

It is always an advantage to combine fish that stay at different water layers. For example: guppies, gouramis, neon/cardinal tetras and armoured catfish, or platies, barbs, dwarf cichlids and armoured catfish.

Also, introduce some algae-eating fish. Small to medium-size fish such as bristle-nose catfish (*Ancistrus dolichopterus*) and midget sucker fish (*Otocinclus affinis*) are especially recommended. These fish constantly scrape off algae on the side of the aquarium glass, stones, gravel and plant leaves. Also, livebearing toothcarps such as guppies, platy, black mollies and swordtails, eat algae.

### Number of fish

The basic rule is: 1 cm of fish per liter of water. Thus, an aquarium of 100 liters provides enough space for 20 fish sized 5 cm each. Allowance is given to the increasing size of the fish.

### Saltwater aquarium

The counterpart of the freshwater aquarium is the sea or saltwater aquarium. Here, organisms from the coral reefs of the tropical seas are kept.

A difference is that there is no higher order of plants than various ornamental algae in a saltwater aquarium. The animal stock does not only include fish but many species of invertebrates as well, such as corals, anemones, starfish, crustaceans and clams.

Marine animals are more expensive than the freshwater fish. Maintenance costs, however, are not much higher than a freshwater aquarium.

# Tips on Aquarium Construction and Setting

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*Para sa karagdagang kaalaman, sumangguni sa:*

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## INTRODUCTION

An aquarium is a characterization of the picturesque underwater world. Caring for an aquarium is a beneficial way to relax during leisure time. It is said that being near an aquarium results to is reduced blood pressure and normalized heartbeat.

The natural setup and maintenance of an aquarium is easier than it may seem. Some basic considerations, however, must be followed.

This guide will discuss the setting up of an aquarium and caring for the fish and plants.

## AQUARIUM CONSTRUCTION

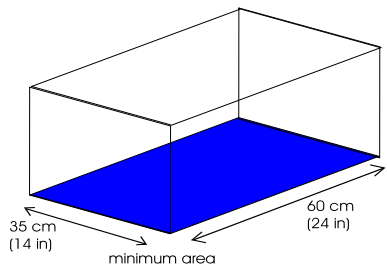
### Planning

Draw a sketch to prepare the basic setup and decoration to avoid mistakes in purchasing and improvising solutions after the set-up.

Larger aquaria are easier to maintain than small ones.

### Size

Choosing an aquarium size depends on the space in your home and the desired number of fish. For every centimeter size of fish, one liter of water is allocated. Be generous and consider the expected final size of the young fish.



The aquarium should have an area of at least 60 cm x 35 cm. Larger size is better.

do not obstruct the view into the aquarium. The height should be below 15 cm.

### b. Middle-ground plants

Taller plants fall into this category. The middle-ground plants are divided into so-called solitary plants and group plants. Solitary plants have a larger space demand to the side. Plant them singly. Group or bunched plants are slender and look best when planted together in bunch.

### c. Background plants

Tall-growing plants can be planted in the background and at the sides. When planted on foreground, these plants will obstruct the view into the aquarium and take away too much swimming space for fish. Fast growing plants, such as hornwort (*Ceratophyllum demersum*) and waterweed (*Egeria densa*) are excellent oxygen providers and remove algae promoting nitrate from the water.

### Fish

Species and varieties of ornamental fishes are immense, at least for the beginner. Fish of all colours, shapes and sizes are available in pet shops. Many beautiful fish are easy to care for by beginners. Some species, however, may only be suitable for advanced aquarists.

In nature, most ornamental fish live and gather in groups. Therefore, they should be kept in pairs in the aquarium. For most aquarium fish, we recommend groups of at least 6 – 8 per species. In doing so, the fish are better kept according to their natural requirements and are also more attractive.

### Fish combinations

Besides buying your aquarium fish for viewing, also consider their behaviour, the expected final size and their special requirements. Nearly all fish you buy will grow considerably.

Most ornamental fish are comfortable with water temperatures of about 25-29°C and pH value of 6.5 to 7.5.

## Plants

Plants fulfill several important tasks in aquarium. The different shades of green bring calmness and harmony into the aquarium. A beautifully planted aquarium is extremely relaxing, and an awesome attraction in homes.

With bacteria in the gravel, the plants form an effective filter system. Fast growing plants such as hornwort (*Ceratophyllum demersum*) or waterweed (*Elodea and Egeria* species) consume nitrate and thus relieve the water from excess nutrients. During photosynthesis, plants consume carbon dioxide and consequently enrich the water with oxygen.

Plants offer the fish hideaways and thus reduce stress. Young fish need a dense planting of fine plants to hide them from hungry fish individuals.

### Number of plants

To create an impressive and lasting beauty of the aquarium, compute the number of plants to be used following this formula:

$$\text{Number of plants} = \frac{\text{Length (cm)} \times \text{depth (cm)}}{50}$$

For an aquarium size of 100 cm X 40 cm, 80 plants are needed.

Planting must include fast growing species which remove nitrogen-containing pollutants.

### Types of Plants

#### a. Foreground plants

Suitable for foreground area are small plants that

## Types

There are four different types of aquaria:

#### a. All-glass

This aquarium does not need a frame. Silicon glue is used to attach the glass-panes together. It is shockproof, and is most common today.

#### b. Partly-framed

This stable and fancy aquarium type has aluminum or plastic frames at the top and at the bottom. When buying such aquarium, ensure the frames are glued to the glass.

#### c. Completely-framed

Glass panes are glued to a stable metal (usually aluminum) frame. This aquarium is shockproof.

#### d. Mould-glass

This type of aquarium is inexpensive, but only suitable for very small water volume of up to 20 liters (5.3 ga.). The side panes are usually uneven and cause optical distortions. This aquarium is used for special purposes, such as quarantine, raising young fry, and culturing live food.

### Aquarium cost

Comparatively, buying and maintaining an aquarium is less expensive than purchasing and caring a small dog. We recommend buying an aquarium as large as possible because maintaining it is easier and is not as expensive as it may seem.

## **Cabinets**

For most aquarium types, matching cabinets with storage compartment are not cheap because they require special construction to handle the aquarium weight when filled with gravel and water. The aquarium cabinet has to be very stable, practical and yet decorative. Cabinets can be in various designs and layout and must suit the living style of the owner.

## **Stand**

If a cabinet is unavailable, a suitable stand maybe used. It must be extremely stable and even horizontally. A spirit level can be used to level the stand.

A 5 mm styrofoam panel must be placed between the aquarium and stand to offset any distortion from the construction of the stand and to avoid tension that may cause cracks in the glass.

## **Power supply**

Multiple electrical outlets must be available near the aquarium. Filter, heater, lighting, etc. are required to be installed in the aquarium. If possible, the power supply should be above the aquarium to avoid accidental spilling into the outlets during water change or refilling.

## **Cleaning and checking water leaks**

Most aquaria sold come with safety standards. However, the panes and the glue seams must be checked for manufacturing defects. Gaps between the silicon and the glass must be absent.

The newly purchased aquarium must be cleaned thoroughly to remove residues from production. Chemical glass cleaners should not be used on the glass panes, including the lid and on the outside. By mistake, minute cleaning detergents may contaminate the aquarium.

Purchase aquarium gravel only from specialized retailers. Avoid buying from building material stores where gravel maybe contaminated and release pollutants into the aquarium water. Clean the gravel thoroughly under running water before use.

## **Stones**

For freshwater aquaria, granite and basalt are more desired than lime-containing stones. Ore stones and metal-contained stones are attractive but less desired.

Rinse every stone thoroughly with scalding water and avoid using too many stones. Use silicon to adhere stone construction together at the connecting points. Adhering the stones together prevents them from collapsing. The active movements of the grubbing fish can easily topple the unsecured stone constructions, thus causing injuries and destruction to the aquarium.

## **Wood**

Bog wood or sinking driftwood, available in every pet shop is suitable for most freshwater aquaria. Bog wood is decorative and durable. It comes from swamps conserved for over a long time and does not float in water.

Self-collected wood may easily rot and release pollutants in your aquarium.

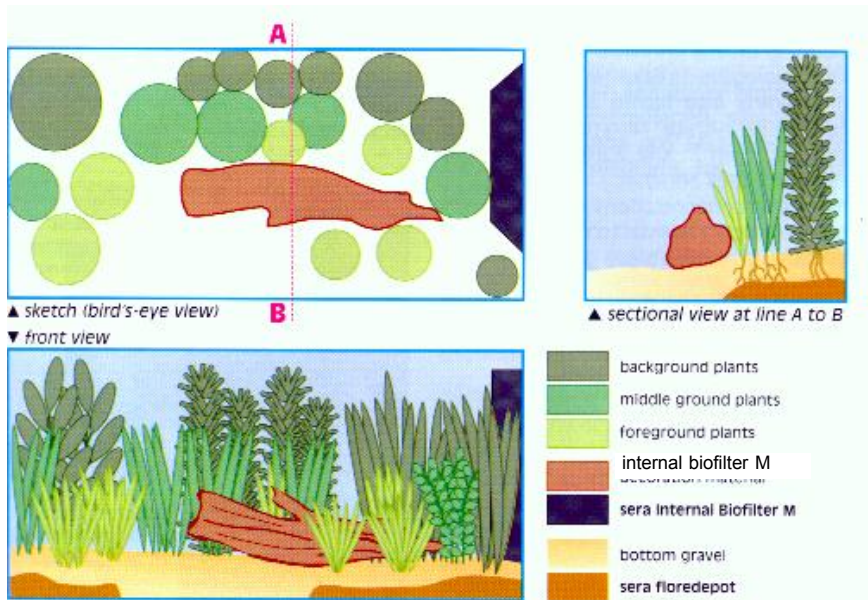
## **Water**

Fill the aquarium up to 80% with moderately warm tap water. Place a deep plate or a bowl onto the aquarium gravel and pour the water onto it. This prevents the gravel from whirling up.

Tap water may not always be suitable as aquarium water. Chlorine and other disinfectants, metal ions and various dissolved salts harm fish, plants and microorganisms. Strongly aerate tap water over 24-hour period before use.

etc., by means of suitable décor materials, so they are unobtrusive. Remember, however, that water must circulate around the aquarium heater.

- Include a sufficiently large free zone as swimming space for the fish.



### Bottom gravel

The bottom gravel forms the basis for successful care of fish and plants. It offers plenty of settling space for useful bacteria that break down pollutants. Further, it provides support for the plants.

Use fine grain (2-4 mm) aquarium gravel or river sand (1.5 mm. Grain size) as a covering layer. Do not use sharp-edged gravel like basalt chippings, fired ceramic chippings, etc. This type of gravel can easily cause injury to grubbing fish like armoured catfish. The gravel should be dark-coloured. Avoid bright or white gravel because they irritate the fish and cause stress. Also, dark coloured gravel enhances the splendid colours of the ornamental fish.

Clean the aquarium thoroughly with hot water. After the aquarium is cleaned, fill with water and observe for leaks. If a leak is absent after two to three hours, the aquarium is considered leak-proof.

### Technical Equipment

In an aquarium, some important technical equipment are required to simulate the natural requirements of most tropical plants and fish. These are:

#### a. Aquarium heater

Some aquarium fish are accustomed to water temperatures of about 25°C. A heater is provided to keep the water warmer in the aquarium. A thermostat heater in a glass has proven best and is most common. They are waterproof and resistant to corrosion in saltwater.

Effective water circulation around the heater is important to provide even heat distribution in the aquarium.

To determine the required size of the heater measured in wattage; calculate approximately 1.5 watts per liter of water in a room with no or poor heating. If the aquarium is placed in a heated room, you can calculate 1 watt per litre of water. Do not hesitate to select a heater with a higher wattage. The power consumption of both low and high wattage heater for producing the desired heat at a certain temperature is the same. A heater with higher wattage has a higher power reserve during electrical failure or brown-outs.

#### b. Lighting

Do not situate the aquarium near the window because exposure to sunlight will promote algal growth.

Lighting enhances the best possible presentation of the fish and is essential for plant photosynthesis in the aquarium. In freshwater aquarium, fluorescent or mercury vapour lamps are favourable. The latter are more suitable for larger aquaria with water depths of more than 60 cm. A 12-hour lighting daily is ideal for aquarium management.

Most specialized pet shops offer ready-to-use aquarium covers with integrated fluorescent tubes. The normal wattage of the lighting is 1 watt per 2 liters of water.

### C. Filter system

The filter cleans the aquarium water mechanically and biologically. It consists of practical chambers in which the filter medium and the submersible pump are placed. The aquarium heater is optional.

The filter may be divided into prefilter and main filter. Prefilter materials are biofilter fibers and/or filter wool. The filter medium cleans the water mechanically by removing dirt particles from the water.

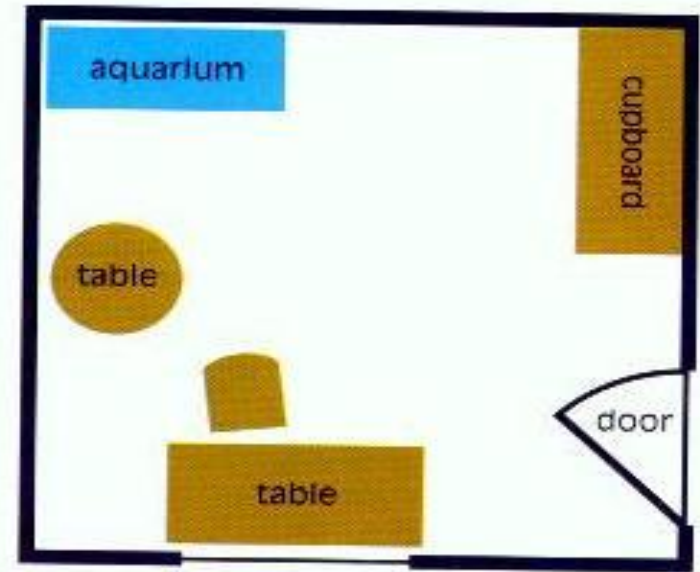
In the main filter, useful bacteria break down the water pollutants such as fish excrements biologically. It is the ideal setting medium for useful bacteria.

## AQUARIUM SETTING

### Location

When choosing a location for an aquarium, consider that moving the aquarium is difficult after it is set-up. A decorated and filled 100-litre aquarium weighs up to 150 kg without the cabinet. The stability of the floor, especially in older building must be considered. Also, consider the viewers' weight surrounding the aquarium. A small aquarium can add to more than 300 kg in a small area of floor space.

A quiet place in the room that is far away from windows is the most ideal area. Sunlight is discouraged because it promotes algal growth. Also, the fish tend to swim in a slanting way (mouth pointing up) towards the sunlight.



Optically, the aquarium stands out better in a dark corner of the room. Also, the fish are not disturbed by frequent human traffic, like opening and closing of doors.

Plan with an ideal layout. Sketch the rock, driftwood and plants formation. The sketch is helpful and will give you an advance idea of how the aquarium will finally look-like.

- Consider ample shelter for the fish. Caves can be built from slab-shaped stones or stones with holes.
- Stones containing lime or metallic-contained stones must be avoided.
- Plant large or tall plants at the back pane of the aquarium so as not to obstruct the view of the aquarium. Place the short growing, smaller and lawn-forming plants at the foreground.
- Obscure the sight of equipment, such as the filter, heater,