Hexagonal plaiting, often called hex weave, involves elements that move in three directions at once, a horizontal and two diagonals at 60 degrees to each other.

Open hexagonal plaiting produces light robust structures that use less material than close woven work. They can be quick to construct from rough materials but there are also beautiful and finely woven Japanese bamboo baskets and hex weave Shaker baskets for cheese.

The weave is flexible and so it may be compressed or stretched to form conical shapes as with the hats found in Thailand and China. More structured forms come from using the geometry inherent in the technique. The weave lends itself to closed polyhedra; multi cornered geometric forms, and all over Thailand and Indonesia to balls for the popular game of sepek raga. Dail Behennah, a British maker, is well known for her lovely stainless steel versions.

In order to produce baskets where sides and openings are needed corners need to be created. Here the weave structure changes and elements are linked together to form the shapes. Basket sides usually rise from hexagonal or triangular bases.

Flat long flexible materials are needed and these can be wood strips, split bamboo, pandanus palm or rattan cane.

The weave is commonly found in basketry in Japan, China, India, Indonesia and in African countries where suitable materials are grown. In Japan hex weave baskets are used for carrying bulky materials such as dry wood, mulberry leaves and vegetables. The structure makes it a useful scoop and it is also used as a reinforcing weave around stake and strand woven baskets. It is seen in seating patterns on caned chairs in Europe.

Patterning: by weaving extra elements between the gaps complex star, diamond and snowflake patterns may be achieved such as those seen on food covers from China and Indonesia and in fancy chair seating patterns.

The pattern known as ‘mad weave’, ‘tri axial’ weave or, in Indonesia where it originated, anyam gila is effectively three interlaced open hexagonal structures woven together so that there are no gaps. The structure is very dense and can create optical illusions when different colours are employed. The pattern is one of hexagons and triangles with sixfold/threefold symmetry.

Its interesting geometry and possibilities for dazzling colour and design puzzles has led contemporary makers to experiment with it using materials such as plastic strapping tape, card and dyed somband (a flat corded paper string product developed for the newspaper industry).
Frame baskets differ from other types which are mainly built from the bottom and shaped as the work progresses. In a frame basket the form is set from the outset by the initial arrangement of the hoops and ribs.

The hoop is formed either of one sturdy rod, of two joined together, or the basket may have a double rim. The join is shaved so that the two ends overlap and fit perfectly together. A second hoop, if there is to be a handle, is lashed to the first at right angles using a ‘god’s eye’ or simple lashing that holds the two firmly together forming a pocket for the placement of the first ribs. If there is only one hoop the first ribs sit against this and are wrapped onto the frame. Variations include baskets with multiple hoops such as the ‘gondola’, ‘melon’ or D shaped forms. More ribs equal greater depth or volume.

With weaving progressing equally from both sides, further ribs are inserted into the pockets that form and these fill out the shape. The weave is usually a simple over 1 under 1. Weavers wrap twice around the rim to keep a straight line that will meet in the centre at the finish without leaving gaps, though sometimes a little packing is needed.

Frame baskets are slow to construct and tend to be made by individuals for their own use on farms, or by travelling people. They were not generally made in large workshops except in the Lake District where oak swills were made in their thousands for the agricultural industry. Names such as ‘egg’, ‘hen’ or ‘potato’ basket are an indication of their use in country work for carrying and collecting.

Sturdy, substantial rods for hoops are needed. Ribs are often split from woodland logs and shaved down to the required shape or they may be whole round rods. Weavers need to be fairly long and pliable and may be whole willow, vines or split materials. Notable are the Welsh cyntell, and particular forms found in Scotland, Scandinavia and Germany. European forms are the antecedents of the Appalachian baskets which were introduced by early settlers in America.
**TECHNIQUES**

**COILING** begins in the centre of the bottom of the basket and grows outwards and upwards in a spiral. It is thought that early ceramic pots were made from clay coils that used coiled baskets as formers.

There are two elements, the core and the wrapping or stitching. The core can be a single rod, or two or three together or be a bundled core of many smaller elements such as pine needles or grasses.

Holding these together is the stitching. This is done using an awl or needle in a softer material which can be corded fibre or a narrow flat pliable material such as split cane.

To begin, use a knot or make a small ring of fine material, thinning down the end of a cane or use a small plaited square of flat material the ends of which are shredded to provide the starting core as in Zulu baskets. An oval start is made by extending the circle and stitching to create the desired length. The start must be tight and neat. From here the core builds to its full diameter and the base expands as each successive row forms the shape either outwards or upwards. The core may be completely covered by the stitching or partially exposed. The working side is neatest and the coiling may progress to right or left depending on whether the work is to be seen from the inside (shallow bowl or tray) or from the outside (pot or container shape).

Many named ‘stitches’ create different patterns and textures: Most commonly used is the figure of eight or Navajo stitch, time consuming and robust; each row is wrapped twice, covering the previous row and building a new one at the same time. Complex imbricated or overlaid stitches using bark are a speciality of the Salish and Klickitat peoples. Native American and African basketry patterns are more than purely decorative, they tell stories and are culturally significant.

A coiled basket can be simply finished by tapering the core or it may have a decorative rim with a different weave such as a herring bone or cordovan looped and braided edge.
SPLIT WOOD

Across northern Europe, in Scandinavia and in America there is a tradition of split wood basketry. Woodland trees, coppiced on a regular cycle, provide the materials and include, amongst others, sweet chestnut, alder buckthorn, cherry and acacia in Spain, oak and ash in England, juniper in Poland and white and black ash, white oak, hickory, maple and poplar in the central and southern Appalachian mountains of America.

Wood strips are woven into frame baskets, or, using the stake and strand technique, into round, oval or square baskets of many kinds.

Small diameter trees, five to thirty years old, depending on the baskets being made, are sought out. Shaded trees that reach for the light with a trunk clear of branches for at least the first 8' - 10' are best. They are felled once the sap has risen in spring.

In Appalacian split wood basketry the log is cleft by driving an axe into one end. Then wedges are leapfrogged over each other to drive the split down the log.

In Europe oak and chestnut logs are prepared by simmering for many hours in a tank of water or by turning them over a fire to heat through. This allows fibres to separate when they are then split apart using a froe. The resulting cleft pieces are successively ‘riven’ to the required depths. Splints are shaved smooth using a drawknife on a ‘mare’ or ‘horse’.

Early American settlers learnt the technique of pounding ash from Native Americans. American black ash (Fraxinus nigra), a wetland species, has soft spring and harder summer growth. After many hours of pounding, crushing the spongy fibres, the harder wood separates into long continuous strips. The fluffy spring growth is scraped off and the strips are further split by hand to reveal the inner silky grain.

There are some notable baskets; Owen Jones is now the only maker earning his living from weaving Cumbrian oak swills. The ‘van’ is no longer made but this great basket, the winnowing fan, was literally the bread basket of Central Europe. It has given its name to the French word for basketry; vannerie. Woven in specialised family workshops, the structure was of willow splints, the weaving between them beaten down so hard that the grains could not fall through.

In Galicia, northern Spain, there are beautiful examples of agricultural baskets, some for harvesting grapes and of jugs, coated with resin inside to make them watertight.
In twined work two elements are involved; a rigid warp and a flexible weft. Sometimes both elements are of soft or the same material but the warp remains the passive and the weft the active element. When soft materials are used for items such as bags and pouches twining could be viewed as closer to a textile than a basket. Think of the colourful imported Kenyan sisal baskets, these are all twined.

The weft is always worked with two or more flexible strands and these are twisted or paired over each other at every intersection locking the warp elements in place.

Twining can result in a close woven structure in which the warp is completely covered or there may be lines of twining across the warp elements at intervals resulting in a looser structure.

The warp elements too may be crossed over each other to make a more open or decorative structure and these will be held in place by rows of twining. In wrapped twining one of the weft elements stays inactive either on the back or the front of the work while the second weft is passed over the warps and the inactive weft.

The materials used for twining range from stiff split woody materials for the warps and softer corded grasses or plant fibres for wefts or the work may be all of soft materials. Often lengthy preparation goes into the making of the warp and weft cords even before any weaving can start.

Elegant patterns are made by changing the number of wefts or colour combinations. In a three strand twine where each of the weft elements works in front of two and behind one, varying the combination of colours will result in spiral, diagonal, vertical stripe or mottled patterns.

Twining is used all over the world but the particular materials, finishes and designs are often traditional and have unique cultural references and it is these that allow us to identify them.

Some Native American tribes are particularly associated with very fine, beautiful twined work, the patterning and shape of the baskets has huge cultural significance.
In plaiting all the elements play an equal part and each moves under and over the others in various combinations of plain, twill or herringbone weaves. The simplest plait is a strip that can be anything from three elements to nine or more wide and these can be stitched into mats or baskets.

By controlling the placement of the crossing corner elements all sorts of shapes can be obtained including triangular shapes, cones and hexagons.

In plaiting the materials are usually flat, New Zealand flax, strips of bark or even long strips of paper or coloured card. By using different colours many patterns are produced as they cross over each other in various combinations.

The work may be finished off by folding the strips back on themselves at the top to make either a level or a zig-zag edge.

A sandwich and sew method for finishing plaited work uses an extra band at back and front to hold the weaving in place at the top and this is then stitched in place.

When it comes to three dimensional weaving the plaiting technique itself makes the form. From a plain over one, under one square plaited base the same weavers can be turned vertically upwards. Extra weft strips can now be woven horizontally between them. If the corners are creased well a square box or can be made, if not the form at the top will be rounded. For an oblong the base is extended.

In a more complex arrangement the corner elements cross over each other to make a diagonal plait with no extra weavers required for the sides. Long strips are needed as they have a long way to travel.

In more complex diagonal plaiting complex twills and herringbone patterns are possible developments.

Complex plaiting patterns are found in the baskets of Sarawak and these are learned by heart and passed down through the generations.

In Spain esparto grass is plaited into strips and sewn into strong baskets. Esparto is also used to make baskets using a spiral plait technique that has a very ancient lineage.
These techniques, often thought of as more textile than basketry, generally result in soft flexible structures. When stronger materials than the usual soft string/twine are employed the possibility of producing rather more intriguing forms opens up. They offer opportunities for exploring structural combinations and experimenting with properties that allow them to be squashed, stretched and manipulated into interesting forms.

A knot joins two ends, a series of knots makes a structure possible. Macrame (square knotting) or sennet braids are used to produce lanyards, leashes and fringes.

Netting, a variation of knotting, a series of loops held by knots allows a ‘fabric’ to develop. Materials for netting are the mesh stick, the netting needle and the twine. The width of the stick determines the size of the mesh. The needle width corresponds with that of the stick but is narrower to allow for the twine.

Square and diagonal nets are used for fishing.

Netting without knots is looping or knotless netting; here possibilities for producing useful ‘fabrics’ multiply. Complex structures may be produced depending on how the loops link with each other as well as the row above. Linking is a series of flat loops that give a very elastic structure.

It is useful to know how string or rope is made. In many parts of the world making cordage from grass or leaf fibre is the first step in the process of weaving a useful container. Cordage is the plying together of two strands of material. By twisting the strands, each in turn the same way (usually right) and then, by twisting them back over each other in the other direction (left), a two-ply cord is produced. In Maori and South American cultures cord is rolled on the thigh using the palm of the hand; two strands are rolled downwards and they ply together on the way back up.

In Ecuador shigras, looped bags are used to carry and store goods and food. Aboriginal peoples have made string knotted/looped ‘dillybags’ for thousands of years for carrying personal belongings, for collecting leaves/food gathering and for ceremonial purposes.

In Papua New Guinea the looped billum is used for carrying everything from babies to foodstuffs.

The ‘nassa’ fishtraps of the Mediterranean combine knotting with a grass or cane trellis and spiral structure.

Shuna Rendell, a contemporary maker in the UK, uses complex linking and looping in her work.
This is a universally common method of construction, found wherever woody or robust materials are available. There are two elements, the passive warp and an active weft. This is the technique mainly used for willow basketry in Europe, bamboo in Japan and for working with cane (rattan).

In order to weave the sides stakes or uprights are inserted into or attached to the base. The side of the basket is then woven up to the desired height using finer graded material so as not to distort the uprights. When using willow care is taken to even out the effect of the taper of the rods.

Various weaves have been developed to suit different parts of the basket and though these are common all over the world local differences make for a fascinating study.

In willow work the ‘upset’ (rows at the bottom) usually consists of a strong waling (three or four strand) weave that helps shape the flow of the basket. Other common weaves are: Randing - a simple over one, under one weave. Slewing - a band of three and up to five or even seven rods worked together continuously, adding new rods on top as rods on the bottom taper out. This creates a strong weave that progresses the work quickly.

The base of the basket is generally made separately, starting with two sets of sticks that are arranged at right angles, tied together with a weaver and then opened out into a circle as the weaving progresses. If the materials are flat, such as bamboo or split wood then they will be arranged to lie on top of each other like the spokes of a wheel. The base may be round, oval or square. For oval work the round base set up is elongated and there is also a version that is constructed underfoot. For square work a set of sticks is inserted vertically into a block and these are woven into a flat square or oblong using finer rods.

At the top of the work the uprights are bent down to form a border. For willow work the basic tools required are; a shop knife, bodkins (for making spaces in the weave) and a rapping iron (to beat the work level and close up gaps). Nowadays a pair of secateurs replaces the picking knife that was used to trim untidy ends.