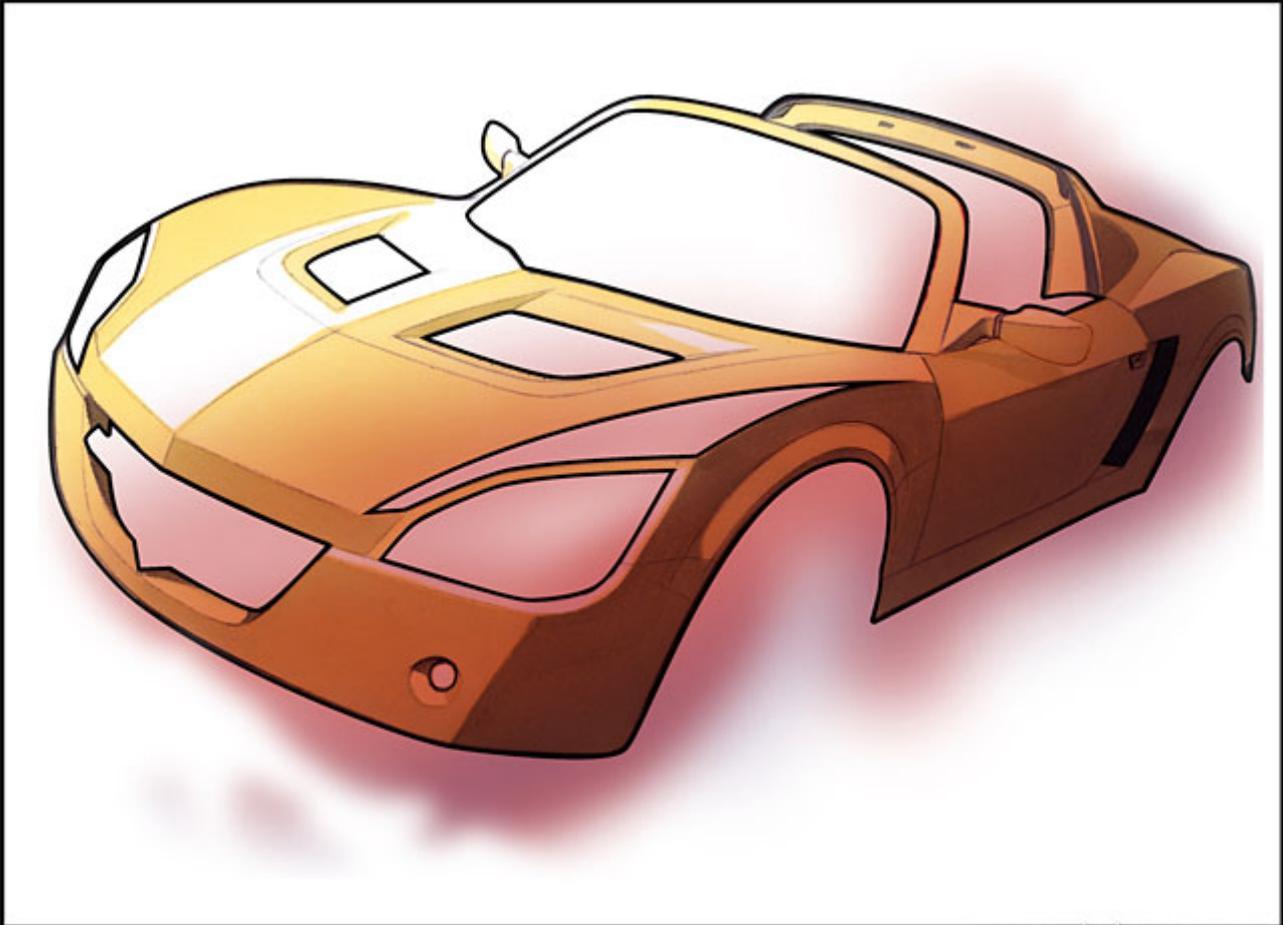
Stage 6



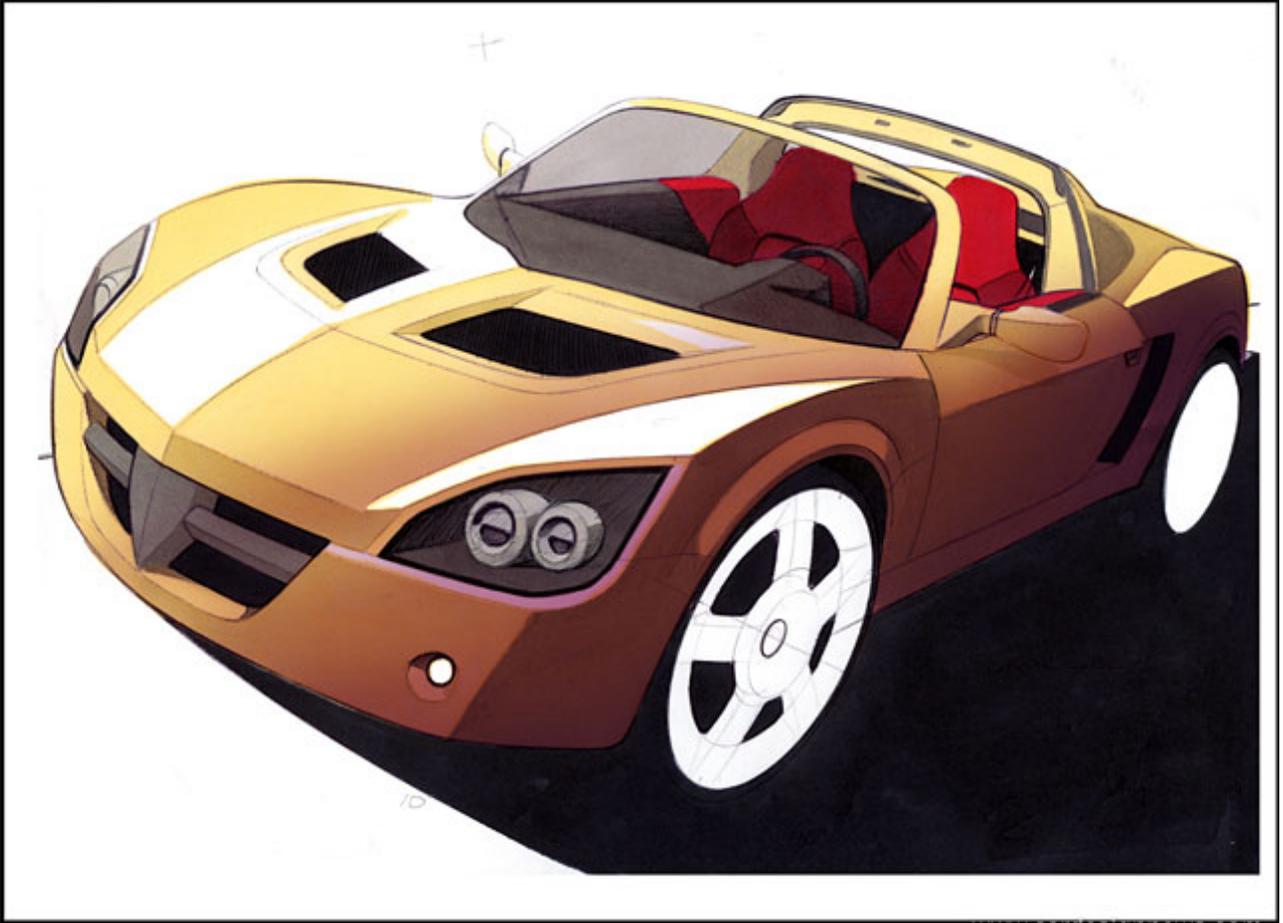
Now that I have blocked in the basic light and dark areas of the body I am ready to move onto airbrush work. At this stage I generally move to Photoshop, the principle is the same however whether you are going to use airbrush, pastels or the equivalent tools in Photoshop. The idea is to put smooth gradients onto the paper without being hindered by having to work around areas like the wheel arches, lamps or windows. To do this you will need to have a method of removing areas of overspray. If you are using a real airbrush you will need to mask off all the non-bodywork areas of the vehicle as shown. If you are using pastel, or like me Photoshop, then you can use the eraser to remove areas of over spray. It is worth taking care at this point, as it is very easy to forget to mask smaller items, such as the spot lamps. Here I am aiming to further darken down the bodywork on the shaded side of the vehicle. I have therefore masked off all areas of non-bodywork.

Stage 7

Here you can see exactly how masking around areas that you don't want to colour enables you to put a smoother gradient down. I have chosen the colour red because as you move away from the light into the shade, colours tend to get colder as well as darker and less saturated. At the rear of the vehicle you can see I have even moved into a shade of purple. When spraying this area the idea is to have as smooth and steady a gradient as possible. In Photoshop this meant using a large soft brush, which covered about half the vehicle, and with an airbrush, would mean holding the spray relatively high. What you don't want to do is have blotches of colour.



Stage 8



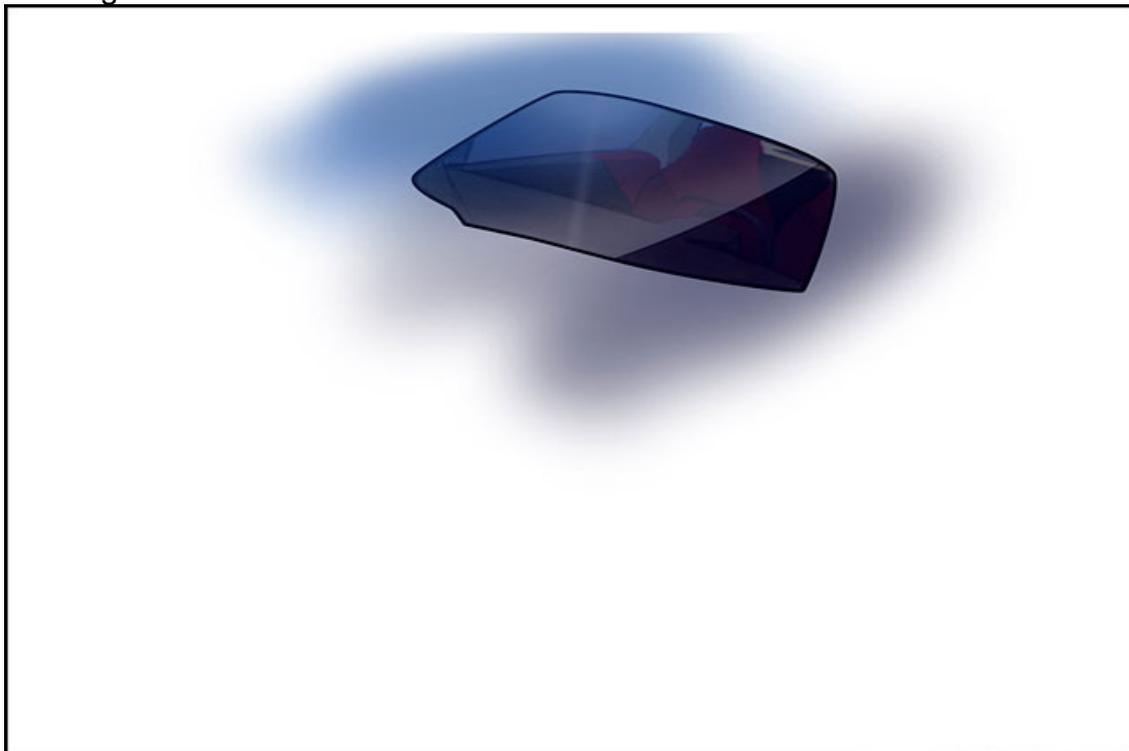
Once you remove the masking (or use the eraser) you can see that the vehicle now has a real sense of depth. You can see at the rear of the vehicle I have also darkened down the bodywork until it is almost as dark as the ground. This helps make the drawing more dramatic, although take care not to completely lose the details in this area.

Stage 9



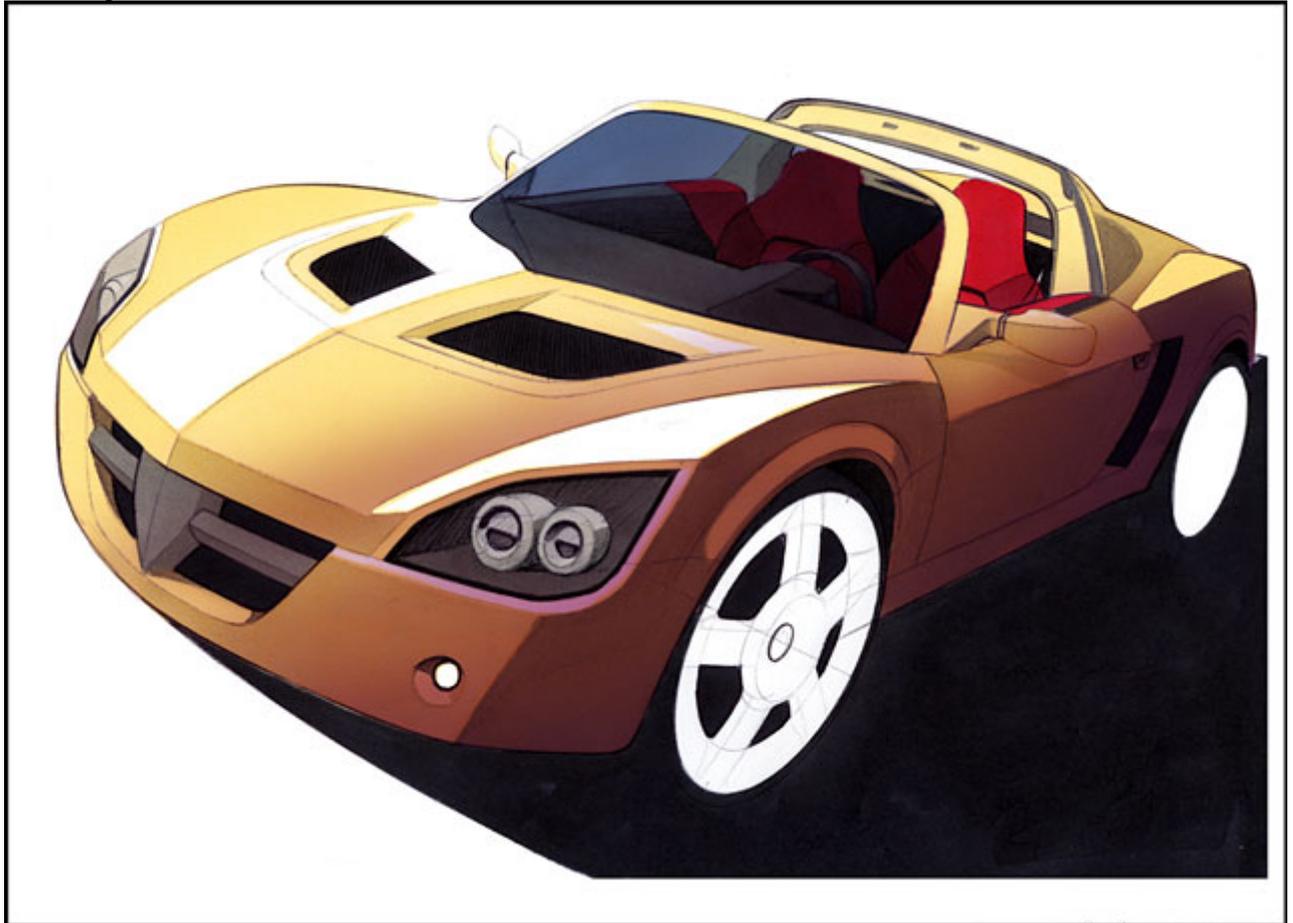
As in stage 6 I have now masked off the windscreen, although I ignored masking the wiper arm. This is such a small detail that it is probably best left until the end, when you can add it back in with coloured pencils. If the car you are rendering has side windows then you might want to include them here. Doing the front and side windows at the same time will help ensure you have continuity in your shading.

Stage 10



When spraying the windscreen I have used a very dark shade on the left of the vehicle, but on the right have gone for a very light shade of blue. Obviously windscreens are very reflective and by using the light blue I have given the impression of the screen reflecting the sky. Take care not to go too dark at this stage, as you do not want to lose the interior details.

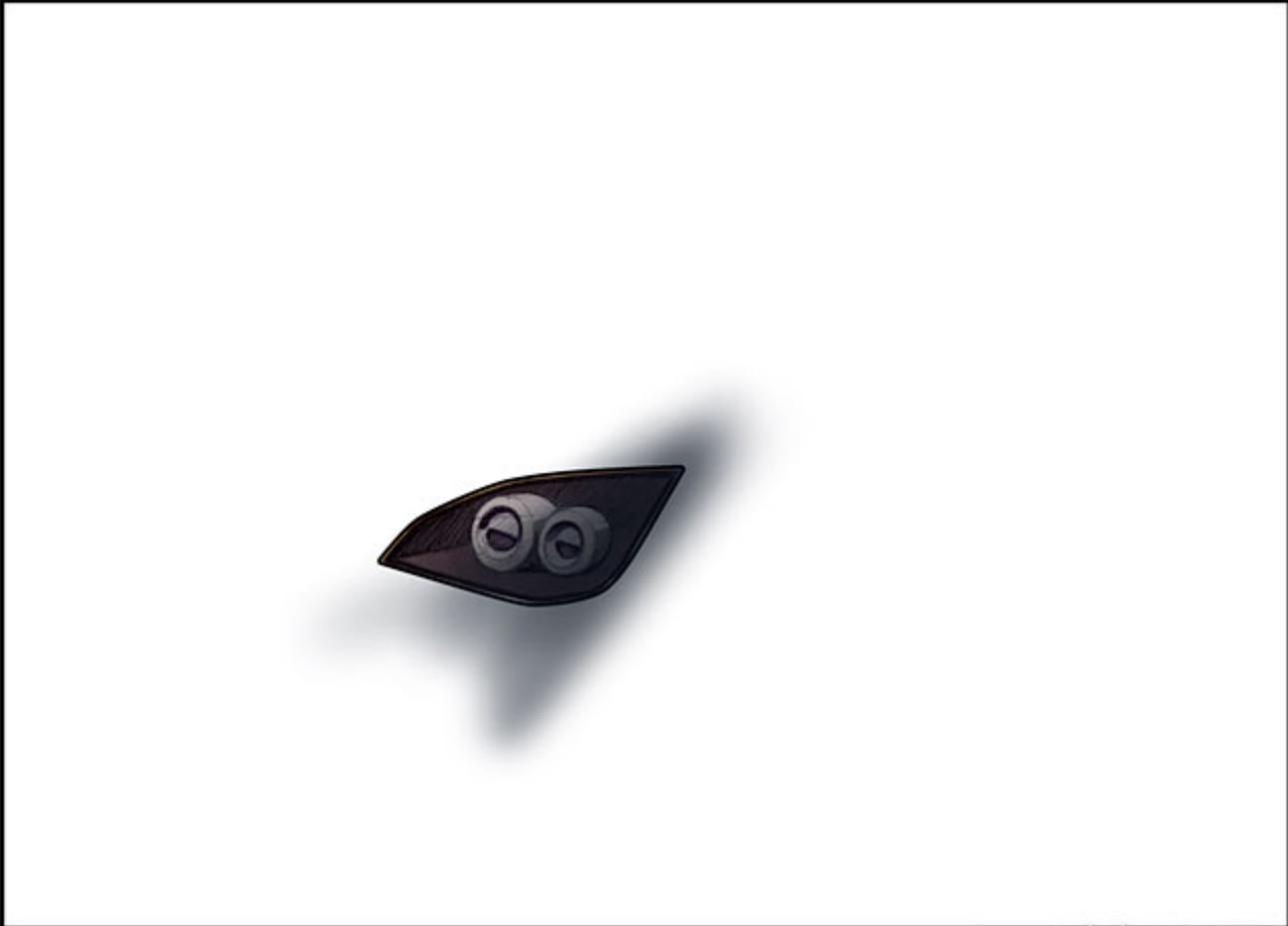
Stage 11



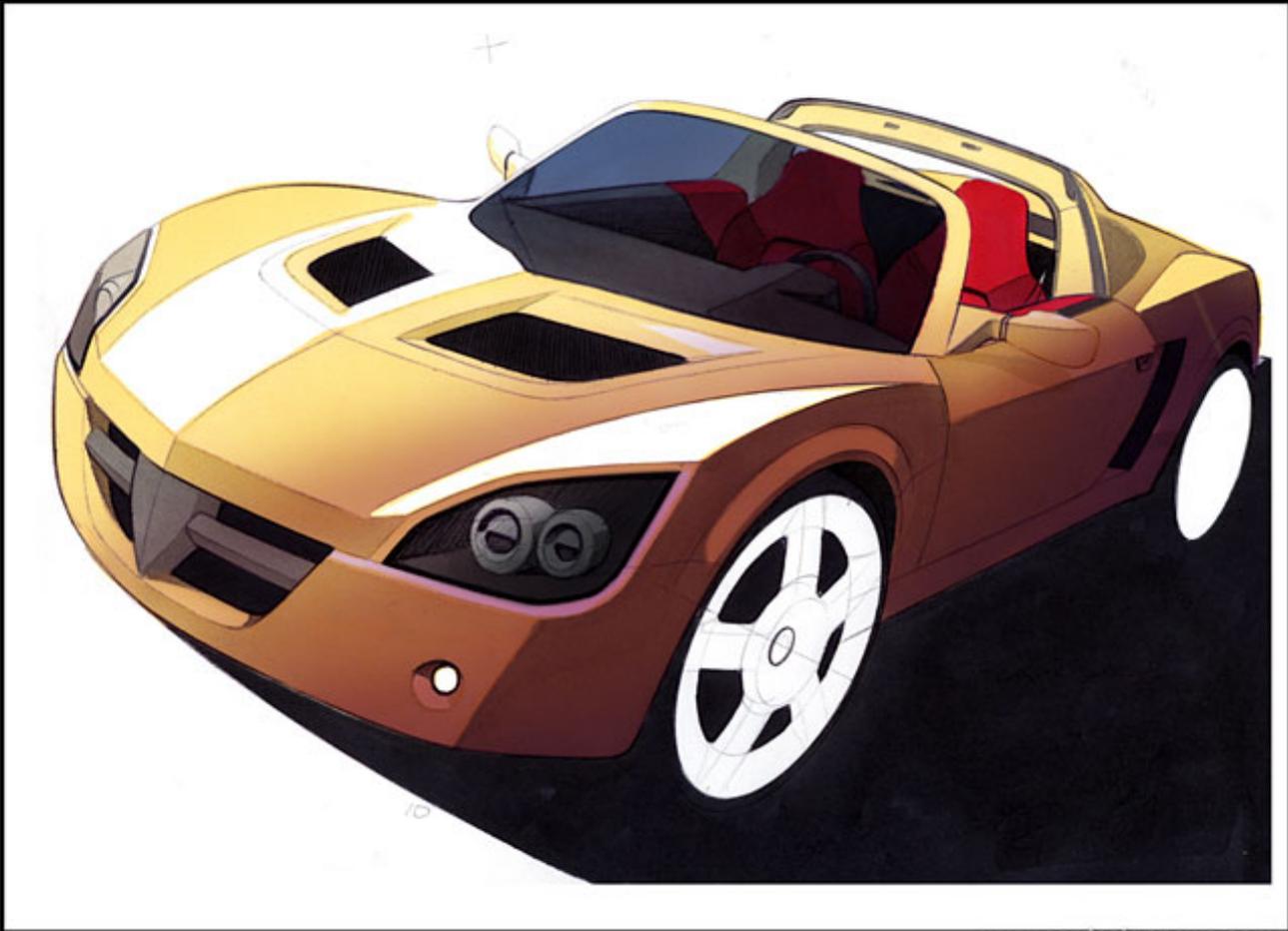
With the mask removed you can now see that the screen has a stronger glass like feel. Later we are going to lighten up the area that is the reflection of the sky with white airbrush in order to achieve a truly shiny look.

Stage 12

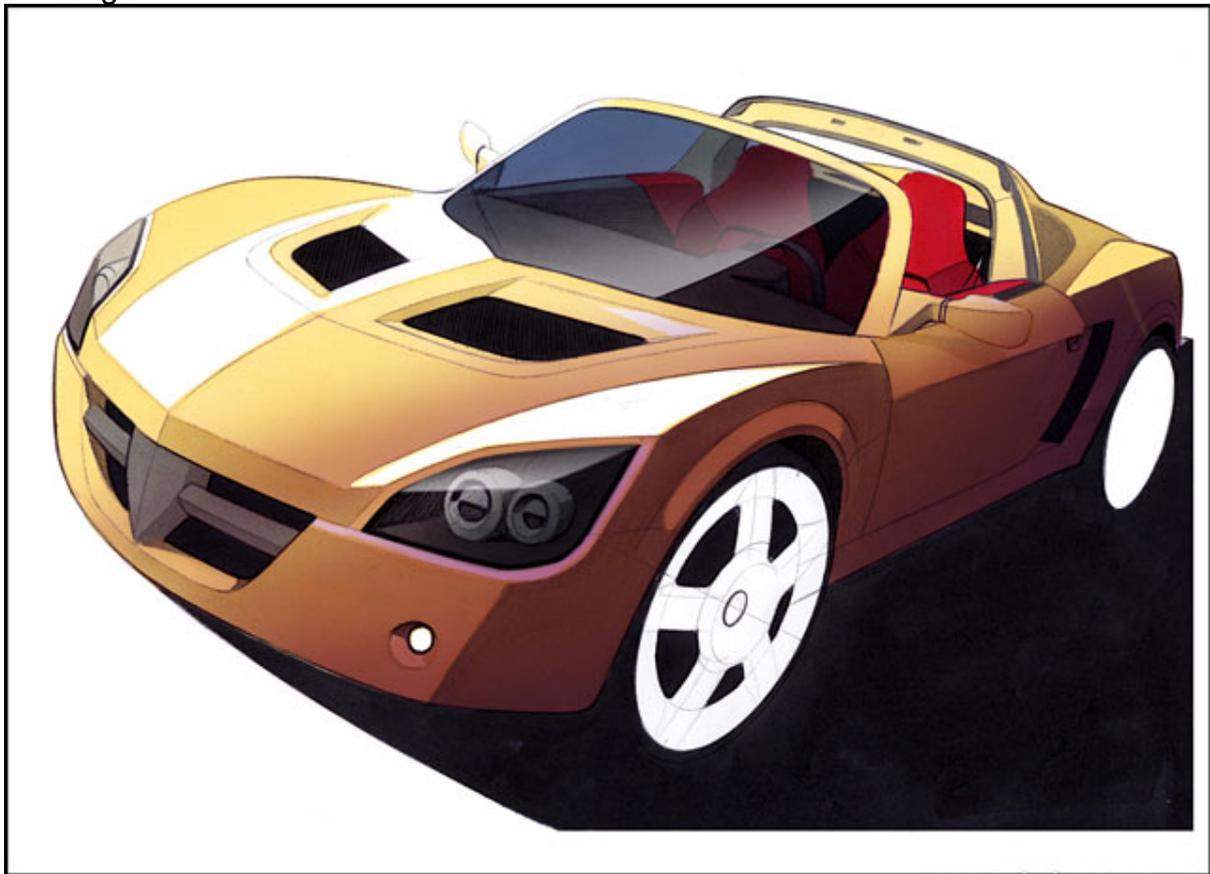
As I think you should now have a good idea of what masking achieves, I will make this the last time I show you. Here I have masked off the headlamp in order to achieve the same effect as I just used on the windscreen. Quick spray of a very dark blue.



Stage 13. Then remove the mask.

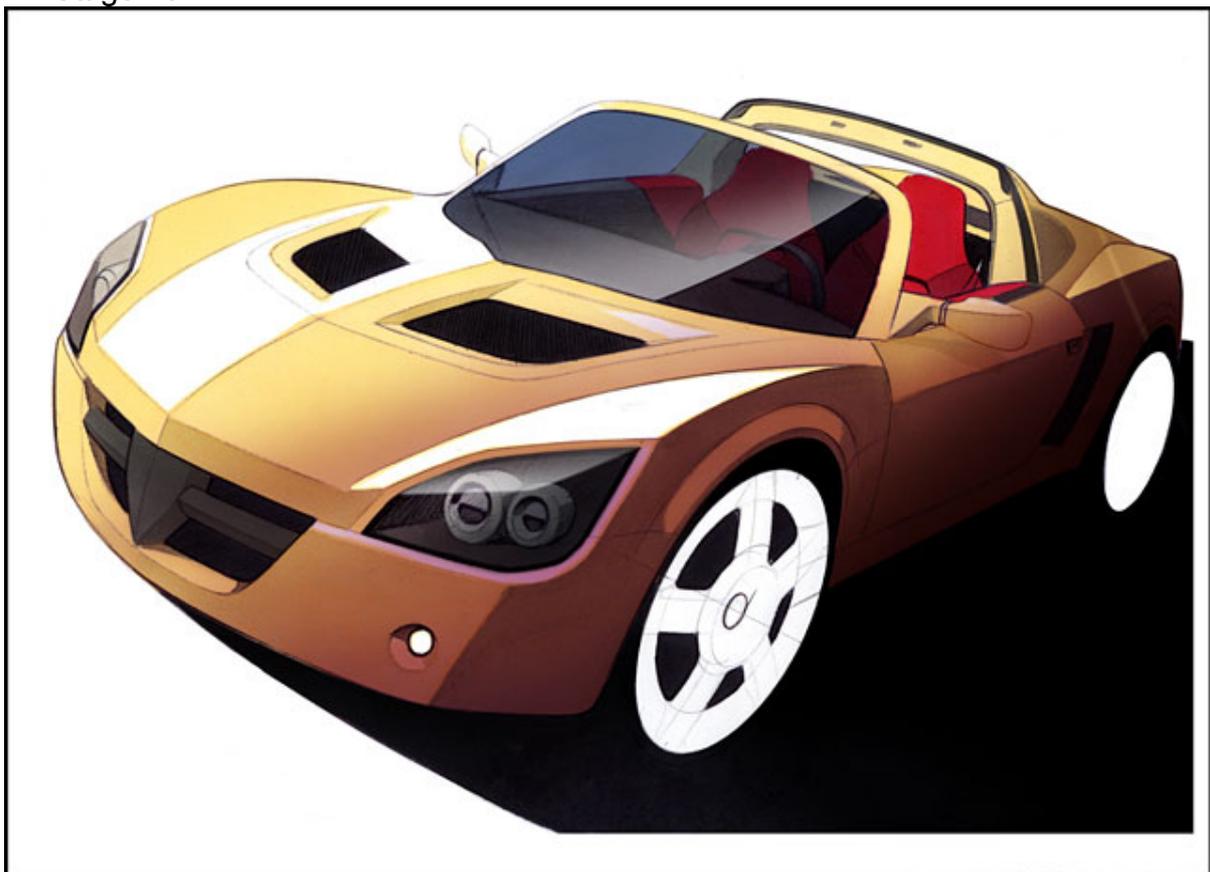


Stage 14



Here you can see that I have again masked the lamp and windscreen but this time stopped where the shadows begin. I have then applied a touch of white airbrush. Again as when applying the darker colours take care not to completely white out these areas.

Stage 15



Having looked at the drawing at this stage I have decided that the body side at the rear probably needs a little more darkening. I have added just a little colour to aid the dramatic contrast of the light and shade. This was done, as before, with some masking and airbrushing.

Stage 16



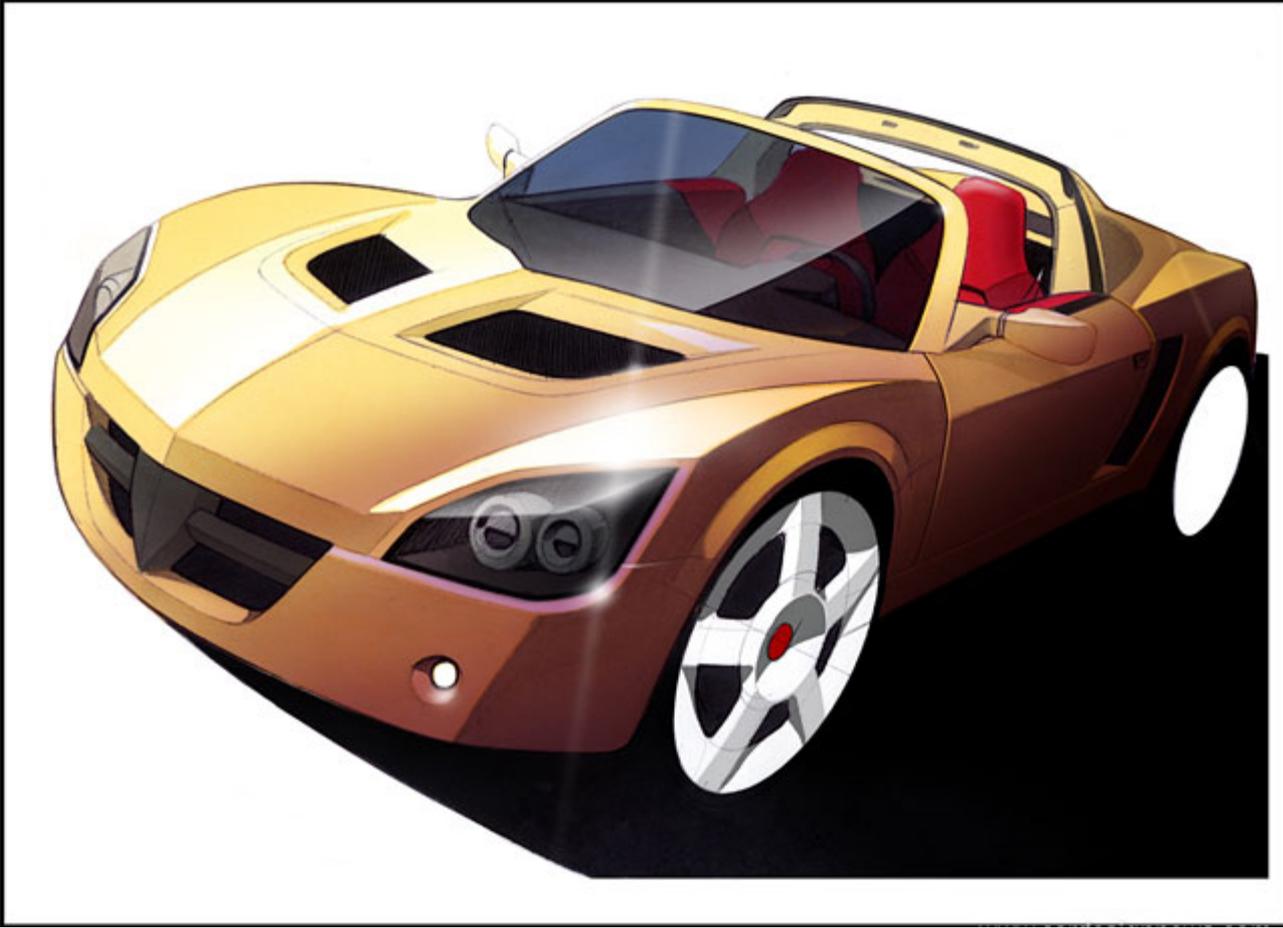
Since it is hard to tell exactly what the drawing is going to look like when you remove the masking you may find that you need to repeat the masking and spraying stage a couple of times. Here I have decided that my wheel arches are a little too dark and not prominent enough. I have therefore done another quick mask and lightened them up with a touch of yellow.

Stage 17

When you feel that you have completed all your marker and airbrush it is time to move onto the final stage. Bringing out some shut lines and highlights. On this drawing I felt I wanted to keep this to a minimum to avoid cluttering an already very complex shape. The idea is however that a shut line compromises two coloured lines. A dark line on the edge facing away from the light source, and a lighter line on the edge facing towards the light source. Try and avoid using black and white for these lines, and instead try to use lighter or darker tones of the colour in which you have used on the body panels the line cuts through.



Stage 18



In order to add highlights to the vehicle I have began by drawing a very faint white line through the body. Onto this line will fall the brightest highlights. The further you move from this line the less intense the highlights will be. Try and place the line so that it does not pass through areas that will be awkward to highlight. Having drawn this line I have then used a white airbrush to really punch out the areas that are reflecting the light. If you are using a real airbrush as opposed to working on Photoshop this is the stage in which you should really take care, as mistakes will be very, very hard to remedy.

Stage 19



For the rest of the smaller highlights since I am working in Photoshop I have used the airbrush tool. If you are working without this you can try using white gouache or white pencil. If using gouache, squeeze a little onto a saucer with a little water. Mix some gouache with the water to get a thick but usable consistency, then using a paintbrush pick out areas where the light would catch on things like shut lines. There is no need to make all your highlights obvious, as even the smallest pinprick of white on a dark surface will have the desired effect. You may also want to spray a faint halo of white using an airbrush over some of your highlights to give them a very bright shiny look.

Stage 20

Finally you may have noticed that I have thus far ignored the rear wheel. I tend to do this as at the end, using Photoshop it is a simple task for me to copy cut and paste the rear wheel with a little bit of resizing. I have also darkened it down just to put it a little more into the distance.

Hopefully you will now have learned some of the basic methods I use in my renderings. Simply being able to see the drawing at each stage is something I find very

useful. What is now important is that you mix what you have learnt here with things you have learnt elsewhere, and then practice. By doing this you will soon develop your own style, and ways of doing things. In the competitive world of automotive design, having your own distinctive and stand out from the crowd style is an asset you should not underestimate.



Allan Macdonald is an automotive designer currently at Volvo Trucks. His previous employment included MG-Rover and ARUP Design Research. He is a graduate of the MDes Transportation Design course at Coventry University.