**Marine Aquatic Ecosphere**

The exciting thing about marine aquatic ecospheres is that scale need not be an issue. People have been able to build sustainable ecosystems using fresh ocean water in 65ml beakers. If you're planning on using a 2 litre container or smaller, it's not a good idea to use vertebrates. However, if you have a larger container using vertebrates could be an option, so long as the species are chosen carefully.

Marine aquatic ecospheres can be tricky to set up. And if you want a larger system they can also be expensive, particularly if you want to keep fish.

**Things to consider in a marine system:**

**Temperature** - the optimal temperature is between 18-25 degrees Celsius. Lower temperatures slow down the metabolism of the organisms and increase life span. Don't let your ecosphere get hotter than 30 degrees, as your animals will die.


**Light** - you may need to buy special lights with the correct UV balance for tropical fauna, as this helps them to grow and reproduce. Small marine organisms do have circadian patterns, so it's probably best to create a night/day cycle in their lighting.

**Salinity** - a marine system requires that you get the salt balances right. You'll need either fresh seawater, or a hydrometer and sea salts from an aquarium shop.

**Nitrate Levels** - if the nitrate levels of your system aren't right, your marine aquatic organisms will die. You will need to adjust the nitrate levels of the water to make it ready for the animals (and to balance your system) before you add any fauna. This can take anywhere from a week to up to six weeks, so don't expect to put your fauna into your tank straight away. Balancing the water takes time.

**You will need:**

- A transparent jar, bottle or container with a top large enough to put your hand into. (Ours is a cylindrical glass vase.)
- Calcium Plus. These are grey stones, available from marine fish shops, which help balance the pH levels of your water.
- Live sand. This is sand that contains micro-organisms and helps start your system, also available from a marine fish shop.
- Ocean Rock and Live Rock. Don't use normal rocks from your garden, as these will introduce minerals into the water that may kill the animals. Live Rock has algae living on it and acts as a natural filter for your water. Do not add until your water has been balanced.
- Biological aquarium supplement (such as bio-mature or nutrafin). This balances the water and controls nitrate levels before initial population. A supplement is not needed if you use sea water.
- Shelless brine shrimp eggs or live brine shrimp.
- Sea salt. Available from your marine fish shop. Not needed if you use sea water.
- A hydrometer so that you can measure the amount of sea salt needed. Not needed if you use sea water.
- A nitrate test kit for balancing nitrate levels in your system. Particularly important if you want to keep fish.

We also gathered some live seaweed to pop into our system. This is a good idea if you have access to the ocean.

**Optional Equipment for larger systems:**

- Biological under-gravel filter
- Multi-use submersible pump for under-gravel filters. If you have a small bottle and add enough plants, you will not need this. We had a large jar so we opted for a filter and a pump. (We used a maxi-jet PH Power head pump, but any submersible under-gravel pump would suffice).
- Small piece of plastic tube to connect the under-gravel filter to the pump.

**What to do:**

**Step 1:** Rinse your Calcium Plus (grey rocks) under running water to remove excess dirt and calcium dust. If you don't get rid of the excess dust the pH levels of the water will be incorrect.

**Step 1a: (if using a filter)** Place the biological under-gravel filter at the bottom of your tank or bottle. It's a plastic sheet with holes in it, so if it doesn't fit just cut it to size. Attach the filter pump to the under-gravel filter pipe with a small piece of plastic pipe.

**Step 2:** Place the Calcium Plus and live sand over the bottom of the jar (or over the top of the under-gravel filter).

**Step 3:** Add water. If you're not using sea water, purified water is best, but beware - it takes weeks to balance. It might be better to buy some already conditioned water from your aquarium shop if you don't have any sea water handy. Ensure that you leave space at the top of your jar for air. Note: If you're using sea water you don't need to do the next step.

**Step 4: (if not using sea water)** Measure the salinity of the water with the hydrometer. You do this by floating the hydrometer in the water. It should stabilise and break the water at a certain level. Add salt (or water) to adjust salt levels until it breaks the surface of the water at the green marker.

**Step 5:** Add the Ocean Rock to create an attractive environment. Do not add the Live Rock at this stage.

**Step 6:** Using the nitrate test kit, measure the nitrate levels - and cross your fingers. If your levels are acceptable, you're ready to go. If not, you need to use your biological aquarium supplement to adjust your nitrate levels. How much you use and how frequently depends on how much water you have. THIS PROCESS CAN TAKE WEEKS!!!

**Step 7:** If your nitrate levels are good, add your animals, Ocean Rock and Live Rock.

**Step 8:** Close the system by sealing the jar.

**Step 9:** Keep your results. Record the size of your container, number and type of plants and animals, and how much sand and gravel you used. Then try to keep track of what's happening in your system. Count your animals, record plant growth and animal deaths. You might also want to record the sunlight levels; even though you shouldn't be keeping your ecosphere in direct sunlight, the ambient light levels effect your system.

**Step 10:** Log on to the DIY Science forum at http://www.open2.net/forum and tell us about your results. You can do this daily or all in one go if you like. Then go to the results page to check out how ours went!