



In the footsteps of Sir Douglas Mawson Gallery

Middle Years - Teacher Information



Government of South Australia
Department of Education and
Children's Services

This Outreach Education Program for schools is made possible by the partnership between the South Australian Museum and the Department of Education and Children's Services. Outreach Education is a team of seconded teachers who are based in public institutions.

© **Department of Education and Children's Services and SA Museum**

This work may be reproduced by South Australian teachers for use with their students. For all other uses contact the S.A. Museum Education Service.

Authors: Chris Nobbs and Simon Langford



South Australian Museum Education Program

Phone: (08) 8207 7429 • Fax (08) 8207 7430 • Email: education@samuseum.sa.gov.au • Web: www.samuseum.sa.gov.au

Visiting the museum

Student expectations

We would like you, and all our visitors, to enjoy visiting the museum.

- Please stay with your group.
- Walk safely around the exhibitions.
- Share the space with other visitors.
- Talking is an important part of learning. Please remember to use a quiet voice.
- The museum glass cases can get dirty or scratched. Please enjoy looking without touching.
- Please use the stairs and avoid the lifts. (They are slow and are needed by people who can't use the stairs.)
- Help keep the museum clean. Please eat and drink outside on the lawns.



Visiting the museum

Teacher expectations

Bookings are essential for all school visits to the museum.

Please supervise your groups of learners at all times. If your visit involves visiting more than one gallery, divide your class into small supervised groups. Respect the needs of other classes that have booked particular galleries. **Parents must specifically consent to students under 18 participating in activities involving indirect supervision.**

When you arrive please let the staff at the front desk know. If the weather is fine, your students can enjoy the outside lawn area while they wait.

Do not use clipboards with metal backings and clips. For your convenience and for the safety of our exhibits, cardboard backings are available at the front desk.

The coffee shop and the museum shop do not cater for large groups. Small groups can visit, with adult supervision. Bags must not be taken into either shop.

Only students with special needs should use the lifts. (Many students visit the museum and using the lifts would cause excessive delays for people who really need them.)

Unfortunately the museum has limited capacity to store bags. A large crate or two for lunches is easier to keep secure.

Program aims

This program has been prepared for lower secondary classes. While visiting 'In the Footsteps of Sir Douglas Mawson' students can follow his active pursuit of science, and his triumph in overcoming immense difficulties with determination and courage as he strove for goals he believed in. Students will gain insights into Mawson's life, discover geological evidence he found, gain an understanding of his Antarctic exploration and learn how Mawson's work has contributed to ongoing research and our understanding of how the earth works.

Curriculum links

The Mawson Gallery promotes understanding of interdependence and what is needed for sustainable social and physical environments. It promotes the understanding that all living things are connected and interdependent and encourages appreciation of the fact that we need to live together in ways that maintain the well-being of the planet.

It also has a strong Futures focus, pointing out that our planet's past climates, landforms and environments have been ever-changing, and showing how understanding our past helps us predict possible futures.

Science

From *Life Systems* and *Earth and Space* students will:

- focus on the origin and structure of the earth
- identify locations showing the effects of natural processes such as erosion, deposition and glaciation
- examine rocks
- identify major features in adaptations enabling animals to survive in their environment
- study the vast range of adaptations, including behavioural adaptations, to gain an appreciation of diversity.

Society and Environment

Studying *Place, Space and Environment* students will:

- identify and account for similarities and differences between places, and begin to understand the nature of spatial associations and variations over the earth's surface
- study the factors and processes influencing aspects of the natural environment (such as vegetation, climate, soils, landforms, fauna).

Design Technology

Sir Douglas Mawson was interested in modern technologies and innovative in their use. Students will:

- analyse how needs, resources and circumstances affect the development and application of technologies.

Teaching strategies

This booklet contains student activities, teacher background information and suggested worksheets. The gallery will be booked for your class for an hour (or an hour and a half if an Education Officer is taking your class for some of your visit).



Many different teaching activities could be done in this gallery. Select from the following possibilities, or make up your own. The first activity is essential for all groups.

Activity 1: Let's have a look

All classes will need at least ten minutes to explore on their own before starting more directed activities. Students need to establish their ideas about museums and the exhibition, by making their own connections. You could formalise this exploration by asking students to report their findings to the class. It is highly recommended that students do not have the activity sheets when first exploring the gallery.

Teacher notes

Activity 2: Sir Douglas Mawson's work

Mawson's main interest was geology. His findings in South Australia inspired him to visit Antarctica where he contributed significantly to its exploration.

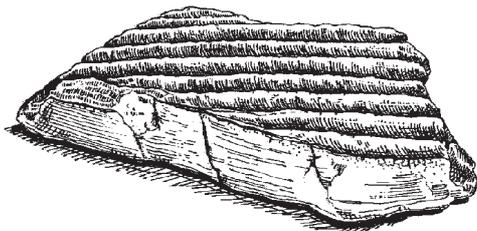
Ask the students to investigate one of the following aspects of Mawson's work.

- Mawson's geological work in the Flinders Ranges.
- Machines and technologies.
- Glaciers, and the rocks that show evidence of previous glaciation.
- Exploring Antarctica.
- The earth's magnetic field and how it relates to the theory of continental drift.
- How and why the land surfaces have changed.

Ask some of the students to share their findings with the class or ask them to prepare a report. By collating all the findings the students will gain an overall view of Mawson's work.

Activity 3: Researching for an interview

Divide the class into groups of three. Collect information for an interview about a scientific issue or some other issue, such as Mawson's explanations for the formation of the Flinders Ranges, Antarctic weather, glaciers and their effect on rocks, sedimentary rocks, his epic sledge journey, living in Antarctica, animals in Antarctica or the use of resources.



Special thanks to Pat Latas for illustrations of the half sledge, leopard seal and emperor penguins

Activity 4: Who goes to Antarctica?

Selecting personnel for an expedition is important. The expedition team needs to be self reliant and skilled to carry out the intended work. Before students visit the Mawson gallery have them compile a list of skills/occupations they think would be part of an Antarctic expedition. When visiting the gallery have them modify their list.

For example:

Skills and occupations I think would be most suitable.

Tick the skills/occupations that were included in the BAE or AAE.

Add skills/occupations you had not thought of.

Activity 5: Complete the activity sheets

Teachers need to assess the appropriateness of the questions for their particular students. There are more questions than students could be expected to complete in the time available in the gallery. About five pages of questions is suggested for each group. Different groups could have different combinations of questions. Some cut and paste may be appropriate.

A dozen computer interactives form a significant aspect of the gallery. There are two large computer screens, one dealing with glaciers, the other dealing with sedimentary rocks, suitable for whole classes instruction.

The questions can be done in groups to encourage interaction and sharing of perceptions.

Activity 6: Positive Minds Attract

If your students are familiar with the "Positive Minds Attract" messages, they might look for evidence of Mawson's positive views of life despite hardship. See (www.headroom.net.au)

Background information

Sir Douglas Mawson had a passion for scientific discovery. He started his South Australian work in the Olary – Broken Hill area where he discovered radioactive minerals and evidence of a past ice age. His interest in ice ages inspired him to seek a place on the 1907–1909 British Antarctic Expedition (BAE). Having visited Antarctica he resumed work in South Australia. He visited the Flinders Ranges and identified radioactive minerals from Mount Painter. In his many field trips to the Flinders he noted their structure and began to work out their geological history. Mawson planned and led the 1911–1914 Australasian Antarctic Expedition (AAE) and the 1929–1931 British, Australian and New Zealand Antarctic Research Expedition (BANZARE). Both these expeditions resulted in the collection of huge amounts of scientific data. The AAE and BANZARE also set the scene for Australian territorial claims to parts of Antarctica.

The gallery is organised into a number of themes that reflect Mawson’s wide scientific interests. The gallery also presents more recent research findings, which extend the work undertaken by Mawson. Some of these themes are as follows.

Exploring the Outback

During 1906 and 1907 field work in the Olary – Broken Hill area he determined two major rock divisions. The older metamorphic rocks, contained the ore body mined in Broken Hill. Younger sedimentary rocks showed evidence of ancient glaciation. Students can see some of Mawson’s work and learn about the processes involved in altering sedimentary rocks into metamorphic rocks.

Rocks: radioactive and igneous

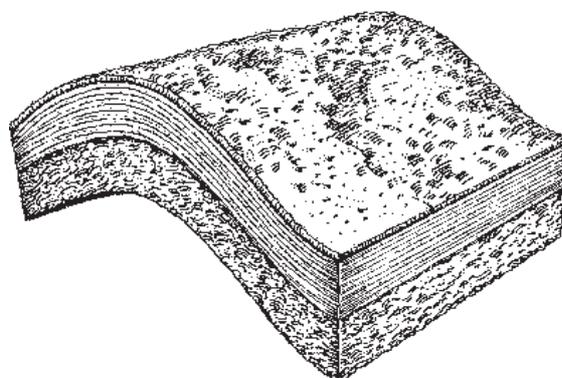
Mawson was one of the pioneers in the study of radioactive minerals in Australia. In 1906 he described a new radioactive mineral which he named davidite. He named Radium Hill after identifying significant deposits of radioactive minerals. It was his interest in these minerals that led him to the Flinders Ranges in 1910 to investigate the radioactive minerals of Mount Painter.

Students can see Mawson’s gold leaf electroscope, which he used to detect radioactive minerals as well as use the computer interactives, which explain radioactivity and how igneous rocks are formed.

Exploring the Flinders Ranges

While working in the Flinders Ranges during the 1920s, Mawson found fossilised stromatolites and radioactive minerals, and he identified the glacial origins of some of the sedimentary rocks from the area. His research helped explain the formation of sedimentary rock layers and their subsequent bending and erosion, which left the ranges as we know them today.

Students can follow Mawson’s investigations into the geological sequence of the Flinders through computer interactives and try their hand at identifying rock formations that show faults or folds. They can also discover evidence to show that climate and sea levels have changed in the past.



Seeking the South Magnetic Pole

On his first Antarctic expedition Mawson was in the party to search for the South Magnetic Pole. The three men dragged their sledges over 2000 km during this expedition. Mawson continued researching the magnetic pole during the AAE and these findings have been incorporated into current research into the Earth’s magnetic fields.

The magnetic pole moves and it is not at the geographical pole. Scientists are still researching the Earth’s magnetic fields. Video and computer interactives help explain this difficult concept.

Science from Ships

When Aurora (AAE) and Discovery (BANZARE) sailed between Australia and Antarctica the scientists took measurements and collected samples. Little was known about the bio-diversity of the Southern Ocean. Some of the animals discovered on the expeditions are on display and students can try classifying them as Mawson's scientists did.

Geographical and geological studies were also made. For example Mawson suggested that unlike the Arctic ice cap, there was an extensive landmass beneath the Antarctic ice cap. More recent studies have shown he was correct.

Living in the Antarctic

The artefacts in the expeditions bring to life the difficulties experienced by Mawson and the other expeditioners. Students will learn how the challenges of living and working in the harsh conditions were overcome. Clothing technology has progressed significantly since Mawson's time in Antarctica. He relied on natural materials such as woollen underwear, Burberry cotton outer garments, fur mitts and finnesko (reindeer skin) boots with dried grass for extra warmth.



Other important pieces of equipment included, goggles to protect the eyes from glare and freezing wind, skis for moving over snow, crampons for slippery ice conditions and ice axes. Sledging parties needed tents for protection against the freezing conditions. Sleeping bags of wool or reindeer skin were used in the huts and by sledging parties.

Cooking for the treks was done on a Nansen cooker, which was designed for maximum efficiency – cooking food and melting ice simultaneously.

Equipment taken by parties journeying from the base huts was packed onto sledges, which were hauled by dogs or men over the snow and ice. Mawson favoured dogs to pull the sledges. He also saw the advantage of motorised transport, taking an

aeroplane on the AAE. However, a crash shortly before leaving disabled the plane so Mawson took it without wings and used it as an air-tractor for hauling sledges. He used an aeroplane extensively on BANZARE.

Students can learn how Mawson quickly took advantage of new inventions and technological improvements and applied them in Antarctic exploration.

Partial replica of Mawson's hut

Mawson's hut is an easily recognised symbol of his Antarctic exploration. Huts provided essential protection against the harsh Antarctic weather. The expedition parties had to survive inside the cramped huts during the long winter. Their confined space was also used for preparing equipment and organising supplies for the scientific trips. In the AAE Main Base hut, the work area was in the narrow central dining area with the table hoisted to the ceiling to allow large items such as sledges to be worked on. The only personal space each man had was his bunk. Everyone was rostered for chores such as cooking and cleaning.

The hut replica will help students visualise the working and living conditions of Mawson and other early expeditioners. They can also consider the design requirements for building in Antarctica.

The Epic Sledge Journey

Mawson lost both his sledge party companions but still survived and continued taking scientific records even when he thought his position was hopeless. Ninnis and the sledge he was driving accidentally broke through a snow bridge over a deep crevasse and were lost. Mawson and Mertz were left with little food and equipment as they abandoned the planned trip and tried to return to the Main Base hut. Mertz died in the attempt. Mawson struggled on, surviving falls into crevasses, starvation and the bitter conditions. His courage and determination to survive show his great personality. Students can use a computer interactive dedicated to the epic sledge journey as well as see the sledge which Mawson cut in half so he could pull it on his own.