Article: Biological Sciences

Summary

This article covers the following jobs:

- Biochemist
- Biotechnologist
- Botanist
- Clinical Engineer
- Ecologist
- Marine Biologist
- Medical Laboratory Assistant
- Microbiologist
- Zoological Scientist.

The job descriptions are only a brief summary. You should do further research on jobs that interest you.

Introduction

Biology is the study of all living things, from plants and animals to micro-organisms. The biological sciences also cover how living things relate to each other and their environment, how we can conserve and protect them, and how we can use them to solve problems.

Specialisms within the biological sciences include human biology, other animals (zoology), microbiology, biochemistry and biotechnology.

Biological scientists carry out laboratory research and fieldwork. They increase our understanding of the living world around us, and also how this world is changing.

For example, they record the number and types of animals and plants in certain areas, helping to identify species that are in danger of extinction.

Many use their findings to solve problems and to create useful products. For example, they:

- Find and test new drugs to fight disease, making them into medicines.
- Protect crops from pests and diseases, for example, by creating pesticides.
- Manage and protect conservation areas like nature reserves and woodlands.
- Use micro-organisms to make products like bread and yoghurt.

In the laboratory, biological scientists design and set up experiments, measure and observe changes, record results (often using statistics and computers) and analyse and display results using a variety of charts, graphs, models and reports.

Biological scientists often lead teams of technicians who are responsible for the day-to-day running of the laboratory, including setting up and clearing away equipment, recording results and disposing of waste.

Some of the careers in this area

**Zoological Scientist**

Zoological scientists specialise in the study of animal life, including their physiology, reproduction and genetics, behaviour, diseases and ecology.

They are involved in many areas, including:

- protecting endangered species
- improving livestock, for example, their breeding and resistance to disease
- preventing pests and diseases from damaging crops
- developing drugs to treat both animals and humans
• undertaking environmental surveys.

Entrants are usually graduates in relevant degree subjects, and many have specialist postgraduate qualifications.

**Biochemist**

Biochemists study the chemistry of life. They investigate how life works at all levels, from molecules to cells and then plants and animals.

Biochemists often use their knowledge to solve problems, for example, in health care, farming, and the development of medicines and food products.

They work in a very large number of places and have lots of different tasks. For example:

- Developing a drug to treat disease. Testing it on cells, first in a test tube and then animals and human volunteers, to make sure it's safe and to find the right dose.
- Studying genetics, for example, how our genes might make us more likely to get a particular disease.
- Testing blood samples to help doctors work out what's wrong with a patient.
- Finding out how to control and change plant genes to improve the way plants grow and their ability to survive heat, cold and disease.

To become a biochemist, you'll usually need a degree in biochemistry or another subject that covers a lot of biochemistry.

**Clinical Engineer**

Clinical engineers apply science and engineering principles to help people with medical problems.

They design and develop technology including prostheses (artificial limbs and joints), robotic surgery, cardiovascular devices such as artificial arteries, and diagnostic equipment like ultrasound and X-ray machines.

They may work in hospitals, university research departments and medical equipment manufacturing companies.

The usual requirement for this career is a relevant degree or HND.

**Biotechnologist**

Biotechnologists combine biology, the science of living things, with technology. They research and develop the use of biology to solve problems in areas such as health care, the pharmaceutical and chemical industries, agriculture, food production and environmental protection.

The processes of making food and drink products like beer, bread and yoghurt have always relied on biotechnology.

Modern areas of work include:

- developing vegetarian substitutes for meat
- using genetic modification to improve plant growth
- creating biodegradable plastics
- developing and testing new drugs, hormones and vaccines.

Most biotechnologists have a degree in a relevant subject. Degrees in biotechnology are widely available.

**Botanist**

Botanists study plants, including their reproduction and growth, distribution, and how pests and diseases affect them.

Some botanists count and classify the number of plant species in a particular region. Their findings help to build up a picture of our plant life, including how it changes and is affected by pollution, such as acid rain, or overgrazing by animals.

Botanists also work in agriculture, finding ways to stop pests damaging crops. Some botanists work for agrochemical companies, developing pesticides.

Others investigate how to improve crop yields or make crops more resistant to pests and diseases. They can use
either traditional plant breeding techniques or genetic modification.

To become a botanist, you need at least a first degree in a relevant subject. Botany and plant science are available as single degree subjects.

**Marine Biologist**

Marine biologists study plants, animals and micro-organisms that live in the sea. They take and test samples of marine life to investigate species and to understand how they are affected by environmental changes and human activity.

Their findings help us to manage and protect marine life, monitor environmental damage and explore ways to make safe use of the sea's resources.

For example, they study the life cycles of fish to make sure they are not 'over-fished'. This involves looking at things like migration patterns, breeding behaviour and the fish's natural predators. Marine biologists study fish stocks at larval, immature and mature stages.

Marine biologists spend time both at sea and in the laboratory, testing the samples they have collected. They must make careful notes, possibly writing up significant findings in scientific journals.

To become a marine biologist, you usually need to complete a relevant degree course. There are specialist degrees in marine biology (often with freshwater biology) and entry is also possible with a degree in another biological science, oceanography or biochemistry.

**Microbiologist**

Microbiologists study life forms such as bacteria and viruses ('micro-organisms' or 'microbes') that are too small to be seen without a microscope. Some microbes cause disease, but others are harmless and some can be used to benefit humans.

For example, sewage treatment relies on bacteria and protozoa that break down the waste material. In medical research and pharmaceutical companies, microbiologists help to develop drugs and vaccines.

In the food and drink industry, microbiologists use microbes to help make products such as beer, wine, bread and yoghurt.

Many microbiologists are involved in environmental work, for example, using microbes to break down industrial waste. In agriculture, they can use microbes to tackle the pests and diseases that affect crops.

The usual entry requirement is a relevant degree.

**Medical Laboratory Assistant**

Medical laboratory assistants support the work of biomedical scientists. They have a number of tasks in medical laboratories, including:

- making up chemical solutions
- labelling blood and tissue samples
- looking after equipment stocks, ordering replacements when needed
- cleaning and sterilising equipment
- carefully removing waste.

They also record and study experiment results, often using a computer. Some specialise in different types of work, such as collecting blood samples from patients.

There are no set entry requirements, although employers might ask for GCSEs. You might need one or more from English, Maths and Science.

**Ecologist**

Ecologists study how living things relate to each other and their environment. They look at the impact of human activity, such as intensive farming and industrial development, on the habitat and development of plants and animals.
They advise local councils, civil engineering and industrial companies on how planned developments, like new roads or factories, will affect the local environment.

Some ecologists manage and protect conservation areas, working as site managers, rangers or wardens. They protect the area against pollution and vandalism, and provide information to visitors.

Entry is usually with a first degree or postgraduate qualification in a biological or environmental subject. Specialist degree courses in ecology are available at a number of universities.

Further Information

Contacts

- **Institute of Physics and Engineering in Medicine (IPEM)**
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- **Maritime UK Careers**
  Tel: 020 7417 2837
  Email: enquiries@seavision.org.uk
  Website: [www.seavision.org.uk](http://www.seavision.org.uk)

- **British and Irish Association of Zoos and Aquariums (BIAZA)**
  Address: Regents Park, London NW1 4RY
  Tel: 020 7449 6599
  Email: admin@biaza.org.uk
  Website: [www.biaza.org.uk](http://www.biaza.org.uk)

- **British Ecological Society (BES)**
  Address: Charles Darwin House, 12 Roger Street, London WC1N 2JU
  Tel: 020 7685 2500
  Email: info@britishecologicalsociety.org
  Website: [www.britishecologicalsociety.org](http://www.britishecologicalsociety.org)

- **Marine Conservation Society (MCS)**
  Address: Unit 3, Wolf Business Park, Alton Road, Ross-on-Wye, Herefordshire HR9 5NB
  Tel: 01989 566017
  Website: [www.mcsuk.org](http://www.mcsuk.org)

- **Marine Biological Association (MBA)**
  Address: The Laboratory, Citadel Hill, Plymouth, Devon PL1 2PB
  Tel: 01752 633207
  Email: sec@mba.ac.uk
  Website: [www.mba.ac.uk](http://www.mba.ac.uk)

- **Society for General Microbiology (SGM)**
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  Tel: 0118 9881800
  Email: info@microbiologysociety.org
  Website: [www.sgm-microbiologycareers.org.uk](http://www.sgm-microbiologycareers.org.uk)

- **Biochemical Society**
  Address: Charles Darwin House, 12 Roger Street, London WC1N 2JU
  Tel: 020 7685 2400
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  Website: [www.biochemistry.org](http://www.biochemistry.org)

Related Careers
• Biochemist
• Podiatrist
• Dentist
• Biomedical Scientist
• Optometrist
• Physiotherapist
• Palaeontologist
• Speech and Language Therapist
• Veterinary Nurse
• Agricultural Research Scientist
• Biotechnologist
• Botanist
• Countryside Manager
• Ecologist
• Biochemical Engineer
• Clinical Engineer
• Biology Laboratory Technician
• Marine Biologist
• Microbiologist
• Orthoptist
• Osteopath
• Physical Education Teacher
• Veterinary Surgeon
• Zoological Scientist
• Midwife
• Acupuncturist
• Environmental Conservation Officer
• Homeopath
• Medical Herbalist
• Medical Laboratory Assistant
• Naturopath
• Nurse
• Doctor
• Biomedical Engineer
• Nursing Associate
• Agroecologist
• Genetic Counsellor
• Myotherapist
• Orthodontist
• Cardiologist
• Paediatrician