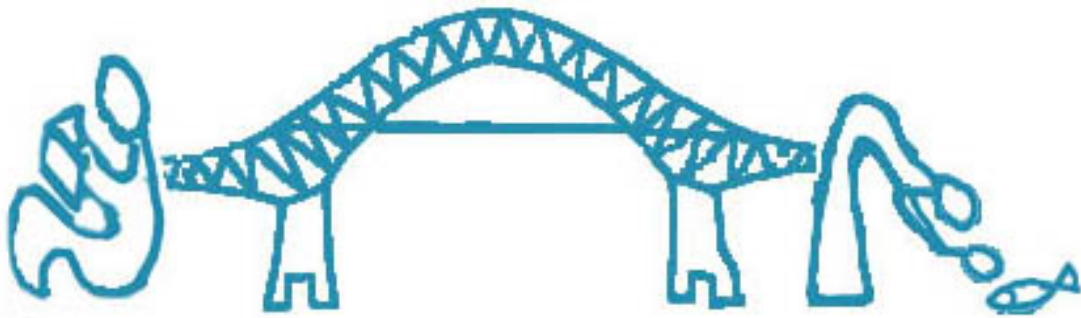




YOU and the SEA with SMITHSONIAN

Educational Program



A Bridge between the Panamanian Curriculum and
The Marine Educational Program of the Smithsonian Tropical
Research Institute



WELCOME!

Welcome to our Home, where the land and the ocean met.

You are invited to enjoy the see smell and the sun, to play, learn playing, to think, and to create. Or if you prefer, you can rest in silence, and hear what waves talk to the sand...

You and the Sea with Smithsonian, is a program which offers to docents and organized groups the opportunity to use our little island as a outdoors' laboratory, as an extension of the classroom, as a tool to touch what is draw in the books, to exercise the critical thinking and our consciousness of ourselves as part of the environment.

Here we present 23 activities specially designed to support the daily activity of our teachers and docents, based in the Panamanian Curriculum from pre-kinder to 12^o grades. They are only the beginning and an excuse to invite you. Come in, and you will see that the possibilities of meeting in our Home are infinite as sea waves.

PRESENTATION

ABOUT THE ACTIVITIES

TOPICS AND ACTIVITIES

¿HOW DID WE DESIGN THE PROGRAM?





PRESENTATION

Our Panama shares more kilometers of frontier with the sea than with its neighbor countries. In only one hour and a half we can wet our feet in two different oceans. Our geographical condition as the continent's waist is interweaved with our prehistory, history and economy. Nevertheless, do we know the place of the ocean in our daily life? How much do we know about our marine resources? How much do we talk about the sea in our classrooms?

Taking advantage of the extraordinary opportunities for an outdoor active learning in the Marine Exhibition Center (CEM) of the Smithsonian Tropical Research Institute (STRI), You and the Sea with Smithsonian Program looks forward to support the mission of our teachers and docents with activities which specifically supplement those marine topics yet present in the Panamanian curriculum.

The CEM, in the small Punta Culebra island at the end of the Calzada de Amador (Causeway), counts with a sandy beach, a rocky beach, aquariums, exhibition room, classroom, and also a small sample of a Dry Tropical Forest, a much extent ecosystem of the Centro American Pacific 500 years ago. The CEM is an outdoor laboratory for teachers and docents, where by the hand of STRI's current marine research, science lost its abstract and non-familiar concept to become a way to see what is around and is ours.

The program counts, currently, with 23 activities available for docents, which cover, more than 20 curricular current topics in Panamanian schools, from the kinder-garden to 12^o grade. All these activities are interactive: minds-on and hands-on. The methodology is based in apply critical-thinking as well as freethinking in a democratic process. Emphasis is on the scientific process of observation, data record, data analysis, and inquiry thinking through hypothesis and experimentation. Also there are included case studies, problem solving, and real life case discussions. The program represents a useful tool to apply in almost every subject, scientific, social, artistic and also transversal axes.

The activities are planned to be used sequentially, according with the pedagogical fundamentals in the development of a national curriculum. In the first visit, a 3-6 years old child will recognize new life forms, so different to his or her corporal arrangement, -which is still learning to control and understand- increasing the universe of shapes, colors, smells, and possible movements through stories, songs and games. This child will come back knowing how to read and write and will discover how different are the animal houses,



and how many of them can be found in the lunch plate. He or she will come back again, and playing to be an explorer, will learn to observe details as well as put in practice the human practice of classify to describe the world. Next time, he or she will practice simple data analysis and will relate his daily life and the sea, talking with the garbage. In the next years, he or she will put in practice theoretical concepts with living organism and real ecosystems. In each visit, he or she will be "jogging" the ability to observe and analyze, and with them, his creativity and critical thinking. In the last years of high school, the student will practice the steps of the scientific method, will discuss and debate on real life cases.

With the help of their docents, along their way in the school and the CEM, our children will have another opportunity to become proud citizens of Panama, in whose hands we can leave our future, when we would be older and they will be the decision-makers in Panama.





ABOUT THE ACTIVITIES

The activities can be adapted to every teaching strategy the teacher likes. Docents can lecture on the topic prior to come to Culebra, work outdoors in their visit as an experimental approach and reviewing it again back in the classroom to finish and reaffirm the concepts. But also docents can use the visit as a motivational presentation of the topic or as the close session of a topic where concepts are put into the real world.

Next Section describes each activity as follows:

A top box with:

1. Topic: the curricular topic to which the activity can be applied based on the Panamanian current official curriculum.
2. Level: grades and ages appropriate for its application.
3. Duration: Duration of the activity IN CEM.
4. Subjects: all curricular subjects where the activity can be applied.

And then, point by point

5. Objectives: objective to reach at the end of the activity.
6. Instructional skills: all those the student will exercise.
7. Materials: all materials needed (will be given by the CEM)
8. Vocabulary: key words and terminology that will be introduced.
9. Background: base: basic knowledge on the topic for teachers, docents and guides.
10. Procedure: all methodology and procedures are explained step by step allowing those teachers and professors that are will to be in charge of their group to do so under CEM personnel supervision. We encourage also the adaptation of all activities to the natural environment the teacher has around the school or in their community.
11. Suggestions for the guide or teacher in charge: we suggest variation for the activity that can adapt it to different group characteristics.
12. Suggestions for the professor: these are ideas for follow-activities once back at school.

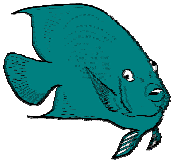




TOPICS AND ACTIVITIES

Topic	Level (grade)	Activity
Locomotion and Feeding	Kinder-1°	1. Marbella and her friends 2. What's under the ocean? 3. I am a sea animal and so are you.
Useful animals	2°	4. About shells and snails
Habitat, Biotic and abiotic components	2°-4°	5. Find my house 6. Make a reef is not an easy task
Classification of plants	2°-3°	7. Nature Explorers
Marine Contamination Garbage	2°-9°	8. Let's ask the garbage 9. How harmful is the crab beach?
Endangered species - Natural resources Conservation	4°-10°	10. Let's save the Hawksbill turtle
Vertebrates	4°	11. My paper fish
Coral reef	4°-8°	12. Protecting the Coral reefs
Adaptation	5°-6°	13. Guess who I am
Panama Canal Watershed	5°-6°	14. Ticket to heaven
Lowlands Vegetation	5°	15. The botany detective
Invertebrates	5°	16. Invertebrates cazuela
Niche, habitat and community. Ecosystems	7°	17. Expedition to the crab beach
Symbiosis	7°	18. Let's work as a team
Renewable and non-renewable Natural resources Conservation	7°-9°	19. Dr. Seuz
Deforestation in Panama	8°-10° 9°-12°	20. In the shade of deforestation 21. Mangroves in Panama: Living on the edge
Industrial contamination and plaguicides	9°-12°	22. Pesticides in Panama
Biodiversity	10°-12°	23. www.playadeloscangrejos.div





¿HOW DID WE DESIGN THE PROGRAM?

Since 1993 the CEM represents a unique learning environment for the Panamanian community. Since the CEM initiated its activities there were more than 200,000 visitors, 40% of which were students in a guided visit as a school outdoor activity.

In 2000, teacher evaluations as well as STRI staff observations lead to consider the necessity of the integration between CEM usual topics and the official Panamanian curriculum. Also it was recognize the need to create new sequential activities from kindergarten to high school levels which imply the active participation of the students.

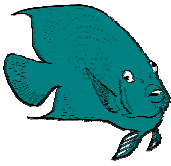
The goal was to prepare a program that integrated the school program activities at CEM with the curriculum counting with the collaboration of teachers and professors. We established first teacher's attitudes and their particular needs to enhance the current curricula. We adapted or developed 23 activities for all levels, from kindergarten to 12th grade.

Being applied since the beginning of 2003, the Program includes all 23 activities, all interactive, hands-on, and minds-on. The instructional methodology is based in scientific thinking, critic thinking, and freethinking as a democratic process. The main focus in the activities allows students to learn the scientific process from observation, data recording, data analysis, hypothesis and experimentation. Also there are included case- study, problem solution and real life case discussions.

The used methodology used along the plan followed Kemp instructional design (1996). That is, first need assessment by establishing the Panamanian curricula content, common textbooks, and teacher's needs and priorities. A survey was conducted in a workshop with 65 teachers and professors, from both public and private schools; this survey guided us to the final need assessment. Based in his information we establish the topics and learning methods that will meet the curricula in the marine science area. The second step was the design of the activities, and third formative and summative evaluations.

The formative evaluation was conducted by STRI staff, two education experts, Georgina de Alba and Argelis Ruiz, and the scientits Héctor Guzmán, Richard Condit, Rolando Pérez y Stephanie Bohlman. This formative committee follows the project and gave recommendations along the program development. A final draft was subject of a pilot evaluation with school groups.





We tried each activity with a small group of docent and student, and then content and processes were revised.

Finally, a Summative Committee reviewed the activities. This Committee counted with a representative of the Education Ministry, Prof. Carmen Moncada from the National Environmental Department; a representative of an Non-governmental Organization, Cesar Tribaldos from Fundación Oceánica, and an outstanding Panamanian professor, Irma Castillo.

The researchers behind the idea and the program design were: María Ephtimiadis, Lidia de Valencia and Adriana Sautú, who had the financial support of the Smithsonian Outreach Program. Key help and collaboration came from Heidi Collazos in the biological inventory of beach organisms; Karen Dertien, in translation to English; Salomón Vergara and Alberto Castillo in illustrations; and Argelis Ruiz, and Georgina de Alba, Associated Director of Finances and Administration, in the supervision and general logistic.

