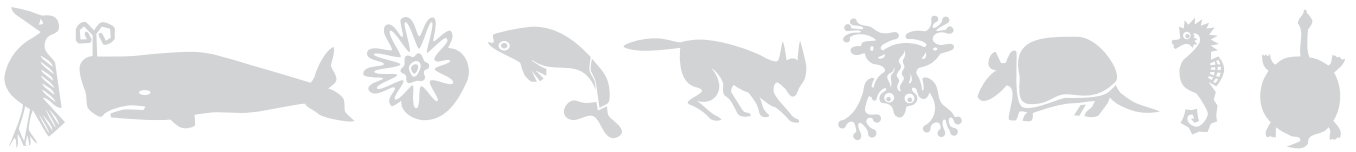
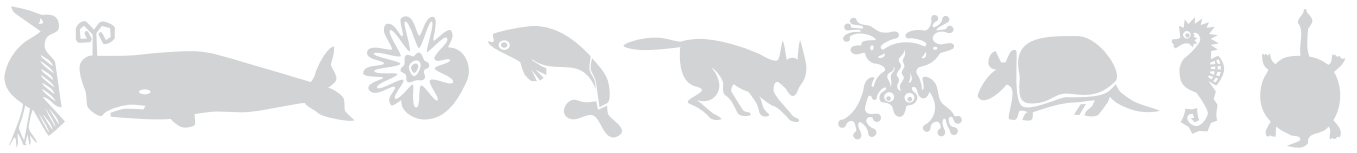


Young Scientists at Work

Endangered, Extinct and on the Brink

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Introduction

Evolution and extinction are natural and unavoidable facts of life. In fact, the extraordinary diversity of life on our planet could not exist without them. Throughout geological time, there have been numerous periods of massive upheaval. During some of these periods almost all forms of life were wiped out. As well as these mass extinction events, individual species are constantly evolving or becoming extinct. But are we on the brink of something more serious? Many scientists believe we are at the beginning of a new mass extinction and this time the cause is not natural – it is us.

This book introduces middle and upper primary students to the great problems facing our environment today by examining extinction events throughout time. By studying the past, students are given a broad understanding about how and why life on Earth has changed over geological time. By studying the present, they identify ways in which humans have accelerated the rate of decline of species worldwide. By looking to the future, students are empowered to identify ways in which they can help to reverse this trend.

Endangered, Extinct and on the Brink encourages students to ‘become scientists’ – ask questions, propose and test theories, design experiments and propose their own solutions. Students are also encouraged to make links between our knowledge of past extinctions with issues relevant to the students’ lives today, such as sustainability and biodiversity.

The approach

This book has been designed around a constructivist model. This pedagogical approach suggests that students learn best when they gain knowledge through exploration and active learning. A feature of this approach is the use of hands-on materials, where students are encouraged to think and construct explanations and new ideas for themselves based on existing knowledge, beliefs and skills, rather than simply memorising and reciting facts.

The 5Es model is one method of instruction that supports constructivist teaching and learning. This model identifies five different phases of learning:

- 1 Engage** – students’ interest and curiosity in the topic or question is attracted; they are given the opportunity to make connections with what they already know about the topic or question; they anticipate the learning that will occur; they develop their own questions about the topic or concept
- 2 Explore** – students actively explore the concept or question using hands-on methods; they identify and develop concepts, processes and skills
- 3 Explain** – students are given opportunities to communicate their new understanding or to demonstrate new skills to a wider audience; if necessary, the teacher might introduce definitions and explanations
- 4 Elaborate** – students extend, develop and broaden their understanding by applying their new knowledge or experience to a new or different situation; they discuss and compare their results with one another
- 5 Evaluate** – students reflect on and assess their new understanding and abilities; they may revisit the questions asked in the ‘engage’ phase; teachers evaluate students’ understanding of concepts and development of new skills.

Although this model is described as a linear sequence, it is often appropriate to revisit different stages throughout the learning experience. For example, evaluation will be an ongoing process and should not necessarily be left until the end of an activity.

Science skills

The activities included in this book aim to develop students' understanding of conceptual ideas, and give them opportunities to gain skills and practise working scientifically.

The book aims to develop a range of scientific skills in students, including:

- questioning
- experimenting and following procedures
- observing, measuring and classifying
- collecting and recording data
- hypothesising and predicting
- thinking analytically, critically and creatively
- inferring
- communicating.

The book

Endangered, Extinct and on the Brink has been divided into three sections – the past, the present, and the future – to emphasise the importance of past events in understanding our present, and how both then can affect our future. It aims to encourage students to see extinctions not as isolated events, but as part of larger issues, both natural and man-made.

Each section has been further divided into a number of topics, each posed as a question for students to explore. Each topic includes:

- a reproducible student fact file that contains background information and illustrations to engage students. This may be used for guided reading or to assist students' investigations
- a teacher information sheet that lists the key concepts, cross-curricular links, materials and preparation required, and instructions for guiding students through the activity, including brainstorm topics, discussion questions and assessment pointers
- a reproducible student activity sheet with creative and fun investigations that will allow students to explore and explain the central concept, and then elaborate and evaluate their learning.

The activities promote a range of science skills. Icons have been used throughout the book to denote each activity's focus.



Students design and pursue hands-on investigations and experiments that build on their curiosity and answer their own questions and hypotheses.



Students gather and present information about current scientific ideas to expand their knowledge and understanding, and answer their focus questions.



Students use their knowledge and experience to propose and present solutions to the focus problems.

There is also a glossary of new or unusual words included. (These words appear in bold throughout the book.)

