

EXTREME WEATHER IN THE NEWS

South Australia: 28th - 29th September 2016



For the Teacher

These are suggested answers for Worksheet 1

1. Eucla - 1008 hectopascals (hPa)
Adelaide - Between 988 and 992 hectopascals (hPa) - accept any figure in between
Melbourne - Between 1004 and 1008 hectopascals (hPa) - accept any figure in between
2. Between 776 and 972 hectopascals (hPa) - the actual figure was 723hPa but accept 774hPa and 775hPa.
3. **High pressure systems** generally bring fine, dry sunny conditions with gentle winds if any.
Low pressure systems generally bring cloudy skies with possible rain and windy conditions.
4. Queensland coastal cities of Rockhampton, Mackay and Brisbane as their weather dominated by high off the coast. Similarly Perth is also likely to be experiencing fine conditions due to the high off the west coast.
5. 16 to 17 hPa (quite a strong pressure gradient).
6. Eucla and Adelaide, possibly Broken Hill.
7. 
8. Two of the following plus others at teacher discretion:
 - the points on the cold front indicate a west to east movement of the front,
 - the position of the cold front has moved to the east by the 29th,
 - the area with rain has extended from South Australia to Victoria and southern NSW by the 29th,
 - the impact of the low pressure system has moved to the east.
9. The cold front had moved to the east and the intense low pressure system moved towards the coast at Adelaide bringing continued rain, storm activity with associated high winds.

These are suggested answers for Worksheet 2

Teacher discretion is need as student responses will vary according to age and/or ability level.

LOW PRESSURE SYSTEM

Explanation - develops when relatively warm air rises, cooling as it does so to form clouds and if the air is sufficiently unstable continuing vertical uplift will form rain clouds. The lows appear on the synoptic chart as closely spaced isobars - the closer the isobars the greater the pressure gradient and so the higher the wind between places.

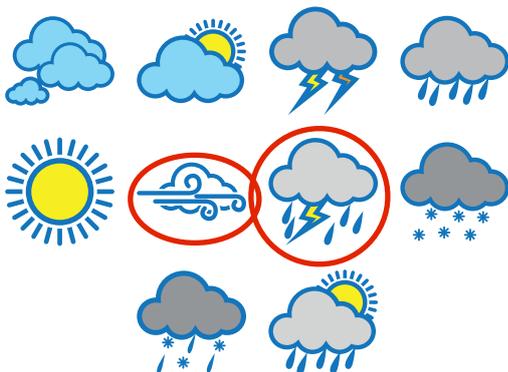
Description of weather - low pressure systems usually bring cloudy conditions with high winds and rainy conditions across southern Australia. In northern Australia much broader low pressure systems associated with the monsoon form in the summer months bringing the warm to hot humid conditions and monsoon rains.

COLD FRONT

Explanation - form when cool air from towards the south moves in to replace warmer air from the north. The warm air is less dense than the cooler southerly air so rises, cooling down as it does so forming cumulonimbus clouds that can develop into thunderstorms.

Description of weather - severe weather can be produced from strong cold fronts with thunderstorms and supercells developing. Squall lines with heavy rain and sometimes hail can result, with severe winds coming from the bottom of the cloud formation (downdraughts).

2. Supercells - a highly organised thunderstorm that have the ability to produce tornadoes (not always), damaging hail and severe winds from downdraughts through the bottom of the cloud that spread out horizontally when they hit the earth's surface. Supercells have what is termed a "mesocyclone" which is a persistent and rapidly spirally column of air towards the back of the storm cloud.
3. Adelaide's extreme weather - The southern parts of South Australia including Adelaide were hit with severe thunderstorms as the cold front moved though on the 28th September. The first series of storms had winds approaching 90kph and rainfall and hail. Lightning strikes occurred with as many as 80,000 as an estimate. The second wave of thunderstorms came through on the 29th September as the centre of the intense low pressure system moved closer to the coast, winds gusts of 140kph were recorded and with continued heavy downpours of rain that caused flash flooding (figures of 14mm of rain in 15 minutes were recorded in some places).
4. High winds, lightning and heavy rain make these two icons appropriate.



5. Students should be able to put a whole range of impacts into their mindmap: floods, lightning strikes, gale force winds, storm surges along the coast. Better students not only describe the damage but locate areas where damage has been pronounced by these causes.