COME RAIN OR SHINE

PRACTICAL ACTIVITY: DRAWING ISOLINES OR CONTOURS

Ideally you would need a pencil for this activity (rather than a pen) – and coloured pencils are useful too.

These activities maybe a little tricky, so do ask for help in the comments area. Or for those who are struggling, we have added a more simplified version of the maps for you to try. Good luck!

Temperature map

The first map shows temperatures – each hollow dot marks a weather station and the number next to it is the temperature it recorded. Your task is to draw the isotherms (lines of constant temperature) for 10.5°C, 8.5°C, 6.5°C, 4.5°C and 2.5°C.

Remember:

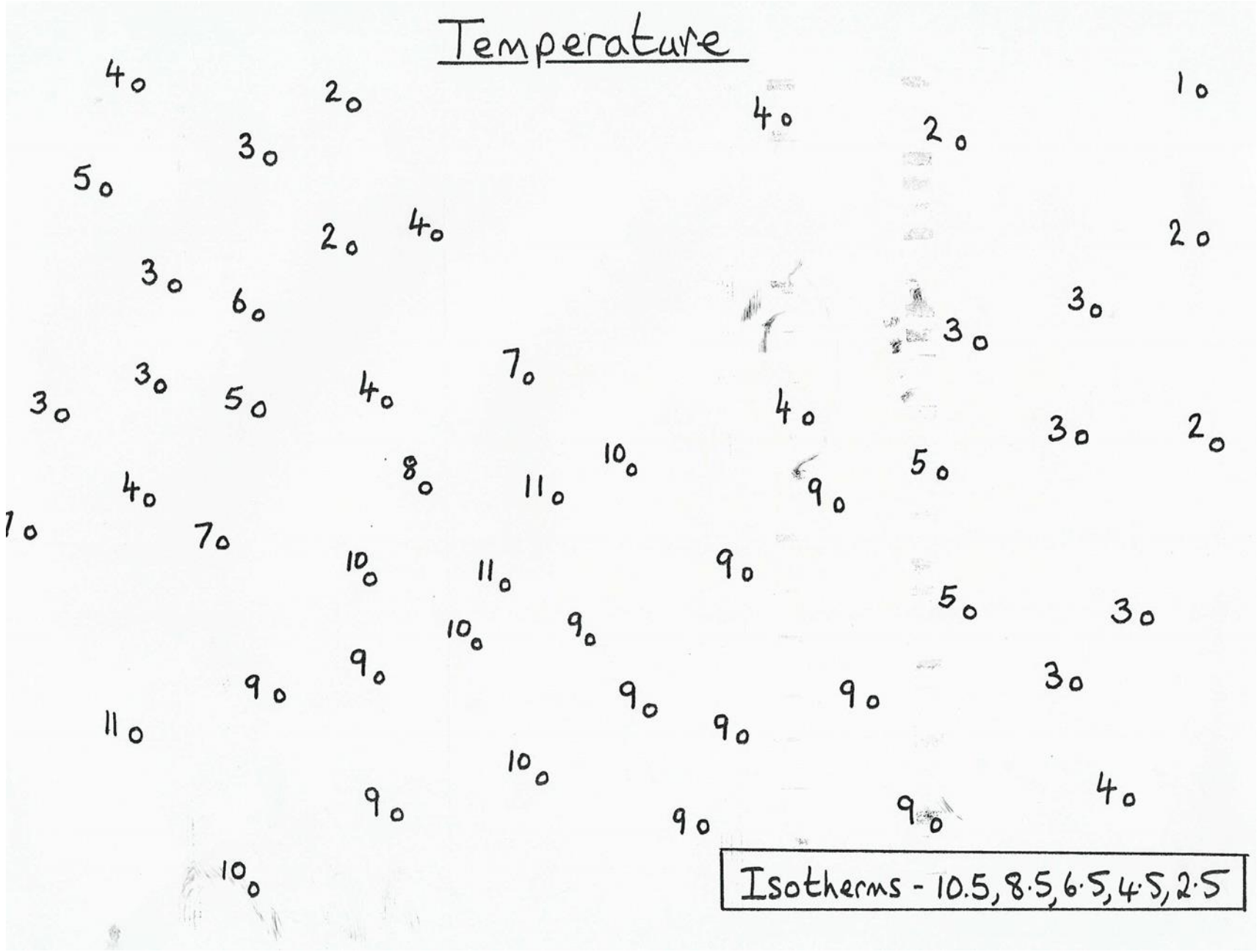
- Contours can't stop in the middle of a map, but they do stop at the edges
- Contours can't touch or cross – that would imply it was two different temperatures at the same place
- Sometimes, there isn't enough information to know exactly what a contour does – you'll find this is the case with the lowest two contours; there are several possible correct answers
- The 6.5°C contour, for example, will have all the places which are warmer than 6.5°C on one side of it, and all the places which are colder than 6.5°C on the other side
- It's not a dot-to-dot

How to start:

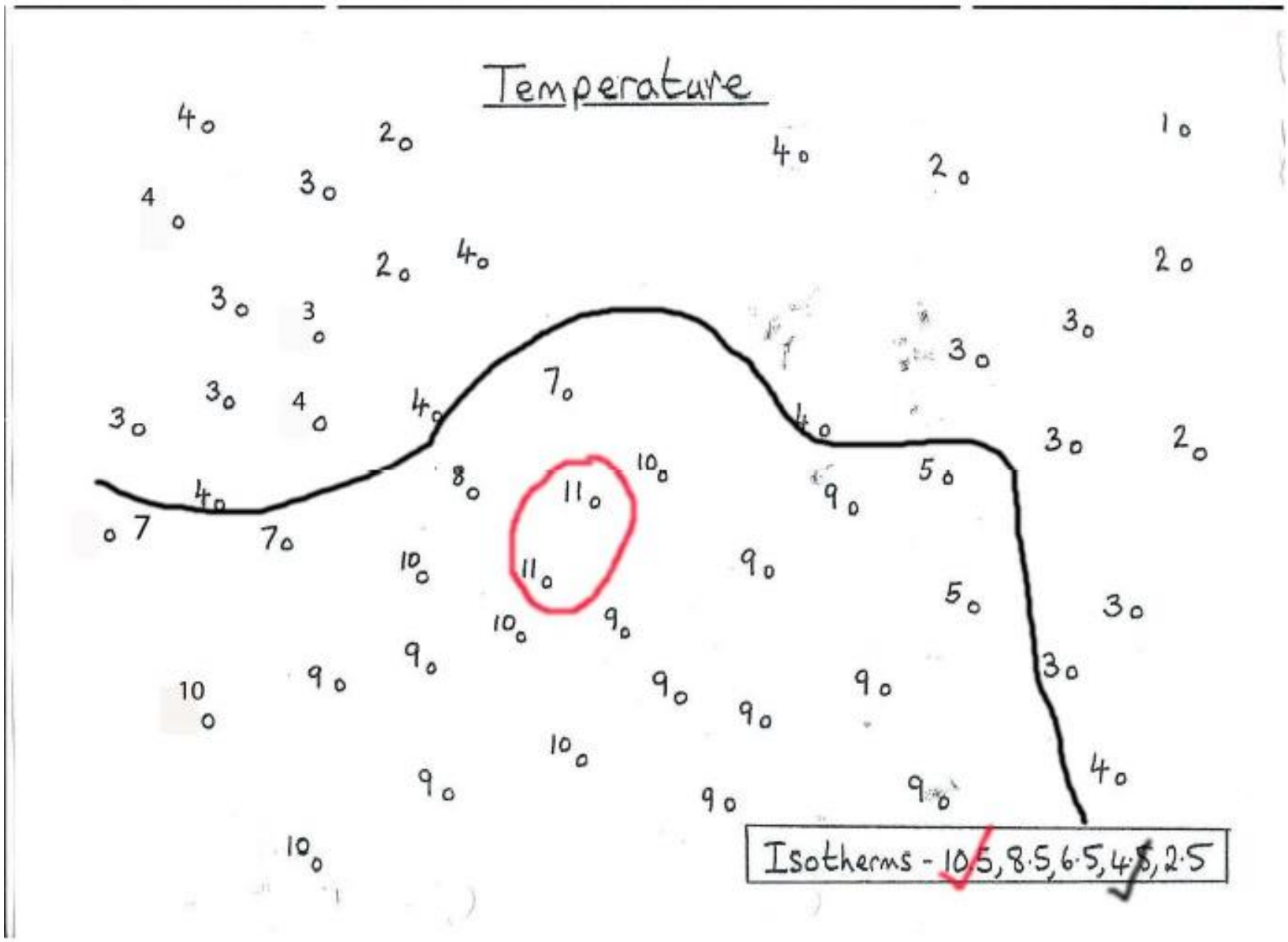
If you have coloured pencils (or use different strengths of shading), start by using one colour to shade all the dots which are over (and therefore warmer than) 10.5°C. You then need to draw a line around these to separate these warmer temperatures. You then choose another colour for the dots which are between 10.5 and 8.5°C, and third colour for the dots between 8.5°C and 6.5°C until you have coloured in all the dots which are between the temperatures listed in bold above. It should become obvious where to draw the lines which separate the colours but the lines must not touch

Alternatively, start by considering the 10.5 contour. There are two dots marked 11 near the centre of the map. Near it, there are some dots marked 10. Try and draw a line which goes half way between the 10 and 11. If the next nearest dot is an 8, then the 10.5 line will be closer to the 11 than the 8 etc. You should end up with a closed circle surrounding the two 11 dots. It's a bit like the top of a hill on a height contour map.

Try and describe the pattern of temperatures in the map – where is it warmest/ coldest? Where is the temperature changing most rapidly? Remember that a front is where cold and warm air meet.


Temperature
4o
2o
3o
5o
2o
4o
3o
6o
3o
5o
4o
7o
3o
8o
11o
10o
1o
7o
10o
11o
10o
9o
9o
9o
11o
9o
10o
9o
9o
10o
4o
2o
1o
2o
3o
3o
4o
3o
2o
5o
9o
9o
5o
3o
3o
9o
9o
4o
Isotherms - 10.5, 8·5, 6·5, 4·5, 2·5

Simpler version:



Pressure map.

The second map shows pressures – each black dot marks a weather station (in exactly the same place as the previous map) and the number next to it are the pressure values. Your task is to draw the 1016, 1012, 1008 and 1004millibar isobars (lines of constant pressure). However, to save space on the map, the pressure values have been recorded in shorthand – so 9 or 09 is short for 1009mb, 11 is short for 1011mb etc.

On this map, we have some extra clues - these weather observations indicate the wind speed by the tail on the symbol. The wind is blowing from the tail of the arrow to the centre (the bars on the tail of the arrow tell you the wind speed) so  is a wind blowing from the west to the east, or  is a wind blowing from the east to the west. The wind tends to blow along the pressure contours, so your contours need to be roughly parallel to the tails on the closest weather symbols.

How to start:

- Start with the 1016mb contour. Where on the map are there places where the pressure is higher than that? If it helps, colour in those symbols where the value is greater than 16. Your pressure contour needs to divide those symbols from the others.
- Now use a different colour to shade the symbols where the pressure value is 13, 14 or 15. Can you now draw the 1012mb isobar?
- Again, use a different colour to shade the symbols where the pressure value is 9, 10 or 11. Can you now draw the 1008mb isobar?
- Lastly, is there anywhere where the pressure is under 1004mb? If so, draw the 1004mb contour to separate off that observation from the others.

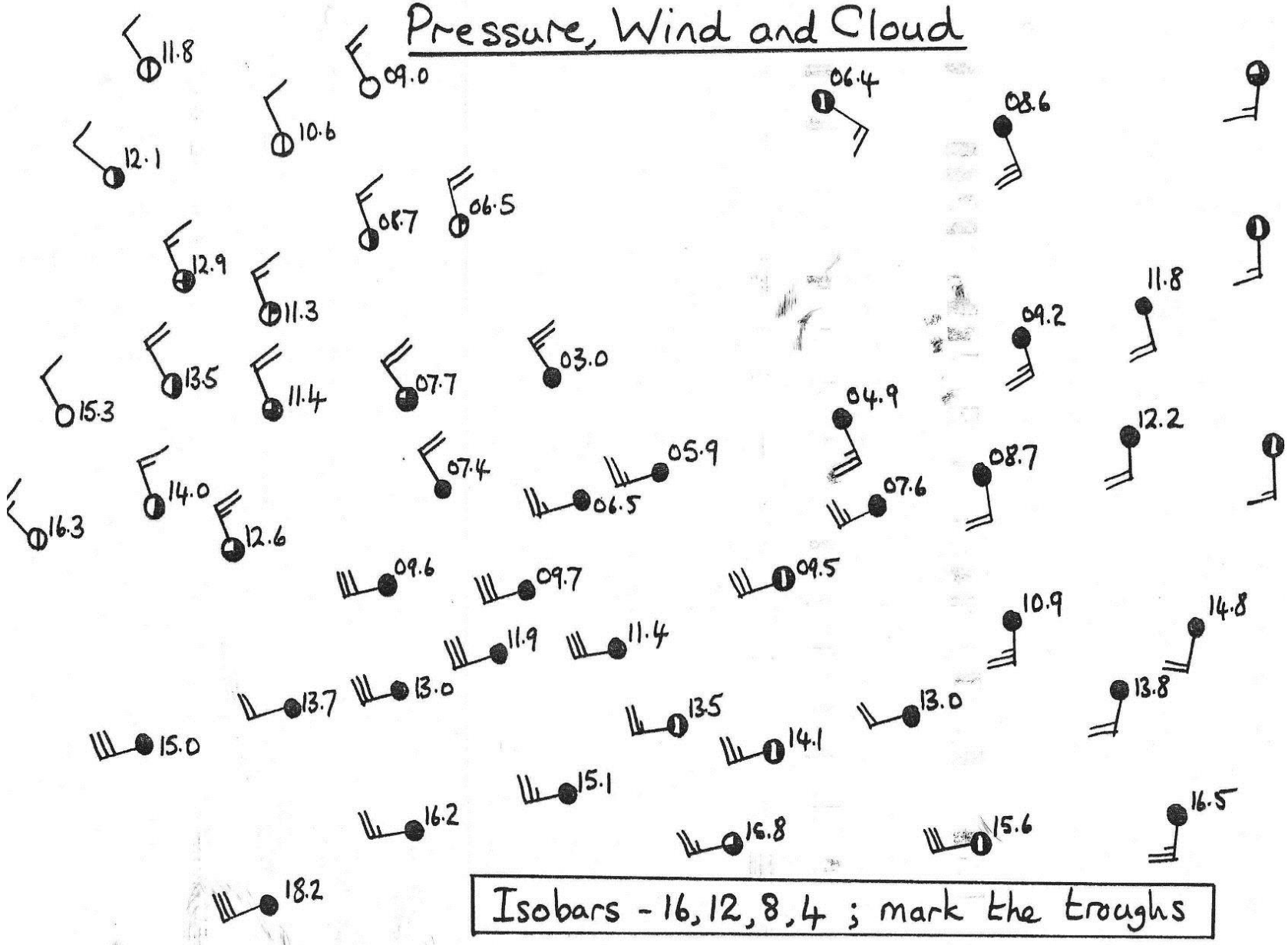
Isobars are lines of constant pressure. Drawing the isobars reveals features (eg highs, lows, ridges and troughs) which help us understand the weather. When trying to draw isobars, remember:

- The symbols on the map give the observed pressure and wind speed and direction. Remember that the wind is blowing from the tail of the arrow to the centre. The bars on the tail of the arrow tell you the wind speed.
- The wind blows almost parallel to the isobars (they actually blow slightly more towards the centre of the low pressure area).
- Isobars tend to be parallel to each other, are as smooth as possible and never cross.
- The closer the isobars are to each other, the stronger the wind. You can use the bars on the tail of the weather station symbol to give you the Beaufort force of the wind.

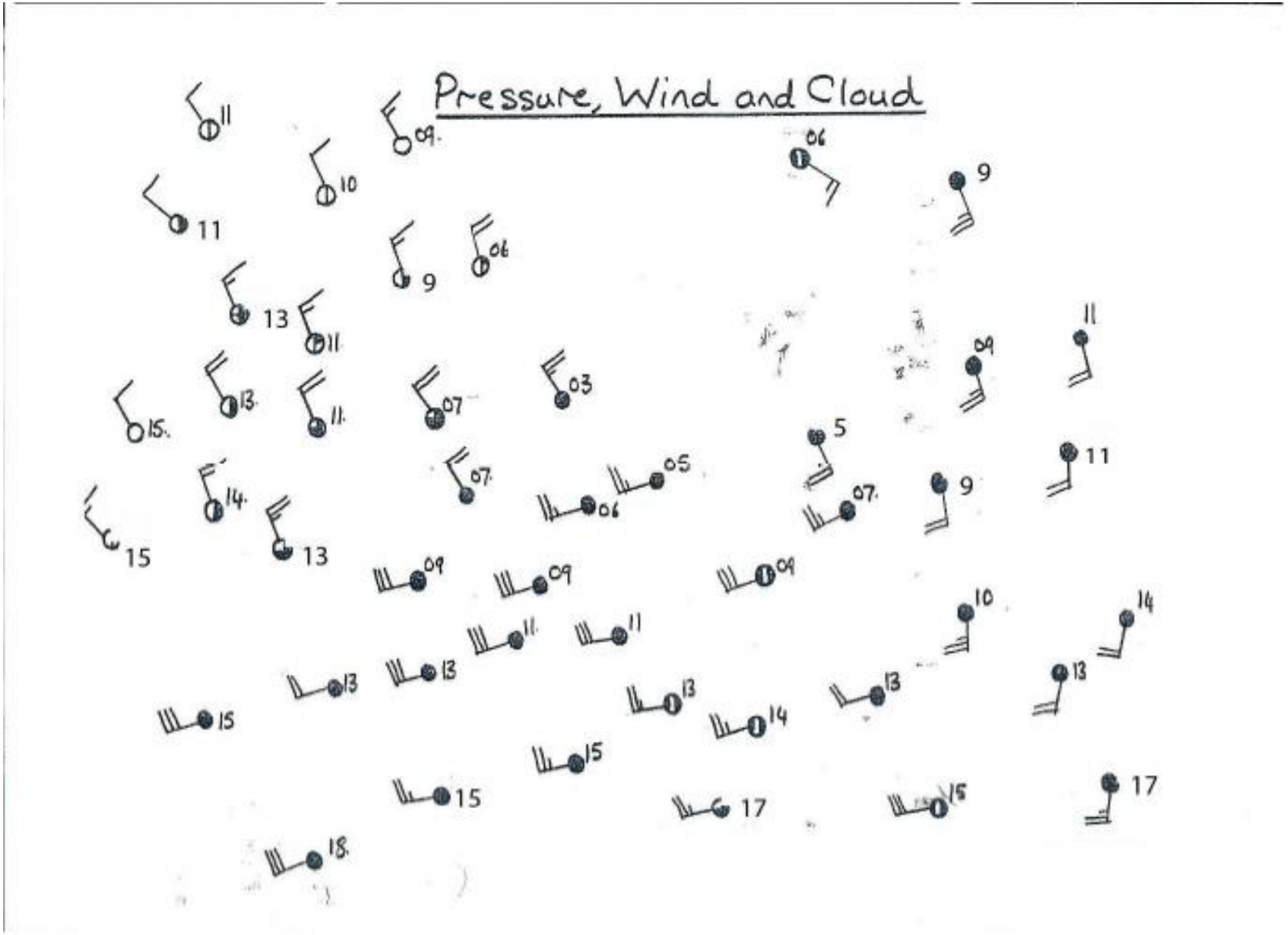
These two maps both correspond to the same weather situation, with the weather stations in the same places. Can you work out what is going on?

Clues:

- Where is the pressure the lowest?
- How is the wind direction changing across the map?
- You can use both maps to see where the cold air is pushing into the warm air (a cold front) or whether the warm air is pushing into cold air (a warm front).


Pressure, Wind and Cloud
11.8
09.0
06.4
08.6
12.1
10.6
08.7
06.5
12.9
11.3
11.8
09.2
13.5
03.0
15.3
11.4
07.7
04.9
12.2
05.9
07.4
08.7
14.0
06.5
07.6
16.3
12.6
09.6
09.7
09.5
10.9
14.8
11.9
11.4
13.7
13.0
13.8
13.5
13.0
15.0
14.1
15.1
16.2
16.8
15.6
16.5
18.2
Isobars - 16, 12, 8, 4 ; mark the troughs

Simpler version:



Weather map

The third map shows the same dots, but this time also includes the weather information at each of these stations. Your task is to shade the areas of rain, heavy rain and drizzle (this isn't a contour drawing exercise). Is it more obvious now what the structure of the weather system is?