

Special Report 1

GSA Queensland Division high school rock and mineral sets

During 2016, the GSA Qld Division (GSAQ) received several enquiries regarding the availability of rock and mineral sets for high schools. Indications were that while individual specimens were available from a variety of sources, sets containing an integrated collection of the various basic rock types were lacking, as were minerals.

The GSAQ responded by canvassing several high schools with a brief questionnaire asking which specimen resources they held, along with their ideas for what they required. The feedback reinforced the earlier indications. Following a scan of the internet, it was apparent that integrated sets to facilitate teaching geology at the secondary level were indeed lacking. The majority of specimen sets available catered primarily to the rock enthusiast, offering samples that were collectable, interesting or just plain 'shiny'!

The next steps were to identify:

- what was really required for Year 11 and 12 Earth Science classes
- where the specimen materials might be sourced, prepared and stored
- how they might be assembled, presented and priced to allow for a sensible (or otherwise) decision about proceeding with the project.

Initially, six sets were proposed: three covering the primary rock type classes, and three for minerals, covering the rock-forming, economic and Moh's set of hardness minerals. The content of these sets was derived in conjunction with Ross Wilson from the Queensland Curriculum and Assessment Authority, based on the new Earth and Environmental Science curriculum to be rolled out in 2019.

Sources for the rock specimens were drawn initially from Warwick Willmott's wonderful Rocks and Landscapes booklets, which provided a host of sites to collect samples. Friedrich von Gnielinski from the GSAQ indicated he had a large collection of both rocks and minerals that could also be used, being secondary samples and offcuts from various field exercises over many years.

More recently, following donations from a few mining organisations, additional 'economic suite' sets, consisting of both ore and host rock specimens, are being created. These currently include a coal set, arranged by Barry Saunders of QGESS Pty Ltd; a copper/base metals set; thanks to Dave Crimeen and Chinova; and now a comprehensive iron ore set, enabled by Bruce Sommerville and Adin Dempster from Rio Tinto Iron Ore. More commodities are currently under consideration, and all offers of assistance with these are most welcome. Specific mineral specimen materials have been provided by Dave Chadwick (Australian Industrial Minerals), Ken Harvey (Superior Resources), Keith McPhee and Rod Dawney (Ausmec).

The Rio Tinto samples arrived in 14 200-litre drums; one forgets just how much a drum of haematite at better than 60% Fe weighs! Fortunately the project has been provided with the use of a forklift, and a 2.5-tonne travelling hoist in the Geological Data Design (GDD) work area by Mick Morel (Star Steel Constructions).

Materials for an additional set suggested by Warwick's booklets are rocks of the Brisbane area. These are being assembled at present.



Some of the many high school rock and mineral sets prepared by GSAQ members. All images courtesy Tony Shellshear

In a moment of madness, GDD put its hand up to provide storage and preparation facilities and equipment. Sorting and preparation by various members of the GSAQ committee started in 2017. The materials Friedrich and the GSAQ provided were collected and sorted, filling some 60 to 70 20-litre drums. This material provided a wealth of specimens of both rocks and minerals that are suitable for these sets, along with an equally large number of specimens best suited for more specialised sets. (And some that the author is still trying to identify...)

Once these initial materials had been roughly sorted, Warwick went to work ferreting out some of the missing rock types from his favourite field locations. Buckets of bundies mysteriously appeared in the GDD car park in the dead of night.

One of the key goals in the assembly of the rock sets was to provide specimens that were large enough to clearly exhibit the identifying attributes for the rock type, rather than a wafer-thin slice, glued onto a cardboard cut-out of Neddy Seagoon's North Sea quarry. Specimen boxes have been sourced that hold eight specimens, 75x75x100 mm in size (that's 3x3x4 in, or 'fist-sized' in the old money). The additional benefit of this size is that they are too big for students to stick in their pockets...

The mineral specimens, being by nature more uniform, are housed in smaller containers holding 12 specimens, allowing a specimen size of 50x50x75 mm. (And yes, Moh's scale of hardness only has ten members, so we added kryptonite and naquadria for interest). Sample preparation consists of reducing the material to the required size, cleaning (some materials had been out in the weather for years), and in some cases coating one face to allow a clearer view of the specimen surface.



"4,521... 4,522... 4,523..."



A close-up of some of the rock specimens in a set

Early on, we found that slabbing the material into 50–70 mm slabs and then breaking the resulting slabs with a bolster greatly reduced the waste compared with simply breaking or crushing the large pieces. This resulted in specimens that had both a broken and a sawn face, which provided a better view of the rock structure and constituent mineralogy in many cases.

We clean grubby specimens by sand-blasting with clear glass beads or garnet. This not only works wonders in removing weathered grime – in some cases it enhances the features of the specimen, eg, the crystal structure in coarser igneous rocks, or the structure of the corals in fossiliferous limestone. Where it improves visibility, one sawn face is coated using a matt polyurethane coating. Some softer porous materials are soaked in an archeological consolidant (Dow Corning Paraloid-72) to improve their resistance to handling. Prepared specimen materials are stored in air-tight, 20-litre plastic drums, again donated for the project.

Another quandary we faced was labelling. The specimen name is provided on the label on top of each set, along with a plug for the GSA and the various sponsors who have contributed specimen materials, equipment or other services. Petrified at the thought of applying white paint and ID numbers to the large numbers of specimens, we decided to affix a photograph of each set to the inside of the lid, removing all ambiguity.

When pricing the sets, a vote by the GSAQ committee established the project as a community service initiative, in which the prices charged would be based on the direct outlays by the GSA to cover the costs of the boxes, along with the preparation and labelling consumables. All specimen materials, materials handling and preparation equipment, preparation and assembly time have to date been met by some very generous donations. The price for each of the sets of eight rock or twelve minerals is currently \$16 + GST. As the project is heavily subsidised, the sets are only for schools for school use, and are not available to the public generally.

The new specimen sets were displayed publicly for the first time at the recent Science Week event at Southbank. They received a great deal of attention, and a number of subsequent orders were taken.

The specimen sets are currently delivered to schools where practical, but for more remote locations, the school is responsible for the cost of delivery.

For further information on the project, and how you can assist, please contact Tony Shellshear at the email address given below.

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Interest in the rock sets was high at the GSA Science Week Booth.

TAG The Australian Geologist

GOT SOMETHING TO SAY?

Send your contribution to the TAG column 'Forum', where GSA members can voice their opinions, advice, criticism and recommendations.

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