

# **Gujarat Council of Science City**

Department of Science & Technology, Govt. of Gujarat

## **VACATION TRAINING PROGRAMME ON BIORESOURCES FOR SCHOOL CHILDREN**

*4<sup>th</sup> to 30<sup>th</sup> April 2015*

### **Brief about the Programme**

Though the human being is a major component of the eco-system, it cannot overlook the importance of biodiversity at species, genetic and ecosystem levels. It has direct consumptive value in food, agriculture, medicine, and industry apart from aesthetic and recreative value. Biodiversity maintains ecological balance and continues evolutionary processes. It has been observed that the present secondary school curriculum is not sufficient to motivate the students to work for their own bioresources.

Further, these days the best students do not come for science courses, particularly to basic sciences or life sciences. The attraction for commercial and professional courses is such that even those who enroll in science courses leaves at the first opportunity. As a result, many seats in undergraduate classes of various science subjects in good degree colleges and graduate science subjects in universities remain vacant. Very few meritorious scholars opt for teaching or research careers in basic sciences.

To attract, encourage and create interest among bright students about our rich bioresources and its importance, Gujarat Science City is organizing a four week long "Vacation Training Programme on Bioresources for School Students" during 4<sup>th</sup> to 30<sup>th</sup> April, 2015.

The programme has been designed for the meritorious students who have appeared for the Std. X examination this year and having more than 90% marks in their Std. IX. About 33 meritorious students have been selected based on their merit and aptitude test for the programme.

The main objective of the vacation programme is to create awareness and understanding about the bioresources and biosciences among the young students who will take a decision to join any pre-degree course after the Std. XII examination. The young students may explore the possibility of understanding the science of bioresources and to make themselves prepare for taking a career in their higher studies. In addition, the programme will impart training on sustainable use and conservation of bioresources and to create better awareness about relevance of bioresources in everyday life.

The program will allow the participating students to use their skills learned in the classroom setting to understand better and serve their community and environment. The students are also encourage to conduct small research projects, visit important bioresource places, interacting with eminent scientists of the field and conducting surveys, interviews, project works and reports.

They will learn about the value of biodiversity, from the discovery of new medicines and materials, to the protection of food crops and local systems. The current loss of biodiversity will be put up into perspective by involving students in laboratory work where they see how species can adapt to changing conditions, learn theories about how species evolve, and study the natural causes of extinctions.

Finally, students may consider the history of actions that people around the world have taken to protect endangered species, and international agreements to preserve biodiversity.

### **Objectives**

- To inculcate among students an appreciation of the biological resources of the country, their use and management.
- To create opportunities for hands-on experiences in the field.
- To understand locally available bioresources, their sustainable use and conservation.
- To interact with leading experts in the field including core and visiting faculty at the organization.

### **Course Curriculum:**

#### **A. Introduction to Biodiversity and Bioresources**

1. Biodiversity and Bioresources-their importance
2. Genetic diversity, species diversity, and Ecosystems diversity
3. Distribution of terrestrial and aquatic bioresources, Microbial bioresources
4. Value of Bioresources – direct and indirect values, Ethical values
5. Natural and wild resources-Medicinal plants, economically/industrially useful plants and animals, parasites & predators
6. Ecologically relevant resources-Keystone species, pollinators, natural predators
7. Bioresources maintained by and in man made ecosystems. Genetic resources, agro biodiversity
8. Ethnic knowledge bases, folklore knowledge bases.
9. Threats to bioresources
10. Conservation and sustainable use of bio-resources.
11. Intellectual Property Rights and bioresources.
12. Biotechnology and Bioresources-scope, limits & precautions
13. Emerging avenues and careers in the fields of Biodiversity, Bioresources and Biotechnology.

The above topics should be discussed by eminent faculties as 'Meet the Scientist' programme in very interactive sessions, which includes audio-visual presentations, brainstorming discussions along with lab works and project assignments.

This vacation training programme for school children at Class X level is an enrichment course to create awareness on bioresources and biodiversity conservation. Though this is not directly related to their school curriculum and examinations, the programme has some relevance to the course content at the level of Std X and XI.

The course contents proposed for this training programme have relevance to the following topics in the Science text book in Class X and Biology text book in Class XI. These includes: biomass as fuel, agricultural tasks and food production, food from animals, animal husbandry, fish as source of animal food, management of food resources, biosphere – structure and function and food chain from Std. X science book. Similarly, emphasis will be given to Std XI Biology topics like, diversity of life, organisms and the environment, natural resources and their utilization, wildlife and forest conservation.

## **B. Exploring the Environment and understanding local Bioresources**

(Practical hands-on activities)

<b>Sl. No.</b>	<b>Exploring environment and understanding local Bioresources</b>
1	Field work for studying and documenting local biodiversity / bioresources
2	Discussion sessions based on the study involving local elders to compare
3	Past and present distribution of species, and to find out factors responsible for the decline of biodiversity.
4	Study of Agricultural biodiversity through visits to farms and meetings with farmer communities.
5	Study of Forest / Wetland / Arid zone Marine biodiversity bioresources (depending on the location) through field visits/Nature camps.
6	Visits to Institutions of relevance

The mode of training and communication will be of very interesting by adopting hands-on and minds-on approach. The Gujarat Science City, in addition to its hands-on and minds-on Hall of Science, Planet earth, IMAX 3D Theatre and Large LED Screen, Energy Education Park, Children Activity Corner, Musical Fountain has also a good stock of environment and ecology related films in English/Hindi. The title of some such films are as follows:

- |   |                                    |
|---|------------------------------------|
| 1) Living Trees;                          | 2) Trees: Evergreens and Deciduous |
| 3) Learning about science: Flowers        | 4) Living Soil                     |
| 5) Genetics & Heredity: Blueprint of Life | 6) Evolution                       |
| 7) Animal Communities                     | 8) The Five senses                 |
| 9) The kingdom of Plants                  | 10) Exploring Dinosaurs            |
| 11) Ecosystem: Nature in Balance          | 12) Ecosystem of a Pond            |
| 13) World's Biomes                        | 14) The Wetlands                   |
| 15) The animal kingdom: Insects           |                                    |

Necessary time slots for screening such movies followed by brain-storming sessions have been planned in the activity schedule. Further, the participants are also to be encouraged to work on computers and with content related CD-ROMs, they will access most advance and relevant resource materials for their use.

### **C. Interactive Sessions**

1. Presentation on specific topics by each student followed by discussions.
2. Quiz programme on discussed topics.
3. Painting / Poster making session on Conservation of Bioresources and sustainable life styles.
4. Web-page designing on bioresources.
5. Play / Skit put up by students on a relevant theme.
6. Screening of audio-visual films on VCD/DVDs.

### **D. Individual Projects by students**

Each student will work on a specific project assignment which involves field studies, library research and data collection and analysis and identification of school / community based activity to be followed up at his/her place of origin.

### **E. Wrap-up Session**

1. Experience sharing
2. Presentation by students followed by allocation / adoption of follow-up projects,
3. Get together with invited guests.
4. Award of Certificates.

Eminent Scientists and Professors of the field have been invited to interact with the students during the above programme. The Gujarat Science City also plans to invite the students of last year vacation training programme and to arrange special session among the participants during the current programme. This will not only be a follow up programme of last year participants, but also be an ideal example of experience sharing and role-model show for the new-comers.