

# Plumbing Essentials: Getting Started

*Drs. Foster & Smith Educational Staff*

[Plumbing](#), whether elaborate or simple in design, is essential for the ongoing health of your aquarium. The configuration of tubing, fittings, valves, joints, etc., performs the vital task of transporting water from your aquarium to your filtration unit(s), then back.

## Connectors

Connectors are either essential or optional.

### Essential connectors include:

- **Slip fittings** have a smooth interior and exterior and are used with PVC cement to permanently glue pipes together.
- **Barbed fittings** have barbs on the outside to provide a watertight connection with [flexible tubing](#). [Hose clamps](#) secure connection.
- **Threaded fittings**, either female pipe thread (FPT - threads inside, smooth outside) or male pipe thread (MPT - smooth inside, threads outside), simply screw together. Use teflon tape on threaded MPT fittings for a watertight seal.



### Optional connectors are for streamlining.

- Watertight union connectors let you disconnect plumbing without moving pump or filter, or loosening clamps.
- [Ball valves](#) control flow rate without harming the pump, or can be used to divert water during maintenance.

## Connecting the Connectors

Aquarium systems employ either soft plumbing or hard plumbing.

- **Soft plumbing** consists of flexible [vinyl tubing](#) connected with barbed fittings and [clamps](#). Soft plumbing is easy to clean, easy to disconnect, and flexible enough to set up without flow-restricting elbows.
- **Hard plumbing** is using PVC pipe with either threaded or permanently glued fittings. Hard plumbing is often used with high flow rates and high water pressure. However, hard plumbing is time-consuming to disconnect/reconfigure; if your setup changes, or you need to add plumbing, you must cut the PVC apart and replace it.