

PLACER DEPOSITS

Purpose

To see how placer deposits are concentrated in different environments. In these experiments we shall use galena as the placer mineral because it is easy to see and obtain. (Galena is not found in nature as a placer mineral because it is easily oxidised and breaks easily along its cleavage planes.) The sediment you will use has 50% by volume galena and 50% by volume sand.

Activity I Plunge Pool

This activity is designed to show how a plunge pool affects the sediment.

- 1. Place about 20ml of mixed sand and galena in the bottom of the glass.*
- 2. Place the glass in the plastic box and under a tap. (see Diagram a)*
- 3. Turn the tap on gradually until lots of grains are "dancing" in the water and some are coming over the side.*
- 4. Watch and describe the movement of the grains.*
- 5. Leave the tap running for a few minutes until about half the sediment has come over the top.*
- 6. Remove the glass from the box and carefully empty the water from both by pouring it into the other container.*
- 7. Tip the grains out on to the paper in the tray.*
- 8. Use the chart to estimate the percentage of galena that stayed in the glass and then the percentage of galena that escaped and was caught in the box.*

Activity II Stream with ribbed bottom

This activity is to show how ribs of rock (caused by alternations of hard and soft strata) affect the sediment.

- 1. Place the grid in the channel with the bars lining up with the marks on the side of the channel. Place an elastic band over each end to hold the grid down. (see diagram b)*
- 2. Place the closed end of the channel on the wooden block and the plastic box in the sink under the open end of the channel.*
- 3. Put about 20ml of mixed sand and galena in the channel in the part above the top rib.*
- 4. Pour water into the top part of the channel above the sediment.*
- 5. Watch what happens to the grains.*
- 6. Continue pouring until all the sediment has moved over the top rib and most over the second rib.*
- 7. Take off the elastic bands and remove the grid.*
- 8. Use the chart to estimate the percentage of galena and the percentage of sand caught above each rib and record them on a table like this*

Upstream end									Downstream end			
section	1	2	3	4	5	6	7	8	9	10	11	12
% galena												
% sand												

Activity III Wind blown

- 1. This shows how placer deposits, e.g. gold in Australia can be concentrated by wind action*
- 2. Place 20ml of sediment along the zero line.*
- 3. Use the hair dryer to blow the sediment until it has all moved at least 5cm.*

4. Use the card to estimate the percentage of galena in each interval and record it in a table like that shown above.

Teacher's Section

Requirements

Activity I

Glass with rounded bottom inside about 15cm high

20ml sediment (see preparation below)

Tap and sink

2 plastic boxes about 20cm by 15cm by 5cm (ice cream boxes will do)

White absorbent paper on tray

Percentage of grains chart (on Geosupplies grain size card and in field geology books)

Activity II

Channel and grid (see preparation below)

20ml sediment (see preparation below)

Plastic box 20cm by 15cm by 5cm

2 litre jug or pipe from tap

Tap and sink

Percentage of grains chart

Block of wood 6cm by 10cm by 15cm

Activity III

20ml of sediment (see preparation below)

Paper 50cm by 120cm (plain (lining) wall paper is good)

Hair dryer

Making the equipment

Sediment. (15 minutes).

Crush some pure galena pieces and then sieve it. The fraction caught on the 1mm sieve is retained and added to an equal volume of white sand of the same size. Broken pieces of galena can be obtained from mineral suppliers

Activity II Channel (1 hour to make)

You will need:

A piece of white, flat bottomed, guttering 1m long and a stop end 1.2m of 6mm by 6mm strip of wood.

A piece of 5mm thick wood 6cm by 60 cm

Fit or glue the stop end into one end of the guttering.

Mark the side of the guttering with permanent pen every 5cm from the open end for 65cm.

Cut 12 pieces of the 6mm by 6mm wood about 8cm long. The latter should fit snugly across the bottom of the guttering so you will have cut the ends at about 60° and round them with a file or sandpaper. Glue and pin the short pieces on to the edge of the long piece of wood at 5cm intervals and at right angles. This is best done by placing the small pieces in the guttering at the correct intervals and gluing the long strip to them. Pin each one when the glue has set. The grid is held in place by two elastic bands.

Activity III Wind blown

Fold paper 10cm from each long edge to make a trough. Draw a line across the trough every 5cm.

Notes

Use damp sediment to avoid grains floating for activities I and II.

Activity I can be done without a tap just by pouring water from a jug.

The grid in Activity II is not stuck to the guttering so that the sediment can be easily observed and then removed. It is possible to do activity II without the grid. The guttering should be almost horizontal and you will get very good separation but no gradation.

Be careful not to lose any of the grains down the sink or elsewhere otherwise the percentage of galena will be changed. The galena breaks up with constant use and the sediment will need to be renewed every few years. Cassiterite would be much better but is more difficult to obtain.

Results

Activity I Almost 100% separation of sand from galena can be achieved. Usually the sand in the tray will contain very little galena but there will still be some sand left in the glass, mostly on top of the galena.

Activity II and III A gradation from almost pure galena at the top to pure sand lower down.

Time

Activity I 10 minutes

Activity II 15 minutes

Activity III 10 minutes

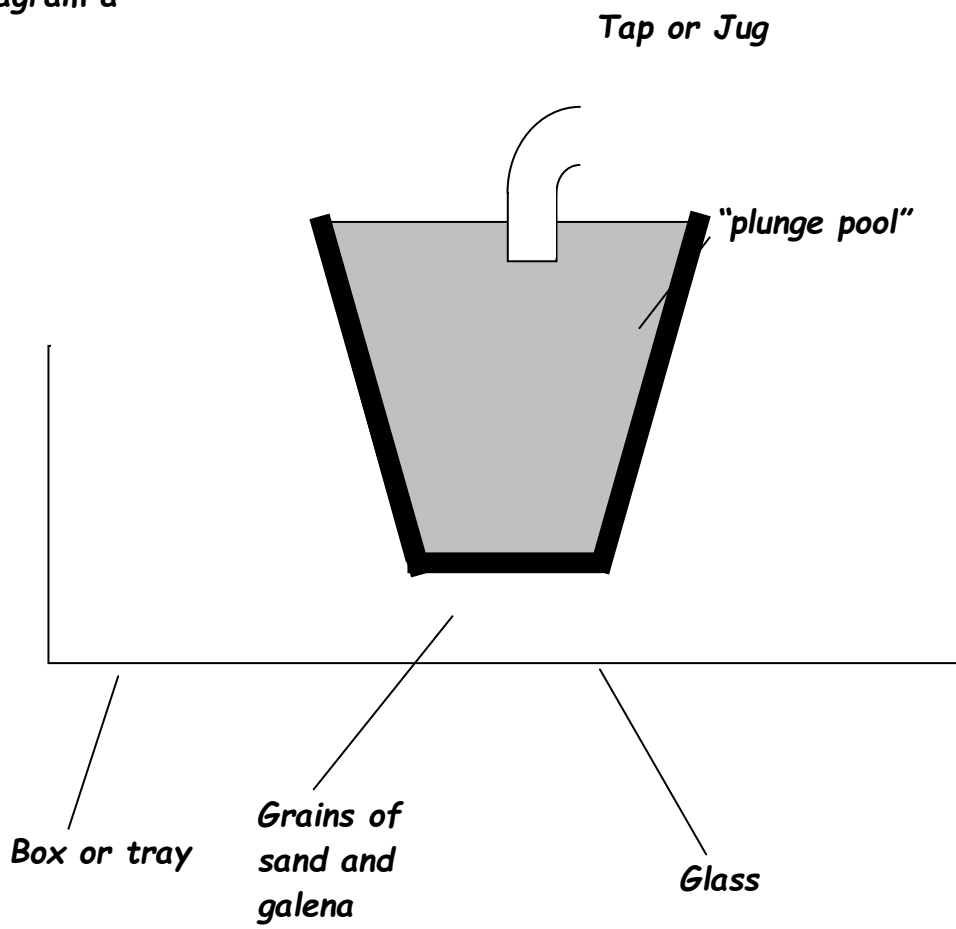
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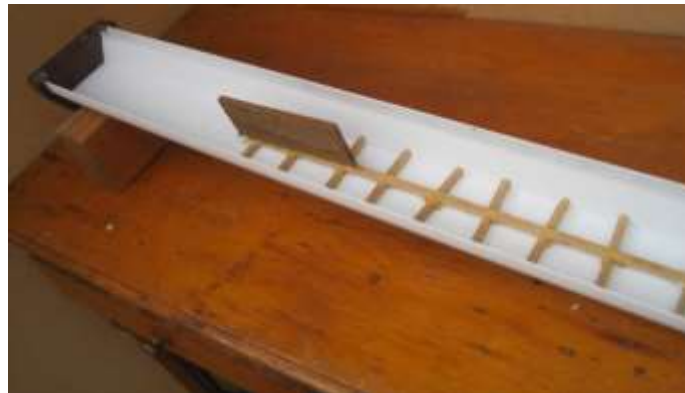
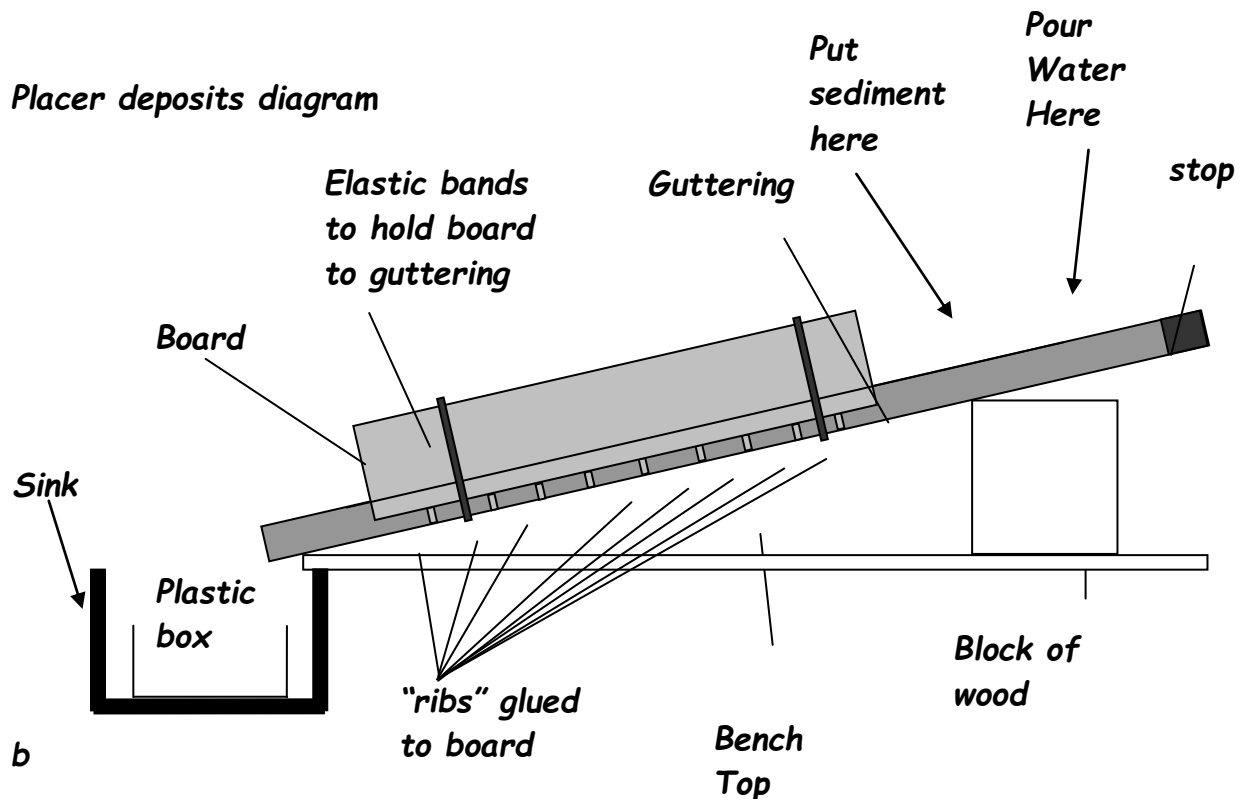
Guttering £8 for 2m



Placer deposits Activity I

diagram a





Channel and grid for Activity II