



# Senior Minerals Museum Research

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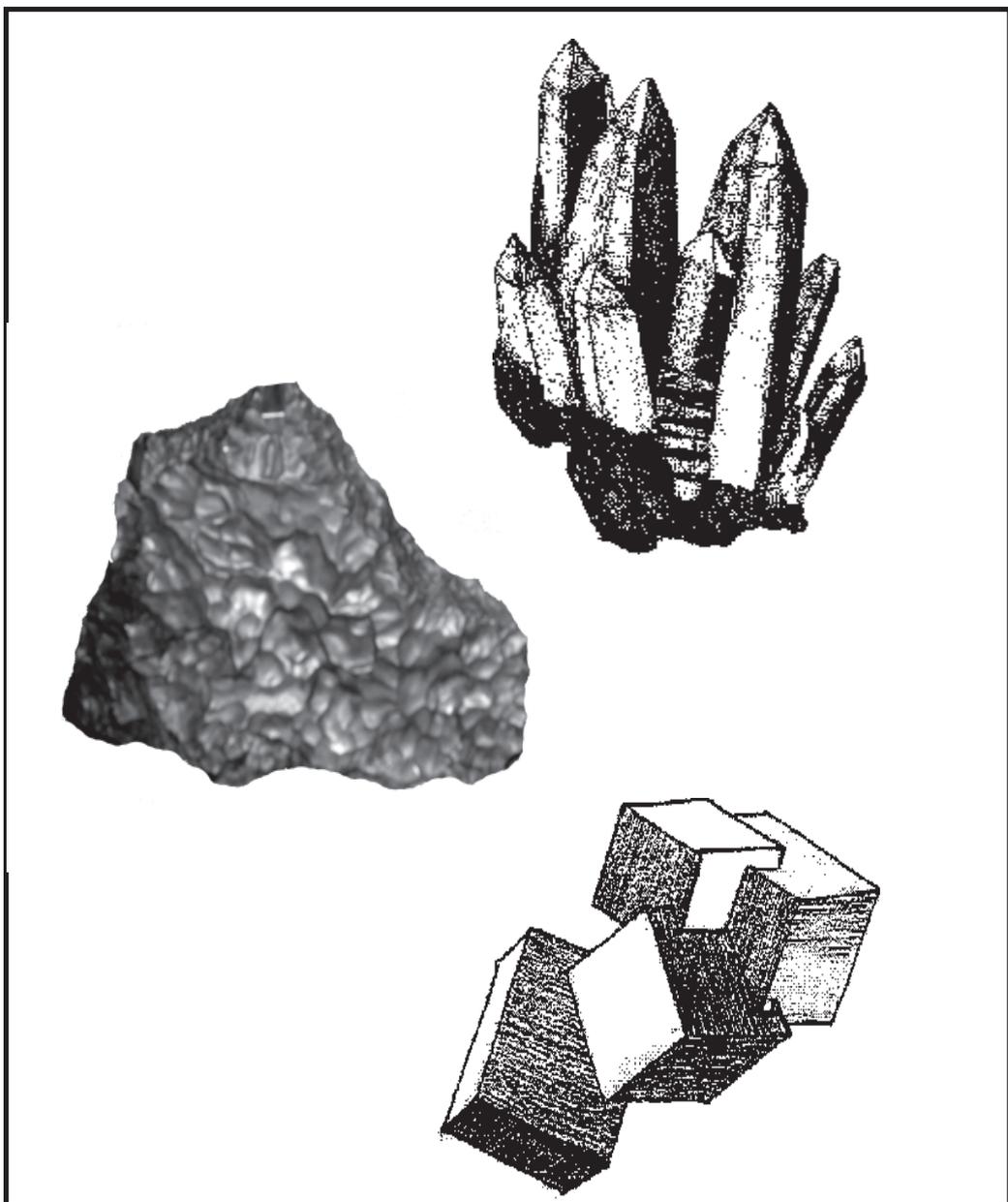
Government of South Australia  
Department of Education and  
Children's Services

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.

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## South Australian Museum Education Program

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## 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 to see all the best parts.
- 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 be responsible for your groups of learners at all times.

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. (The number of students in the museum would cause excessive delays for people who really need lifts.)

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

**Supervisors' bags must be left at the security desk, or be inspected and tagged by the security officers.**

## Mineral Gallery research

**For students in years 11 & 12**

### Aims of this activity

- \* To appreciate the variety and beauty of the Mineral Kingdom
- \* To see some mineral specimens of high quality and value
- \* To gain an understanding of South Australia's mineral heritage
- \* To reinforce your classroom study of minerals

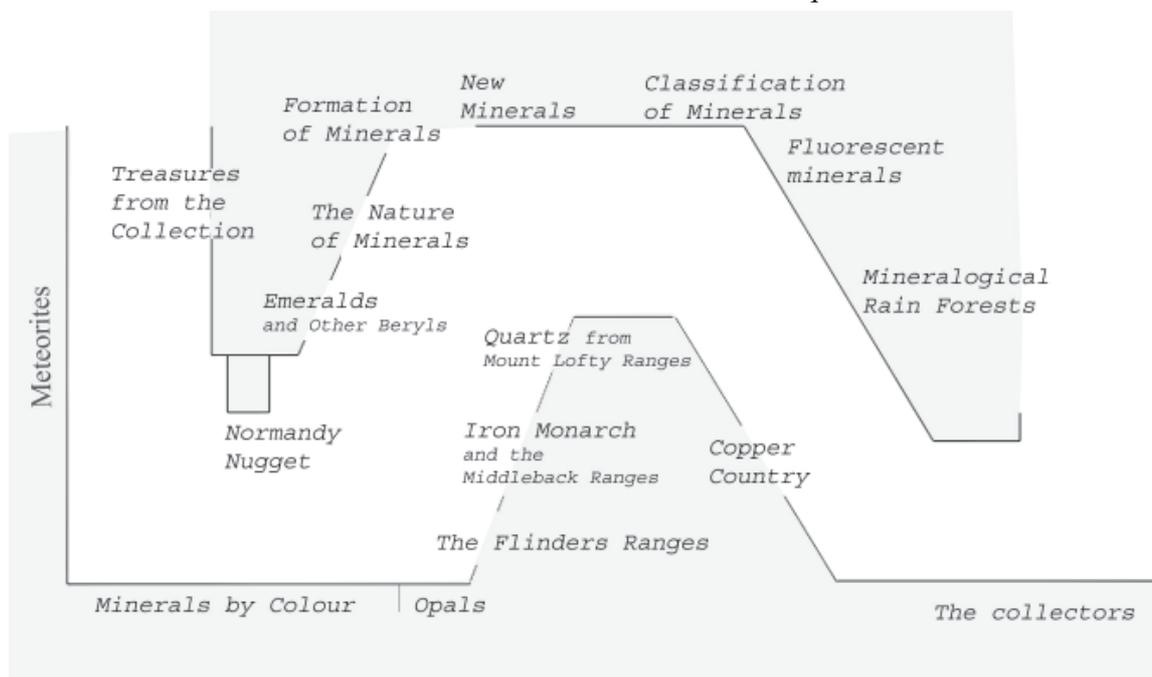
## SSABSA Performance Criteria

By satisfactorily completing this worksheet, you will have met the following SSABSA criteria for fieldwork performance, as listed in the SSABSA Geology Curriculum Statement.

- \* Participate in field activities
- \* Make appropriate observations of geological phenomena
- \* Keep accurate and appropriate records of observations
- \* Extract relevant information from a variety of sources
- \* Analyse and interpret data
- \* Justify conclusions
- \* Discuss and explain concepts
- \* Use geological terms correctly
- \* Express ideas simply, clearly and accurately

## The exhibition

Use this map to find the cabinets you need to answer the questions on the following pages.  
Enter at the northern end to see the cases in the same order as the questions in this booklet.



### Your task

To answer the following questions, look carefully at the mineral specimens displayed and read the information about them.

- \* The headings above each set of questions are the names of the cabinets in the display. These names are etched in the glass towards the top of each cabinet. Use the map on page one to help locate each cabinet.
- \* You do not need to answer the questions in any special order, so start with any cabinet that does not have people crowding around it.
- \* There are no questions for some of the cabinets. The questions refer only to specimens in the cabinets named.

### MINERALS BY COLOUR

This cabinet shows the wide variety of colours found in minerals.  
Enjoy the beauty of this case and admire the skill of its designer.

### OPALS - GEMS OF MANY COLOURS

1 Describe a special feature of coloured opal that makes it such a desirable gemstone.

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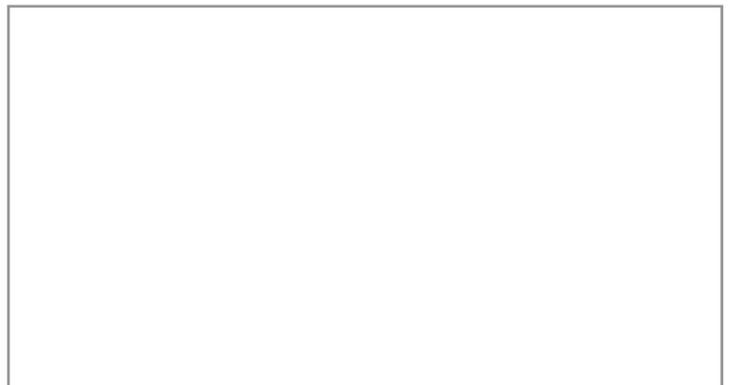
2 Explain the difference between coloured opal and potch. \_\_\_\_\_

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3 What evidence can you see that opal may be formed in a marine environment?

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- 4
- a. Sketch the specimen of *Boulder Opal* shown in the small cabinet.
  - b. Label the areas of rock and opal.
  - c. Indicate the approximate size of the specimen.



5 Suggest why the specimen called *Painted Lady* is so named.

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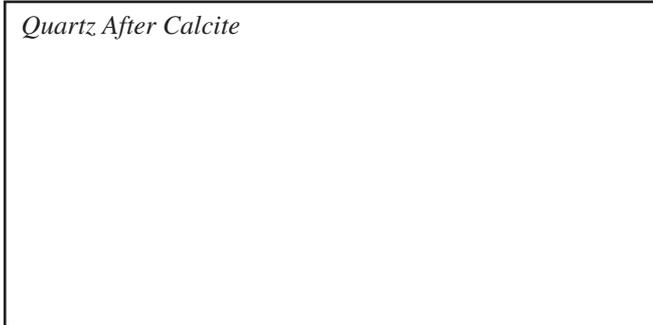
6 Describe the difference in appearance between natural opal and synthetic opal.

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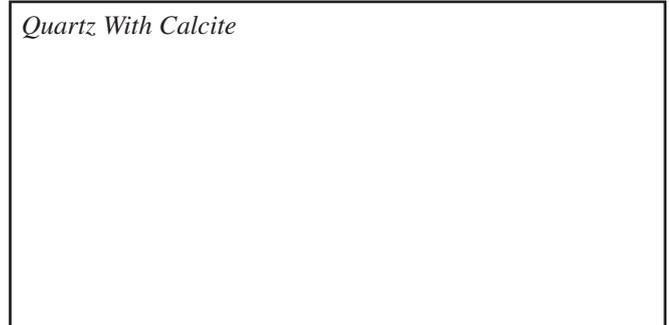
**THE FLINDERS RANGES**

7 a) Sketch the specimens labelled *Quartz After Calcite* and *Quartz With Calcite*.

*Quartz After Calcite*



*Quartz With Calcite*



- b) Give an indication of the size of each specimen.
- c) Label the *Quartz With Calcite* specimen to indicate the quartz and the calcite.

8 Describe the probable effect/s of acid on each of the specimens you have just drawn.

a) Quartz After Calcite. \_\_\_\_\_

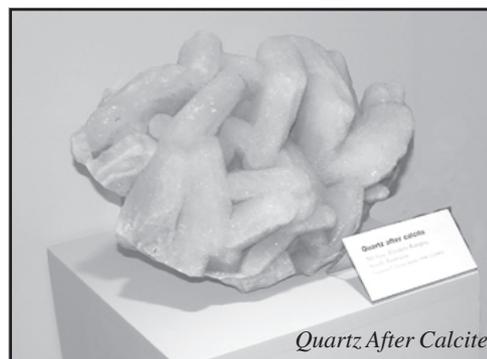
b) Quartz With Calcite. \_\_\_\_\_

9 Give reasons for your answers to question 8. \_\_\_\_\_

\_\_\_\_\_

10 Suggest a meaning for the term *Quartz After Calcite*. \_\_\_\_\_

\_\_\_\_\_



11 Bonus question: Can you see any clues that told the geologists the quartz was “*after calcite*” and not after some other mineral, (such as Galena or Halite for example).

\_\_\_\_\_

**QUARTZ FROM THE MOUNT LOFTY RANGES**

12 State two conditions that were necessary for the growth of these large crystals.

1 \_\_\_\_\_

2 \_\_\_\_\_

13 What features must have been present in the White Rock Quarry to provide one of these this condition?

\_\_\_\_\_

14 a) Sketch one of the crystal assemblages in the cabinet.

b) Give an indication of its size.



15 Describe the shape of the crystals.

\_\_\_\_\_

16 What factor determines the crystal shape?

\_\_\_\_\_

17 If you broke one of the crystal assemblages, would it form many smaller quartz crystals?

\_\_\_\_\_

18 Give a reason for your answer to question 20.

\_\_\_\_\_

\_\_\_\_\_

**THE NATURE OF MINERALS**

19 How does the display describe and explain the following mineral properties?

a. hardness \_\_\_\_\_  
\_\_\_\_\_

b. density \_\_\_\_\_  
\_\_\_\_\_

c. fracture and cleavage \_\_\_\_\_  
\_\_\_\_\_

20 Look at the large specimen of muscovite mica in the lower right-hand corner of the cabinet.

a. How many cleavage planes do the mica minerals possess? \_\_\_\_\_

b. Given your answer to the question above, what is surprising about the edges of the large mica specimen? (Hint: think about other pieces of muscovite you have seen and see question 26).

\_\_\_\_\_

21 a. Name and describe the two elements that combine to form galena.

1. \_\_\_\_\_

2. \_\_\_\_\_

b. Is the galena specimen shown in this cabinet a crystal or a cleavage fragment? \_\_\_\_\_

\_\_\_\_\_

c. Compare its shape with the cleavage fragments of galena you have used in the lab.

\_\_\_\_\_

**THE NATURE OF MINERALS (Continued)**

22 d. What can you say about crystal shape and cleavage planes for galena? \_\_\_\_\_

\_\_\_\_\_

e. Can you say the same thing about quartz? Explain your answer. \_\_\_\_\_

\_\_\_\_\_

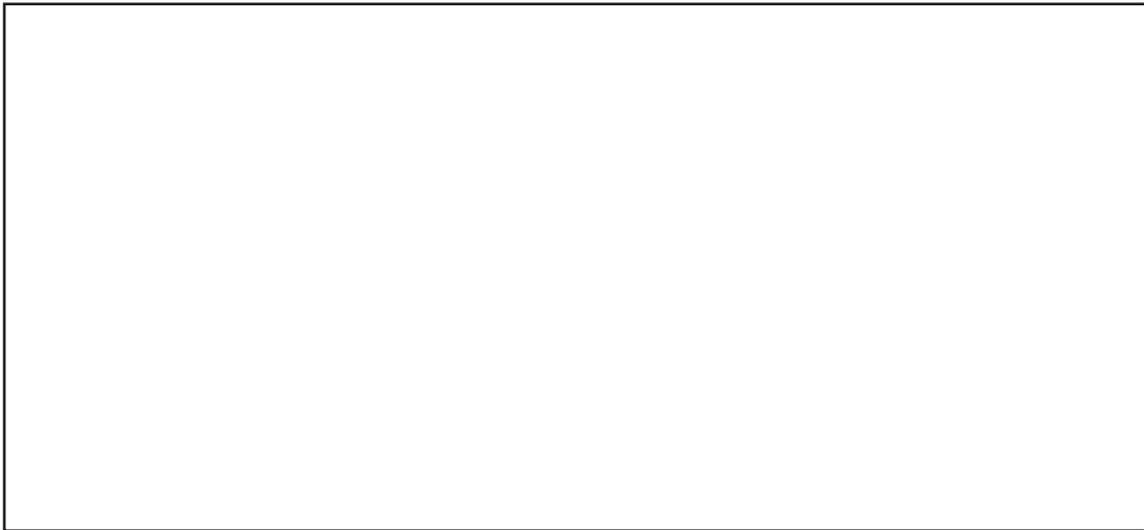
\_\_\_\_\_

23 Find a model of the internal structure of the mineral pyrite.

Actual pyrite specimens indicate that this single internal structure can be expressed in a variety of forms.

a. Sketch three forms of pyrite.

b. Indicate the approximate size of each specimen.



24 Name and describe the three forms of carbon shown in the cabinet.

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

3. \_\_\_\_\_

**THE FORMATION OF MINERALS**

25 Look at the specimen named *Quartz After Wood*

a. At first glance, what does it look like? \_\_\_\_\_

\_\_\_\_\_

b. If you could touch it, do you think it would feel like wood or like stone? \_\_\_\_\_

\_\_\_\_\_

c. Suggest a meaning for the term *Quartz After Wood*. \_\_\_\_\_

\_\_\_\_\_

d. How do you think it might have been formed? \_\_\_\_\_

\_\_\_\_\_

26 Look at the muscovite mica crystals in the granitic pegmatite specimen at the top of the cabinet and then suggest a reason for the unusual edges of the large mica specimen mentioned in number 20 (b).

\_\_\_\_\_

\_\_\_\_\_

**NEW MINERALS**

27 This cabinet shows some minerals that have been discovered in the comparatively recent past.

a. Do you think any more new minerals will ever be discovered? \_\_\_\_\_

b. Give a reason for your answer to Part a. \_\_\_\_\_

\_\_\_\_\_

c. Imagine you find a mineral specimen on a field trip and think you might have discovered a new mineral. What steps could you take to be sure that your specimen was indeed new to science?

\_\_\_\_\_

\_\_\_\_\_

d. Read the conventions for naming new minerals, and then invent a name for your new discovery.

\_\_\_\_\_

**CLASSIFICATION OF MINERALS**

28 Name the mineral groups shown in the cabinet that are listed in your Curriculum Statement. \_\_\_\_\_

\_\_\_\_\_

29 What do you notice about the Silicate group? \_\_\_\_\_

30 Name the minerals shown in the cabinet that are listed in your Curriculum Statement.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

31 Name two of these minerals that have a metallic lustre. \_\_\_\_\_

32 Find two minerals that have the same chemical composition but are different colours. Name them and describe their colours.

\_\_\_\_\_

\_\_\_\_\_

**COPPER COUNTRY**

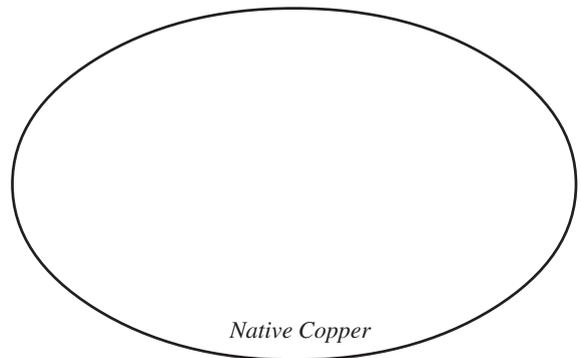
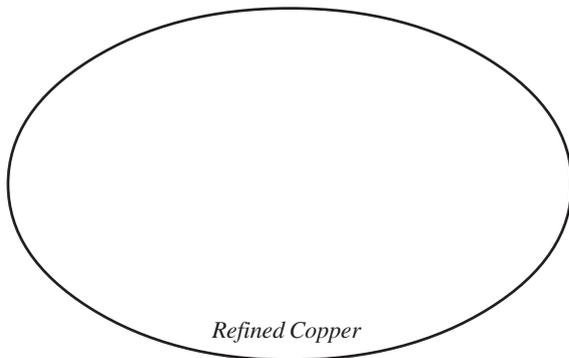
This case shows the ores found at South Australia's most important copper mines – Burra, Moonta/Wallaroo and Olympic Dam.

- 33 What differences are there between the ore minerals found at Burra and those found at Moonta/Wallaroo?
- a. In appearance \_\_\_\_\_
  - b. In mineral type \_\_\_\_\_
  - c. In mineral composition \_\_\_\_\_
- 34 A few of the many minerals displayed in this cabinet are listed in your Curriculum Statement. Name these minerals and state the location at which each one was found.

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- 35 Samples of native copper and refined copper are found in this cabinet.
- a. Sketch an example of each type of copper.
  - b. Include the approximate size of each specimen.



- c. Describe the origin of each type of copper.
  - i. Native Copper \_\_\_\_\_
  - ii. Refined Copper \_\_\_\_\_

- 36 Name two metallic resources that are found at Olympic Dam but not at Burra or Moonta/Wallaroo.

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**METEORITES**

37 Explain how meteorites provide information about:

a. the Earth’s interior.

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b. the age of the solar system, including the Earth.

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38 a. Explain how tektites are formed.

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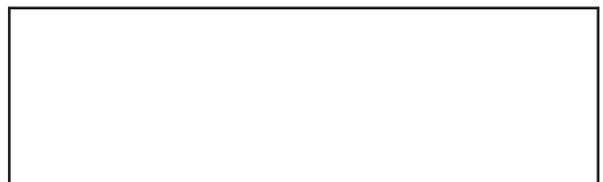
b. What useful information do tektites provide to geologists?

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c. Sketch one or two typical tektites in the space provided.

d. Indicate the approximate size of each tektite.



39 a. Describe the evidence that Lake Acraman was formed by a meteorite impact.

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b. On the adjacent map of South Australia, mark and label the locations of:

- i. Lake Acraman — the meteorite impact site.
- ii. The ejected rock fragments that have been discovered.

