REVIEWS

Enjoy teaching science investigations at key stage 1

Sue Cooper and Barry Davis
Oxford: Oxfordshire County Council Learning and Culture, 2004
Available from sciencecentre@oxfordshire.gov.uk or tel. 01865 428122
144 pp. £22.00

PHOTOCOPIABLE RESOURCE BOOK FOR TEACHING KS1 SCIENCE INVESTIGATIONS

This is a very useful book for new and experienced teachers of science to 5–7 year-olds. It is packed with lots of very useful (and commonsense) notes on how to teach investigations to young children, with photocopiable planning and recording sheets differentiated according to ability and year group. It is heartening to see a range of investigations beyond the fair test (which features prominently). You will find exploration investigations, which are super for engaging different learning styles, and pattern-seeking investigations, which are particularly useful for developing children's language of comparison.

The investigations are organised methodically around Sc2, Sc3 and Sc4. Learning intentions, knowledge and understanding, skills, key words, resources, safety issues, ICT links (good to see sound sensors used in year 2) and teaching tips precede informative lesson plans. The text is clear and well displayed, making access to information easy. I particularly like the suggestions made for setting the investigations in a context relevant to the children. A wide range of context types is offered which will no doubt stimulate teachers' own ideas for providing the children with creative contexts. There are many examples of recording by children, which are always very useful for showing teachers how recording can be done in different ways; this is particularly the case when working with very young or less-able children where recording may be an issue because of insufficiently developed literacy skills.

The book may seem somewhat expensive but it does provide a wealth of photocopiable material, as well as suggestions for classroom management, how to make investigations fun, how to make recording enjoyable, and notes on how to use the 'planning house' system recommended by the authors.

I believe that key stage 1 practitioners will find this a very practical addition to the materials available for the teaching of scientific enquiry. Highly recommended.

David Barker
Primary Science Coordinator, St Andrew's CE Primary School, Radcliffe, and part-time Primary Science Consultant, Bury LEA

Using science to develop thinking skills at KS1

Max de Bóo
London: David Fulton, 2004
162 pp. £14.00
ISBN 1 84312 150 6

THIS IS A VERY USEFUL GUIDE FOR TEACHERS INTERESTED IN CATERING FOR ALL LEVELS OF SCIENCE ABILITIES WITHIN THEIR CLASSROOMS, THOUGH SPECIFICALLY AIMED AT KS1 GIFTED AND TALENTED CHILDREN

Much is written about special educational needs provision, usually concentrating on those at the lower levels of achievement. This book looks at the needs of key stage 1 children who are perceived to be performing at the upper end of the subject spectrum. The author, Max de Bóo, explores the phenomenon of the more-able child in relation to accepted definitions of the gifted and talented and concludes that the term is applicable to around 15 to 20 per cent of this age range (4 to 7 years). This is a significant proportion and points up the relevance of this publication to early-years' classroom practitioners.

The introductory section of the book addresses contemporary educational issues such as the scaffolding of children's development and the importance of the promotion of 'thinking skills'. It is extremely readable and contains useful advice on assessment, record-keeping and effective questioning. Its study should certainly create some teacher-centred cognitive conflict. The introduction concludes with instructions on how to use the book when teaching the subject in the classroom.

Scientific endeavours are centralised within a framework that includes the following elements: introduction, activity, organisation, questions to encourage thinking skills, vocabulary, extension and enrichment activities, points of significance to look for and additional ideas and resources. This is a comprehensive list that works well when outlining investigations the author deems applicable for use with the more-able children. The activities are easy to resource and the step-by-step guidance encourages children to make comparisons, interpret results and draw conclusions, all laudable and scientifically desirable processes. Even though it is targeted at talented and gifted 4–7 year-olds, I feel the book over-extends its remit, for example, when describing work that can be done with conductors and insulators. Some things are best left to older age groups. There is a chapter devoted to each of the three main content areas of primary science, that is, life processes, materials and physical processes, and these are liberally peppered with 'concept cartoons' and cross-references to the QCA scheme of work.

Finally, an appendix outlines 'tables of significant attainment' and a 'progression of learning outcomes' for the three attainment targets above, useful indicators of progression for the teacher who requires instant indicators of children's progression.

This book is useful beyond its brief. It may be used quite effectively for the purpose for which it was intended, or more than adequately as a stimulus for enhancing science teaching across both key stages for a wider learning audience.

Peter McAlister
Science Adviser, South Eastern Education and Library Board Northern Ireland

Understanding primary science: ideas, concepts and explanations

2nd edn. Martin Wenham
London: Paul Chapman, 2005
302 pp. £18.99
ISBN 1 4129 0163 4

A TEACHER'S RESOURCE AIMED AT ACHIEVING EFFECTIVE TEACHING OF PRIMARY SCIENCE

This second edition of *Understanding primary science* benefits from the fact that it has been updated in accordance with, but is not limited by, the National Curriculum. There are already several teachers' resources that try to cover the enormity of the science curriculum, but this one aims to establish a sound knowledge base for teachers focusing on the big ideas in science. It cites many examples of contemporary science, such as DNA and genetic engineering, whilst setting out a wealth of facts, developing concepts and explaining theories. All are explored with a refreshing slant geared towards teaching at primary level.

Based loosely on constructivism, this resource recognises the role children's ideas and experiences play in making learning in science effective. For example, the section on basic anatomy

emphasises the need to begin with the child's own experiences of the body, which focus on observable features, rather than using the more conventional approach starting with the skeleton and building up from there. This learner-centred approach is evident throughout the physical sciences section, which focuses on common misconceptions and alternative ideas. Everyday examples, such as boiling an egg and baking a cake, are used in the materials section to introduce basic household chemistry. More challenging aspects of physics, such as magnetism, electricity and energy, are tackled in a similar way, but the thorough explanations at times go into too much depth, trading ease of understanding for detail.

The biological section is generally less inspiring: it reads more like a conventional textbook and would have benefited from the same misconceptions approach. However, the value of the book's content, clear presentation and readability cannot be disputed. This book should definitely have a place on every primary science teacher's shelf but with a health warning attached. In its thoroughness it risks confusion and where that thoroughness is less evident potential errors slip in. Examples include the classification of algae as plants. This is very problematic because, although they photosynthesise, they do not contain the complex vascular structure that other plants do. This type of error could lead to confusion at a later date. Despite this, the book clearly goes some way to achieving its goal of enabling the effective teaching of science at primary level.

Liz Lakin
Head of Science Education, St Martin's College, Lancaster

Wild habitats of the British Isles: Woodlands

Louise and Richard Spilsbury
Oxford: Heinemann, 2004
32 pp. £10.99
ISBN 0 431 12125 7

CAPTIVATING BOOK ABOUT THE DIFFERENT WOODLAND ENVIRONMENTS THROUGHOUT BRITAIN

From the very beginning this book captivates its audience.

Words appearing in bold feature in the glossary and serve as a word bank for vocabulary associated with woodlands. This encourages the reader to improve their referencing skills. Case studies are also highlighted and prove a useful model for developing one's own case study.

The use of '*Get this*' is an engaging means of introducing statistics to children. The pictures are attractive and provide visual clues to the accompanying text, at the same time enhancing meaning and understanding. The font size and style are appropriate, but the pages are cluttered and, despite attempts to break up the text, it is still a little intimidating. The '*Find out more*' section extends children's understanding and cites other resources, encouraging children to become actively involved in the protection of woodlands and their environment. The inclusion of maps is useful, giving children some indication of the location of these habitats around the UK. This is an excellent progression from a theoretical understanding to a practical application of the new knowledge, understanding, skills and attitudes this resource will provide.

This would certainly be appropriate for older children though many would find the text quite difficult.

Nicholas Murray
Class teacher, Longforgan Primary School, Perth and Kinross

Nature's patterns: Migration

Monica Hughes
Oxford: Heinemann, 2004
32 pp. £9.50
ISBN 0 431 11394 7

AN ATTRACTIVE INTRODUCTION FOR YOUNG READERS TO THE MIGRATION PATTERNS OF ANIMALS

This book is particularly attractive for a number of reasons. The striking photographs draw readers into the text, encouraging them to spend more time on each page. The photographs are detailed enough to facilitate further discussion concerning the specifics of each animal's particular migration habits. The font is appropriate and key vocabulary is highlighted. These words can serve as a word bank for use in display as well as an effective glossary of terms.

Colour-differentiated fact bubbles feature on each page and focus the reader's attention. There is a further reading section supporting the key themes of life cycles, weather and patterns, drawing upon a case study of one particular mammal, such as '*The blue whale*'. A web-based section develops further the children's interest in the original theme.

The high quality of the photographs and simplicity of the text make this a valuable individual resource. A 'big book' version would be welcome so that the content could be shared with the whole class in group discussion.

Nicholas Murray
Class teacher, Longforgan Primary School, Perth and Kinross

Nature's patterns: Day and night

Anita Ganeri
Oxford: Heinemann, 2004
32 pp. £9.50
ISBN 0 431 11397 1

EXCELLENT INFORMATION BOOK FOR YOUNG READERS

The bold attractive front-cover design of this book will immediately entice the young reader. The contents page and index make it easy to find facts and information and the large clear font will help the reluctant reader to enjoy this book. The photographs and illustrations are of high quality and fit very well with the text. Children will really enjoy looking at these and they also give great clues to the meaning of the text. Text bubbles on each page lead the reader into the illustrations and give added depth and meaning to the informative text. There is just the right amount of text arranged alternately at the top and bottom of each page, as opposed to a more continuous flow of prose, also helping the more reluctant reader. The words highlighted in bold on each page draw the eye to the main focus.

This book is of very high quality and children will really relish delving into it as part of a topic, or even just for personal enjoyment.

Alison Cuthbert
Class teacher, Longforgan Primary School, Perth and Kinross

Horrible Science: Teachers' resources

Nick Arnold
Scholastic, London, 2004
Animals
ISBN 0 439 97181 0
The human body
ISBN 0 439 97180 2
48pp. £15.00 each

CREATIVE AND INSPIRING PHOTOCOPIABLE ACTIVITIES LINKED TO CHILDREN'S TEXTS IN THE SAME SERIES

These are rather novel teachers' guides. *Animals* is linked to the children's non-fiction text of the same series, *Nasty nature*, and also includes material linked to the same publisher's *Evolve or die*, *Explosive experiments* and *The awfully big quiz book*. *The human body* is linked to the children's text in the same series, *Blood, bones and body bits*, and also includes material linked to the publisher's *Disgusting digestion* and *The body owner's handbook*. The first seven pages of each are assigned to brief descriptions of the subsequent photocopiable resources. *Animals* is basically divided into six parts: *Describing creatures*, *Creatures in their habitats*, *Life cycles*, *Food and food chains*, *Extinct or endangered?* and *Quiz and assessment*; while *The human body* is divided into three parts: *Us*, *Our health* and *Parts of the body*. The subsequent activities can be assigned to a range of year groups. Each description begins with a clear learning objective with obvious links to the National Curriculum and relevant QCA scheme of work unit.

The activities in *Animals* appear to be quite zany – certainly capable of capturing the interest of the weakest member of a class and perhaps inspiring them more than a normal illustrative activity or demonstration. In *The human body*, the photocopiable activity on reproduction is intended to teach the children that life processes common to humans and other animals include reproduction. The pictures on the sheet are of human reproductive organs, sperm swimming in a 'race' and the fertilization of an egg. They are all in a cartoon style. The children are asked to draw a picture of what a human baby looks like when born. The possibilities of what might be

achieved by this are endless and in some cases rather worrying!

The format of the photocopiable sheets is rather cramped: there is lots of information present and the style of presentation is more suited to able readers; lower ability children may feel slightly overwhelmed. The vocabulary used is scientific, balanced by the expected humorous style of the 'Horrible Science' series. Where appropriate there are interesting facts attached to the activity sheet. Safety issues are also included. However, this information is attached to the main sheet as if clipped on with a paper clip and children's attention may need to be drawn to it to recognise its importance.

Some of the activities would work well as homework tasks, but others would require some careful planning and for secondary resources to be available.

Overall, the activities described are creative and inspiring, with lots of opportunities for cross-curricular links including drama. These are good all round alternatives to the usual teachers' guides, but caution is needed with some of the activities.

Louise Culver
Science coordinator, Loose Junior School, Maidstone, Kent

Science answers

Chris Oxlade
Heinemann, Oxford, 2004
The human body
ISBN 0 431 17517 9
Life processes
ISBN 0 431 17516 0
32 pp. £10.99 each
CHILD-FRIENDLY BOOKS WITH INFORMATION AND INVESTIGATIONS FOR CHILDREN OF 7+

These resources are aimed at the junior age group (age 7+) but go into quite complex detail in places. Both include a very good glossary with clear explanation of terms emboldened in the text that I am sure a child of this age could understand independently.

The human body gives two examples of investigations; both are simple and most children should have no problem in doing them unaided. However, they are not particularly inspiring. For example, the heartbeat change might have been better if a more exciting activity had been suggested rather than '*jump up and down on the spot for a few minutes*'. In their favour, both investigations are easy for a child to organise and need no special equipment. The page layout is clear, with factual accounts and explanation at the top of the page and more specific details at the bottom. Each page is supported with a diagram, picture or photograph to clarify details given. The quality of the artwork varies and some diagrams do not really complement the explanation given. Most of the explanations however, are good. The book follows a logical order as it deals with the aspects of how the body works. In a small book items can only be covered in a fairly general way and depth of coverage is slightly erratic. For example, I find it hard to justify the inclusion of the picture and comments on kidney transplant and why this organ is singled out for mention in this way when others such as the heart are not.

There is a very good section on scientists and I like the way the development of an idea over the centuries is followed, for instance blood moving around the body. This is obviously a complex subject to cover in just 32 pages and the book does fairly well in addressing its subject matter at a suitable level.

In both books '*amazing facts*' are a welcome inclusion; although other books do something similar, this is done in a short, snappy and effective way to interest the children.

Life processes introduces the seven life processes in a child-friendly way. It is divided into eight questions with roughly a double-page spread on each. I like the examples given for investigation or demonstration plus the guidelines at the front of the book covering health and safety issues. Most of the examples cited could be done with objects found in the home or bought easily in the shops, which makes this a user-friendly book for children and parents. The investigations could certainly be done on the whole by the children themselves with minimum help from an adult. Again, the pages are clearly set out, with a factual account and explanation at the top of each page and then a related box of information and/or leading question at the bottom to promote thought. The examples appear to be carefully chosen to be of interest to a child: the hatching out of baby crocodiles would definitely appeal and the pictures are of excellent quality. Some more complex issues, such as photosynthesis, are dealt with well – the magnified photograph of stomata would fascinate children. This coupled with the photographs would make this a popular book with junior age children. The section on scientists is very good. I could not really find any negative aspects in *Life processes*.

Jay Pye
Head Teacher, Loose Junior School, Maidstone, Kent

Heinemann Infosearch

Ian Graham
Oxford: Heinemann, 2004
Soil
ISBN 0 431 11554 0
Plants
ISBN 0 431 11551 6
32 pp. £10.99 each
EASY-TO-READ INFORMATION BOOKS FOCUSING ON SCIENCE KNOWLEDGE IN RELATION TO RESOURCES WE DEPEND ON FOR 8–11s

This series is targeted at top primary children, and aims amongst other things to emphasise the need for sustainable use of natural resources. These two books give a lot of valuable attention to what soil and plants are, as well as how we use and depend on them: each includes case studies of particular regions or topical concerns such as GMOs, to provide concrete, real-world examples. New terminology (emphasised in bold) is dealt with in a glossary page at the back of each book. Each page has full-colour photos or diagrams relating to the text, with captions in straightforward language. For all these reasons, the books are child-friendly, concise, interesting and relevant.

Each has weaknesses, however. One concern is the relative emphasis given to different aspects of the resources dealt with. For example, in the section '*What are flowers for?*', the emphasis is on flowers for ceremonies and events, with no discussion at all of the role of flowers in reproduction! Similarly, the section on GMOs takes up four pages, whilst in the same text the only mention of organic farming is the sentence, '*some farmers, especially those who run organic farms, choose not to grow GM crops*'. Even where plant pests such as aphids are discussed, pesticides are mentioned but not organic means of reducing pest damage. *Soil* does have one paragraph and one illustration on '*Do organic farmers look after the soil differently?*', but in the list of websites at the back there is no mention of the Soil Association, a key resource on organic farming. This seems an opportunity missed.

While most of the illustrations are appropriate, some could have been better chosen: for example, on a page that mentions plants that children may not have seen (flax, jute, sisal and cotton), the photo is of wheat, with which they are likely to be familiar; another opportunity missed. Whilst a page that is mainly about bacteria, algae and 'tiny animals' has a photo of leaves and slugs on the top of soil, which might mislead. A map of Australia is colour-coded to represent soil types, but there is no key to explain which is which. And where the photo is of a bio-fuel station that sells 'alcool', it is a pity that the text only talked about ethanol. Will they make the link?

Finally, the value of glossaries. I feel that these can be very important and helpful, provided that they are not misleading; and it is very difficult to simplify definitions without doing so. Definitions such as particles as '*tiny pieces*', erosion as '*slow removal of soil by land and water*' or shoots as '*baby leaves or branches*' might be too over-simplified for children at this stage. In the end, what do the books add that we don't already have access to? The one plus of this series is the use of case studies to bring children face to face with topical issues to do with real resource use in real places.

Alan Peacock
Hon. Research Fellow, Exeter University, and PSR Editor