# Topic 4 – Practical 1

## *Setting up a mesocosm*

### Safety

• There are no specific safety hazards associated with this practical.

### Apparatus and materials

• a large glass container, such as a carboy, with a narrow, sealable neck

• good-quality potting compost

• grit or shingle

• a selection of small plants such as small ferns (indoor ‘maidenhair’ or *Adiantum* sp.), *Tradescantia* sp. and small *Chlorophytum* sp., small trailing plants such as *Soleirolia* sp. (‘Mind your own business’) or other suitable plants available locally

### Introduction

The idea of a mesocosm is to create a self-sustaining environment in a small enclosed space. Such systems may be terrestrial or aquatic. Each has its own special characteristics and should require little maintenance in the short term. The longest established terrestrial mesocosm survived for more than 50 years with minimal maintenance. Larger scale mecososms are used by scientists to study the effect of environmental changes and model the breakdown of toxic substances in the environment.

### Procedure

**1** Use a large spoon to insert a layer of grit on the bottom of the glass container.

**2** Cover this layer with compost to a depth that will accommodate the roots of the plants and is suitable for the size of the container (approximately 6–8 cm).

**3** Introduce the plants, using a stick or tongs to manipulate them into place and position their roots in the compost. Use small plants and space them evenly.

**4** Cover the compost between the plants with a thin layer of grit to keep the compost in place.

**5** Add a small amount of water to the container but do not over water as this will lead to decay of the plants, and fungal growth.

**6** Place the mesocosm in well-lit position but away from windows that receive a great deal of intense sunlight.

**7** Seal the container tightly.

**8** The plants will grow over a period of weeks and months. In the early stages it may be necessary to adjust the water in the container but otherwise the container should not be opened.

### Questions and further work

Note your responses on separate paper.

**1** Make careful observations of the mesocosm. Note the appearance of water vapour on the insides of the container and the times when this occurs.

**2** Estimate the relative growth rates of the different plants in the container. Assess the effects that each has on the others.

**3** Research the potential use of plants as ‘scrubbers’ to remove pollutants in space stations. Can a space station be considered to be a larger version of a mesocosm?

**4** Use the ‘systems’ approach to discuss the mesocosm. What are the inputs and outputs of the system? Is the system open or closed?