**Examination Information**

***i*d** e n t i f i c a t i o n **q** u a l i f i c a t i o n s

NAME OF UNIT: **FRESHWATER ALGAE**

REFERENCE NUMBER: **B051**

COST OF EXAMINATION: **£250**

SYNOPSIS:
The aim of this examination is to test the application of skills in identifying the more common and the environmentally-important British algae (except diatoms) from a variety of freshwater and estuarine habitats. Environmentally-important algae include those that produce toxins, impart tastes and odours to potable water, indicate water quality and conservation status, form unsightly blooms or scums, and block water filtration plants and drainage ditches. The level of difficulty has been matched to the quality standards required for identifying biological material in environmental impact assessments, habitat evaluations or other ecological surveys, and routine monitoring.

Candidates will be expected to demonstrate proficiency in identifying algae to species level, or to higher groups such as genus or family as required. Both planktonic and benthic communities will be represented. The following major algal phyla will be covered: **Chlorophyta (includes stoneworts), Chrysophyta, Xanthophyta, Cryptophyta, Euglenophyta, Pyrrophyta (=Dinophyta), Rhodophyta, Cyanophyta (Cyanobacteria).** In the case of the Bacillariophyta (diatoms), identification will be to genus level in most cases; where identification to species level is required the relevant keys will be provided. The examination material will be in the form of preserved fresh samples, microscope slide mounts, photographs and line drawings..

A time element has also been taken into account so that the examination is a realistic test of efficiency of practical work as well as accuracy of identification. There is no restriction on the use of keys, handbooks or other identification manuals. Candidates will also be expected to demonstrate an understanding of relevant morphological terms, especially those that are used as diagnostic or key characters; familiarity with the use of identification manuals, and a basic working knowledge of botanical nomenclature as it relates to the correct application of taxonomic names.

CANDIDATE GROUPS:
Biologists and ecologists working for the Environment Agency, SEPA, water plcs or elsewhere in the water industry; consultants, conservationists and taxonomists engaged in assessing, monitoring or evaluating freshwater habitats; also culture collection staff and experienced amateur naturalists.

EXAMINATION FORMAT:
The examination comprises a practical test lasting about two and a half hours, and a short written paper of about half an hour - total duration 3 hours.

The main practical test will be in two parts: the first lasting about half an hour will involve the identification of specimens to class, genus or species level as required. In the time allocated this material will have to be identified without the use of keys. The second part (2 hours) will comprise identification to species for which full use of keys will be essential. Some specimens which cannot be keyed out to species may also be included; candidates will be expected to state if it is impossible to identify these, and any guesses at inappropriate levels of accuracy will be regarded as incorrect answers.

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The written paper will consist of 5-10 multiple-choice questions on morphology, structure of keys, relevant publications, and the correct use of scientific names.

EQUIPMENT:
Candidates are encouraged to bring their own microscopes but where this is not possible a microscope (x 50) and lamp will be provided for each candidate, and one or more shared compound microscopes will be on hand. Standard items such as forceps, mounted needles, slides and cavity blocks will be provided. Facilities for making temporary slide mounts will be available, although dissections will not generally be necessary.

Candidates will be expected to bring their own identification keys, handbooks, and other identification aids. Reference collections will not be available, nor can they be brought into the examination by candidates. Any problems over the availability of equipment and literature should be referred to the Museum well in advance of the examination date.

MARKING:
The pass mark for the examination is 90 per cent. Candidates achieving the pass mark will receive the full IdQ Certificate. As well as being informed in writing of the result, each candidate will also be given the actual percentage mark achieved.

To encourage training in the identification of freshwater algae and the progressive acquisition of skills, candidates who fail to achieve the 90 per cent pass mark but who reach the intermediate standard of 70 per cent will be awarded an Intermediate Certificate.

VENUE:
The examination will normally take place at The Natural History Museum, South Kensington, London.

REFERENCE LIST:
The key guide to British freshwater algae is 'The Freshwater Algal Flora of the British Isles' (2002. John, Whitton & Brook, eds) and its accompanying CD of algal images (compiled and edited by York, John & Johnson). Other useful works on freshwater algae listed are intended only for guidance. For further references, see Sims *et al.* (1988).

Barber, H.G. & Haworth, E.Y. 1981. A guide to the morphology of the diatom frustule with a key to the British freshwater genera. *Scientific Publications of the Freshwater Biological Association* No. 44.

Belcher, J.H. & Swale, E.M.F. 1976. *A Beginner's Guide to Freshwater Algae.* HMSO, London.

Belcher, J.H. & Swale, E.M.F. 1979. *An Illustrated Guide to River Phytoplankton.* HMSO, London.

Bellinger, E.G. 1992. *A Key to Common British Algae: Freshwater, Estuarine and some Coastal Species*. 4th Edition. Institution of Water and Environmental Management, London.
John, D.M., Whitton, B.A. & Brook, A.J. 2002. *The Freshwater Algal Flora of the British Isles.* CUP and NHM. (includes CD photo catalogue).

Lind, E.M. & Brook, A.J. 1986. A key to the commoner desmids of the English Lake District. *Scientific Publications of the Freshwater Biological Association* No. 42.

Moore, J.A. 1986. *Charophytes of Great Britain and Ireland.* BSBI Handbook No. 5.

Pentecost, A. 1984. *Introduction to Freshwater Algae.* Richmond Publishing Company, Richmond.

Prescott, G.W. 1962. *Algae of the Western Great Lakes Area.* 2nd Edition. Wm C. Brown Company, Iowa. (Reprinted in 1987 by Koenigstein.)

Prescott, G.W. 1978. *How to Know the Freshwater Algae.* 3rd Edition. Wm C. Brown Company, Iowa.

Sims, R.W., Freeman, P. & Hawksworth, D.L. 1988. *Key works to the fauna and flora of the British Isles and north-western Europe*. 5th Edition. The Systematics Association Special Volume No. 33. (Gives a comprehensive listing of identification works on algae)

**Freshwater Algae** List of Genera covered by IdQ (B051)

**Desmids**
*Closterium*
*Cosmarium*
*Cylindrocystis*
*Desmidium*
*Euastrum*
*Hyalotheca*
*Netrium*
*Micrasterias*
*Penium*
*Pleurotaenium*
*Sphaerozosma*
*Spondylosum*
*Staurastrum*
*Staurodesmus*
*Xanthidium*

**Other green algal groups**
*Actinastrum*
*Ankistrodesmus*
*Aphanochaete*
*Carteria*
*Botryococcus*
*Brachiomonas*
*Bulbochaete*
*Chaetopeltis*
*Chaetophora elegans*
*Chaetophora incrassata*
*Characium*
*Chlamydomonas*
*Chlorogonium*
*Chlorella*
*Chlorococcum*
*Chlorogonium*
*Cladophora glomerata*
*Closteriopsis*
*Coelastrum*
*Coleochaete*
*Colacium*
*Crucigenia*
*Desmococcus viridis*
*Dictyosphaerium*
*Draparnaldia*
*Elakatothrix*
*Eremosphaera*
*Eudorina*
*Franceia*
*Golenkinia*
*Gonium*
*Gongrosira*
*Haematococcus*
*Hydrodictyon reticulatum*
*Kirchneriella*
*Klebsormidium rivulare*
*Koliella*
*Lagerheimia*
*Lobomonas*
*Microspora*
*Micractinium*
*Microthamnion*
*Monoraphidium*
*Mougeotia*
*Nephrocytium*
*Oocystis*
*Oedogonium*
*Pandorina*
*Pediastrum boryanum*
*Pediastrum duplex*
*Pediastrum tetras*
*Phycopeltis*
*Prasiola*
*Protoderma*
*Pteromonas*
*Quadrigula*
*Rhizoclonium hieroglyphicum*
*Scenedesmus* (*=Desmodesmus, in part*)
*Schizochlamys*
*Spirogyra*
*Sphaerocystis*
*Stichococcus*
*Stigeoclonium*
*Tetraspora gelatinosa*
*Tetraedron*
*Tetrastrum*
*Trentephohlia*
*Ulothrix zonata*
*Uronema*
*Ulva* (*=Enteromorpha*)
*flexuosa*
*Volvox*
*Zygnema*
*Zygogonium*

**Stoneworts**
*Chara*
*Nitella*

**Cryptophyta**
*Cryptomonas*

**Euglenophyta**
*Euglena*
*Lepocinclis*
*Phacus*
*Trachelomonas*

**Pyrrophyta (=Dinophyta)**
*Ceratium*
*Gymnodinium*
*Peridinium*

**Rhodophyta**
*Audouinella*
*Bangia atropurpurea*
*Batrachospermum*
*Chantransia* - stage
*Hildenbrandia rivularis*
*Lemanea*
*Porpyridium*

**Chrysophyta**
*Dinobryon*
*Mallomonas*
*Hydrurus foetida*
*Synura*

**Xanthophyta**
*Botrydium*
*Ophiocytium*
*Tribonema*
*Vaucheria*

**Raphidophyta**
*Gonyostomum*

**Cyanophyta**
*Anabaena*
*Aphanizomenon*
*Calothrix*
*Chamaemosiphon*
*Chroococcus*
*Coelosphaerium*
*(= Gomphosphaeria)*
*Gloeocapsa*
*Gloeotrichia*
*Hapalosiphon*
*Lyngbya*
*Merismopedia*
*Microcystis*
*Nostoc*
*Oscillatoria*
*Phormidium*
*Rivularia*
*Spirulina*
*Stigonema*
*Sctyonema*
*Tolypothrix*

*Frustulia*
*Gomphonema*
*Gyrosigma*
*Meridion*
*Navicula*
*Nitzschia*
*Pinnularia*
*Pleurosigma*
*Rhopalodia*
*Stauroneis*