

## Now, where did we lose Kingdom Fungi ...?



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The fact that fungi are not plants, not animals, and not bacteria, is not even mentioned in current GCSE specifications. Instead, the National Curriculum persists with comparisons between animals with plants, and by so doing fails to show the pupils that fungi have their own unique cell biology, their own unique developmental biology, their own unique life style, and a crucial place in every ecosystem and in every food web on this planet.

Despite the NC, though, with a little bit of thought, fungi can be used for teaching many areas of the current curriculum specifications and in cross-curricular activities. Fungi are not just mushrooms, yeast and moulds.

Fungi digest the grass eaten by cows (and all other herbivores) and by so doing indirectly provide the milk for our breakfast and the steak for dinner.

Fungi make plant roots work (more than 95% of all terrestrial plants depend on mycorrhizal fungi) and, even leaving aside the effect of this (and the lichen symbiosis) on the evolution of terrestrial flora, by so doing mycorrhizal fungi help today to provide the corn for our cornflakes, as well as every other crop plant, and even oxygen for our daily breath.

The fungal life style is to secrete enzymes into the environment to digest nutrients externally; and we harness this feature in our biotechnology to produce enzymes to start our cheese-making, clarify fruit juices, and even distress denim for 'stone washed' jeans, as well as, conversely, providing conditioners to repair day-to-day damage to our fabrics in the weekly wash.

Fungi also produce a range of compounds to compete with other organisms in their ecosystem; when we harness these for our own purposes we create products like cyclosporin, which prevents organ rejection by suppressing the immune response in transplant pa-



tients, the statins, which keep so many people alive these days by controlling cholesterol levels, and even today's most widely used agricultural fungicides, the strobilurins.

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a series of five ready-made KS4 lessons comprising an introductory *Welcome to the World of Fungi, Reproduction and Conservation, Favourite or Nastiest Fungus, Fungi and Industry* and *Fungi and Disease*. All of these lesson packages include class sheets for pupil and teacher, the latter including references to supplementary materials carefully chosen from articles previously published in British Mycological Society publications.

an integrated series of class sheets that describe 15 different 'What's your favourite fungus?' stories from which the pupils extract important points, a pack of playing cards that mirror the class sheets and can be used to play a variety of games (and all the time the players are holding cards that each carry a different 'fungal fact'), and a 'name-game' starter exercise.

These materials have all been classroom tested with groups of pupils ranging from year 8 through to year 11 and were all well received by the pupils and successfully increased their knowledge base. These resources, and the experience we have had with them, show that pupil understanding and pupil awareness of fungi can be improved with as little as one to five hours of 'fungus-oriented' lessons.

The resources are highly adaptable, allowing the teacher to include parts of them in other lessons. They can be mixed in a variety of ways and also work well as resources for plenary events or when used for the 'theoretical' background for a workshop featuring some practical activity (school foray, food science investigation, industrial visit, etc.).

The Key Stage 4 resources have been printed as a package that is available for distribution (free) from David Moore (address below), and all work-sheets and classroom materials (ranging in suitability from primary to post-16) can be downloaded (free) from the British Mycological Society website at

<http://www.fungi4schools.org/>.

*David Moore, Stephanie Roberts, Charlotte Quinn, Ruth Townley & Kelly Fryer, Faculty of Life Sciences, 1.800 Stopford Building, The University of Manchester, Manchester M13 9PT.*

## Useful Web Addresses

<http://fungi.fvlmedia.dk/> This is one for the teachers and all those Interactive Whiteboard/PowerPoint presentations. This site can give you any image you might ever need of fungi. Photographs are arranged by scientific names and images are good quality even if you do need to have at least some basic knowledge of common names

<http://www.myfg.org.uk/fungus.htm>. The Mid Yorkshire Fungus Group has an interactive and fun site with games and quizzes. You can get in a little cross curricular benefit with the fungi in literature page, use the body parts section to help your students identify fungal structures and test yourself on basic fungi facts. The site is easy to use and navigate. There is enough on the site to keep most students entertained for a good half hour.

<http://www.doctorfungus.org/> This site will allow your students to read up on all the possible fungi diseases they may have. It's site aimed primarily at older students although some aspects are generally useful.



## Starters and Plenaries:

### The Fungi Name Game

#### Instructions

The object of this activity is to pick the true names from the fake fungal names. Students are encouraged to shout out names to find the real names, which form a path of touching squares from the top of the grid to the bottom.

COFFEE HUMP	EARPICK FUNGUS	DINGY TWIGLET	BUBBLE PUFF	HAIRY STINKWEED
WASP CRABTREE	TURTLE TRUFFLE	PLUMS AND CUSTARD	SQUARE PORE	WAXY SHEEP
DEADLY SPIDER	SILKY PIGGYBACK	TURKEY TAIL	WITCHES' BUTTER	SMOOTH TALON
DOUBLE JEWEL	LEMON DISCO	FLUTTER DEVIL	SLIMY DONKEY	BOOTY MOULD
MOTTLED FAIRY	FROSTY FUNNEL	LAWYER'S WIG	DRUMSTICK TRUFFLE CLUB	BLUELEG BROWNIE
PEACOCK OYSTER	CHALK AND CHEESE	RABBITS TAIL	MOUSEPEE PINKGILL	CHERRY BONNET

This activity is provided courtesy of Stephanie Roberts, David Moore and the British Mycological Society. A full lesson plan and worksheets are available through the website [www.fungi4schools.org](http://www.fungi4schools.org).

Answers: available from [www.fungi4schools.org](http://www.fungi4schools.org)

# T Teaching H Ecology E Newsletter



Issue 32

Spring/Summer 2006

## Ecological Education Grants

The Ecological Education Grants (EEG) were launched last year and are proving successful with schools, especially in the categories of School Grounds Development and Field Equipment.

Professional development grants also continue to be well represented through our partnerships with the Field Studies Council and Science Learning Centres.

Currently the majority of applications are from primary schools and we are now looking at ways to increase the applications from other sectors.

We remain keen that as many people as possible get to know about these grants so please help us to spread the word and let your colleagues know. Flyers about the grants are available from the London offices and updated criteria are on line.

### Innovation and research

*Description:* This grant helps teachers to develop creative

approaches in teaching ecology. The aim is to promote good practice and to support ecology teaching that is both exciting and intellectually stimulating

*Suitable for:* All levels

### School grounds developments

*Description:* School grounds provide an opportunity for students to observe living animals and plants in their natural habitat. This grant supports initiatives which enhance school grounds for the teaching of ecology

*Suitable for:* All levels

### Primary school field work or nature visit

*Description:* Funding is available for teachers to arrange for their class to participate in a field trip

*Suitable for:* Primary

### Field equipment

*Description:* This grant supports the purchase of ecological fieldwork equipment

*Suitable for:* All levels

### Teacher attendance at BES meetings

*Description:* Anyone involved in ecology education that cannot access funding from employers may apply for financial support

*Suitable:* Schools and schools providers

### Higher education (HE) taster events

*Description:* Funding is available to support schools in attending events at HE institutions which promote ecology

*Suitable:* Secondary and tertiary

### Professional development

*Description:* The BES sponsors a range of courses by contributing directly to tuition fees or by paying for supply cover

*Suitable for:* All

*Please check out the website if you are interested in applying for any of these grants.*

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## Outreach Education in the North West

There are many barriers preventing teachers taking their students out into the school field let alone to the local park.

Well, now the BES and FSC have formed a partnership that hopes to address some of these barriers and make it easier for teachers to get out into their own fields at least.

Post SATS year nine students

and their teachers are being offered a two day course in their school ground ecology. The project will be piloted in the North West region and is likely to have a focus on Manchester schools in particular.

Karen Devine of the BES and Annie Duckworth of the FSC will be working with teachers for one day and demonstrating lessons with year nine students

on a second. They will be identifying outdoor education opportunities, producing the resources aimed at each school grounds and hopefully giving teachers the confidence to continue with a programme of outdoor activities through their schemes of work.

**The next edition of TEN will feature the work they have been doing this year.**

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British Ecological Society

Innovating

Ecology

Inspiring

Teaching

Education

Learning

**Editor: Karen Devine**  
 Education Officer  
 British Ecological Society  
 26 Blades Court  
 Deodar Road  
 London SW15 2NU

**Chair of ETCC: Dr David Slingsby**  
 British Ecological Society  
 26 Blades Court  
 Deodar Road  
 London SW15 2NU  
 Email: [david@hamar.fsnet.co.uk](mailto:david@hamar.fsnet.co.uk)

Queries and comments? Please feel free to contact me at [karen@britishecologicalsociety.org](mailto:karen@britishecologicalsociety.org)

### About the Teaching Ecology Newsletter (TEN)

The original purpose of TEN was to help ecologists teaching around the country to keep in touch with each other and with what the society was doing in education, and to provide a forum for debate. These remain its functions and we welcome the contributions of any TEN reader, whether they take the form of a very short note, a letter, a book review or a longer article.

### Submitting a Contribution

We will accept material in any form but a text file attached to an email is preferable. Illustrations, pictures or clip art are also welcome. Please make sure there are no copyright problems with anything you submit for inclusion in TEN. Any secondary source material should be properly acknowledged and the author's permission obtained if necessary. The editor reserves the right to make modifications to material submitted in the interests of overall consistency, although we would normally get back to you in the case of major changes.

### About the BES

The British Ecological Society is the oldest ecological society in the world and Sir Arthur Tansley was its first president. The BES has a worldwide membership of over 4000 ecologists, produces four internationally respected scientific journals and organizes meetings and symposia at both national and international levels.

The Education, Training and Careers Committee (ETCC) is a formal committee of the British Ecological Society, which administers an educational budget, has a growing number of educational initiatives, and advises the council on matters of educational policy.

You don't have to be a member of the BES to receive TEN, but we hope you might want to join and play a full part in the Society once you start to get involved

BES Head Office:  
 British Ecological Society  
 26, Blades Court  
 Deodar Road  
 Putney  
 London  
 SW15 2NU



Tel: 020 8871 9797

Fax: 020 8871 9779

[info@britishecologicalsociety.org](mailto:info@britishecologicalsociety.org)[www.britishecologicalsociety.org](http://www.britishecologicalsociety.org)

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In the United Kingdom, the most likely answer to the question “How much are your children taught about fungi in school?” (posed in the article by David Moore *et al.*, 2005) is: “Little or nothing”.

It's a sad truth that although fungi are fundamentally important to virtually every aspect of our every day lives; there is a distinct lack of fungal biology in the school curriculum. This means that children are missing out on being taught about an important Kingdom, which will come as a surprise to parents who might expect science teaching to be properly balanced, but the problem starts with the National Curriculum. The state of the National Curriculum (NC) is a real concern because the current specifications all contain material on animal and plant comparisons with little or no consideration for the largest group of higher organisms on Earth: Kingdom Fungi.

To try to compensate for this educational deficiency, the British Mycological Society has recently published a range of classroom tested teaching resources, including:

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