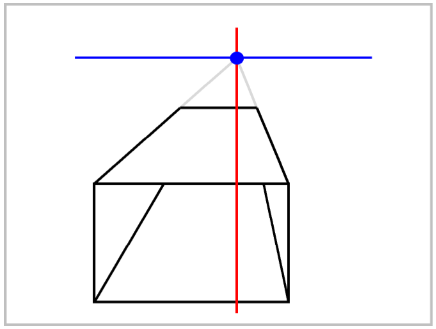
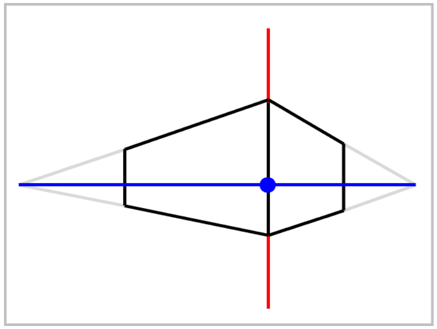
All perspectives are dependent on two factors. The first being the shape and dimensions of the 'subject' being viewed, and the second being the position from where it is been viewed.

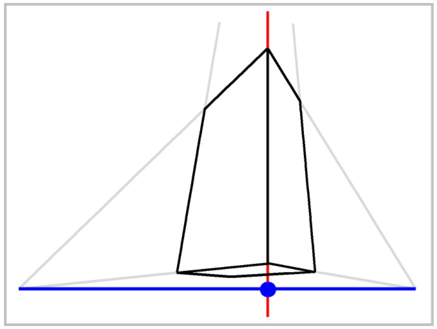
To cover the wide range of possibilities 'Point Perspective' will be reviewing and demonstrating the methods used to draw the different types of technical perspective, and how those methods can be applied to draw perspectives of different shapes, forms and sizes including forms by design and the human figure.

Besides the value of perspective in art, it also has an important purpose in a wide range of professions ranging from Architecture & Engineering right through to Manufacturing & Sales. In fact if there is a need for a graphic presentation or illustration the perspective is always an option. Including the so-called 'purpose designed' transparent and exploded perspectives or axonometric projections.

There are three fundamental types of perspective. Those being perspectives that have either 1, 2 or 3 vanishing point. Each is constructed in a similar fashion using common standards that are adjusted to accommodate the set-up of each.







The so-called 1, 2 and 3-point method of drawing a perspective is the nearest simulation of how we normally see things. I say simulation because it excludes that fact that we have two eyes with lenses and a brain that computes what is seen by each eye and converts it into to a single 3D image.

In addition to these 3 basic types there is also the multi point perspective. As the name implies it is a perspective that has more than 3 vanishing points. So often we come across a reference to a 6, 9, 12 or whatever point perspective. These are referred to as a multi point perspectives. Yet they are all constructed in much the same way.

The multi point perspective is used to draw multiple objects and complex objects that have more 'faces' that the conventional four sided shape. In the following demonstrations you will be shown how the multi point perspective can apply to both the 2 and 3-point method of drawing perspectives.

Before we start the demonstration on how to draw the different types. We need to review the basic set-up and drawing requirements of technical perspective.

Firstly, you will require a plan, elevation and in some cases a section of the 'Object' you wish to draw perspective of. All must be the same scale. However, depending on the detail of the elevations you may require a second elevation. On the other hand if you are working on a very simple object the elevation may not be necessary. Providing you have the dimensions it would probably be easier to draw it using a scale.

To draw perspective you will require a larger worktop to layout your working drawing, plan, and elevations. In the demonstrations that follow you will be shown how the drawings are laid out on the worktop. Once these have been set-up as per the guidelines they must to be taped down. This would probably be ideal for a right-handed person. However, if you are left-handed there is no reason why the side drawings could be positioned the other way round.

Next you will need a longer straightedge, a scale to match, and the trusty pencil. It is advisable to use a softer grade of graphite such as an HB or B to do your setting out. The setting-out lines are temporary, and they will have to be erased later. Using harder grades of graphite may appear lighter, but they are more difficult to erase. Lastly, for the axonometric projections an adjustable set square would be useful addition.

On more complex studies you work will tend to a little dirty. So use a dusting brush regularly and avoid sliding the straightedge across your working drawing.

In the demonstrations that follow the construction lines are shown as a complete line from point to point. Though this is necessary to illustrate the point, in reality the working drawing will get dirty from the straightedge been moved over the existing construction lines. To reduce that possibility, only draw that part of the line that is relevant. For example, at the intersections only.

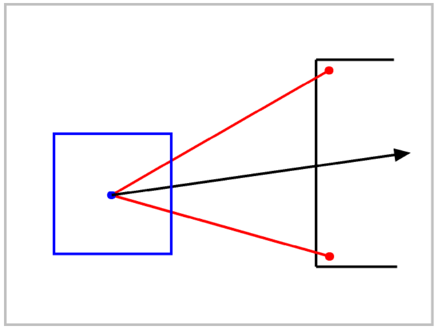
Then there is the aspect of drawing quality where accuracy is key to a quality of a hand drawn perspective. A good percentage of you work will depend on accurate construction lines. When drawing a long line, keep the pencil at a consistent angle and roll it in your fingertips as you draw the line. This will prevent flat spots and create a crisp line.

Another method that could be employed is to insert a mapping pin at the vanishing points and at the viewing point to support the straightedge at that point. Then you have the option of using a thread instead of a straightedge.

There will come the time when one of the vanishing points you have set-up will be positioned beyond the edge of your worktop. Consequently, it becomes very difficult to map the related regressions when the vanishing point is not fixed and is 'somewhere out there'.

One solution could be, 'get a larger worktop'. That is easier said than done. So, an alternative solution is to set-up a triangular vanishing point.

First you need to set-up the temporary vanishing point (VP) on a table or worktop next to your worktop. Next insert two mapping pins at the top and bottom of the worktop. Then add a tread from both mapping pins to the VP and tighten. Thereafter, add another **tread** from the VP that is long enough to reach the far end of the worktop. This thread will be used to map the regression lines.



If need be, the adjoining table could be removed. When the regression is mapped from (to) that VP, make sure that the VP is stretches into place before hand.

Tip: It may not be a good idea to set-up the mapping pins on the front surface of your worktop as this will damage it. An alternative could be to set them up on the side of your worktop.

Ensure that all treads are secure to each other and to the two mapping pins on your worktop.

In the demonstrations that follow you will shown how each type of technical perspective is constructed. Despite their differences, they all share certain commonalities that are applied differently to suit the different methods used to construct that particular type of perspective.

The basic construction of the perspective is fundamental to the technical perspective. It is important become familiar with the terminology, its purpose and how the different components are applied.

All perspectives are structured on two factors. The first being the object been viewed, and the second is the point from where that object is been viewed. That point is referred to as being the viewing point. In some schools of thought the viewing point is referred to as the 'eye'.

The term object is the subject matter. This could rage from being a single item, building, person or the like to a number of objects or a complete landscape of different buildings or objects.

One of the first decisions your be required to make is, 'from what position will you be looking at the object?'

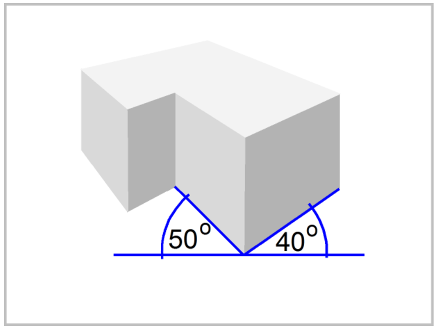
Is it from the front, or is a little to one side?

The answer as to the orientation of the perspective will probably play to either the strengths of the subject matter or to satisfy the purpose of the perspective.

Despite your decision on what orientation you choose the effectiveness of final perspective can be enhanced by subtlety adjustments in the standard set-up. To support your decision consider how adjustments to the following could possible be an advantageous to you perspective.

Rotation:	Rotate object about its own axis.
Distance:	Distance from object.
Scale:	Size of the final perspective.
Height:	Height from where the object is been viewed.
Arch of Vision:	Angle of binocular vision, or field of vision.
Focal Point:	A focal point on the object.
Line of Vision:	Sight line.
Picture Plane:	A line to map viewed points on plan.
Pitch:	Looking up or down on the object.
Elevation Plane:	A line to map viewed points on elevation.
Vanishing Points:	Points to map the regression.

Rotation



The rotation of the object will probably have the most significant effect on the finial outcome of your perspective.

At what angle is the object been viewed from?

Firstly, the rotation will determine what is seen and what is hidden. Secondly, it controls the position of the horizontal vanishing points and consequently the regression lines of the faces been viewed. The less a particular face is rotated, the lesser the regression.

Conversely, the greater the rotation, the steeper the regression line will be. This can be seen in the image below where the object has been rotated to 50 degrees from its base line.

The typical rotation usually lies between 30 to 60 degrees. However, and depending on the shape of the object been viewed, a greater rotation can produce a more dramatic perspective. On the other hand, the resulting rotation should not loose sight of important elements the object may have, or obscure the purpose of the perspective.

Distance

The next significant factor that will affect the outcome of your perspective is distance.

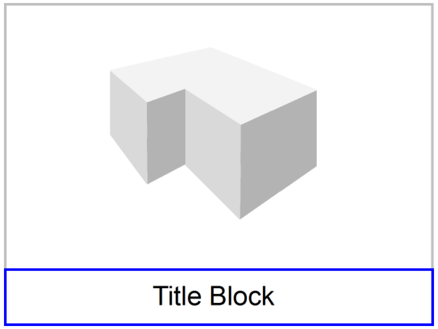
How far is the viewer from the object?

In the real world the distance will affect the size. The further you move away from the object, the smaller it appears.

However, in a technical perspective this is not necessarily the case. The size of your final perspective is determined by the position of the picture plane. Which intern influences the position of the vanishing points and the steepness of the regression lines. But more on that later!

The primary affect the distance will have on your perspective is also to determine what can be seen and what is not seen. For example: If the viewing point is a short distance from the object, does a projecting element on the face of the object obscure that which is beyond it, and to what extent?

Scale



Before we move on to the remaining factors it would be wise to review scale first, as it will determined by much of what follows.

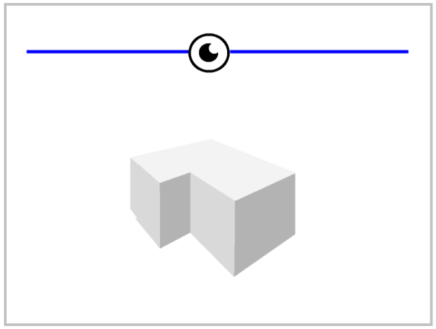
You will probably have some idea as to what should be the scale or size of your finial perspective.

What is the size of the paper is your working drawing going to be drawn on?

If this is not an issue because - A, it is being drawn digitally on a computer, or B, it can later be reproduced at a scale to suit, then this may not be a problem.

However, if this is an issue then you may need to consider adjusting the scale to accommodate possible rendering and presentation. Later you will be shown how to make changes to the set-up to either reduce or enlarge the perspective to suit these requirements.

Height



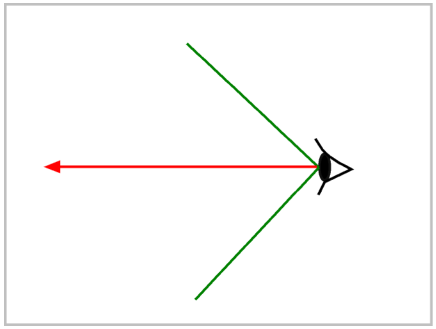
Here we have to consider two factors – A, being the height of the object, and B, the height of the viewing point. *From what height is the object been viewed?*

The height of the viewing point is critical to the set-up of any perspective as it determines the height of the horizontal vanishing points.

The first and fundamental rule in all perspectives is that the viewing point, or eye is always on the horizon. No matter what the height of the object, the horizon is always at eye level.

In a 2-point perspective the viewing point, and subsequently the horizon, are generally within the height of the object. However, there is no reason why the horizon could not be either above or below the object. This is usually done to draw a perspective of objects that is not very high and wide in nature. Where the regression of the vertical lines is so small that it is just not worth the effect.

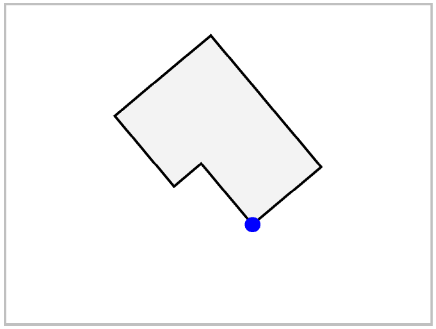
Arch of Vision



The arch of vision, or field of vision (FOV) is the angle of our binocular vision. That being what both the eyes see at any one time. In humans this is approximately 120 degrees wide and 100 degrees high. Beyond that is our peripheral vision that widens what we see to approximately 180 degrees.

When doing a perspective where the viewing point is at a short distance and in particular with internal or 1-point perspective are done the arch of vision should be applied.

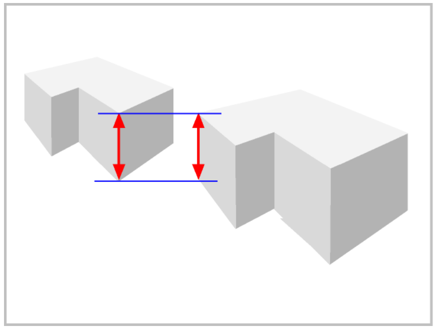
Focal Point



The focal point is a point on the object where all dimensions are to scale. It can be placed any where on the plan of the object.

Although, it becomes impractical if the focal point is not sited at a real point such as a corner or the like.

The focal point is usually the nearest real point on the object. This is the setting-out point where all dimension are to scale. The height of all the points beyond the focal point will be reduced, and all points in front of it will increase. This is because those points will be affected by the regression.



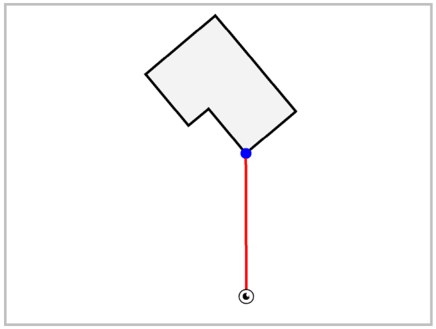
This method of placing the focal point on the nearest real point on the object is probably the most practical.

However, if you wish to increase that size of you perspective, the focal point can be placed on another real point on the object. In that case, the height of all points in front of the focal point will increase in height.

Conversely, the size of your finial perspective could be reduced if the focal point is placed in front of the object.

In this case the focal point must be a measurable point that has set dimensions from the object on both the plan and elevation.

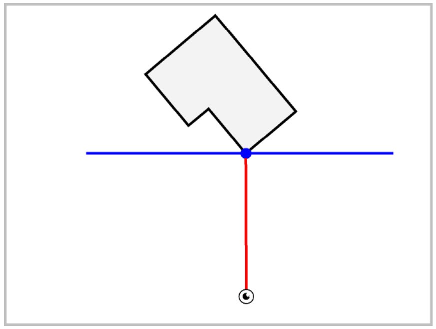
Line of Vision



The line of vision is the shortest line from the viewing point to the focal point, and is always perpendicular to the base line to the rotation.

During the drawing process of your perspective this line will also be used as a yardstick for the vertical dimensions.

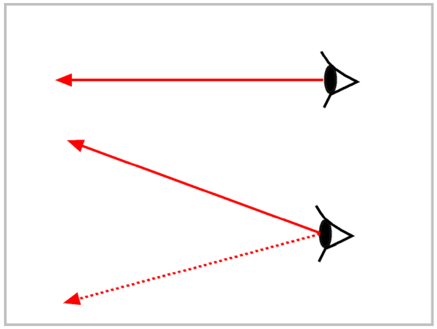
Picture Plane



The picture plane could be described as being a photograph of what is beyond. The picture plane is perpendicular to the line of vision and always positioned at the focal point.

Its purpose is to map all the relevant points on your plan and bring them to a common line. In the demonstration that follow you will be shown how these points on the picture plane is used both to set-up the horizontal vanishing points and to map the vertical lines of your perspective.

Pitch



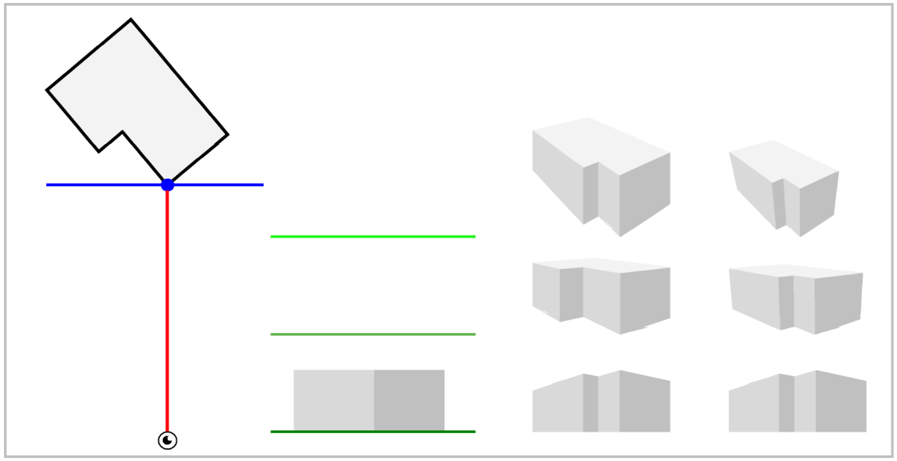
Above, the purpose of the line of vision on plan was discussed. But in elevation, the pitch of the line of vision is what establishes the 3-point perspective.

Are you looking directly at the object or are you looking up or down at it?

The difference between a 2-point and 3-point perspective of an object, is NOT determined by the height of the horizon but rather by the pitch of the line of vision.

The line of vision on a 2-point perspective is horizontal. Whereas on a 3-point perspective the line of vision is either pitched up or down. What's more, the steeper the pitch of the line of vision, the greater the vertical regression. You can probably recall this effect when looking up at a tall building compared to when it is seen from a distance. So let's look at these variations.

Here we have the plan of the set-up with the viewing point at a set distance. The next column shows the elevation of the object with the horizon at 3 different heights. The final 2 columns show the final perspective of the object seen from the 3 heights in either 2-point or 3-point perspective.

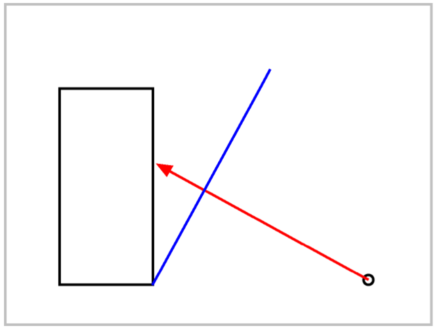


Whenever the Line of Vision is pitched as in a 3-point perspective (column 3) the heights off the focal point will be affected by a vertical regression. For example the levels on a tall building become reduced the further they are from the viewer.

To determine the position of the third vanishing point a Elevation Plane is added.

Elevation Plane

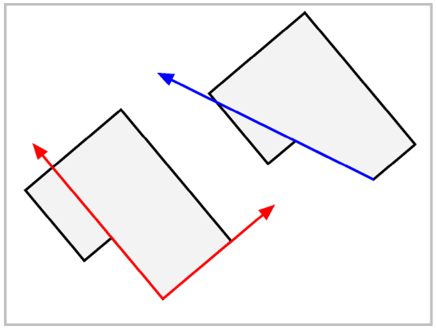
The purpose of the elevation plane is to map the diminishing spacing of horizontal line as they get nearer to the vanishing point. For example the sleepers on a railway track. This can vary depending on the distance of the focal point. The elevation plane applies mainly to the 3-point perspective.



The elevation plane is at a equal distance from the viewing point as the focal point, and is perpendicular to the pitch of the line of vision.

The elevation plane is a integral part of the over all set-up. Where dimensions on how the plan was set-up must match those on the elevation. This will be discussed in more detail in the 3-point perspective demonstrations.

Vanishing Points



Most of the perspectives you will do will probably be the conventional rectangular shaped objects with parallel sides. In this case, they will comply with either the standard 2-point or 3-point methods of drawing a perspective. Where the parallel sides will have their own vanishing point and, or the third vanishing point either above or below the object.

Whenever, a face is not parallel to the others and is at an angle of its own, then an additional horizontal vanishing point must be added to plot the regression of this face. This then becomes a multi point perspective. In the demonstrations that follow you will be shown how to draw each variation.