

Introduction

This set of mini-projects is based on the work done for the British Ecological Society (BES) by Stephen Tomkins and Michael Dockery and published in the book *Brine Shrimp Ecology* (ISBN 1 900579 10 3). All of the information given here is adapted from the book, which contains much additional background information and ideas for further investigations.

Further information is available from the Society at BES, 26 Blades Court, Deodar Road, Putney, London SW15 2NU or at <http://www.demon.co.uk/bes>.

We are pleased to acknowledge permission to use this material and the help given by the authors.

Running the activity

A single large bottle or covered tank can be set up to provide a stock of shrimps at different stages of development. The sand/crushed shell or limestone mixture from the bottom of the tank will become impregnated with decomposer microbes. Some of this (about 30cm³ for each litre of water) should be transferred into each new 'pond' which is set up for experiments. Plastic drinks bottles of various sizes (150cm³, 330cm³, 1 litre or larger), beakers or wide-necked jars make good 'ponds'.

'Ponds' need to be set up a few days before experiments begin and left in a well-lit place to allow algae to grow before the shrimps or eggs are introduced. Sea salt sold for making up marine aquarium water contains essential minerals needed for healthy growth and will help to make colonies last longer.

Addresses for purchase of shrimps, shrimp egg cysts and other requirements are given in the technician's notes.

Possible investigations

Pupils can investigate the conditions needed for successful hatching of eggs. Salinity, temperature and pH are all important. Different students or groups can investigate each variable, whilst holding the others at constant values. Optimum values are 2.8% salt, 28 °C and pH 8.5. Eggs should hatch in between 24 – 48 hours. Young larvae should be fed by adding one or two drops of a proprietary feed such as Liquizell (from pet shops), then returned to an established stock tank.

The preference of shrimps for the top or bottom of the tank can be tested. Adult males seem to wander up and down more than young or females.

Pollution studies should show that if the algae are inhibited or killed, this cuts off the food supply to the shrimps. The green colour of the water will fade after Simazine is added.

Several other studies are suggested in the Brine Shrimp Ecology book, and this would allow a full class or science club group to work collaboratively on an overall study of the life-cycle of the shrimps.

Trouble-shooting: If the shrimps fail to thrive

Breeding does not readily occur below 25°C. Shrimps may die if the temperature rises too much above 28°C. Algae need light for photosynthesis – a bench light or Grolight may be used if natural illumination is low.

As part of the trials of this project, we should be very grateful to receive information about any arrangements of apparatus that work particularly well, and also any which should be avoided!

Learning outcomes

- Assessment of chemical hazards
- Development of investigative skills
- Understanding of photosynthesis
- Appreciation of feeding relationships and recycling of nutrients

Prior learning

It is helpful if students have some knowledge of food chains and photosynthesis.

Where the activity fits in

- Sc 1 skills development
- Sc 2.3a - d
- Sc 2.5a - f

Skills

Pupils' general manipulative skills will be developed by these exercises with basic laboratory apparatus.

Where investigations extend over more than one session, skills in planning and monitoring progress will be enhanced.

Where a class or group collaborate to share out tasks in order to give wider coverage of the chosen topic, skills of working with others will be demonstrated.

Communication skills are involved in locating information about the substances tested and in writing reports.

Safety

Eye protection should be worn at all times when any of this practical work is in progress.

Pupils should wash off splashes of liquid immediately, and wash hands after each working session.

Brine shrimps or eggs from commercial suppliers may come with safety information, which should be incorporated into any hazard assessment or instructions to pupils. Brine shrimps are living creatures, so should be handled gently. Careful transfer in sieves or pipettes should cause no harm or distress, but care must be taken not to injure the delicate legs of the shrimps, or to let them dry out.

The chemicals used in making up the 'ponds' are of low hazard. If herbicide experiments are used, it is recommended that you obtain the pure, ready diluted herbicide from Homerton College, which comes complete with safety guidance. Do NOT use agricultural brands, which may present serious risks.