PHYSICAL GEOGRAPHY OF ANTARCTICA

SESSION 1

- Expectations, Outcome, Rubric
- Formation of Antarctica
- Geological Timeline
- Map - Location of Physical Features
- West vs East Antarctica

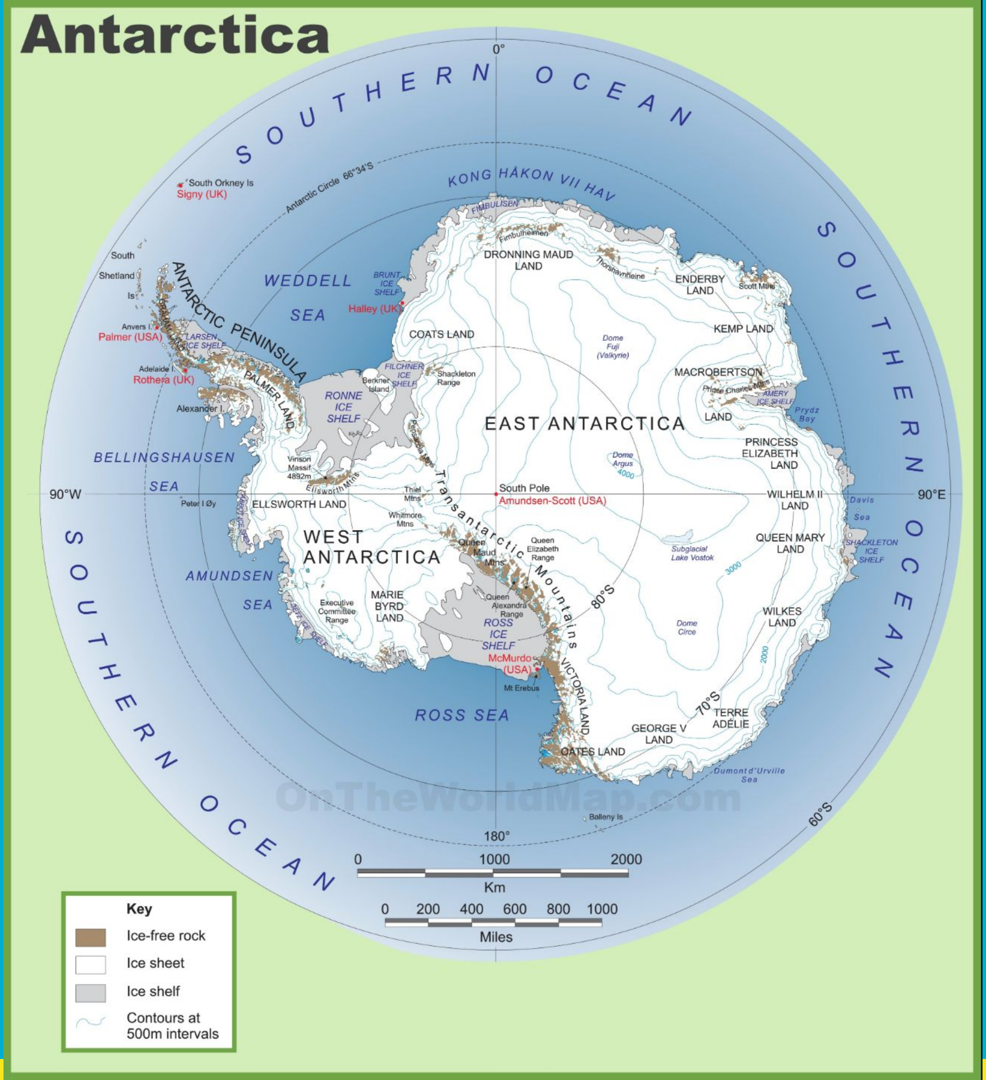
Formation of Antarctica

https://www.sciencelearn.org.nz/resources/952-continental-drift

https://www.coolantarctica.com/Antarctica%20fact%20file/History/history_of_the_land_geological-timeline_of_antarctica.php

Gondwana - what was it?

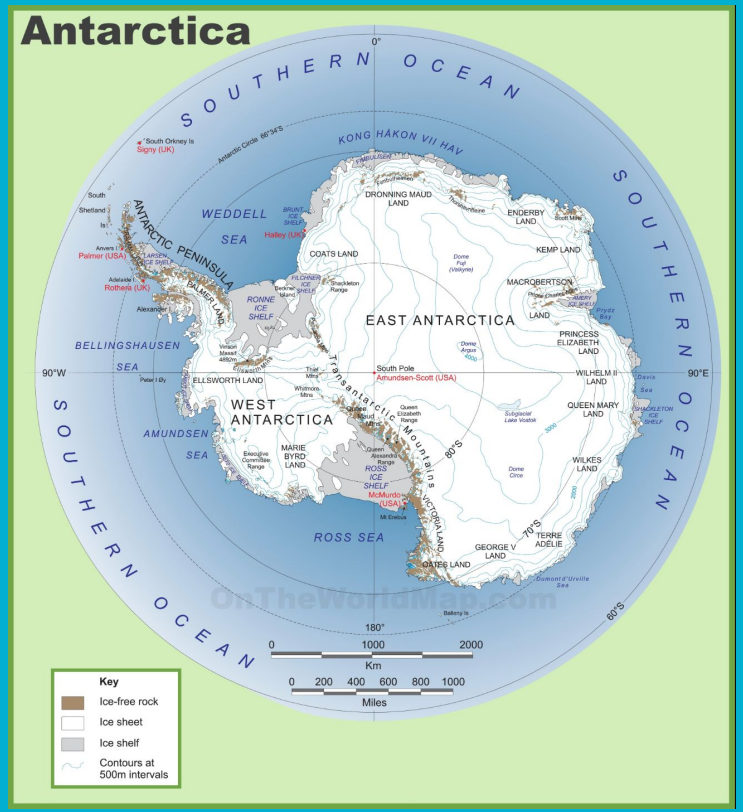
Reading - highlight key facts and summarise in bullet points


Antarctica
0°
SOUTHERN OCEAN
KONG HÅKON VII HAV
South Orkney Is
Signy (UK)
Antarctic Circle 66°34'S
South Shetland Is
Anvers I.
Palmer (USA)
Adelaide I.
Rothera (UK)
Alexander I.
ANTARCTIC PENINSULA
PALMER LAND
WEDDELL SEA
BRUNT ICE SHELF
Halley (UK)
LARSEN ICE SHELF
RONNE ICE SHELF
FILCHNER ICE SHELF
Berkner Island
Shackleton Range
FIMBULISEN
Fimbulheimen
DRONNING MAUD LAND
Thorshavnheine
ENDERBY LAND
Scott Mtns
KEMP LAND
COATS LAND
Dome Fuji (Valkyrie)
MACROBERTSON LAND
Prince Charles Mtns
AMERY ICE SHELF
Prydz Bay
EAST ANTARCTICA
PRINCESS ELIZABETH LAND
BELLINGSHAUSEN SEA
Vinson Massif 4892m
Ellsworth Mtns
Dome Argus
90°W
Peter I Øy
ELLSWORTH LAND
Thiel Mtns
South Pole
Amundsen-Scott (USA)
WILHELM II LAND
Davis Sea
90°E
Whitmore Mtns
Transantarctic Mountains
WEST ANTARCTICA
Queen Maud Mtns
Queen Elizabeth Range
Subglacial Lake Vostok
QUEEN MARY LAND
SHACKLETON ICE SHELF
AMUNDSEN SEA
Executive Committee Range
MARIE BYRD LAND
Queen Alexandra Range
ROSS ICE SHELF
80°S
Dome Circe
WILKES LAND
McMurdo (USA)
Mt Erebus
VICTORIA LAND
ROSS SEA
70°S
TERRE ADÉLIE
GEORGE V LAND
OATES LAND
Dumont d'Urville Sea
Balleny Is
60°S
180°
0 1000 2000
Km
0 200 400 600 800 1000
Miles
Key
Ice-free rock
Ice sheet
Ice shelf
Contours at 500m intervals
OnTheWorldMap.com

GEOGRAPHICAL FEATURES

Locate & highlight these geographical features:

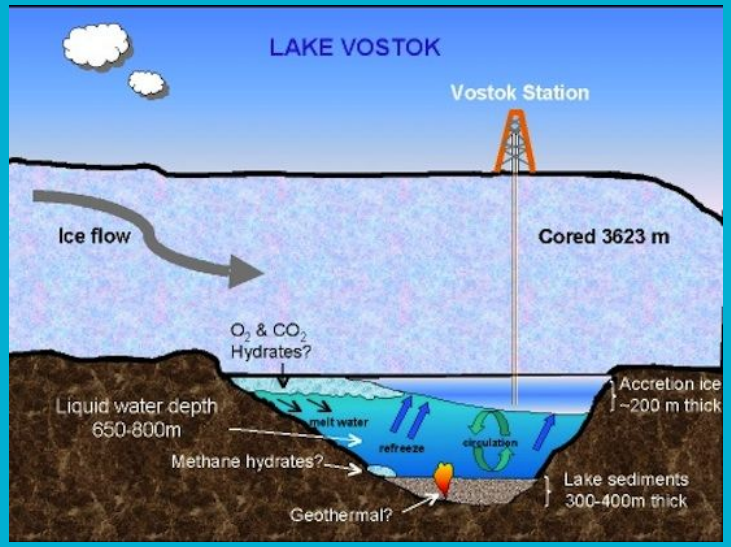
- Vinson Massif
- Transantarctic Mtns
- Lake Vostok
- Ross Ice Shelf
- Ross Island
- Mt Erebus
- Dry Valleys



VINSON MASSIF

TRANSANTARCTIC MTNS

LAKE VOSTOK

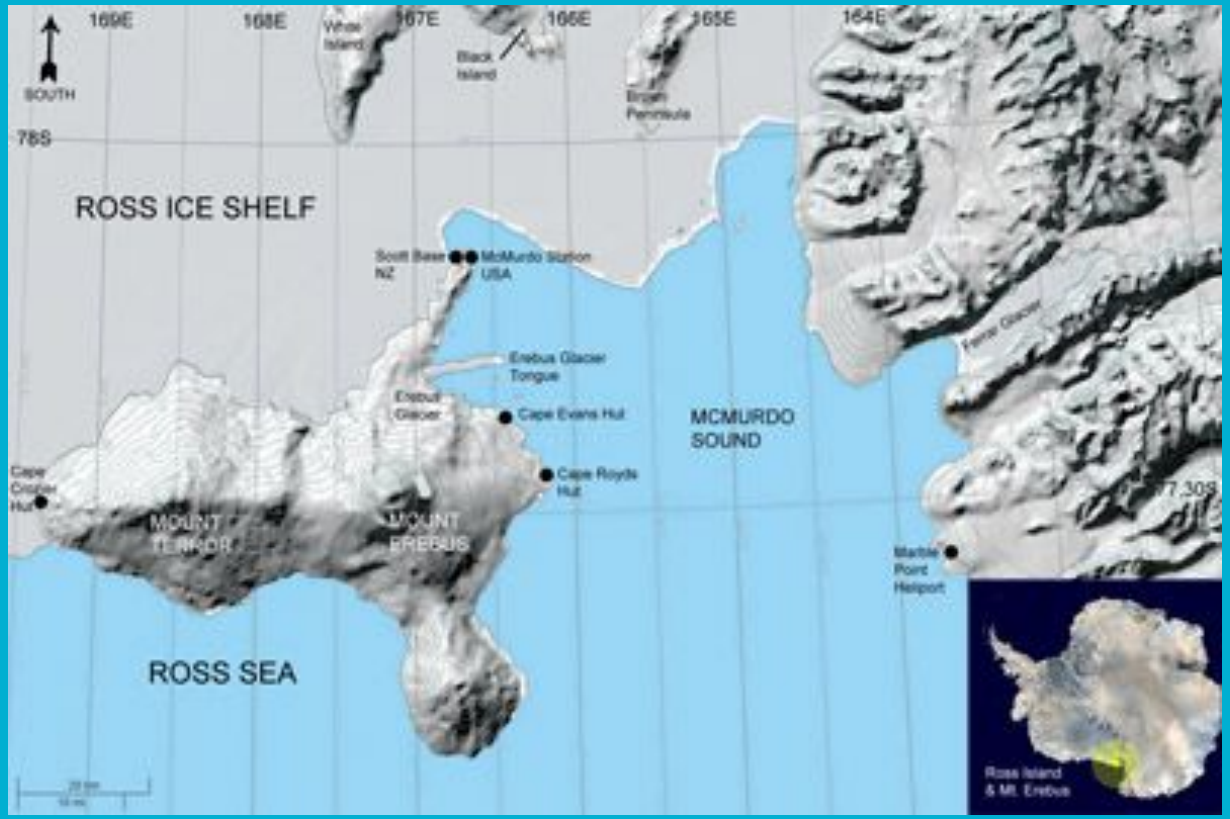

LAKE VOSTOK
Vostok Station
Ice flow
Cored 3623 m
O_2 & CO_2 Hydrates?
Liquid water depth 650-800m
melt water
refreeze
circulation
Accretion ice ~200 m thick
Methane hydrates?
Lake sediments 300-400m thick
Geothermal?

ROSS ICE SHELF

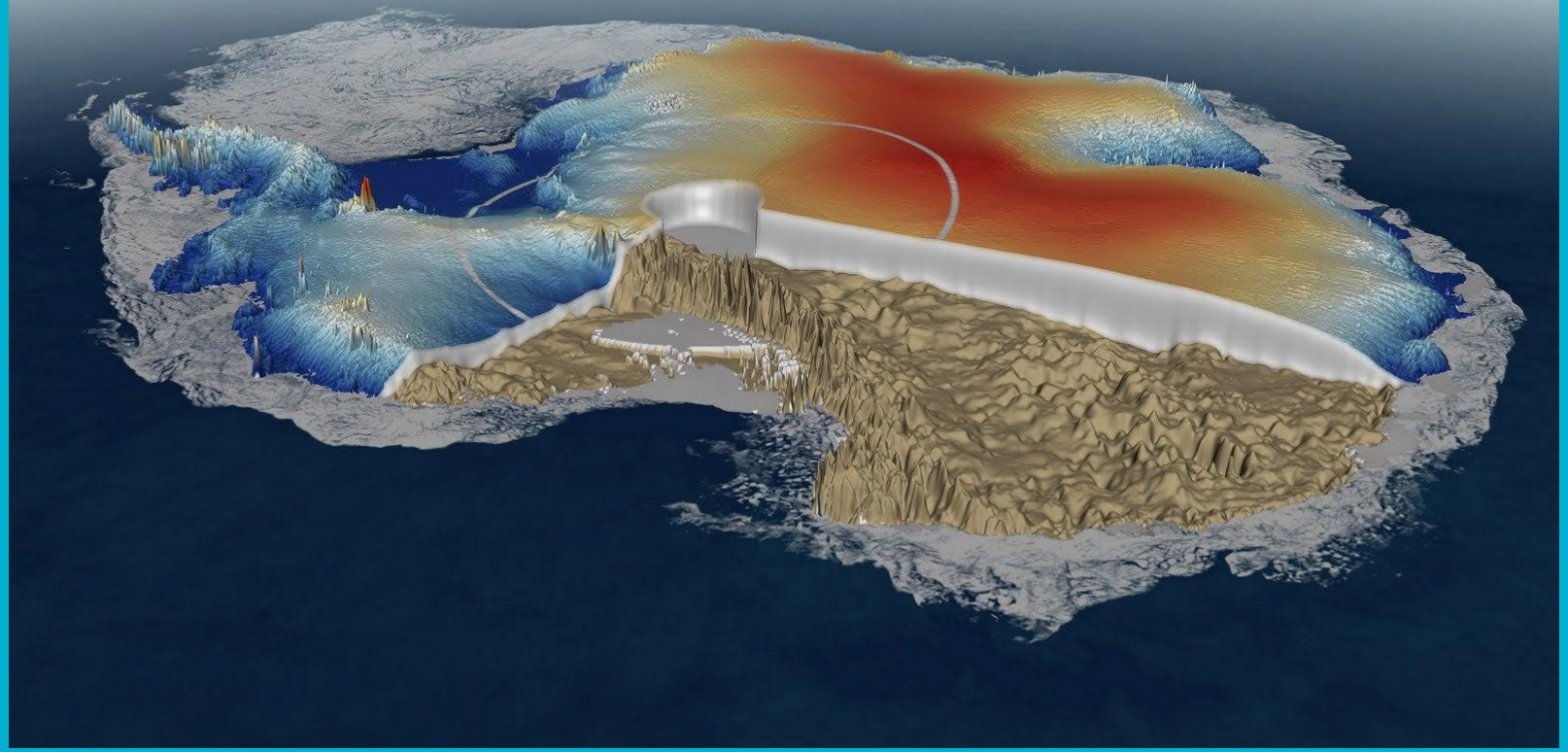
MT EREBUS

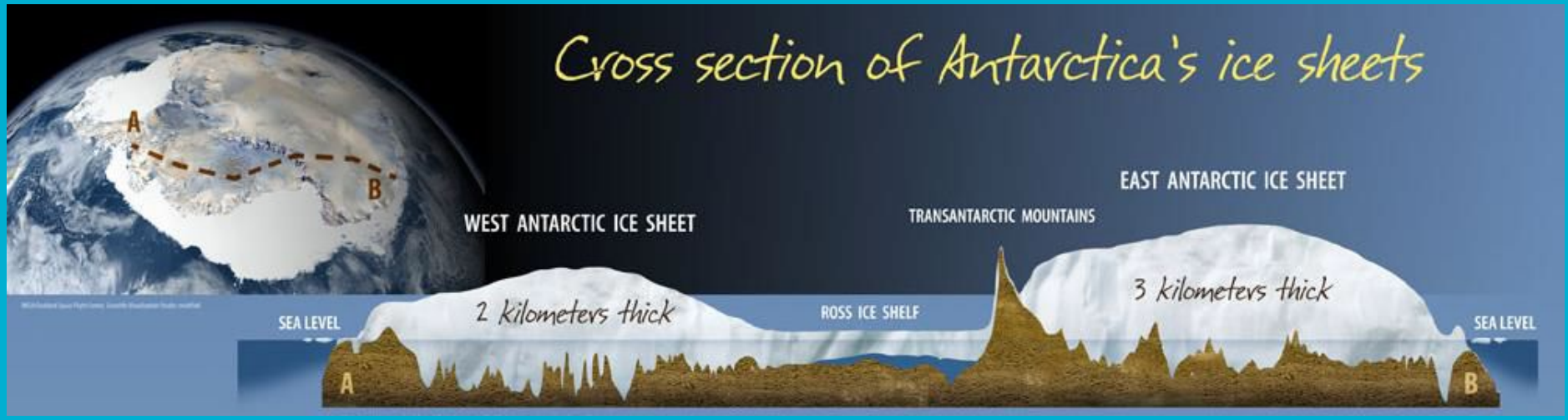
DRY VALLEYS

ROSS ISLAND

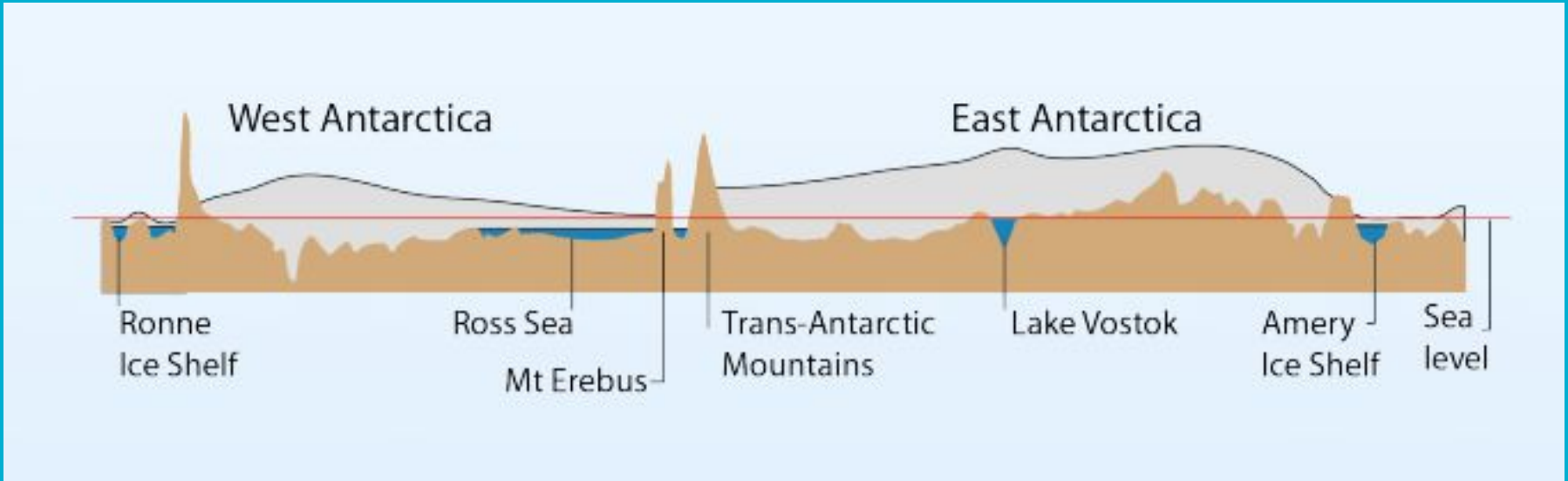

SOUTH
169E
168E
167E
166E
165E
164E
78S
White Island
Black Island
Brown Peninsula
ROSS ICE SHELF
Scott Base NZ
McMurdo Station USA
Erebus Glacier Tongue
Erebus Glacier
Cape Evans Hut
Cape Royds Hut
Cape Crozier Hut
MCMURDO SOUND
MOUNT TERROR
MOUNT EREBUS
Marble Point Heliport
ROSS SEA
Ross Island & Mt. Erebus

Cross Section of Antarctica




Cross section of Antarctica's ice sheets
A
B
WEST ANTARCTIC ICE SHEET
EAST ANTARCTIC ICE SHEET
TRANSANTARCTIC MOUNTAINS
2 kilometers thick
3 kilometers thick
ROSS ICE SHELF
SEA LEVEL
SEA LEVEL
A
B

WEST VS EAST ANTARCTICA



West Antarctica	East Antarctica
• much younger geological history	• extremely ancient geologically history
• rocks are mainly less than 500 million years old.	• oldest known Antarctic rocks at 4000 million years old
• a large part is below sea level	• mainly above sea level
• composed of islands, archipelagos and small land masses	• composed of a large mass of ancient rock
• connected by the West Antarctic Ice Sheet (WAIS)	• covered by the thick East Antarctic ice sheet (EAIS)
• WAIS sits on land that is mostly below sea level	• EAIS flows outwards over ancient bedrock
• mountainous and spectacular throughout	• mainly flat except for the buried Gamburtsev Mountains

SESSION 2

In groups produce a factual summary of your groups' physical feature to form a collaborative wall display. Be ready to present your information to our group.

Specifications:

- A5
- Includes the most important information presented in a clear, easy to read way
- Shows excellence (correct info, spelling, punctuation, neat layout)
- Acknowledges information sources used
- Layout has been considered and colour used effectively

Groups:

Vinson Massif, Transantarctic Mtns, Lake Vostok, Ross Ice Shelf, Ross Island, Mt Erebus, Dry Valleys, Icebergs, Ice shelf, Ice sheet, Ice streams, Antarctic Glaciers, Sea Ice

SESSION 3 - A WORLD OF ICE

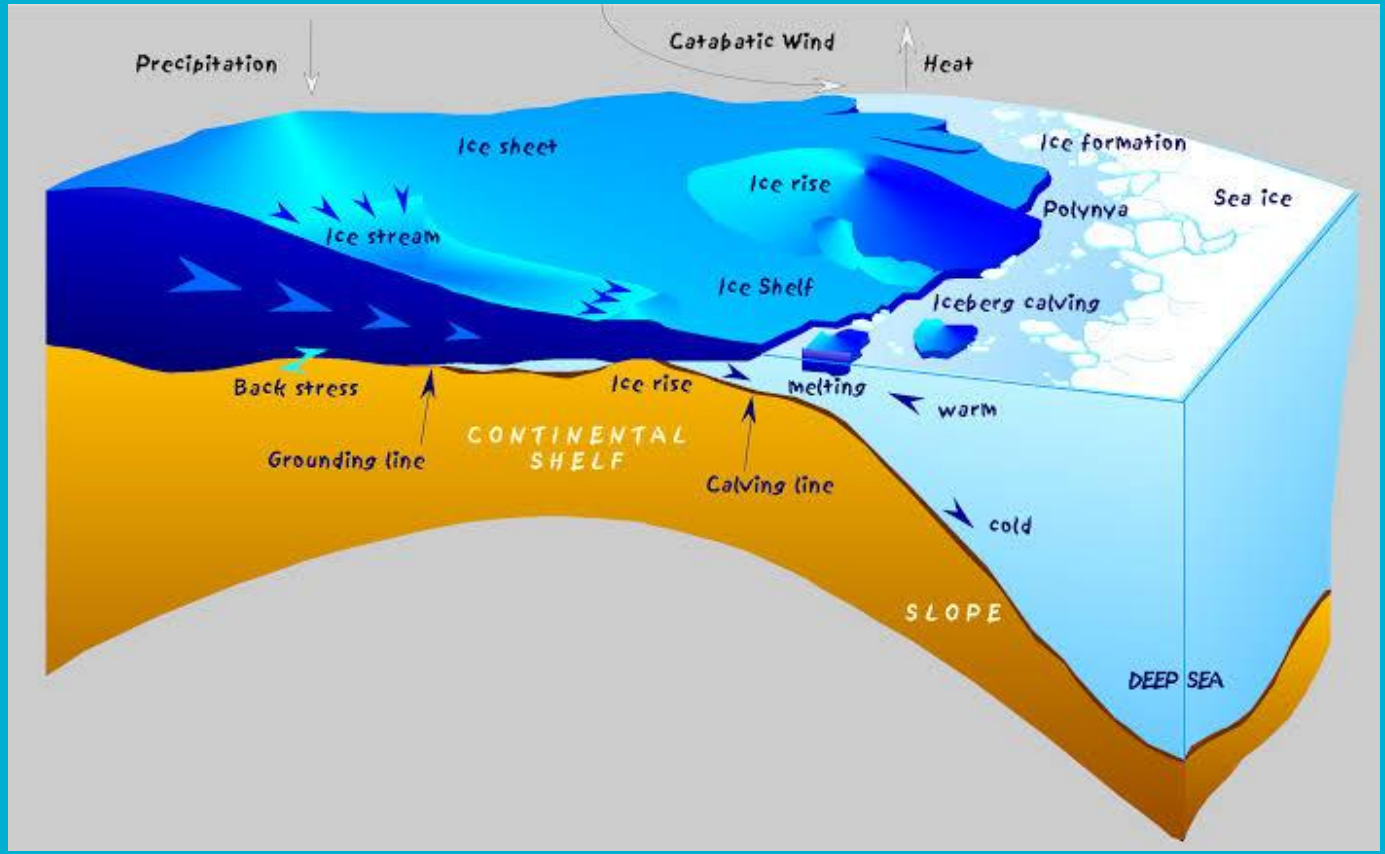
ICE FACTS

- 90% of planet's fresh water locked up in Antarctic snow/ice
- Ice cap - single largest solid object on the surface of the Earth
- Preserves detailed climate record spanning more than a million years
- Glacial conveyer belts transport 200 billion tonnes of ice to ice shelves each year, eventually breaking into icebergs
- If ice melts, oceans could rise by 65m

Snow and Ice Formation

- Snow - moisture evaporates from open water, cools and condenses on tiny particles such as dust. Snow & Ice formation
- Coastal areas have increased snow activity due to snow needing moisture and cold.
- Diamond dust settles near the Sth Pole, only accumulating 2-5cm each year.
- Snow falls
- Snow compresses
- Air is sealed into pockets “bubbly snow”
- Bubbly snow air % is 10%
- Core samples gather air samples which can be extracted and measured, plotting previous CO2 levels etc.

ROSS ICE SHELF



ICE FEATURES IN ANTARCTICA

- Ice streams
- Antarctic Glaciers
- Ice shelves
- Icebergs
- Sea Ice
- Ice sheet