

## INTERNATIONAL OCEAN INSTITUTE—KIDS: TARGETING AWARENESS ON THE SEA WITH THE YOUNGER GENERATIONS

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### BACKGROUND TO THE ESTABLISHMENT OF THE IOI-KIDS WEBSITE

The Internet revolution has led to the proliferation of accessible web-based educational resources. The International Ocean Institute (IOI), initiated through its operational center at the University of Malta, has funded the IOI-KIDS project, the institute's flagship educational activity targeting awareness and knowledge-sharing about the sea with younger generations. The IOI was founded in 1972 and is an International NGO, with centers in 25 different countries and special consultative status within the United Nations. Some of the key missions of the IOI are to disseminate information, share and transfer knowledge and experience, and instill, within the younger generations, a greater interest in the sea. To further spread the legacy of the United Nations Convention on the Law of the Sea (UNCLOS), IOI organizes the *Pacem in Maribus* (PIM) conferences. At the 32nd PIM conference in Malta in November 2007, the emerging Malta Declaration called for youth to help protect the marine environment, to move beyond the narrow circles of ocean professionals and stakeholders to broader audiences, whose knowledge and understanding are key to the support of sound ocean policy, and to change perceptions and heighten appreciation for the oceans and its importance to our lives and future, especially among the young (Drago 2008a).

The IOI-KIDS project represents the IOI's mission to help children, youth, community groups, and teachers across the world share ideas, projects, and experiences about the sea (Drago 2008b). The IOI-KIDS website ([www.ioikids.net](http://www.ioikids.net)) uses the Internet as a tool to create awareness among the younger generations. The website features appealing visual content on the marine environment through interactive educational games and resources, informative articles, quizzes, and video features, including contributions from young authors, teachers, and individuals. The IOI-KIDS initiative originated from an idea of the author and has been developed under the IOI program, *Women, Youth and the Sea*. The initial launch of this project consisted of the "set-up" and launch of the website, which was completed in 2007. The second phase targeted increasing the visibility of IOI-KIDS; expanding the educational materials with greater participation from the recipients; promoting cooperation with other IOI centers, notably in Slovenia and South Africa; and establishing the website as a resource for educational and cross-cultural exchanges. The project is now poised to grow into a system-wide, online IOI platform, involving a wide group of collaborating IOI centers.

Other organizations that use the Internet as a web source for marine-related educational resources include: the National Marine Educators Association (NMEA), National Oceanographic Partnership Programme (NOPP), Sea Grant Educators Network, and the National Oceanic and Atmospheric Administration (NOAA), all in the U.S.; the Marine Conservation Society (MCA) and Coastnet in the UK; and the Marine Education Society of Australasia (MESA) and Reef Educators Network in Australia. The Bridge ([www.marine-ed.org/bridge](http://www.marine-ed.org/bridge)) is an example of a collaborative effort between organizations (Sea Grant, NMEA, and NOPP) to compile online, teacher-approved marine educational resources and has been doing so since 1997. The spread of marine-based educational resources on the Internet is a fairly new occurrence, especially when compared to other academic disciplines. The potential of online educational resources has been recognized by many scientific groups. For example, the Tara Oceans Expedition (<http://www.b2science.org/institute/program-tara.html>) is currently involved in a three-year exploration of the world's oceans and hosts an educational version of its website parallel to its research site.

The focus of the IOI-KIDS website is to engage both K-12 and high school-aged children. The primary goal is to reduce and fill gaps and increase the level of understanding about the sea through the use of technology. With the use of the Internet, IOI-KIDS offers animated knowledge about the sea and brings it into young people's homes, as well as offers colorful games and informative online activities through an interactive learning experience. These are the primary concepts and drivers of the IOI-KIDS website in its current shape—to raise awareness among younger generations about the sea and life in that marine environment, and to provide knowledge that is easily understandable and channeled in a child-friendly and visually appealing way.

IOI-KIDS uses the Internet medium, which is becoming more easily accessible to all social classes and available in remote corners of the globe, thus opening the way to a growing audience and reaching widely diverse cultures. The IOI-KIDS website seeks to provide an educational program that tackles the marine realm holistically, being conducive to promoting responsible citizenship and informed viewpoints by the public. The use of the web offers a key vehicle in promoting communication between schools, especially between those in coastal regions and those in the inland areas, allowing children who may never have come in contact with the sea to experience it through the eyes of their peers. The use of visual media is an important element in creating a form of distance education, raising awareness and

the communication of ocean issues, especially with children and communities that cannot experience the sea directly. This is precisely the scope and basis of the IOI-KIDS initiative which seeks to raise awareness about the sea among the younger generations, and to place greater emphasis on sea-related topics in school curricula. The goal of the IOI-KIDS website is to educate the younger generation to adopt an informed and forward-looking approach to the world's ocean, and encourage participation in common activities with a focus on the sea.

### SALIENT FEATURES OF THE IOI-KIDS WEBSITE

The IOI-KIDS website is structured into a number of self-contained, inter-related components. Its main elements are classified under three main target streams:

- Learning through fun experiences - using a colorful and appealing web environment to present knowledge of the marine environment through leisure activities such as interactive educational games; user-friendly and informative articles; and structured online lessons on interesting themes, as well as audio and video clips.
- The IOI-KIDS teamwork - provides a facility for the direct involvement of kids from primary and secondary schools to create projects to share with others; interact with other kids across the globe; participate in thematic competitions and "team-up" with friends, working together on projects; and providing a "News" section where schools can report their activities.
- A Teacher's Resource - providing teachers with additional materials to enrich their lessons, aligned to national curricula; and encouraging experts and educators in marine- and environment-related fields to submit resources for online publication to share with other teachers and students. Contributors to this section of the website are encouraged

to consult the *Ocean Literacy Scope and Sequence for Grades K-12* and visit the Ocean Literacy website ([www.oceanliteracy.net](http://www.oceanliteracy.net)).

The IOI-KIDS website is intended to provide a virtual warehouse and information mining service on the sea. In its most innovative element, IOI-KIDS creates a basis for a virtual classroom setting by supporting a more IT-based classroom where traditional whiteboards and exercise books are replaced with monitors and virtual writing pads.

IOI-KIDS primarily seeks to provide educational resources on the sea, specifically for younger viewers, and teaching aids for teachers. The initiative contributes to school curricula through dedicated tutorials, notes, and clips; and provides a warehouse of additional information upon which curricular sea-related topics can be established and enhanced. As its content increases, the IOI-KIDS website would like to provide teachers with the tools to add notes, as well as post their didactic materials to share with other colleagues across schools and countries. The intention is to increase content on the website through contributions by teachers who want to share their lessons, as well as by students who want to publish their projects.

Moreover, the website provides a framework and prolific medium for kids and educators to exchange opinions, share ideas, projects and experiences, and to join in virtual dialogue on topics relating to the marine environment. This functionality is expected to evolve in the future by further developing the IOI-KIDS website in line with state-of-the-art web technology that enables direct input of content by the users, such as through forum space or conducting online surveys. This will promote interaction between teachers, students, and schools. The content of all submitted material will be vetted by a validation team composed of a biologist and a teacher prior to online hosting. The names of the professionals that form part of this validation team will be visible on the website.

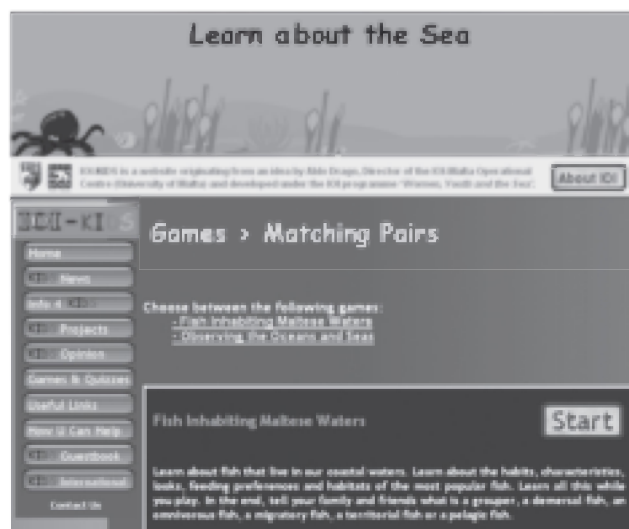


Figure 1. Screenshot of the *Matching Pairs* game.

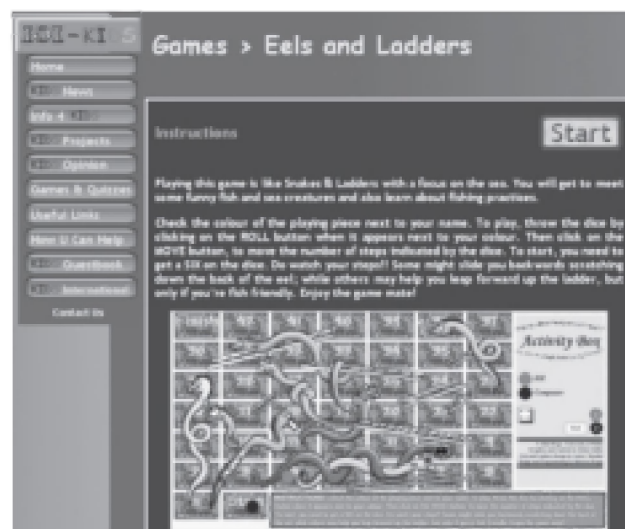


Figure 2. The *Eels and Ladders* game.



Figure 3. An online lesson giving an overview of marine floral and faunal species.

IOI-KIDS is organized to enable easy access to its various components from different entry points. In its current format, the website is composed of the following key sections:

**IOI-KIDS Games and Quizzes:** Utilizes the learning-through-fun experience to teach young viewers basic knowledge about the marine environment in an appealing way through interactive educational games and quizzes. From the onset of the IOI-KIDS program, the focus was on marketing a blueprint that stimulates the interest of youngsters, and includes innovative, instructive, colorful, and eye-catching online games and quizzes. Each game is linked to a marine theme, providing instructive material. Two examples are illustrated in Figures 1 and 2. The *Matching Pairs* game is based on pictures and short accompanying notes on: 1.) fish in the Maltese coastal sea; and 2.) marine instruments and methods used to implement underwater observations. The *Eels and Ladders* game is adapted from the well-known *Snakes & Ladders* board game. The game is played online, linking to interesting snapshot notes on positive and negative fishing practices as a moving piece on the board “goes up” a ladder or “slips down” an eel.

**Info 4 Kids:** Providing an educational web resource about the sea for both kids and educators. This section offers online lessons, special notes, and articles that complement school curricula and articles to raise awareness on marine-related issues. Submitted content is compiled by marine experts and educators, and school children are able to contribute to the forum (which is subject to vetting). Figure 2 gives a screen shot from an online lesson focusing on marine floral and faunal species.

Experts on marine and coastal affairs, such as marine educators, popular science authors, and representatives of educational, environmental NGOs and other organizations, are encouraged to contribute to this section. This “Info 4 Kids” theme constitutes



Figure 4. The video clips section of the IOI-KIDS website.

the majority of the website's educational materials, featuring on-line lessons to aid students with marine flora and fauna; marine historical heritage (compiled in Maltese); marine conservation efforts; weather and climate; the open ocean; and the coast. A recent addition to this section has been regular uploading of short audiovisual clips on the Mediterranean marine environment, depicting selected underwater habitats, such as seagrass meadows and photophilic assemblages; iconic marine taxa, such as gelatinous plankton (salps and pyrosomes); and marine species, such as bluefin tuna. Figure 4 introduces the video clips section of the IOI-KIDS website.

**IOI-KIDS News:** A dedicated section for the publication of news items about the sea and notifications about events and activities. IOI-KIDS links to useful newsfeeds and alerts, making kids aware of and giving them access to detailed information on topics they want to learn more about. Children and educators may also contribute their own news items. Children are urged to join the IOI-KIDS News Team and become young journalists on maritime affairs by contributing their own stories to this section. Kids are encouraged to use their investigative and research abilities and write news items relating to marine and coastal issues of a local, national, regional, or global nature. Such an initiative squares with similar initiatives being taken to foster young environmental reports—for example, as promoted by the Young Reporters program operated by the Foundation for Environmental Education (FEE). Some news items, together with related audio and video clips, are already online and more will be added regularly as this web feature gains popularity with viewers.

**IOI-KIDS International:** This section links to partner websites. To date, two partner websites (IOI Slovenia and IOI South Africa) have been launched. Other contributions are expected from additional IOI operational centers as the IOI-KIDS initiative gains momentum toward becoming a system-wide project of the IOI network.



**Useful Links:** Links to websites offering further information and resources related to the marine and coastal environment. A number of links are already online.

**About IOI:** Introduces the mission to visitors of the website.

**IOI-KIDS Projects:** This section is intended to provide a web space where kids can share their projects or special reports on the sea with others through online publishing. It is dedicated to the publication of kids' projects, including web pages, "write-ups," drawings and other artwork, posters and messages, stories, and poems, all relating to the marine environment. Participating school children and their guardians relinquish intellectual rights of submitted material in order to give the website's validation team the ability to review and edit the materials for scientific accuracy. This section is an opportunity for children to use their creativity, see their work published online, and pass on messages about the sea to other kids. A number of dedicated campaigns and competitions have been launched in recent years targeting schools, children's summer clubs, and other educational networks to attract attention to this component of the IOI-

KIDS website. This campaign effort has resulted in substantial contributions in the form of drawings and messages about the sea that have been reviewed and selected for online publishing. Further outreach among schools and in the local media continues to increase this momentum.

**IOI-KIDS Opinion:** This section represents a space where kids and educators can voice their thoughts and exchange views about marine affairs and a variety of topics related to the marine and coastal environment as well as to related studies. This area of the website is intended to promote intercultural and cross-cultural exchanges and experiences through online forums and surveys.

### THE SPOT THE JELLYFISH INITIATIVE

The IOI-KIDS program of activities also entails novel and flagship dedicated initiatives that are based, hosted, and further enhance the IOI-KIDS concept.

The Spot the Jellyfish initiative showcases the IOI-KIDS citizen science program, which was launched in June 2010 jointly by the IOI-Malta Operational Centre (IOI-MOC) at the University of Malta and the Malta Tourism Authority (MTA), with the support of a number of Maltese ENGOS. This initiative's primary aim is to gain awareness among younger generations and the public at large, concerning the growing phenomenon of jellyfish blooms. Through regular monitoring of different jellyfish species, the initiative assesses intra-seasonal and intra-annual changes in jellyfish species composition and abundance, pursuant to formulating management recommendations to authorities and to dispel prevalent myths about such species. The aim was achieved through targeted lectures at schools; interventions during selected media programs; regular contributions to print media; and through an online map of the Maltese Islands, hosted on the initiative's ad hoc website ([www.ioikids.net/jellyfish](http://www.ioikids.net/jellyfish)) with updated statistics of jellyfish sightings and "snippets" of information on different jellyfish species. Although the initiative originally addressed only jellyfish species, sightings of other gelatinous megaplankton species, including pelagic tunicates (salps and pyrosomes) and ctenophores, were also coordinated.

A tailor-made initiative leaflet was produced (see Figure 5), depicting a visual guide to identifying different gelatinous megaplankton species (jellyfish, ctenophores, and salps), and a numerical code to the different coastal locations of the Maltese Islands. Large numbers of the leaflet were printed and distributed to school children as well as made available online through the dedicated Spot the Jellyfish website. Poster-size versions of the initiative were also printed and funded by the MTA and posted at different coastal locations around the islands (see Figure 6). Jellyfish sightings can be submitted by the public in a variety of ways, including the online submission form, the printed ad hoc leaflet sent by post, or through mobile short-messaging service (SMS) or email.

Jellyfish spotting initiatives are relatively common on a global and regional scale. The Monterey Bay Aquarium hosts an on-

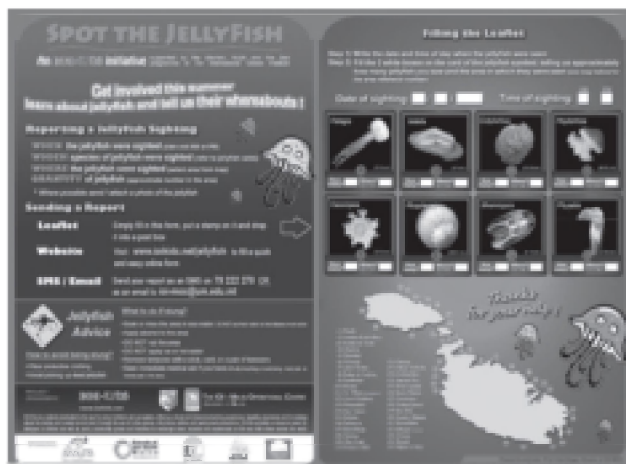


Figure 5. The ad hoc Spot the Jellyfish initiative reporting leaflet.



Figure 6. Spot the Jellyfish posters affixed at a coastal site in the Maltese Islands

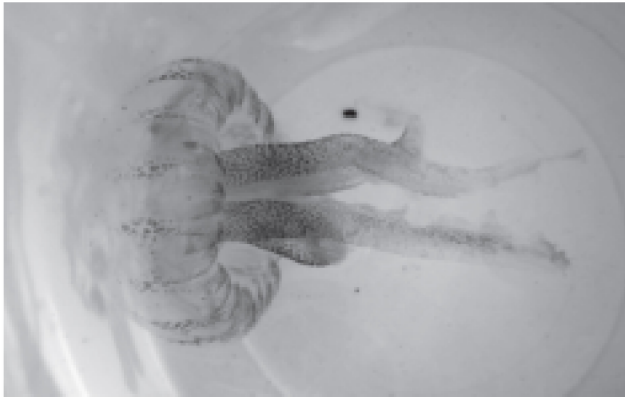


Figure 7. Image of a mauve stinger (*Pelagia noctiluca*) jellyfish.

line database (<http://www.jellywatch.org/>) of global jellyfish sightings, while the International Commission for the Scientific Exploration of the Mediterranean Sea (CIESM) hosts a similar program throughout Mediterranean waters (<http://www.ciesm.org/marine/programs/jellywatch.htm>). Somewhat more elaborate jellyfish spotting programs exist for Irish waters (EcoJel programme, which includes jellyfish tagging, <http://www.jellyfish.ie/jellytag.asp>) and for British waters (Marine Conservation Society Jellyfish Survey, which links jellyfish sightings to the presence of leatherback turtles in UK waters).

A previous jellyfish sighting exercise was conducted in Maltese waters, with Malta starting its participation in the monitoring protocol of the MEDPOL (The Programme for the Assessment and Control of Pollution in the Mediterranean region) Jellyfish Programme in 1982, with the aims of characterizing major features of coastal aggregations of *Pelagia noctiluca* and identifying the major environmental factors of such aggregations (Axiak et al. 1991). The methodology adopted involved the recruitment of a large number of volunteers, managers of coastal touristic establishments, and the Beach Cleaning Section of the Ministry of Tourism (who were provided standard data sheets to record sightings of jellyfish stranded on the shoreline or in the immediate vicinity of the coastline). Sightings at sea were recorded by the Maritime Squadron of the Task Force (local Coast Guards).

The Spot the Jellyfish initiative draws on the lessons learned from these existing programs and introduces innovative improvements, including the direct liaison with school children through the dissemination of the ad hoc leaflets and briefing sessions; real-time, geo-validated statistics on jellyfish sightings; and the utilization of mobile SMS, as well as other avenues, to submit jellyfish sightings. Additionally, the Spot the Jellyfish initiative makes a concrete effort to reach the younger generations by simplifying related posters and leaflets. For example, while the CIESM's Jellywatch Programme posters include a total of thirteen gelatinous species (jellyfish, ctenophores, and salps), this number has been reduced to eight in Spot the Jellyfish printed material (although sightings of other gelatinous species not included in such printed material are still accepted, if substantiated by photographic or video evidence).

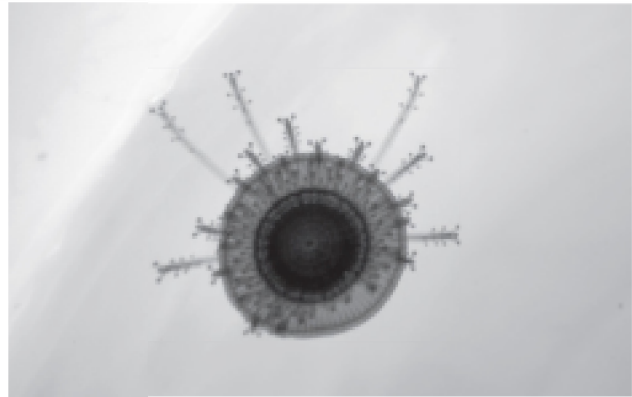


Figure 8. Close-up of the blue button (*Porpita porpita*) jellyfish.

During the first three operational months (June-August 2010) of the Spot the Jellyfish initiative, over 330 jellyfish sightings were submitted, with the online sighting form being the preferred submission choice (responsible for over 70% of all submissions). School children constituted ca. 10% of all jellyfish sightings received, with the printed leaflet used as their preferred method of reporting submissions. Predictably, ca. 90% of all jellyfish sightings received referred to the mauve stinger (*Pelagia noctiluca*). A total of seven cnidarian species (the hydrozoans *Porpita porpita*, *Velella velella*, *Aequorea* sp. and *Physalia physalis*); the scyphozoans (*Pelagia noctiluca*, *Cotylorhiza tuberculata* and *Olindias phosphorica*); one cubozoan (*Carybdea marsupialis*); one ctenophore species (*Leucothea* sp.); and two, pelagic tunicate species (*Salpa maxima* and *Pyrosoma atlanticum*). The Spot the Jellyfish initiative will be conducted over the coming successive seasons and years in order to identify emerging inter-seasonal and inter-annual trends in gelatinous megaplankton species composition. (See Figures 7 and 8 for featured jellyfish photos submitted by children for the Spot the Jellyfish initiative.)

#### THE IOI-KIDS BEST PROJECT COMPETITION 2010

Another dedicated initiative is the IOI-KIDS Best Project competition 2010 (<http://www.ioikids.net/Competitions/2010/index.html>). This competition is the latest among many organized with the goal of generating a collection of didactic material suitable for online publishing in the "IOI-KIDS Projects" section. Primary and secondary school children are challenged in this competition to combine their artistic and computer talents, and prepare attractive and informative electronic contributions in the form of projects on topics related to the sea. The competition was open to individuals or teams of Maltese children in two separate age groups, 5-10 and 11-16 year olds. The young authors of the selected original works and projects were eligible to participate in an international competition, and share their works and projects on dedicated pages of the IOI-KIDS website with other kids in Malta and worldwide. Submissions could take several formats, including a narrative in the form of a lesson; an essay, poem, or story; a web page, a database, or collection shared online; a set of notes on a selected topic; or a PowerPoint presentation. Sub-

missions are expected to be complemented with images (in the form of photos or drawings) and/or audio or video clips.

The accepted works could cover any topic related to the sea and the coast, and take the shape of: interesting articles, compilations, events or notes; interesting and/or unusual incidents; recent scientific or other discoveries; conservation issues; species of plants or animals; ecosystems or places of interest; people whose work is connected to the sea; and many other imaginative contributions. The 2010 competition follows a similar competition, held in 2009, which solicited contributions from teachers and parents, rather than from school children. Almost 60 submissions were received, ranging from marine topics on conservation of endangered fish species, such as the killifish, to the ecological impact of oil spills, to poems revolving around marine themes.

#### FUTURE PROSPECTS FOR THE IOI-KIDS WEBSITE

The continued expansion of the website's didactic ethos is envisaged through the development of a greater number of tailor-made online lessons, video clips, and other educational features. Such a development is mainly planned to address the paucity in marine-related topics included in Maltese school curricula, thereby providing complementary resources to fill curricular gaps. The website's proponents also want to bolster the multi-cultural character of the website and promote a higher degree of inter-IOI center exchanges by encouraging the submission of educational materials to include opinions or indigenous anecdotes and stories about the sea; for example, in native languages that could be subsequently translated into English for widespread dissemination. In so doing, the website would further its outreach among non-native, English-speaking children by removing any existing linguistic barriers. Finally, website proponents acknowledge the need to further incentivize school children to contribute to the online forum section, even through the utilization of popular social websites.

#### REFERENCES

- Axiak, V., Galea, C., and P.J. Schembri. (1991). Coastal aggregations of the jellyfish *Pelagia noctiluca* (Scyphozoa) in Maltese coastal waters during 1980-1986. *Mediterranean Action Plan Technical Report Series* 47: 32-40.
- Drago, A. (editor). (2008a). *Proceedings, Pacem in Maribus XXXIII Conference*, Malta: International Ocean Institute - Malta Operational Centre.
- Drago, A. (2008b). IOI-KIDS: A web-based learning resource on the sea for children and youth. In: *Proceedings, Pacem in Maribus XXXIII Conference*, 239-247. Malta: International Ocean Institute - Malta Operational Centre.
- Jenkins, R.O. (1997). Biotechnology educational resources on the internet. *Biochemical Education* 25(2): 102.
- Wolman, Y. (1996). Chemical education on the internet. *Trends in Analytical Chemistry* 15(5): 381-384.
- ALDO DRAGO** is the Director of the IOI-MOC within the University of Malta. He is marine physicist and also the Maltese delegate for a number of marine research organizations, including CIESM. He is the conceiver of the IOI-KIDS website project, as well as being the main proponent of initiatives taken by the IOI-KIDS team.
- ALAN DEIDUN** holds a Ph.D. in Biology and is a lecturer within the IOI-MOC. He is the resident biologist for the Spot the Jellyfish program and validates educational material hosted on the IOI-KIDS website. He is also the author of many online lectures and video clips hosted on the same website.
- MARTIN GALEA DEGIOVANNI** is a project officer at the IOI-MOC and is working on a master's degree in Environmental Studies. He is responsible for designing and maintaining the IOI-KIDS website through the constant uploading of didactic material and through the development of a blueprint for the website.
- ALICIA SAID** is a graduate trainee at the International Ocean Institute-Malta Operational Centre (IOI-MOC) at the University of Malta. She is working on a master's degree in Geography and has promoted the IOI-KIDS initiative by delivering talks to school children and local councils.

#### PHOTO CREDIT

All Photos: Courtesy of [www.ioikids.net](http://www.ioikids.net)

#### RELATED BRIDGE RESOURCE PAGES:

Discover your world with NOAA:

<http://celebrating200years.noaa.gov/edufun/book/welcome.html>

Ocean Guardian:

[http://sanctuaries.noaa.gov/education/ocean\\_guardian\\_prog.html](http://sanctuaries.noaa.gov/education/ocean_guardian_prog.html)

Island Explorers Curriculum:

<http://www.usc.edu/org/seagrant/Education/IELessons/IELessons.html>

Voyager for Kids:

<http://explorations.ucsd.edu/Voyager/>