
TetraPond
Creating a garden pond
Approved by
SPARSHOLT
COLLEGE HAMPSHIRE

The 'magic' of water has fascinated us for centuries. There is a sketch from 3400 years ago which depicts a garden featuring four man-made ponds. Virtually all cultures on earth have found a way to incorporate water into their gardens and living spaces in some way. The Chinese made use of streams for meditative purposes; in Islamic civilisations, water steps and channels were used to promote relaxation; while in France, springs and extravagant fountains came to represent wealth and good taste.

Garden ponds continue to hold the same fascination today; bringing a new dimension to our outdoor living spaces, and creating a stunning focal point for any garden. In addition, they can provide an important habitat for native wildlife, which would otherwise be lost amidst our expanding urban areas. For many people, there is nothing better than relaxing by their pond on a warm, summer's day.

Today, creating an attractive garden pond is easier than ever. Modern materials and equipment allow you to achieve almost any design, ideally suited to your particular requirements.

Tetra makes it easy to keep your pond attractive and healthy, allowing you time to relax and enjoy it. By choosing **Tetra**, the global leader in pond and aquarium products, you can benefit from our unrivalled investment in testing and research, coupled with the industry's most advanced manufacturing and quality control procedures. As a **Tetra** customer, you can also rely on our experience and expertise for any information you require to keep your pond, and all its inhabitants, healthy and well – **www.tetra.net**

Content

Nature at your fingertips…

Garden ponds are a haven for wildlife, providing a habitat for frogs, newts, invertebrates, and fish, as well as offering a valuable supply of water for birds, hedgehogs, foxes, and other visitors. By considering wildlife in your design, you can create a pond that will bring your garden to life with animals and plants you may otherwise never see.

Or modern design for outdoor living

If you prefer, you can design your pond around the aesthetics of your outdoor area, enhancing its overall appearance with the dazzling effect of moving water. Modern materials, coupled with a multitude of books on pond design, mean that your creation is only limited by your imagination.

Designing and planning

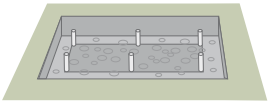
Before you begin installing your pond, it is well worth taking the time to carefully design and plan for it. This will ensure you get the most from your new water feature, and avoid any common mistakes. It is often worth creating 2 or 3 alternative designs to choose from, considering the following points for each:

If you don't fancy installing your pond yourself, ask your water gardening outlet for names of recommended pond designers and landscapers.

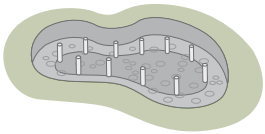
❶ Style

Ponds are often described as 'formal' or 'informal', based on their design. A formal pond tends to have straight or evenly curved edges, and is roughly symmetrical, and would look good incorporated into a patio for example. An informal pond is designed to look like it was formed naturally, and would look good as part of a more heavily planted garden.

Ensure that your pond fits with the overall design of the garden, considering its shape, planting scheme, and materials used to create it.



Formal



Informal

❷ Size

Size is a very important consideration, as it will affect the suitability of the pond for its intended purpose, as well as its overall cost. As with style, the size of the pond should reflect the garden – a large pond in a small space will look out of place. When allocating space, remember that you will need an area around the pond for external equipment, edging (e.g. plants or slabs), and to allow sufficient access.

Size and depth will also determine what species of fish and plants you can have. For example, the majority of pond fish will be happy with a pond that is 45cm (18in) at its deepest, with a surface area of at least 3m^2 (32ft^2). For larger fish, such as koi, you will need a depth of 90cm (3ft), and a much larger surface area. The same is true for plants – if you want a bog garden to accommodate moisture-loving plants, plus larger aquatic plants such as lilies, you will need to allow additional space and depth.

3 Type of pond

At one end of the spectrum you may wish to create a pond purely designed for wildlife. Such ponds tend to be informal in design, and require a lot of planting both in and around the water to provide habitat for animals. A wildlife pond should have gently sloping sides, to ensure a smooth transition from a deep area (approximately 45cm / 18in) to the shore. This allows wildlife to enter and leave easily. Unless you make the pond very large to provide lots of different habitats, a wildlife pond should only contain smaller fish. Wildlife ponds usually contain native plants where possible.

At the other extreme, koi ponds are designed purely for the fish themselves. They need to be large, well-filtered, with very few or no plants. Such ponds are often quite formal in style, and are ideal if you want a large, impressive feature, containing large, impressive fish.

In reality, most people opt for a 'mixed' pond, with a varied selection of popular fish and plants. They can be fine-tuned to favour wildlife or fish, and be informal or formal.

4 Moving water or still

Moving water is visually appealing, as well as being beneficial to the pond. Waterfalls, fountains, and streams all help to aerate the water, improving its oxygen level. Consider how you want to incorporate movement, as waterfalls and streams require a little more space compared to fountains.

5 Complexity

The more complex the shape of the pond, the harder it will be to construct. It is much better to stick with larger curves and fewer corners, and then use edging materials or planting schemes to create the illusion of an intricate shape.

Pond Safety

Any area of water poses a potential hazard, especially to young children. Careful consideration should be given to this during the planning stage, and appropriate steps taken. For information on making your pond safe, and safety around water in general, visit the Royal Society for the Prevention of Accidents website **www.rospa.com**

Mark out the shape of your pond with a hosepipe or rope to try out different designs.

6 Position

The position of the pond will affect the quality of the finished design. Things to consider include:

Aspect – ideally the pond should receive 6 hours of sunlight a day, to aid plant growth without encouraging excessive algae.

Viewing – make sure the pond is in a position where it will be easily seen and enjoyed.

Electricity – most pond equipment requires electricity, so ensure the pond is somewhere where a supply can be installed.

Access – the pond should be accessible for occasional maintenance, planting, adding fish etc.

Trees – roots from trees can damage lining materials, so avoid placing your pond near them. Falling leaves are also a nuisance; however these can be kept out with a net if necessary.

Drainage – don't place your pond in an area that gets waterlogged, as it will disrupt the liner and potentially cause permanent damage. A well drained area is best, or alternatively you may need to install some additional drainage.

Electricity in the garden
Current regulations on using electricity outside require equipment to be wired in by a suitably qualified person. Your local aquatics or water gardening centre can advise you further on this.

Constructing a pond

Materials

When choosing how to construct your pond, there are three main options available:

Preformed ponds and watercourses are made from moulded plastic, and are the easiest to install. However, because they are pre-moulded, you are stuck with the manufacturer's design. They also tend to be limited to smaller pond sizes. If you want a small to medium pond, and are happy with the designs on offer, then a pre-formed pond may be ideal.

Flexible liners are the most popular choice for constructing ponds, as they allow an almost unlimited range of designs to be created. There are different types of lining material available, characterised by their strength, durability, weight, cost, and ease-of-use. **Butyl** based liners are stronger and more reliable, whereas **PVC** liners are cheaper and more flexible, yet not as strong or durable. Ask your water gardening centre for advice on the lining materials they offer.

Brickwork ponds and other more advanced construction methods can be considered, although they are much harder to install. If you have the necessary skills, or are happy to pay someone to build your pond, they are usually very strong and durable, and allow you to raise the pond up if required.

Although flexible liners are the preferred method for constructing ponds, it is becoming increasingly popular to combine them with preformed water courses.

Although it is fairly simple to build a watercourse out of liner, modern pre-formed units can look excellent, and are usually easier to work with.

Sizing pond liner

Before committing to a particular design, make sure you work out the required size of pond liner. This will help you to cost the project accurately, and avoid you getting a piece that is too small or wastefully large.

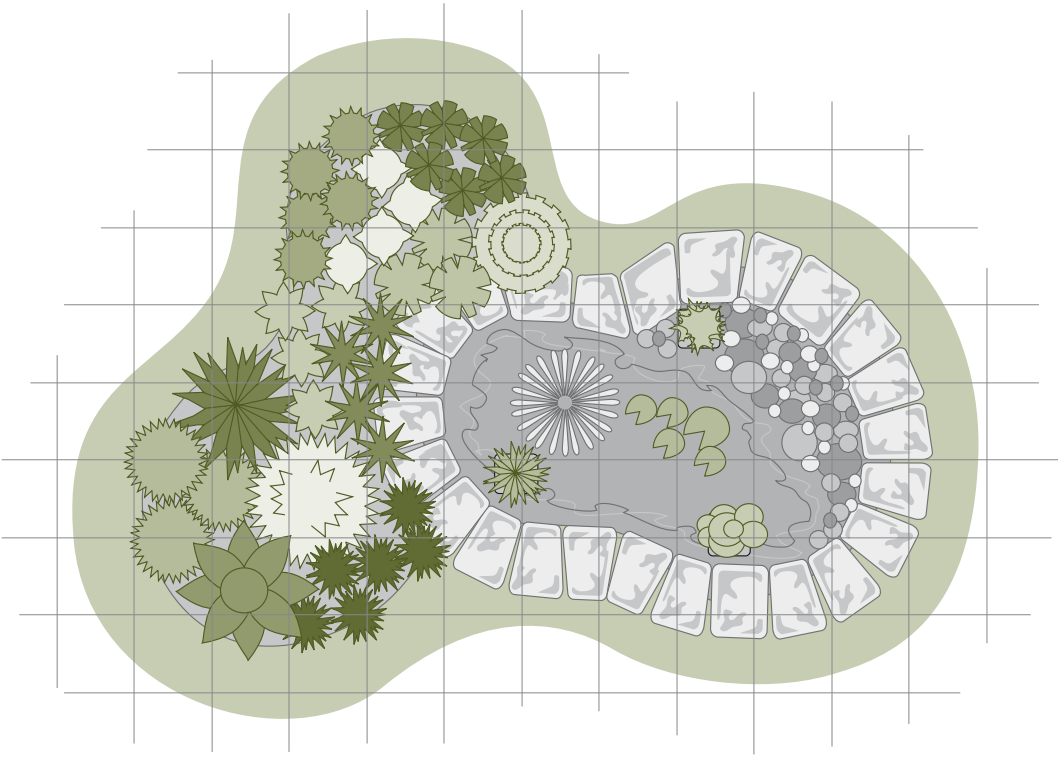
You can work out the size you need as follows:

Length + 2x depth + overlap = Total Length
Width + 2x depth + overlap = Total Width

For example, allowing 40cm (16in) for overlap (20cm at each side), a 3m x 2m x 0.6m (10ft x 6.5ft x 2ft) pond would require a liner of:

3 + 1.2 + 0.4 = 4.6m Long
2 + 1.2 + 0.4 = 3.6m Wide

For irregularly shaped ponds, use the dimensions at the widest and longest parts of the pond. Once you've dug your hole, you can more accurately work out the size of liner you need with a flexible tape measure, or by laying a piece of rope along the length and width and then measuring it (remembering to add on the overlap).



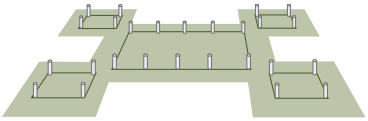
Constructing a lined pond

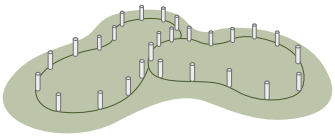
Here we show you the key stages in installing a typical lined pond, showing ideas for both a formal and informal design. For more information, or to find out how to install other types of pond, consult your aquatics outlet or water gardening centre.

Digging the pond

Stage 1

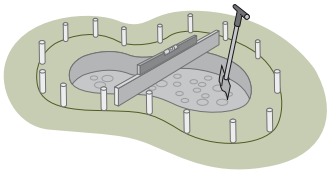
Mark out the shape of the pond and surrounding garden with wooden pegs and rope/string. Ensure that the ground where the pond is being built is level.





Stage 2

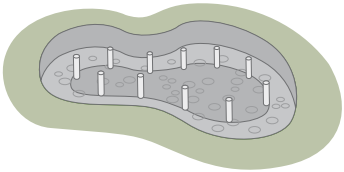
Start digging in the middle of the pond and work outwards to avoid breaking the edges. Undisturbed soil makes a much better foundation than an area that has been backfilled and firmed.

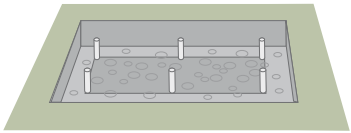


Remove the soil down to a depth of 23cm (9in), which is the depth of the marginal shelf. The marginal shelf provides an area of shallow water onto which plants can be placed. Checks should be made using a spirit level to ensure that the top edge of the pond is level, as the water will immediately show any faults. This can be done by laying a plank of wood across the excavation to rest the spirit level on.

Stage 3

Mark the outline of the marginal shelf using wooden pegs and rope/string. This should be 30-45cm (12-18in) from the outer edge of the pond.

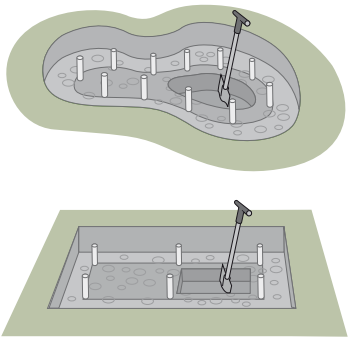




Tip:
If possible it is highly recommended to construct a concrete collar around the edge of the pond excavation, to help provide a level surround and firm base for any edging stones. Please ask your water gardening outlet for more information.

Stage 4

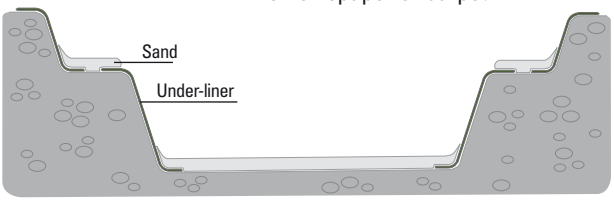
Starting from the centre of the pond, dig down to a depth of at least 45cm (18in). Again take care not to damage the edges of the marginal shelf. Remove any sharp objects such as nails, twigs or stones that could puncture the liner.

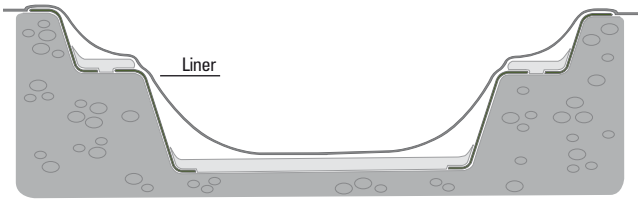


Positioning the liner

Stage 5

Add a 5cm (2in) layer of sand to the horizontal surfaces and a then cover the entire hole with a sheet of pond under-liner. This will not rot over time like newspaper or carpet.





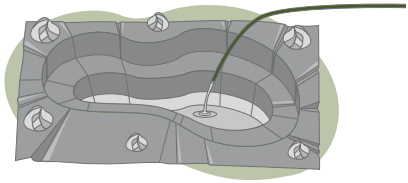
Stage 6

Drape the pond liner loosely into the excavation with an even overlap all around. Remove your shoes and get into the middle of the pond to push the liner into position. Take care not to stand close to the edge of the shelves as the sand will fall away from the excavation. If possible, undertake this stage during warm weather as the sun will quickly warm the liner making it softer and easier to handle.

Filling the pond

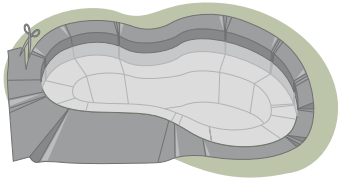
Stage 7

Position a number of smooth stones around the sides of the liner to hold it in position. Run a hose pipe into the pond and start to fill with water. As the pond fills with water, the stones should be lifted to allow the liner to fit snugly into the excavation. Some creasing of the liner is inevitable, but this can be minimised by folding and stretching the liner as it fills.



Stage 8

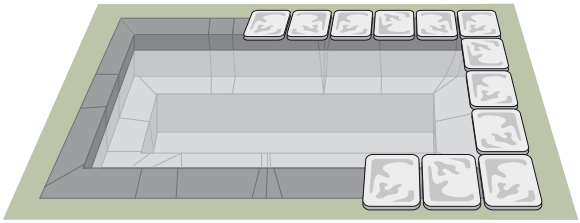
When the pond is full, the surplus liner can be cut off, leaving at least a 20cm (8in) flap around the side. This allows the liner to be secured with appropriate edging materials.



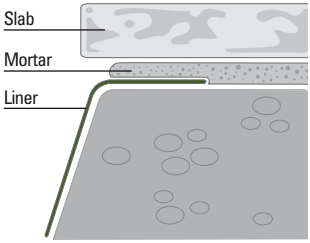
Edging

Formal Pond

Place paving slabs around the pond on a bed of mortar (3 parts sand to 1 part cement) ensuring that there is a 5cm (2in) overlap over the pond to hide the liner. It is important that the paving slabs are level around the pond as any variation will be obvious against the water level. The mortar should be used to trap the pond liner and hold it in position. Immediately remove any mortar that falls into the pond. Complete the paving, ensuring that it is level, and allow it to set for 2 days before walking on it.

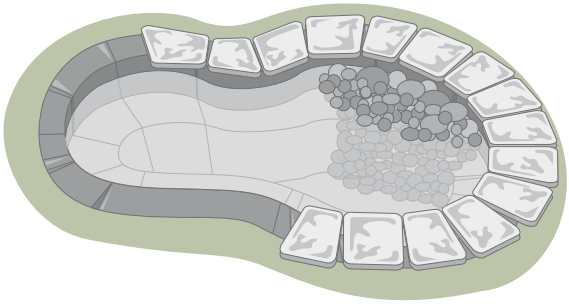


Formal Pond



Informal Pond

Use natural-looking cobbles and stones around the edge of the pond, ensuring that the liner is completely covered and that it is above the water level. Natural paving stones can be used to secure the liner, placing them on a bed of mortar (3 parts sand to 1 part cement) and gently firming them into position.



Informal Pond

If desired, a preformed watercourse can easily be added to the edge of the pond, or you can construct one out of off-cuts from the pond liner. Use the excavated earth from the main pond to build a raised mound for the watercourse, and if desired a second header pond to feed it.

Treat any cement in or around the pond with an appropriate pond sealant, to prevent it altering the chemistry of the water.

Pond Equipment

To create a balanced, healthy pond, which looks good and provides a suitable home for fish and wildlife, it is important to have the right equipment. Here we take a quick look at the most important items you need for your pond. For more information on choosing the right pond equipment, see our **'Pond Equipment'** brochure.

Pump

This is the heart of the pond, and responsible for any water movement. You need it to run a filter system, watercourse, fountain, water feature etc. Areas of water movement and splashing are great for increasing the oxygen content of the pond and keeping it healthy.

The type of pump you need will depend on what you want to do with it. For example, **fountain pumps**, such as the **TetraPond FP**, are designed to deliver clean water to fountain attachments. They therefore need good pre-filteration to sieve out any dirt, which requires occasional rinsing according to how clean the pond is.

If you don't want a fountain, a better option may be a **debris-handling** pump, such as the **TetraPond CFP**, which is built to handle large quantities of solid waste without clogging. This dramatically reduces maintenance, and ensures a more consistent flow of water.

Once you have selected the type of pump you need, make sure you have the following information to help your aquatics outlet recommend the right sized unit:

System head – this is basically the height between the surface of the pond and the highest point to which water is being pumped (e.g. the top of a waterfall).

Pond volume – the volume of the pond will determine the ideal flow rate for the pump.

Additional features – any extra fountains or water features will increase the demands on the pump.

Waterfall width – larger waterfalls require more flow than smaller ones.

Provided you give them the right information, your aquatics outlet or water gardening centre will be able to recommend the correct pump for your pond. If in doubt, always slightly overestimate your requirements – excess flow can easily be turned down or diverted.

Filter

The fish and other inhabitants of your pond are constantly producing waste. This includes solid and dissolved wastes, both of which will cause problems if allowed to accumulate. Whilst very lightly stocked ponds, with plenty of plants, may remain in a natural balance, the vast majority require additional help to keep the water healthy. A filter provides an area in which natural waste removal can occur, thereby keeping the pond and its inhabitants healthy.

Most filters have two main functions:

1 The physical straining, or 'mechanical filtration', of solid waste from the water. This keeps the water clear.

2 The breakdown of toxic dissolved wastes (principally ammonia and nitrite) by naturally occurring bacteria. This is referred to as 'biological filtration', and it keeps the water healthy and safe for fish.

Most common pond problems are linked to poor water quality, so selecting the right filter for your pond is essential. To do this, you need to be able to tell your aquatics outlet the volume of your pond, and if you already have one, the size of your pump.

Ultraviolet clarifier

Although not essential, an ultraviolet clarifier is beneficial to most ponds. It prevents the formation of unsightly green water, thereby helping to keep the pond water crystal clear. Many filters, including those produced by Tetra, come with integrated ultraviolet clarifiers. Alternatively, standalone units, such as the **TetraPond UVC**, can be fitted to an existing system.

For more information on pond equipment, refer to our 'Pond Equipment' brochure.

Two types of pond filter are available:

Gravity-fed filters, such as the **TetraPond PFC-UV**, must be positioned at the highest point in the system. Water is pumped into them, and then allowed to run through the media and back out into the pond or down a watercourse. They can hold lots of filter media, yet consideration must be given to how they will be concealed from view.

Pressure filters, such as the **TetraPond PFX-UV**, can be positioned more freely, and even partially buried. This is because they are pressurised, which means water can be pumped through them, and then on up to a watercourse for example.

Filling your Pond

Having constructed your pond and installed the equipment, you need to fill it with mains water. Rainwater, and water treated with a domestic softner are unsuitable, as they lack essential minerals.

Once the pond is full, it is essential to condition it using **TetraPond AquaSafe**. Tap water contains chlorines, heavy metals, and other substances to make it safe for us to drink, but which are harmful to fish and wildlife. **AquaSafe** neutralises these, and adds ingredients that protect fish and improve water quality, thereby creating water that is ideal for fish and other pond inhabitants.

To work out how much **AquaSafe** to add, you need to know the volume of the pond. This is most accurately done by using a water meter during the initial filling – you may be able to hire one from your local water gardening centre or aquatics outlet. Alternatively, an approximation of the volume can be made using the dimensions of the pond:

Length x Width x Depth (in metres) = cubic metres

Cubic metres x 1,000 = volume in litres

OR

Length x Width x Depth (in feet) = cubic feet

Cubic feet x 6.23 = volume in gallons

For informal ponds, estimate the average length, depth and width.

TetraPond treatments are designed to allow a safe margin of error, so you can be confident in using them even where a precise volume is unknown.

Having ascertained the approximate volume of the pond, add the required amount of **AquaSafe** according to the on-pack instructions.

You should now turn on all of the equipment, and leave the pond to settle for a week before adding plants.

Planting your Pond

Most ponds benefit from having a healthy selection of plants, both for their aesthetic qualities, and for their positive effects on the pond environment. For example:

- They attract wildlife, providing food, shelter, and breeding sites.
- They can be used to add colour to the pond, and break up hard edges.
- They are used as spawning sites by fish and other pond inhabitants.
- They offer baby fish and other creatures a place to hide.
- They produce valuable oxygen, and remove carbon dioxide.
- They shade the pond, providing cover for the fish and preventing excessive algae growth.
- They remove nutrients from the water, improving its quality and helping to prevent algae.

Types of pond plant

There are a number of different categories of pond plant, within which there are thousands of species to choose from. The key categories are:

Water lilies

Water lilies and other lily-like plants grow in deeper areas of the pond, sending up leaves to the surface. These floating leaves are ideal for shading the pond, and fish will often bask under them on hot, sunny days. **You should aim to cover around a third to one half of the pond with floating leaves** (floating plant varieties can also be used to do this). If you are just using water lilies for the deeper sections of the pond, they can be planted at a rate of one for every 1.5 – 3m^2 (16 – 32ft^2) of surface area (the exact amount will depend on what size the lilies are).

Lilies tend to start flowering when the water temperature exceeds 18°C, with the blooms getting steadily more impressive as the season progresses. Each bloom tends to last around 4 days, with the flower opening in the morning and closing again in the evening.

Oxygenators

Oxygenating plants, such as Canadian Pond Weed and Water Milfoil, are so called because they produce oxygen during the day. Their name can be a little misleading, as at night they stop producing oxygen, yet they continue to respire and use it up. In a moderately stocked pond, the amount of oxygen used up at night is not a problem, and they benefit the pond environment by providing good spawning sites for fish and other creatures. They also create a refuge for fish fry and other small pond creatures, and provide homes for a variety of invertebrates which fish like to eat. Their rapid rate of growth also makes them ideal for natural algae control. **Oxygenating plants often come in bunches, and should be added to the pond at around 5 bunches for every square metre (10ft^2)** of surface area. They will need occasional pruning to keep their growth under control, and it

Marginals

Marginal plants are those which are suited to shallow areas of the pond, although there are a few that will tolerate deep water (these are normally marked as 'deep water marginals'). Generally, they can only cope with having a few inches of water covering their containers, and therefore a special marginal shelf is usually incorporated into the pond to accommodate them. This shelf should be around 30 – 45cm (12 – 18in) wide, and about 23cm (9in) deep. Marginal plants come in all shapes and sizes, from tall grasses and irises to low, creeping varieties. They can provide shelter from the wind and a safe refuge for all manner of pond life. Taller varieties can also help to shade the pond, although this is best done with floating leaves.

is often easier to plant bunches of oxygenating weed in a pond basket as this keeps them in one place and allows them to be more easily removed if necessary.

Floating plants

Floating plants are usually only available in the summer, as they do not over-winter particularly well. The majority of them will either require replacing every year, or over-wintering indoors in a bucket of water (adding a handful of aquatic compost to this will provide them with the nutrients they need). There are quite a few varieties of floating plant available, such as Water Hyacinth, Water Soldier, Frogbit, Water Chestnut, and so on. Their root systems dangle in the water and provide good spawning sites for pond fish, as well as extracting nutrients from the water that would otherwise encourage algae. They are very useful for shading the pond, as well as offering a home for invertebrate life upon which the fish may feed. In order to give them sufficient room in which to multiply, **floating plants should be added at around one for every 1 – 1.5m^2 (10 – 16ft^2)** of surface area. Some varieties will grow very rapidly and need occasional thinning out.

Moisture-loving plants

Moisture loving plants are those that require permanently damp soil, but that will not do well in any depth of water. They are ideal for bog gardens and can add a whole new dimension to the pond, often attracting all sorts of wildlife to the area. Some varieties of plant will do equally well on a marginal shelf or in a bog garden, and so it is important to check information labels to see exactly where you can put a particular plant. Moisture lovers are best moved and divided during either the spring or autumn, and in the spring the soil can be perforated and the area given a general tidy up. Autumn is a good time to dig over the soil, so the winter frost and rain can break it down for the spring. Moisture lovers are not planted in pond baskets like other aquatics, but instead placed directly into the bog garden soil.

Under no circumstances should pond plants, or cuttings of plants, be discarded into the wild. Doing so poses a threat to native species. Always carefully dispose of dead plants and cuttings, or ideally add them to the compost heap.

Planting

Pond plants are usually labeled with their care requirements, size, details on when they flower, and a picture showing what the flowers look like. Use this to choose suitable plants for your pond.

The best way to give your new plants a healthy start is to repot them, replacing the soil they come in with good quality aquatic compost. Aquatic composts contain the right nutrient balance for pond plants, along with a higher loam content to prevent clouding of the water.

New plants should be housed in baskets that are large enough to allow for expansion. The larger the container they are in, the longer it will be before they need re-potting. The reason aquatic plants must be placed in perforated containers, and not ordinary flower pots, is that their root systems need a flow of water to supply nutrients and oxygen. This aeration of the soil prevents it from becoming anaerobic (depleted of oxygen) and foul smelling.

Once you are ready, you can pot your aquatic plants using the following procedure:

1. Line the basket with hessian to prevent compost leaching into the water.
2. Start filling the basket with aquatic compost, firming it as you go.
3. Remove the plant from its original pot, make room for it in the compost and place it in its new container.
4. Firm more compost around the plant and add water to it in order to drive out any trapped air. This may cause the compost to sink slightly, in which case more should be added.
5. The compost should then be topped with around 1 – 2cm (0.5 – 1in) of hard gravel or pond flint, in order to stop the fish from digging into it, and to stop it lifting out of the container when submerged.

The same method can be used for re-potting plants when they out-grow their containers. At such times the plant can either be divided up and planted in the same sized container, or simply moved to a larger one.

Planting water lilies

With water lilies, make sure that you use a large container, with at least 15cm (6in) of compost. When you re-pot them it is very important to place the growing tip (or 'crown') so it is exposed to the water, and in the same position as it was in its original pot.

There are two approaches to the introduction of lilies to the pond, the first being the more traditional approach:

1. Lower the lily to its final position in the pond slowly, starting off by covering it with only 15 – 25cm (6 – 10in) of water. It can be supported on bricks or upturned baskets, lowering it by around 15cm (6in) at a time over a period of a year or so. This is done because lilies do not adapt well to sudden changes of depth, the effects of which can include checked growth, small leaves and poor flowering.

2. Alternatively, you can cut the lily's foliage back to its crown and place it at the bottom of the pond. New growth will then start to appear in the following weeks and months

If you plan to plant the lily very deeply then it may be advisable to stick to method one, but in shallower ponds either approach should work.

When selecting your new plants there are a few things to look out for. The best ones are those that show signs of new growth, and that are not damaged or stunted. It is also wise to look out for signs of pond snails or eggs (which appear as clear jelly-like masses attached to leaves), and wash them off before the plant is potted up. Choose a mixture of plants to create a balanced environment, and select those that fit with the overall design of the pond.

To give oxygenating and floating plants a good start, and to sustain their growth thereafter, **TetraPond PlantaMin** can be added to the pond. It contains all of the essential nutrients that plants require for lush, healthy growth, without nitrates and phosphates to avoid promoting algae.

Stocking your Pond

Having filled your pond, turned on the equipment, and stocked it with plants, you can now turn your attention to stocking it with fish. This is one of the most enjoyable parts of creating your pond, and should be done carefully.

Avoiding 'New Pond Syndrome'

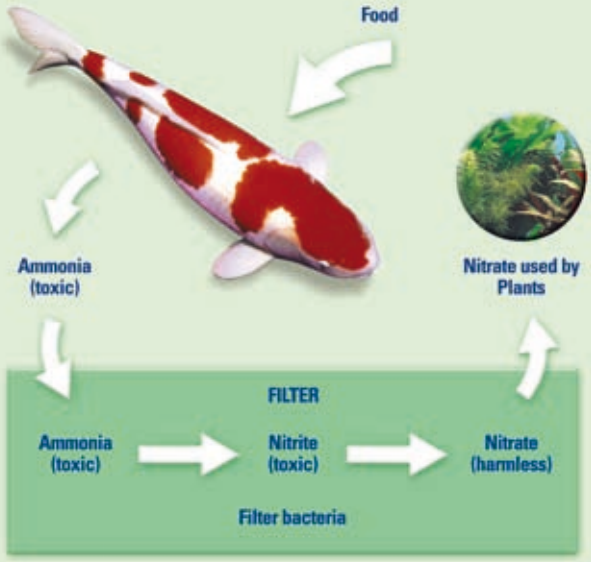
A common mistake made in new ponds is to stock the fish too quickly. This can lead to sick fish and disappointment, caused through poor water quality – a phenomenon known as 'New Pond Syndrome'.

In a 'mature' pond, the filter contains a population of bacteria that convert the ammonia that fish excrete into nitrite, and then turn nitrite into nitrate. Both ammonia and nitrite are toxic to fish and other pond life, and they must be turned into nitrate for a healthy environment. This process is called **nitrification** or **biological filtration**, and it happens on the biological media in the filter.

When first started, the filter lacks the beneficial bacteria that convert toxic ammonia into harmless nitrate. Therefore, the ammonia that the fish excrete will accumulate. Given time, the bacteria multiply and remove this ammonia, first converting it into nitrite, and then finally into nitrate. If too many fish are added at once, ammonia will accumulate rapidly, and the filter bacteria will not be able to multiply fast enough to cope. This leads to prolonged exposure to high ammonia and nitrite, and sick fish.

By gradually stocking the pond with a few fish at a time, severe increases in ammonia or nitrite are avoided, as the bacteria have time to adapt. The process of developing the filter bacteria in this way is called 'filter maturation'. A mature filter is one that contains sufficient bacteria to remove the ammonia produced by a full stock of fish.

Ammonia Production and Removal



For easy, trouble-free stocking, follow these simple rules:

1 Wait a week after planting the pond, and then add 3-4 small to medium sized fish. Hardy species such as goldfish or shubunkins are ideal at this stage.

2 Use a **TetraPond Ammonia** kit and **TetraPond Nitrite** kit to test levels of ammonia and nitrite every 2-3 days. You should observe an initial increase in ammonia, followed by an increase in nitrite. Eventually both should start to fall.

3 Once ammonia and nitrite levels are safe according to the tests, you can add the next 3–4 fish.

4 Repeat this process each time you add fish, until you have fully stocked the pond. As you introduce more fish, the time taken for the filter to remove the ammonia and nitrite will decrease.

If during stocking the pond you record dangerously high ammonia or nitrite levels, you should perform a partial water change. You should also temporarily reduce the amount of food you feed, to reduce pressure on the filter. Remember to use **TetraPond AquaSafe** when adding new water to the pond.

By stocking carefully, and testing the water regularly, you will avoid any problems and keep the fish healthy.

When cleaning the filter, always wash the biological media in a bucket of pond water, and never with mains water. Mains water will kill the beneficial bacteria, resulting in water quality problems.

Choosing and introducing fish

The number of fish you can keep in your pond depends on its size. As a rough rule of thumb, in a filtered pond you can begin by adding 25cm of fish per 1,000 litres of water. This allows them room to grow, with a maximum final stocking level of 50 – 75cm per 1,000 litres of water. The best time to add fish is in the spring or summer, when temperatures are warm but not extreme.

Choosing fish

When choosing fish you need to consider whether or not your pond provides a suitable home for them. Find out as much as you can about their requirements, including what size they grow to; the food they need; and whether they need to be kept in shoals. There is more information later on in this brochure.

When buying fish from your aquatics outlet or water gardening centre, make sure that the fish generally look healthy and active, with no obvious signs of injury or disease. However, avoid the temptation to pick individual fish from a large vat or aquarium. The process of catching the fish is stressful for them if prolonged, and may mean you end up with a fish that is not in top condition. The staff in your local aquatics outlet will be able to select good quality fish for you.

Transporting fish home

The aquatics outlet will place your new fish in a sealed bag, sometimes with added oxygen. Don't be alarmed by the apparent lack of water in the bag – it is far better for the fish to have less water and more air / oxygen, as this creates a healthier environment.

During the journey home, keep the bag in the dark, and away from direct sunlight or excessive heat. Take your fish home as quickly as possible, as the process of being transported is quite stressful if prolonged unnecessarily.

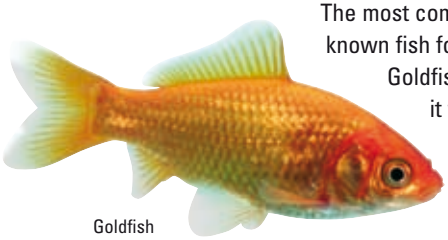
Introducing fish to the pond

When you get your fish home, keep the bag sealed and float it in the pond for 10 minutes to allow the temperature to equalise with the rest of the water. Then, open the bag and roll the sides down. Over a period of thirty minutes, slowly top the bag up with water from the pond. This helps your new fish get used to the chemistry of the water. Once this is done, use a small net to transfer the fish into the pond. If possible don't pour water from the bag into the pond, as it will be polluted.

Your new fish may hide for a day or two until they feel secure. Having plenty of plant cover will help them to settle quickly. Offer a small amount of food at the same place each day, to encourage them to come to the surface. Remove any that is uneaten, and avoid feeding on the first day. It is beneficial to add **TetraPond AquaSafe** to the pond when you add fish, as it helps them to cope with the stress they may have experienced.

Types of Pond Fish

There is a wide range of coldwater fish to choose from, and it is important to select those that are right for your pond. It is also important to know what their requirements are, so you can keep them healthy and in good condition.



Goldfish

Goldfish *(Carassius auratus)*

The most common and well-known fish for ponds, the Goldfish as we know it was developed in China from a native carp species in around 1000AD. Although available in a multitude of shapes, it is the common Goldfish that is most suitable for life outdoors.

Comet

Although, in a very large pond or lake, Goldfish may reach 45cm (18") in length, in most cases they will grow to around 12-15cm (4-6") and are suitable for most sizes of pond. They do not have to be kept in shoals, but prefer to be in small groups, particularly when young.

Goldfish will thrive on most **TetraPond** foods, however for best results use specially formulated **TetraPond Gold Mix**. This contains a special blend of sticks, flakes, and river-shrimp, to keep goldfish in top condition.

Golden Orfe

Shubunkin *(Carassius auratus)*

Shubunkins are the same species as goldfish, the only difference being that they have been selectively bred to produce a multi-coloured body pattern. The care and behaviour of Shubunkins in ponds is the same as for Goldfish. For best results, keep them in small groups and feed them with **TetraPond Gold Mix**.

Comets *(Carassius auratus)*

As with Shubunkins, Comets are a variety of Goldfish, and therefore require the same care. They are usually red and white, and often have more ornate finnage. Keep in small groups and feed on **TetraPond Gold Mix** for best results.

Orfe *(Leuciscus idus)*

After Goldfish and Shubunkins, Orfe are the next most popular species for ponds. They are naturally adapted to faster flowing waters, where oxygen levels tend to be higher and the water quality a little better. Therefore although they adapt well to pond life, they are more sensitive to any deterioration in the quality of the water.

A filter system, with a good flow of water to aerate the pond, is essential. The pond must also be of a reasonable size, as Orfe grow rapidly to 20-30cm (8-12") and need to be kept in shoals of at least 4-6 fish. A surface area in the region of 5-6m^2 would be enough to provide the swimming space that these fish need. Their dietary needs can be met with most **TetraPond** foods, with **TetraPond Variety Sticks** being ideal.

Carp *(Cyprinus carpio)*

Although many fish may be referred to as 'carp', where ponds are concerned it generally refers to the Common, Ghost or Koi carp, all of which are different varieties of the same species. Common carp generally include the non-ornate varieties (such as Mirror, Leather, and Common) typically being those found in lakes and rivers. Koi carp are coloured varieties of the common carp, developed in Japan over the last 200 years or so. Ghost carp (or Ghost Koi) are a cross between a variety of common carp and Koi, and exhibit some traits from each of these.

Carp are large fish that are not suited to smaller ponds. They regularly grow to 45cm (18") or more, and are quite capable of getting even larger. On top of this, they enjoy nothing more than uprooting and eating plants; so any that are in the pond must be well secured with large pebbles.

For Koi and other large carp, you will need to ensure that the pond is very well filtered and aerated. The pond also needs to be deep, ideally 90cm (3ft) or more in places, with plenty of swimming space (8m^2 or more).

To get the best out of their colours, Koi require a specific food, such as **TetraPond Koi Sticks**. The growth rate of Koi and other large carp can be maximised by feeding **TetraPond Koi Sticks Growth** in the summer. Carp enjoy being in small groups when small, but do not need to be kept in shoals.

For more on feeding Koi, see our **'Koi Nutrition'** brochure.

Tench *(Tinca tinca)*

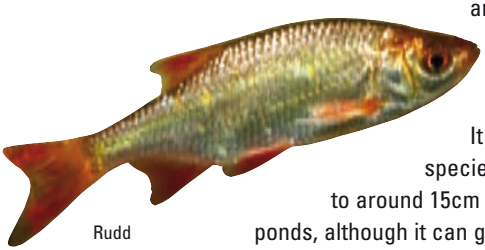
Often bought as a 'scavenger' to clean up the base of the pond, Tench are a native fish that frequent slow-moving lakes and rivers. In fact, Tench will not clean the pond in any great sense, and nor will any other fish. However, they are very impressive in their own right and make good additions to medium and large ponds.

Tench

Tench grow to around 20cm (8") in most ponds, although they are capable of much larger sizes. Tench, like all other pond fish, will do well on a general pond food, such as **TetraPond Sticks**. They do not need to be kept in shoals, and are happy on their own or in small groups. As well as the natural green form, Tench are also available in golden and red varieties.

Carp

Rudd *(Scardinius erythrophthalmus)*
Another native species, the Rudd also makes a good pond inhabitant and is most commonly sold in its golden form. It is a shoaling species that grows to around 15cm (6") in most ponds, although it can get larger. Given that they shoal and behave like Orfe, yet do not get as big, they are a good substitute in smaller ponds. They do require good water quality though, and a filter is essential. Rudd have evolved to feed from the surface of the water, where they will spend the day picking off insects that stray into the pond. **TetraPond Sticks** or **Variety Sticks** provide an ideal diet.


Rudd

Other species

Beyond those already mentioned, there are other fish that sometimes appear for sale in water gardening outlets. Many of these may be non-native and have certain legislation imposed on their sale, whilst others are natives that are just not available very often. Although it is impossible to list them all, some of these species are mentioned below:

Native species

Of the native British species that are sometimes seen for sale, the most suited to ponds include Sticklebacks, Bream (often called 'silver bream' when small), Gudgeon, Roach, and Crucian carp. None of these species grow large in captivity and they are all well suited to filtered ponds, with Sticklebacks being an excellent choice for wildlife ponds. Of all of them, it is the Gudgeon that requires the best water conditions, as they live in fast-flowing rivers. Roach, Gudgeon, Bream and Crucian carp are all shoaling species and need to be kept in groups. Whatever you do, always buy your fish from an aquatics outlet, and never capture them from the wild. Not only is this illegal in many cases, but it is likely that you will introduce disease into the pond. All of these species can be fed on **TetraPond Flake** or **TetraPond Variety Sticks**.

Non-native species

These are fish that are not native to Britain, and generally include species from the European mainland and North America, as they can survive our climate. Such fish are subject to legislation ('The Prohibition of Keeping or Release of Live Fish' Order 1998) which is designed to track their whereabouts in case they are released into the wild. This is important for the protection of native fish populations, and any water gardening outlet that wishes to sell these fish will have a license to do so.


Stickleback

Sturgeons and Sterlets are increasingly popular due to their strange appearance and friendly character. However, they require a large, well-filtered pond (Koi ponds are often ideal), and need to be fed a special diet – **TetraPond Sterlet Sticks**. This is because their dietary needs are very different from other pond fish, and normal foods can cause them harm if fed for too long.

Sterlet

Grass carp are often bought in the belief that they will consume algae. Although you might be lucky enough to get them to eat some blanketweed, their preference is for soft-leaved plants and, even more so, for food sticks. In addition, grass carp grow very large and are capable of getting bigger than Koi, so a large pond is essential. Good filtration and water quality is also important, as these fish come from large rivers. If possible, buy a shoal as they will stick together when young.

'Catfish' are usually one of a few species. Channel catfish ***(Ictalurus spp.)***, Bullheads ***(Ameiurus spp.)*** or Wels catfish ***(Silurus glanis)*** are the usual culprits, with none of them being suitable for anything but the largest Koi pond, as they grow large and eat anything they can fit in their mouths.

For more information on different species of pond fish, talk to your aquatics outlet or water gardening centre or visit **www.tetra.net**

Other Tetra brochures

Caring for your Pond

Pond Equipment

Feeding your Pond Fish

Beating Green Water and Blanketweed

Pond Problem Solver

Koi Nutrition

Setting up a Tropical Aquarium

Caring for your Tropical Aquarium

Planting your Aquarium

Aquarium Equipment

Feeding your Aquarium Fish

Aquarium Problem Solver

Goldfish Care

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Tetra (UK) Limited, PO Box 271, Southampton SO18 3ZX Email: tetrauk@tetra.net CPG1

For more information: www.tetra.net