science
& technology

Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

marine careers

So, you want to work with the sea?

an educational resource produced by **NPC Sea World Education Centre** at uShaka Marine World, Durban

Sponsored by the Department of Science and Technology

Did you know?

- Over 70% of the Earth's surface is ocean.
- Life on Earth is possible because of the oceans.
- YET we know more about the surface of the moon than we do about our oceans!

- Most oxygen used on land is generated in the world's oceans.
- The Earth's climate is driven by the oceans.
- Most of the solar energy that reaches the Earth is stored in the ocean and helps power oceanic and atmospheric circulation

- 60% of South Africans live within 100 kilometres of the sea.
- The sea provides over one billion people with their primary source of protein.
- BUT 75% of the world's fisheries are fully or over exploited.
- And many species of fish are less than 10% of their original stock levels.

- Over 450 cubic kilometres of waste is dumped into the sea each year.
- Widespread marine habitat destruction has left many coastal communities vulnerable.

Why choose a marine career?

Over half of the world's population lives in countries edging on the Indian Ocean. Most of these are developing countries that have a critical need for food security, development opportunities and sustainable use of their resources.

As a growing global population stresses the ability of our society to produce food, water, shelter and energy, we will continue to look to the oceans to help sustain our basic needs.

To survive, we will have to build upon our existing knowledge of the ocean and its potential to help meet the needs of the world and its inhabitants. And we urgently have to manage our interactions with this environment.

From scientists to technicians and laboratory assistants... from divers to dolphin trainers... from resource managers to environmental educators... many different and exciting opportunities are available to those who want to pursue a career in the marine environment.

This booklet, developed and produced by the **NPC Sea World Education Centre**, is an introduction to marine careers. Information touched on includes: different career options and areas of specialisation; tertiary qualification requirements; working conditions; and potential employment prospects.

Learners are encouraged to research further, to make contact with institutions and organisations working in the marine environment, to explore options for tertiary education and training.

Most importantly, we encourage learners to discuss Grade 10-12 subject choices with their educators.

aquarist

looks after fish and other animals in an aquarium and ensures that the animals on exhibit are healthy and well fed. Aquarists may catch fish for exhibit and conduct research with a view to rearing or keeping different species in the aquarium.

Where to begin:

- B.Sc. with Zoology

coastal engineer

uses engineering techniques in the coastal zone and offshore environment. Coastal and ocean engineering is a branch of civil engineering and involves the development of harbours, recreational facilities, effluent outfalls and mining.

Where to begin:

- B.Sc.Eng specialising in Civil Engineering

commercial diver

uses SCUBA equipment to do a wide range of different jobs under water. Commercial divers help to build piers or pipelines, or they can help to salvage (recover) the wrecks of ships that have sunk at sea.

Where to begin:

- Class 4 commercial dive qualification

conservation officer

a marine conservation officer ensures the public are aware of and adhere to regulations associated with the harvesting of marine species. Marine conservation officers play an important role in data collection ensuring better resource management.

Where to begin:

- National Diploma in Nature Conservation *or*
- B.Sc. *or*
- National Diploma in Fisheries Resource Management

fisheries economist

is concerned with the question of how people's material needs can be satisfied by the marine environment with the aid of such resources as labour, capital, technology and entrepreneurship.

Where to begin:

- B.Com. with specialisation *or*
- B.Econ. with specialisation

Marine careers are very specialised and it is important to understand that in order to succeed, you must be prepared to spend a great deal of time and effort acquiring the necessary education and training.

The first, and probably most important thing to consider, is your choice of Grade 10-12 subjects. Subject choices directly influence what career opportunities will be available to you in the future, and which of these you will be in a position to explore. Your subject choices should match requirements for the specific tertiary training and education you will need to complete in order to pursue a particular marine career.

This booklet offers you an introduction to what tertiary qualifications are necessary for specific marine careers, as well as suggestions on what and where to study. We encourage you to do further research and to contact the many institutions and organisations mentioned for specific information on entry requirements, syllabus and length of study.

Remember... entrance into tertiary education institutions is by no means guaranteed, and you will be facing tough competition. Tertiary education is expensive, and bursaries are only offered to students who have good matric marks.

fisheries scientist

studies the numbers of different types of fish and other marine animals that are harvested by people. Fisheries scientists work out how much fish and other marine resources can be harvested sustainably.

Where to begin:

- B.Sc.

mammal trainer

marine mammal trainers care for, train, and do public presentations with dolphins, seals and other marine mammals.

Where to begin:

- B.Sc. *or*
- National Diploma in Nature Conservation *or*
- B.A./B.Soc.Sci. with Psychology major *or*
- B.A. with Drama major

mariculturalist

farms marine species under controlled or natural conditions.

Where to begin:

- B.Sc.

marine biologist

studies the animals and plants that live in the sea. Marine biologists study the distribution, abundance and life cycles of organisms and may also study the biological interactions between different species and their environment.

Where to begin:

- B.Sc.

marine chemist

investigates the processes determining the distribution and effect of chemicals, pollutants and micro-nutrients on the marine environment. They also search for natural products from the sea for food production, cure of diseases and industrial applications.

Where to begin:

- B.Sc. with Chemistry

WHAT AND WHERE TO STUDY

Are you interested in becoming a scientist conducting your own research? Are you more interested in the practical aspect of a marine career such as collecting material in the field or making and maintaining apparatus? Do you want to concentrate on marine education or marine conservation? Or are you specifically interested in working in an aquarium or becoming a dolphin trainer?

These are important questions to consider as each of these fields involves different areas of study at tertiary level.

MARINE SCIENCES

Due to the wide variety of related scientific fields, the specialised training of a marine scientist only commences after completion of a **B.Sc. (Honours) degree** in an ordinary science or engineering field.

Entrance to the science faculty of most universities requires a matriculation exemption with a pass in Mathematics plus a comparable pass in at least one science subject such as Biology or Physical Science.

A **B.Sc. degree** is three years in duration.

marine educator

plays a vital role in creating an awareness of the importance of the marine environment as a food, medicine, recreation, economic and spiritual source and equipping people, both young and old, with the appropriate information to live in harmony with this environment.

Where to begin:

- B.Sc. *or*
- B.Ed. with Science/Biology

marine engineer

keeps ship engines, generators and associated systems like pumps, fuel purifiers and compressors in good, working order.

Where to begin:

- B.Sc.Eng. specialising in Mechanical Engineering

marine geoscientist

researches the processes forming the sea floor as well as the sediments and rocks at the bottom of the ocean and along the shoreline.

Where to begin:

- B.Sc. with Geology and Geography

marine surveyor

makes maps of the ocean floor. These maps show all of the features under the sea (just as a map of the land would), and help people to find their way around the oceans.

Where to begin:

-

meteorologist

marine meteorologists study the ways that the oceans influence our weather and climate. They help to predict weather and climate by studying how the oceans distribute heat around the globe.

Where to begin:

- B.Sc. Meteorology

An **Honours degree** is a further year of study.

In addition to majoring in one or two of Botany, Zoology, Chemistry, Geology, Physics, Microbiology, Environmental or Cell Biology, the prospective marine scientist may include a course in Mathematics, Statistics and/or Computer Science in the degree.

A carefully considered combination of minor subjects is also of vital importance. A **degree in Engineering** provides an excellent basis for specialisation in certain aspects of physical oceanography.

Certain South African universities teach subjects with a marine science content at the honours level while a number of universities provide post-graduate training in aspects of marine science.

It is important to contact these universities in order to find out exactly what courses are offered.

Different universities offer different courses and it is important to ensure that the university you select offers the courses that interest you. Also, be sure to check entry requirements as these could differ from university to university.

maritime lawyer

works with and helps others to understand the laws that govern international maritime zones and marine resources.

Where to begin:

- B.A. LLB

oceanographer

studies the ocean. There are many different types of oceanographers. For example, a physical oceanographer studies the physical properties of seawater and the forces that move it.

Where to begin:

- B.Sc. *or*
- National Diploma in Oceanography

technician

oceanographic technicians perform vital applied functions in many oceanographic categories. They may also focus on collecting specimens in the field, working in laboratories or on making and maintaining equipment.

Where to begin:

- National Diploma in Oceanography

south african navy

offers a choice of careers from officers' posts such as combat officers and intelligence officers, to posts like surveying, navigation, catering or diving.

Where to begin:

- The Navy provides training for various careers such as officer, submariner, etc.

environmental health

the use of the sea for sewage and industrial effluent is increasing. Research on tides, currents and wave movements is of vital importance in areas where this is planned. It is also essential to have people monitoring water quality to determine the impact on the environment.

Where to begin:

- National Diploma in Environmental Health

TECHNICAL TRAINING

For those who do not want to become scientists, there are several marine careers to consider. Laboratory technicians, draughtsman, electronics technicians and instrument makers are required on the ships and in laboratories, for example.

Cape Technikon offers a **National Diploma in Oceanography** which concentrates technical training in the marine field. This is a three-year course, half of which is spent at a research establishment. A skipper's or advanced diving qualification may also be required.

For those interested in working in the field of marine conservation, the **Nature Conservation Diploma** offered at Technikon SA, Pretoria Technikon, Mangosuthu (Durban) Technikon and Cape Technikon provides a good background.

MARINE MAMMAL TRAINERS

The qualifications required for a dolphin trainer are varied and each person is assessed on their individual experience and personal qualities. Qualifications in psychology, nature conservation, teaching, as well as speech and drama, are all worthwhile.

Working conditions and employment possibilities

If you are interested in working with the sea and pursuing a marine career, it is important to understand that employment possibilities, even for qualified people, are fairly limited. Success requires hard work, perseverance and (in many cases) higher qualifications.

While rewarding and often exciting, a marine career should only be considered by dedicated and committed individuals.

Working conditions vary according to the nature of the work being done and salaries are low in comparison to many other professions even though the work is demanding, specialised and vital to ensure the sustainable future of precious marine resources.

Researchers can expect to spend time out in the field, be it at sea, on the beach or in an estuary. However, not all of a researcher's time is spent in the field. For every hour spent in the field, many hours must be spent in the laboratory, in the library and in front of the computer, entering and analysing data or writing up the work. Diving may form one of the necessary activities in a researcher's programme, but this will depend on the nature of the research.

Technologists can expect to spend much of their time in the laboratory or in the field, while managers will often be office based. Education officers will be expected to work closely with people and will spend much time developing projects and working with children.

People working with animals at an aquarium usually need a B.Sc.(Hons) or a behavioral studies qualification. It is advantageous to have worked as a volunteer at an animal care facility (for example, the SPCA).

You need to be comfortable working in an outdoor environment and be able to swim. SCUBA training may also be needed.

Marine Careers

a holiday workshop for Grade 10-12 learners

run by the
NPC Sea World Education Centre
at uShaka Marine World, Durban

Are you thinking of exploring a marine career? Run twice a year during school holidays, this workshop will introduce you to a variety of careers associated with the work done in an aquarium, dolphinarium and marine research institute.

For more information and to book, please contact:

NPC Sea World Education Centre
Tel: (031) 328 8195/6
Fax: (031) 328 8211
Email: education@seaworld.org.za

Useful contacts, employment prospects and places of work

Cape Peninsular University of Technology
PO Box 1906, Bellville 7535
Tel: (021) 959 6911
www.cput.az.za

Department of Ichthyology
Rhodes University
PO Box 94, Grahamstown 6140
Tel: (046) 603 80111
www.ru.ac.za

Ezemvelo KZN Wildlife
P/Bag X3, Congella 4013
Tel: (031) 274 1150
www.kznwildlife.com

Institute of Oceanography
University of Cape Town
P/Bag Rondebosch 7701
Tel: (021) 650 3282
www.sea.uct.ac.za

Irvin & Johnson
70 Prestwich Street, Greenpoint
Cape Town 8000
Tel: (021) 402 9200
www.ij.co.za

Lusitania Food Products
PO Box 17391, Dalebridge 4014
Tel: (031) 466 1545
www.lusitania.co.za

Marine & Coastal Management
P/Bag X2, Rogge Baai 8001
Tel: (021) 402 3911
www.mcm-deat.gov.za

Murray & Roberts Construction
(Land and Marine)
PO Box 8212, Elandsfontein 1406
Tel: (011) 820 4600
www.construction.murrob.com

Natal Sharks Board
P/Bag 2, Umhlanga Rocks 4320
Tel: (031) 566 0400
www.shark.co.za

National Resources and the Environment
CSIR
PO Box 395, Pretoria 0001
Tel: (012) 874 1291
www.csir.co.za

Nelson Mandela Metropolitan University
PO Box 77000, Port Elizabeth 6031
Tel: (041) 504 2111
www.nmmu.ac.za

Port Elizabeth Museum
PO Box 13147, Humewood 6013
Tel: (041) 584 0650
www.bayworld.co.za

School of Geosciences
Wits University
P/Bag 3, Witwatersrand 2050
Tel: (011) 717 6547
www.wits.ac.za/geosciences

South African Navy
SA Naval Headquarters
P/Bag X104, Pretoria 0001
www.navy.mil.za

Sea Harvest
PO Box 29035, Maydon Wharf 4057
Tel: (031) 205 1822
www.seaharvest.co.za

Sea World
PO Box 10712, Marine Parade 4056
Tel: (031) 328 8222
www.seaworld.org.za

South African Institute for Aquatic Biodiversity
P/Bag 101, Grahamstown 6140
Tel: (046) 603 5800
www.saiab.ru.ac.za

South African Naval Hydrographic Office
P/Bag X1, Tokai 7966
Tel: (021) 787 2408
www.sanho.co.za

The Oceanographic Research Institute (ORI)
PO Box 10712, Marine Parade 4056
Tel: (031) 328 8222
www.ori.org.za

The South African Museum
PO Box 61, Cape Town 8000
Tel: (021) 590 1570
www.iziko.org.za

Two Oceans Aquarium
PO Box50603, Cape Town 8002
Tel: (021) 418 3823
www.aquarium.co.za

University of KwaZulu-Natal: Howard College Campus
King George V Avenue
Durban 4001
Tel: (031) 260 1111
www.ukzn.ac.za

University of KwaZulu-Natal: Pietermaritzburg
King Edward Avenue
Scottsville 3201
Tel: (033) 260 5111
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Other Websites
International Marine Animal Trainers Association:
www.imata.org

Association of Zoos and Aquaria (USA): www.aza.org

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