



# Katy's Tropical Fish

- A Complete Guide

By Katy Parry



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# TABLE OF CONTENTS

***THE SECRETS TO SUCCESS WITH TROPICAL FISH*** \_\_\_\_\_ **7**

**BENEFITS OF KEEPING A FISH TANK** \_\_\_\_\_ **7**

    Feature in the Home \_\_\_\_\_ 7

    Entertainment Antics and Personality \_\_\_\_\_ 8

    Therapeutic and Relaxing \_\_\_\_\_ 8

    Education Hobby \_\_\_\_\_ 9

    Conservation of Species \_\_\_\_\_ 9

***PLANNING YOUR AQUARIUM*** \_\_\_\_\_ **10**

**IMPORTANT QUESTIONS TO ASK** \_\_\_\_\_ **10**

    Best Fish Species \_\_\_\_\_ 10

    Minimum Fish Tank Size \_\_\_\_\_ 11

    Standard Aquarium Size \_\_\_\_\_ 12

    Best Location \_\_\_\_\_ 13

    Aquarium Environment \_\_\_\_\_ 14

***BATTLE OF THE FISHES*** \_\_\_\_\_ **16**

**FISH AND SPECIFIC ENVIRONMENTS** \_\_\_\_\_ **16**

    All About Water \_\_\_\_\_ 16

    Dinnertime Madness \_\_\_\_\_ 17

    Home Sweet Home \_\_\_\_\_ 17

    Juvenile versus Maturity \_\_\_\_\_ 17

    Difficult Tenants \_\_\_\_\_ 18

**KEY FACTORS WHEN CHOOSING FISH** \_\_\_\_\_ **18**

    Large Aquarium – Better Home \_\_\_\_\_ 18

    Stocking to Full Growth \_\_\_\_\_ 19

    Fish Retailers \_\_\_\_\_ 19

***MANAGING AQUARIUM WATER*** \_\_\_\_\_ **21**

**FISH IN THE WILD** \_\_\_\_\_ **21**

    Oxygen Depletion \_\_\_\_\_ 21

    Low pH \_\_\_\_\_ 22

    Poor Quality \_\_\_\_\_ 22

    Parasites \_\_\_\_\_ 22

    Overcrowding \_\_\_\_\_ 22

    Aquatic Weeds \_\_\_\_\_ 23

    Predators \_\_\_\_\_ 23

    Herbicides \_\_\_\_\_ 23



**THE NITROGEN CYCLE** \_\_\_\_\_ **23**

**CYCLING** \_\_\_\_\_ **25**

    Adding Fish \_\_\_\_\_ 25

    Cycling Method \_\_\_\_\_ 26

    Special Readings \_\_\_\_\_ 27

    Cycling Process Time \_\_\_\_\_ 27

    Chemicals During Cycling \_\_\_\_\_ 28

    Bacterial Supplements \_\_\_\_\_ 28

    Potential Problems \_\_\_\_\_ 28

**WATER TEMPERATURE** \_\_\_\_\_ **29**

    Power Outage \_\_\_\_\_ 30

**OXYGEN** \_\_\_\_\_ **31**

**REVERSE OSMOSIS** \_\_\_\_\_ **33**

**TRACE ELEMENTS** \_\_\_\_\_ **33**

    pH \_\_\_\_\_ 33

    General Hardness \_\_\_\_\_ 35

    Salinity \_\_\_\_\_ 35

    Phosphate, Iron, and Carbon Dioxide \_\_\_\_\_ 36

**TESTING THE NITROGEN CYCLE COMPONENTS** \_\_\_\_\_ **36**

    Testing Chart \_\_\_\_\_ 37

    Ammonia \_\_\_\_\_ 37

    Nitrite \_\_\_\_\_ 37

    Nitrate \_\_\_\_\_ 37

    pH \_\_\_\_\_ 38

    Phosphate \_\_\_\_\_ 38

**IMPORTANCE OF TESTING** \_\_\_\_\_ **38**

**WATER CHANGE** \_\_\_\_\_ **38**

    Partial Change \_\_\_\_\_ 40

**CLOUDY, SMELLY, OR FOAMY WATER** \_\_\_\_\_ **41**

**GREEN WATER** \_\_\_\_\_ **41**

**WATER CONDITIONER** \_\_\_\_\_ **42**

**THE BASICS - EQUIPMENT** \_\_\_\_\_ **43**

**FILTRATION SYSTEMS** \_\_\_\_\_ **43**

    Biological \_\_\_\_\_ 43

    Chemical \_\_\_\_\_ 43

    Mechanical \_\_\_\_\_ 45

    Under-Gravel Filters \_\_\_\_\_ 45

    Canister Filters \_\_\_\_\_ 46

    Tank Mount Filters \_\_\_\_\_ 46

    Protein Skimmer \_\_\_\_\_ 47

    Internal Filters \_\_\_\_\_ 48

    Diatom Filters \_\_\_\_\_ 48

    Wet/Dry or Sump Filters \_\_\_\_\_ 48

    Sponge \_\_\_\_\_ 49

    Box Filter \_\_\_\_\_ 49



<b>FILTER MEDIUM</b>	<b>49</b>
Biological Medium	49
Chemical Medium	49
Mechanical Medium	50
<b>CHOOSING THE BEST FILTRATION SYSTEM</b>	<b>50</b>
<b>HEATING</b>	<b>51</b>
Heater Wattage	51
Heater Placement	52
Buying a Heater	53
Thermometer	53
Chiller	54
<b>LIGHTING</b>	<b>55</b>
Light and Plants	55
Exposure	55
Intensity	55
Incandescent Lighting	56
Wattage	56
<b>OXYGEN</b>	<b>57</b>
Air Pumps	58
Check Valves	59
<b>TANK</b>	<b>60</b>
Watertight	60
Non-Toxic	60
Sturdy	60
Aesthetics	61
Acrylic	61
Glass	61
<b>STAND</b>	<b>62</b>
<b>BRACING</b>	<b>63</b>
<b>WATER VOLUME</b>	<b>63</b>
Calculations	63
<b>HOOD</b>	<b>64</b>
SAFETY TIPS	65
<b><i>DECORATING YOUR AQUARIUM</i></b>	<b>66</b>
<b>CHOOSING DECORATIONS</b>	<b>66</b>
Soft versus Hard	67
Stones	67
Ceramics	67
Rubber or Plastic	67
Coral, Shells, and Limestone	68
<b>GRAVEL</b>	<b>68</b>
Cultured	68
Safety	68
Cleaning	68
Types of Gravels	69



<b>DRIFTWOOD</b>	<b>69</b>
Curing	69
Boiling	70
Safety	70
<b>LIVE PLANTS</b>	<b>70</b>
Plant Options	71
Plant Options	72
<b>ARTIFICIAL PLANTS</b>	<b>73</b>
Benefits of Artificial Plants	73
<b>BACKGROUND</b>	<b>74</b>
<b>TUNNELS AND CAVES</b>	<b>74</b>
<b>LIVE ROCK</b>	<b>75</b>
Inshore Rock	75
Reef Rock	75
Dead Rock	75
<b>CORAL AND SUBSTRATE</b>	<b>76</b>
Sand	76
Gravel	76
Dolomite	76
<b>PUTTING IT ALL TOGETHER</b>	<b>77</b>
<b>TYPES OF FISH</b>	<b>78</b>
<b><i>SETTING UP YOUR AQUARIUM</i></b>	<b>79</b>
<b>IMPORTANT STARTER TIPS</b>	<b>79</b>
<b>SETUP PROCESS</b>	<b>79</b>
<b>COMMON MISTAKES</b>	<b>81</b>
Too Small	81
Adding Fish	81
Too Many Fish	81
Incompatibility	82
Too Much Food	82
Inadequate Filtration	82
Testing the Water	82
Water Change	82
<b>CHOOSING THE RIGHT FISH</b>	<b>83</b>
Quarantine	83
<b>SCHEDULED CLEANING</b>	<b>84</b>
Daily	84
Weekly	84
Bi-Weekly	85
Bi-Annually	85





<b>FEEDING THE FISH</b>	<b>86</b>
<b>FISH DIET AND SUPPLEMENTS</b>	<b>86</b>
<b>FOOD QUANTITY</b>	<b>86</b>
<b>FOOD TYPES</b>	<b>87</b>
Live Food	87
Prepared Food	87
Frozen Food	88
Dried Food	88
Green Food	88
<b>ANATOMY AND HEALTHCARE</b>	<b>89</b>
<b>EXTERNAL ANATOMY</b>	<b>89</b>
Eyes	90
Fins	90
Gills	90
Lateral Line	90
Mouth	90
Paired Nostrils	91
Scales	91
Spine	91
Vent	91
<b>INTERNAL ANATOMY</b>	<b>91</b>
Brain	92
Heart	92
Kidney	92
Liver	93
Pyloric Caeca	93
Spine	93
Spinal Cord	93
Stomach/Intestines	93
Swim Bladder	93
Gonads	93
Muscles	94
<b>SIGNS OF DISEASE</b>	<b>94</b>
Argulus	94
Anchor Worm	94
Bottom Crashing	94
Chilodonella	95
Clamped Fins	95
Cotton Mouth	95
Dropsy	95
Ergasilus	95
Eye Problems	96
Fin Rot	96
Flukes	97
Gasping	97
Glancing	97
Hole in the Head Disease	98
Glugea	98



Pop Eye	98
Ich or Whitespot	98
Neon Tetra Disease	99
No Appetite	99
Red or White Sores	99
Shimmy	99
Slimy Skin Disease	100
Swim Bladder Abnormalities	100
Velvet	100
<b>TREATMENT OPTIONS</b>	<b>100</b>
<b>WATER QUALITY</b>	<b>101</b>
Ammonia	101
Nitrites	102
Nitrates	102
Low Oxygen	102
Low pH	102
High pH	102
<b>SETTING UP A HOSPITAL TANK</b>	<b>102</b>
Constantly Running	102
Kit	103
Prefabricated	103
<b>SUMMARY</b>	<b>104</b>





## THE SECRETS TO SUCCESS WITH TROPICAL FISH

Thank you for choosing my book, "*Katy's Tropical Fish - A Complete Guide*"! I have conducted in-depth research and pulled from years of personal experience to bring you a comprehensive book on owning and caring for all kinds of tropical fish.

As you are about to discover, tropical fish are a great addition to any home or office for a number of reasons. In addition to making fun pets, tropical fish are also colorful and even mesmerizing. In fact, consider the number of doctor and dentist offices that have fish aquariums – the reason being that they create a calm distraction.

The bottom line is that the world of owning and caring for tropical fish is exciting and rewarding. My goal is to educate my readers on the appropriate way to set up and maintain a beautiful environment for these amazing creatures so they can be enjoyed for a long time. With proper care, fish will make excellent pets that can be enjoyed in their natural environment. Therefore, I want to show you ways of getting set up that are affordable and easy.



Many people have started out with beautiful fish tanks in their home, only to become disappointed as their fish die and their tanks turn green. By reading this book you can learn from their mistakes and avoid the potential pitfalls of fish keeping.

In this book, I will discuss the importance of water quality, aquarium types, required supplies, food, maintenance, and everything in between. With the proper setup, you can sit back and simply enjoy the color and personality of your tropical fish! Most people are unaware that tropical fish have distinct character. Some fish are bold, some shy, and others, very comical and child-like. In fact, people who keep fish as pets will tell you they become very attached to them, just as you would a dog or cat.

### ***BENEFITS OF KEEPING A FISH TANK***

As you will discover in this section, fish tanks offer all types of benefits, some obvious and some a little surprising!

#### **Feature in the Home**

As mentioned, fish actually make great pets. For some people, a typical pet such as a cat or dog is just not feasible. This might be due to living in a high-rise apartment where getting out to walk a pet is difficult, it could be that the apartment complex does not allow dogs and cats, or it could be that the individual has allergies to pet dander. In each of these scenarios, a fish tank is the ideal solution.



Maintaining tropical fish is also an excellent way to introduce small children to pets and the associated responsibility. With the fish being contained, there is no worry about harm to the creature due to tiny hands. However, the child still has the chance to watch and learn about fish life, watch feedings, and learn about upkeep and cleaning. Therefore, if you have been considering a pet but were not sure what type would be best for a small child, tropical fish are perfect.

A properly set up fish tank will also make a beautiful feature in your home – it is literally a living ornament! You'll find your guests drawn to it, wanting to know all about your fish.

### **Entertainment Antics and Personality**

Fish are without doubt extremely fun to watch. Depending on the type of tropical fish you buy, some are very comical and love to entertain and get your attention. Just as with any pet (fur or furless), fish have a tremendous amount of personality and interesting behaviors. Take "Oscars" as an example. Although this is a larger species of fish, they learn very quickly the hand that feeds them. In fact, if worked with, you can get to the point where the fish will come to the surface at feeding time to be petted before being fed.

Other species of fish also exhibit theatrical behavior including watching other fish, performing unusual courtship rituals or having dominance battles which are all very entertaining. The "Kissing Gourami" is a good example of this. While it looks as if these fish can't get enough of kissing each other, they are actually lip-locking to test each others strength!

### **Therapeutic and Relaxing**

Today you find doctors, dentists, businesses, and other organizations with beautiful, soothing fish aquariums in their foyer or waiting area. Fish tanks have long been used as a means of creating a tranquil and peaceful environment for humans to enjoy. Just as with waterfalls, bubbling brooks, or crystal blue lakes, there is something very magical about water. Then when you add in the soft, slow movements of the fish, it creates a sense of calm.

Within the home or office, just kicking back to watch the fish as they lazily go about their day has proven time and again to be a great stress reliever. There is something very placid and natural about a fish aquarium that allows your mind to wander, forgetting about the heavy demands of children, school, or work.



***Image 1 – An example of the therapeutic & relaxing nature of aquariums***

Interestingly, there are a growing number of therapists (for both adults and children) using fish aquariums to help lower inhibitions, resulting in more successful treatment!

### **Education Hobby**

Sometimes, fish aquariums are used simply for education purposes, both at home and in the classroom. After all, keeping a fish tank in a classroom of children is a great way to teach them about life, care, breeding, and babies without crossing any forbidden lines.

Even adults enjoy the process of buying various tropical fish, breeding them, and watching them spawn. In fact, many hobbyists have started out with an education experiment and ended up with numerous fish tanks or as fish breeders now running successful businesses.

### **Conservation of Species**

If you want to become a serious fish keeper (aquarist), then your heart would be more on conservation of rare or near extinct species than just watching some colorful fish swimming around the tank. Fortunately, many people just like this have a special interest in tropical fish, truly one of earth's most spectacular creatures.



Unfortunately, today the list of endangered tropical fish is growing, many now on the brink of extinction all because of humans. With the destruction of the earth's rainforests, rivers being dammed and polluted, and non-native species being introduced, numerous tropical fish species are being affected. To combat the problem, you can get involved with a conservatory effort, on your own or through a number of organizations.

I hope this introductory chapter will intrigue you enough to learn more about tropical fish, truly amazing creatures. Fish have been a part of earth since creation and will continue to amaze and entertain. In the rest of the book, I will be getting down to some serious business about buying fish, planning your aquarium, managing water, setting up, feeding, health and illness, decorations, plants, and much, much more!

## PLANNING YOUR AQUARIUM

One of the most important decisions you will have in getting started is the planning of your aquarium. Years ago, you had just a few choices for fish aquariums. Most were rectangular, although they came in many different sizes.



Then in the 1970s, the octagonal fish tank became popular. From that time forward, the sizes, styles, designs, colors, materials, etc. are endless. You can even purchase a picture frame to hang on the wall that is actually a fish tank!

Nowadays there are many more species of fish available to the everyday fish owner. Rare and exotic species of fish from all over the world can now be obtained from your local pet store.

### ***IMPORTANT QUESTIONS TO ASK***

While all these possibilities make buying your aquarium far more exciting than it used to be, it also means you have more to consider.

### **Best Fish Species**

Although all fish swim in water, they can each have different requirements. In other words, you cannot simply stop by your local pet store and take two of those, four of those, five of those, and three of those, and expect to have a healthy, happy aquarium. The truth is that not all fish get along. Therefore, you need to determine the right type of fish, which also has several considerations:



- Tropical, Marine or Coldwater Species
- Compatibility of Species
- Tank Size
- Water Chemistry
- Maintenance Level
- Breeding

Choosing the best fish species is discussed in one of the bonus books, covering both marine and freshwater species to help get you started. Although you can always be creative in your decisions, the information will at least steer you down the right avenue.

### **Minimum Fish Tank Size**

Deciding on a minimum fish tank size is probably the most important decision to make, as it will greatly affect the type and amount of fish you can keep. There are three main considerations to take into account when choosing your tank size. Firstly, budget is a major consideration – the larger the tank, the more money it will cost you to buy it, stock it and run it. Secondly, location – you can only buy as big a tank as you have room for. Some locations are of course better than others (as I will discuss). You don't want to be moving your tank around, so find the most appropriate place the first time around. Thirdly and finally, time is another major consideration. Bigger is better when it comes to a fish tank and believe it or not, the bigger the tank, the less time you will spend maintaining it. A larger volume of water is less susceptible to fluctuations in temperature, buildups in waste matter and conflicts with fish species. It also more closely mimics a natural environment for most fish and is a healthier environment, allowing you to do less work and enjoy your fish.

Another consideration when choosing aquarium size has to do with the species. For example, "Beta" fish, also called Japanese or Siamese Fighters get along with some fish but not each other. Therefore, if you want a Beta, you can only keep one, regardless of the tank size. Then, you have "Angel Fish", which are prone to aggression. In addition to these species, a number of other fish are highly territorial, meaning you would have to stock less of these fish, even if you have room for more. For your approximate fish stocking level, the general rule of thumb is to keep one "inch of fish" per gallon of water. By this I mean that you need to have an idea of a fish's full grown size in inches, and then add the total amount of "fish inches" you will have in total. Or rather, the total amount of water your tank holds in gallons will only be able to handle so many "fish inches". For example a tank holding 20 gallons of water will be able to handle 20 "fish inches". This may mean having 20 fully grown fish that are one inch in length, or 10 fully grown fish that are 2 inches in length and so





on. This rule is also dependant on having the appropriate size filter for you tank – this will be discussed further in a later in the book.

If you currently have a fish tank but have no idea of its size, this can easily be determined. For this, use the width multiplied by the height multiplied by the depth in inches. Then, take that number and divide it by 231. The number you come up with are the total gallons of the tank. As an example, if you had a standard 12x12x24-inch tank, after going through this step, you would discover that you have a 15-gallon tank (rounded up).

### **Standard Aquarium Size**

To give you an idea of the standard aquarium sizes on the market today, you can use the following tables:

#### **Small Size Tanks**

<b>Tank Size</b>	<b>Length x Width x Height</b>	<b>Filled Weight</b>
2 ½ gallons	12x6x8	27 pounds
5 gallons	16x8x10	62 pounds
10 gallon leader	20x10x12	111 pounds
15 gallons	20x12x12	170 pounds
15 gallon high	20x10x18	170 pounds

#### **Medium Size Tanks**

<b>Tank Size</b>	<b>Length x Width x Height</b>	<b>Filled Weight</b>
20 gallon high	24x12x16	225 pounds
20 gallon long	30x12x12	225 pounds
25 gallons	24x12x20	282 pounds
29 gallons	30x12x18	330 pounds
30 gallon breeder	36x18x12	348 pounds
40 gallon breeder	36x18x16	458 pounds
40 gallon long	48x12x16	455 pounds



### Large Size Tanks

Tank Size	Length x Width x Height	Filled Weight
50 gallons	36x18x19	600 pounds
55 gallons	48x13x21	625 pounds
65 gallons	36x18x24	772 pounds
75 gallons	48x18x21	850 pounds
90 gallons	48x18x24	1,050 pounds
125 gallons	72x18x21	1,400 pounds
150 gallons	72x18x28	1,800 pounds
180 gallons	72x24x25	2,100 pounds

**Note - Weight does not include the stand, if applicable.**

### Best Location

As you can see from the fill weights on the tables listed above, even a two and one-half gallon tank would weigh almost 30 pounds! Therefore, the goal is to find the ideal location for the tank from the beginning. Remember to allow yourself enough room on the backside of the aquarium to reach wall outlets, hoses, filters, lighting and the heater, since you will not be able to simply move the tank out to take care of business.

Then, if you will be placing your fish aquarium on a stand, and adding gravel, rocks, decorations, filtration system, fish, and so on, you have even more weight, making moving impossible. In addition to location from the perspective of weight, safety, and convenience, you need to consider a few other things.

You should never place your fish aquarium near a heat source, in direct sunlight, or any place where it could be in the line of heat or cold drafts. In saying this, the tank should not be in a dark, damp corner either. Instead, you want the aquarium to be in a place that will provide the fish with the most comfortable environment. Stresses such as these can actually kill fish!

Another consideration is that some fish, including Goldfish, do not appreciate loud noises or bumps. Therefore, keep the tank situated in a low-traffic area, away from stereo or television speakers, and in a location where it will not accidentally be bumped as people walk by. Finally, consider the overall weight of the fish aquarium and stand. Since this can be extreme, you want to avoid placing the fish tank on sloping or thin floors. For maintenance convenience, it is ideal to have your tank located near a water source to prevent you from carting buckets of water all over





the house. You will also need an electrical socket close by to plug in the tank equipment.

### **Aquarium Environment**

The ultimate goal of the 'Aquarium Environment' is to create a tank that both looks beautiful and at the same time fulfills a fish's needs. You can attempt to recreate a fish's natural environment by adding certain types of décor to your tank such as:

- **Gravel** – In addition to enhancing the appearance of your aquarium, gravel does much more for the environment including:
  - Adds color and a more natural appearing environment
  - Helps hide the filtration system and grids
  - Creates a warm particulate substrate for live plants
  - For some fish, including the “Peacock Eel” and “Banjo Catfish”, it provides a burrowing substance

When choosing gravel for your aquarium, you always want to go with river sand, quartz, or basalt, which is void of minerals that harden the water. Then, you want coarse gravel that will not be sucked up into the filter, causing it to become clogged. I recommend you gently slope the gravel so it is slightly higher in the back and on the sides. This way, fish waste slopes downward, making siphoning during cleaning much easier and more effective. It is also important to make sure the gravel you decide upon does not have sharp edges that can cut fish. Always have a minimum depth of gravel for the tank of 1 inch and a maximum of no higher than 3 inches.

- **Rocks** – Always choose solid rocks so pieces do not crumble off. The best options include granite, quartz, lava, sandstone, slate, or basalt. Rocks also have benefits for fish:
  - Creates a place for some fish to burrow
  - Provides a hiding place for a number of species during breeding season
- **Wood** – Not everyone puts wood in their fish aquarium but it also provides benefits:
  - It can help create the right water chemistry for some fish



- Creates a place for some fish to burrow - great for newly introduced fish during which time they are stressed
- Provides a place for certain plant species to grow and spread roots
- Provides a hiding place for a number of species during breeding season
- Can be part of some fishes natural diet.
- **Plants** – Many times, an aquarium will have plants. Although you can choose from plastic plants, which work well, live plants are always favored. These too have their own set of benefits that include:
  - Creates a natural environment for fish of all species, providing a place to spawn and hide
  - Provides a natural hiding place for fish
  - Helps to eliminate algae and other toxins
  - Provides a tank with extra oxygen
  - Can be a part of some fishes natural diet



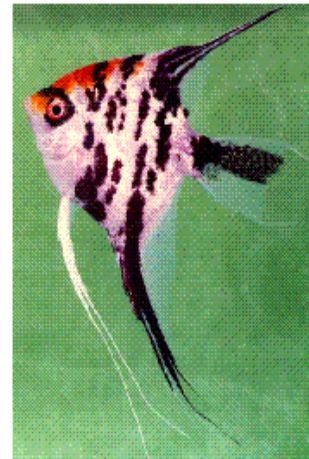
## BATTLE OF THE FISHES

As briefly mentioned, not all fish get along. To ensure you have a stable environment for your fish, it is essential that you choose your species wisely. Although a reputable pet store or breeder should be able to guide you through the process or answer any questions, I have outlined information to use when choosing.

### ***FISH AND SPECIFIC ENVIRONMENTS***

Some fish need specific environments. When you think about fish and their natural environment, you need to understand that there are four distinct factors involved. First, you have water quality and temperature, then food and feeding habits, next behavioral tendencies, and finally, the physical design of the aquarium.

What happens is that if just one of these found factors does not agree to each of the fish living in it, then every fish becomes stressed and nervous. Unfortunately, when this occurs, you end up with a tank full of sick or perhaps even dead fish. For this reason, it is essential you that look at all of these aspects so you can create the most comfortable and healthy environment possible.



### **All About Water**

First, it is important to look at the crux of the aquarium – the water. With this, you have chemistry, quality, and temperature. Regardless of the fish that you buy, they should all agree to the same living conditions. Although this requires a little bit of education and research, it is not difficult to determine. To help, I have provided you with some guides in one of the bonus books on both marine and freshwater fish.

For instance, a number of fish species would much rather live in hard, alkaline water while other species like soft, acidic water. As you can imagine, trying to make the two species co-habitat will only lead to disaster. Some types of tropical fish need high oxygen content to live. These fish are extremely sensitive to soluble compounds, as well as any pollutants at all.

At the other end of the spectrum, you have some tropical fish that are highly tolerant, being able to somehow survive in the worst possible water compositions. The two cannot mix or you will have dead fish. Again, education and research will help you identify the species that will work



best together in the same aquarium environment. The same is true for water temperature.

### **Dinnertime Madness**

Not all tropical fish eat the same things. Once again, a number of factors come into play. You need to think as fish like children and adults. You would not feed a small child a large, well-done steak nor would you feed an adult a jar of mashed up baby food. The same theory is true with fish in that you have different mouth sizes, different appetites, and different food preference and needs.



To keep feeding time under control, remember that fish eat and swim at the same time. If you have slow swimming fish, they may back off from food if surrounded by swift swimming fish. You also want to balance out the number of bottom versus top feeders so not all the fish congregate to the same location for feeding. Fortunately foods are available to suit every mouth size and feeding requirements of your fish.

### **Home Sweet Home**

Next on my list of aquarium environment issues is that of the arrangement of decorations, equipment, and accessories in the tank. The goal when setting up any fish tank is to create an environment that is natural and that closely resembles a fish's natural environment. That means providing the tropical fish with adequate substrate (the surface on which a plant grows or is attached), and either sand or gravel on the bottom.

In addition, make sure there are enough plants (preferably live), rocks, hollowed out areas, or decorations for hiding (especially for nocturnal fish that need to sleep during the day), and anything else that creates a homely space for the fish. In other words, setup and decorate your fish aquarium just as you would your own home – for comfort and safety.

### **Juvenile versus Maturity**

When you buy baby fish, most are small but eventually they grow. Therefore, when shopping around for tropical fish, keep their potential fully-grown size in mind. While several small fish of different species may do well together as juveniles, once some begin to mature and grow in size, the smaller fish could easily become prey.

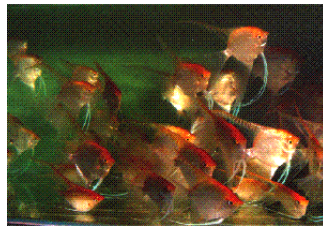


## **Difficult Tenants**

While you will have several obstacles when establishing your aquarium environment, although not impossible, the greatest is what I call “tank harmony”. Depending on the species of tropical fish you want, you will be dealing with many different personalities and behavioral tendencies. Therefore, size is a very important consideration. Try to keep the sizes comparable so that even non-aggressive fish do not become tempted.

The same is true in choosing hyperactive fish and quiet fish – it simply does not work well. Typically, you would find the faster, more aggressive fish constantly bullying the more passive fish, ultimately leading to stress, which then potentially leads to illness and ultimately, death. Just as with size, choose fish with comparable behavior levels.

Then, you have some species of tropical fish that are very territorial. Some fish will only guard turf during feeding, breeding, or caring for the babies while other fish are territorial all the time. You want to avoid having too many territorial fish or you will have your own “West Side Story” in an aquarium.



Finally, think about fish that prefer to stay together, those that prefer to be alone, and those that like to stay close to a mate. Generally, fish that swim in schools will easily become overwhelmed and stressed if in a tank alone or with non-schooling fish.

The same would be true for a fish that prefers a mate. If just hanging out alone, the fish will eventually be overcome with stress and die.

## ***KEY FACTORS WHEN CHOOSING FISH***

As briefly mentioned, not all fish get along. To ensure you have a stable environment for your fish, it is essential that you choose your species wisely. Although a reputable pet store or breeder should be able to guide you through the process or answer any questions, I have outlined information to use when choosing.

### **Large Aquarium – Better Home**

As previously mentioned, there is a rule for tanks – the bigger the better, with surface area being more important than the actual tank capacity. You will discover that larger tanks are actually easier to take care of because toxic substances released by the nitrogen or biological cycle are dispersed



in larger volumes of water. With this, the water quality will remain higher for longer periods.

Therefore, if you are just starting out, I suggest you consider a larger tank over a small, 10-gallon aquarium. In fact, you would probably enjoy an aquarium as large as 20 to 55 gallons, made from all glass. This size is again, easier to care for and not so large that it becomes overwhelming.

In addition, a misconception is that if you have small fish, you should have a small tank. However, sometimes smaller fish are more active than larger ones, meaning they need more room. As you begin shopping for your new tank, keep both cleaning and fish size plus their relative activity levels in mind.

### **Stocking to Full Growth**

You should be basing your choices on the fish you buy on a number of factors including their compatibility and the water quality they require, but also of course on the size the fish will become. Obviously, your fish will need adequate room to swim. Although they may do well together as small babies, as they begin to reach a mature size, the fish tank will soon become overcrowded.

When that happens, your fish will become stressed, which results in poor color, poor organ system function, improper musculature and fin form, and inability to fight disease. Unfortunately, the fish will experience various diseases because of low immune system and eventually die.

### **Fish Retailers**

When it comes time to buy the fish for your aquarium, you should talk to your local dealer or knowledgeable pet store about fish availability. I strongly recommend that you avoid the temptation of walking into a pet store and leaving with bags of fish. Although this is hard, it will benefit you in the end.

For starters, you want to buy your fish from someone knowledgeable. In other words, while the high school student running a pet store is admirable, he or she probably knows very little about fish. Especially if you are a beginner at fish keeping, you will have tons of questions.

The key is to work with someone who has a great understanding of fish and fish compatibility. This means knowing the scientific name of the fish, breeding habits, behaviors, water quality needs, and so on. The individual you buy from should be willing to spend time with you in choosing the right fish.



If possible, find an individual that breeds fish or a store that specializes in nothing but fish. With this, you have much better chance of buying fish that are easy to find and in good health. Unfortunately, some of the larger pet store chains will set up fish tanks and then cram them with fish. Again, this type of practice leads to stress, which leads to disease and ultimately death.

Local marine fish dealers typically have a nice stock of fish for all size fish tanks. They understand fish and can guide you through the process of choosing, as well as be there to answer any questions you might have once you bring the fish home. If you cannot locate a smaller specialty shop or fish dealer, then you may have no choice but to buy from the larger chains.

In this case, just make sure you do not see numerous dead fish floating in the water, make sure the water and tanks are clean, that the fish are colorful and active, and that they offer a refund should the fish die within a certain number of days. Please refer to 'Setting Up Your Aquarium' for guidelines for choosing healthy fish to purchase for your Aquarium.





## MANAGING AQUARIUM WATER



One of the most important things you can do for your fish is to provide them with a safe and healthy environment. From a human perspective, think of being forced to live in a city full of smog, making breathing difficult, the pores of your skin becoming clogged, your hair greasy, and your overall appearance and health poor.

The same is true for fish and water. When they do not have the right quality water, color becomes dull, they become less active, body formation can be affected, and then immune systems decline, which again, can lead to illness, disease, and even death. Typically, your freshwater fish tank will need a partial water change on a regular basis.

In other words, once you set your fish tank up, you will not just leave as the water beings to evaporate. Instead, you will actually draw out approximately 15% to 20% of the water every month, replacing it with clean water. I recommend you keep to this smaller water change done more frequently than removing 50% or 60% of the water every two to three months.

You need to change portions of water frequently because a fish tank is a 'closed system'. Unlike rivers or lakes the water is not being naturally replenished, so your fishes' wastes can build up quickly, poisoning them if not dealt with.

With water change, you are removing compounds that are not removed by the filtration system, which includes things such as nitrates and phosphates. In addition, water change helps to replenish trace elements, as well as clean gravel of unwanted waste and detritus. If you keep activated carbon in your tank, this too should be replaced every month.

### ***FISH IN THE WILD***

If you look at fish in the wild, water quality is crucial to their survival, as you will discover below:

#### **Oxygen Depletion**

A common cause of fish dying in the wild is from oxygen depletion. In most cases, oxygen depletion will occur during the summer months in fertile ponds and rakes resulting from pond turnover or die-off of algal bloom. During the hot months, these ponds will develop a layer of water close to the bottom, containing little to no dissolved oxygen.



What happens is that when a cold rain or high winds occur, the water mixes with the upper pond water, causing oxygen levels to drop. Oxygen depletion can also occur when dead algae or other types of plant decay exist in the pond due to herbicide usage to control nearby weeds. The same result can also occur in fish tanks where algae killing products have been added without removing excess algae. Eliminating any algae before using any algae killing products is crucial to avoid oxygen depletion.

### **Low pH**

Low pH or acidic water is also a problem for fish in the wild, although not as common as other problems. This occurs with heavy rains when tannin, (an acidic substance found in tree leaves) gets into the water. However, in the wild large volumes of water are usually involved in the ecology of the area – so any change usually occurs slowly and has minimal impact.

### **Poor Quality**

Fish in the wild, just like fish in an aquarium will become disease ridden when the water quality is poor or the living conditions. Unfortunately, once disease sets in, the fish will either survive or die whichever way nature takes the situation. Fortunately with a tank, you have the ability to play 'nature' and prevent these things before they ever happen.

### **Parasites**

Fish living in the wild deal with a number of different parasite types but generally do not show any symptoms until the infection is out of control. These parasites include things such as Tapeworm, Yellow Grub, Black Grub, and Black Spot parasite. For the fish, no direct chemical treatment is usually available so the result is often death.

### **Overcrowding**

Fish in the wild also do not do well with overcrowding conditions. In some cases, pools or lakes of water evaporate drastically in hot spells. Events such as this of course lead to lack a lack of oxygen making water quality poor, which in turn usually leads to death for most of the fish. Some fish, such as the "Lung Fish" have evolved to be able to cope with situations such as this. These fish can burrow into the mud in a state of 'hibernation' until the rain comes again to correct the poor water quality and low amount of oxygen in the water. Amazingly enough, fish have their own means of population control, they emit a pheromone (a chemical released by the fish affecting other fish nearby it) which inhibits their growth. In a small volume of water that could not support too many fish, the pheromone would be very concentrated, stopping the fish from growing



too large and overpopulating the area. The same applies to a large volume of water, in which the pheromone is diluted allowing the fish to grow as large as the water volume can support. Because a fish tank is a 'closed system' you will find the more water you change the larger your fish will grow! This can be very helpful in rearing baby fish and when you want to promote growth.

### **Aquatic Weeds**

This problem is a serious one, which interferes with a fish's environment. When vegetation is dense, it is common for "Bream Fish" to become overcrowded, which can lead to stunting. Therefore, outdoor ponds should always be cleared of aquatic weeds.

### **Predators**

Fish in the wild experience life as no fish in an aquarium should – living in fear of 'Predators'! No matter what type of fish you are, someone or something is usually trying to catch you and eat you. The behavior fish develop to avoid this such as schooling and hiding is transferred to an aquarium and should be catered to, in order to make your fish feel as secure as possible. To keep a schooling fish in a group less than six is to place it under stress, usually leading to illness and death.

### **Herbicides**

Use of herbicides to kill off nearby land weeds is always a problem. These chemicals can run down into the water, causing illness, deformation, and death.

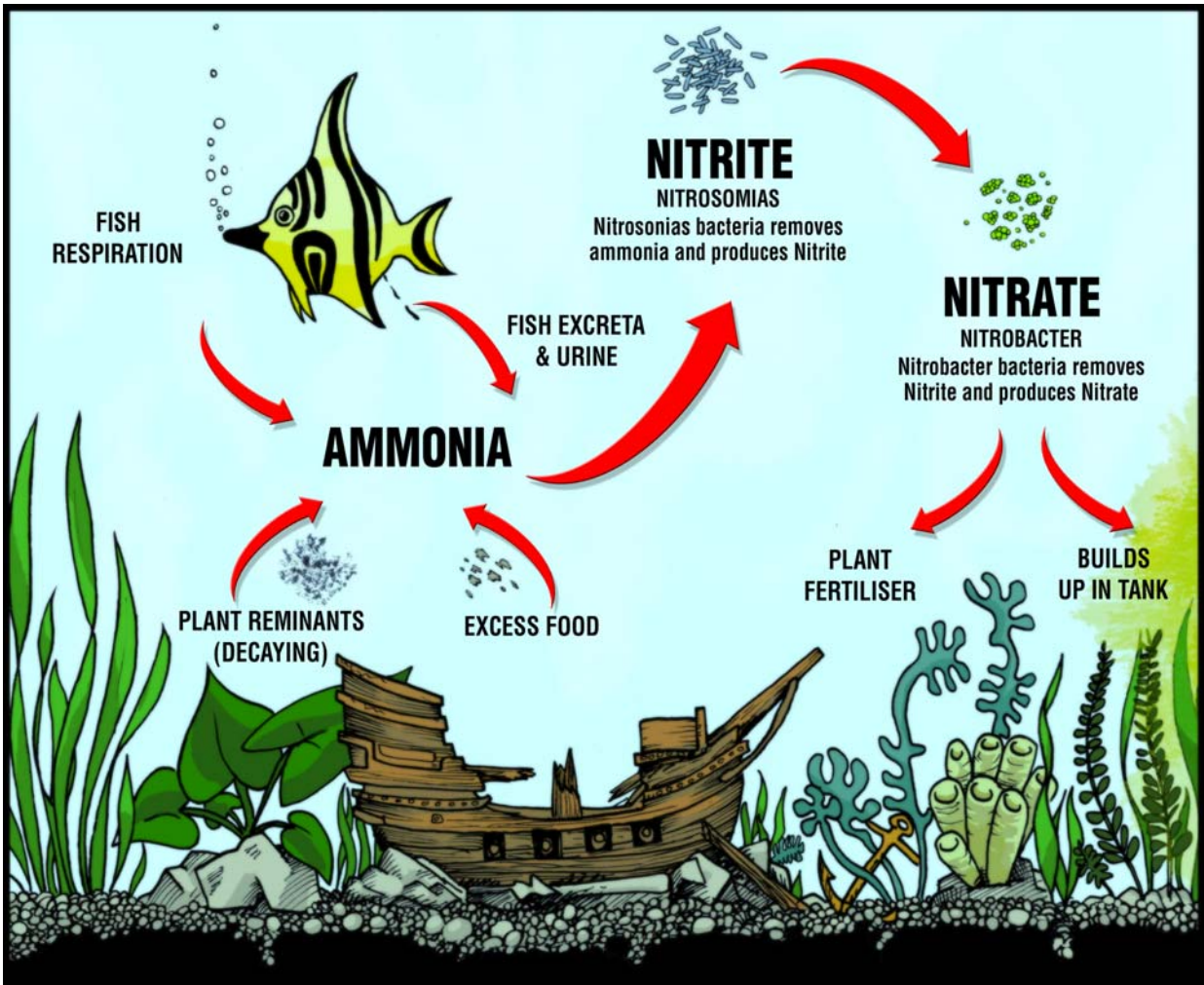
As you can see, fish in the wild go through many of the same challenges as fish in an aquarium. Providing your fish with quality water is truly the key to happiness and health.

## ***THE NITROGEN CYCLE***

The nitrogen cycle may seem like a lot of scientific jargon to start off with, and you may feel like you are even back at high school. However once you have wrapped your head around it, you will find it to be one of the most important things you can know about your aquarium. The nitrogen cycle explains exactly how fish can live healthy and happy in a 'closed environment' and how to achieve a balanced aquarium.

As you can see from ***Figure 1*** below, the nitrogen cycle starts when you introduce organic waste into your aquarium such as fish respiration, excrement and decaying food and plant matter. When these types of wastes are present

ammonia is produced as a result and this in turn is directly toxic to fish. Over a period of time bacteria known as Nitrosomonas (good bacteria), convert this ammonia into the molecule Nitrite. Whilst not being generally as toxic as Ammonia, Nitrite is still very harmful to your fish. Bacteria known as Nitrobacter then convert this Nitrite into Nitrate which is usually not very harmful to fish (unless left to build up in your tank). Nitrate is the end product of the nitrogen cycle and, while a small amount of it may be used as fertilizer for live plants, it will build up over time, reaching dangerous levels. It is for this reason that small, regular water changes of your aquarium must be undertaken in order to prevent the buildup of Nitrate.



**Figure 1 – The basics of the nitrogen cycle within the environment of a private aquarium**

As you can see, bacteria perform a major role in the nitrogen cycle. The key to having a balanced aquarium lies in growing and maintaining a healthy colony of bacteria in the tank’s filters to prevent nasty toxins harming the fish. I will discuss later in more detail, how to go about looking after your colonies of ‘good bacteria’.



## **CYCLING**

To keep your aquarium water at the appropriate level for nitrogen and oxygen, as well as maintain an adequate level of good bacteria, you need to go through a process known as “Cycling”. This process will need to be done when you get ready to set your fish aquarium up. Interestingly, many people have never heard of the cycling process. Unfortunately, some of those who have choose to ignore it. However, to ensure your fish live in a healthy environment, cycling is essential.

Cycling is the process of building up a large colony of good bacteria in the tank filter, to help remove toxins such as ammonia and nitrates created by fish waste.

When you first introduce fish into a new tank there will be no bacteria present, as there have previously been no fish present to create waste to feed it. For this reason, only introduce very small numbers of fish initially, so as to give the bacteria time to build in numbers and breakdown the fish wastes. During the cycling process small amounts of the water will need to be changed on a regular basis to dilute toxins being produced and fish wastes should be kept to a minimum (by feeding the fish less for example).

### **Adding Fish**

The most effective way to go through the cycling process for your fish tank is slowly. These following steps will show you exactly the proper way to accomplish this.

- Start with the smallest number of fish possible. For instance, when first introducing fish, start only with a small number for a small schooling fish, about 6 to 10. Keep in mind that you want hardy fish only, which would include Guppies and Tetras among others
- While Goldfish are considered hardy fish, use only a few to cycle the tank unless you plan to keep them as fish. Most pet stores will recommend that you use feeder Goldfish when cycling but in truth, this is a bad idea for a number of reasons. As an example, requirements of a Goldfish compared with tropical fish are very different, meaning temperature and pH level adjustments would be needed for the goldfish to survive. However, in doing this, the other fish would become stressed. Goldfish are also more susceptible to disease. Because of this, the tank could become diseased. Finally, the species of Goldfish typically used for cycling are feeders, which are different from quality fish.





- Other fish good for cycling include Zebra Danios, White Clouds, and Cherry or Tiger Barbs. For a 10 to 20-gallon tank, six of these fish would be ideal.
- Remember to limit the number of fish used for cycling. If you use a large number of fish, the results could be devastating, as shown below:
  - You would experience a high production of excess waste, which means a great deal of stress on the fish. Chances are you would have the spread of disease and a growing number of dead fish.
  - Water problems would increase dramatically
  - The tank would develop an unpleasant smell

### **Cycling Method**

The proper way to cycle your fish aquarium includes the following:

- Set up your aquarium allowing it to rest for at least 24 hours.
- 
- Place the plastic bag of water and fish purchased from the pet store or breeder into the tank, letting it float for 15 minutes
- Next, open one side of the bag, being careful not to let the bagged water leak into the tank water
- Slowly, let the water from the tank enter the bag. In 10 minutes, allow the new fish to swim loose
- Use a bacterial supplement (available from pet stores) to encourage the growth of your good bacteria
- Leave the fish and fish aquarium alone for three days. During this time, take care not to over feed the fish. Feeding every second day is fine.
- During the entire cycling period, the water should be drained about 15% every three days and then replaced with regular tap water. Always use a water conditioner to treat it first.
- Add as many air pumps and air stones as possible during the cycling period, allowing them to run 24 hours a day to help increase oxygen levels, again speeding up the process.



- Run the filter throughout the cycling process to help increase water flow, while ensuring an adequate buildup of good bacteria in the filter material
- Never drain your tank more than 15% or clean your filter too regularly. Avoiding this lessens the chances of stressing your fish. This can cause a problem for building the bacteria colony. The result will be an inadequate filtration and bacterium will be eliminated.

### **Special Readings**

During the cycling process, it is essential that both ammonia and nitrite levels in the water be monitored on a regular basis. If not, you will not know when you have completed the process. The result is all types of problems arising.

- Continue changing the water 15% every three days for about two weeks. It is imperative that during these weeks, you consistently test the water for levels of ammonia and nitrite. The reason is that fish waste and decayed food particles can cause the levels of ammonia to rise, which is toxic. By establishing this biological filtration, the ammonia is changed to nitrate which, unless is in large quantities, is not harmful to the fish.
- You can buy testing strips at your local pet store. Simply dip them into the water. As they turn color, you can compare the color to a chart provided with the strips to determine current levels of ammonia and nitrite. Another option is to take a small sample of the water to your local pet store and have them conduct the testing for you.

### **Cycling Process Time**

The process of adding smaller fish to the tank, changing the low levels of water, and testing the water **is** the cycling process, which takes about six to eight weeks for completion. At the end of that time, both ammonia and nitrite levels should have dropped.

- When adding more fish to the aquarium, start with just a few at a time. Work the same process of floating the bag of fish and water from the pet store, allowing the fish to acclimate to the new environment. If too many fish are added, you will begin to notice a foul odor at which time you should start the cycling process all over.
- Total cycling time for the average fish tank would be 30 days at 78 degrees F, although this varies. Occasionally, some aquariums will remain at high levels of nitrite for weeks and even months. One of the





best ways to fight this is by adding one cup of gravel from a tank already established, if possible. Patience is your biggest asset during the cycling process. You may be dying to add more fish to your aquarium, but remember to do so is to put them at risk, and it may require you to start completely again.

### **Chemicals During Cycling**

Never use chemicals to help reduce ammonia levels in your fish tank. Instead, the biological filtration being established will do the work for you. If ammonia levels become too high after the cycling process is complete, chances are one of more of the following has occurred:

- Too many fish have been placed in the aquarium
- The tank does not have enough filtration or the correct type of filter
- The fish are being fed too much

Occasionally when cycling a tank, some fish may develop diseases, parasites or infections due to levels of toxins in the water. Chemical treatments can be obtained to correct these problems, but bear in mind a number of these treatments will kill off some of your 'good bacteria' causing you to have to begin the cycling process again.

### **Bacterial Supplements**

A number of bacterial supplements are now available on the market, and these are easily obtained from your local pet store. These products are not chemicals, but are in fact the type of bacteria you want to promote in your aquarium. While the cycling process will take place without the use of a bacterial supplement, using them on a regular basis can greatly cut down on the time it takes for the cycle to complete. .

### **Potential Problems**

Sometimes, even after being very careful with the cycling process things go wrong. In this case, you still have options for correction. For instance, if after the six to eight weeks the ammonia and nitrite levels are still not, where they should be, troubleshoot to find a solution.

- Does your filter have enough space to house the amount of bacteria you require?
- Was the tap water too heavy with chlorine and chloramines? Remember, if using tap water with these chemicals, it must be treated



first. Otherwise, these chemicals kill bacterium required to set up a healthy environment for the fish. Distilled water is usually the best bet for tank water.

- Did you go through the process of changing the water on a scheduled basis? Remember, this step is vital for removing excess waste before it kills the bacteria or worse, the fish.
- Make sure you kept within the guideline 15% when you changed the water. Any more than 15% would stress the fish. Additionally, the aquarium would not have adequate filtration and the ammonia/nitrite levels would not metabolize.

As you near the end of the cycling process, you will notice a marked improvement in the fish's appetite and activity level. As the nitrite drops and rises, small green algal blooms may appear. To keep the algae under control, you can add small scavenger fish that will clean the sides and bottom of the tank or reduce the amount of time you have your lights on each day.

Once ammonia and nitrite levels reach zero and only the nitrate level begins to rise, you have confirmation that the cycling process is complete. With this, you can begin to add other fish to the tank. Although cycling takes a little time, it is not difficult and by following these simple steps and being patient so your new tank has adequate time to cycle, you will soon have a beautiful and healthy tank full of vibrant, happy, and healthy fish.

### ***WATER TEMPERATURE***

Because fish are "exothermic" animals, any adjustment in the temperature of their environment leads to a direct change in the internal temperature of the fish. The perfect water temperature for your fish aquarium will depend on a number of factors. For example, you have a balance between temperature tolerance and conditions under which the fish live. Keep in mind that the temperatures provided are a general guide so remember the type of fish, the amount of fish, the size of the tank, and so on also play an important role in the final number.

The most suitable temperature for a fish tank is between 77 and 82 degrees F. However, remember that higher temperature means less dissolved oxygen in the water for the fish. Thus fish have an increased requirement for oxygen as temperature rises. You can use a thermostat to keep an eye on the temperature and if it becomes too cool, a heater to control it. Without controlled heating, you run into the problem of water temperature fluctuation based on room temperature.



One of the most important factors for fish and water temperature is stability. If the tank water temperature fluctuates more than a couple of degrees Fahrenheit an hour, your fish may become stressed.

The more wattage of the heater the more heat will be generated. Obviously, the larger the fish aquarium the more heat required to maintain optimal temperature, just as smaller tanks would need less wattage. A good rule to follow is 50 watts per 10 gallons of water. Therefore, if you had a 50-gallon fish tank, you would need a 250-watt heater. I will talk about various options for heaters in the chapter "The Basics – Equipment".

### **Power Outage**

If you were to experience a power outage due to bad weather or some other situation, you need to remember that your fish will need a little assistance to avoid becoming too hot or cold and ultimately, stressed. Typically, fish will survive a gradual change in the summer better than in winter. What happens is that oxygen levels drop and carbon dioxide levels increase or decrease. If the tank water were warm and/or overcrowded, this would be a serious problem.

Another common problem with power outage is that ammonia and sometimes nitrate increases to dangerous levels since there is no filtration. Again, if you have a tank full of fish, the problem would be worse. Then, bacteria in the biological filter would die. Without it getting food, air, and/or water, bacteria cannot survive. It takes approximately 24 hours for bacteria to completely die off in a filter.

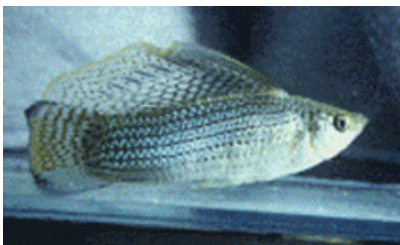
When power comes back on and the filter is again working, you would find dead bacteria and hydrogen sulfide, which is noticed by the distinct smell of rotten eggs. When this is released into the aquarium, the fish will be in harms way. If you have live plants, those too might die. To protect your fish during a power outage, I recommend the following:

- If you live in a region where power outages are common, it would be worth the investment to buy a battery-operated air pump to help keep the tank aerated. When the power goes off, the pump will kick in automatically. Best of all, these pumps are usually less than \$15. You simply keep the air pump plugged in all the time. When the power is on, the pump does nothing but when the power is off, it goes to work.
- If you have a larger fish tank, several fish tanks, or expensive fish, then it might be worth spending a little money for a generator to maintain the tank. Although these cost \$100 or more, it would be worth it to save the lives of your fish.



- Another option during power outage is to pour some of the tank water over the biological filter material about every hour to keep the bacteria from drying out. Remember, this bacterium will begin to die quickly, being completely dead in after around a day. If the biological filter system dies, not only would the fish be in danger but you would also have to go through the cycling process again.
- If you have warm water in the hot water heater, use a little to add to the tank to keep it at the correct temperature. This would need to be added gradually and remember, make sure the water is treated first. If you do not have hot water but have a fireplace or stove, you could boil some water. Just make sure the water is not boiling when added to the fish tank, just warm.
- A power outage is another situation where a bigger tank is better, since a large tank of water will retain heat for far longer than a small tank.
- Stop feeding your fish if the power is out for very long. Even if the fish give you that “I’m hungry” look, avoid feeding. The reason is that the more the fish eat the more waste they will produce, which raises the level of ammonia in the water. Without the filtration system working, the level will become lethal. In addition, if the water temperature is too cold, the food could actually ferment in the fishes’ stomach, killing them. In most cases, fish can go about five or six days without food.
- If the aquarium has been without filtering for more than two days, you may need to go through the cycling process. In this case, change all the non-biological filter materials including carbon and floss filters— see the later chapters for more details on what these are. Then, perform a 30% to 50% water change to help dilute fish waste. Next, vacuum the gravel from the tank and if there are any dead fish, remove them. Add liquid concentrated good bacteria and ammonia-removing resin in the filter to help get rid of ammonia and nitrate if there is inadequate live bacteria.

## OXYGEN



Although fish live in the water, they need oxygen to breathe. Any live plants maintained in your fish aquarium also need oxygen. What happens is that everything that can die or rot in the fish tank needs oxygen, which means it is also capable of depleting oxygen. This includes your good bacteria, which also must have a regular supply of fresh oxygen.



Other things found in a fish aquarium that deplete oxygen include proteins, carbohydrates, and organic acids all absorbed by the activated carbon. For your fish tank, oxygen gets into the water through surface agitation or plant photosynthesis. The amount of oxygen that is capable of being dissolved in the water depends on salinity levels and water temperature. I also add fresh oxygen when I perform a part water change.

In addition, the level of dissolved oxygen will fluctuate throughout the day, typically being higher when there is light and lower early in the morning. Typically, you want a dissolved oxygen level of 5-7ppm (parts per million). In most cases, when levels drop to 4ppm or lower, you would begin to notice your fish being stressed. Then when levels dip to 2ppm or lower, fish will die. In most cases, a fish aquarium will have adequate oxygen for the fish but sometimes, levels will drop. The causes of dissolved oxygen levels include the following:

- Short light period (plants produce oxygen in the light and burn it up at night)
- Too many fish, which results in large quantities of waste, which needs more bacteria to oxygenate
- No or too little water agitation
- Waste rotting in the filter or in the gravel at the bottom of the tank
- Green or cloudy water

If the oxygen content in the aquarium should fall too low, you would notice your fish coming to the surface and gasping often. In fact, some will try to jump out of the tank, known as "Escape Response". When the water temperature of a tank rises, its oxygen content will decrease. When this occurs, the saturation level of dissolved oxygen at different temperature, changes.

Different fish have different abilities to handle this reduced oxygen state. Typically, the larger, faster moving fish are less adaptive while invertebrates (animals without spines) tolerate lower oxygen better. In addition, the consumption of oxygen by bacteria is an important limiting factor for stocking your fish tank, using as much as 30 times oxygen per body weight as fish.

Then, any rotting waste would produce hydrogen sulfide, which becomes oxidized in healthy fish tanks. Good rules to remember when it comes to aquarium oxygen include:

- Large fish need more oxygen than smaller fish
- Always use a pump or filter to create surface agitation



- Purchase a test kit to keep an eye on your tank's oxygen level

## **REVERSE OSMOSIS**

Reverse Osmosis, also called RO, is a water purification process that forces water through a semi-permeable membrane to help remove 80% to 90% of all tap water impurities. With this, water is free from minerals, chloride, and other contaminants that can harm or kill fish. An RO filter will remove the impurities, keeping your fishes' environment healthy, however because RO removes mineral content from water, it will make your tank water very soft, and should only be used for fish that can tolerate this.

## **TRACE ELEMENTS**

Each of these compounds is important when keeping a fish tank, as you will discover below:

### **pH**

The pH level in a fish aquarium is a reference to water being acid, base, or neutral. For instance, normal pH level in a fish tank would range between 0 and 14, 0 being the most acidic and 14 the most alkaline. If the pH level were neutral, the measurement would be 7. However, if the level were below 7 the water would be considered acidic and above 7 basic, also called alkaline. When measuring pH, the scale is logarithmic.

Because of this, measurement of 5.5 would be 10 times more acidic than water measuring 6.5. By changing the level of pH in the fish tank, you are changing more than just the chemical. Even a slight or sudden change could have a stressful effect on the fish.

When keeping a fish tank, you need to remember two specific factors associated with the pH level. The first is again, any type of rapid change would prove stressful to the fish. For this, if you were to change the pH level more than .3 units daily, the fish would not do well. Second, it is important that the pH level in your aquarium match the requirements of the type of fish you keep.

Usually, freshwater fish live in water with a pH between 6 and 8, with most living happy and healthy if the water is just slightly on the acidic to neutral side, between 6 and 7.5. If you use tap water to fill your fish tank, you can change the structure of the water using bicarbonate, phosphate, or some other type of buffer.

In most cases, low pH would occur because of decaying plant and fish waste. What happens is that as the pH level drops lower than 5.5,





bacteria that would break ammonia down becomes reduced, actually causing the level of ammonia to rise. If you have high pH in your aquarium, you can use a special chemical sold at pet stores and pet supply stores. However, make sure you choose the right product since those with a phosphate base will encourage the growth of algae.

In addition, pH can be lowered in your fish tank by using plants and fish during respiration as oxygen is exhaled into the water. If you have hard water in the home, then expect the process of lowering the pH level to be more challenging. The key here is to use reverse osmosis or peat filtration to soften the water. On the other hand, if you have a high level of pH, add bicarbonate, which is baking soda, or you could remove some of the organic buildup by changing the water.

When you 'buffer-capacitize' your fish tank's water, this means maintaining a stable pH level regardless of whether an acid or alkaline substance has been added to your tank. With buffering capacity, added acid can be absorbed and neutralized without making major changes to the pH level. Think of buffering capacity as a giant sponge that absorbs the acid when added without changing the pH level significantly. Remember that the amount of acid the "sponge" can absorb is limited. Therefore, when buffering capacity is full, you would see a faster change in pH.

The interesting aspect of buffering is that it can be both negative and positive. During the nitrogen cycle, nitrate is produced. Without the use of buffering, the pH level in the fish tank would eventually drop, which is negative. However, with sufficient buffering, pH levels would remain stable, which is positive.

From a negative standpoint, hard water coming from the tap typically has a large buffering capacity. Therefore, if the pH level were too high, the buffering capacity would make it hard to lower to something better for the fish. In freshwater fish tanks, the majority of the buffering capacity is done because of bicarbonates and carbonates.

To determine the amount of buffering your fish tank needs would be determined by the level of KH, which is Carbonate Hardness. You can purchase a KH test at your local pet store to take an accurate measurement. The larger the KH the more resistant to pH changes the fish tank water will be. The goal is for the water to have enough KH to help prevent huge swings in pH.

When measuring KH, if it falls below 4.5 dH (Degree Hardness – see below for more details), then you want to check the aquarium's pH level weekly to get it stable. If the pH level drops two-tenths of a point over 30 days, then you should think about increasing the KH. The other option is





to perform a partial water change more often. Remember, unlike pH, KH does not have a direct effect on the fish so whereas you would need to match fish with pH, you would not need to match fish with KH.

**General Hardness**

General Hardness or GH is a reference is to the dissolved concentration of calcium and magnesium ions. When shopping for fish, you might hear them referred to as liking hard or soft water, this relates to GH. Keep in mind that GH becomes a little confusing, especially for the beginner fish keeper. Because of this, most experts caution a beginner to leave General Hardness alone unless necessary.

When talking about water hardness, you will hear the term Degree Hardness or dH and ppm, which means parts per million. This is equivalent to mg/L in water, meaning one unit of dH is the same as 17.8 ppm. Typically, test kits will break hardness down in units of CaCO<sub>3</sub> (Calcium Carbonate), which means the hardness is the same as CaCO<sub>3</sub> in water, although it does not automatically mean it came from CaCO<sub>3</sub>. For a little more understanding, refer to the General Hardness table below:

General Hardness (GH)		
0-4 dH	0-70 ppm	Very Soft
4-8 dH	70-140 ppm	Soft
8-12 dH	140-210 ppm	Medium Hard
12-18 dH	210-320 ppm	Fairly Hard
18-0 dH	330-530 ppm	Hard

**Salinity**

For salinity, this is a reference to the complete amount of dissolved substances. When measuring salinity, it takes into account components for GH and KH, as well as sodium. Keep in mind that if you own a freshwater fish aquarium, all you need to watch is the ph, GH, and KH levels. However, if you have a saltwater fish aquarium, then knowing salinity would be very important.

When measuring salinity, the method is in expressed terms of specific gravity, the ratio of the solution's weight when compared to weight of an equal volume of distilled water. When water is heated, it expands, which then changes its density. For measuring salinity, a hydrometer is used that is calibrated to use at a specific temperature.

The salinity component of sodium is not found in GH or KH. While a few freshwater fish can tolerate small amounts of salt, most do not.



## **Phosphate, Iron, and Carbon Dioxide**

Phosphates are the second most prominent nutrient, which have been linked to the growth of algae. Therefore, if you notice an abundance of algae growth in your fish tank, you could have too high a phosphate level. Typically, you want to maintain levels of .2mg/L or less. Then to keep algae growth under control, remember the value of partial water changes, which helps by lowering nutrient levels. You can also purchase products to place in your filter which removes phosphates.

Other trace elements found in tap water include iron and manganese. If you maintain plants in your fish aquarium, then iron in small amounts is needed to help them grow. Finally, carbon dioxide is a gas found in water as a byproduct of organisms due to respiration. Your plants will need carbon dioxide during photosynthesis.

When your fish tank does not have adequate levels, leaves on the plants will begin to turn yellow and stop growing. Sometimes, carbon dioxide dissolves in water from carbonic acid, which can cause pH levels to decrease. However, if your fish tank has too much carbon dioxide, then the fish will become stressed. You can add this element to your water if needed. Plant fertilizers can be purchased with just the right levels of iron to promote plant growth while not promoting algae growth.

## ***TESTING THE NITROGEN CYCLE COMPONENTS***

One of the most toxic nitrogenous products in a fish aquarium is ammonia. This component results from fish respiration, excretion, and decaying food in the tank. When keeping fish, it is imperative that you understand the water and the ways in which it can affect your fish's health. To do this, you also need to understand and perform regular water testing. With this, you can identify problems before they become too menacing.

In addition to your fish tank's water temperature, you will also need to test for other things on a regular basis including ammonia, nitrite, nitrate, and pH. By maintaining the appropriate level of each, your fish will live long, healthy lives. The following chart can be used as a guideline for testing, which is covered more in-depth later in this section.

**Testing Chart**

TEST	Acceptable Range	Frequency	Remedies
Ammonia	0.00 ppm	Daily while cycling then weekly thereafter	Partial water change, reduce feeding, add bacterial additive or ammonia-removing product
Nitrate	<60	Once weekly	Partial water change, add live plants
Nitrite	<1.0 ppm	Daily while cycling then every two to three weeks thereafter	Partial water change, reduce feeding, add bacterial additive
pH	6.0 to 7.8	Several times weekly	Use pH buffer
Temperature	75 to 80 degrees F	Daily	Adjust heater

**Ammonia**

Again, ammonia is critical when it comes to testing your fish tank. Keep in mind that during the startup cycle of a new tank, levels of ammonia will likely be higher than normal. However, if your tank water is not changed on a regular basis, the tank is overstocked, the filters cannot keep up with the cleaning, or you use medication for sick fish, ammonia levels could also be elevated in an established tank. If you begin to notice fish dying, the first thing you should check is the ammonia level.

**Nitrite**

When establishing your fish aquarium, you will find that nitrite levels skyrocket, which can stress and kill fish. Even after cycling the fish tank, experiencing high levels of nitrite are normal on occasions. Therefore, you should test for nitrite every week. If you see fish becoming stressed or dying, then make sure that you check for this problem as well. In most cases, water change will correct the problem.

**Nitrate**

While ammonia and nitrite are worse on fish than nitrate, you should monitor these as well to avoid the fish from becoming stressed. Typically, you would notice a problem with excessive algae if nitrate levels were too high or low. In most cases, water changes will resolve the issue. However, I recommend you test for nitrate once a week, especially if breeding the fish, since young and juvenile fish tends to be more sensitive.



## **pH**

Fish can become stressed when the pH level is off as well. Unfortunately, pH levels are often overlooked and since fish cannot handle sudden changes in pH, you need to keep on top of this potential problem. By knowing your tank's pH level, you can act appropriately for adjustment if necessary.

## **Phosphate**

Finally, when algae begin to overtake your fish aquarium, check the level of phosphate. The problem is that phosphate acts as a nutrient to algae so when levels are too high, the problem gets out of control. The number one cause of high phosphate is dry fish food, especially overfeeding. Therefore, I recommend you choose fish food lower in phosphates.

## ***IMPORTANCE OF TESTING***

Today, you can find testing kits at most pet stores or pet supply stores that are designed to check for appropriate levels of ammonia, nitrate nitrite, pH, salinity, and other components. Although saltwater tanks require more testing than freshwater tanks do, this is still an important process.

The key with testing the water of your fish tank is to know when and how. Even if your fish tank is already established, testing is essential. By using a special kit, you will be able to test for high or low levels of things such as ammonia or nitrate, which can be deadly to fish. Keep in mind that if you were not comfortable with testing your own water, most pet or fish stores will test the water for you for a minimal fee.

By testing your fish aquarium water, you can spot trouble before it gets out of control. Obviously, being proactive in the health of your fish is far better than having to be reactive

## ***WATER CHANGE***

In this section, I wanted to go through the process of water change since it will play a pivotal role in maintaining a healthy environment for your fish. Although there are no definite rules on the process of water change and each setup is somewhat different, I can provide you with some general guidelines.

- Once a month, you should change a minimum of 25% of the water for a lightly stocked aquarium



- Depending on your tank setup and/or fish species, you might need to change the water more often. As an example, maintaining “Cichlids” would need a 30% tank change every two weeks.
- If you are breeding and raising “Fry”, you want to encourage growth by more frequent water change
- If you have a heavily stocked aquarium, you will have a higher waste load. Therefore, you will need to change the water more often than if you had a lightly stocked tank.
- Typically, changing a smaller amount of water more often is best. This minimizes change in water chemistry, thus less stress on the fish.
- You can test the nitrate level in your fish tank, which is a good indicator of the water quality. In this case, if the levels of nitrate are high, you know the water needs to be changed.
- The more water you remove the greater the importance of matching both water chemistry and temperature on the water being added back in.
- The greater quantity of water removed, the more important it is to remove chlorine out of the tap water before adding it back in.
- Purified water from a DI or RO unit is critical for maintaining marine fish.

Again, while there are many factors to consider when it comes to water change for your fish aquarium, the table below can be used as a good guideline.

<b>WATER CHANGE</b>		
<b>Tank Setup</b>	<b>Minimum Change</b>	<b>Recommended Change</b>
Tank not fully stocked (average)	25% monthly	20% every two weeks
Tank well stocked	25% every two weeks	20% weekly
Malawi cichlid tank	25% every two weeks	25% go 35% every one to two weeks
Tanganyikan cichlid tank	15% to 20% every two weeks	10% to 20% weekly
Large cichlids and predators	25% to 30% every two weeks	25% to 30% weekly
Fry rearing (up to one month)	10% to 20% every two to three days	10% daily
Marine Tank	10% to 15% every two weeks	10% weekly



## **Partial Change**

For a partial change, you need the following:

- Two plastic buckets (perhaps more for a larger tank)
- One plastic, two liter pitcher
- Paper towels, plastic scraper, or algae scrubber
- One gravel siphon
- Thermometer
- Net
- Water conditioner
- Filter replacement cartridges

Start by filling one of the buckets with tap water. Then measure the appropriate amount of water conditioner according to the directions. Add this to the water and set aside. Next, unplug your fish aquarium's electrical units. Using the plastic scraper, or algae scrubber, clean the algae off the inside of the tank's glass. Trim any plants and use the net to remove any other debris from the tank

Place the large end of the siphon into the fish tank with the hose end in a bucket. Most siphons only work once you completely fill them up with water before placing them into the tank. Doing so creates a vacuum; however some siphons have valves to start the flow of water through them. Once the siphon has started, you can vacuum the gravel.

For this, push the tube down into the gravel, pulling it straight up. The waste particles from the gravel will siphon out while the gravel falls back to the bottom of the aquarium. You want to repeat this action across the bottom until the excessive waste has been "vacuumed" up. Add the bucket of water and conditioner to the clean tank, taking your time to avoid too much water force on the fish and stirring up the gravel. Use the 2 liter pitcher if necessary.

Repeat this step until the tank is full. Use the thermometer to make sure the water temperature of the new water is close to that in the tank to avoid stressing the fish. Change the filter carbon or media according to the manufacturer's instructions and wipe off the outside glass and hood of the tank. When finished, plug everything back in. If your filter media needs to be cleaned, use a bucket of the siphoned water to rinse it. Never rinse media out under tap water, as it will kill your good bacteria.





## **CLOUDY, SMELLY, OR FOAMY WATER**



Sometimes, water can become cloudy, smelly, or foamy. When this occurs, the problem is usually due to a high concentration of bacteria that comes from uneaten food or excessive waste. When you notice cloudy, smelly, or foamy water, pay attention since this could be a sign of stress and disease that could kill your fish.

To eliminate the problem, you will need to do a good cleaning. This means removing all the decorations, using a scraper on the inside, vacuuming the gravel, changing out filter media, and so on. In addition to cleaning the fish tank, you can help prevent this type of problem by changing some of the water daily.

When you change water, you are removing dissolved waste, which then helps to starve out the bacteria. The key is being patience and changing only a slight amount of water each day. If you change too much water, you can stress the fish. After the cloudy, smelly, or foaming problem disappears, you can begin changing some of the water twice weekly.

Then, once you have the problem under control, you should reduce the amount of food, which is especially bad for cloudy water. By reducing the food, your tank will be cleaner and the fish happier. In addition, any food not eaten within 10 minutes should be scooped or vacuumed out. Finally, make sure you are using the appropriate type of filter and filter medium.

## **GREEN WATER**

If you have an abundance of algae in your fish aquarium, you would notice the water turning green. Typically, this problem is caused by too much dissolved fish waste. For this, you would need to change some of the water each day until the water becomes clear again. In addition, if the algae are on the inside of the glass, use a scraper to remove it.



You can also purchase special, algae eating fish such as “Siamese Algae Eaters” and “Plecostomus Catfish”. These fish love algae, helping to keep the tank nice and clean. In fact, I generally recommend you add algae feeders to the tank even if you do not have an algae problem as a preventative. However, if the problem remains, then you can add certain chemicals to help battle the problem as a last resort.

Another option for fighting algae is to reduce the amount of light just during the period when the cleanup process is occurring. By keeping the hood light off as



much as possible, this will also help starve the algae. If the aquarium is near a window, then you can use foil to cover up the side that receives any sunlight. Remember, this reduction of light is just temporary. Also check the age of your light bulbs. If they are older than a year, replace them.

While you will change about 20% of the water daily at first, as the algae problem gets under control, you will move to changing it just twice a week. Remember, algae will not hurt the fish but when it gets out of control, it changes the quality of the water, which is what can stress the fish.

### ***WATER CONDITIONER***

To keep your water in the best possible condition, you can add water conditioner designed specifically for fish aquariums. For instance, AquaPlus is an excellent choice sold in most pet stores and pet supply stores. This particular product is affordable and efficient. However, it is just one of many types of water conditioners. A good water conditioner should remove chlorine, chloramines and heavy metals. Ideally it should have an anti-stress component to help relax your fish during a water change and protect their mucus covering. All you need to do is follow the directions on the bottle, which usually means just administering a few drops.



## THE BASICS - EQUIPMENT

In this chapter, I will provide you with all the information needed in buying the proper equipment. Keep in mind that using the right equipment is crucial for your fish's life but you do not have to spend a fortune when setting up your tank. The key is to choose equipment that will keep your fish aquarium working optimally so your fish have a long, happy life.



### **FILTRATION SYSTEMS**

One of the most important things you can do for your fish is to provide them with a healthy environment, which can be achieved through using the appropriate type and size filter. The filtration system will keep excessive waste, decayed food, and algae under control.

In fact, experts estimate that as much as 80% of health problems experienced by fish are directly linked to an inadequate or improper filtration system. When talking about filtration systems, you will discover three primary types, which includes the following. Although many people will use one system type I advise using all three since they each offer different benefits.

#### **Biological**

The biological filtration system helps by using bacteria to break down excessive waste. As you know, fish produce waste, which cannot be filtered out of the aquarium completely using chemical or mechanical filtration systems. Unless the excess waste is removed, they will build to dangerous, toxic levels that can stress and kill fish.

The biological system supports beneficial bacteria known as Nitrofiors (good bacteria), which grow inside the tank, converting the harmful waste to something not nearly as harmful. Every fish tank needs to have a biological filtration system to create a healthy environment. Keep in mind that to create a flourishing biological system, it takes about between 4 to 6 weeks using the cycling process.

#### **Chemical**

When I talk about chemical filtration, I mean a type of filter media that changes the chemical composition of the water. For chemical filtration systems, you have two primary types of filters, namely activated carbon, and ion exchangers.

- Activated Carbon – This type of medium is widely used for chemical filtration systems. Activated carbon works by removing organic



pollutants coming from proteins, hormones, metabolic waste, organic acids, organic compounds, antibiotic compounds, and so on that only a chemical filtration system can handle.

For activated carbon to work effectively, it must be able to absorb, diffuse gases, and do what is called chemo-sorption whereby particles are irreversibly bound to the carbon. As the activated carbon absorbs particles, it will eventually need to be replaced. Generally, you would notice the carbon taking on a yellowish tint, which means time for a replacement.

As far as the amount of activated carbon to use, the recommended amount is three tablespoons to one cup for every 200 liters. Typically, carbon will last a minimum of six weeks although if the tank is bad, it might need to be changed as often as 12 hours until the problem is brought under control.

Just as activated carbon can be highly beneficial for your aquarium, there are also dangers that you should be aware of including:

- Oxygen Depletion – This is caused by using too much activated carbon
- Phosphates – Some carbon products leach out phosphates. To check for this, be sure you measure phosphate levels several hours after adding the carbon.
- Medication – Medication used for fish, specifically antibiotics, can be absorbed by the carbon, thus taking treatment away from the fish.
- If you keep plant in your fish aquarium, some trace elements needed for growth can be depleted by the carbon.
- Ion Exchangers – This chemical process removes or adds an ion into or from the exchange medium being used, which would typically be synthetic resin or zeolite. Ion exchange is often used for the removal of ammonia, although it can also be used to remove nitrate and nitrite. Just remember that ions will lose their capacity over time, needing to be recharged.

If you have a high dissolved organic content level of hard water, the effectiveness of the ion exchanger will be dramatically reduced. The goal is for the water to flow through carbon, followed by the resins. The key is the rate of water flow. For instance, zeolite products cannot perform the needed task if flow rate is too high.



Ion exchangers also target ammonia so you want to make sure ammonia levels are measured during the cleaning process with this type of filtration system. If the resin becomes saturated with ammonia, the levels will rise dangerously.

### **Mechanical**

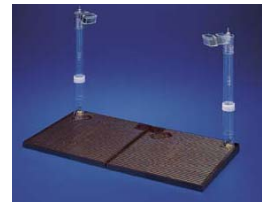
A mechanical filtration system works with solid particles in the water that pass through filter media, becoming trapped.

For the three types of filtration systems, you have various options for filters, as listed below:

### **Under-Gravel Filters**

This type of filtration system is easy to use. This type of filtration system is very affordable and the most common of all fish tank filter systems. For this, the amount of equipment needed is minimal.

Typically made from a screen or flat plate, the filter is set up on the bottom of the fish aquarium underneath the gravel. This filter has two uplift tubes connecting to a small space left under the filter that works by drawing up water with the use of an air pump located on the top of the tube.



As water passes down through the gravel, it comes back up to the tank's surface through the uplift tubes. Keep in mind that if the filter bed for this type of filtration system becomes partially clogged with particulates, the water will begin to channel around those areas, reducing biological cleansing activity.

When this occurs, ammonia is converted to nitrite and then nitrate. As the levels of ammonia rise, the environment for the fish becomes extremely dangerous. To fix the problem, you can use a hydro-cleaning device also called a gravel vacuum. For this, you would siphon the water from the aquarium, churning the gravel in the large end of the siphon hose. The result is particulate matter being removed while the gravel stays in the tank.

In addition, you could use a good quality mechanical filtration system for removing the majority of solid waste material before it has time to settle into the under-gravel filter. Underground filters are more suited to smaller tanks, being harder to maintain in a larger tank.



## **Canister Filters**

Canister filters are great in that they are the one type of filtration system that come the closest to having all three components of the biological, chemical, and mechanical. These filters sit on the floor next to the aquarium, typically hidden in a cabinet. The canister filter has a large canister with an inlet and outlet connection.

The inlet tube is attached to the tank wall with suction cups. Then, a hose connects to the opposite end of the rigid tube, routing to the inlet of the filter housing. A second hose runs from the outlet side of the filter to the aquarium, which is used to return the filtered water. Next, the housing compartment has three to four areas used to hold bio-balls, media, and activated carbon.

Although not all fish keepers agree, most experts believe that canister filters are the best option possible. The advantages of this type of filter are that you can keep the filter out of sight and choose from various types of media. In addition, this type of filter works as all three filtration systems, it is easy to clean, and it has great water circulation. The disadvantage of the canister filter is price, which is higher than other types of filters. These filters suit medium to large tanks and are a good option as far as ease of cleaning is concerned.

## **Tank Mount Filters**

This type of filter is designed to hang on the outside of the fish aquarium. The tank mount system is designed to pull water from the tank, allowing it to trickle back into the tank. While this happens, the water passes through one, possibly two filter pad inserts. The first pad works by trapping large debris that usually floats in the water while the second pad lets nitrifying bacteria grow on the surface so a biological filtration system can get to work as the water trickles through.

For the water coming back into the tank, small amounts of air space is dropped that agitates the water's surface, thus enhancing oxygenation. The important thing in this case is to ensure the mechanical filter pad remains clean. If you experience a clog, water will simply bypass the pad, running into the biological filter pad that is already trapping particles. The result is another clog.

It is also important that the second or biological pad not be disturbed. By cleaning too vigorously or using chlorinated water, such as that from a tap, you will destroy the good bacteria needed to keep the fish aquarium clean. Although you would not generally use a tank mounted filtration system alone, they are good supplementary systems. In addition, this type of





filtration system is affordable, letting you keep a larger number of fish in the aquarium.

### **Protein Skimmer**

When it comes to keeping your fish tank's environment healthy and clean, protein skimmers are hot commodities that promote the health of a saltwater environment. Interestingly, while these filters have grown in popularity over the past few years, they have actually been around for a long time.



When buying a protein skimmer, you would generally consider price and size. In addition to upfront cost, protein skimmers require things such as pumps, which use electricity so you need to consider long-term costs as well. Even so, some manufacturers are now making cost effective models.

When choosing the appropriate size protein skimmer, you need to have a sump or unit that can hang off the back of the fish aquarium. The sump will help determine the size skimmer it can handle. Therefore, make sure you have things in place before you purchase a protein skimmer. Size does have an affect on performance, such that a larger skimmer will perform better than a smaller one will.

As far as cost, you could spend hundreds of dollars on a protein skimmer but it will pay off in the end by providing your fish with a healthy environment. Look for sales and you can usually bring the price down a bit. This type of filter will help the water quality via gas exchange and export of organic waste, which are both critical to optimize water conditions. The four primary factors associated with a protein skimmer's effectiveness include:

- Size of bubbles
- Quantity of bubbles
- Flow-through rate
- Contact time quality



### **Internal Filters**

These small, specialized filters are designed to mount on the inside of the fish aquarium. Internal filters provide mechanical filtration, as well as circulation specifically beneficial for Fry and hospital tanks. Keep in mind that units have to be removed prior to tank cleaning, so they are not highly convenient. However, internal filters are affordable and they do work well in many conditions. They are suitable for small to medium size tanks, or extra mechanical filtration

### **Diatom Filters**

Diatom filters are extremely specialized used for “polishing water”. Using earth powder to coat a filter bag, water is filtered down to microns (a very small size). Because this filter is so efficient, they are used only on occasion and for short amounts of time.

### **Wet/Dry or Sump Filters**

Also called trickle filters, the wet/dry filtration system works similar to the under-gravel system. The difference however is that the biological filtering bed is located on the outside of the fish aquarium. With this, water comes in at the top of the filter column, trickling down through some type of medium that is not submerged.



The nitrifying bacteria works by inhabiting the medium surface, cleaning the water as it trickles through. Then, water is collected at the bottom of the filter column, pumping it back into the tank. The benefit of the wet/dry filtration system is that it is highly efficient for nitrification and oxygenation.

If you have a marine aquarium, this filter is excellent since dissolved oxygen levels are generally low. However, this filter also works great for freshwater tanks that have soil substrate for plants whereby an under-gravel filtration system would not work.

To keep the wet/dry filtration system working its best, the volume of water trickling through the column should equal 8% to 10% of the aquarium volume. Then, water flow rate should be about four to five times that of the tank volume every hour. To benefit from the greatest nitrification, make sure the filter area is designed to yield 0.5 to 1.5 gallons of water per minute per square foot.

One caution when choosing both the wet/dry and under-gravel filtration system for your fish aquarium is that they are sensitive to any type of power failure. If you run into a situation where the filter has not operated



for a full 24 hours, nitrifying bacteria starts to die. Then, once the power is back on and water begins to flow again, you would see conditions like starting a biological filter with a new tank setup, which is usually worse.

### **Sponge**

Of all filters, this is the most basic, consisting of a sponge through which water is drawn by raising bubbles from the air pump. The sponge filter is more like a mechanical filtration system, making this a great choice for a small tank or one used for breeding.

### **Box Filter**

The box filter is air powered and available in many different sizes that fits various size fish aquariums. With this design, airflow draws water through the filter's chamber, which is filled with some type of medium. You can move a box filter between fish tanks, providing mechanical filtration.

## ***FILTER MEDIUM***

For each filtration system used for fish tanks, different filter media are used. Keep in mind that the possibilities are endless so I have focused on the most popular and economical choices.



### **Biological Medium**

As mentioned, the biological filtration system is the most important for your fish aquarium in removing excess fish waste. With this, you will have a large surface area that helps house good bacteria that is responsible for the nitrogen cycle, breaking down deadly levels of ammonia and nitrites. Biological Medium comes in a number of varieties including:

- Bio balls
- Beads
- Cubes
- Cintered glass spheres
- Ceramic noodles (tubes)
- Volcanic rock

### **Chemical Medium**

Chemical filtration systems work by removing dissolved compounds that you want to eliminate from the fish tank. The media used for chemical filters help remove specific compounds, although there are some forms of



media that cover several aspects of the cleaning process. The most popular mediums are activated carbon and zeolite

Typical chemical medium helps with:

- Ammonia
- Colors
- Nitrite
- Odor
- Phosphates and Nitrates
- Heavy metals

### **Mechanical Medium**

For a mechanical filtration system, free-floating waste material is removed from the aquarium's water. Some of the most common types of media include:

- Floss
- Pads
- Sheets
- Sponges

### ***CHOOSING THE BEST FILTRATION SYSTEM***

If you plan to use just a mechanical filtration system, what happens is that large particulate matter becomes trapped in the filter medium. However, you will experience minimal biological filtration from the nitrifying bacteria in the medium. In addition, dissolved organic carbon, including that from plant degradation and fish waste will not be removed from the water. The result is toxic buildup.

When you have a limited amount of biological filtration, fish load is affected thus also affecting fish growth, water temperature and feeding rate. What happens is that the bacterium has no surface on which to cling with the exception of the mechanical filter medium. Keep in mind that adding activated carbon for a chemical filtration system does nothing for the ineffectiveness and unreliability of removing nitrogenous waste.

When setting up the under-gravel filtration system, you have virtually no chemical filter to help with the dissolved organ compounds. Without having an efficient mechanical filter, the nitrification bed becomes clogged up with all kinds of particulate matter. With this, nitrification is reduced, meaning the life of the tank declines. On the other hand, by using a filtration system involves all three systems (biological, chemical, and mechanical), you will own a very healthy aquarium that is easier to maintain.



The bottom line is that no filtration system is capable or designed to keep the water perfectly clean and healthy. What happens is that eventually, the quality of the water will start to deteriorate. However, by using a combination of all three, filtration types along with a 20% water change is the key to optimal water quality.

## **HEATING**



Keeping the fish aquarium at the right temperature is an essential element. Fish rely on external resources to regulate body temperature so maintaining proper tank temperature is crucial to their survival. In fact, even small changes in water temperature can have an affect on the fish.

To ensure water temperature remains constant, heaters are used. With this, the fish can maintain proper metabolism, remaining healthy, happy, and strong. You will need to determine the ideal temperature based on the type of fish chosen. I recommend you maintain the tank temperature somewhere around 79 degrees Fahrenheit.

While you could choose only cold water fish such as Goldfish or Koi, you will enjoy the variety of fish more by simply choosing a heater to help regulate the water temperature. Fish, unlike warm-blooded humans, take on the temperature of the surrounding water. In the wild, fish cannot simply maintain a constant body temperature at a desired fixed level.

When choosing the best heater, you will find the hang-on style or submersible type. The type that is hung onto the tank is your basic type. With this type of heater not being underneath the water, it is not as efficient as a submersible kind. However, hang-on heaters are also more cost effective but with fewer operating controls and not as much precision.

The submersible type of heater is attached to the inside of the fish tank, most often using suction cups that apply to the glass. Since this heater is completely under the water, it provides a more consistent water temperature, making it a more efficient choice. If you have an extra large aquarium, you will likely need two or more heaters to keep the water temperature where it should be.

### **Heater Wattage**

When choosing a heater, you should buy five watts of power for every one gallon of water. Therefore, if you have a 20-gallon fish aquarium, you want 100 watts of heat. I do recommend that you go over the recommended wattage rather than under since heaters have built in thermostats which simply turn off the heat when the desired temperature has been reached. However if your wattage is not strong enough, your



heater will be working all the time to reach optimum temperature. This can dramatically increase your electricity consumption.

Since different fish species like different temperatures, the best option is to choose those that prefer the same water temperature. Although not everyone agrees, the best water temperature for the average marine fish tank is between 75 and 77 degrees, with freshwater tanks are best between 79 and 83.

The following table is a great guideline to keep handy when getting ready to buy the heater. The equation used for determining the right heater is as follows:

- Subtract the room's average temperature from the temperature you want to maintain for the aquarium water. Next, using the table below, locate the gallons of your fish tank. Move to the column that represents the number of degrees the aquarium needs to be increased in heat.

Sometimes, you will need to move up more than one column. For large tanks or if the room temperature is dramatically below the water temperature needed, you may need to consider using two heaters.

<b>Heater Guide</b>			
<b>Gallons</b>	<b>9 Degrees F</b>	<b>18 Degrees F</b>	<b>27 Degrees F</b>
5 gallons	25 watt	50 watt	75 watt
10 gallons	50 watt	75 watt	75 watt
20 gallons	50 watt	75 watt	150 watt
25 gallons	75 watt	100 watt	200 watt
40 gallons	100 watt	150 watt	300 watt
50 gallons	150 watt	200 watt	Two, 200 watt
65 gallons	200 watt	250 watt	Two, 250 watt
75 gallons	250 watt	300 watt	Two, 300 watt

### **Heater Placement**

Although different types of heaters are designed for various locations on the fish aquarium, most use suction cups to cling to the back of the tank. Just be sure you place the heater in a place where there is good water movement.





The goal when placing two heaters in the fish tank is to place them at opposite ends of the tank, each using half the wattage. For example, you would have a heater on each end, one at 50% desired wattage and the other heater at 50% wattage.

Therefore, for a 20-gallon fish tank, you would have one heater running at 50 watts and the other heater running at 50 watts for the total 100 watts, the desired wattage for this size of tank. You will also find that heaters come in various tube lengths, which are designed to accommodate different height tanks.

Remember, heat rises so you want to choose the appropriate length so the water is heated evenly and consistently. Most heaters can be set to the desired temperature but because heat is so crucial, you also want to invest in a thermometer.

### **Buying a Heater**

You can purchase a fish aquarium heater from any pet store or pet supply store. In addition, many online websites offer great prices and a wide array of choices. You will even find great savings through online auctions such as eBay ([www.ebay.com](http://www.ebay.com)) or warehouses such as Overstock ([www.overstock.com](http://www.overstock.com)).

### **Thermometer**

Thermometers are not expensive and can be purchased at any pet store or pet supply store. The most convenient option is one that attaches to the side of the fish aquarium with the use of suction cups. Obviously, without a thermometer, you would only be guessing about water temperature, which is dangerous.



Knowing the accurate temperature of the water is essential to the health and happiness of your fish. Therefore, simply choose the thermometer that matches your personal preference. The most popular choices include those listed below:

- Stick-On Digital Thermometers – These thermometers attach to the outside of the fish tank via suction cup. Because they are inexpensive and easy to use, they are popular. Being able to see the water temperature from a glance is a huge benefit. Bear in mind these thermometers also measure a certain amount of room temperature, so they are not 100% accurate. They are best used in conjunction with a thermometer placed inside the tank.



- **Stick-On Mercury Thermometers** - These are made from glass and are cheap and accurate. They simply attach to the outside of the tank via a suction cup as the digital thermometers above.
- **Floating Thermometers** – These thermometers can also be attached to the tank but this time, on the inside. However, the floating thermometer can also be placed in the water and allowed to float. Made from plastic, these thermometers are affordable but somewhat hard to read.
- **Stainless Steel** – The stainless steel thermometer is hung from the outside of the aquarium using a special mount. Having a bubble design, the thermometers are easy to read, durable, and can be seen easily.
- **Standing Thermometers** – With this, the thermometer is weighted so it stays on the bottom of the fish tank. The only drawback is that when used in aquariums with fish that like to swim a lot, this type of thermometer is hard to read.
- **Hydrometers** – Also known as, floating thermometers, these dual-purpose units literally float on the water's surface. The benefit to this type of thermometer is that in addition to water temperature, you can also check the salinity level.
- **Multifunctional Remote Digital Sensor Thermometer** – This unit is the most expensive but also the most functional. This unit is convenient and is hung on a mount on the inside of the tank. Depending on the model you buy, some will actually provide you with an alarm when water temperature is too high or too low.

### **Chiller**

If you happen to get the water temperature in your fish tank too high, you can use a chiller to reduce it, also called a cooler. Another option is to remove the ballast and use a hood fan. Many times, people will use a chiller during the hot summer months. Unfortunately, chillers are fairly, expensive but they are also beneficial.

For starters, running a chiller for your fish aquarium means you do not have to keep your air conditioning set so low, thus saving you money. If you work outside the home all day, a chiller would be an ideal solution. In addition, chillers are very low maintenance and they last for years. Best of all, you do not have to do anything with them, meaning no clean and no part replacement.



## **LIGHTING**



When setting up your aquarium, your goal is to create an environment for your fish that is safe and comfortable. In addition to keeping lighting for the fish, if you maintain plants, lighting becomes even more crucial. Interestingly, both look for lighting that looks like natural daylight. I would like to briefly talk about the importance of lighting specific to plants.

### **Light and Plants**

Obviously, plants need light for energy and growth. Typically, aquarium plants are tropical, meaning they need directly sunlight. In tropical countries, summertime sun is bright and hot.

### **Exposure**

In tropical climates, light would be exposed anywhere from 12 to 14 hours per day, throughout the year. In a fish tank, the plants would need the same amount of light, just as they would get if in their tropical land. For this reason, you would need to have your fish tank light system on a timer or remember to turn the lights on and off.

### **Intensity**

In addition to the number of hours needed for lighting, the other factor to consider is the intensity of the light. Most tropical plant species love light but some do prefer shade. Therefore, I recommend you use fluorescent lighting with a daytime spectrum.

If you have a fish species that likes more light intensity, you could go with an energy efficient lamp. Another thing to consider is that spiraled fluorescent lights are much brighter than the straight kind. Also, Lumilux lights have 30% more luminosity than other brands – this is something to keep in mind.

Keep in mind that the deeper the light penetrates the water the more it becomes diminished. In other words, the surface of the fish tank will get a lot of light whereas the middle and deeper areas of the tank will get less. In addition, if the water in your fish aquarium is a brownish color, more light will be absorbed, meaning less light reaches the plants.



## **Incandescent Lighting**

If you have a fish tank with an incandescent light in the hood, you probably already know how much heat these put out, which can be a serious problem for the fish. Rather than having to buy an entirely new hood, you can now purchase a compact fluorescent bulb that fits in an incandescent socket. Just remember that one bulb is approximately 50 watts so all you need is one bulb, even if you have an incandescent dual socket.

## **Wattage**

The standard rule for lighting wattage is to choose between 70 and 1,000 watts. The appropriate wattage for your fish aquarium depends on the size of the tank, species of fish, and other factors. The following information will help you in the decision making process.

- Metal Halide – These lights outperform other types of fish tank lights. For one thing, environmental conditions within the tank can be regulated better, making it easier on the fish and the plants. The phosphorus-coated light leans toward the red end of the spectrum, which is a good, all-purpose growing light. However, the clear light leans more toward the blue end of the spectrum. These lights are mainly used in marine aquariums, specifically reef tanks which require strong lighting for corals.
- Ballasts – Certain types of lamps need ballasts, which contain a transformer and capacitor that helps regulate lamp voltage. Typically, HID bulbs come in 250, 400, or 1,000-watt options. The important thing about ballasts is that using the wrong one will burn out the lamp and create an unhealthy environment.
- Fluorescent Lighting – The blue is best with a 10k or 6500 k metal halide lamp, sun is perfect for a full spectrum use for growth; aqua blue is perfect as a standalone light, and actinic blue spikes at 420 nanometers for the ultimate in fluorescent capability.
- Deluxe Fluorescent – Known as URI lamps, these use IceCap VHO ballasts for the best performance. Actinic white is good for a soft, coral tank, super actinic R is a color enhancement for freshwater and saltwater tanks, and Aquasun is for stony, hard coral tanks.

As a good rule of thumb, use one to two watts of lighting per gallon for fish only tanks. Then for freshwater tanks with fish and plants, use two to five watts per gallon. Finally, for reef aquariums, you want four to eight watts per gallon.



## OXYGEN



As mentioned earlier, oxygen in a fish aquarium is crucial to the health and wellness of the residents. While fish have an unlimited supply of oxygen in the wild, when in captivity, they live in a closed system with limited amount of water and oxygen.

What happens is that any decaying plant matter or fish waste will pollute the water, which can become toxic ammonia that kills. Just like humans, fish have to have oxygen to breathe. Having said that, a huge difference between the ways in which oxygen is used between the two exists. For instance, fish do not decompose water into hydrogen and oxygen.

Instead, oxygen taken up by fish is actually oxygen gas that has dissolved in the water. For this reason, many fish keepers will boil tap water before adding it to the aquarium to cause discharge of any dissolved chlorine that might be present. By percent, there is more oxygen in the air than what can be dissolved in water. With this, you would think that fish could survive out of water, however because of the thin membranes of the gills (allowing oxygen-bearing water to move between the layers and enable oxygen to diffuse in the bloodstream) they cannot.

The amount of oxygen that can be dissolved in the water depends largely on water temperature and salinity levels and surface area. Keep in mind that oxygen levels will vary during the day, typically being higher during the day and lower at night. In most cases, a fish aquarium will have sufficient oxygen to support the fish but just as you check other levels in the water, this too would be monitored.

Oxygen levels in the water also have to do with water quality. For instance, there is what is known as Redox potential, which is a reference between oxygen and waste particles. The bottom line is that the more wastes the less the Redox potential because of lesser oxygen. Redox is measured in mV, with a normal range being 150 to 250.

Additionally, Redox is related to biological oxygen demand known as BOD, which is the measurement of how much oxygen is needed to break down created waste. The higher the BOD value the poorer the water quality. For a fish tank, the acceptable BOD value would be 1 to 2mg/liter or ppm.



## Air Pumps

The way oxygenation is created in a fish aquarium is with surface disturbance in the form of bubbles. The best and most convenient way to accomplish this is by using an air pump or stones.



However, you would not need an air pump if your filtration system runs on one of if you have an action ornament or decoration in the aquarium to create bubbles. If you need oxygenation, then an air pump or an will do the trick.

In addition, air pumps help stabilize pH while also providing oxygen for the fish. With the air bubbles, your tank will be more visually pleasing and some fish actually enjoy playing in and around the bubbles. In addition to oxygenation, air pumps have other benefits such as:

- Certain types of fish (including Mudskippers, Crabs, and Newts) need fresh air circulation to keep them from escaping the tank
- By having the creation of a current in the water, oxygen is diffused more evenly

The air pump will help power air stones, which are porous stones attached with tubing, used for supplying supplement aeration and circulation, as well as to promote gas exchange. Some types of filters including the under-gravel filter are also powered by air pumps.

Just remember when you get ready to buy an air pump or air stone that it would be worth your money to pay a little more for a quality unit. Otherwise, you will have a noisy unit that is annoying. When choosing, you have two primary options:

- The most basic design is a vibrator/diaphragm pump that is widely available and affordable. These pumps have single or multiple ports for connecting air tubing. In addition, some pumps have a controller to help regulate the amount of airflow from the pump.
- The other type is a piston/rotary vane pump, which is more complex. These air pumps are typically more expensive than the other type but quieter and used for larger aquariums.

In most cases, air pumps have ports for standard size tubing that can then be connected to air stones. When it comes time to choose an air pump, there are no hard, fast rules. However, some air pumps will be rated specific to a tank size.





If the air pump will be used to run an under-gravel filter and your fish aquarium is not too large or small, then you would want to choose the appropriate size. On the other hand, if the air pump is being used for any other purpose or the tank is large or small, ratings for an air pump are not important.

To help with the process of buying the right air pump for your fish aquarium, use the following guidelines:

- The more decorations and other equipment being run in the aquarium the larger the air pump needed, whereas less equipment allows you to get by with a smaller size pump
- If your fish aquarium is larger than 18 to 20 inches tall, be sure to purchase a deepwater air pump
- The more resistant things to air you have, the larger the air pump needed

The bottom line is that you want a pump that is slightly larger than the suggested size for your aquarium to allow a healthy surplus of air. The air pump allows better water circulation than what the filter alone can produce. While the pump itself does not increase the amount of oxygen, it does mean you can increase the number of fish being kept.

### **Check Valves**

In addition to the air pump, a check valve needs to be placed in line in the air tubing that goes between the air stone and the pump to help prevent back siphoning of the water from the tank water to the pump should there be a loss of power. A check valve is an important safety measure that every tank should have.



## TANK



In this section, I want to talk about the fish tank. As you have already learned, good filtration, water changes, cycling, testing for ammonia, nitrate, and nitrite, and choosing the right type of fish are all a part of being successful with fish keeping. I now would like to talk specifically about the fish tank, the very home where your fish will live.

As you begin your search for the right fish tank, you will quickly find so many incredible choices but regardless of the style or size you choose, there are specific things you need to make sure your tank has, which includes the following:

### Watertight

Most importantly, make sure the aquarium is watertight, especially if you have purchased a used tank. If the tank is not watertight, you will experience quick degradation of the environment, creating a real problem for the fish. With water leakage, the fish lose environment in which to swim. However, you will also have a problem with less dissolved oxygen and more waste concentration, not to mention a big mess on your carpet! This is why it is always important to try and let your fish tank stand for a couple of days before you add fish, to make sure there are no leakages or problems with your equipment.

### Non-Toxic

The material of which your fish aquarium is made should be non-toxic. If you have chosen something toxic, the chemicals will be released in the water, causing the fish to become ill and possibly die. Additionally, if your tank is second hand, you will want to give it a thorough cleaning using a mixture of dissolved rock salt and hot water, rinsing thoroughly to try and clean any previous toxins that may have been present.

### Sturdy

One of the most important considerations is choosing a fish aquarium that is sturdy and strong. Obviously, the fish tank will undergo a tremendous amount of pressure once it is filled with water. To ensure the tank will hold the water, the gravel, the filtration system, and fish, and so on, it must be strong enough to cope with this weight. Check for bracing – any tank over 3 feet long should have brace bars running through the middle and around the sides to prevent it from ‘bowing’. Any tank larger than 4 feet long should be made from 10mm thick glass rather than the standard 6mm.



## Aesthetics

Although not mandatory, you should also think about the aesthetics of the aquarium. After all, this fish tank will become a part of your home so you want it to look nice.

## Acrylic

When it comes to fish tanks, you have two primary choices of material, which includes acrylic and glass. Acrylic fish aquariums can be advantageous in that if you ever need to modify the hood, lighting, or other aspects of the design, you can drill them whereas with glass, you cannot drill.

With acrylic, you will have a lighter tank that is much easier to handle and move. Additionally, an acrylic aquarium is actually stronger than glass while providing better visual ability. While there are many benefits of acrylic over glass, some disadvantages also exist. For instance, acrylic tends to scratch easier, is more challenging to repair, and the cost is greater.



## Glass

When choosing a standard size tank such as a 10 or 20-gallon, 99% of people go with glass but the choice is yours to make. Just as an acrylic fish tank has benefits, so does glass.



For example, a glass aquarium does not cost as much as acrylic, it is scratch resistant, the glass will not yellow over time (a common problem with acrylic) and glass tanks do not require as much of a brace support as acrylic. Additionally, glass aquariums, especially the larger ones, do not need as much support as an acrylic tank.

Just as there are many wonderful benefits to choosing glass over acrylic, remember glass is not perfect. Glass is much heavier, glass provides less insulation, glass is not available in cool shapes, and styles, most pet stores will not ship glass tanks (primarily the larger ones) because of the weight and cost of shipping. Then, glass needs to have the seams sealed with silicone as a normal part of maintenance.

You will need to weigh the pros and cons, choosing the type of fish tank that is the better choice for you. The exciting aspect of choosing a fish tank is the more than 4,000 tropical fish species from which to choose.



This section will guide you through the process of choosing the best tank and stand. First, consider the following:

- Are you interested in keeping specific types of fish that would warrant a certain type of size of fish tank?
- Do you want the fish aquarium to blend in with other pieces of furniture in the home?
- How much space do you have to dedicate to the fish tank?
- What price range do you want to stay in?
- Is there a specific shape that you find attractive?

In most cases, you should try to purchase the largest fish aquarium possible based on the information above. However, when going with a larger tank, you need to know certain things, such as, larger tanks:

- Cost more to set up
- More difficult to move or transport
- Weigh much more than a smaller tank does

## **STAND**



While you can always place a smaller aquarium on a countertop, bookcase, desk, or some other type of furniture, I strongly encourage you to purchase a tank stand, especially for the larger tanks. With this, you have a number of great choices. For instance, you could choose an ornate stand made from wrought iron or an actual aquarium cabinet, which can be a little on the pricy side but they look great and usually offer storage.

An important thing to consider when choosing the stand or cabinet is that you want something such as polystyrene or foam matting placed in between the tank and the stand surface to ensure the tank does not slide. This will also provide an even surface and distribute your tank's weight evenly. The key is to shop around since prices will vary dramatically. You should even consider thrift stores, garage sales, auctions, and online auctions when trying to save money.



Remember, the fish stand should complement the appearance of the room, not stick out. In addition, you want the stand to be the right height, making tank maintenance more convenient and to make viewing easier. The benefit of a cabinet is that you can store food, medicine, filter medium, and other supplies needed, out of sight. However, other important considerations include:



- Remember that water weighs about 10 pounds per gallon. Therefore, a 10-gallon fish aquarium would weigh a minimum of 100 pounds (more because of decorations, gravel, fish, filter, etc). Because of this, the fish stand must be strong and sturdy.
- Make sure the stand has a place in the home that is also stable. In other words, you will need a location for the size and shape of the stand where the flooring underneath is strong, sturdy and level.
- The stand should have a completely, flat surface. Even with the slightest stress, a glass, fish tank can crack. Therefore, you want to make sure the tank is level and placed on a solid stand so it will not experience any stress.

### ***BRACING***

If you have an old aquarium tucked away in the closet or have found one at an auction, you want to make sure it has a center brace, if possible. Unfortunately, most do not have this which means a full hood cannot be used. Typically, glass canopies and hoods are made for frames that have a center brace. If your tank does not have this, you could visit your local home improvement store to see if they can cut the glass for you.

### ***WATER VOLUME***

Determining water volume will depend on the size and shape of your aquarium. To ensure the aquarium is treated with the proper dosage of medication and fish stocking levels, you need to know the water volume. As you will see from the calculations below, water volume is based on a tank without plants, gravel, substrate, and so on, just one filled with water. For these things, you would allow a 10% to 15% allowance.

#### **Calculations**

When calculating water volume, you will need to use the inside dimensions of the aquarium in inches. Then, follow these steps:

- Write down the length of the tank
- Write down the width of the tank
- Write down the height of the tank



To determine the amount of water your tank will hold, take your three measurements, multiplying them. In other words, if the length were 12, the width 10, and the height 12, you would take  $12 \times 10 \times 12$ . Your fish tank would be 1,440 cubic inches. Now, multiply that number by 0.00433, which means the tank, would be 6.2 gallons.

## HOOD



The hood is what houses the lights and reflectors. Remember that your aquarium should always be covered to help reduce evaporation and keep fish from accidentally jumping out. Typically, hoods are designed of stainless steel or plastic and come ready to fit incandescent or florescent lights.

Just as with aquarium stands, hoods can be simplistic or fancy. However, you have some considerations here too, which include:

- **Sturdiness** – Remember that water is heavy so you want a hood that will accommodate the size tank you have
- **Water Durability** – Because the hood will be over the tank of water, it must be water resistant and water durable
- **Storage** – Depending on the type of hood you buy, some actually have small compartments designed for storage of small supplies such as food and medicine
- Although you can choose incandescent lighting, I strongly urge you to go with fluorescent lighting, which will produce less heat, cost less to operate, and be a better choice for both the fish and plants.
- Do not use grow lights as your tank hood. The problem here is that a grow light will actually encourage algae, something you do not want.
- Know the difference between a hood and canopy. A hood has the light already built in whereas a canopy is two strips of glass that are connected with a plastic hinge, separate from the lighting unit.
- Use the light of your hood a minimum of 12 hours daily
- If you are unsure whether the lighting in the tank hood is adequate, watch the plants. If they grow and look strong, the hood, and light are probably fine but if the plants grow excessively, then you have too much light.





## **SAFETY TIPS**

Remember that you are always working with water and electricity, a deadly combination. Please pay heed to the following precautions:

- Keep the aquarium on a level, nonskid surface that will support its weight, keeping it level so water does not splash or drip
- Never plug the aquarium into the electrical outlet prior to filling it with water
- To avoid tripping or falls, do not use extension cords that run from one side of the room to the fish tank, lying directly in traffic area
- Before plugging the aquarium items into the outlet, make sure they are all dry, wiping plugs off with a dry cloth if necessary. In addition, make sure electrical wires, light bulb sockets, and other functional motor parts are completely dry prior to plugging them in.
- If your hands or clothing should be damp or wet, do not handle any of the electrical devices. Instead, dry your hands and change your clothes.
- Prior to performing any type of maintenance on your fish aquarium, always unplug any electrical equipment from the wall outlet
- If the aquarium should drip or splash onto an electrical cord already plugged in, DO NOT unplug it's electrical components. Instead, flip the breaker to that outlet from the breaker box.
- Make sure you use a surge protector for all of the plug-in items and that the electrical outlet you choose can accommodate more than one electrical item.
- If you notice your fish tank leaking or dripping, flip the breaker and then unplug the electrical items from the outlet
- If any of the cords for your light, heater, pump, etc are frayed, cracked, or damaged in any way, do not use them
- Do not attempt to handle the light bulb or socket, decorations, or other electrical devices when the fish aquarium is in operation and being powered by electricity
- If you have smaller children in the home, take time to teach them about the safety of electricity



## DECORATING YOUR AQUARIUM



Although some people do not decorate an aquarium, this is actually important for both you and your fish. For you, the fish tank will be more visually pleasing, providing you something you can sit back and enjoy. With this, you find that you allow the mind to wander, escaping from the stresses of the day. With color of gravel, plants, backgrounds, and animations, you will find the tank exciting and fun.

For the fish, the decorations will add places to hide and play, which ultimately makes it fun for you. Most fish are more comfortable and happy when they can get out of the limelight from time to time so they need caves, logs, decorations, plants, and other places to hide. Therefore, while you set the aquarium up, do not overlook the importance of adding decorations.

You will find this creates a more natural environment for the fish, making them happier and healthier. If you look at how fish live in the wild, they have rocks, plants, reefs, and other things that provide them with safety from predators. Even though your fish will hopefully not have to worry about being prey in an aquarium, they still want what comes naturally – protection.

In fact, offering your fish decorations to create a natural environment will make them behave as they would in the wild. That means the fish will be more active and less stressed. In addition, providing fish with a natural environment will make their color more vibrant. Therefore, add some decorations to your tank and watch what happens. Keep in mind that if you have any nocturnal fish, those that sleep during the day and play at night, decorations will not change this behavior.

### ***CHOOSING DECORATIONS***

The goal with choosing decorations for your aquarium is to go with what you like and what most closely matches your fish's natural environment. For instance, if you have the aquarium in a study with rich, warm colors and furnishings, then you would probably not want a background of pirates or cartoon characters.



Apart from water quality, the main factor keeping your fish happy is their environment. Remember a happy fish means a healthy fish. Fish, unlike other pets owners keep, cannot wag their tails and purr to show that they're happy. The best owners can do for them is to keep them in an environment that most closely resembles their natural habitat. I will explain more about this in my bonus books.



## **Soft versus Hard**

As mentioned, it is important that you consider the type of fish. For instance, some species of fish do prefer certain types of coverage. If you have slow-moving fish, then you would want to offer soft plants or soft things for cover. However, faster moving fish generally like hard cover, which would be found in things such as logs, rocks, and hard decorations.

You can typically add both soft and hard decorations to your aquarium and cover the entire population. Bear in mind that you don't want to use any decorations with sharp edges that may harm fish, so make sure any rocks and other ornaments have rounded edges.

## **Stones**

Having shown the importance of choosing the right type of decorations, you also want to be aware of some potential problems. First, make sure you never add any type of toxic decoration to the tank. For instance, some minerals are water-soluble. While these stones are not necessarily toxic, when they dissolve in water, they could release a toxic substance.

Another possibility would be the stone reducing the water's ability of carrying oxygen, which is needed for the fish to breathe. Therefore, you will need to understand which stones you can and cannot use. Another problem with stones is that if the stone is soft, the fish could gnaw on it or rub up against it, causing either internal or external damage. A good test is to check if there are any yellow, gold or white lines running through the stones - if so, don't use them. If you are still unsure about the suitability of your stones, pour vinegar on them. If they fizz, they will be unsuitable for your aquarium. Buying stones from your pet store is always the best option as they will stock the safest ones for aquarium fish.

## **Ceramics**

You will find a number of ceramic decorations for sale but with this, you want to avoid those with glazes of yellow, red, or blue. The reason is that these dyes could contain harmful and soluble lead. If the fish were to nibble on the decoration, it could die. Again, speak to your local pet store about what they recommend to be safe.

## **Rubber or Plastic**

Never put any type of rubber or plastic in the aquarium unless it is made specifically for tank use. In other words, plastic plants designed for fish



tanks may not be the same as plastic plants sold at hobby stores, which could contain preservatives or solvents that are harmful.

### **Coral, Shells, and Limestone**

Unless you have a tank of lake cichlids or marine fish, you should avoid using coral, seashells, and limestone, which will dissolve over time in the tank, thereby increasing the pH level of the water.

### ***GRAVEL***

Another important aspect of decorating your fish tank is the gravel, which comes in a wide selection of colors and sizes. The information below will help you choose the best gravel for your aquarium.



#### **Cultured**

Cultured gravel is the standard option for fish tanks. This type of gravel has a layer of beneficial bacteria that grows on the surface of each piece. Cultured gravel is sold in most pet stores or pet supply stores for a reasonable price. Remember, bagged and new gravel is not cultured gravel. Some pet stores will actually have an aquarium set up so they simply scoop up some of the gravel that has had time to cultivate to sell.

Cultured gravel will help your aquarium 'cycle' faster since it already contains the good bacteria to breakdown your fishes waste. However, you should still follow the previous steps mentioned for 'cycling' your aquarium.

#### **Safety**

Unfortunately, not all gravel is considered safe for a fish tank. In fact, some gravel contains toxic material that could stress or kill the fish. For this reason, you should always buy your gravel from an actual pet store or pet supply store that sells gravel labeled for aquarium use only. Another great option is to mix regular aquarium gravel with cultured gravel.

#### **Cleaning**

If you use one-quarter inch of cultured gravel, all you need to do is stir the gravel up and then vacuum the particles out while letting the remaining particles be cleaned by the filter. If you use more than one-quarter inch, never stir the gravel up. Instead, use a gravel vacuum to siphon out excessive waste and other particles.



## **Types of Gravels**

There are many different types and grades of gravel to choose from. The two most popular being firstly, a lighter colored stone commonly called 'Fruit Salad' and secondly a simple mix of greyer stones. A lightly colored stone usually contains some type of mineral deposit and can sometimes raise the tank pH slightly. This usually happens slowly and is not much of a cause for concern unless your fish prefer a low pH. If this is the case greyer gravel would be more appropriate being inert and therefore unable to change the pH of your tank's water.

If your gravel is too fine, it may not let water pass through it. This in turn can cause a toxic buildup of anaerobic (non oxygen breathing) bacteria beneath it. If your gravel is too chunky it may trap waste and make it harder to siphon from your tank. A rounded gravel size of approximately ¼ inch is therefore recommended for most aquariums.

## ***DRIFTWOOD***



Driftwood is a lovely looking, natural decoration to add to your aquarium. Many fish come from places in the world where large amounts of waterlogged wood are present. Driftwood offers places for your fish to hide, a place for some plants to root and can even be a part of their natural diet! If you want to use driftwood in your aquarium you will need to 'cure' it to make it safe.

## **Curing**

Prior to placing it in the water you will need to go through some preparation steps. For starters, determine where in the tank you will place the driftwood. Then, use a clean medium-bristled brush to scrub the piece of driftwood, removing any debris or dirt, using only tap water, no chemicals, or soaps. Next, place the driftwood in a bucket or sink of water, allowing it to saturate and cure. Once the driftwood is clean and saturated, it will sink in the bottom of the fish tank. Typically, this process takes anywhere from one to two weeks so you will need to be patient. Without saturating the driftwood, you will likely have a problem with it floating.

During the curing process if you have trouble with the driftwood trying to surface, simply place a rock on top to keep it weighted down. As the driftwood becomes waterlogged, it will be ready for use in your fish tank. The curing process helps the excess tannins darken so they do not discolor the water and cause harm to your fish. Some driftwood purchased from pet stores may be special, imported hardwood and may sink straight away. It is wise however, to follow the following steps to



avoid discoloration of your aquarium water due to tannins leaching out (a brown substance derived from plant material – much like tea).

While curing, you may need to change the water several times, as the tannins are drawn out. When you empty the bucket or sin, simply rinse the piece of driftwood, refill the water, and soak it again. Eventually, the water will stop turning brown, which is when you will know the driftwood is done.

### **Boiling**

Next, you want to boil the driftwood to encourage even more of the tannins to be removed. In addition, boiling the driftwood will help kill any algal or fungal spores that could take hold when in the tank. In most cases, boiling the driftwood for two hours will suffice to sterilize it. When finished, the wood is ready to place in the aquarium for the fish to enjoy.

### **Safety**

As with anything you place in your aquarium, you must be careful not to use anything toxic to your fish. Driftwood is no exception – certain types of wood may be poisonous and kill your fish. Never use driftwood collected from a beach or any wood where sap is present. As usual, the safest option is to purchase driftwood from a pet store.

## **LIVE PLANTS**



Plants are always a great decoration for fish aquariums. In addition to looking great, plants are a necessity providing fish a place to hide. As mentioned earlier, you can go with artificial plants but in addition to not looking as nice as real plants, you need to make sure you choose artificial plants made specifically for fish aquariums.

Most live plants are easy to take care of and you have a huge selection of colors and types. You will also find that live plants help improve the water chemistry, working to absorb carbon dioxide and nitrates. The only thing to remember is that keeping live plants in your tank means providing them with proper lighting and that some fish such as Cichlids like to eat them.

Another benefit to life plants is that they make a great place for fish to spawn. When the fry are hatched, they can use the live plants to hide in for survival from other fish. By adding live plants to your fish tank, you are actually converting it into your own, miniature ecosystem. Just remember, plants need three things to survive – food, light, and carbon dioxide.





## **Plant Options**

The following are some of the live plants you might consider adding to your fish aquarium:

- Anubias – These plants are slow growing but very tolerant. In fact, most fish keepers will agree that Anubias are nearly indestructible. Strong with thick leaves, the only real downfall to Anubias is that on occasion, they can have too much algae. As this plant has a rhizome root system and does best tied on to driftwood or rocks with a piece of cotton rather than planted in groves.
- Banana Plant – This plant looks like a bunch of bananas. The plant is a tuber with few leaves - great for goldfish tanks.
- Borneo Sword – One of many plants in the sword family, this popular plant with large, broad leaves is perfect for larger tanks, or as a centerpiece in a smaller tank.
- Cabomba – A very popular choice in many aquariums, this plant is tall with very fine, fern-like leaves and makes a great hiding place for fish. The plant itself prefers stronger light.
- Crypts – The great thing about these plants is that they live well in low light situations. As a slow growing plant, Crypts are extremely healthy and resistant to problems. They usually grow to a medium height.
- Hairgrass – This smaller plant looks like hair and grows on the bottom of the tank.
- Hornwort – This is also a common plant, growing extremely well in most situations. Hornwort likes to float, so you will need to anchor it to the bottom of the tank. As a slow-growing plant, Hornwort does best with a lot of light and carbon dioxide.
- Hygrophilas – These plants have large leaves. The plant is beautiful but sometimes, the leaves fall off. This is a fairly undemanding plant.
- Indian Fern – This fern can grow large, covering the entire surface of the water. Typically, you will see baby ferns that grow off the leaves of the larger fern.
- Java Moss – This particular plant grows in clumps at the bottom of the aquarium. A few things to keep in mind when choosing Java Moss is that it can grow a little out of control and some fish like to eat it.



However, this plant makes an excellent choice for small egg-laying fish.

- Java Fern – The great thing about this type of plant is that it can grow well with low light levels and few fish eat it. This plant produces spores, often growing small, baby plants on the leaf. Java Fern is also a slow-growing plant with large leaves. It does best attached to driftwood or rocks.
- Rotala Indica – This fast growing plant is great for aquariums. This plant has small leaves with a beautiful, pink tint. The plant will grow to the surface of the tank, and then spread out horizontally.
- Valisneria – This light green plant is great for providing fish with a hiding place. Valisneria grows horizontally, and quite fast.

### **Plant Options**

Just like plants in your garden, aquatic plants need nutrients to keep them healthy and to promote growth. While some plants are very hardy and grow like weeds, others may need a little help. Generally in a new tank, nutrients essential to a plant's growth are in short supply. This situation is easily remedied by using a liquid fertilizer. Most fertilizers should be added once a week to your tank. Plants with very fine, small leaves absorb nutrients such as iron from the water making a liquid fertilizer ideal. Plants with large broad leaves, generally receive most of their nutrients from the gravel they are planted in. You can buy 'root tabs' blocks of fertilizer that should be placed in the gravel around the roots of these types of plants.

Carbon dioxide is also essential for healthy plant growth. While certain levels of CO<sub>2</sub> will be present in your aquarium, for best results with plants, you may want to add a CO<sub>2</sub> diffuser. There are many different styles around, with quite a few cost effective options available nowadays. If you want the absolute best from your plants, a CO<sub>2</sub> diffuser is essential. CO<sub>2</sub> diffusers may alter your water chemistry, so it is very important to test your kH, gH and pH on a regular basis.



## **ARTIFICIAL PLANTS**



I talked about the importance of live plants but if you want to avoid the added work (although minimal), you might consider using plastic plants or other decorations. Years ago, plastic plants were unattractive and bulky but over time, the development and design has changed.

Today, you will find plastic plants that look amazingly real. These plants are much more flexible, allowing them to sway naturally in the water. In fact, these newer type plants will build a natural patina of algae, which makes them look and behave even more like the real deal. With such a great selection of colors, types, and sizes, you will have unlimited possibilities.

### **Benefits of Artificial Plants**

Other benefits of using artificial plants are as follows:

- Immediate Visual Appeal – Artificial plants can be taken out of the package, placed in the tank, and immediately enhance the appearance of the aquarium.
- Little to No Maintenance – Unlike real plants, plastic plants require no specific level of lighting, no substrate, and no supplements.
- Cleaning – To clean plastic plants, all you do is remove them from the fish tank, wash off in clean water, and replace.
- Flexibility – With artificial plants, you can mix and match all you want and rearrange their placement in the tank at any time without worrying about damaging the plant.
- Resistant – Some fish will nibble on live plants, damaging or killing the plant. With artificial plants, the fish cannot do any serious damage.
- Consistent Water Chemistry – Live plants release oxygen or carbon dioxide in the water whereas artificial plants do not. Therefore, plastic plants do not promote the growth of algae.
- Fish Safety – Since plastic plants are not harvested in another body of water and then moved to your fish aquarium, no harmful parasites or pests are introduced to your healthy fish.
- Budget – While artificial plants may be a little more expensive initially, you will not have to replace them in the same you would live ones.



- Clear Water – Plastic plants do not go through natural biological changes or rot so they will not cause cloudy or smelly water.
- Convenience – The number one reason people use artificial plants is the sheer convenience.

## **BACKGROUND**



By using a nice background for your fish aquarium, you can completely change the way it looks. Although a background is not mandatory, they look nice and offer fish security. When choosing a background, the ultimate goal is to cover the back and both sides, keeping just the front glass open for viewing.

However, some people prefer to use a background on just the back glass, which is fine. To give you an idea the way in which a background can change your fish tank, consider the following ideas:

- Budget – When on a budget, you can take a normal black plastic trash bag. Then, measure the back and/or sides of the tank and cut the bag to fit.
- Moving Up – Another option would be to purchase designer-look contact paper. Again, cut to measure the back and/or sides.
- Get Creative – If you have a creative side, you could use regular cardboard or brown grocery bag. Using colored pencils, craft paints, or anything you like, make something unique and fun.
- Going High Tech – You can find some amazing backgrounds at pet stores and pet supply stores. Some of these are so realistic that even the fish will try to swim into the water oasis.

## **TUNNELS AND CAVES**

Fish love places to hide, as well as places where they can swim and play. You can purchase tunnels and caves that provide the ideal place for some fish species to get away from the rest of the fish.



Tunnels and caves are sold at pet stores but you can also use a number of items including flowerpots, coconuts, stacked driftwood, PVC – basically anything that can be stacked. Just remember to choose things that will not be harmful to the fish.



## **LIVE ROCK**

Although called “live rock”, the rock is not actually alive. However, because micro and macroscopic marine life live on and inside the rock, it got the name “live rock”. The rock is comprised of calcium carbonate skeletons of dead corals, as well as other calcareous organisms. When choosing a live rock, you will find a number of options.

### **Inshore Rock**

Inshore rock is a rock that came from the inside of a reef, which is typically denser, becoming covered with things such as clams, mussels, crabs, macro algae, shrimp, and other unwanted organisms.

### **Reef Rock**

Reef rock is a piece of coral rock or coral that comes from outside the reef, which has broken off, falling to the bottom. With that, the rock becomes covered with encrusted organisms including sponges and coralline algae. Reef rock is preferred over inshore rock.

### **Dead Rock**

Dead rock is rock that has no life growing on it. This particular type of rock is completely devoid of any external life.

When you add live rock into your fish aquarium, it will become established. After that, you can then add other types of live rock although this needs to be done slowly. The challenge comes in trying to find actual live rock since suppliers will use various verbiage. Therefore, when buying live rock, ask specifically what type of live rock you are buying.

By using live rock, this becomes the primary biological nitrification base or biological filter for a saltwater tank. What happens is that as soon as the live rock is introduced to the water, it immediately brings with it several forms of algae, bacteria, and small invertebrates that contribute to the overall quality of the water

Regardless of the type of live rock you end up settling on, remember that a biological filter base must cycle and settle for your fish aquarium to run as it should.



## **CORAL AND SUBSTRATE**



Substrate materials can be used primarily for decorative purposes, to help form part of the filtration or as a rooting medium that is needed for growing and maintaining plants. The most common types of substrate include sand and gravel.

### **Sand**

When buying sand, you will find that it comes in a number of colors and grades. Silver sand is fine, lime-free silica which will not alter your tank's pH. It can be found at most home improvement or gardening centers. This type of sand is pre-washed and graded for aquarium use. In addition, you will find fine grade sand that is also made specifically for fish tanks, which is generally cleaner than other types of sand.

If you plan to keep bottom feeders or delicate type fish, sand is the better choice. You will also discover that sand is easy to clean since unlike gravel, any excessive waste or debris will remain on top. Just remember, if you choose sand for your fish tank, never use an under-gravel filtration system, which will cause the filter to block.

### **Gravel**

Gravel is the most common substrate used in aquariums. This comes in many sizes, colors, and textures. You can also choose from natural gravel if you prefer. The smaller gravel, called "pea-sized", is the favorite since larger size gravel allows too much waste and other particles to fall deep, making it hard to clean.

If you will be using live plants in your fish aquarium, then I recommend you stick with the finer grade gravel and always choose lime-free. An important note – aquarium gravel is typically not lime-free so you will need to look specifically for this option.

Another type of gravel to consider is coral, which helps maintain pH and hardness if you have hard water. The only disadvantage in this case is that coral is generally jagged and sharp, meaning little fish could experience injury. Coral and coral sand are generally only used in marine aquariums.

### **Dolomite**

Another type of substrate is called dolomite, which is a great choice for freshwater tanks. For this, you want to make sure you ask for commercial dolomite. Typically, dolomite is white and looks just like small gravel. The





drawback is that it usually only comes in larger size bags and it costs more. However, it is a good option that fish enjoy.

## **PUTTING IT ALL TOGETHER**

The fun part of decorations is putting it all together to create the look you want. Typically, 50% to 75% coverage is perfect for most fish species. While that is quite a number of decorations for a fish tank, it is just a guideline, so you can of course adjust this as you see fit. However, you could easily use 50% and by arranging it properly, have a gorgeous tank.

When setting the decorations up, be sure to use things that actually provide coverage. For example, a rock would be fun for the fish while providing them with a natural environment, however it provides no coverage. In this case, you would need some plants or something else that would actually give the fish a place to hide. Other tips for organizing your decorations include:

- Place any larger decorations and plants toward the back and along the sides of the tank, with shorter decorations and plants in the front
- You can also use taller plants and decorations for hiding tubing, heaters, thermometer, and other things within the tank that you would like to hide
- To make the fish tank look natural, use fewer varieties and go with groupings of the same plant species, coupled with a few different groupings of different color and texture
- Small rocks and plants are perfect for hiding corners of waterwheels, volcanoes, castles, shoes, or any other decoration made from plastic, resin, or ceramic
- Add a background onto the outside, back of the fish tank, giving it the appearance of depth and interest. Backgrounds are also great distractions for pipes, tubes, filters, etc.
- While you can add a number of decorations and plants, I recommend you choose one or two primary decorations and then add other things for enhancement.
- You can also use live plants if you like but remember these will require care. With so many things sold today that look like the real thing, you can avoid the extra work by choosing high quality artificial plants instead.
- Ornaments are a great way to decorate a fish tank. These animations are fun while producing bubbles and places for the fish to play.



## ***TYPES OF FISH***

You also want to consider the types of fish you keep when choosing decorations for your fish aquarium. As an example, live plants in a tank of “Silver Dollars” or “African Cichlids” means you just provided them with a tasty snack. In addition, “Cichlids” tend to be somewhat aggressive so you want to offer great hiding places for a happier and less aggressive fish.



## SETTING UP YOUR AQUARIUM

After purchasing everything needed for your fish aquarium, now comes the time to set it all up. In this chapter, I wanted to provide you with some great information on setting up your fish aquarium so you will know what to buy, as well as the process for getting it done.



### **IMPORTANT STARTER TIPS**

Just a few tips to remember when getting started include:

- Always wash the gravel out under running tap water. This will help wash off any debris before placing it in the tank
- Any rocks or other decorations should also be rinsed off with clean tap water
- Even if the fish aquarium is new, wash it out to make sure there are no leaks or cracks. You can use plain tap water for this, drying it out with a lint-free cloth before you place anything inside.
- Prior to going out to buy your fish, check your equipment first to make sure everything is working, as it should. This would include the filter, pump, air rock, heater, thermometer, etc.

### **SETUP PROCESS**

As you are about to discover, the setup process for your fish tank is not difficult although you do want to follow specific steps, which I have outlined below.

- Start by placing the stand or cabinet for your fish aquarium in the location it will be setup. Make sure you leave at least a 2 inch gap behind the stand for access to cords etc.
- If you will be using a background, attach it now, making sure it is on securely.
- Next, place the fish aquarium on top of the stand or cabinet, making sure it is level and secure. Make sure the tank is clean and dry.
- You now want to wash the gravel in a bucket, using clean, tap water. I do not recommend that you wash the gravel in the sink, as it can fall into the plumbing and cause a clog.



- If you plan to use an under-gravel filter, place this in the bottom of the tank, following the manufacture's instructions for installation.
- Place the clean gravel evenly on the bottom of the tank and on top of the under-gravel filter. Remember, your goal is to end up with two inches of gravel. Sometimes, people will make one end about an inch higher for visual effect, which is fine.
- The aquarium will now be filled with water. Remember, if using tap water then make sure you have used something to remove the chlorine. Fill the tank close to the top, leaving about two to three inches so decorations, pump, plants, and other things can be added without causing overflow.
- Install the heater according to the manufacturer's instructions. Set the temperature to 78 degrees or to the appropriate setting for the type of fish you plan to keep. After the tank has been setup, you may need to adjust it from time to time.
- Next, the pump will be installed, again according to the manufacturer's instructions. Once that is installed, connect it to the under-gravel filter.
- The air stone will now be connected to the pump, which helps to enhance oxygenation of the water, thus improving overall water quality.
- If using a canister or internal filter, install this now as per the manufacturer's instructions.
- The thermometer will now be placed in or outside the tank according to the directions.
- Any decorations such as animations, plants, logs, caves, flowerpots, decorative rocks, or driftwood should be added to the aquarium in a design you find pleasing. If using rocks, make sure they are stable and not likely to fall against the glass or fish!
- Next, the light and hood would be installed. Again, I recommend you go with a fluorescent light.
- Once the fish aquarium is set up, the water will need to rest for 24 hours, which will allow any leftover chlorine to dissipate. Then, before you add any fish, make sure the water temperature is between 75 and 78 degrees.
- For purchasing your new fish, you want to buy only from a fish breeder or reputable pet store. Keep in mind that you want to start small, allowing the new residents time to become acclimated to their new home. Then over time,



you can add more fish. In addition to the fish, remember to add a couple of bottom feeders to keep algae under control.

- Rather than just dump the fish in the water, you will need to keep them in the plastic bag of water in which they were sold. Place this entire bag in the fish aquarium, letting it float for about half an hour, which will help them adjust to the new water temperature. After that time, open a small opening in the bag and let the fish swim out on their own.
- It is a good idea to turn off your light once you have introduced new fish, turning it back on the next morning. This helps fish to settle in less stressfully.
- Once the fish are swimming about the next day, offer them something to eat, taking care not to overfeed.

## **COMMON MISTAKES**

When setting up a new fish aquarium, common mistakes happen. To help you avoid making these mistakes, I have provided information so you know what not to do.

### **Too Small**

Although the small fish bowl or five to ten-gallon tank seems like a nice size to start with, I actually suggest you go larger. What happens in a small fish aquarium is that the characteristics of the water change very quickly, making it difficult to manage. As mentioned earlier, a larger fish tank is actually easier to maintain than a smaller one. Therefore, go with at least 20 gallons, even more is best.

### **Adding Fish**

Although it might be tempting to add the water to your fish aquarium and then rush out to buy the fish, remember that the water needs to rest for a minimum of 24 hours prior to adding fish. If you were to add fish any sooner, you would be throwing your money away since they would all go into shock and die.

### **Too Many Fish**

Remember, add five to ten small fish at first, letting them settle in before you add more. You can always add more fish but do not add too many all at once. Overstocking the fish tank is the most common mistake made by fish owners since they want lots of activity and color – however you need to be patient.



### **Incompatibility**

At the beginning of this book, I talked about how not all fish get along. Although you want to choose fish that you find interesting and intriguing, you want to avoid putting just any fish in the same tank. Instead, learn which fish get along and stick with those or you will have ongoing fighting and death.

### **Too Much Food**

Most fish in their natural habitat, graze and are usually constantly in search of their next meal. They don't have a physiological mechanism which tells them when they are full. Many people overfeed their fish because they say the fish always appear hungry! It is very hard to overfeed your fish, but very easy to overfeed your tank! Any food you introduce to your tank contributes to the waste, even if it is being eaten. You therefore need to find a balance between keeping your fish happy and not polluting your tank. I will discuss this more in the "Feeding" section.

### **Inadequate Filtration**

You need a good filtration system to keep the water quality where it should be. The goal with any filter is that it should run all of the tank's water through a minimum of three times per hour. If not, you have an inadequate filtration system. In this case, you would need to purchase a larger unit. Remember, you can under-filter but you cannot over-filter your aquarium.

### **Testing the Water**

One of the most important things you can do for your fish is to test the water for dangerous levels of ammonia, nitrite, and nitrate. In addition, you want your tank's water to have the appropriate pH level and water hardness. You can purchase a test kit at your local pet store or pet supply store. Refer to the chapter "Cycling" so you know how often to test.

### **Water Change**

It is imperative that you go through the proper [water change](#), as earlier discussed. Without going through the process of water change, waste will build up that stresses the fish. The only ways to remove this excessive waste is via vacuuming and regular water changes.





## **CHOOSING THE RIGHT FISH**

This is the fun part of the process – choosing your new fish. The types of fish you decide to buy will depend first on the size of the fish aquarium. Second, your decision will be based on fish compatibility, and third, your budget. Some freshwater fish are expensive so you need to consider how much you are willing to spend for your fish.



With fish, you have wonderful choices for freshwater. Although you might be eager to buy, buy, and buy, I suggest you purchase inexpensive, hardy fish to start with, adding others as you go. Again, only buy from a reputable fish breeder, pet store, or pet supply store. Some of the initial species you might consider include Swordtails, Guppies, Mollies, and Platties, all hardy and beautifully colored. In fact, some people will start with these species and never go beyond.

Obviously, you want to buy only healthy fish. Although somewhat of a challenge, the best option you have for getting only healthy fish is becoming educated and working with someone reputable. When looking at fish, watch the way they swim, looking for fish that are alert, active, and maintaining an upright position.

Look at the skin of the fish, along with the fins and scales, trying to spot any type of open sore, bumps, yellow or white spots, ragged edges, or redness. If you notice fish keeping the fins in close to the body, breathing fast, appearing hesitant to swim away from the water's surface, or aerating bubbles, these could all be a sign of some type of respiratory infection or disease.

Instead, you should be looking for fish that are well rounded, active, alert, and interested in you. Healthy fish would not have scales flaring out, enlarged abdomen (unless pregnant), or have a gaunt hollow look. If possible, watch the fish being fed. A healthy fish will dart quickly toward the food, seizing it fast. If the fish is not interested, then you might be wary.

### **Quarantine**

If you have a fish aquarium already set up with fish and plan to add new fish, it is wise to establish a quarantine time. With this, you would set up a separate tank, which can be smaller than the permanent home, allowing the new fish to become established for two to three weeks. This way, you are ensuring the new fish are healthy before introducing them to your existing tank. This is especially important with marine species, as many are wild when caught and so they can carry parasites and diseases.



## **SCHEDULED CLEANING**

After getting your fish tank in the ideal situation, you need to maintain it. This requires scheduled cleaning, which lowers the risk of sickness for your fish.

### **Daily**

Your fish will need some care on a daily basis. While they do not require as much work as a dog or cat would, they still require some attention.

- Feeding – Your fish will need to be fed at least once daily but only feed as much as what they can eat within five minutes at a time.
- Water Temperature – Check this daily, remembering that water temperature will vary throughout the day. For this reason, I recommend you test the water in the morning and then at night. I also recommend you keep an ongoing journal so you can spot any trouble before it gets out of hand.
- Behavior Check – Every day, watch the fish, looking for any signs of trouble such as irregular swimming, surface or bottom swimming, spots, etc.
- Equipment Check – Each morning, look at the heater, filter, lights, and pump, making sure they all work right.
- Water Check – Just glance at the water to make sure it is not turning cloudy, green, or developing a foul smell.

### **Weekly**

On a weekly basis, the following things should be checked:

- Algae – With a scraper, clean off the algae from the inside of the glass, as well as off the rocks, wood, and decorations.
- Plants – If you have live plants, remove any dead leaves. Then, if the plant is growing too large, trim off excess growth.
- Water Change – With your siphon hose, siphon out any debris from the surface into a bucket. Then, remove about 15% of the water and treat new tap water for chlorine or chloramines prior to adding it in the tank.
- Gravel – Use the siphon to vacuum the gravel (taking care not to stir it up) to remove excess waste.



- Glass – With a clean cloth, spray on some window cleaner away from the fish aquarium (to avoid getting chemicals in the water). Wash the outside of the glass.

### **Bi-Weekly**

Every two weeks, you will need to do a 20% to 25% water change to keep the tank clean and the fish happy. Remember that when the tank is not cleaned on a scheduled basis, you will start to have problems with increasing levels of ammonia and nitrite, which will kill the fish. Therefore, your water change is one of the most important steps to a healthy environment. Keep in mind that to avoid stressing your fish, you should never undertake more than a 50% water change.

### **Bi-Annually**

In addition to the scheduled maintenance above, you need to do a more thorough cleaning twice a year. This will include the following components:

- Filters – These should be cleaned twice a year but not completely cleaned. Remember, your filter needs some level of bacteria to help keep ammonia and nitrite under control. For this, rinse the filter plates or grids in a bucket of water taken from your tank. Depending on the type of filter used, you may need to rinse your filter media more often to prevent it from blocking it. If the water flow from your filter is reduced, you should check to see if your filter needs cleaning.
- Filter Media – Regardless of the type of filter medium you use, replace it. Again, you want to keep one old one and one new one for the sake of bacteria. Therefore, you could replace one of the filters medium on one week and then two weeks later replace the other one.
- Lights – If you use fluorescent lighting, replace the bulbs, even if they are still operating.
- Heater and Thermostat – Check both the heater and thermostat to ensure they are working properly.



## FEEDING THE FISH

The proper diet plays an important role in the health and happiness of your fish. Therefore, I wanted to talk about diet, types of foods, and schedule to consider. As just discussed, overfeeding fish is a common mistake made by fish keepers of all levels. Therefore, I have provided valuable information to ensure you understand all aspects of feeding fish.



### ***FISH DIET AND SUPPLEMENTS***

With so many different fish species, diets will vary dramatically. Some fish are carnivores, meaning they eat other animals, some are herbivores, eating plants, and some omnivores, meaning the fish eat both animal and plant. Tropical fish fall into all of these categories.

When purchasing your fish from a reputable breeder or pet store, you will be given specific information as to the type of food you need to give your fish. However, if not you can use any number of fish references to determine the appropriate diet. Just be sure to purchase quality commercial food.

In addition to the primary diet, you can also choose supplementary food, which would include things such as Tubifex worms or shrimp, especially for carnivores. However, if all you keep is herbivores, the algae growing naturally in the fish tank may be all you need to supplement their diets.

If you have herbivores and the tank does not have enough algae, you can always add a piece of lettuce to the bottom of tank for them to nibble on. Keep in mind that if the lettuce is not eaten within 30 minutes, remove it for a while and then place it back in periodically. It is important to blanch the lettuce first to breakdown cellulose and make it more palatable.

### ***FOOD QUANTITY***

Knowing how much to feed fish can be a little tricky but a good rule to follow is that you should not feed your fish any more than what they can eat in 10 minutes. In addition, the fish should be fed two to three times a day. Any more will result in excess food sitting on the bottom of the tank decomposing.

When this happens, ammonia levels rise. If going out of town, large fish will generally do quite well for a few days. However, smaller fish do not fare as well. You can purchase slow-release feeding blocks or automatic feeders to feed your fish while you are away. Just remember to do a water change before you go away and when you arrive back.



## **FOOD TYPES**

The interesting thing about fish is that they have much the same nutritional needs as humans do. This means they need fats, carbohydrates, amino acids, vitamins, trace elements, minerals, and water. Just as with people, remember that fish can be fed right and wrong foods.

### **Live Food**

While most fish love live food, remember that you will pay significantly more than you would with dry food. Another concern associated with live food is the possibility of introducing parasites, pests, pollutants, or infectious disease to the tank. To minimize these risks, you can use marine food for freshwater tanks, rinsing them off before use and even quarantining the food.



You will also find that live food is not nearly as convenient to use as dry food is. Then, live food can both incite and intensify killing or aggressive behaviors. Therefore, before you buy live food, consider all the challenges associated with it. Never use live fish as food, as it is unnecessary and quite often spreads diseases.

### **Prepared Food**

Prepared food is the most common type of food used. You will find this in various options including frozen, flaked, and dried. Of all prepared food, flake or pellet is the most common and popular format. Fish love this type of food, it is easy to store, and does not have a foul odor. The only thing you need to be aware of is that overfeeding is a common problem with flakes or pellets.



One of the most important things associated with prepared food is freshness. Make sure you purchase food that is packaged well and not stale. I also recommend you avoid buying refills or bulk prepared food. Instead, you want the food to be fresh, which will not be the case if you have large quantities sitting around.

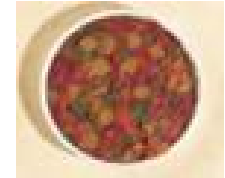
The design of prepared food comes in a shaker type container. All you do is open the top and shake the food into the water. This method actually helps prevent oxidation of nutrients through exposure to the atmosphere. Food is packaged this way specifically so it cannot be refilled or re-packaged.



Tablets for bottom feeding fish are also available, catering for both herbivores and carnivores. It is important to provide the right type of food to suit your fish's mouth shape.

### **Frozen Food**

Frozen foods are not quite as convenient as dried or processed foods but they are usually affordable and safe. You can purchase packs of single species such as krill or brine, or if you prefer, cubes of homemade or commercial blends. Frozen food is just as good as live but without the safety risks. Typically, you would defrost the food and rinse it before introducing it into the tank.



### **Dried Food**



Dried food is made by freeze-drying to keep the food fresh. Dried foods are affordable, easy to find, and generally a good option.

### **Green Food**

Another type of food on the market is a semi-fresh, dried, flake, or pellet that is fed to certain species of fish. Although the nutritional value could be better, green food does provide some roughage. For instance, you can purchase dried algae such as Kombu or Noritake.

Obviously, the key with any diet is to know your fish species and understand the type of food needed. By understanding what the fish would eat in the wild as well as capacity, you can choose the right type of food. As mentioned, you always want to feed the fish in small amounts and more frequently to avoid excess food settling on the bottom of the tank where it will rot.

If anything, you would be better to underfeed than overfeed the fish. Learning the amount of food your fish eats is a learning process. Again, pay attention to the fish during feeding time, watching to see how much they eat so you can make the needed adjustments. If you find food on the bottom of the tank, get out the siphon and vacuum it up.





## ANATOMY AND HEALTHCARE

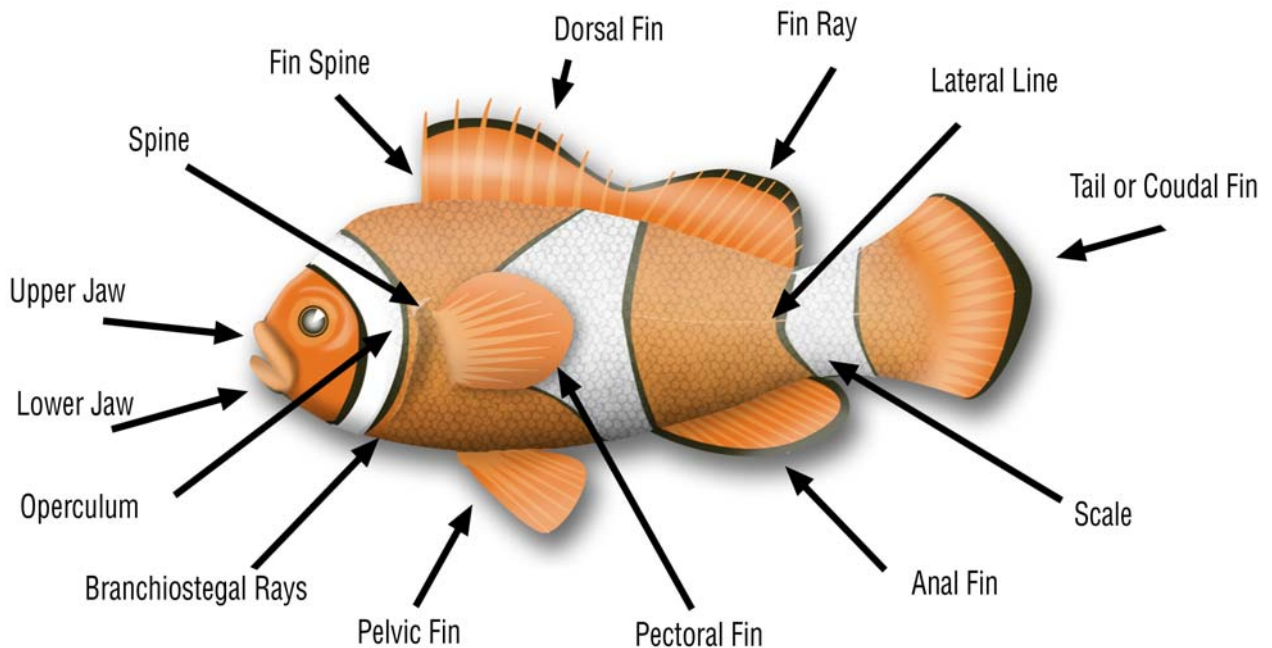


With proper care and good water quality, your fish should live for years. However, chances are you will be faced with one health problem or another, which is why understanding the fish's anatomy is so important. In this chapter, I want to address tips on how to detect early signs of symptoms, as well as the appropriate treatment option.

### EXTERNAL ANATOMY

Understanding the anatomy of fish is interesting, providing a better way to get to know your fish. Fish are cold-blooded creatures with a backbone and fins. Typically, fish will have scales and to breathe, they use gills located on the sides of the body, as seen in **Figure 2** below.

## ANATOMY OF A FISH



**Figure 2** – The basic external anatomy of a tropical fish



## **Eyes**

The eyes of the fish help them detect color. You will notice that freshwater fish have very round eyes, which are created with a refractive index of water. The round eyes also help the fish focus by moving the lens in and out. With this, vision is not distorted.

## **Fins**

The fins are appendages that help position, steer, move, and stop the fish while swimming. Depending on the species, they will have fins that are single, running along the centerline of the body, which includes the dorsal fin (or back fin), the caudal (or tail) fin, and the anal fin. Then, you have paired fins, meaning the fish has a pectoral (or chest fin) along with a pelvic (or hip) fin.

For catfish, this species also has a fleshy lobe located behind the dorsal fin known as the adipose (or fat) fin. Both the dorsal and anal fins help the fish stay upright so they do not roll over. The caudal fin is the primary fin, used to propel the fish, moving it forward. Then the paired fins help with the steering, hovering, and stopping.

## **Gills**

The gills of the fish are their breathing apparatus. With this, there is a gill cover called the operculum, a flexible bony plate that works to protect the sensitive gills. The way a fish breathes is by inhaling water through the mouth, which is then passed over the gills and exhaled below the operculum.

## **Lateral Line**

This sensory organ is filled with fluid sacs that have a hair-like sensory apparatus. With this, there are a number of pores that open along a line on the side of the fish. This particular organ helps determine water pressure, currents, and movement.

## **Mouth**

The mouth of a fish is designed specifically to catch whatever it is they eat. Therefore, you will find a number of different shapes and sizes. Freshwater fish have an amazing sense of taste, often sampling a number of things before they decide to swallow. Even in a fish aquarium, you will notice fish taking in food, sometimes eating it and sometimes spitting it out.



While most freshwater fish are omnivorous, meaning they eat both animal and plant, others are Piscivorous, eating primarily fish while others are herbivores, meaning they like just plants. Depending on the species of fish, some have teeth and some have none. The type and size of teeth also varies dramatically from one species to the next.

### **Paired Nostrils**

Also called nares, the nostrils are used to detect odor in the water. Typically, the nostrils are very sensitive, especially in catfish.

### **Scales**

In most freshwater fish, known as bony fish, the scales would be cycloid or ctenoid. Keep in mind that some catfish do not have scales. The cycloid scales have smooth, rounded edges while the ctenoid scales are jagged. Typically, the fish will have a layer of mucus that covers the body, helping to prevent infection as a part of the scale system.

### **Spine**

Freshwater fish also have a spine that is supported by the fins. The spine is rigid and in some cases, extremely sharp.

### **Vent**

The vent is an external opening that goes to the digestive urinary and reproductive tracts of the fish, usually found in front of the anal fin.

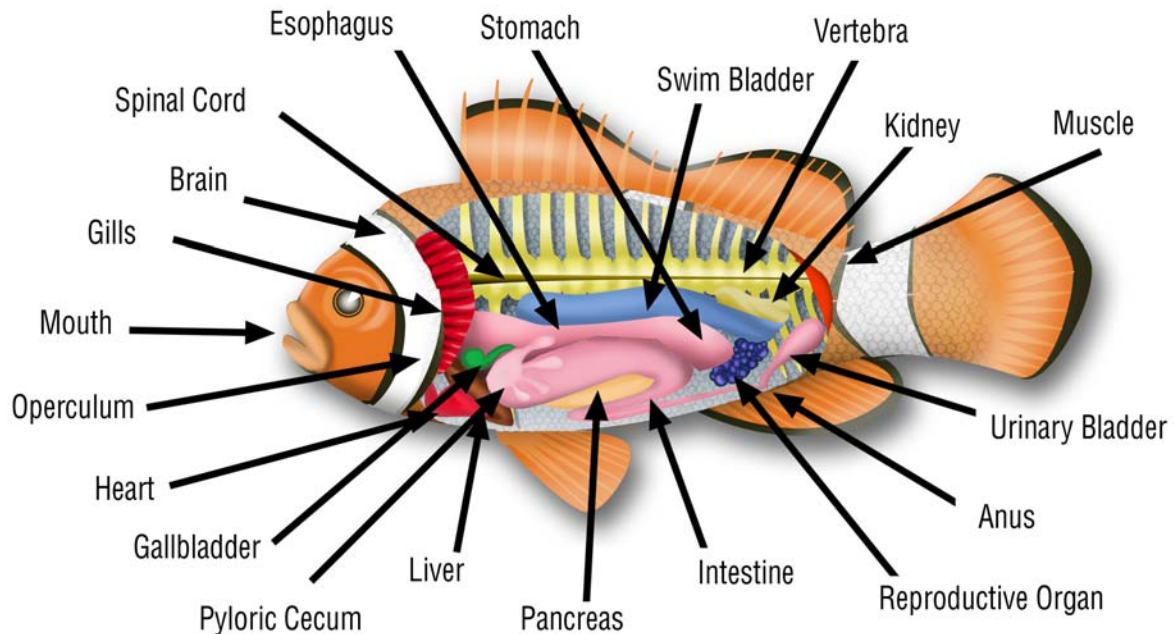
## ***INTERNAL ANATOMY***

Just as the external anatomy of a fish is interesting, the internal is even more fascinating. Cells and organisms such as the amoeba are very small, microscopic units of life. In larger creatures with multi-cellular structure, the individual cells are similar in performance and structure but grouped into tissues, which are then grouped into more complex and specialized structures known as organs.

These organs are responsible for performing a number of bodily functions including digestion, sensory reception, and respiration. Fish, like humans, also have internal organs including kidneys, a liver, heart, brain, stomach, as shown in **Figure 3** below. However, fish have a special organ known as a swim bladder. The following information will summarize each of the internal functions of freshwater fish.



# ANATOMY OF A FISH



***Figure 3 – The basic internal anatomy of a tropical fish***

## **Brain**

Again, as with humans, the brain of the fish is the hub, the control center if you will. The brain consists of automatic function including breathing along with more sophisticated function such as making decisions for dinner.

## **Heart**

The heart is the organ that circulates blood throughout the fish's body. Both digested nutrients and oxygen are delivered to the cells of the body's organs through blood. In addition, the blood helps transport waste products out of the cells to the kidneys and liver for final elimination.

## **Kidney**

The kidney is what filters out liquid waste from the blood, which then passes them out of the body. Obviously, the kidney is a vital organ that helps regulate both water and salt.



## **Liver**

The liver is another vital organ that helps with the digestion of food. The way the liver works is by secreting enzymes that break down fat. In addition, the liver works as a storage area for both carbohydrate and fats. The final roles of the liver are to destroy old blood cells while maintaining appropriate blood chemistry and to help with nitrogen excretion.

## **Pyloric Caeca**

This organ has finger-like extensions and is located toward the junction of the stomach and intestines. Although not fully understood, the main function is believed to be that it secretes enzymes that help with the digestive process.

## **Spine**

The spine serves as the main framework or structure of the fish. The spine connects to the skull at the front of the body and then to the tail toward the back of the body. Made up of several vertebrae, the spine is hollow and houses, as well as protects, the fish's delicate spinal cord.

## **Spinal Cord**

The spinal cord connects the brain to the rest of the body. In addition, the spinal cord is responsible for relaying sensory information from the body to the brain, along with any instruction from the brain to the body.

## **Stomach/Intestines**

The fish must be able to digest and absorb minerals from food to survive. For fish that eat other fish, they have short intestines since the food is easy to chemically break down and digest. However, for fish that eat plants, the intestines are longer since plant matter requires more digestion because of the fiber.

## **Swim Bladder**

Sometimes referred to as the Air Bladder, this organ is hollow and filled with gas that allows the fish to conserve energy when maintaining neutral buoyancy, or floating.

## **Gonads**

The Gonads, also known as the reproductive organs, are found in the female. During spawning season, the Gonads will become quite enlarged,



making the female easy to spot. However, the males produce milt that is used to fertilize the eggs. The milt is small and white. The eggs, also called roe, are considered a delicacy in some areas, which is where caviar comes from.

### **Muscles**

The muscles of the fish help with movement and propulsion.

## ***SIGNS OF DISEASE***

Typically, if you notice your fish displaying any of the following signs, it could be stressed or sick. Therefore, take each of these symptoms seriously.

### **Argulus**

This parasitic disease is also known as Fish Louse. You would notice your fish scraping up against objects in the tank, as well as visible parasites measuring about one-quarter of an inch in diameter. These parasites attach to the body of the fish, causing severe irritation.

The best treatment for Argulus is to place the affected fish in a hospital tank and give them a 15 to 30-minute bath of 10mg potassium permanganate per liter of water. If you like, you can treat the entire tank with 2mg per liter but this is a messy dye and it may harm your biological filter.

### **Anchor Worm**

Formally called Lernaea, the fish would scrape against objects of the tank while displaying white-green threads hanging out of the skin. The area would be inflamed and red. These worms are crustaceans that burrow deep into the muscles, developing for months before symptoms show. Eventually, the Anchor Worm will lay eggs and then die, leaving behind holes that become infected.

Because this type of worm burrows so deep, you cannot simply pull it out. Instead, you would need to treat the fish with 10mg per liter of potassium permanganate, or again, the entire tank with 2mg per liter.

### **Bottom Crashing**

If the fish is crashing on the bottom of the fish aquarium and not swimming, it is likely exhausted. This can be caused by illness, shimmy, clamped fins, or gasping. For this, refer to the recommended six steps for treatment.





### **Chilodonella**

The fish would become dull because of excessive slime buildup. You would also notice the fins fraying, gill damage, and overall weakness. As the disease progresses, the skin will break down and the gills will be destroyed. Treatment for this would include Acriflavine used at 1% solution per liter of water. In addition, make sure the fish water is set at 80 degrees.

### **Clamped Fins**

For this, the fish would literally clamp the fins, keeping them close to the body. Clamped fins are a sign of stress or serious disease, requiring immediate treatment, which is usually successful.

### **Cotton Mouth**

Cotton Mouth causes cotton-like patches around the fishes' mouth. This disease is very hard to treat but the six steps of treatment might help. A product called Furan 2 is available, being the best course of treatment for Cotton Mouth.

### **Dropsy**

With Dropsy, your fish would have a bacterial infection of the internal organs. Obviously, with the problem being on the inside, it makes identifying the problem and treatment challenging. The cause of dropsy is typically from poor water quality, being moved, or overcrowding.

What happens is that excess body fluids begin to build up, making the fish appear bloated. When this occurs, the scales may stick out abnormally. Sometimes, Dropsy is misdiagnosed for pop eye because the eyes will bulge from the fluid buildup.

You can purchase a number of products at your local pet store to help treat a fish with Dropsy. The key is to catch the infection in the early stages. Unfortunately, if you find the scales of the fish protruding, the infection is probably so bad that treatment would not work. You can certainly try, but do not expect miracles.

### **Ergasilus**

This problem presents itself when the fish rub or scrape against decorations, filters, and other things in the aquarium. You may also notice a white/green thread coming out of the gills. Similar to an Anchor Worm,



Ergasilus is best treated with a 15 to 30-minute bath of 10mg potassium permanganate per liter. Again, you can treat the entire tank with 2mg per liter but the process is messy.

### **Eye Problems**

A fish can experience a number of eye problems related to pop eye, blindness, swelling, opaque lens, or cloudy cornea. For example, if your fish had a cloudy cornea, it means there is a bacterial infection. In this case, antibiotics will often help. For opaque lens, the problem is likely due to poor nutrition or *Metacercaria* invasion known as grubs. For this, add certain foods to the diet that are higher in vitamins.

Pop eye is discussed below, which is often the result of a vitamin A deficiency or bacterial infection. With amoxicillin or penicillin (both antibiotics), the problem can usually be treated successfully. Then for blindness, this is usually from poor nutrition or excessive light. For this, lower the intensity of the light and change the diet to include foods with higher nutrition.

Although the fish may not have restored vision, you should make the changes for the other fish. In addition, a blind fish will usually survive although you may need to separate it from the other fish for feeding purposes.

### **Fin Rot**

In this case, the fish's fin begins to disintegrate or fall off. To treat fin rot, make sure any aggressive fish that might be biting are removed to a different tank.

If you observe that your fish have caught fin rot early on, there is a good chance you can prevent it from becoming a major problem. Fin rot is usually a bacterial condition with fungus setting-in in the later stages. There is an excellent product called Melafix, which is widely available. It is a gentle antibacterial which will not harm other fish, or your biological filter. Use this as a first option. If fin rot does not clear up or progresses, you may need to use a stronger product such as Methylene Blue. Remember, you will need to do a lot of small regular water changes after this treatment in order to help out your biological filter and remove excess treatment from the water. This is where a quarantine tank comes in handy, as you can simply remove the affected fish and treat it separately with no adverse effects to your main tank.



## **Flukes**

If you notice your fish scraping its body against decorations, the filter, or some other type of object in the aquarium, it could have flukes, also known as flatworms. When this occurs, the mucus covering of the scales and even the gills are worn away, which leaves the skin red and open to infection.

When the gills are destroyed, the fish will die. You may notice the fish looking pale, dropping the fins, breathing fast, and having a hollow belly in addition to the scraping. If you can catch the problem and administer treatment quickly, your fish has a good chance for survival. For this, you could place the fish in a bath of 10mg per liter of potassium permanganate or use a product called 'Fluke Tabs' specifically designed to kill flukes.

## **Gasping**

If you have fish gasping toward the water's surface, the tank probably does not have adequate levels of oxygen. Keep in mind that if there is just one fish gasping, something else could be wrong. However, if inadequate oxygen is suspected, the following steps should be taken immediately.

- Make sure your filter is working correctly. If not, then it would need to be fixed right away.
- Make sure the water temperature is between 75 and 80 degrees. If not, make an immediate adjustment.
- You also want to check the water's surface to make sure there is not any type of scum or algae blocking off airflow. For this, simply scoop out any debris and remove the top two inches of the water.
- Do a small water change using a water conditioner, sold at pet stores. For this, simply follow the directions on the bottle.

## **Glancing**

This type of fish behavior is when the fish rubs itself on the gravel on the bottom or the aquarium or something else rigid such as a rock, decoration, filter, etc. The reason for this is that the fish itches, also a common sign of stress or illness. Again, follow the six steps to cure listed below.



### **Hole in the Head Disease**

Also known as Head and Lateral Line Erosion, the Hole in the Head Disease is common among “Discus” and other types of Cichlids. With this, the fish would literally develop a hole in the head that on occasion, goes along the lateral line of the body.

Although the cause is unknown, most experts believe it is directly related to poor water quality and stress. However, some people believe this disease is also connected somehow to poor nutrition, especially a deficiency in Vitamin C. One thing that experts know is that fish living in aquariums with live plants get Hole in the Head Disease far less than other fish do. If this condition goes untreated, it will disfigure or kill the fish.

To treat this disease, test the water, and make any necessary adjustments to ensure the water quality is optimal. You should also stop using carbon filtration so nutrients in the water are not eliminated. Next, change your fish’s diet to one that is high in vitamins, again, specifically high in Vitamin C. If the Hole in the Head Disease is stubborn, you can use Metronidazole, also known as “Flagyl” to help with the lesions.

### **Glugea**

Also called Henneguya, this disease produces nodular white swellings on the body and fins of the fish. You would notice large cysts that release spores. The good news about Glugea is that it is extremely rare. However, if you notice the fish swelling, keep in mind there is no cure so the fish will most likely die.

### **Pop Eye**

For this, you would notice the fish’s eyes looking as if they are about ready to pop out of its head. This disease is very hard to treat but the six steps of treatment might help.

### **Ich or Whitespot**

Ich (full name Ichthyophthirius multifiliis) is one of the most common of all tropical fish diseases. For this, the fish would have small, white spots on the fins and body. Ich is treatable but if ignored, it will spread throughout the tank, killing off all the fish. You can purchase medication made from Malachite Green and formalin at pet stores. All you need to do is follow the directions on the label. You can also raise the water temperature to 90 degrees for a short period which increases the fish’s internal temperature, increasing its metabolism and therefore helping it fight the infection.



If those treatments do not work, then try the transfer method. For this, you would move the fish every day to a clean tank that has warm, conditioned water. That way, any lingering parasites will fall off the fish, being left behind in the old water. In most cases, one week of transfer will get rid of the problem. The only drawback is that all the movement can cause stress to the fish.

### **Neon Tetra Disease**

For Neon Tetras, you would see a whitened area that goes deep into the fishes' flesh. Another common problem is muscle degeneration that causes problems with swimming movements. This disease destroys the vivid, green blue color of the Neon stripe. Organisms form cysts that burst and release spores.

When the spores burst, they penetrate deeply into the flesh, forming even more cysts. Over time, the spores migrate in the water, being eaten by other fish. Once digested, the spores will move to the digestive tract, followed by the muscles and then you have a serious issue with infection. Unfortunately, not only is there no cure, but once the fish die the entire tank could be at risk. It is recommended you do not add any more Neon Tetras to a tank affected with this disease for at least 6 months after the outbreak.

### **No Appetite**

If you have a fish that has stopped eating, or on that is putting food in its mouth but then spitting it out, something is not right. You can follow the recommended treatment below, as well as try a different type of food. Testing water is crucial to make sure toxins are not present which could cause a fish to lose its appetite.

### **Red or White Sores**

Although there are a number of things that might cause red or white sores on fish, including rubbing up against something sharp or from fighting, the problem is that untreated wounds can become infected. If the sores are new, they can usually be treated with antibiotics but for larger, older sores, treatment is more challenging.

### **Shimmy**

In this case, the fish would appear as if it were swimming very fast while staying in the same place. This particular problem is easy to identify and again, if treated quickly, the results are usually excellent.



### **Slimy Skin Disease**

With this disease, you would notice a white-gray film on the skin, specifically on the eyes. Another symptom would include dark pigmented area around on the affected fish. The gills may be swollen and there may be ulcerated areas on the body. In most cases, fish with Slimy Skin Disease will congregate around the surface of the water or on the bottom of the tank.

Unfortunately, this particular disease is highly contagious. Therefore, you want to treat infected fish in a hospital tank and treat the fish not yet sick. The best form of treatment is Malachite Green, using 0.10ppm for three treatments, once every other day. If you notice that the problem is not improving, then perform a 50% water change and add a copper-removing polymer or resin to help reduce copper levels.

### **Swim Bladder Abnormalities**

If your fish is floating on its side or upside down, then you know you have a problem. While a number of freshwater fish can get swim bladder abnormalities, most of these problems are seen in fancy goldfish. What happens is that dry food eaten quickly swells up in the intestine, keeping the fish from having control over the swim bladder. To avoid the problem, feed only pre-soaked or gel-based foods.

The problem with swim bladder abnormalities is that the fish might also have an infection. Therefore, use antibiotic food. If the fish is not eating, then you can use antibiotic drops in the water. I suggest you put the sick fish in a hospital tank for the best treatment and option for recovery.

### **Velvet**

With this, the fish would take on an appearance of having fine, dusted flecks of gold. Other symptoms often associated with velvet include shimmy and clamped fins. You can use an anti-parasitic medication sold at any pet store or pet supply store.

## **TREATMENT OPTIONS**

Although some diseases will need special medication, you never want to overlook the importance of the environment. For any of the problems listed above, start by going through the following process:





1. Start by cleaning the fish tank. You do not have to completely take everything out, but use your siphon to remove excess waste from the gravel, scrape off the side of the glass, and if needed, clean off decorations and anything else on the inside of the tank.
2. Second, make sure you clean the gravel. Remember, a small fish bowl should have one-quarter inch of gravel. If you have an aquarium with an external power filter and Bio-wheel, gravel would not be mandatory. Regardless, siphon it out, making sure you get every inch.
3. Test all water conditions, making sure they are within normal ranges, if not remedy them using the steps outlined under the "Water Quality" section of this book.
4. Next, change about 20% of the tank's water.
5. Use a product that is appropriate to the fish's problem. You may need to speak to your pet store about what they recommend or have available.
6. Finally, increase the water temperature to 82 degrees. Even for coldwater fish, this increase in temperature will help.

If none of the above helps, contact your local fish breeder, pet store, or Veterinarian for further instructions. The key is to identify problems early and take immediate action.

## ***WATER QUALITY***

Since the majority of stress and disease seen in fish is caused by something going wrong in the environment, you need to be concerned about the water quality. For example, if the fish are gasping on the surface or have purple gills, chances are the water has high levels of ammonia or low levels of dissolved oxygen. If the fish are being inactive, you could have a problem with pH levels, dissolved oxygen, nitrates, and nitrites.

### **Ammonia**

If the problem is high ammonia levels, change enough water to reduce the levels by 1 to 2 ppm. Even if you have to change as much as 35%, this is really important. Then make sure the water being added back into the fish aquarium is the same temperature and has the right pH, salinity, and hardness levels.



### **Nitrites**

For nitrite problems, you want to change the water enough to bring the levels down to 2 ppm. Then, add one tablespoon of aquarium salt per five gallons of water and increase aeration.

### **Nitrates**

For nitrates, the water should be changed and the filter cleaned. In addition, change the water more often and feed the fish less going forward.

### **Low Oxygen**

For this, you can use an air rock to increase oxygen levels. In addition, you may need to do a thorough tank cleaning or add more water.

### **Low pH**

If the pH level is low, be sure the carbonate buffering is right. Then, add one-teaspoon baking soda per 30 gallons of water to help raise the dH levels. Remember to always make any changes to an aquarium very slowly.

### **High pH**

To help lower pH levels, use distilled or ionized water in with the tap water or filter over peat.

## ***SETTING UP A HOSPITAL TANK***

A hospital tank is a separate fish tank that is used for treating sick fish. A hospital tank is smaller than your regular fish tank, which means you can use less medication to treat illness. Typically, you would have just one to three fish in a hospital tank at any time, making treatment better. Some of your options for a hospital tank include the following:

### **Constantly Running**

If you have many fish, you might consider keeping a hospital tank up and running at all times so when you need it, the tank is readily available.



## **Kit**

I also recommend you keep your eyes open for sale items when it comes to heater, filter, and other supplies so you can eventually set up the hospital tank.

## **Prefabricated**

A prefabricated tank comes with everything you need for life support. Many companies sell these tanks specifically for this purpose.

By having a dedicated system, you are prepared if fish become ill. Obviously, the key in treatment of any disease or injury is starting treatment quickly. Without having a hospital tank ready to go, proper treatment is delayed, which could be the matter of life and death. For your hospital tank, you would need the following:

- 15 to 20-gallon aquarium
- Fully adjustable heater
- Sponge or over the tank filtration system
- Substrate, crushed coral or pebble gravel
- Non-toxic hiding places
- Live rock



## SUMMARY

Thank you for taking the time to buy and read my book. I hope that you found the information contained within to be helpful. Remember, you want your fish keeping experience to be one that is fun and enjoyable, not a tiresome project that you will end up regretting. By following the guidelines, you will have a great start to years of fish keeping experiences.

Just like any other type of pet, fish are great pets, fun, exciting, and entertaining. As you will discover in my bonus books, "***An Introduction to Freshwater Plants***", "***A Guide to Choosing the Right Marine Fish***", and "***A Guide to Buying Freshwater Fish***", once your aquarium is established, you need to fill it with the best plants and fish. These bonus books will provide you with great options to consider so you have a beautiful and healthy environment.

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THE END