

## IX. MULTIPURPOSE SYRINGES

Disposable plastic syringes afford a variety of uses in biological studies. A few of these will be given in this section. Additionally, syringes can be used as pipettes, burettes, etc., and for many of the functions normally taken by test tubes. They are potentially one of the most useful items in the laboratory. All syringes in this chapter are to be used without their needles. The categories given below have been arrived at according to the function of the syringe within the system.

Readers with special interest in disposable syringes are referred to Paul D. Merrick, Experiments with Plastic Syringes, and two articles by Andrew Farmer in the School Science Review.

### A. INJECTION AND EXTRACTION SYSTEMS

In these devices, disposable syringes are used for accurately injecting or extracting precise amounts of materials into or out of closed systems.

### B. COLLECTION APPARATUS

Here, syringes are used to collect gases in measurable quantities.

### C. REACTION CHAMBER

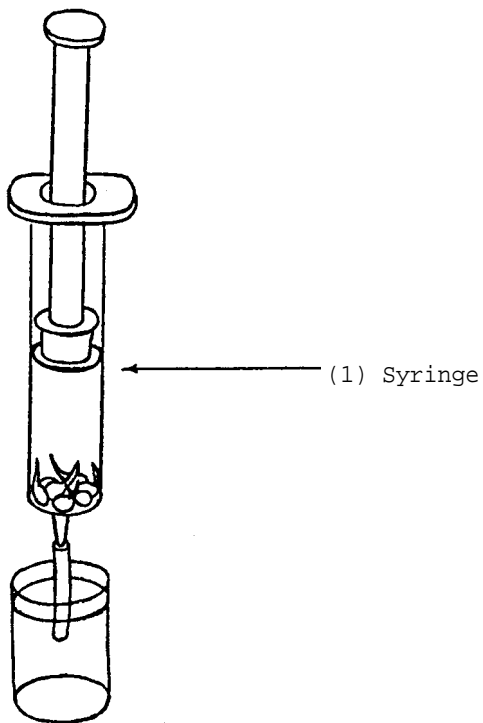
In this device, the syringe itself is used as the container for the reactions.

### D. RESPIROMETERS

Two versions of respirometers fashioned from plastic syringes are given.



B2. Seedling Gas Collection Device



a. Materials Required

<u>Components</u>	<u>Qu</u>	<u>Items Required</u>	<u>Dimensions</u>
(1) Syringe	1	Syringe (A)	35-50 cc
	1	Beaker (B)	50-100 ml
	1	Rubber Tubing (C)	5 cm long, 0.4 cm diameter
	10	Day-old Bean Seedlings (D)	--

b. Construction

(1) Syringe

Fasten the rubber tubing (C) to the nozzle of the syringe (A) and place the bean seedlings (D) in the barrel of the syringe. Next, fill the beaker (B) with water and put the end of the tubing in the water to prevent gas from escaping from the syringe.

C. Notes

(i) Day-old bean seed **lings** carry on only **respiration**. Thus, the gas collected in the syringe after a period of six hours will be primarily carbon dioxide ( $\text{CO}_2$ ). This can be shown by injecting the collected gas into a solution of limewater in which a white precipitate will be found. No reaction will occur if normal air is injected into the limewater. This same experiment can be done using insects.