

REVIEWS

Active assessment: thinking, learning and assessment in science

Stuart Naylor, Brenda Keogh and Anne Goldsworthy
London: David Fulton, 2003
152 pp. + CD-Rom + poster.
£27.00 ASE members, £30.00 others
ISBN 1 84312 145 X

**A SUPER RESOURCE FOR TEACHERS
LOOKING FOR INNOVATIVE LEARNING
AND TEACHING STRATEGIES THAT
PROVIDE OPPORTUNITIES FOR
FORMATIVE ASSESSMENT.**

This book and accompanying CD-Rom are written by Stuart Naylor and Brenda Keogh, originators of the highly successful 'concept cartoons', in collaboration with Anne Goldsworthy. The content builds on recent research into formative assessment such as that carried out by Black and Wiliam and the Assessment Reform Group.

The book claims to link thinking, learning and assessment in a creative and integrated fashion by drawing on existing good practice in the area of formative assessment. This is exemplified by more than 30 practical learning and teaching strategies set into specific science contexts. Each strategy provides two illustrations, the first aimed at younger pupils and the second for older learners. A number of these strategies are also provided on the accompanying CD-Rom which facilitates whole-class interaction with the text, using data projection and interactive whiteboard. Additional support is provided by a double-sided colour poster, 'Asking questions'.

A number of the strategies exemplified may already be familiar to teachers, such as concept cartoons, games and annotated drawings. However, there are numerous new and innovative suggestions to make science lessons exciting for teacher and pupil. I particularly like the card sort, graphic organisers and the section on questions.

Each strategy has a two-page description describing what it is, how teachers can use it as a formative assessment tool and how this can help with learning. The two photocopiable exemplars that follow are clearly set out in a pupil-friendly font with illustrations similar to those used for the authors' concept cartoons, as are the materials on the CD-Rom.

I have shown this resource to a number of colleagues interested in developing their practice of assessment in science and all have received it enthusiastically. My one minor criticism is that a wire-bound format would have made photocopying much easier.
Janette Kean
*Learning Development Officer,
Improving Science 5-14, Learning
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Nature detectives: environmental science for primary children

Max de Bóo
Hatfield: Association for
Science Education/Woodland
Trust, 2004
112 pp. £10.00 ASE or WT
members, £12.00 others
ISBN 0 8637 340 1

**A VALUABLE RESOURCE FOR
TEACHING ENVIRONMENTAL SCIENCE**

ACROSS THE PRIMARY AGE RANGE.

This book aims to reconnect children with nature by creating opportunities for them to learn about the natural environment and by promoting greater sensitivity towards nature – as you would expect from a book published jointly by the ASE and the Woodland Trust. But it does a whole lot more. *Nature detectives* contains additional material on phenology or 'nature's calendar' and climate change, which is an important part of the book, as well as a full-colour poster on woodland trees and an attached guide to species from the Woodland Trust.

The book is primarily a compendium of ideas and information that teachers and youth group leaders can dip into. The activities have been devised so that they fit into a normal teaching lesson, as far as possible. The book is divided into eight well-focused sections, such as *Getting to know your environment*, *Tree studies*, *Birds*, and *Pond studies*, so teachers can access information easily.

Each section is then clearly structured into: introduction, learning objectives, resources and preparation required for the activities, examples of questions and predictions and a great variety of activities, some of which are supported by photocopiable materials in the appendix for each section.

Icons differentiate many of the activities so that teachers can see at a glance, which are suited to younger or older pupils. The instructions given for the majority of the activities are clear and would help any teacher to plan lessons effectively.

The text is well organised and is full of line drawings that aid understanding.

The activities excel in two respects. Firstly, the wealth of investigations will help children to develop their knowledge and their science enquiry skills. Pattern-seeking, identifying and classifying, and exploration investigations feature – a much-needed reminder of forms of enquiry that do not involve the fair-test procedure. Secondly, in addition to the 'pure science' the book is packed full of ideas for developing creativity in children by making cross-curricular links. There are suggestions for art, DT (I can't

wait to make the jumping frog with year 1!), drama, music, creative writing (each section is prefaced with a piece of descriptive writing) ... the list could go on.

Practical reminders about health and safety issues appear throughout the text. These are particularly valuable when they focus on the outdoors, as fears about health and safety can limit the opportunities that teachers give pupils to explore the natural world. The book also provides website addresses and suggestions for further reading.

The final section, *Planting a garden for wildlife*, is different from the rest of the book in that it gives guidance and information on how to create a 'wildlife area' and use it as a teaching resource. This would be particularly valuable for children living in dense urban areas where green spaces are few.

Significant links are made with the National Curriculum for England and Wales, Scotland and Northern Ireland and the foundation stage for early years. However, there are no explicit references to the QCA scheme of work. This is a pity since it would have helped teachers with their planning by focusing the activities on specific year groups. It would also have reinforced those learning objectives in the national scheme of work concerned with environmental science.

I shall certainly be recommending this book to schools in my area. If schools are determined to celebrate the joy and highlight the importance of environmental science (notwithstanding the pressure on the curriculum timetable), these ideas and activities will really encourage children to become 'nature detectives' and approach the natural world with a sense of wonder and with minds keen to investigate it scientifically. This resource will help teachers to equip today's children with the knowledge, skills and attitudes they will need as future citizens making important decisions about conserving the natural environment.

David Barker
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Animals UK

F. Ahearn and L. Merrick
Gatekeeper Educational, 2004
CD-Rom and 2 packs of 40 A6-size cards
CD-Rom £35 single user, +10 user licence £75, + site licence £120

Card packs £12.00 each

PRACTICAL RESOURCE FOR KS2 TO SUPPORT ENVIRONMENTAL INVESTIGATIONS AND STUDY OF HABITATS, FOR USE IN THE CLASSROOM OR OUT IN THE FIELD WITH HUGE POTENTIAL FOR USE WITH INTERACTIVE WHITEBOARDS

The complete resource consists of a CD-Rom for identifying and understanding the habitats of British animals found on land and in freshwater, and two packs of identification cards, one on land invertebrates and the other on water creatures.

The laminated cards cover water invertebrates, amphibians and freshwater fish, and land invertebrates and show clear coloured drawings of the creatures. Identification is carried out by sorting cards to match the specimen, for example sorting by number of legs/wings/colour for water invertebrates. At £12 a set they are rather expensive as a stand-alone resource, but would provide a good in-field tool to support the CD-Rom - although you could save the cost and take a laptop outside!

The CD-Rom aims to develop an understanding of *why* animals live in certain habitats and how their presence is influenced by their success in finding food or shelter. It is also an excellent tool for identification of animals and can be used to good effect with an interactive whiteboard.

The user can identify common animals that are likely to be found in the locality of British schools, including school grounds, parks and waste spaces, by answering questions about their observable features. Common British species are covered in eight databases: land invertebrates, freshwater invertebrates, butterflies, freshwater fish, amphibians, reptiles, birds and mammals

The matching system used recognises that variations occur in nature, that some criteria are less reliable than others, and that it is not always possible to

answer all questions. Matches are presented in decreasing order of closeness to the criteria. It may also be used for selecting animals that conform to specific characteristics; for example, one may select all herbivorous insects and see how they are adapted for that lifestyle.

The software is very user friendly, for both teacher and children, runs well on an interactive whiteboard, and provoked an enthusiastic game of 'Guess my animal' from my class of year 4 children; they were even prepared to give up their break to continue the game! The only criticism from the children, after several days of extensive use, has been about the colour choice for some animals, which has not always been what they expected.

The CD-Rom also contains a number of interactive investigations and is supported by worksheets that can be used to record findings and a spreadsheet for collating data. Overall this CD is very good value for money, especially as it can be purchased with e-learning credits.

Jenny Robson

Science, Gifted & Talented & ICT subject leader, Parson Cross C. of E. Primary School, Sheffield

Seasons

Monica Hughes
Oxford: Raintree, 2003

Summer

ISBN 1 844 21338 2

Autumn

ISBN 1 844 21339 0

24 pp. £7.99 each, pack of 4 titles £30.36

INFORMATION BOOKS TO HELP 4-6 YEAR-OLDS UNDERSTAND SEASONAL CHANGE.

This non-fiction series aims to develop observations of the world made during the foundation stage and to introduce some links between changing seasons and plant and animal behaviour covered in key stage 1. Concepts such as pollination, plant growth, migration and seed production are referred to in simple terms within small blocks of text accompanying colour photographs on each page. The child-friendly layout includes chapter headings that pose questions such as 'What is the weather like in ...?' and 'What happens to plants in ...?' and, as

each title adheres to the same format, comparisons between the seasons can be made.

Many of the visual images in *Summer* and *Autumn* will resonate with 4-6 year-olds. The children will relate to the images that reflect their own experience of seasons in the UK: licking an ice cream perhaps, or playing outside on a crisp autumn day. They may also recognise some of the urban or rural scenes - a shop window advertising stationery at the start of a new school year for instance, or a farmer ploughing a field.

Teachers may find, however, that young children need support to read the text and navigate the glossary - which links to key words printed in bold type. Moreover, despite mention of Notting Hill Carnival and Divali in the chapters on seasonal celebrations, the paucity of positive cultural diversity is a serious shortcoming in both books. The image of a child holding a lighted sparkler in her bare hand, when everyone from RoSPA to 'Blue Peter' advises against it, is also disappointing. This series undoubtedly does provide a useful introduction to the skills required to access information in non-fiction texts, but it is a shame that there are some missed opportunities.

Gillian Ravenscroft

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Developing scientific skills and knowledge

Christine Moorcroft
London: A & C Black, 2003

Developing science, year R

ISBN 0 7136 6639 0

Developing science, Year 1

ISBN 0 7136 6640 4

64 pp. £16.99 each

PHOTOCOPIABLE ACTIVITY BOOKS FOR TEACHERS DESIGNED TO 'NOT ONLY DEVELOP CHILDREN'S KNOWLEDGE AND UNDERSTANDING OF SCIENCE, BUT ALSO PROVIDE OPPORTUNITIES TO DEVELOP THEIR SCIENTIFIC SKILLS'.

Each book contains a series of photocopiable activity sheets and accompanying notes for the teacher. The activities in the reception year book are based on *Curriculum guidance for the foundation stage: knowledge and understanding of the world*, whilst

those in the year 1 book are based on the relevant sections of the National Curriculum and the associated QCA scheme of work for year 1. They are organised thematically according to areas of knowledge and understanding but are also designed to develop science skills, each activity concentrating on a certain skills area. However, only one learning objective (either knowledge and understanding, or a skill) is specified per activity. Most sheets have the useful feature of a suggestion for an extension activity but these are sometimes rather banal. The teachers' notes are clearly laid out and cover important areas such as: classroom organisation; health and safety; and vocabulary. There are also useful suggestions, and suggested sources, for linking the work to other subject areas. The activities are such that most children will be able to undertake them in a fairly independent fashion after an appropriate introduction. An interesting feature is the fact that the materials are supported by further, web-based activities. It is outside the scope of this review to comment on these activities but it is certainly a useful extra strand to the books.

Such photocopiable materials are perennially popular in schools, having the undoubted advantages of providing quick and easily accessible ideas and activities. There are often problems however. One is that a quickly reproducible worksheet may not mean a quickly run activity if it then requires a lot of extra support for the children. In this respect I feel the activities will not fare too badly although there are some that, in the interests of accessibility, have perhaps become a little too straightforward. A further common problem concerns progression both of knowledge and understanding, and skills. Progression between the two books is discernible so far as knowledge and understanding is concerned, but it is much less obvious regarding the development of science skills. This need not be a problem, however, assuming the activities used are carefully selected to complement and

enhance a more detailed scheme of work.

The activities provide a useful series of ideas that could sometimes be used for reinforcement or to provide a record of the children's learning, but have the shortcomings typical of such materials. The drive for accessibility has meant that there is very little emphasis on children's ideas and possible misconceptions and the activities, used cold, will do little to challenge children's thinking or facilitate testing their ideas. They might, of course, be developed to do so, but the effort involved means they would no longer be a quick and easy option; it might then be better to use more expensive and in-depth materials and tailor these to the specific needs of particular children.

Neil Rutledge

Science lecturer, St Martin's College, Carlisle

Magnetism

Christopher Cooper
Oxford: Heinemann, 2003
32 pp. £10.99, pack of 7 titles
£73.08

ISBN 0 431 17493 8

A 'FIND-OUT-FOR-YOURSELF' BOOK FOR ABLE 7-9 YEAR-OLDS.

This is one of a series of seven titles, which aims to answer the questions that young people ask about the physical sciences. The other titles are: *Electricity*; *Grouping materials*; *Forces and motion*; *Light*; *Sound*; and *Solids, liquids and gases*. The books are well illustrated and each contains a useful glossary.

Each book starts off with everyday examples of phenomena with which children will be familiar, such as the use of magnets in remotely controlled door locks and on refrigerators. The books then move on to more complex topics, such as what causes magnetism and whether living things can sense magnetism. The books contain simple experiments, which the publisher suggests children can do at home. However, many children would not have access to the equipment needed, such as iron filings, horseshoe magnets and a compass. The

experiments could be carried out at school.

The books are aimed at children aged 7-9, but *Magnetism* covers electromagnetism and magnetic fields, which are part of the key stage 3 programme of study.

These books would be of interest to able upper key stage 2 children and to primary teachers wishing to brush up on their knowledge and understanding of the physical sciences.

Christine C. Khwaja

Principal lecturer in primary science education, Middlesex University

Science smart

Gwen Diehn, Terry Krautwurst, Alan Anderson, Joe Rhatigan and Heather Smith
Poole, Dorset: Sterling Juvenile (Main Street), 2003
400 pp. £12.99
ISBN 1 4027 0514 X

AN INVOLVED AND INVOLVING WORK TO GRASP YOUR ATTENTION AND IMAGINATION, AND AWAKEN THE SCIENTIST WITHIN! FOR CURIOUS UPPER KS2 PUPILS AND TEACHERS.

This is a bright, bold book full of fun and adventure. It starts with an introduction that promises much: you are told to leave your staid old ideas of scientists at the door and think of those that find lost cities, fit together dinosaur skeletons and walk in space, and many more besides.

It gives hints and tips about carrying out the over 150 projects included, considering safety and practicality, and goes on to keeping records of your scientific discoveries. Then it dives straight into the projects, curiously yet quaintly separated into the elements of earth, air, water and fire plus a big section on geology. These projects are interspersed with unusual and interesting facts, often with a historical slant. You can make a 'solar stone', just like one the Vikings used to help them find north. Or how about a fire clock, like the ancient Chinese? There are also some very useful fact

pages such as 'How waves work' and 'The Sun, center of life'.

This book is highly suitable for sparking the imagination of young, interested children at key stage 2 and is jam packed full of projects that will truly spark your curiosity by asking all the right questions, in all the right ways. It then helps you to find those answers, rather than giving them to you.

Satwinder Takhar

Teacher

Fascinating science projects: Everyday chemicals

Sally Hewitt
London: Franklin Watts, 2003
48 pp. £11.99
ISBN 0 7496 4955 0

PRACTICAL CHEMISTRY PROJECTS FOR 9-13 YEAR-OLDS.

Can an American book on practical chemistry for children aged 10 to 11 succeed in the UK? It has the predictable 'wow' factor. However, there are certain hurdles to overcome such as the availability of chemicals from your local DIY or superstore as compared to those in the USA. For example, the metal content of our coins is different, our PVA glue does not always make acceptable 'slime' and 'rubbing alcohol' is not readily available. Procedures are well set out but some of them require adult supervision.

However, there is a bigger problem: the text reinforces the misuse of terminology, which leads to confusion in school science. So it states 'a polymer is a long chain of molecules', talks of 'salt molecules' and says 'salt dissolves in water because it breaks into atoms' (yet it uses 'ions' later). Yeast is described as containing microbes when it is a microbe, and it 'breathes out' carbon dioxide. This is the type of book grandparents might buy their grandchildren who seem to like science at school; it is cheaper than commercial chemistry sets. The activities could be useful in school science clubs.

Bob Worley

Adviser, CLEAPSS School Science Service

Space mania

Michael A. DiSpezio
Poole, Dorset: Sterling Juvenile, 2003
80 pp. £12.99
ISBN 0 8069 7287 4

8-12 YEAR-OLDS ARE INVITED TO EXPLORE OTHER WORLDS WITHOUT LEAVING THEIR OWN.

This well thought-out and attractive book covers the day, night, seasons and phases of the Moon elements of the key stage 2 curriculum with much, *much* more besides! It is also crammed full of phenomena such as the Big Bang, galaxies, crater formation and solar eclipses.

Each double-page spread deals with a different concept, all of which are explained in simple terms enhanced by colourful artwork. Quizzes and a variety of activities and projects ensure that this book provides junior-aged children with a lively introduction to astronomy.

Measurements for scale models of the solar system enable the reader to make a planetary mobile or investigate their distance from the Sun. There is advice on how to recognise constellations in both the northern and southern hemispheres and collect specks of meteorite during various meteor showers as they occur throughout the year. Children can even follow instructions on how to make a model radio telescope dish that can then be used to change television channels!

Fascinating scientific facts abound: from how light travels to what makes a shooting star or a black hole and why methane produced as cows digest grass could provide a vital signal to aliens studying Earth. *Space mania* is as entertaining as it is informative and would make a popular addition to the school library as well as appealing to budding astronomers who like to visit distant worlds from the comfort of the armchair!

Gillian Ravenscroft

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