

V. AQUARIA AND TERRARIA

A. CLASSROOM DEMONSTRATION AQUARIA

This is the most common type of aquarium and is used for student observation of the various relationships demonstrated by an ecosystem. Therefore, this type of aquarium is characterized by the use of glass.

B. BREEDING AQUARIUM

This is used to provide places for maintaining and growing a supply of aquatic organisms. Since the purpose is not primarily that of student observation, glass sides are not necessary.

C. TEMPORARY AQUARIUM

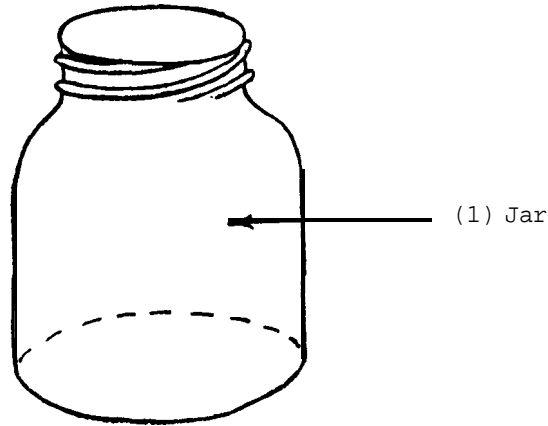
This is useful for short-term storage of fish and aquatic plants. Depending on the materials used, the temporary aquarium will suffice to hold plants and animals for approximately one to seven days, or much longer if care is taken in its construction.

D. TERRARIA

Any container in which plants can be grown will serve as a terrarium. The chief criterion for such a structure is that it be large enough to give the desired plants room to grow without crowding.

A. CLASSROOM DEMONSTRATION AQUARIA

Al. Quickly Made Demonstration Aquarium



a. Materials Required

<u>Components</u>	<u>Qu</u>	<u>Items Required</u>	<u>Dimensions</u>
(1) Jar	1	Glass Jar (A)	2 liters or larger

b. Construction

(1) Jar

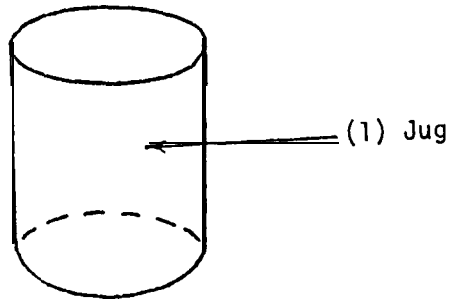
Simply clean out the jar (A), add water and fish. Sand and small plants may also be added.

c. Notes

(i) The number and size of fish which can be kept in a non-aerated aquarium varies, but a general rule is at least 2 liters of water per each centimeter of fish. Remember that the amount of oxygen available to the fish depends on the surface area of the water so that jars with narrow necks should be filled only to the point where the neck begins to narrow.

(ii) This or any aquarium may be covered to prevent fish from jumping out, but remember to allow some air flow under the cover to insure that oxygen will dissolve from the air into the water.

A2. Jug or Carboy Aquarium



a. Materials Required

Components

(1) Jug

Qu Items Required

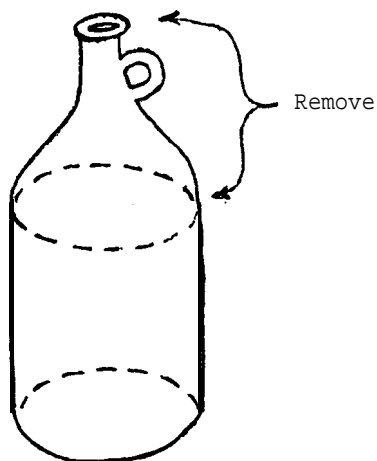
1 Glass Jug or Carboy (A)

Dimensions

3-4 liters or larger

b. Construction

(1) Jug



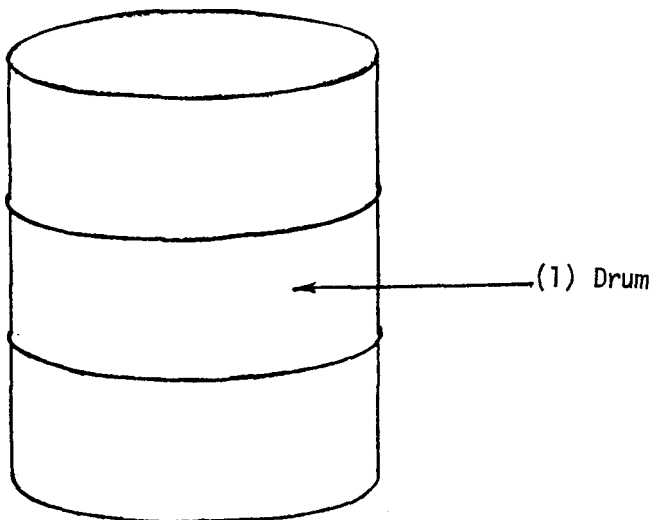
Remove the top portion of a jug or carboy (A) by either method described under item CHEM/I/F2.

c. Notes

(i) When the neck is removed, add water, sand, plants and fish. Remember, at least 2 liters of water is required for each centimeter of fish.

B. BREEDING AQUARIUM

B1. Breeding Aquarium



a. Materials Required

<u>Components</u>	<u>Qu</u>	<u>Items Required</u>	<u>Dimensions</u>
(1) Drum	1	Oil Drum (A)	100 liters or larger

b. Construction

(1) Drum

Remove the top from a large oil drum (A) or any similar container. Clean the drum thoroughly before adding water, plants, sand and fish.

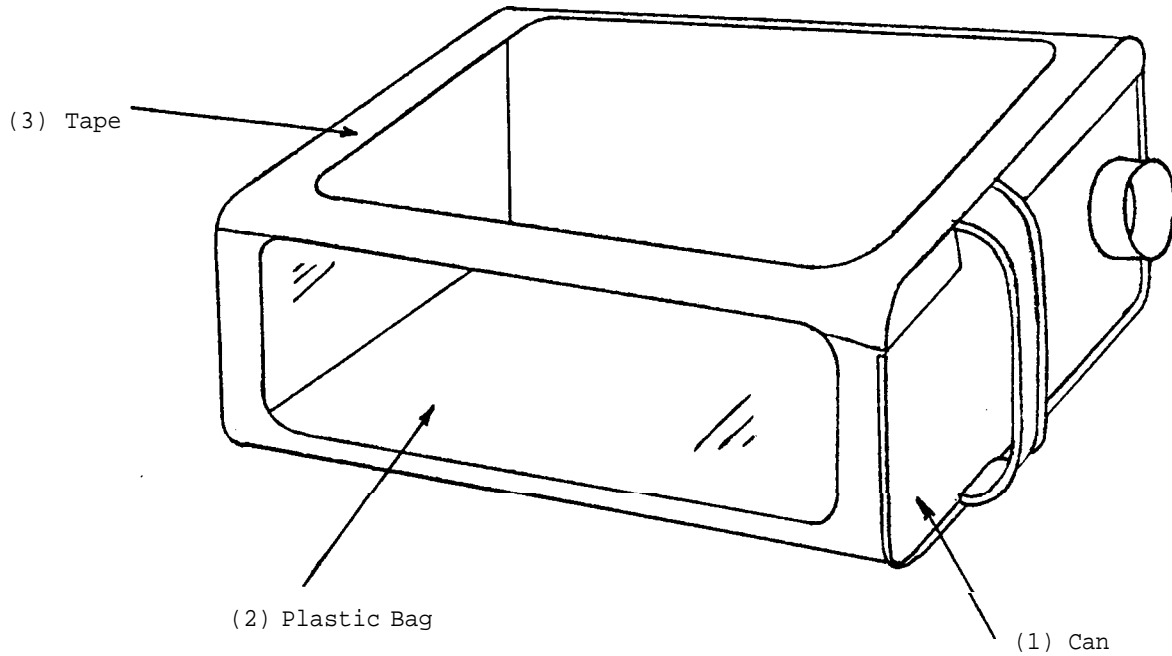
c. Notes

(i) Since many fish breed best or only when plants are present in the aquarium, a light source may have to be placed over the top of the drum to provide for healthy plants.

(ii) Most fish are extremely sensitive to water containing a high concentration of metallic ions, so the drum should be lined with a plastic bag, or the inside painted with non-leaded paint or other non-toxic coating.

C. TEMPORARY AQUARIUM

Cl. Plastic Bag Aquarium



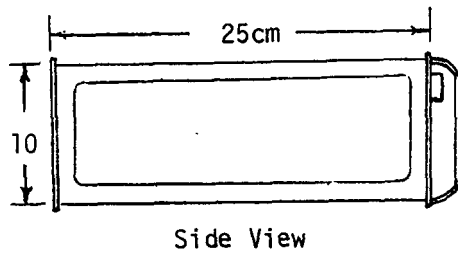
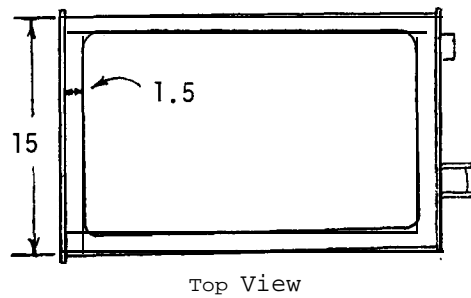
a. Materials Required

<u>Components</u>	<u>Qu</u>	<u>Items Required</u>	<u>Dimensions</u>
(1) Can	1	Rectangular Tin Can (A)	4 liter capacity or larger (at least 10 cm x 15 cm x 25 cm)
(2) Plastic Bag	1	Plastic Bag (or Sheeting) (B)	50 cm x 60 cm
(3) Tape	2	Masking Tape (C)	30 cm
	2	Masking Tape (D)	20 cm

b. Construction

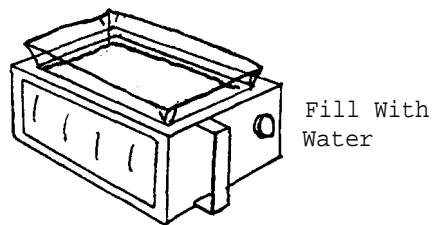
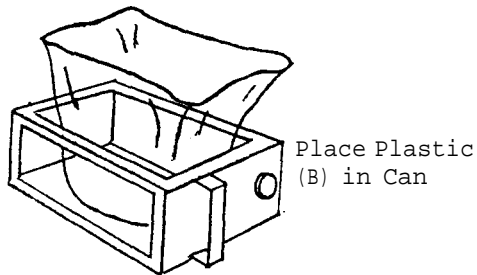
(1) Can

Cut the top and one side out of a four liter rectangular tin can (A) leaving about 1.5 cm of metal remaining to provide rigidity. Such cans can easily be cut with metal snips or shears. Begin each hole by



holding the can firmly, placing the edge of a screwdriver against the side, and striking the screwdriver sharply with a hammer. The sharp edges of the metal should be taped to prevent them from cutting the plastic.

(2) Plastic Bag



Use a large clear plastic bag or piece of plastic sheeting (B). Carefully place the middle of the plastic on the bottom of the inside of the can (A) and spread the plastic out so it fills up the inside. Let the excess plastic extend above the can. Next, carefully pour water into the center of the plastic until the can is filled to the level desired.

(3) Tape

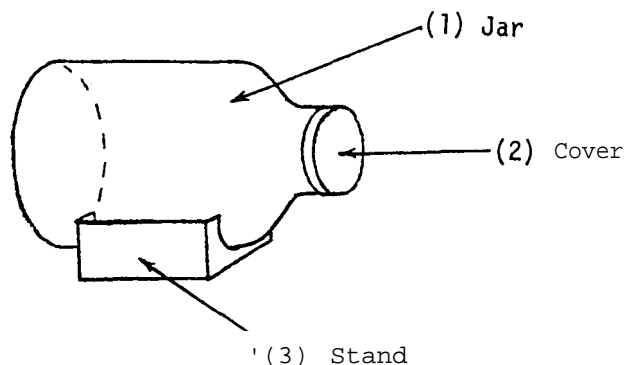
Use the four pieces of masking tape (C,D) that hold down the excess plastic sheeting. Waterproof plastic tape is recommended instead of masking tape if it is available.

c. Notes

(i) With this design, fish and other aquatic organisms can be easily viewed while the three sides of the can provide excellent rigidity. Gravel, plants, rocks, etc., may be placed in the aquarium to provide a more natural environment.

D. TERRARIA

D1. Simple Terrarium



a. Materials Required

<u>Components</u>	<u>Qu</u>	<u>Items Required</u>	<u>Dimensions</u>
(1) Jar	1	Glass Jar (A)	4 liters or larger
(2) Cover	1	Plastic Sheeting (B)	Approximately 12 cm diameter
	1	Adhesive Tape (C)	40 cm long
(3) Stand	1	Cardboard Box (D)	15 cm x 15 cm x 10 cm

b. Construction

(1) Jar

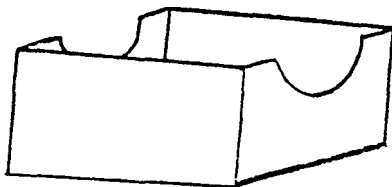
Select a wide-mouthed glass jar (A), the larger the jar and the wider the mouth, the better.

(2) Cover

Tape a circular piece of plastic sheeting (B) over the mouth of the jar with the tape (C) to make it fairly airtight.

(3) Stand

Cut two semicircular pieces from the cardboard box (D) so the terrarium can be set on it without rolling off.

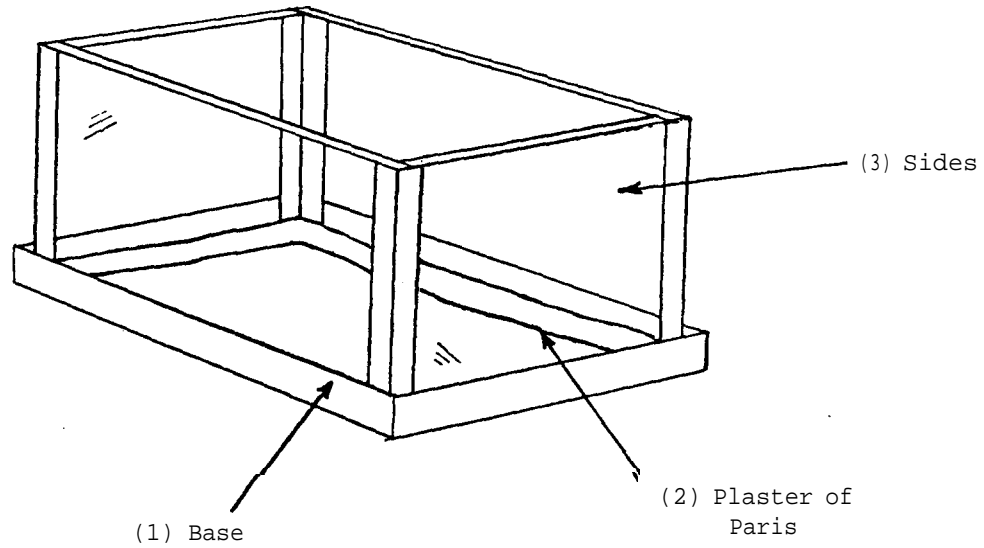


C. Notes

(i) Fill the bottom of the terrarium with rich soil and add plants or seeds. The plastic cover will prevent moisture loss and permit some gas exchange. The jar lid may be used instead, but it has a tendency to rust.

(ii) More durable stands made from metal or wood may be constructed if desired.

D2. Glass Terrarium

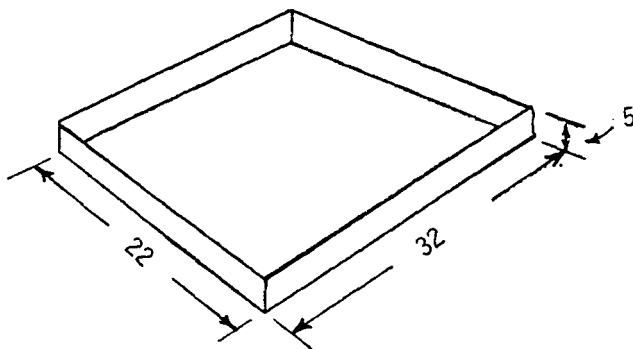


a. Materials Required

<u>Components</u>	<u>Qu</u>	<u>Items Required</u>	<u>Dimensions</u>
(1) Base	1	Tin Can (A)	32 cm x 22 cm x 5 cm
(2) Plaster of Paris	--	Plaster of Paris (B)	--
(3) Sides	2	Glass Plates (C)	30 cm x 20 cm x 0.3 cm
	2	Glass Plates (D)	20 cm x 20 cm x 0.3 cm
	1	Plastic Sheet (E)	35 cm x 25 cm
	4	Tape (F)	--

b. Construction

(1) Base



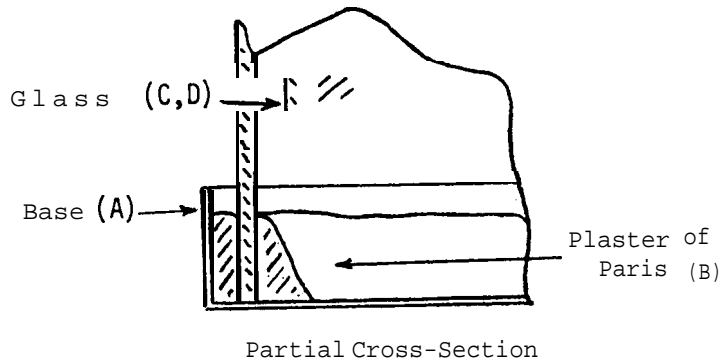
Cut the base from a rectangular tin can (A) to the approximate dimensions given. Adequate bases can also be made from wood, cardboard, sheet metal, etc.

(2) Plaster of Paris

Mix about 1 liter of dry plaster of Paris (B) with enough water to make it workable but stiff.

(3) Sides

Spread the plaster of Paris (B) thickly around the sides of the base (A). Set the plates of glass (C,D) in the plaster while it is wet. Tape the corners where the glass plates come together with tape (F) to hold the sides upright while the plaster is drying. Cover the terrarium with the plastic sheet (E) when plants are kept in it to prevent moisture loss.

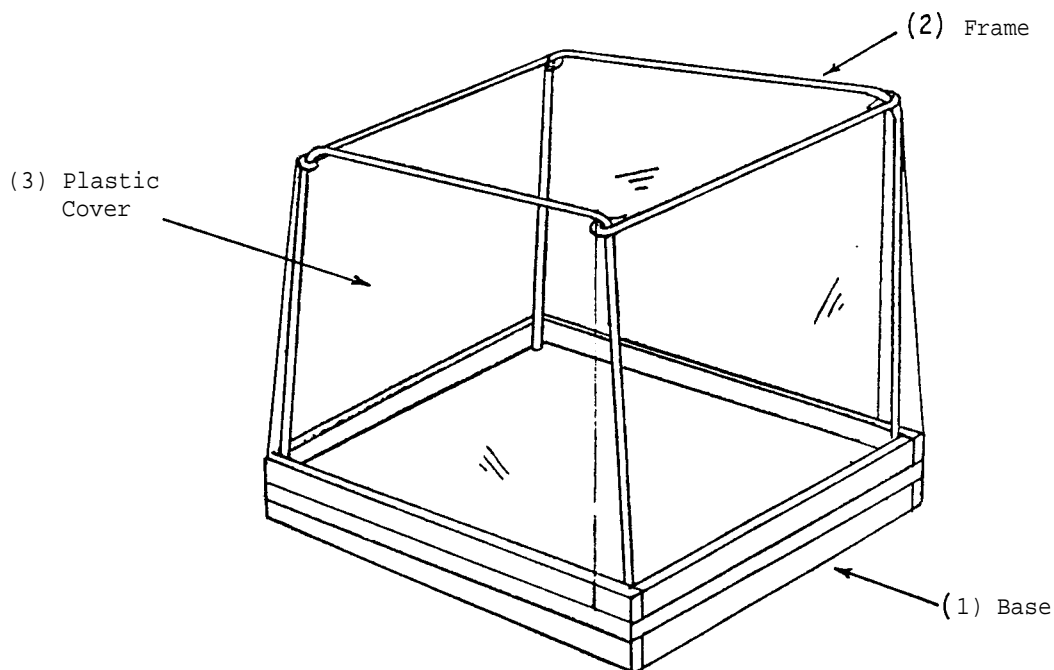


c. Notes

(i) The dimensions of this terrarium may be varied in order to meet special needs or to fit materials available.

(ii) Plants may be placed in the terrarium in pots or planted in soil. If they are planted in soil, be certain that the plaster used is impervious to water.

D3. Plant Growth Chamber

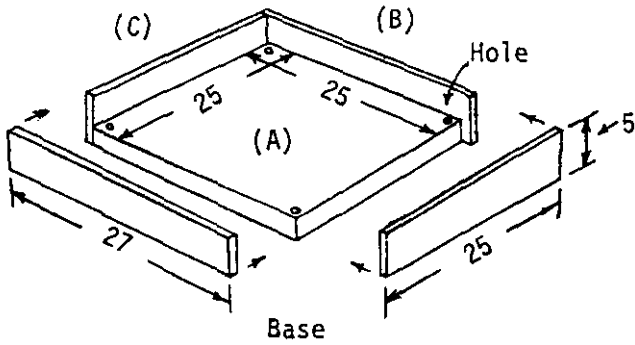


a. Materials Required

<u>Components</u>	<u>Qu</u>	<u>Items Required</u>	<u>Dimensions</u>
(1) Base	1	Wood (A)	25 cm x 25 cm x 2 cm
	2	Wood (B)	27 cm x 5 cm x 1.0 cm
	2	Wood (C)	25 cm x 5 cm x 1.0 cm
(2) Frame	2	Soft Wire (D)	75 cm long, 0.2 cm diameter
	2	Soft Wire (E)	25 cm long, 0.2 cm diameter
	4	Wire (F)	10 cm long, 0.1 cm diameter
(3) Plastic Cover	5	Transparent Plastic Sheeting (G)	30 cm x 30 cm
	--	Tape (H)	--

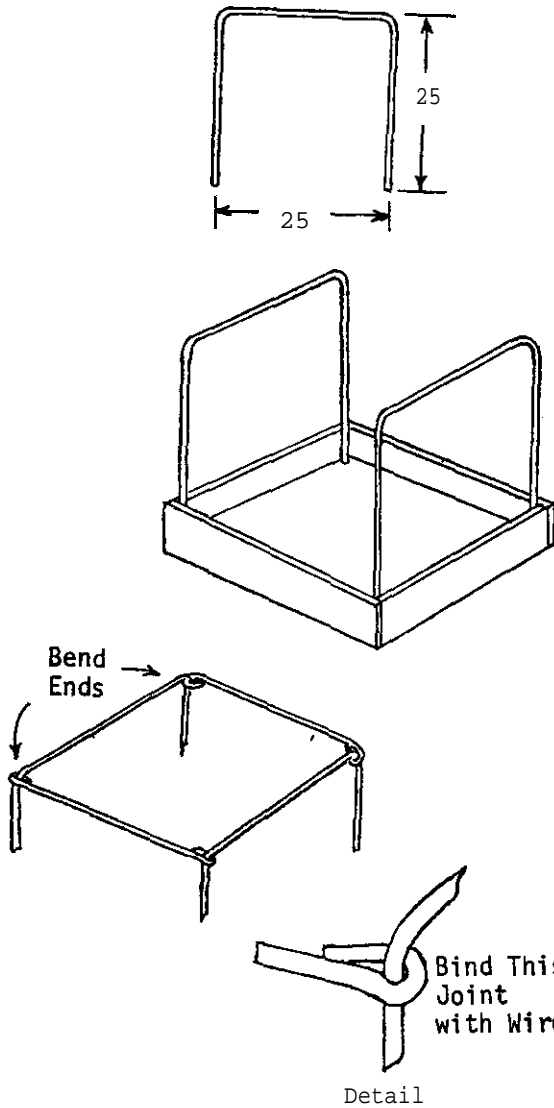
b. Construction

(1) Base



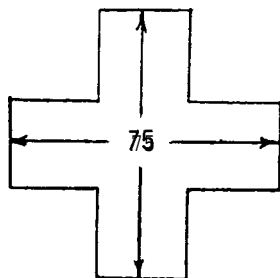
Nail or glue the four rectangular pieces of wood (B,C) to the square piece (A). Drill four holes, 0.2 cm diameter, in the square piece (A), one hole near each corner of the wood.

(2) Frame



Bend the two longest pieces of soft wire (D) into a "U" shape, and insert the ends into the holes in the base. Fasten the shorter pieces of soft wire (E) to the frame by bending about 1 cm of each end around the bends in the longer wires (D). Bind the joints together with the short, thinner wires (F).

(3) Plastic Cover



Cut a piece of transparent plastic sheeting (G) to the pattern shown or use five separate pieces of sheeting. Whether using the single or separate sheets, cover the frame with plastic and seal the joints between the sheeting with tape (H). Leave one side of the sheeting loose to be used as a "door" in order to easily remove the plants.

c. Notes

(i) Plants may be placed in the chamber in pots or soil may be placed in the base in order to hold the plants.

(ii) Dimensions for the plant growth chamber may be altered in any way depending upon the purposes to which it will be put. Especially, the base needs to have more depth than 3 cm if plants are to be grown in soil rather than pots.