A PRACTICAL GUIDE to your aquarium

with World of Water £1

→TROPICAL
→MARINE
→COLDWATER

From buying your **aquarium** to **choosing** and **caring for your fish**

World of Water AQUATIC CENTRES

www.worldofwater.com

in association with

practical fishkeeping MAGAZINE

www.practicalfishkeeping.co.uk

Contents

World of Water is delighted to welcome you to this unique guide to setting up an aquarium. Happy fishkeeping!

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World of Water

The UK's leading Aquatic Superstores

World of Water was founded in 1984 in Romsey, Hampshire, and has quickly risen to become one of the UK's largest and most successful aquatic retailers with branches throughout England and Wales.

Wherever you are in the country the centres are well worth a visit, most with large tropical departments and now a number with extensive marine sections. Please see back page for listings.

The Choice

World of Water has a huge range of the latest aquarium kits to make life easy for the beginner, whilst also showcasing state-of-the-art equipment to tantalise even the most seasoned aquarist. Products shown in this guide are readily available but we would suggest you phone ahead if you are travelling far.

Help at Hand

Each World Of Water Tropical department is staffed by highly experienced fishkeepers who are only too happy to advise on any requirements you may have, whether you are a beginner or hobbyist.

The Value

World of Water believe in value, you'll find most products in this guide at permanently low prices.

This Guide

We hope this guide will prove useful for all those who enjoy the wonderful hobby of fish keeping. Please remember, this guide can only cover a small fraction of the enormous range of products available at World of Water, so a trip is always worthwhile.

World of Water AQUATIC CENTRES

www.worldofwater.com

Welcome to the world of fish

Platy

If you picked up a magazine or entered a World of Water store you will already have had an insight into the world of fishkeeping. Indoor aquariums open the door to a myriad of opportunities and what could be the hobby of a lifetime.

Siamese fighter

Neil Hepworth

Fancy goldfish

Neil Hepworth

TIP ALWAYS FIND OUT AS MUCH AS YOU CAN ABOUT A FISH **BEFORE YOU BUY** IT, TO ENSURE IT'S **COMPATIBLE** WITH THE REST OF YOUR FISH – AND THAT IT WON'T GROW TOO BIG FOR YOUR AQUARIUM!


Neon tetra

The Goldfish Bowl / photomax.org.uk


Amazon Classic Darkwood


Amazon Bay

Amazon tank range available exclusively at World of Water.


Amazon Bow

A world of choice

Whether it's a decorative aquarium that you are looking for or a new pet, aquatics encompasses it all. From simple goldfish to green, planted aquaria, to the stunning marine reefs, there is a tank and fish to suit everyone.

Aquatics can suit people of all ages, all skills and all budgets, and World of Water superstores stock a wide range of aquariums to get you started. (Please check back page for full listing.)

Friendly, experienced staff are always on hand at every World of Water branch to make sure you get it right first time and guide you through every aspect of the hobby with ease.

Benefits

Keeping fish can not only enhance the look of your living room – it has also been proven to lower stress. What could be more relaxing than an aquarium full of happy contented fish displaying all the colours of the rainbow? And just by following a few simple steps, you could own that very thing within weeks.

But an aquarium can offer much more than just vistas. You can make it as easy or as complicated as you like, and your first step into fishkeeping can soon evolve into an all enthralling pastime.

The pitter patter of tiny fins

Did you know that lots of aquarium fish can be bred? If you would like to breed fish, how about some livebearing fish, where the females of the species give birth to live, fully formed young. Special foods and breeding units are available in store.

Or what about some cichlids? These colourful, intelligent fish lay eggs and protect them and the young fry from other fish. Watching a pair of Kribensis herd a shoal of fry around a furnished aquarium can be a wonderful sight, and educational too.

The colourful cichlids of Lakes Malawi and Tanganyika are very popular because of their bright patterns and the way in which they breed. African cichlid tanks are great for those who want the look of a marine tank, but aren't ready to take the plunge. Decorate with coral sand, Ocean or tufa rock and a marine scene can easily be created.

Underwater gardeners

For the more green-fingered among you, how about a planted aquarium? A range of aquatic plants are available and beautiful planted aquascapes can be created with the aid of some extra equipment and a little patience.

Or how about a biotope aquarium where plants, décor and fish from the same natural habitat are used to create a natural-looking scene from the comfort of you armchair.

Live plants can benefit fish of all types, providing them with shelter, aiding water quality and even offering somewhere for fish to breed. ■

Neil Hepworth

KEEP MARINES

The ultimate aquatic experience for many is replicating a live coral reef in the home. There has never been a better time to keep marines and selected World of Water stores carry everything you need to succeed from fish to invertebrates to corals.

Whether it's a small aquarium that you are looking for or a full-blown slice of the Indo-Pacific, we are here to guide you and our in-store displays will provide you with the inspiration that you need to create your own display at home.

Whether it's rare corals and unusual fish that are your thing, or a simple pair of clownfish, our marine stores will either have it, or can get it for you – and always at competitive prices.


Clownfish

Neil Hepworth

Before you

Once you have decided what species of fish you wish to keep, you'll need to provide them with a suitable home. Here are some of the things you'll need to consider when choosing a tank for your fish.

Take a minute to consider what sort of fish you wish to keep and their requirements. Marine systems use specialist marine equipment, so if buying a bare tank check first that the extra equipment can be fitted. Live plants and corals need bright light, so again, check that the light fittings supplied will do the job.

Tank size

Fish can vary in size so the right tank must be chosen accordingly. Always buy the biggest tank that you can afford as larger volumes of water are more stable and will hold more fish.

As a rough guide, an aquarium should be at least six times the adult length of the fish and bear in mind that some territorial fish need lots of space if they are to live with others.

Weight

Aquariums are very heavy when filled with water so they must be placed on a suitable level surface and combined with a strong, specially made stand. A Juwel Vision 180 aquarium holds 180 litres when filled. Each litre weighs one kilo, so add that to the weight of the tank, the gravel, the décor and the cabinet and the whole thing could weigh the same as three grown men once set up, and they should never be moved when filled.

Check that the area is level with a spirit level before you fill it up. Even empty tanks can be heavy so make sure that you have lots of help available to lift it into position when you get it home.

Aquarium furniture

Most larger aquariums will have matching furniture to stand the tank on and a matching or built in hood that accommodates the lighting. Whether you want slick, silver finishes or something to match the dresser we have the tank for you, and many designs are available in several colours for that purpose.

But there are added benefits from choosing proper stands and cabinets as they can complement the tank and they are fit for purpose. Whichever tank you choose, speak to a member of staff instore. They will be able to recommend the best type of cabinet to suit that tank.

Cabinets can be used to store and disguise equipment too. Large aquariums and cabinets often come with doored cabinets to place an external filter, and a shelf to store food and medications. This not only looks neater but the filter can be accessed away from the main tank with minimal disturbance to the fish.

Design

This is where you can let your imagination run wild. If you can think of a shape, there is probably a tank to match – but some designs are more suitable than others. If space is at an absolute premium, a square nano tank may be for you and can be placed in the office or kitchen without taking up any more room than a small, portable television. Nano tanks have come on leaps and bounds too, with models not only being suitable for small tropical and coldwater fish but also marines.

If the traditional style goldfish

TIP BIGGER AQUARIUMS ARE EASIER TO MAINTAIN AS LARGER BODIES OF WATER ARE MORE STABLE. THEY ALSO ALLOW YOU TO KEEP MORE FISH!

start...

bowl still catches your eye, what about the BiOrb from Reef One, with integral filter and lighting options? You can even swap the top and bottom trim for a whole range of fashionable colours. The design and filter included in the BiOrb makes it a more suitable, modern choice than the goldfish bowl, and you will achieve much better results with more ease.

The ideal shape for any aquarium is one that is longer than it is tall so that the fish can exercise by swimming from one side to the other. Fish are adapted to swim horizontally, like in a shallow stream, so standard rectangles and bow-fronted aquariums offer them the most swimming space and have the largest surface areas for oxygen exhange.

If you want a large volume, and a great focal point, how about a corner aquarium? These bow-fronted tanks will grace any room, and with lots of depth they look great when decorated.

Where to position that tank

Ideally you should choose a spot where the aquarium becomes a focal point for the room. It needs to be a permanent position - you certainly won't want to move it every few months.

TOP TIPS TO PLACE YOUR TANK

DO place it in a room that is used often, such as the living room. This way your fish become part and parcel of your life - and you get to enjoy them every day.
DO make sure there are power points within easy access.
DO choose a spot that allows easy access. It's no fun carrying out maintenance in a cramped space.
DON'T position it where the fish are likely to be frightened by children or pets dashing around.
DON'T put it next to a window as the sunlight can cause algae to form on the glass. Too much sun such as in a conservatory can also cause the water to overheat.
DON'T position your aquarium near doors or radiators - draughts and central heating will affect the temperature of the water. The fish may also be upset by the noise and vibration caused by doors being opened and closed frequently.

Watch that filtration

If there is one thing your fish need, it's filtration. Get this right, and you're heading strongly in the direction of success.

Congo tetra

Neil Hepworth

The filter is the life-support system of any aquarium. Fish produce pollution from breathing and defecating, and if not removed or broken down, that pollution can kill fish as they are not equipped to swim and survive in their own waste.

In nature, fish waste products like toxic ammonia are diluted by the sheer volume of water or swept away downstream. In the aquarium water volumes are limited and we cannot change water constantly, so we employ a bit of engineering and a little help from Mother Nature to do the job of filtration.

Benefits

Filtration keeps the water clear, aerates it in some cases, and breaks down fish waste. Without filtration aquarium water would quickly become cloudy and smelly. Worse, your fish could go off their food, become ill and even die. Unfiltered aquariums are fraught with water quality issues and may cause the untimely death of any fish.

Filter media

When it comes to filtering water, it can be done in three ways: mechanically, biologically and chemically. Mechanical filters trap debris and particles in the water. When they have trapped lots of debris they may clog and stop the pump from working, so they must be cleaned or replaced regularly. Common forms of mechanical filter media include sponge and filter wool, or floss.

Biological filtration is perhaps the most important to the fishkeeper as without it fish could die from ammonia poisoning. To filter biologically, we use porous media with a large surface area, but that is not what does the filtering – it's what is living on that media that is important.

Biological media provides a home for naturally occurring nitrifying bacteria. The more media you provide, the greater the surface area and more bacteria can live there.

Biological filter media should never be washed under the tap as chlorine and chloramine will kill the bacteria that you need to purify the tank water. Examples of biological filter media include ceramic and plastic balls or rings. Sponge will also work as a biological filter once colonised with beneficial bacteria.

Chemical filtration is often used to fine-tune aquarium water. The most well-known chemical filter is carbon, or charcoal. Carbon absorbs impurities from water and makes it crystal clear and odour free. Activated carbon is better as it is more porous and has a higher surface area.

Resins are also used as chemical filters and can be used to remove phosphate, nitrate and other organic pollutants like ammonia. They can be used alongside other filter media, and phosphate and nitrate resins can be used to control algae.

TIP NEVER CLEAN YOUR **FILTER SPONGE** OR ANY OTHER FILTER MEDIA UNDER THE TAP AS THE CHLORINE IN THE TAPWATER WILL KILL ALL THE **BENEFICIAL BACTERIA**. INSTEAD, GIVE THE MEDIA A RINSE IN THE BUCKET OF **TANK WATER** THAT YOU'VE REMOVED DURING YOUR WATER CHANGE.

Types of filter

Filters can be divided into internal and external, and power filters and air-powered filters. Internal filters sit inside the tank whereas external filters sit underneath the tank in a cabinet, hang on the back of the tank, or can be built into the hood above the waterline.

● **Internal power filters**
These are by far the most popular and are most suited to small tanks and beginners. A water pump sits on top of a small canister containing sponge, and water is drawn through the sponge, trapping debris and breaking down waste.

Some internal power filters come with adjustable flow and an aeration device called a venturi, which blows bubbles into the water. Although traditionally available just as mechanical and biological filters, new hi-tech internal filters come with additional chemical filter media and separate biological media.

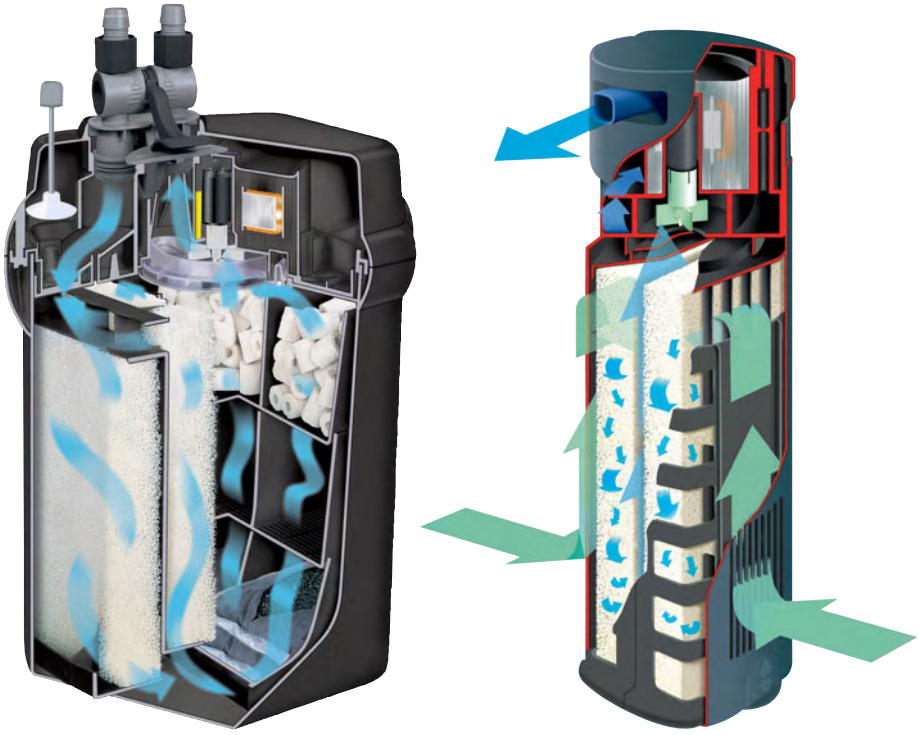
● **External power filters**
The traditional external filter consists of a sealed canister connected to the aquarium by an inlet pipe and an outlet pipe. External filters are larger and more powerful than most internal filters and can hold a lot more media, offering better cleaning and supporting more fish.

The superior power of external filters makes them suitable for large aquaria; heavily stocked aquaria like African cichlid tanks; and large fish. External filters are designed to hold a variety of mechanical, biological and chemical media and are versatile so can be packed with the media of your choice.

Being fitted underneath the aquarium, it provides ease of access and maintenance with no disturbance to the fish. The best filters are those that come with a priming mechanism, meaning that they are easy to fill and get going straight away.

● **Air-powered filters**
Air-powered filters are now largely a thing of the past, but they still have their uses. Air-powered filters are less powerful than power filters so they create a more gentle flow and are less likely to suck up small fish. Because of this, air-powered sponge filters are popular with fish breeders and air pumps consume low amounts of electricity, offering low running costs.

Undergravel air-powered filters were once popular but they may hinder plant growth. Undergravels can be upgraded by fitting a powerhead.



Which one is best for me?

Filter choice can depend on your budget, experience and the sort of fish that you wish to keep. You cannot over-filter, so the bigger the better is the order of the day.

External filters can be more expensive to buy and slightly more technical to set up, but they are the best for your fish.

For small nano tanks, an internal power filter will be fine.

GET IT MATURED!

As good as any filter is, when you buy it new it will be sterile. Filters need time to mature and colonise with bacteria, and in that time they will not support a full stocking of fish. Always add a maturation fluid to a new tank and new filters, and test water regularly to monitor progress.

What else do you need?

So if you want to keep fish, what other equipment do you need and what does it do?

Lighting is essential for successful plant growth.

Lighting

All living organisms are adapted to a daily cycle of light and dark. In the tropics, it is sunny nearly every day and fish, plants and corals are adapted to take advantage of that light.

Artificial light can be used to enhance fish colours and aid plant growth. Because of the close proximity to water, we use lighting that is splash-proof and light tubes that are specifically designed for aquatic use. The most common form of lighting available is fluorescent tubes and they can range from a single, standard tube to power compact, high output or multiple light tubes in "luminaires" which span across open-topped tanks.

Choose from standard T8, high-powered T5 or the incredible brightness of suspended metal halide lighting. Any lighting can be further enhanced by the addition of a reflector, which can increase the brightness considerably.

For multiple lighting without all the cabling, twin light starter units can used.

Live plants may need two or more light tubes to aid their growth, and some marine corals are demanding of very bright light so use T5 or metal halide lighting for them

Although beneficial, too much lighting can cause nuisance algae to grow so it should be on for no longer than 10-12 hours per day. Plug lighting into a timer so it comes on daily and at the same time.

Keep reflectors and cover glasses clean, and replace light tubes every 12 months.

TIP MATCH THE LIGHTING TO YOUR LIVESTOCK. IF **MAXIMUM COLOURATION** IS YOUR THING GO FOR HAGEN POWERGLO OR INTERPET TRIPLUS. THIS WILL **ENHANCE FISH COLOURS** FROM THE RED AND ORANGE OF GOLDFISH TO THE BLUE AND YELLOW OF MALAWI CICHLIDS. FOR MARINES, ALWAYS CHOOSE MARINE LIGHTING AS **CORALS NEED LIGHT** OF THE RIGHT SPECTRUM IN ORDER TO THRIVE.

Coldwater fish have high oxygen requirements and need increased filtration.

Heating

Heating is essential if you wish to keep tropical fish. Although our climate is seemingly getting warmer, it is still not warm enough for tropical fish to survive, even indoors, without additional heating.

To heat water we use a heater/thermostat. It's an all-in-one device that regulates temperature in the aquarium by way of a heating element and a built-in thermostat, and it can be set to your desired temperature.

Heaters come in different sizes for different sizes of aquaria – usually from 25 watts to 300 watts, and will cover any length of tank from 30cm to 200cm long. For larger aquaria or tanks placed in cool areas, more than one heater can be used simultaneously.

Set the heater to 24°C for community fish. Some South American fish like Discus prefer it a little warmer. Use a thermometer to check how warm your water is.

Heaters can be delicate so don't take them out of the water when they are still plugged in, or knock them against rocks.

To protect your heater, place it inside a heater guard. Read temperature more accurately with a digital thermometer.

However, if you don't want tropical fish, temperate fish are available – and these don't need heaters.

Aeration

Oxygen is vital for fish and in some aquariums, it may be lacking. Aeration can be added by agitating the water vigorously with a power filter or by using additional aeration from an airpump.

Traditional airpumps sit outside the aquarium and pump air along tubing into the water. It can be diffused through an airstone, producing thousands of tiny bubbles, or put to use making an ornament move. No matter how you introduce air to the aquarium, the fish will benefit.

A whole range of air accessories are available from spare parts to splitters, connecters and valves that enable complete control.

Whichever size or style of airpump you choose, anything is better than nothing, and fish and filter bacteria will benefit. Look instore for a range of aeration features, air accessories and action ornaments. Leave aeration running 24/7, and run extra aeration when adding medicine or dealing with very hot weather conditions.

Large airstones and multiple air-operated features require large pumps. Ask for assistance to choose the best airpump for your needs.

When you go away on holiday

Food blocks are available to feed your fish when you go away. TetraMin Holiday gel-based formula provides up to two weeks' food for tropical or coldwater fish, giving you the peace of mind that they will be in top condition on your return.

The Tetra foods don't contain plaster like some do and won't cloud the water. If you are going away for a shorter period of time, choose the Tetra Holiday and Weekend foodsticks.

For added convenience, how about an automatic feeder?

These timed, battery-operated devices dispense food at regular intervals when you are away, and can be used with virtually any dry aquarium foods. You could even use an automatic feeder when you are at work.

World of Water AQUATIC CENTRES

www.worldofwater.com

AVAILABLE FROM WORLD OF WATER

● **Tronic heater**
Submersible aquarium heater with safety shut-off. Available in sizes from 50-300W.

● **TetraMin Holiday**
Gel-based food block that doesn't contain plaster. Feeds for up to 14 days.

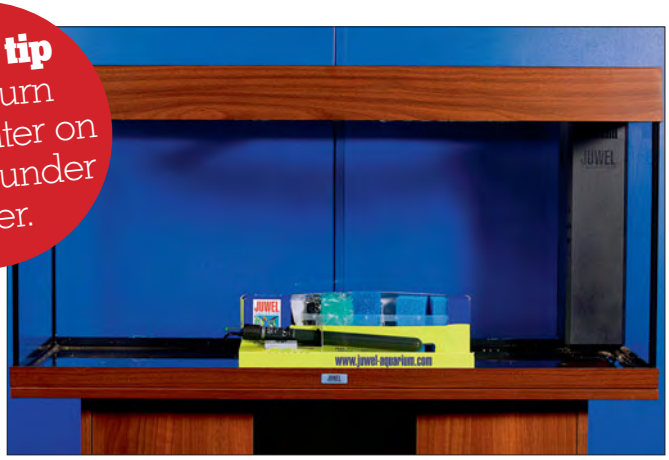
● **Interpet T5 lighting**
T5 power compact lighting offers up to three times the light output of ordinary tubes. Available in a wide range to suit all types of fish.

● **Aqua One air pump**
The SR series of air pumps is available in models from 150lph to a whopping 1900 lph.

Tropicals made easy

So you want to keep tropical fish? We show you how to set up and decorate the aquarium in 11 easy steps.

Safety tip
Don't turn your heater on until it's under water.

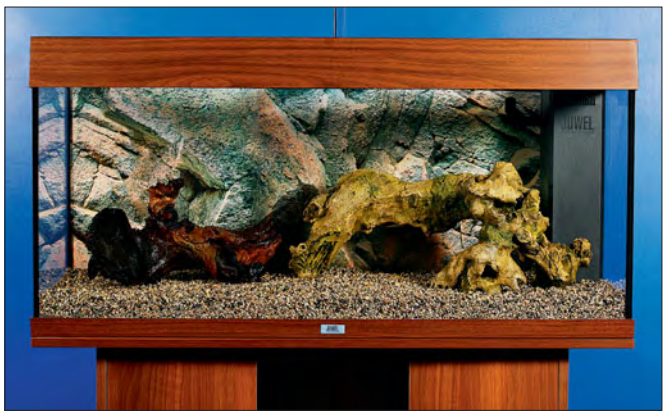


1 The 180 litre tank is a good sized tank for both tropicals or marines. The model we have chosen, in dark wood, comes with twin lighting, a 200 watt heater and a 600lph internal filter.
The filter comes with a coarse sponge, fine sponges, a nitrate removal pad, a carbon pad and a fine poly pad.

2 We've added a background picture to the tank to complement the plants and fish. This 3D rocky background is reversible and can be simply stuck on the back with clear double-sided tape. Trim the edges for a neat fit. The filter media can be removed from packaging and fitted as directed. For good plant growth, replace the carbon pad with another sponge as carbon can remove plant food.

3 We want good results with live plants and that means adding a substrate fertiliser. This Tetra Complete Substrate should be poured over the base of the tank, before you add any gravel.

4 Choose a gravel that will not alter the water chemistry and is safe for use with plants. Wash it to remove any dust and cover the Tetra substrate completely, to a depth of 5cm/2".



5 The "hardscape" is the next thing to be added. A combination of real bogwood and replica wood has been selected and two large pieces have been placed in the tank. The bogwood has been rinsed to remove any dust.

Photography: Neil Hepworth

6 The hardscape is finished off by two pieces of carved lava rock. We have placed it in a pile, to the right of centre, where it will complement the bright green, low-growing plants. Again, rinse it before putting it in the tank.

7 Half-fill the tank ready for planting. Use a hosepipe or buckets – we've used the lid from the Tetra Complete Substrate to deflect the water so as not to disturb the gravel too much. Dechlorinate the water, making it safe to add the plants.

8 Plant the taller, background plants first. We've planted *Vallisneria* in one corner, and twisted Vallis in the other. We've used *Cabomba* as a space filler and some Amazon swords toward the midground to make a feature.Continue filling any gaps with other fast-growing plants. We've added some red *Alternathera* and some dark green *Egeria*. The Vallis, *Egeria* and *Cabomba* will grow quickly, taking up nutrients and helping to prevent algae.

9 Test water and mature the tank before adding any fish. Add a filter maturation fluid, a liquid plant food and how about a CO_2 system for better plant growth? This simple CO_2 device from Tetra is easy to use and suitable for beginners. You should notice the benefit within a few weeks of fitting it.

10 With everything in place, leave it for a week before adding any fish, then add a small number of hardy fish and continue to test while ammonia and nitrite peak, and then return to zero. More sensitive fish should be added later on.

11 The finished tank with community fish, clear water and growing plants. We've chosen a selection of fish to occupy all levels of the tank and live in harmony with each other. Add them in stages to allow the biological filter to catch up.

TIP SETTING UP AND AQUASCAPING A NEW AQUARIUM IS A FUN JOB AND ALL THE FAMILY WILL ENJOY BEING INVOLVED. GIVE YOURSELF PLENTY OF TIME ONTHE DAY AND DON'T RUSH IT. BUT MOST OF ALL ENJOY IT.

The right combination of décor will make your tank come alive.

Choosing the décor

Once the aquarium has been placed and the equipment fitted comes the fun part – decorating it – and there is loads of choice!

Gravel

The key to any good aquascape is to start at the bottom. Gravel must be easy to keep clean and safe for fish, but the choice of grade or colour is entirely up to you.

From bright pinks and orange to black to natural sands and gravels, World of Water has it all, and quantities range from a couple of kilos to 25 kilogram sacks.

Coloured gravels are popular with the bright colours of fancy goldfish, and fine sands are a must if trying to create that authentic Amazonian biotope. Wash all sands and gravels when you get them home to remove any dust or debris.

Specialist sands and gravels

Substrates can be used for more than just decorative purposes. The right substrate will aid plant growth, offering them a secure footing and aiding the flow of nutrients to the roots. Combine plant substrates with fertilisation and bright light for the best results.

Some sands and gravels can be used to effect water parameters. The calcareous properties of coral sand and aragonite sand help to buffer pH and alkalinity in East African cichlid tanks and marine tanks. Ask in store for substrates that aid pH buffering.

Bogwood

There's something about bogwood, plants and tropical fish that just look right. Bogwood isn't just any wood though, and for a start, it sinks. So why is it called bogwood? They are actually from bogs and are ancient roots and branches that have been semi-preserved by the anaerobic conditions of the bog.

There are other types of wood available like Mopani wood, which has a two-tone effect – an effect that has been created by sandblasting one face of the wood, and that can be very appealing on the eye, too.

When choosing any wood, first of all make sure that it is safe to be placed in aquariums as not all wood is. World of Water's wood comes from reliable sources and is guaranteed safe in aquariums and with freshwater fish.

When you first place bogwood under water it may leach tannins and stain the water the colour of tea. This is perfectly natural and will create conditions similar to many tropical fish habitats in South America, South-east Asia and West Africa.

If you don't like the water to be too brown, either soak the wood for several weeks in tapwater or place it in an old saucepan and boil it for a while. Activated carbon is very

TIP DARK SUBSTRATES ENHANCE FISH COLOURS AND MAKE THEM FEEL AT HOME. FINE GRAINED GRAVELS CAN MAKE A TANK LOOK LARGER, AND ARE BETTER FOR PLANT GROWTH.

effective at removing tannins, so the regular replacement of carbon in your filter will help keep the water crystal clear.

Rocks

It is hard to find any natural waterway that doesn't contain rocks of some kind. From smooth pebbles in streams to the large boulders of African Rift Lakes, they all play a part in the visual features of that habitat and a home for fish.

With few exceptions, any rocks can be used in freshwater aquariums, and World of Water stock many different kinds to help you create an underwater aquascape.

Some rocks like Tufa and Ocean rock affect water quality by making the water hard and alkaline with a high pH. This makes them unsuitable choices for most community tanks, but they can be used with the cichlids of Lakes Malawi and Tanganyika, or for simple fish-only marine tanks.

Rocks are heavy so place them carefully. Put the rocks in first and then move the gravel around them so that they cannot be undermined by the digging action of the fish.

Ornaments

World of Water stock a massive selection of ornaments comprising action ornaments, replica wood and rocks, kids' ornaments and everything in between.

Aquatic ornaments have the advantage of being safe for use with fish, and your imagination can run away with you as you can create underwater cities, brightly coloured fantasy islands or naturalistic aquascapes from replicas.

Ornaments are often lighter than natural wood or rocks and won't displace so much water. Even the less-realistic ornaments will be used by fish to hide, feed and breed, and a small catfish will happily take up residence in a replica hollow log or a sunken ship.

Combine aquatic ornaments with plastic plants for a low-maintenance, long-lasting look.

Backgrounds

The finishing touch to any aquascape is often the background. Along with lighting and gravel choice, the background can really help illustrate the theme of the tank, and put the fish at ease.

Choose from plain blue or black, to planted, to rocky, to 3D, or even structured backgrounds. No matter what the size of your tank, we have a background to fit.

Structured backgrounds

The ultimate in background design, structured backgrounds are realistic and make your fish feel right at home. They also make a great backdrop for live plants and other decorative features.

Choose Juwel or Aqua One structured backgrounds to imitate sunken trees or river banks and add another dimension to your aquascape. The natural, muted colours of structured backgrounds complement the fish and can be fitted to most designs of tank with ease. Place them in the tank first and stick them into place with aquarium silicone. Ask a World of Water staff member if you are unsure.

Plecs enjoy grazing on bogwood, and it's good for them too.

5 ways to better plants

Do you like live plants but want better results? World of Water shows you five easy steps for better plant growth.

1 LIGHTING

Light is a fundamental requirement for all plants. Light must be provided in the correct wavelength and colour temperature for plants to photosynthesize, and on for the right duration throughout the day.

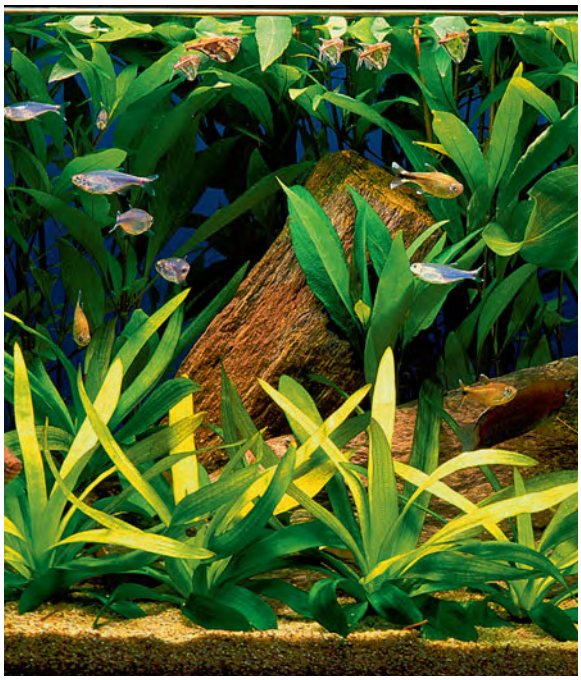
Most of our plants come from the brightly lit areas of the tropics, and we need to replicate that in our aquariums if they are to thrive.

Add reflectors to standard T8 tubes or use high-powered T5 tubes to provide sufficient light, and that usually means two or more light tubes per tank.

As a rough guide, best plant growth will be provided by 0.5 watts of light energy per litre, or 50 watts of lighting per 100 litres of water.

The colour temperature of artificial lighting is important for plants, so check the colour temperature (measured in Kelvin or "K") when you buy your next light tubes.

Plants grow best in colour temperatures of between 2000 and 10,000K. This can be catered for by Hagen SunGlo, LifeGlo, or Flora Glo. Plug lighting into a timer and set it to come on for 10-12 hours per day.



2 SUBSTRATE

Proper substrate choice can mean the difference between success and failure with plants. Plants need substrate to anchor and to take up nutrients, and the substrate needs to be of the right grade and depth to be able to do just that.

Fine substrates of between one and five millimetre diameter are best, with three millimetre being a good average size. The particle size of substrates is important because too coarse, and nutrients are washed away, and if it's too fine, the gravel can become anaerobic and the roots will rot. Always make sure that the gravel is pH neutral, or inert, as most plants do not do well in very hard, alkaline water. Layer gravel to a depth of between 5 and 10 cm to enable the plants to send down roots. This deeper-than-average substrate depth should not be vacuumed too heavily as any fertilisers will be removed. Use a combination of algae-eating and substrate-feeding catfish to keep your gravel clean.

3 SUBSTRATE FERTILISERS

Once gravel has been chosen, a fertiliser must be added to provide the plants with their food. As good as any sand, gravel or grit is, they are mostly sterile so they need a substrate fertiliser in order to allow the plants to take up nutrients.

Some very hardy plants like *Egeria* take nutrients from the water and will survive in sterile substrates, but most aquatic plants like *Vallisneria*, Amazon Sword plants and *Cryptocoryne* need food. Compare your substrate and plants to those in your garden. Few, if any, will survive in a pot of gravel, and instead need soil.

Special aquatic soils, eg Tetra Complete Substrate, are available from World of Water along with fertiliser tablets and powders to make sure you achieve good results. Tetra Complete Substrate is an excellent substrate fertiliser and will help you on your way to successful plant growth.

There is another element that aids growth of aquatic plants.

A heating cable is a low-wattage cable that is placed under the gravel, amongst the fertiliser or soil. It doesn't need to be controlled by a thermostat and is not warm enough to heat the tank by itself.

Instead, heating cables provide gentle convection currents in the substrate and turn your gravel into a slow propagater, gently warming the roots and easing the movement of nutrients.

Heating cables are not essential, but they have been the key to success in many Dutch-style planted aquariums for the past few decades.

TIP ALL THE BEST PLANTED AQUARIUMS IN THE WORLD USE A COMBINATION OF THE RIGHT SUBSTRATE, FERTILISERS, LIGHTING AND CO2. GIVE IT A TRY, YOU WON'T BE DISAPPOINTED!

Five plant profiles

■ **Name:** Amazon sword, *Echinodorus bleheri*
Origin: South America
Size: 45cm/18"
Water parameters: pH 6-8, temp 20-30°C
Lighting: One or more fluorescent tubes
Notes: Amazon swords are large plants for the midground and come in a variety of sizes and colours. They send out long roots and need to be planted in a nutritous substrate. Combine with algae-eating fish to keep the large leaves free of algae.

■ **Name:** Vallis, *Vallisneria* spp.
Origin: Widespread throughout the world
Size: Up to 180cm long depending on species, but usually shorter.
Water parameters: pH 6-8.5, temp 15-30°C
Lighting: One or more fluorescent tubes
Notes: Vallis looks like long grass and it is usually planted at the back of the aquarium, where the long leaves flow in moving water. It can get long and spread by runner, but the additional shade provided by the surface leaves may help to surpress algae underneath. Hardy and undemanding.

■ **Name:** Java fern
Origin: South-east Asia
Size: 30cm /12"
Water parameters: pH 6-8, temp 20-30°C
Lighting: Suitable for low-lighting conditions
Notes: Java fern has a very natural look and can be tied to wood or rocks for good effect. Its tough leaves withstand even plant-eating fish in some cases, and it grows happily in conditions that are unsuitable for most other plants.

■ **Name:** Crypts, *Cryptocoryne* spp.
Origin: South-east Asia
Size: 10-20cm/4-8"
Water parameters: pH 6-8, temp 20-30°C
Lighting: One or more fluorescent tubes
Notes: Crypts are commonly used to plant the foreground and their compact, rosette shape and ease of growing has made them popular. They are slow growing and appreciate substrate fertilisers.

■ **Name:** Green cabomba, *Cabomba caroliniana*
Origin: America
Size: Up to 90cm
Water parameters: pH 6-8, temp 15-30°C
Lighting: Two or more fluorescent tubes
Notes: *Cabomba* is a good space filler, and it's good at hiding equipment like heaters and filters too. It's a fast grower in bright light and only needs a liquid food added to the water. Egg-scattering fish may use it for cover and for scattering their eggs over, but don't combine it with large, destructive fish.

4 LIQUID FERTILISERS

Liquid fertilisers are meant to top up any deficiencies that may occur in the water. As plants grow, various essential elements may be used up like iron, and the regular addition of a liquid fertilser can help make up any deficiencies.

Add liquid fertilisers on either a weekly or daily basis, and their ease of use and proven results often mean that they are the first tool used to aid better plant growth in any freshwater aquarium.

Use as directed as overdosing may cause algae. Liquid fertilisers are good for when your plant leaves look a little yellow. Use as part of a complete fertilsation and lighting package for best results.

5 CARBON DIOXIDE

This is without doubt the biggest breakthrough in plant aquaculture over the past few years. Carbon is one of the basic building blocks for all life, and when presented to plants in a way they can use, the results can be spectacular.

To understand the benefits of carbon dioxide we must first look at photosynthesis. In the daytime, plants absorb carbon dioxide (CO_2) and produce oxygen. They use the carbon that they have absorbed to build their structures and to grow.

In the aquarium, CO_2 can be deficient in the day time as filtration and aeration drive off CO_2 – good for fish but not so good for plants. By adding CO_2 through a diffuser, more CO_2 is available in the water for plants and they will not only survive, but thrive.

CO_2 can be added to the aquarium safely by use of a fermentation kit (like the Nutrafin system) or from a pressurised system (like the Hydor kits). Individual CO_2 bubbles are added to the water in a way that is safe for the fish, and the plants repay us by producing extra oxygen for the fish, fighting algae and soaking up nitrate and phosphate.

Choosing your fish

Definitely the best bit about setting up a new tank – but there are hundreds to choose from, so where do you start?

Name: Angelfish, *Pterophyllum scalare*
Origin: South America
Size: 10 cm/4”
Minimum tank size: 90 cm/36”, 100 l./ 22 gal capacity
Water conditions: pH 6-8, Temp 24-28°C
Comments: Angelfish are tall fish that require tall tanks. Their long fins are vulnerable from attack by fin-nipping fish, and they may eat small fish like Neon tetras. Keep with other medium to large, peaceful fish.

Name: Ram, *Mikrogeophagus ramirezi*
Origin: South America
Size: 5 cm/2”
Minimum tank size: 45 cm/18”, 30 l./ 7 gal capacity
Water conditions: pH 6-7, Temp 24-30°C
Comments: Rams are beautiful dwarf cichlids but they do need soft acidic water with a low pH if they are to thrive. Combine with small, peaceful tetras in a well planted tank and feed a variety of frozen foods.

Before you buy

As tempting as tropical fish are, you must research their individual requirements before you buy. Check the eventual size and water requirements of each species, and whether they will suit your tank and mix with the other species on your list.
The expert staff at World of Water can help you make the right choice.
Always test the water before adding any fish.

Name: Kribensis, *Pelvicachromis pulcher*
Origin: West Africa
Size: 10 cm/4”
Minimum tank size: 60 cm/24”, 60 l./ 14 gal capacity
Water conditions: pH 6-8, Temp 24-28°C
Comments: Kribensis are peaceful dwarf cichlids that form pairs and may breed, with the adults tending the young. Male ‘Kribs’ are slightly larger with longer fins and females are shorter, with a pink belly. Furnished aquariums suit them best with live plants and rocky retreats.

Name: Siamese fighter, *Betta splendens*
Origin: Thailand
Size: 5 cm/2”
Minimum tank size: 30 cm/12”, 15 l./ 3 gal capacity
Water conditions: pH 6-8, Temp 26-30°C
Comments: Siamese fighters are best kept in small tanks with gentle filtration, and away from fish that may try to nip their fins. They like to be warmer than most other tropical fish. Never keep males together as they will fight and may kill each other.

Name: Cardinal tetra, *Paracheirodon axelrodi*
Origin: South America
Size: 4 cm/1 1/2”
Minimum tank size: 30 cm/12”, 20 l./ 5 gal capacity
Water conditions: pH 6-7, Temp 24-30°C
Comments: Cardinal tetras are some of the most beautiful tropical fish available. Best in shoals of six or more, they appreciate warm, soft, acidic water with a low pH. Treat new arrivals with a whitespot treatment.

Name: Discus, *Symphysodon spp.*
Origin: Amazon, South America
Size: 18 cm/7”
Minimum tank size: 120 cm/48”, 240 l./ 53 gal capacity
Water conditions: pH 5-7, Temp 28-32°C
Comments: Discus are beautiful, but more demanding than most tropical fish. Use RO water to create the soft acidic conditions that they require. Keep them warm and feed regularly on frozen food and Tetra Prima. Tall tanks are essential.

Name: Bristlenose, *Ancistrus temminckii*
Origin: South America
Size: 15 cm/6”
Minimum tank size: 90 cm/36”, 90 l./ 20 gal capacity
Water conditions: pH 6-8, Temp 24-28°C
Comments: Bristlenose are good algae eaters and make a more suitable choice than the common plec. The male fish develop the bristles that give them their name, and mature pairs may breed in the aquarium. Feed on sinking algae wafers.

Name: Neon tetra, *Paracheirodon inessi*
Origin: South America
Size: 3 cm/1 1/4”
Minimum tank size: 30 cm/12”, 20 l./ 5 gal capacity
Water conditions: pH 6-7, Temp 24-28°C
Comments: Neon tetras are one of the world’s most popular aquarium fish. They are a shoaling fish, so keep in groups of at least five, preferably more. Don’t keep with large or boisterous fish as they may be eaten. Well-decorated tanks suit them best, with live plants for cover.

Name: Rosy barb, *Puntius conchonius*
Origin: India
Size: 10 cm/4”
Minimum tank size: 75 cm/30”, 80 l./ 18 gal capacity
Water conditions: pH 6-8, Temp 18-28°C
Comments: Rosy barbs are hardy, colourful and suitable for unheated, indoor aquaria. Male Rosy barbs are the more colourful. Long fin, Neon and Glowlight versions are also available. Recommended community fish.

Name: Tiger barb, *Puntius tetrazona*
Origin: Sumatra
Size: 5 cm/2”
Minimum tank size: 75 cm/30”, 80 l./ 18 gal capacity
Water conditions: pH 6-8, Temp 24-28°C
Comments: Tiger barbs have a reputation for nipping fins. To counteract this, keep them in large shoals and with no long-finned fish. Females are deeper bodied and males have more colourful fins.

Name: Harlequin, *Trigonostigma heteromorpha*
Origin: South-east Asia
Size: 3 cm/1 1/4”
Minimum tank size: 45 cm/18”, 20 l./ 5 gal capacity
Water conditions: pH 5-7.5, Temp 24-26°C
Comments: Harlequins are great additions to the smaller community tank and are always active. Keep them in groups of five or more against a backdrop of bogwood and live plants.

Name: Corydoras, *Corydoras spp.*
Origin: South America
Size: 5-10 cm/2-4”
Minimum tank size: 60 cm/24”, 60 l/14 gal capacity
Water conditions: pH 6-7.5, Temp 22-28°C
Comments: *Corydoras* catfish are bottom scavengers that can be added in groups to the community tank. There are hundreds of species available and they all behave in a similar way. Sand is the ideal substrate for foraging as it is soft and won’t damage their delicate barbles.

Name: Platy, *Xiphophorus maculatus*
Origin: Mexico, Belize
Size: 5 cm/2”
Minimum tank size: 45 cm/18”, 30 l./ 60 gal capacity
Water conditions: pH 6.5-8, Temp 24-28°C
Comments: Platies are hardy and colourful and make great additions to the community tank. They breed readily, and if you keep males and females together you will soon have fry. Outnumber males with females.

Name: Dwarf gourami, *Colisa lalia*
Origin: India
Size: 5 cm/2”
Minimum tank size: 60 cm/24”, 60 l./ 14 gal capacity
Water conditions: pH 6-7.5, Temp 24-28°C
Comments: Dwarf gourami are pretty fish that are suited to the well-planted aquarium. They need gentle filter currents and can be kept with other small, peaceful fish. Males are the colourful ones in most cases, but blue dwarf gourami may have blue males and blue females.

Name: White Cloud Mountain minnow, *Tanichthys albonubes*
Origin: China
Size: 4 cm/1 $^{1}/_{2}$”
Minimum tank size: 30 cm/12”, 20 l./ 5 gal capacity
Water conditions: pH 6-8, Temp 15-25°C
Comments: These small fish are more temperate than tropical, and originate in cool mountain streams. They are hardy fish, ideal for beginners or as an alternative to goldfish in unheated aquaria. Keep in groups of six or more.

Name: Guppy, *Poecilia reticulata*
Origin: Trinidad
Size: 5 cm/2”
Minimum tank size: 45 cm/18”, 20 l./ 5 gal capacity
Water conditions: pH 6.5-8, Temp 22-28°C
Comments: Guppies are universally popular because of the males’ colourful tails and their willingness to breed. Females are larger, less colourful and give birth to live young. Don’t keep with large, boisterous fish or fin nippers.

Name: Molly, *Poecillia velifera/latipinna/sphenops*
Origin: Central America
Size: 7.5 cm/3”
Minimum tank size: 75 cm/30”, 80 l./ 18 gal capacity
Water conditions: pH 7-8.2, Temp 24-28°C
Comments: Mollies are hardy livebearers that come in Sailfin and Black forms. They inhabit salty estuaries. Add salt to their tank to fight disease.

Name: Zebra danio, *Danio rerio*
Origin: India
Size: 4 cm/1 $^{1}/_{2}$”
Minimum tank size: 30 cm/12”, 20 l./ 5 gal capacity
Water conditions: pH 6-8, Temp 15-25°C
Comments: Hardy shoaling fish suitable for tropical tanks or unheated indoor aquaria. Keep in groups of six or more. They like some filter current and are often found at the water’s surface, flitting in and out of the current.

Introducing fish

Patience is vital when you first stock an aquarium. You should never attempt to fully stock a newly set-up aquarium.

Stress-free introduction

- Turn off the aquarium lights
- Float the bag in the aquarium for approximately 20 minutes to equalise water temperatures.
- Now open the bag and gently pour in about 30% aquarium water.
- Wait 10 minutes then repeat this process twice more at the same intervals.
- Carefuly net the fish out of the bag and place them in the aquarium.
- Dispose of the water in the bag. Do not pour this water into the aquarium.
- If the new fish are the only ones in the aquarium, wait 24 hours before initial feeding.

TIP SPEND TIME OBSERVING YOUR FISH ON A DAILY BASIS

Healthy fish

A healthy, happy aquarium is the goal for every fishkeeper. We offer you some advice for keeping your fish healthy and disease free.

Whitespot is a common ailment but it can be avoided.

Feeding

After water quality, proper feeding is paramount to keeping your fish healthy. A well-fed fish will have a strong immune system and will be better at fighting off disease.

Feeding a combination of a good staple food, occasional treat foods and frozen foods is best for all fish.

Staple, dry foods like flake are complete foods that contain all the vitamins and minerals that fish need to survive and grow.

Frozen foods are whole foods that have been freshly frozen. They offer the fish variety, and condition them for breeding and better colouration. Frozen foods can themselves be varied to provide more variety.

Consider the feeding requirements of each species and do your best to accommodate it. Once a diet has been chosen, choose a food particle size that suits the size of the fish. Large Oscars need large, protein-rich food sticks and small rasboras need micro pellets or crushed flake. And take a look at how often your fish should be fed.

Fast-swimming, active fish have fast metabolisms and should be fed little and often. Large, slower-moving fish such as big catfish will eat more per sitting, expend less energy in the daytime, and can be fed once per day or even every other day.

Only feed as much as any fish will consume within a few minutes and syphon off any uneaten food.

Fish health

The vast majority of fish health problems are related to water quality. With regular water changes and maintenance, few problems will occur. But fish can still get ill sometimes.

Recognising the symptoms early goes a long way to curing any problems that crop up. If your problem isn't detailled below, ask advice at your local World of Water branch.

Whitespot

Look closely at the fish. Are the spots circular and the size of a pin head? If they are it could well be whitespot, a parasitic infection. The problem is common and easy to treat, but must be caught in time before your fish get too ill to recover. It is stress related.

Fungus

Fungus looks like patches of cotton wool on a fish and are a secondary infection that may result from poor handling, injury or poor water quality. Fish with fungus are best isolated.

Fin and mouth rot

This comes from damage or prolonged periods of poor water quality. Fix the water first, then treat them with an antibacterial remedy.

Tail rot and fungus on a fish will mean a course of treatment.

Mouth rot.

Basic health tips

- **Whitespot treatments are more effective when you combine them with a rise in water temperature.**
- **When using medications, aerate the water heavily to help the fish breathe.**
- **Whitespot is stress-related, so find out the cause for a more effective treatment.**
- **Remove carbon from your filter when adding medications. Carbon removes them and will render them useless.**
- **Copper-based parasite treatments are harmful to shrimps, crabs, snails and crayfish. Always read the label before treating your tank.**

Aquarium maintenance

Maintenance is an essential part of keeping fish. We maintain our tanks to keep our fish healthy first and foremost, and to keep our tanks looking good.

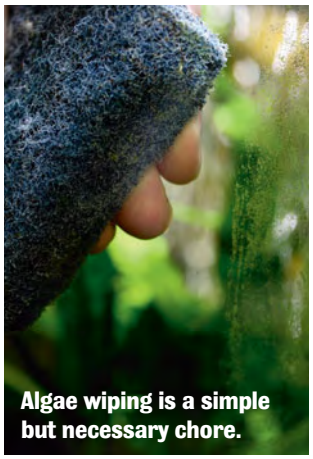
Where light combines with water, you will always find algae, but it can be controlled. Algae can grow in low light or bright light and thrives in water that is full of nitrate and phosphate. We normally deal with the end result, and physically remove it from surfaces like the aquarium glass and decoration. The best way to do this is to use either an abrasive pad, an algae magnet or special scrapers, with either plastic or metal blades.

Algae magnets are very popular algae 'wipers' because they are so easy to use and convenient. One half of the magnet is coated with an abrasive pad and goes inside the aquarium, while the other half is coated in a soft pad for polishing the outside aquarium glass. Pull the magnet across the glass and it will remove algae as it slides over it. You keep your hands dry on the outside and they can even go around corners.

Floating algae magnets are the ultimate in convenience because if the inner magnet falls off, it floats up to the top where you can retrieve it.

Algae can also be prevented by lots of water changes, and by using special resins.

A great natural algae remover is to add algae-eating fish. They clean the tank and entertain you at the same time.



Algae wiping is a simple but necessary chore.

Water changing

Water changing is the single most important bit of maintenance that we do.

The biggest reason for changing the water regularly is to dilute pollutants that have built up over time. Filtration breaks down ammonia and nitrite into less harmful nitrate, but high levels of nitrate, from 40-140ppm, can cause algae and may have an adverse effect on newly acclimatised fish. Very high levels of nitrate can kill fish.

Other factors affect aquariums as the water becomes aged. Phosphate levels build up through fish waste and food, and phosphate is a major cause of algae in freshwater aquariums.

If the water becomes very acidic it can suffer from pH collapse, where the pH drops from six or seven to three or four overnight, with dire consequences for most fish.

Water changes add buffers, which help to maintain pH.

Attach a gravel cleaner to a siphon tube for a thorough clean.

Photography: Neil Hepworth

One of the most effective ways to change the water is to use a siphon tube. Choose a self-starting siphon device to drain water from the tank into a bucket. That can be thrown away or used to water your plants.You can wash filter media in it too.

Only remove a proportion of the tank water at any one time, and always use a dechlorinator and thermometer to check temperature and make the water safe for fish.

Never remove all the water or strip the tank down as too much beneficial bacteria will be removed in one go, causing potential water quality issues.

Gravel vacuuming

This process goes hand in hand with water changing, and removes all the dirt and debris from the gravel. To do this

TIP COMBINE **ALGAE WIPING** WITH **GRAVEL VACUUMING** AND **WATER CHANGING** FOR A COMPLETE CLEAN. WIPE FIRST, THEN GRAVEL CLEAN AND WASH FILTER MEDIA IN THE OLD TANK WATER.

Very dirty mechanical media should be cleaned or replaced.

properly, buy a gravel vacuum and siphon tube combined, and choose one that self-starts to save you sucking the pipe.

The principle of gravel vacuuming is to hover the wide diameter intake over the gravel. Once started the vacuum will lift the gravel and spin it around inside, removing any debris. The debris then flies up the tube into the bucket and the heavier gravel is dropped back down. Repeat the process over the entire surface area of the gravel and by the time you have done that, the water change will also have been carried out.

Regular vacuuming helps to remove debris that may hold nitrate and phosphate, and even parasites like whitespot, which has a life stage that lives in the gravel.

Vacuuming is particularly important for bottom-dwelling catfish like *Corydoras* because without it, their delicate barbels may become infected.

Filter maintenance

Filter maintenance is essential to keep your filter working properly, and your fish healthy. By the nature of what they do, filters become clogged over time and may even stop.

Maintain mechanical media, like sponge and filter wool, the most regularly and clean or replace it to keep water flow constant. If your filter sponge is doing the job of mechanical and biological filtering, only ever replace half of it at a time and wash it in old tank water to keep bacteria levels high. When you clean mechanical media, clean the impellor at the same time.

Next is the chemical media like carbon. Carbon soaks up pollutants to the point of saturation and then it won't remove any more. Replace carbon every four weeks to prevent this.

Nitrate and phosphate removers are also forms of chemical media and also need regular replacement.

Test your water so that you know when the media is spent and needs replacing.

In a well-maintained filter, biological media should need to be maintained the least. If it becomes dirty, only wash it in old tank water. Biological media can be replaced, but only part of it at a time to maintain bacteria levels.

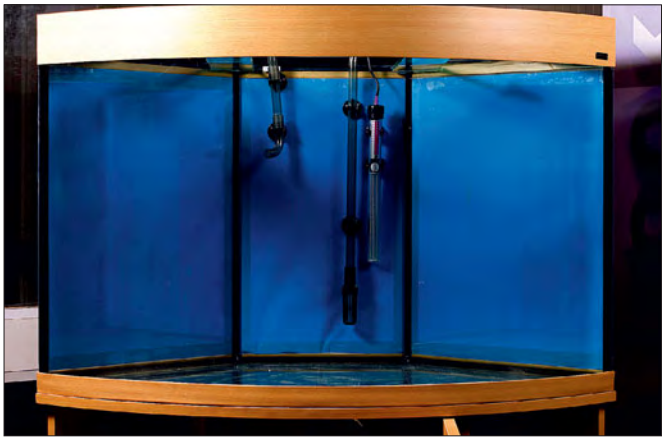
Wash biological media in old tank water.

Marines made easy

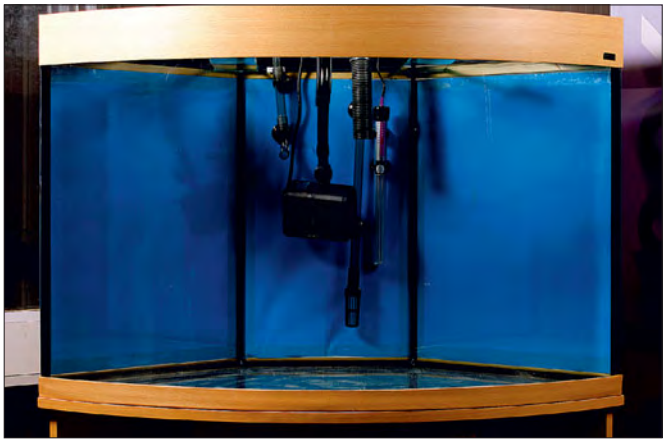
So you think you are ready to take the plunge with marines?

1 We've chosen a World of Water Amazon 220 Corner tank as it comes complete with an external filter and has room at the back for a hang-on skimmer. A plain blue background has been stuck on the back with double-sided tape.

2 Assemble the external filter and connect the pipework. We've added some Rowaphos phosphate remover to the filter to help keep nuisance algae at bay. We will be using live rock to aid filtration, so we could remove the biological media at a later date and use the filter purely for mechanical and chemical filtration. Carbon has been added too.

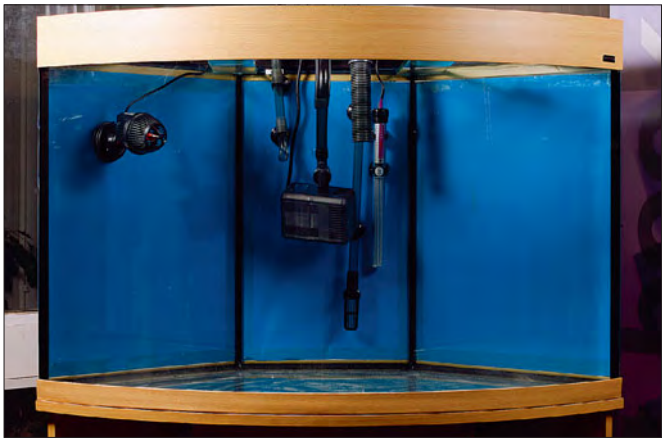


3 Place the heater at the back of the tank and set it to 24°C/75°F. Flow will be strong, so even with vertical placement, the heater will distribute heat evenly around the tank. A heater guard can be used for extra protection.

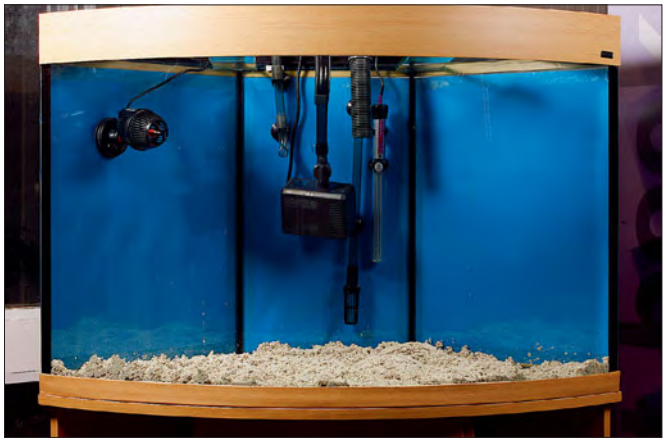


4 A protein skimmer is vital to the success of most reef tanks. This V² Skim 400 from TMC will skim up to twice this tank's capacity and comes with a Rio 2100 pump. Hang the body of the skimmer on the back. The versatile hood on the Amazon tank allows for most equipment to be fitted.

TIP MARINE TANKS TAKE LONGER TO MATURE THAN FRESHWATER TANKS AND MAY TAKE MONTHS BEFORE THEY START TO LOOK REALLY GOOD. TAKE YOUR TIME AND RESEARCH ALL LIVESTOCK PURCHASES THOROUGHLY.



5 The last of the electricals to be fitted is this powerful Korallia pump. It's been added to increase water flow and turnover in the tank, washing waste away from corals and exercising fish. Aim for a turnover of at least 10 times per hour.



6 When all the equipment has been fitted, the coral sand can be added. We have rinsed the sand to remove most of the dust and intend to add it to a layer of about 3cm/1" in depth.

7 Fill the tank with salt water before adding the rock. This is to prevent the rock from drying out when aquascaping. Expect the water to go cloudy as it further agitates the sand.

8 We're adding about 30 kg/66 lb of cured live rock to this tank. Cured rock will aid maturation and bring with it desirable algae and planktonic life. A base rock like Ocean rock can be used underneath live rock to raise it up. After the rock has been added, fill the tank to the top, plug all equipment in and wait for the water to clear and water tests to prove negative.

9 The finished tank, but as marine tanks take longer to mature than freshwater tanks, it still has a long way to go before it starts to look really good. Use a light stocking of fish initially and add just a few hardy corals. The great thing about marine tanks is that even when you reach your maximum fish stocking, you can go on and on with invertebrates. Marine tanks look better over time as the corals spread.

Get into marines!

So you're really keen to get into marines – but what equipment will you need?

Protein skimmer

A protein skimmer is one piece of equipment that you may not be familiar with. It is an additional form of filtration that mechanically removes proteins and waste from salt water. It does this by creating lots of tiny bubbles inside that become coated with protein, and then overflow into a collection cup. The collection cup can be emptied and cleaned periodically, removing waste from the system.

Why you need a protein skimmer

Traditional filters break down waste by converting ammonia to nitrite and then nitrate. We remove the end product, nitrate, by changing water. In an aquarium you don't want any ammonia, nitrite or nitrate, and a protein skimmer helps by removing it at the source.

Marine fish and invertebrates will not tolerate any pollution in the water, and a protein skimmer acts a primary, mechanical filter. Skimmed water is cleaner and healthier.

Protein skimmers can mean a higher start-up cost when keeping marines, but their benefits are well documented and many of the world's best marine aquariums are filtered using this method. Some marine aquariums don't use any other form of filtration apart from a protein skimmer and live rock. This method is called the Berlin System, and more information will be available from the marine expert in store.

Powerheads

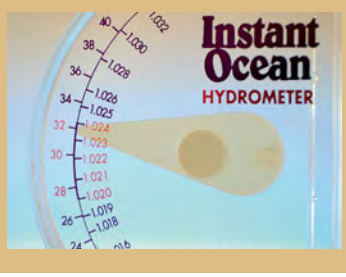
A trip to your nearest coastline, or watching a marine nature documentary, will reveal that the oceans are constantly moving, be it from wave action, currents or the Gulf Stream. Marine life is totally dependant on water movement to bring them their food and wash away their waste, and that movement should be replicated in the aquarium.

Flow is provided by pumps, filters and powerheads. Calculate the total volume of your aquarium and provide enough turnover to pump the entire water volume ten to twenty times per hour. This will be sufficient for most corals, fish and invertebrates. If you use an external filter and protein skimmer, the flow from these devices can also be factored in, so an aquarium of 180 l. / 40 gal volume, for example, should have a turnover of 1800 lph / 400 gph or more.

Hydrometer

An essential piece of equipment when keeping marines. A hydrometer tells us how salty the tank water is, and we need to know this because marine life needs a certain level of salt in the water to survive.

We make up our own salt water at home by mixing pure, fresh water, preferably RO water, with synthetic sea salt. To tell us how salty the water is, we use a hydrometer. This usually consists of a plastic box with a swing needle inside, or a floating object that looks a bit like a thermometer. Whenever you use a hydrometer to measure salt levels, make sure you bring the water to the correct temperature first.



TIP WHEN CHOOSING A MARINE SET-UP, MAKE SURE THAT THE SYSTEM CAN BE FITTED WITH ALL THE NECESSARY EQUIPMENT. YOU CAN BUY A SYSTEMISED AQUARIUM WITH EQUIPMENT ALREADY FITTED, IF YOU ARE UNSURE.

Filtration

This area is dealt with in a different way to freshwater filtration. Marine reef aquariums require the best possible water quality at all times, and most use a combination of filtration and protein skimming to achieve that.

An external filter packed with mechanical, biological and chemical filtration is a good start, and is essential for most fish-only marine tanks where fish are the focus and no invertebrates are added, but the majority of modern reef aquariums are actually filtered primarily by live rock, with powerheads providing food and oxygen for bacteria, and the rough inner and outer surfaces of the rock providing a home for them to grow and multiply.

When lots of live rock is used, biological media can be removed from the filter and it can be replaced with important chemical media like carbon and phosphate remover.

Neil Hepworth

Lighting

The majority of marine fish and invertebrates that we keep come from the warm, shallow seas of the tropics. For much of the day, coral reefs are exposed to full sunlight and it's much brighter than we provide for most freshwater set-ups. Furthermore, most corals rely on the sunlight to give them their energy as they harbour algae called zooxanthellae, which need bright light in order to photosynthesize.

Lighting is available for marine tanks and it is generally brighter and of a different colour to freshwater lighting. Marine lighting tends to have a blue tinge to replicate the light available underwater.

This can be done by using a combination of daylight and actinic (blue) tubes, or by using light tubes that combine both types of light. You may need extra lighting for more demading corals.

We also use more light for lighting marines, and we do that by using a number of standard light tubes, high-powered T5 light tubes or metal halide lighting – high-powered bulbs that are normally suspended over open-topped aquariums.

A minimum requirement for small tanks is two light tubes, preferably high-powered ones. For larger, deeper aquaria, four T5 tubes (two blue and two white) are normally necessary, and for the brightest light with the best effect, choose metal halide light in combination with actinic blue fluorescent light tubes.

As a rough guide, aim to provide one watt of lighting for every litre of water.

Chiller

With bright lighting and lots of pumps and equipment, it is not heating that is the problem with most marine tanks, but cooling. High temperatures (over 27ºC/80ºF) can stress and even kill tropical marine life, so artificial cooling is the sensible long-term option.

A cost-effective cooling method is to use fans. Several small fans can be fitted to the top of the tank to blow cool air across the surface of the water. One can even be fitted on either side of the tank rim – one to blow cool air in and one to suck hot air out.

For larger aquariums, hot rooms and tanks that use very bright lighting, a chiller may be the only option. Chillers work like refrigerators, only they connect to the aquarium via pipework. The required temperature can be set on the chiller and it will work tirelessly to hold that temperature, venting off lots of heat as it does so.

A chiller must be connected to a either a powerhead in the main tank or an external filter underneath.

They are not cheap, but the cost can easily be offset when protecting a tank full of corals and fish from overheating.

Ultra-violet steriliser

UVs can help to kill disease pathogens and parasites. Some marine fish like Powder Blue and Regal tangs are susceptible to marine whitespot, and the addition of a UV can help to prevent that.

UVs can be fitted below in a cabinet, above or behind an aquarium, and can work in conjunction with external filters, sumps or powerheads. They are also suitable for disease prevention in freshwater aquariums.

Change the bulbs regularly for maximum efficiency.

Choosing marine fish

With such a diversity of species to choose from, picking the right marine fish can be a bit of a minefield. Here are some recommended species.

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Name: Royal gramma, *Gramma loreto*
Origin: West Atlantic
Size: 7.5cm/3”
Minimum tank size: 100 l. /22 gal
Reef friendly: Yes
Comments: The Royal gramma is one of the most striking marine fish. They do best in mature reef tanks with lots of live rock to offer them a safe refuge. Can be kept in groups, but are fine as solitary specimens mixed with other fish.

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Name: Pyjama cardinal, *Sphaeramia nematoptera*
Origin: Western Pacific
Size: 7.5cm/3”
Minimum tank size: 100 l. /40 gal
Reef friendly: Yes
Comments: Pyjama cardinals are peaceful fish that are best kept in groups, and may breed in the aquarium, with the male mouthbrooding the eggs and fry. Don’t combine them with aggressive or territorial fish, like most damselfish, as they may get picked on.

The Goldfish Bowl / photomax.org.uk

Name: Flame angel, *Centropyge loricula*
Origin: Pacific
Size: 10cm/4”
Minimum tank size: 180 l. /40 gal
Reef friendly: Yes
Comments: Flame angels are stunning marine fish, providing a splash of bright red in the marine tank. They can be kept singly or as mated pairs, and graze the rock for algae and tiny marine life. Best kept as the only dwarf angel in the tank. Expensive, but well worth it.

The Goldfish Bowl / photomax.org.uk

Name: Common clownfish, *Amphiprion ocellaris*
Origin: Pacific
Size: 10cm/4”
Minimum tank size: 60 l. /13 gal
Reef friendly: Yes
Comments: Now almost universally known as Nemo, the common clownfish is a familiar species and is available tank bred. They are hardy, reef-friendly and one of the easiest marine fish to keep. The Percula clown is a similar species.

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Name: Yellow tang, *Zebrasoma flavescens*
Origin: Pacific
Size: 15cm/6”
Minimum tank size: 180 l. /40 gal
Reef friendly: Yes
Comments: Yellow tangs make great additions to the medium or large reef tank. They are fairly easy to keep as long as they are well fed, and their bright colour and activity has made them popular aquarium fish. Feed lots of algae in their diet.

MP & C Piednoir / aquapress.com

Name: Mandarin, *Synchiropus splendidus*
Origin: Pacific
Size: 7.5cm/3”
Minimum tank size: 180 l. /40 gal
Reef friendly: Yes
Comments: Mandarins are exquisite but they need extra care. In the wild they eat hundreds of tiny copepods per day and in the aquarium this should be accommodated for by providing lots of live rock to seed the system, and produce planktonic life. Only add to mature reef aquaria.

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Name: Yellow goby, *Gobiodon okinawae*
Origin: Indo-Pacific
Size: 4cm/1$^{1}/_{2}$”
Minimum tank size: 40 l. /9 gal
Reef friendly: Yes
Comments: This tiny yellow fish inhabits coral branches in the wild. It can be kept in nano reefs due to its small size, but it does need regular feeding. Keep either on its own or in groups, and with small fish and inverts. It is sometimes available tank-bred.

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Name: Lionfish, *Pterois volitans*
Origin: Indo-Pacific
Size: 38cm/15”
Minimum tank size: 300 l. /66 gal
Reef friendly: No - it will eat small fish and shrimp
Comments: Lionfish are instantly recognisable because of their elaborate fins and reputation for being venomous. Not one for the reef tank, this species prefers more gentle currents and open space. Only combine with other large marine fish to prevent this predator from swallowing them.

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Name: Pyjama wrasse, *Pseudocheilinus hexataenia*
Origin: Indo-Pacific
Size: 7.5cm/3”
Minimum tank size: 75 l. /16 gal
Reef friendly: Yes
Comments: Pyjama wrasse are colourful, active and hardy. They swim in and out of live rock and predate nuisance flatworms so they can benefit the mini reef aquarium. Don’t mix with other small wrasses as the Pyjama wrasse may bully them.

MP & C Piednoir / aquapress.com

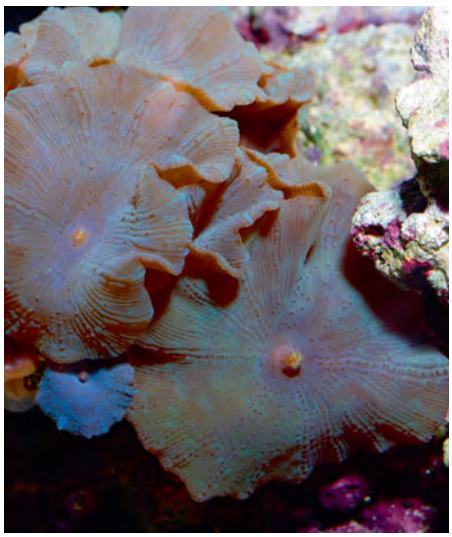
Name: Coral beauty, *Centropyge bispinosa*
Origin: Indo-Pacific
Size: 10cm/4”
Minimum tank size: 180 l. /40 gal
Reef friendly: Yes
Comments: Coral beauties are well-behaved dwarf angels, and perhaps one of the hardiest members of their genus. They are safe with most invertebrates but like all angels, they will nip at featherdusters. Live rock is essential for grazing.

Choosing your Inverts

New to reefkeeping? Here are some easy inverts.

■ **Name:** Toadstool, *Sarcophyton* spp.
Origin: Indo-Pacific
Lighting requirements: Moderate to high
Water flow: Moderate
Comments: Toadstools are popular soft corals that are easy to care for but they can grow too large for tanks under 200l capacity. Place them low down so that when they do grow, they don't shade other corals. They can be propagated by cuttings or by sprouting new toadstools from the base.

Photography: Neil Hepworth



■ **Name:** Mushroom rock, *Actinodiscus/Discosoma/ Ricordea* spp.
Origin: Pacific
Lighting requirements: Moderate
Water flow: Low to moderate
Comments: Mushrooms are hardy and easy to keep. Unlike most corals they don't thrive in very strong light conditions and prefer a slower flow. So place at the bottom of the rock pile where currents and lighting penetration are less. They come in all colours and sizes.

■ **Name:** Cleaner shrimp, *Lysmata amboinensis*
Origin: Pacific
Size: 7.5 cm/3"
Minimum tank size: 60 l/13 gal
Comments: Cleaner shrimp are colourful and easy to care for. In the wild they clean passing fish, but in the aquarium they will accept frozen foods instead. They can be kept together and with other invertebrates.

■ **Name:** Dwarf red leg hermit crab, *Clibanarius digueti*
Origin: Mexico
Size: 2.5 cm/1”
Minimum tank size: 30 l/6.6 gal
Comments: Hermit crabs are often referred to (along with snails) as reef janitors and are added to tanks to clear up uneaten food and help control algae. Make sure they have spare shells to move into as they grow. Don’t confuse the dwarves with other hermits as large hermit crabs are not reef friendly.

■ **Name:** Bubble coral, *Plerogyra sinuosa*
Origin: Indo-Pacific
Lighting requirements: Low to moderate
Water flow: Low to moderate
Comments: Bubble corals are one of the easiest ‘hard’ corals to keep and don’t need lots of light or lots of flow. They have quite powerful stinger tentacles, so don’t place them too close to other corals. They appreciate regular feeds of small frozen foods.

■ **Name:** Polyp colony, *Zoanthus* spp.
Origin: Indonesia
Lighting requirements: Moderate
Water flow: Moderate
Comments: Polyp colonies come in all shapes and sizes, and are usually attached to a lump of live rock. If they spread, the effect can look spectacular with every surface of the reef living and moving. Make sure they are not covered over by other corals or growths of macroalgae.

■ **Name:** Turbo snail, *Turbo* spp.
Origin: Mexico
Size: 5 cm/2”
Minimum tank size: 30 l/6.6 gal
Comments: Turbo snails are used to control algae in reef tanks. You can add as many as one per gallon of water and they will graze on all algae surfaces including the glass. “Turbo snail” is a name given to several species of reef-safe marine snail including species from the genus *Astrea*.

Marine fish, like this hawkfish, will not tolerate poor water conditions.

Neil Hepworth

Running your marine tank

What's involved in the day-to-day running of your marine set-up?

Water changes

We can only try to mimic the vastness of the oceans in our home aquaria, but replicating its exacting water conditions can mean the difference between success and failure with marines.

The water around coral reefs has a constant level of salinity, temperature and organic load, and the fish and corals are adapted to only accept those conditions.

When we set up our marine tanks, the synthetic salt mix sets many parameters but over time, the quality of marine water degrades and becomes polluted.

Carry out regular partial water changes with a good brand of synthetic salt and RO water, and mix it thoroughly with a strong powerhead before you add it to the main tank. Test your nitrate levels and try to keep them under 40ppm for marine fish and less than 10ppm for corals and invertebrates.

Regular water changes are the key as allowing nitrate levels to build up will not only stress your livestock but will prove costly in terms of salt when you try to lower them in one big water change. Specialist nitrate removal equipment is available at World of Water marine stores. Please ask for more details.

Feeding

Most marine fish will be happy with a couple of feeds a day, although some fish, like Anthias really require more frequent feeds, so check with your retailer when buying your fish. Flake and granular foods are available for marine fish, as are frozen foods like *Mysis*, krill, brineshrimp, cockle etc. Some fish, like tangs, are herbivorous, so require foods like spinach or algae – once again research their needs before purchase. Don't allow food to sit uneaten at the bottom of the tank, as it will affect the water quality.

Nuisance algae can choke corals. Control phosphate levels and introduce algae grazers.

Neil Hepworth

Equipment maintenance

The most important piece of marine equipment is often the protein skimmer, and to keep them running efficiently they need frequent maintenance.

When the collection cup is emptied, it should also be cleaned every time, as dirty funnels can mean less efficient skimming. Also check the

TIP MATCH THE LIGHTING TO YOUR LIVESTOCK. IF **MAXIMUM COLOURATION** IS YOUR THING, GO FOR HAGEN POWERGLO OR INTERPET TRIPLUS. THIS WILL **ENHANCE FISH COLOURS** FROM THE RED AND ORANGE OF GOLDFISH TO THE BLUE AND YELLOW OF MALAWI CICHLIDS. FOR MARINES, ALWAYS CHOOSE MARINE LIGHTING AS **CORALS NEED LIGHT** OF THE RIGHT SPECTRUM IN ORDER TO THRIVE.

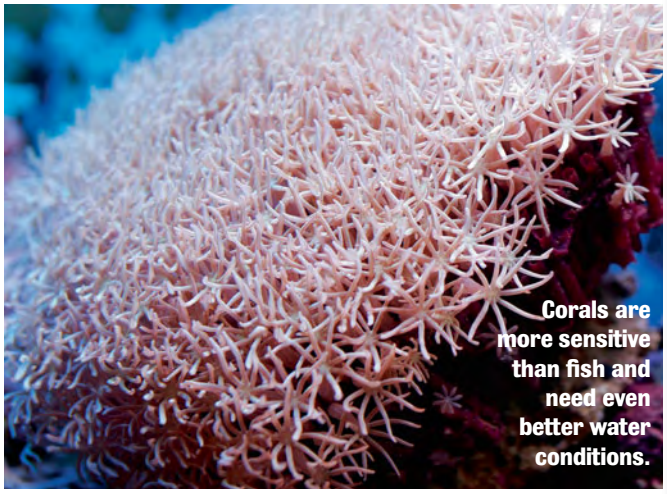
pump impeller and any air intake devices as dirty intakes will mean less air bubbles and decreased performance. If you use an external filter, change chemical and mechanical media frequently.

The benefits of chemical media

Activated carbon and phosphate removers have been explained in other sections of this magazine, but nowhere is their use more important than in marine aquariums. Although not harmful to fish, phosphate can cause corals to recede and will prevent the growth of desirable algaes. Even minute traces of phosphate will cause nuisance algae to grow and may affect more delicate corals.

To prevent this from happening, we recommend the use of RO water from the start (which is relatively free of nitrate and phosphate,) and the use of a phosphate removal resin at all times to keep phosphate levels close to zero. Ask in store for our range of phosphate removers.

Activated carbon keeps marine water pure and soaks up any impurities. However, prolonged use can soak up some trace elements as well so experts recommend short exposure to a high-grade carbon for best results.



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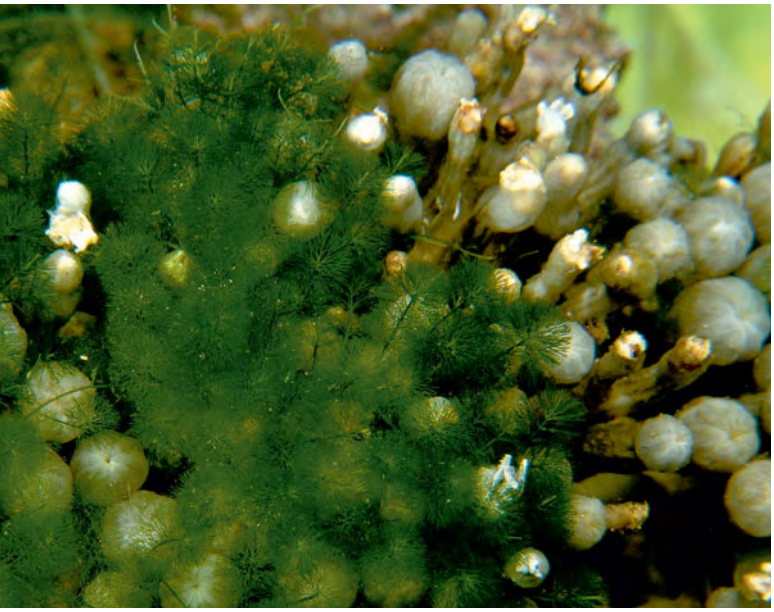
Corals are more sensitive than fish and need even better water conditions.



REGULAR TESTING

If you already keep fish, you will be aware of the importance of water testing. For freshwater we check temperature and test for ammonia, nitrite, pH and nitrate. With marines we test for those parameters too, but we also check the salt levels using a hydrometer and we test extra parameters for reef tanks.

Corals not only need constants like salinity, temperature and low pollutants, they also need the correct levels of trace elements and minerals. Test for calcium, magnesium, alkalinity and always test that phosphate levels are low.

Test results will indicate whether or not you need to add supplements and if so, how much. Adding supplements is part and parcel of reef tank maintenance for if levels of calcium become depleted for example, your corals will not be able to grow.

The use of a good salt mix will aid calcium, pH, alkalinity and magnesium levels, and regular water changes will help lower nitrate and phosphate.

Other maintenance

The obvious one when keeping a marine tank is the need for regular algae wiping. The well-oxygenated, brightly-lit conditions of the marine tank will make algae growth rampant, and the front glass may need wiping on a daily basis. A strong algae magnet is the best choice for regular wiping, combined with a metal scraper to tackle more stubborn algae.

Live rock brings with it desirable algae like pink and purple coralline algae, and lots of undesirable ones that quickly take over. Many marine keepers choose not to fight it too much and let it grow all over their powerheads, pipework and the rear glass. This helps to disguise any equipment over time, and a bright purple background can look appealing and provide a surface for coral polyps to attach to.

Evaporation occurs in all marine aquaria, especially those with very bright lighting and open tops. As water evaporates, the tank water becomes more and more salty, so keep an eye on salinity.

RO water

RO stands for reverse osmosis and is a way of purifying tapwater. Water is pushed through a membrane and the resulting water is very pure, free of nitrate, phosphate and chlorine. RO water is perfect for mixing with marine salt, and is better for corals.

Top up evaporation losses with RO water, and supplements can be added at the same time.

Buy RO water from your local World of Water store.