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ROLE OF RESOURCE CENTRES IN SCIENCE TEACHING

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Formal education is the structured and chronological grading of learning that takes place in schools. Education is a life-long process, and learning can take place no matter where, when or how. This learning may vary in depth and complexity and is called *informal learning*.

Non-formal science education consists of organised educational science activities outside the formal system in schools. Organisations like the Zoo, the Botanic Gardens and the Science Centre are non-formal institutions of learning and contribute as important resource centres for the teaching of science. They tend to be more experimental and innovative in their operations. They seek to fill a need for greater public understanding and appreciation of science and how it can be applied to our everyday life. They also provide a wide range of interesting experiences, sometimes self-motivating, that encourage learning through the use of the senses and the intellect.

Often when we want to teach certain topics in Biology, we have difficulty in obtaining specimens. More generally, we lack the time to set up and maintain, for example, out-door labs for ecology or genetic experiments with fruit-flies, in our schools. Psychologists point out that learning takes place only when it is linked up with experience (what is known) in the pupils' minds. Yet some teachers still teach with mere words from a textbook without recourse to concrete examples and regard for pupils' real life associations.

The dimensions of education should extend beyond the classroom. Much of science taught in schools can be presented in a far more interesting way than is presented in most textbooks. Much of science learning can occur in places other than the classroom/laboratory setting, where students can be given a greater awareness, understanding and perspective of values and attitudes to science and of man's relationship to his total environ-

ment. This is a process-centred approach to education that the classroom cannot provide.

Visits to resource centres can thus broaden the horizons of both teachers and students. Here the teacher is introduced to new subject matter developments and presentation techniques, while at the same time, the student enters doors of self discovery, independent study and new experiences outside the classroom.

In Singapore, we are lucky to have a wide range of resource centres to help the science teacher extend her classroom into the real world. The table below outlines the special non-formal educational activities and resources available in some 10 non-formal institutions of learning in Singapore.

There is an abundance of resources that can be found around our schools – in the people and businesses of our community. Butchers and slaughterhouses discard usable biology specimens e.g. cow's eyes and hearts. The baker's shop would give us a good example of types of cereals used in a variety of breads or the functions of yeast in the baking of bread. The grocer in the market can supply us with most fruits and vegetables for teaching purposes, while the local supermarket or minimarket would give a wide display of various means of preserving and keeping food substances, such as milk and dairy products, for longer periods of time.

Ask a dentist to lend you X-rays, dentures or models illustrating the structure of teeth, to discuss how to brush teeth and the consequences of tooth neglect. A nurse could demonstrate a sphygmomanometer to take blood pressure, so students could measure heart rates of their friends in different positions and after various activities. Ask your students to analyse your tuck-shop food as a class project. They could test for the calorific value of each dish.

The school library is also an excellent resource centre where pupils can browse, explore and discover materials or their own.

A teacher's job is to open windows in the minds of her

students, by bringing to their attention as many aspects as possible of the world in which they live in, in as many ways as possible. It is up to you as a teacher to decide whether a visit to a particular non-formal institution merits the time, money and anxiety involved, when compared to what is gained in knowledge and experiences by your pupils.

RESOURCE CENTRES FOR SCIENCE TEACHING IN SINGAPORE

Name of Resource Centre	Address	Materials	Special Educational Activities
1 BOTANIC GARDENS	Cluny Road Singapore 1025	Museum of Labelled living plants Herbarium (½ million sheets) Primary jungle, Lakes, greenhouses	School of Ornamental Horticulture, Nature rambles
2 CORALARIUM	Sentosa Singapore 0208	150 species of live corals, sea whips, sea fans, sea shells, coral skeletons	
3 INSTRUCTIONAL MATERIALS LIBRARY (IML)	Oei Tiong Ham Building IE Campus, 469 , Bukit Timah Road Singapore 1025	Films, videos, film slides, film strips and hardware facilities	Workshops
4 JURONG BIRD PARK	Jurong Hill Jalan Ahmad Ibrahim Singapore 2262	255 species of birds Walk-in aviary Ornithological library	Educational films, slide-shows, lectures and talks on birds, bird-shows
5 MARITIME MUSEUM	Sentosa Singapore 0208	Exhibits an Navigation, oceanography, shipping and fishing	Films, slides shows, talks cum workshops
6 NATURE RESERVES	Bukit Timah Nature Reserve Kranji Nature Reserve The Water Catchment Area	75 hectares of primary undisturbed rainforest with tropical trees, plants, flowers, birds and animals	Nature rambles
7 SHELL'S RESOURCE CENTRE	Shell Tower 50, Raffles Place Singapore, 0938	AVA material	
8 SINGAPORE SCIENCE CENTRE	Science Centre Road Singapore 2260	5 Science galleries, Eco-garden (forthcoming Planetarium)	Laboratory courses, quizzes seminars, workshops, science camps, exhibitions
9 SINGAPORE ZOOLOGICAL GARDENS	80, Mandai Lake Road Singapore 2572	150 species of animals, children's zoo, common plants	Audio-recorded information animals shows, slide shows and talk, tram rides around the zoo
10 VAN KLEEF AQUARIUM	River Valley Road Singapore 0923	Tanks containing 4600 specimens of freshwater and marine life	Talks