Mayfly in the Classroom:
Basic apparatus assembly

What you need

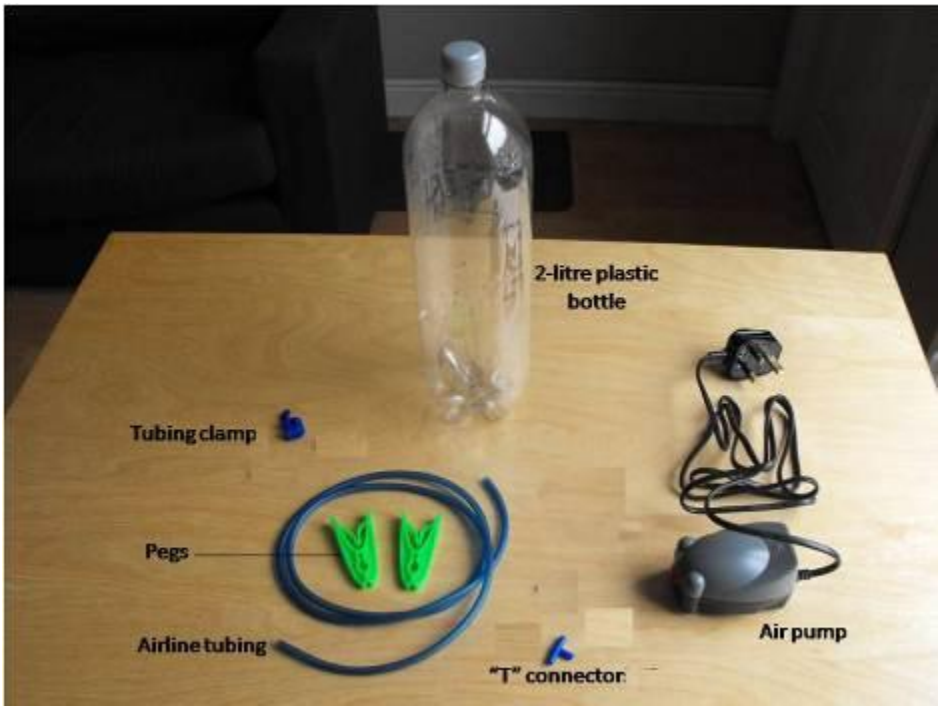
Up to 6 vessels can be employed in a Mayfly in the Classroom system.

Equipment requirements (1 vessel):

- 1 x 2-litre clear plastic bottles (two mayfly nymphs per bottle)
- 1 x Tubing clamps
- 1 x "T" connectors
- About 20- 30 cm of soft plastic airline tubing (6mm diameter)
- 2 x clothes pegs or small bulldog clips
- 1 x electric air pump
- Deep sided tray to sit in
- Ice/cold packs

Optional:

- Turkey baster type pipette (can be used to handle nymphs)
- Airstones or 200-µl volume pipette tips – to regulate airflow
- Thermometer

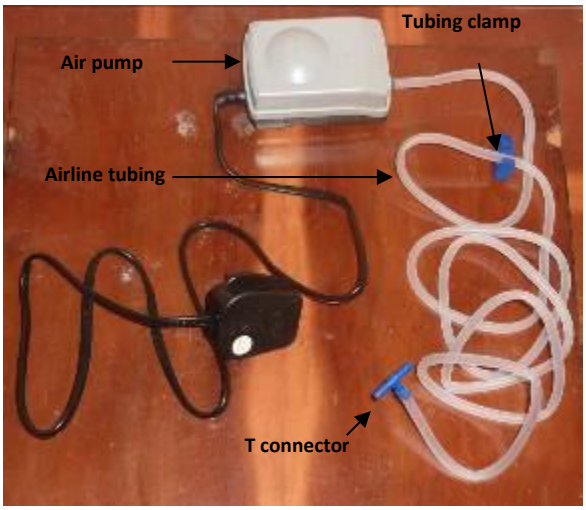


Basic equipment for mayfly vessels ready to assemble

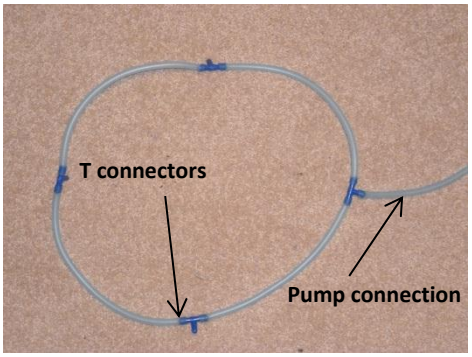
Assembly – 5 steps

1. **Make the vessels:** Cut off the top third of three plastic bottles using scissors and punch a circular hole in each bottle lid. Safety concerns may dictate that this is done by the teacher before the lesson. Use circular bottles (e.g. coke bottles) rather than bottles with squared edges.

2. **Connect airline tubing to the electric pump:** Using scissors; cut about 90cm length of airline tubing and push it into the connection on the pump. Fit a tubing clamp at any point on this length of tubing. This will regulate the total flow of air into the system. Then, connect a ''T'' connector to the end of the tubing.

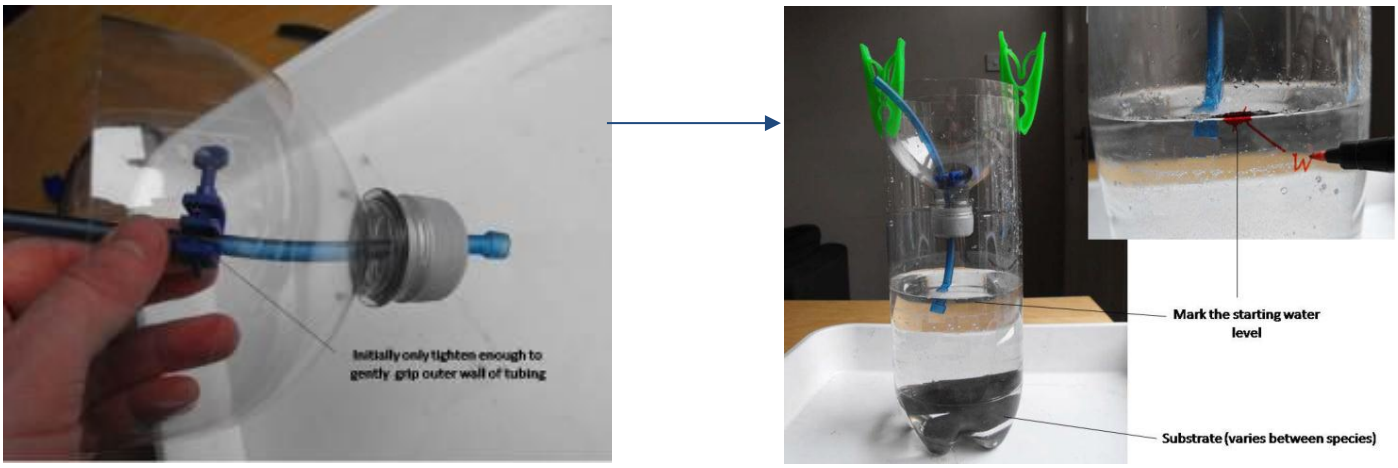


3. **Assemble the airline:** Fix 20cm stretches of airline to the ''T'' connector. Insert two other ''T'' connectors to the 20cm stretches. By repeating this arrangement, either an O ring (see below) or inline configuration can be made. The tubing branches that will connect the aquariums to the open ends of the ''T'' connectors are made in the next step.



4. **Prepare the vessels:** making sure the bottles have some water in them, thread lengths of tubing through the bottle top holes, judging how much is needed before cutting them off level with the top of the bottles. Put an airline clamp on each length of tubing, this will regulate how much air

is pumped through. Do not fully tighten the tubing clamps at this stage as it will cause a blockage when the air pump is switched on. If you wish, you can fit an airtsone to the end of the airline tubing entering the bottle. Water should be filled up to a point about 5 cm below the level that the screw cap will sit. This water level should be marked on the side of the vessel. The conical section can be inserted into the main vessel and secured with the clothes pegs as shown below. Leave some of the tubing clear of the water; nymphs will crawl up this when they hatch.



5. **Connect the system:** connect the three 'T' connectors on the airline to the three tubing lengths on the bottles then fix the open connector connecting the electric pump to the airline together. Place the bottles in a tray filled with water for added stability; ice/ice packs can be added to the water to maintain a constant temperature. At this point, it may be necessary to **manipulate the clamps** so that each bottle is getting an adequate supply of oxygen. Clothes pegs can be used to fix the top part of the bottle (see set up on left).

Final 3 vessel setup configurations; **(inline) left, O-ring (right).**

The setup should sit in a tray; water and ice blocks are then added to the tray to regulate the temperature accordingly.

Final considerations & tips

- See **'Maintenance & Care** for subsequent instructions
- The substrate appropriate to your particular type of mayfly nymph (see table below) should be added to the vessel

Table of substrates for each mayfly type.

Mayfly "type"	Families	Substrate
Burrower	Ephemeridae, Caenidae	River Sand/gravel
Agile Darter	Baetidae	Pebbles/water crowfoot
Stone Clinger	Heptageniidae	Pebbles
Crawler	Ephemerellidae	Gravel/Sand/aquatic plants such as water crowfoot

- Each vessel (bottle) should house 2 mayfly nymphs
- Icepacks or ice can be used to keep the temperature constant
- Students can be split up into different groups when assembling the kit
- Nymphs raised in river water typically show better survivability than those in mineral water
- Important – the air pump must be (securely) positioned ABOVE the level of the water in the vessels. This is to avoid the possibility that, during a power cut, the water could siphon out of the vessels via the aeration system. As an alternative, a simple one-way valve could be fitted to the system.
- Before switching on the air supply – the individual clamps for each bottle should be fully open

Customize your setup

- To simplify the setup further; a small plastic tank (see below) can be used in the place of bottles. These retail at about £5 and can be purchased at most pet-shops and aquarium stores. The advantage of this setup added stability and visibility. More nymphs (up to 4) can be housed.