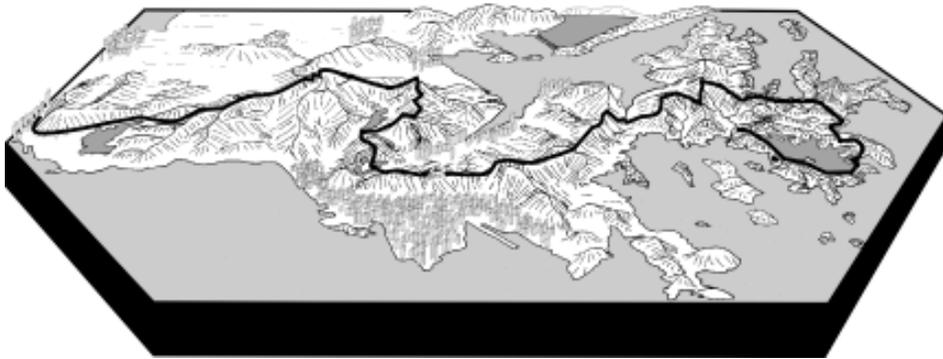


**Hong Kong Landscapes:
Along the MacLehose Trail
WORKBOOK**

Bernie Owen & Raynor Shaw



Hong Kong Landscapes, Along the MacLehose Trail



This workbook presents a series of games, puzzles, stickers, and questions that examine the origins of the rich and diverse landscape of Hong Kong. Colour stickers on p. 24 can be matched by number or printed out and glued at the appropriate places.

Each section is linked to parts of the book: *Hong Kong Landscapes: Along the MacLehose Trail*. References to Background Notes (BN...) and page numbers (p...) in the reference book are given in square brackets.

This book may be printed out for educational purposes.



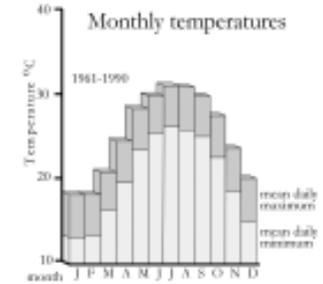
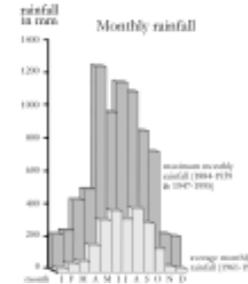
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LANDSCAPE & CLIMATE

1. Hong Kong Climate

Hong Kong climate ranges from hot and humid to cold and dry [p. 10]. This is important for landscape.



Look at the graphs and answer the questions below.

1. Heavy rains cause rapid increases in stream flow. In which months are flash floods most likely?

2. Weathering is promoted by hot wet conditions. Is this decay of rocks more rapid in the summer or the winter?

3. When are grassland fires most likely?

4. Heavy rains trigger landslides. When is this most likely?

5. Rainfall erodes paths. When is path erosion most rapid?

2. Hong Kong Landforms

Match the stickers on page 24 to the statements below.

A. Summer rains contribute to footpath erosion [p. 52].



B. Winds can erode sandy material revealing internal layers [p. 60].



C. Hot wet conditions produce deeply weathered rocks.
Heavy rain can then trigger landslides [p. 94].



D. Heavy rain infiltrates into soil and sometimes moves
through small tunnels called soil pipes [p. 165].



E. Particles in rock weather at different rates. This may cause
parts of a rock to stand out more than others [p. 143].



F. Fire resistant trees (*Acacia confusa*) are used as firebreaks in
some Country Parks [p.160].



G. Making slopes stable involves keeping them dry by covering
them in a cement-like material called shotcrete [p. 35, BN105].



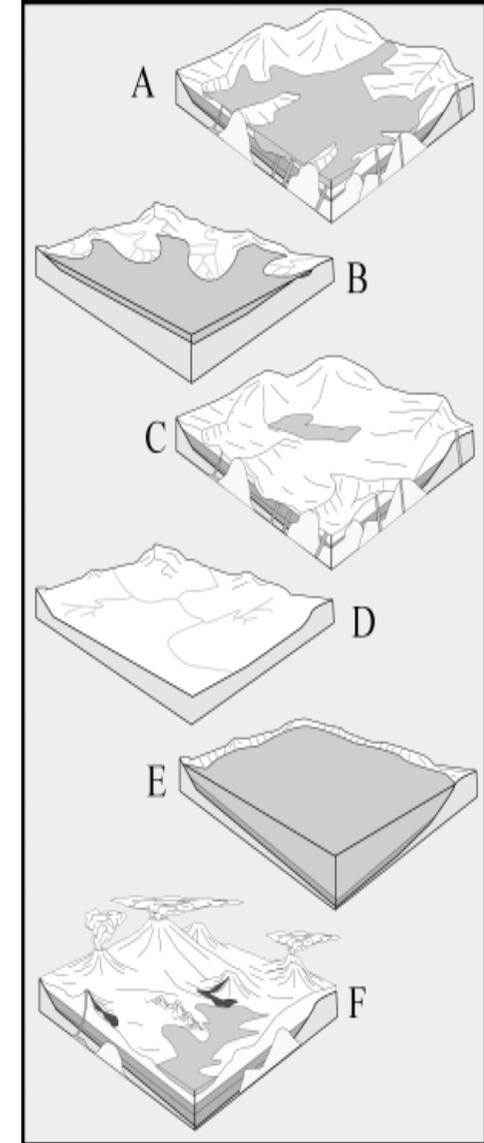
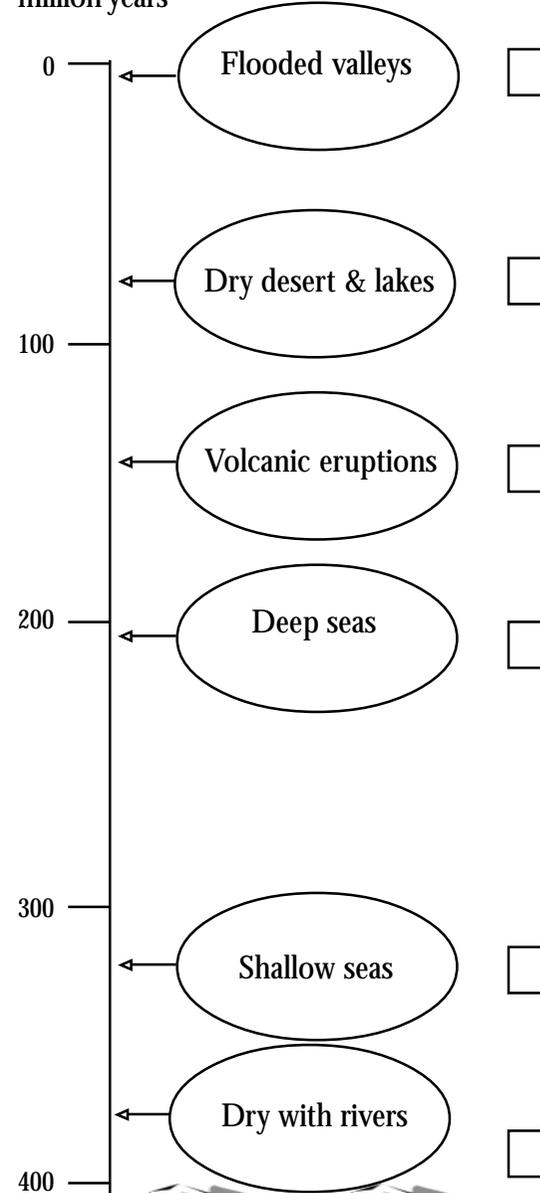
GEOLOGY

1. Geological History

Over scales of millions of years major environmental changes can occur [p. 12-14].

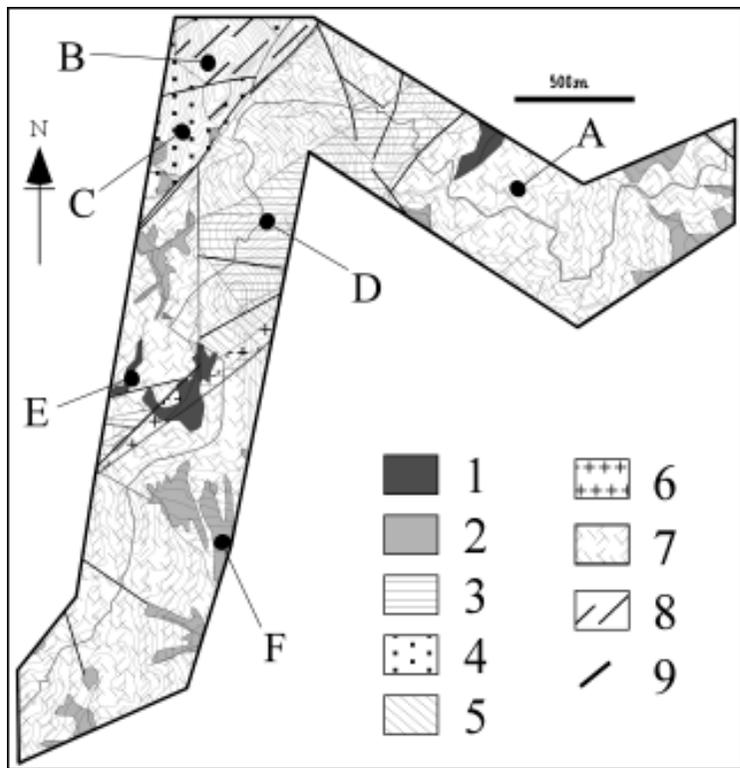
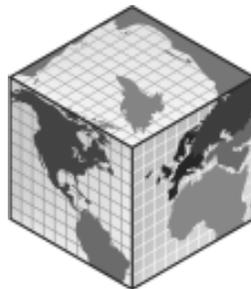
Match the description with the diagram by placing matching letters in the box

million years



2. Geology Maps

Geology maps [p. 7-8] show the rock type at particular locations. What are the rock types at points A-F on the map below.



[Stage 4 map on p. 89]

Rock types: 1-river sand; 2-sand & boulders; 3-rhyolite; 4-sandstone; 5-siltstone; 6-granite; 7-tuff; 8-coarse tuff; 9-faults

A _____

D _____

B _____

E _____

C _____

F _____

3. Rock Type

Minerals have a fixed structure and chemistry. Rocks are mixtures of minerals or other rock fragments [p.14-19].

Match a mineral/rock sticker (p.24) next to the the closest description



Minerals:

A. Quartz - glassy transparent or grey, with 6-sided crystals.

B. Feldspar - pink to grey and opaque.

C. Biotite - black and sheet-like.

D. Calcite - white a twisted cube shape.

Rocks:

E Tuff - speckled grey with larger fragments.

F. Rhyolite - grey with parallel ridges on weathered surfaces.

G. Granite - pink to grey with many dark spots.

STRUCTURE

There are two main types of cracks in rocks [BN102, p. 32]. Faults are cracks where movement has occurred. Joints are cracks with no movement.

1. Fault Types

Four main types of fault occur. Draw arrows on either side of the faults in the block diagrams below to show the movement described

Normal - upper block moves down



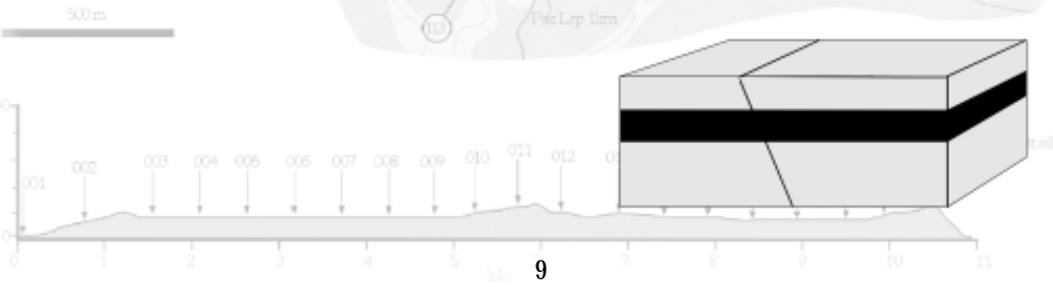
Reverse - upper block moves up



Thrust - low angle, with upper block moving up



Strike - blocks move sideways



2. Faults in Hong Kong

Look at the map. There are two sets of fault directions in Hong Kong [BN103, p. 33]. These are lines of weakened rocks that have often been eroded to form valleys.



A. What two compass directions do these faults follow?

B. Name the valleys controlled by the labelled faults.

1 _____

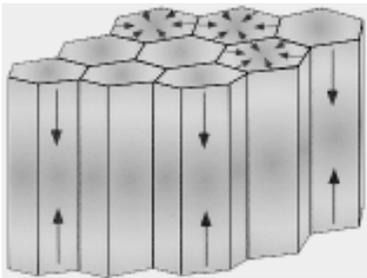
2 _____

3. Joints

Joints are produced in different ways. Some are caused by earth movements and form rectangular blocks, others are caused by cooling of hot rocks and form hexagonal patterns.

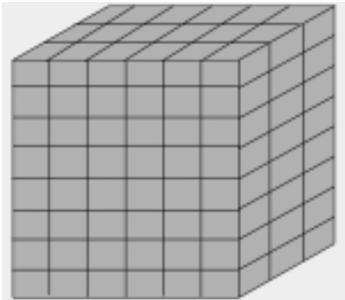
Find stickers (p.24) that match the joint types shown and label them as block or columnar joints.

A





B



COASTAL REGIONS

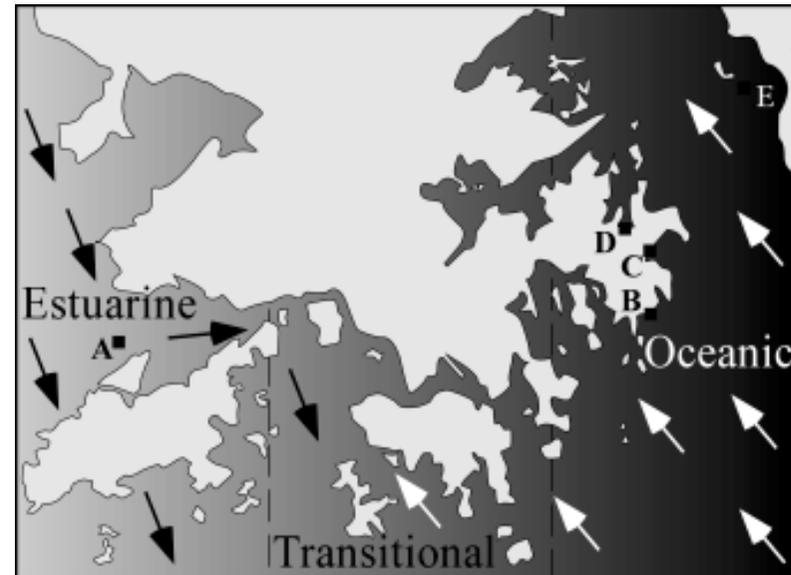
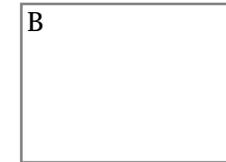
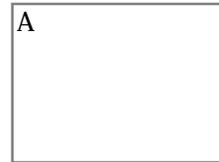
1. Coastal Environments

Coastal Hong Kong is influenced by the Pearl River in the west and by salty ocean water in the east [BN203, p. 53].



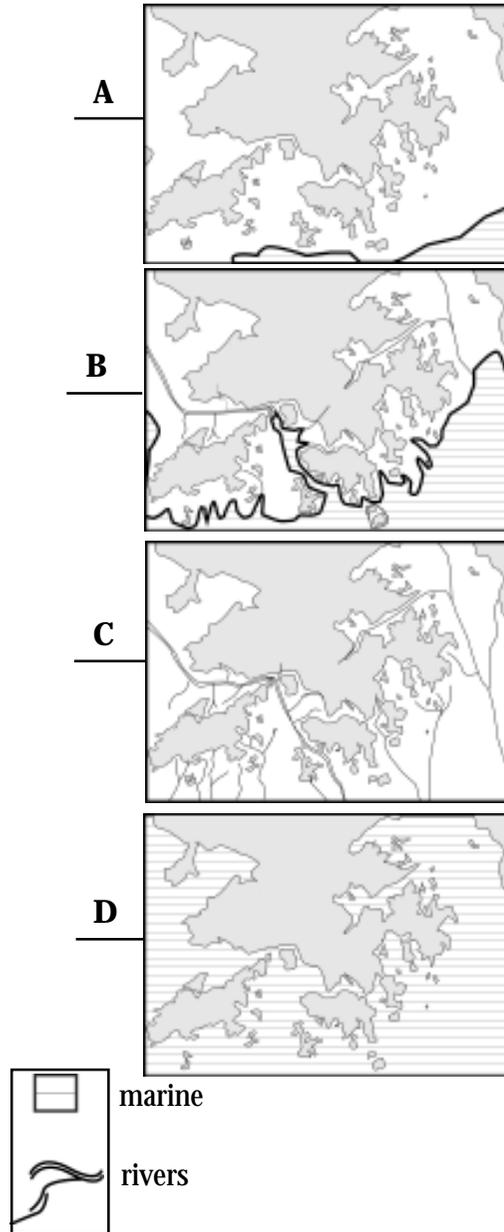
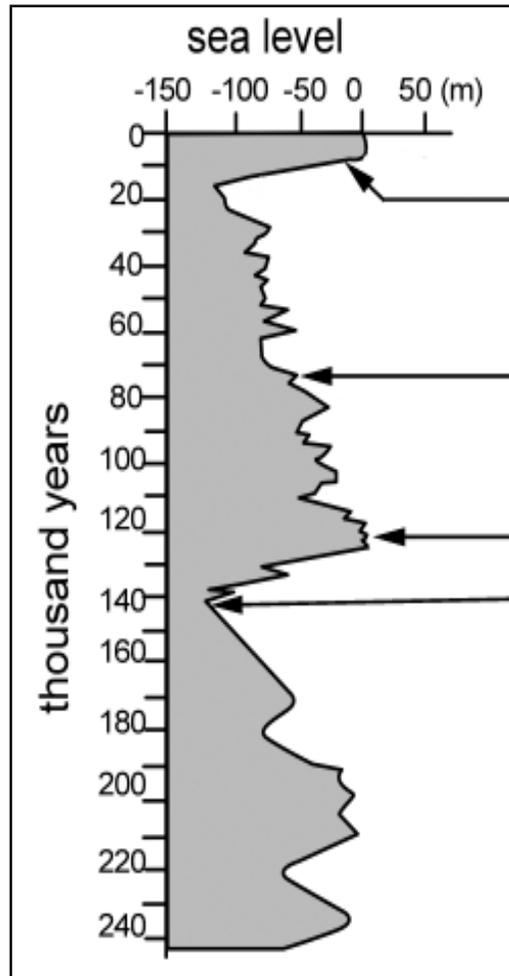
Strong waves from the southeast erode coasts on headlands and deposit sand in embayments. Where waves are weak muddy sediments and mangroves occur. Corals grow in salty water and the Chinese White Dolphins prefer less salty conditions.

Given the above information. Match stickers (p.24) in the boxes that match the map locations:



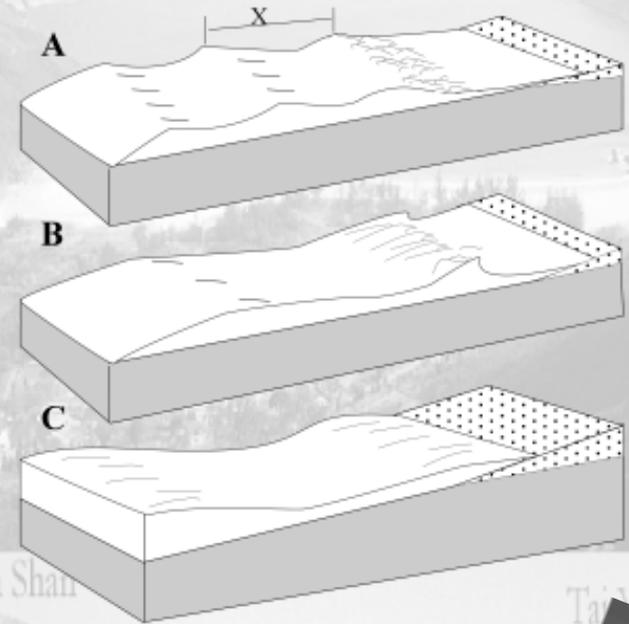
2. Sea Level Change

The level of the sea has changed by over 100 m several times during the last 240,000 years [BN106, p. 38]. Match the maps and sea level curve by connecting them.



3. Beaches

Beaches are accumulations of sand that are controlled by the wavelength ('x' in the figure below). This is the distance between wave crests [BN207, p. 60].



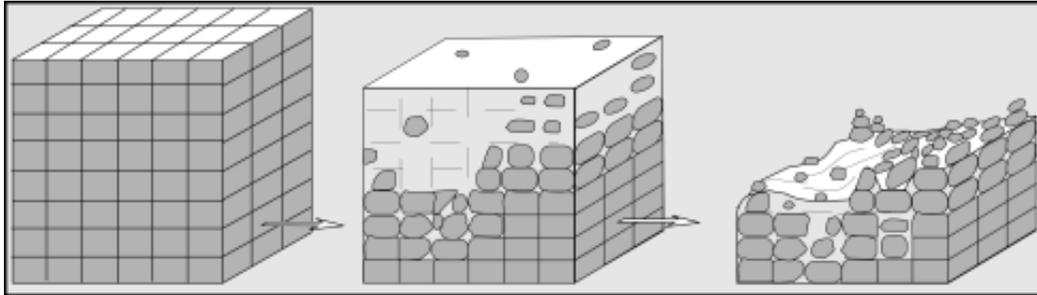
Indicate the letter in the figure that matches the statement below

1. The shortest wavelength occurs in: _____
2. The longest wavelength occurs in: _____
3. The beach is steepest in: _____
4. Overhanging or collapsing waves occur in: _____
5. Foam and bubbles form on the waves in: _____

WEATHERING & MASS WASTING

1. Weathering and Landscape

The hot humid climate of Hong Kong causes chemical decay of rocks [BN602, p. 120]. Erosion removes this material. The diagrams below [BN405, p. 92] show the evolution of a landscape. Dark grey represents fresh rock and light grey is weathered material. Write true or false next to the statements below.

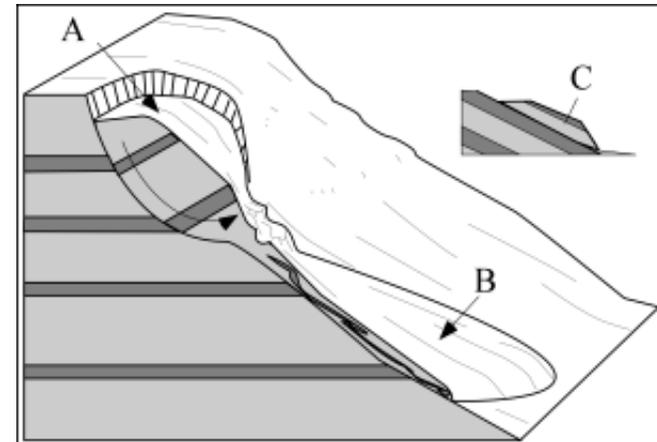


1. Water flows through fresh rock faster than along cracks _____
2. As weathering proceeds rock blocks become rounder _____
3. The larger surface area at corners allows faster weathering than at edges _____
4. Rounded blocks (corestones) never rest on top of each other _____
5. The ground surface is gradually raised by erosion _____

2. Mass Wasting

Mass wasting involves materials moving downslope under the influence of gravity [BN401, p. 87]. There are several types recognised. Weathering tends to weaken material and increase the rate of mass wasting.

Three common types are shown below (A) is a slump involving movement of a block; (B) is a debris flow which moves in a liquid manner; and (C) is a slide over a flat surface. Write true or false next to the statements.

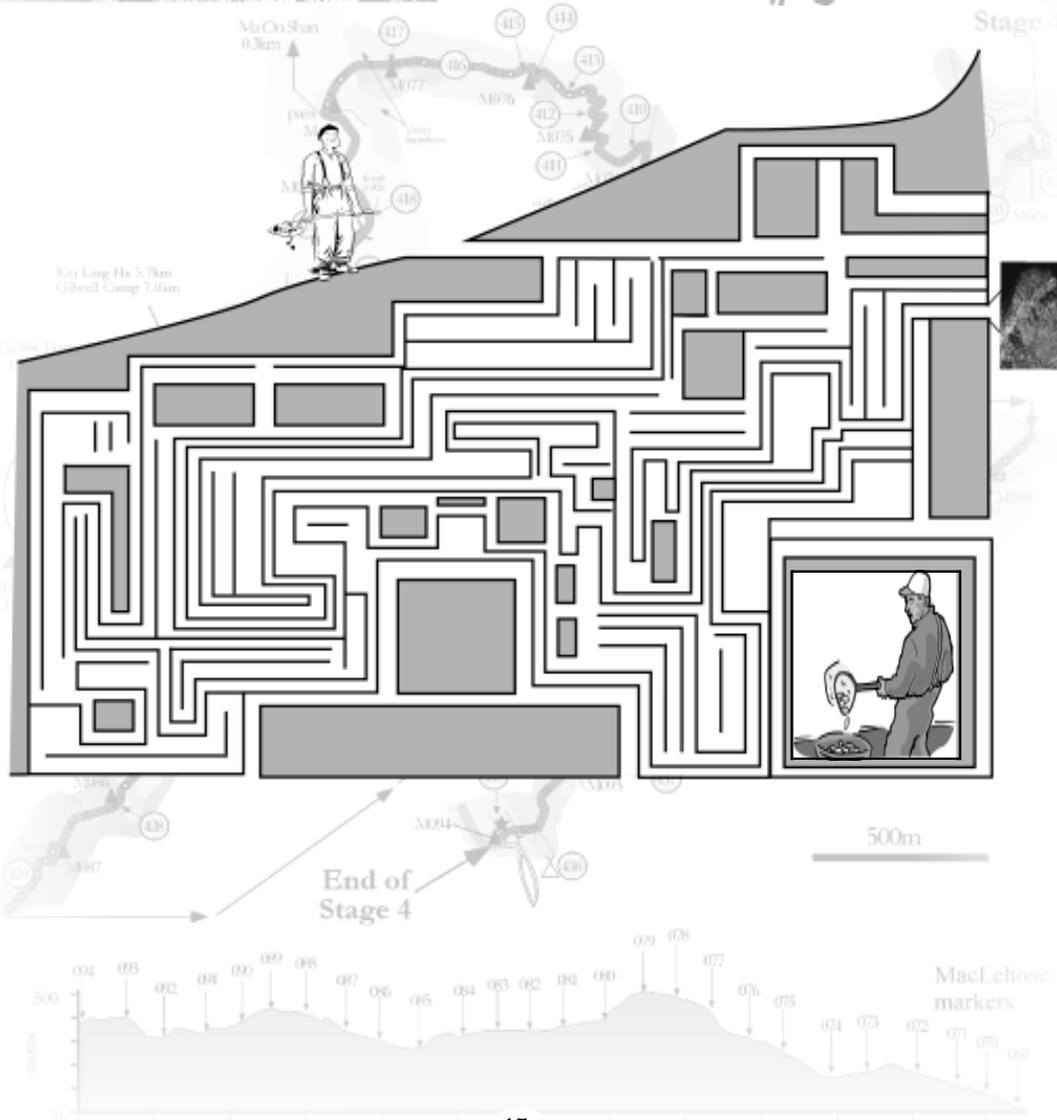


1. In a slump the rock layers are rotated around a central point. _____
2. A slump moves downhill over a curved surface _____
3. The layers in a debris flow remain undisturbed _____
4. Material moved in a slump may turn into a debris flow _____
5. A scar forms at the upper end of a slump _____

HUMAN IMPACTS

1. Mining

Mining for lead, iron, tungsten & graphite were once major industries in Hong Kong [BN904, p.163]. Can you help the miner to trace a route to the iron ore at the end of the tunnels?



2. Mining Effects

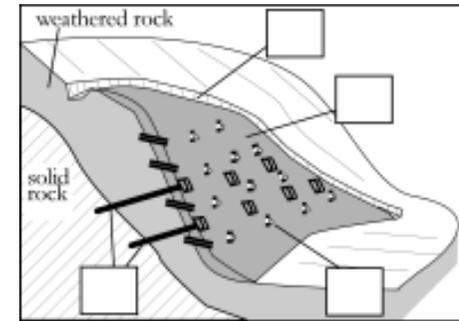
Mining has had a major impact on landscape. Match stickers (p.24) with the statements below.

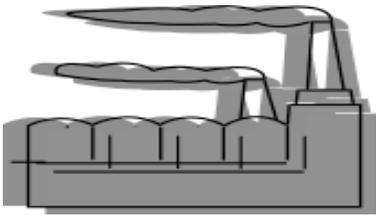
- A. Landslides can be caused by surface mining, which removes support for slopes [p. 93].
- B. Adit mining leaves dangerous tunnels and small mounds of debris over wide areas [p. 133].
- C. Surface mining along mineral veins can cause eroded landscapes that take many years to recover [p. 130].
- D. Quarrying of rock for building materials leaves large scars on the landscape [p. 43].

3. Slope protection

Several methods are used to prevent collapse [BN105, p. 35]. Label the diagram A-D to match the descriptions.

- A. WEEPHOLES are used to allow water to escape
- B. ROCK BOLTS are used to anchor material
- C. DRAINS divert water away from the slope
- D. SHOTCRETE covers the surface to stop water entering the slope.





4. Reclamation

Hong Kong has added new land to its coast for over 100 years [BN508, p. 111]. Look at the maps of Victoria Harbour, note the coastal changes, and match the map letters to the correct years.

- 1903 _____
- 1967 _____
- 1980 _____
- 1995 _____



RIVER GAME

Make a counter and role a dice (or write numbers on pieces of paper that you can select at random)

If you land on an arrow follow the current backwards or forwards. Land on a question mark and answer a question from the page opposite. If your wrong you lose a turn.

start

1? 2 3? 4 5 6? 7 8? 9 10 11? 12 13 14? 15 16 17? 18 19 20 21? 22 23 24? 25 26? 27

finish

20

River Game Questions (Answer true/false)

Answers are given below and upside down.

1. Water flows faster on the outside of a river bend.

2. River sediment becomes coarser downstream.

3. Sediment accumulates on the inside of a river bend.

4. Particles carried by rivers are rounder upstream.

5. Water flow in a stream is fastest near the centre.

6. Flash floods are slow increases in the volume of water in a stream.

7. Urban areas cause greater runoff because water cannot sink into concrete.

8. Base level is a lower limit, such as sea level, below which a stream cannot erode.

9. Flooding can be minimised by straightening a stream channel.

10. Floods tend to occur in winter in Hong Kong

11. A delta forms where a stream enters the sea.

12. Quartz resists weathering and erosion and tends to increase downstream.

1 - T, 2 - F, 3 - T, 4 - F, 5 - T, 6 - F, 7 - T, 8 - T, 9 - T, 10 - F, 11 - T, 12 - T

True ground distance - 10.6 km
 Apparent map distance - 10 km
 Lowest point - 165 m
 Highest point - 510 m
 Approximate total climbing - 490 m
 Tamed road for 1.7 km between
 Tate's Cairn & Sha Tin Pass
 Difficulty: _____
 Cool dry winter day - moderate _____
 Hot dry summer day - moderate/hard _____
 Time - 3.5 hrs winter/4 hrs summer _____

MOUNTAINS

1. The MacLehose Trail

The MacLehose Trail runs from east to west. See if you can match the points on the oblique map (A-G) with the corresponding points (not all match) on the cross section (N-Z). Consider height, east-west distance, and distance from the coast. Use the spaces to record your answers.

⬡ A. Tai Long Wan

⬡ B. Kai Kung Shan

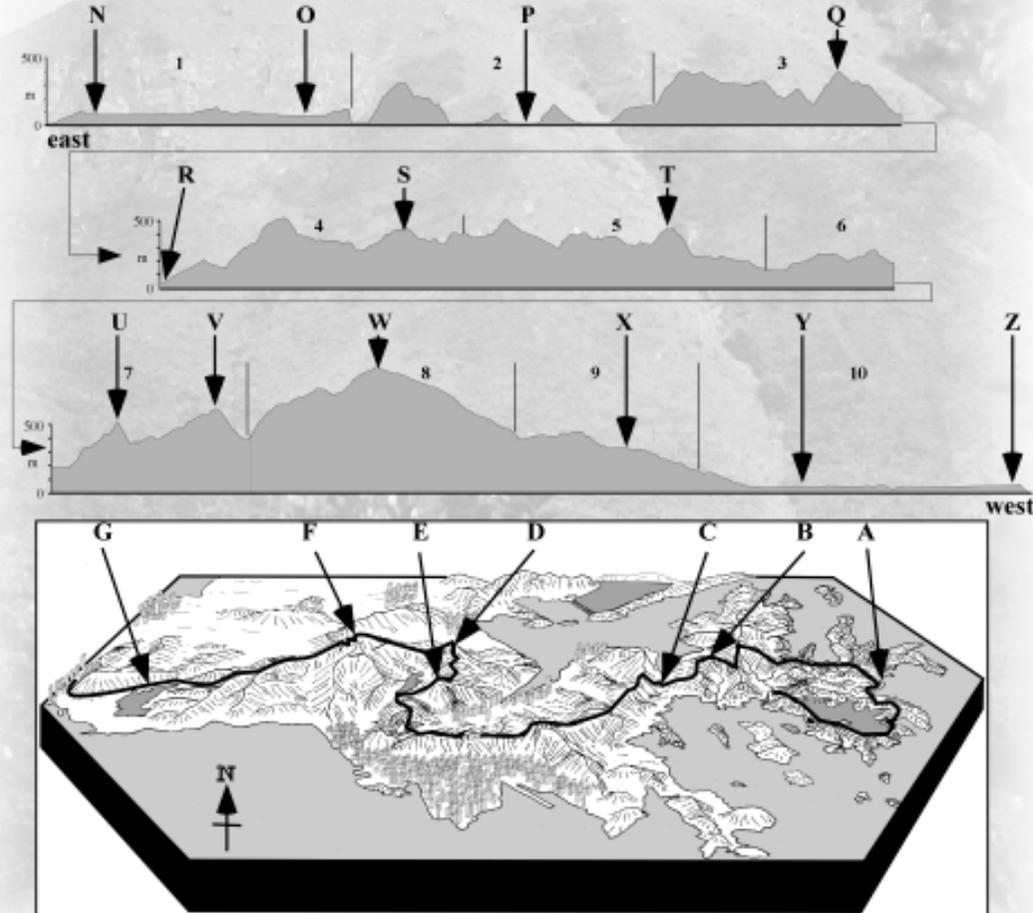
⬡ C. Sai Sha Road

⬡ D. Grassy Hill

⬡ E. Needle Hill

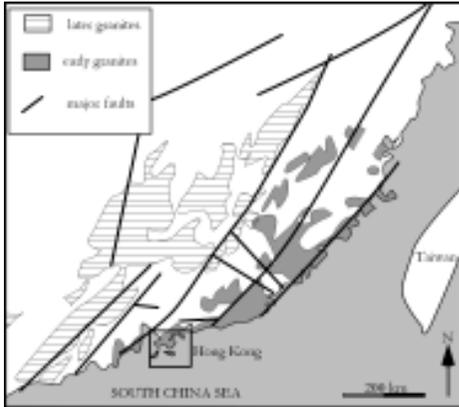
⬡ F. Tai Mo Shan

⬡ G. Tai Lam Reservoir



2. Mountain Trends

Mountains & valleys in Hong Kong follow certain alignments [BN803, p. 148]. Examine the maps & answer the questions.



1. What compass direction do the major faults follow in SE China _____

2. What direction do the granite rocks follow in SE China _____

3. In Hong Kong what direction do the Sha Tin Valley and Tolo Channel follow _____

4. What rock types dominate in the mountains shown in the map of Hong Kong

A (Tai Mo Shan) _____

B (Needle Hill) _____

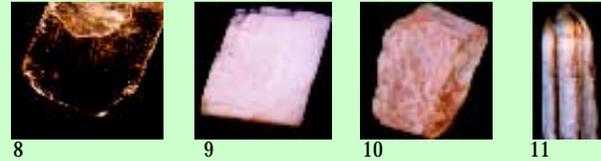
C (Lion Rock) _____

D (Sharp Peak) _____

LANDSCAPE & CLIMATE



GEOLOGY



STRUCTURE



COASTAL REGIONS



HUMAN IMPACTS



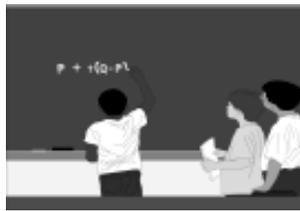
Answers

Landscapes & climate

1. *Hong Kong Climate*

1. May to August; 2. Summer;
 3. Winter; 4. Summer; 5. Summer.
- A-7; B-1; C-3; D-4; E-6; F-5; G-2

2. *Landform stickers*



Geology

1. *Geological history*

Flooded valleys-A; Dry desert & lakes-C; Volcanic eruptions-F; Deep seas-E; Shallow seas-B; Dry with rivers-D

2. *Geology maps*

A-7; B-8; C-4; D-3; E-1; F-2

3. *Rock types*

A-11; B-10; C-8; D-9; E-12; F-13; G-14

Structure

1. *Fault types*



2. *Faults in Hong Kong*

A: NE-SW & NW-SE; B: 1-Tuen Mun, 2-Sha Tin

3. *Joints stickers*

A-15; B-16

Coastal Regions

1. *Coastal environment stickers*

A-19; B-17; C- 20; D-18; E-21

2. *Sea level change*

A-75,000; B-8,000; C- 145,000; D-120,000

3. *Beaches*

1-A; 2-C; 3-C; 4-B; 5-A

Weathering & Mass Wasting

1. *Weathering & landscape*

1-false; 2-true; 3-true; 4-false; 5-false

2. *Mass wasting*

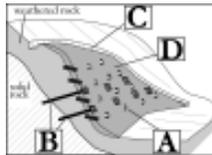
1-true; 2-true; 3-false; 4-true; 5-true

Human Impacts

2. *Mining effects stickers*

A-25; B-23; C-24; D-22

3. *Slope protection*



4. *Reclamation*

A-1995; B-1980; C-1903; D-1967

Mountains

1. *MacLehose Trail*

A-P; B-Q; C-R; E-U; D-V; F-W; G-Y

2. *Mountain trends*

1-NE-SW; 2-NE-SW; 3-NE-SW; 4A- volcanic; 4B- volcanic;
4C- granitic; 4D- volcanic and sedimentary; 4E- volcanic