

How to Create an Organic Aquarium

*The Beginner's Guide to Soil-Based
Freshwater Aquariums*

OLIVER JAMIESON

ACRE PRESS

an imprint of

Egg Publishing

ACRE PRESS

An imprint of

Egg Publishing

eggpublishing.com

First published 2025

001

Copyright © Oliver Jamieson, 2025

The moral right of the author has been asserted

All rights reserved

The permission under 'Epigraph' on page 213 constitutes an extension of this copyright page

Please note that the information contained within this publication is for educational and entertainment purposes only. Whilst the publisher has made every reasonable effort to ensure the information presented is accurate and complete, no liability can be accepted for any loss incurred in any way whatsoever by any person acting, or refraining to act, as a result of reading the information contained herein.

All images copyright © Egg Publishing 2025

Edited by Sophie Judge

Proofread by Lisa Stephen (Eagle Editing)

Interior design by Wendy Mach (White Stone Pages)

Cover design by Wendy Mach (White Stone Pages)

Illustrations by Cahyani G. Mulwinda

A catalogue record for this book is available from the National Library of Australia

ISBN: 978-1-763-71379-6 (Hardback)

ISBN: 978-1-763-71377-2 (Paperback)

ISBN: 978-1-763-71378-9 (eBook)

hello@eggpublishing.com

7

Setting Up Your Aquarium

SHOPPING LIST

EQUIPMENT

TANK

- ☐ Container – a clean glass vessel

LIGHT

- ☐ Adjustable desk lamp
- ☐ 15–23W CFL daylight bulb
- ☐ Plug-in timer for ‘siesta’ schedule

SUBSTRATE

- ☐ Soil substrate – organic potting soil or topsoil without added fertilisers
- ☐ Cap – coarse sand (0.5–2 mm) or fine gravel (2–3 mm)

PLANTS

- ☐ Floating plants (e.g. duckweed, frogbit)
- ☐ Root-feeding plants (e.g. crypts, swords)

How to Create an Organic Aquarium

- ☐ Water-column feeders (e.g. hornwort, bacopa)
- ☐ Epiphytes and mosses (e.g. Java fern, anubias, Java moss)

WATER

- ☐ Reliable water source
- ☐ Water conditioner – to remove chlorine/chloramine
- ☐ Liquid test kit (ammonia, nitrite, nitrate, pH, GH/KH)
- ☐ Thermometer

MAINTENANCE

- ☐ Clean 5-gallon bucket (aquarium use only)
- ☐ Plastic tubing for water changes
- ☐ Scissors (aquarium or clean kitchen scissors)
- ☐ Aquarium net
- ☐ Plastic card, or a razor blade scraper – to shape soil and clean glass
- ☐ A clean cloth or kitchen roll – for cleaning the glass during setup
- ☐ Spray bottle – to keep plants moist during setup

EXTRAS

CONDITIONAL

- ☐ Heater
- ☐ Small filter/pump

OPTIONAL

- ☐ Spoon or cup – for distributing soil and cap
- ☐ Measuring stick or ruler – for measuring soil and cap depth
- ☐ Hardscape (rocks, driftwood, or decor)

Setting Up Your Aquarium

- ☐ Aquarium-safe superglue (cyanoacrylate gel) – for securing hardscape and attaching epiphytes and mosses
- ☐ Planting tweezers – for planting and propagating

THE PREP

POSITIONING YOUR AQUARIUM

You want to interact with your ecosystem regularly. Find a location where you can easily observe and maintain it.

Position it on a sturdy, level surface. Water weighs approximately 1 kilogram per litre – plus substrate, plus hardscape. Ensure your surface can support this load. Make sure the aquarium is in its final location before beginning the build: a filled tank should not be moved.

If you are using a second-hand tank, fill it and leave it for several hours to make sure it holds water. You do not want to spend hours creating a beautiful aquascape only to find the tank's seams don't hold water.

The light, heater, and filter need power, but all aquariums occasionally splash. Place your aquarium near outlets but far away enough to avoid splashing risks. Similarly, choose a location where spills won't damage furniture or flooring.

The aquarium's position should be away from direct sunlight, drafts, radiators, or air conditioners. The surface it is on should also be resistant to temperature swings (e.g. wood rather than stone). We want to create stable conditions; these factors can all cause temperature fluctuations and excessive algae growth.

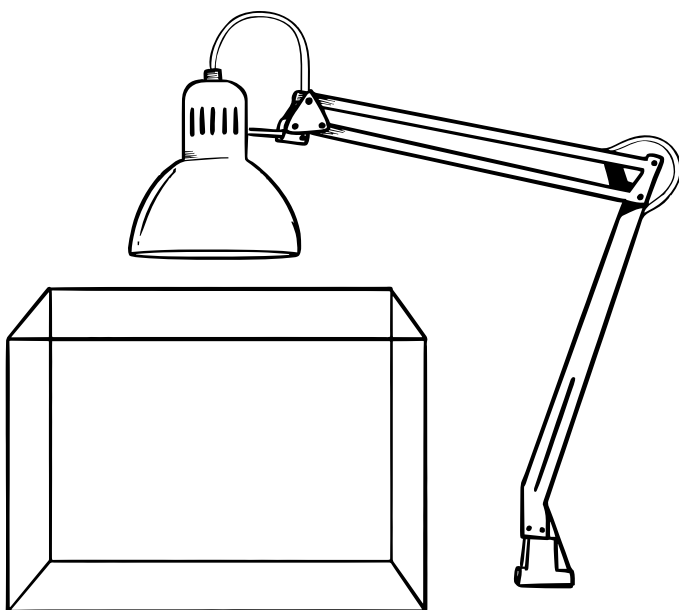
SETTING UP YOUR LIGHTING

Before planting your aquarium, it is important to set up your light. The interplay of light and shade have a big effect on the look of your aquarium. This is an aesthetic and practical consideration. If your hardscape casts most of the tank in shade, your plants are going to struggle.

How to Create an Organic Aquarium

As a starting point, position your lamp so that the light source sits 15–20 cm above the top of the tank. This can be adjusted later based on plant response. Make sure that the light is evenly distributed across the aquarium.

Prepare the plug-in timer for its ‘siesta’ lighting schedule (4 hours on, 4 hours off, then 4 hours on) to balance plant growth and discourage algae. This can be connected at the end once your aquarium is assembled. In the meantime, just plug in the lamp and use the light to guide your hardscape and planting.



PLANNING YOUR LAYOUT

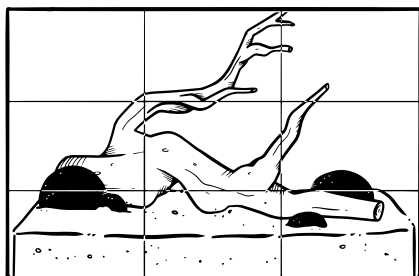
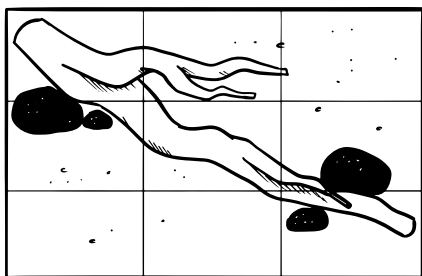
Find an inspiration, then keep it simple.

Research natural environments: riverbanks, lakeshores, forest streams. Look at how plants, hardscape, and light interact in these habitats. Aquarists of all abilities and budgets share their aquascapes online and it is a brilliant resource for ideas. There is a list of recommended forums and YouTube channels at the end of this book to get you started.

Setting Up Your Aquarium

Here are some key design principles to help guide your layout:

- Create asymmetrical compositions (odd numbers of rocks look more natural).
- Establish focal points with larger elements (the rule of thirds helps position these).
- Include negative space for visual relief and fish swimming areas.



Once you have your hardscape, you can start to experiment with various dry arrangements. Use the aquarium box, or mark out the tank's dimensions with tape, as a size guide. Alternatively, you can temporarily fill your aquarium with your cap material and test different designs inside the aquarium. Adding the cap material at this stage protects the bottom of your tank and holds the hardscape in place as you experiment. With the aquarium lighting in place, you will get a much better understanding of how the finished result will look. Just note that you will have to remove the sand or gravel before proceeding with the build.

Photograph different arrangements as you experiment and see which composition you like the most. If you are undecided, step away for a day or two. See which composition you are most drawn to when you return. It is easier to spend time iterating with dry arrangements than it is once the tank is planted.

Don't overthink the design process. The most important thing to remember is that it is your tank. If you like the way it looks, you've succeeded.

Once you have decided on your layout, you are ready to start building.

THE BUILD

SUBSTRATE

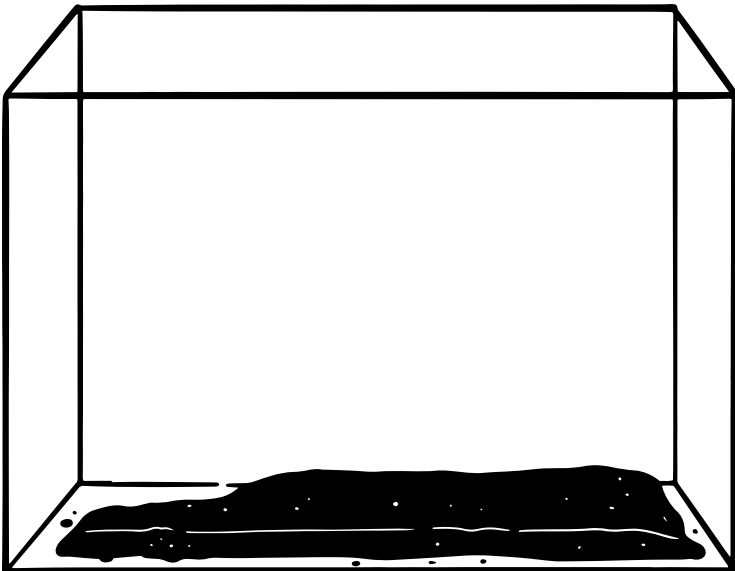
ADDING THE SOIL

Prepare and portion the soil; be careful to distribute it at a consistent depth:

- Under 10 gallons: 2 cm depth
- 10–40-gallons: 2.5 cm depth
- 40 gallons and up with big plants: Up to 4 cm depth.

When distributing this layer, place less soil in areas that will be covered by hardscape.

Once in the aquarium, wet the soil with dechlorinated water until saturated (this makes it easier to manage during the capping). Then, use a plastic card to create a 2.5 cm gap between the soil and the aquarium walls. Lastly, clean any soil residue from the glass.



Setting Up Your Aquarium

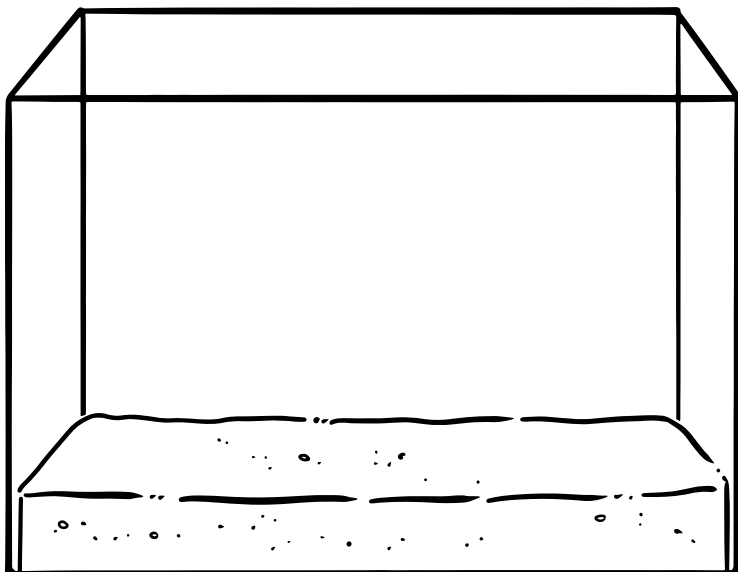
CAPPING THE SOIL

Clean your cap material before adding it (this can be done ahead of time). The easiest way to do this is to add your cap to the bucket and fill it with water. Stir the cap material by hand and drain the cloudy water away. Repeat this until the water runs clear. Whatever dust and dirt you remove at this step is what you would otherwise have introduced into your aquarium.

When adding the cap, start by filling the gap between the soil and the aquarium walls; this will prevent the soil from being pushed into this clean area you've just created. Repeat for the areas with less soil cleared for hardscape. Once filled, gently cover the soil with a uniform layer:

- Coarse sand (0.5–2 mm): 2.5 cm depth
- Fine gravel (2–3 mm): 3.5–4 cm depth.

Check your substrate depth as you build to make sure you are building to your desired soil and cap measurements.



How to Create an Organic Aquarium

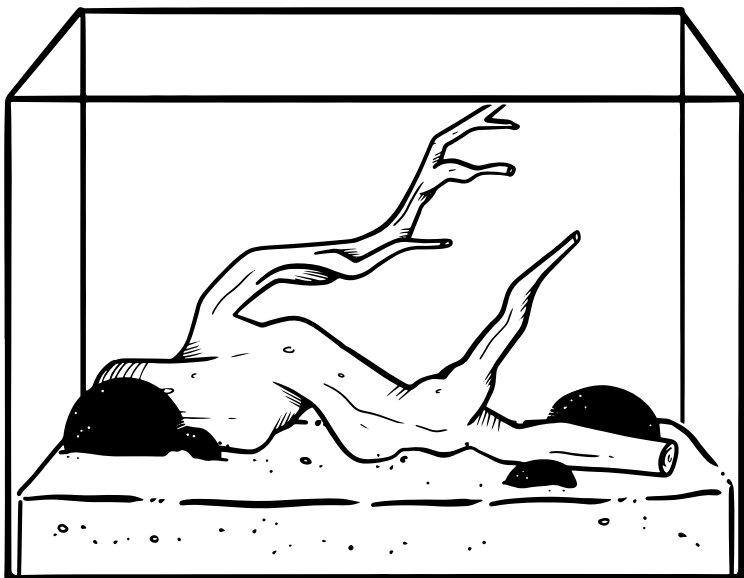
HARDSCAPE

With your substrate in place, you can now finish your layout. Be mindful to position the hardscape in the areas designated so that you don't compact or disrupt any soil.

If you are using driftwood, make sure it is waterlogged or attached to rocks to hold it in place. If the driftwood floats when the aquarium is filled, it can disrupt the layers of the substrate and pull soil into the water column.

If you are using rocks, make sure they are stable. If they wobble when tapped, reinforce them. This can be easily done by superglueing elements together at key contact points. If an unstable rock falls in your aquarium, it can easily break the glass and cause disaster. Better safe than sorry.

Once in place, you can enhance the layout with smaller stones, detail rocks, or thin pieces of wood to tie the whole scene together. By adding a variety of stone fragments, especially around larger hardscape elements, you can visually connect the cap to its surrounding environment.



Setting Up Your Aquarium

PLANTS

Heavy planting from day one is the best way to set your aquarium up for success. Aim for at least 50% coverage immediately to stabilise the aquarium environment quickly.

Prepare your plants for planting by removing their packaging and cleaning them gently. Trim away any damaged or dying leaves. You can also trim excessively long roots but only if required; it is best to preserve as much of the root as possible. Mist plants with dechlorinated water during planting to prevent them from drying out and maintain moisture until the aquarium is filled.

Start by attaching the epiphytes and mosses to the hardscape. Place epiphytes securely by wedging them into place, or by attaching the rhizome to the hardscape with aquarium-safe superglue. Similarly, mosses can be attached to smaller stones or directly to hardscape by using a thin layer of glue. When using superglue to attach plants to hardscape, less is more. You only need a small amount of glue as a contact point; too much can smother the rhizome.



How to Create an Organic Aquarium

Once the epiphytes and mosses are in place and secure (and the glue is drying), we can start planting in layers. Plant deeply into the substrate: ensure the base of the plant is pushed through the cap layer and into the soil below. Plant small species in the foreground, and taller plants in the midground and background.

The fast-growing water column feeders can be planted last, once the aquarium is filled. It is much easier to see how they sit in the aquarium once you can see them in their full height.

WATER

Once you have finished planting, treat your water according to the conditioner's instructions and fill your aquarium gradually until the water level is approximately 2.5 cm from the top. (In larger tanks, water conditioner can often be added directly to the tank to make filling easier.) It is important to not disturb the substrate layers when adding water. Place your hand, a clean sponge, or a piece of bubble wrap onto the substrate and pour water slowly onto it. This will displace the water and prevent it from



Setting Up Your Aquarium

disrupting the cap and soil below.

Once filled, check to make sure your substrate, hardscape, and plants have not been disturbed. Plant the remaining stem-plants and any uprooted plants – you can use small stones to temporarily hold them in place if they stubbornly keep floating up.

At this stage, mount any additional equipment. If you are using a filter or water pump, wait for any initial cloudiness in the water to pass, then install. The outflow should be placed low to reduce surface agitation, and the flow rate should be minimal. Just enough to ensure a gentle circulation of the water throughout the aquarium. If you are using a heater, ensure it is positioned where it will not be smothered by plants or hardscape. If there is a filter or water pump in the aquarium, place the heater close to the filter outflow. This will help distribute the heat evenly throughout the system.

Lastly, spread the floating plants across the water's surface, making sure they are all the right way up. If you are eager to try houseplant hydroponics, this is the perfect time to add them.

THE BALANCE

INITIAL WATER CHANGE

Within 24 hours of setup, perform a 50–75% water change. This significant water replacement helps clear initial cloudiness and tannins released from the substrate and hardscape, ensuring clearer water for observing your aquarium's development. Refill gently with dechlorinated water to avoid disturbing plants and substrate.

For the next 4 weeks, refrain from performing any further water changes. This period allows the biological processes to stabilise and beneficial microbes to establish a balanced ecosystem naturally.

If some plants die or melt causing coverage to drop below 50%, add more floating and fast-growing species to prevent algae from gaining the advantage. If you are starting with under 50% plant coverage, perform small water changes (10–25%) twice a week for the first 4 weeks and propagate fast-growing species.

How to Create an Organic Aquarium

TIMELINE

- **Weeks 0–4 (Pioneer):** Expect initial cloudiness, biofilm growth, and early algae blooms such as brown diatoms. These initial signs are natural and indicative of biological activity. Do not introduce any animals during this stage. Let plants establish themselves and microbes colonise the aquarium.
- **Weeks 4–8 (Intermediate):** Monitor water parameters closely. Once ammonia and nitrite levels remain consistently at zero, introduce your hardy clean-up crew: shrimp and snails. These organisms will help manage algae, detritus, and biofilm, supporting the detrital food web.
- **Week 8 onwards (Climax):** If water parameters remain stable (i.e. ammonia and nitrite stay at zero) and plants are growing healthily, slowly introduce fish. Add fish in small groups and monitor water quality closely after each addition to ensure the biological filtration adjusts to increased bioload without disturbance.

TESTING

Test water parameters regularly (ammonia, nitrite, nitrate, pH, GH/KH) to confirm stable, healthy conditions. Test every few days in the pioneer stage; every other day in the intermediate stage; and every day in the first couple of weeks of the climax stage (after introducing fish). Consistent testing allows prompt detection and management of potential imbalances, ensuring your aquarium remains a thriving, balanced ecosystem.