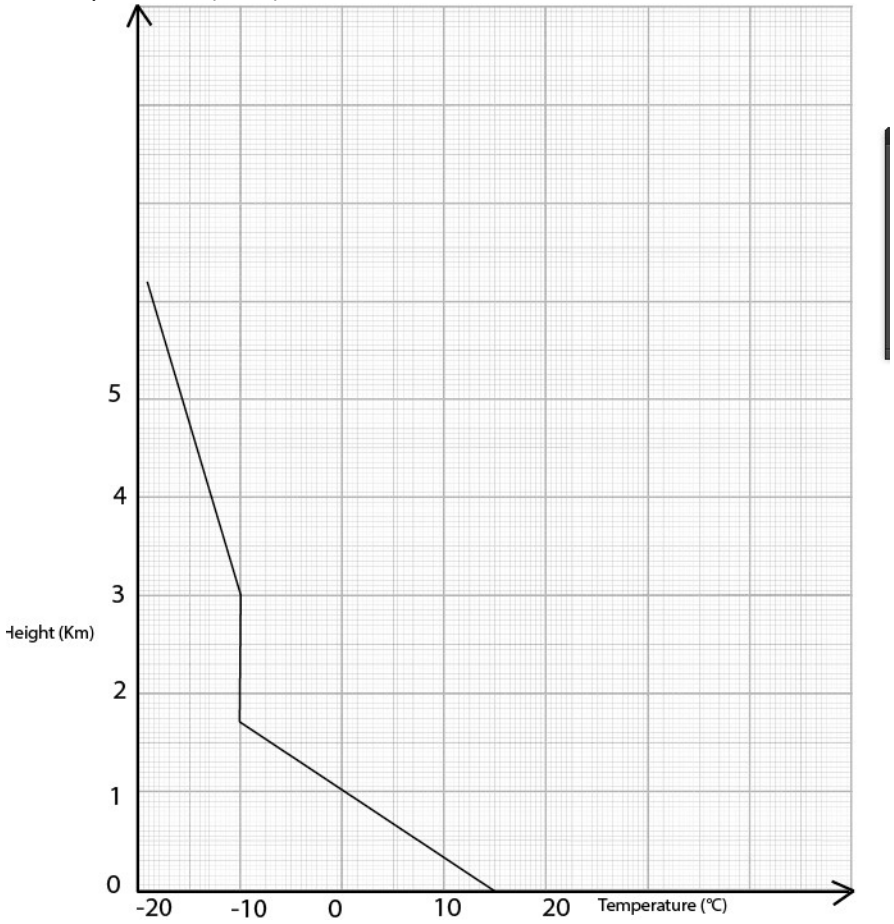
Atmospheric Stability and Clouds for A level Geography

Case Study 1

Make the following assumptions for this idealised situation:
The Dry Adiabatic Lapse Rate is 10°C/km
The Saturated Adiabatic Lapse Rate is 5°C/km
The air cools at the DALR when the air temperature is above 5°C. When the air temperature is lower than 5°C, cloud droplets can form and the air cools at the SALR.
The ground temperature (0km) is 15°C.



How to find out what sort of cloud will form:

- Have a look at the Environmental Lapse Rate (ELR) for this day.
- Mark a cross on the ground (0km) at 15°C.
- Draw a line at the DALR.
- Is the air stable or unstable near the ground?
- Identify where cloud base will be.
- Change to the SALR
- Where will the top of the cloud be?
- What sort of cloud is this?

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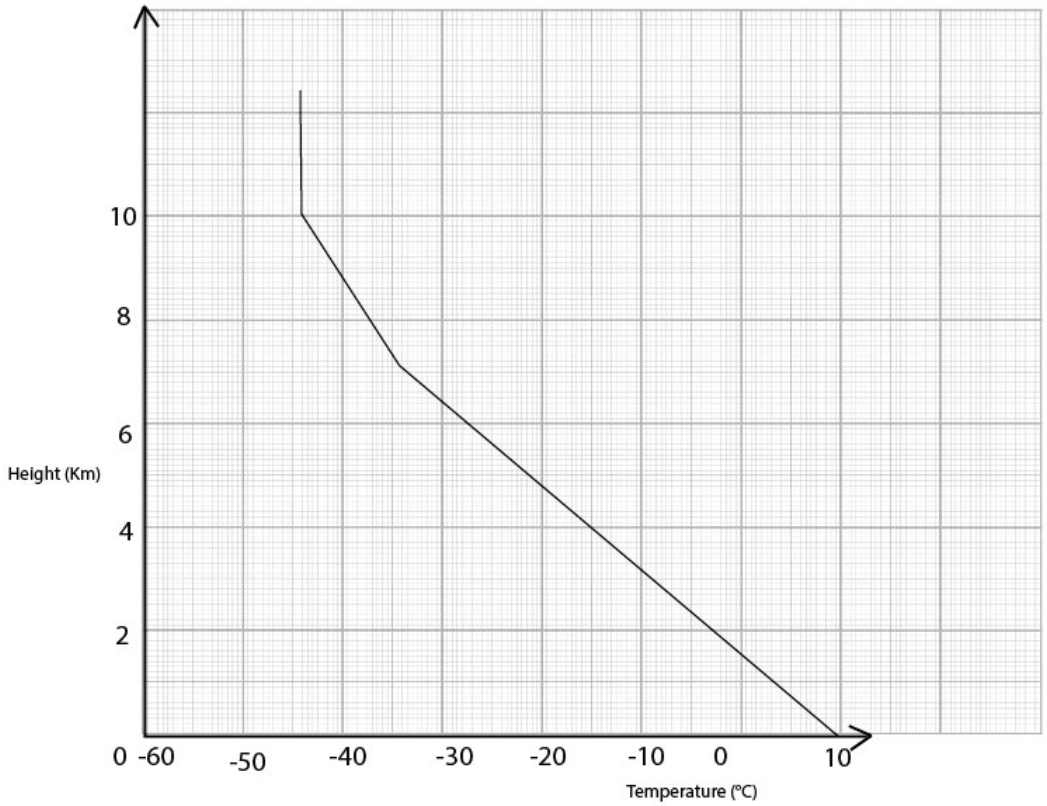
Case Study 2

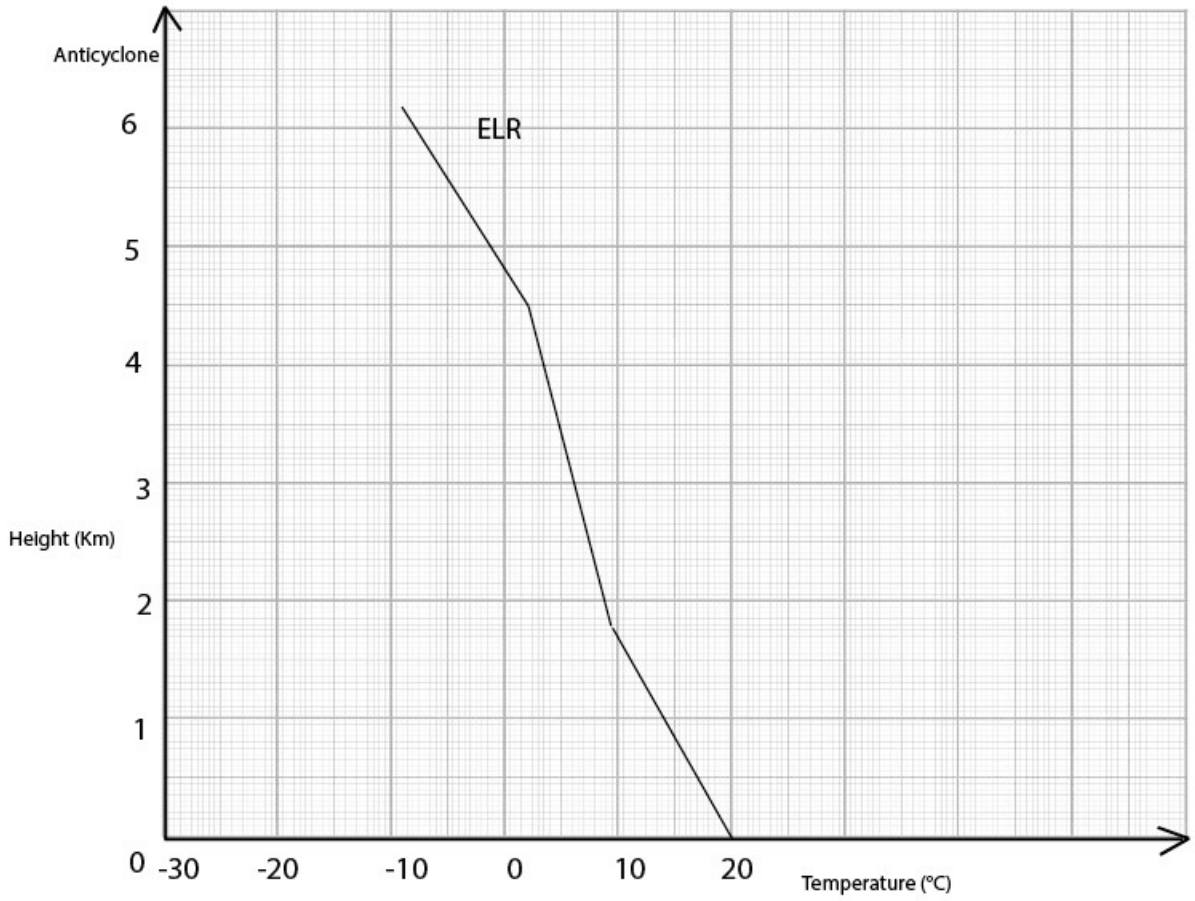
Students should make the following assumptions for this idealised situation:
The Dry Adiabatic Lapse Rate is 10°C/km
The Saturated Adiabatic Lapse Rate is 5°C/km
The air cools at the DALR when the air temperature is above 5°C. When the air temperature is lower than 5°C, cloud droplets can form and the air cools at the SALR.
The ground temperature (0km) is 10°C.



How to find out what sort of cloud will form:

- Have a look at the Environmental Lapse Rate (ELR) for this day. Mark a cross on the ground (0km) at 10°C.
- Draw a line at the DALR.
- Is the air stable or unstable near the ground?
- Identify where cloud base will be.
- Change to the SALR
- At what height does the air become unstable? If the air has to blow over a 2km mountain, will cloud form?
- Where will the top of the cloud be?
- What sort of cloud is this?

Case Study 3



Students should make the following assumptions for this idealised situation:
The Dry Adiabatic Lapse Rate is 10°C/km
The Saturated Adiabatic Lapse Rate is 5°C/km
The air cools at the DALR when the air temperature is above 5°C. When the air temperature is lower than 5°C, cloud droplets can form and the air cools at the SALR.
The ground temperature (0km) is 20°C.

How to find out what sort of cloud will form:

- Have a look at the Environmental Lapse Rate (ELR) for this day. Mark a cross on the ground (0km) at 20°C.
- Draw a line at the DALR.
- Is the air stable or unstable near the ground?
- Identify where cloud base would be if the air were forced to rise.
- Change to the SALR
- Does the air become unstable?
- What sort of weather situation is this?