The difference between weather and climate

It's important to understand the difference between weather and climate. Use the video to help you answer the question below.

www.youtube.com/watch?v=vH298zSCQzY

- What are the differences between weather and climate?

Task 1: Measuring the weather

There are many things that we can measure about the weather. We can call these variables.

Take a look at the weather forecast for your location using the UK Meteorological Office (known as the Met Office) www.metoffice.gov.uk

- Write below the **variables** being measured and reported in the forecast

- Are there any weather variables that could be measured but weren't here?

Many location across the UK have been measuring and recording weather for many years. This historic data can be incredibly useful to consider change over time.

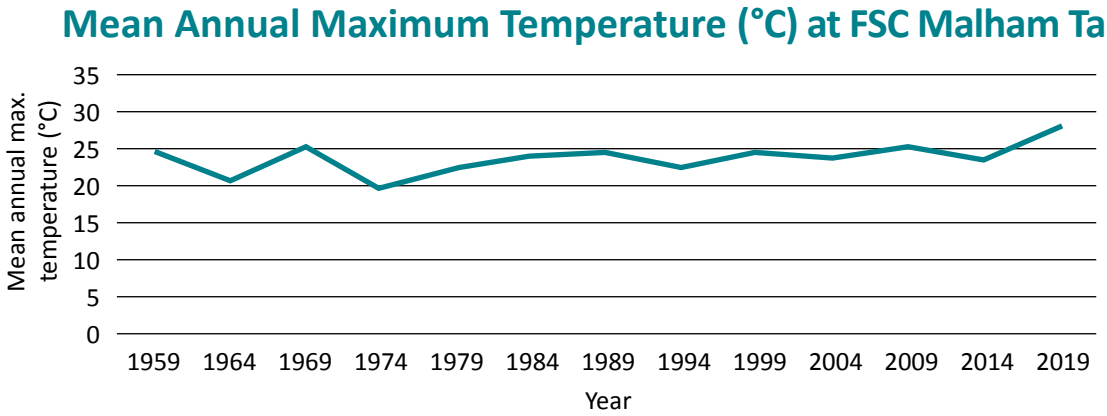

Figure 1. Mean annual temperature (°C) recorded at FSC Malham Tarn's weather station (1959-2019).

The following points might help you when describing graphs:

- **G**eneral Trends
- **E**xamples (use values and examples from the data)
- **O**dd (is there anything that doesn't follow the trend?)

➢ Describe what Figure 1 shows.

➢ Who would be interested in knowing the key information from this graph? Why?

Task 2: Human Influences on Climate Change

It is widely recognised now that humans are changing the climate. This is called anthropogenic climate change.

Watch this video on the Keeling Curve. Use the video to help you with the questions below.
www.youtube.com/watch?v=dXBzFNEwoj8

- What is the general trend of Carbon Dioxide (CO_2) since Dr Keelings' Dad started his measurements?

CO2 is measured through the Manometer (see photo left).

- Why is it important to analyse the CO_2 to see if it comes from plants, cars, factories etc?

Why Carbon Dioxide (CO_2)? Why are scientists so interested in the gas?

Watch this video on the greenhouse effect, and use the information to help complete the following tasks.
www.youtube.com/watch?v=BPJJM_hCFj0

- Use the Key Words to label Figure 2.
- Then add the statements in the correct place.

Figure 2

Key Words

Earth	Sun	Atmosphere
Light waves	Ocean	Land

➔ Solar radiation passes through the atmosphere in the form of light waves –most of this radiation is absorbed by the earth heating it up

➔ Some of the energy that has warmed the Earth is radiated back into space in the form of infrared waves

➔ Some of this outgoing infrared radiation is trapped by the Earth's atmosphere and warms it

The greenhouse effect means that we can survive on Earth. What are some of the negative impacts of having increased amounts of greenhouse gases in our atmosphere?

To explore more about how humans are changing our planet you can view this storymap from ESRI: https://storymaps.esri.com/stories/2015/atlas-for-a-changing-pl

Summarise your learning in the table below.

Something you have learned	Something you already knew	Something still to find out

Task 3: Create your own weather station

Use this information and the guide from The Met Office advice to create your own weather station https://www.metoffice.gov.uk/weather/learn-about/met-office-for-schools/other-content/other-resources/weather-station/index

A Rain gauge

1. Take a plastic drinks bottle and cut the top third of it off.
2. Pour PVA glue into the bottle to the top of the knobbly leg bits. Leave this to dry.
3. Place the top upside down and inside the top of the lower portion of the bottle.
4. Place this outside measure the depth of the rain in (mm) each day
5. Remember to empty out the water after you have recorded it.

➢ What things should you consider to make this a fair test?

B Cloud Cover

To measure the cloud cover. Look up at the sky, and make a judgement of how much of the sky is covered by cloud. Use the okta scale in Figure 3 to record the cloud cover.

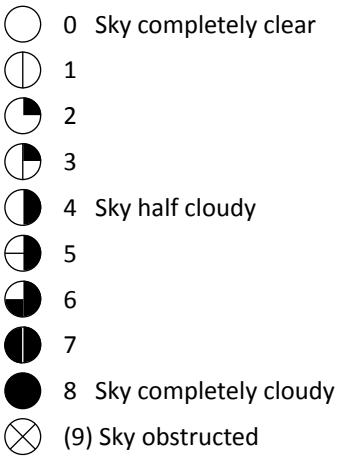

Figure 3

Wind Speed

There are different ways of measuring and recording the speed of wind.

The Beaufort Wind Force Scale is a descriptive scale, that can be used to classify the strength of the wind. Use the scale in Figure 4 to record the wind force.

Beaufort Number	Description	Wind speed	Wave height	Sea conditions	Land conditions
0	Calm	<1 knot <1 mph <2 km/h	0 ft 0 m	Sea like a mirror	Smoke rises vertically
1	Light air	1–3 knots 1–3 mph 2–5 km/h	0–1 ft 0–0.3 m	Ripples	Direction shown by smoke drift
2	Light breeze	4–6 knots 4–7 mph 6–11 km/h	1–2 ft 0.3–0.6 m	Small wavelets	Wind felt on face
3	Gentle breeze	7–10 knots 8–12 mph 12–19 km/h	2–4 ft 0.6–1.2 m	Large wavelets	Leaves and small twigs in constant motion
4	Moderate breeze	11–16 knots 13–18 mph 20–28 km/h	3.5–6 ft 1–2 m	Small waves	Raises dust and loose paper
5	Fresh breeze	17–21 knots 19–24 mph 29–38 km/h	6–10 ft 2–3 m	Moderate waves	Small trees and leafs begin to sway
6	Strong breeze	22–27 knots 25–31 mph 39–49 km/h	9–13 ft 3–4 m	Large waves	Large branches in motion
7	High wind, moderate gale, near gale	28–33 knots 32–38 mph 50–61 km/h	13–19 ft 4–5.5 m	Sea heaps up	Whole trees in motion
8	Gale, fresh gale	34–40 knots 39–46 mph 62–74 km/h	18–25 ft 5.5–7.5 m	Moderately high waves	Twigs break off trees
9	Strong/severe gale	41–47 knots 47–54 mph 75–88 km/h	23–32 ft 7–10 m	High waves	Slight structural damage
10	Storm, whole gale	48–55 knots 55–63 mph 89–102 km/h	29–41 ft 9–12.5 m	Very high waves	Trees uprooted, considerable structural damage
11	Violent storm	56–63 knots 64–72 mph 103–117 km/h	37–52 ft 11.5–16 m	Exceptionally high waves	Widespread damage
12	Hurricane force	≥ 64 knots ≥ 73 mph ≥ 118 km/h	≥ 46 ft ≥ 14 m	Exceptionally high waves, sea is completely white	Devastation

Figure 4

Ⓓ Wind Direction

Can you think of any other ways of measuring the direction of the wind?

1. Draw an arrow 25 cm long on card and cut it out.
2. Make another arrow by drawing around the first arrow and cutting it out.
3. Place the pen top between the arrows, in the centre facing down, and glue together.
4. Push four matchsticks into the long edge of the cork at right angles to each other.
5. Cut out four small squares of card and label with the four main points of the compass; N, E, S, W. Attach these to the end of each matchstick with Blu-tack.
6. Fill the bottle with sand.
7. Push the knitting needle into the cork and push the cork in the top of the bottle. Now balance the wind vane arrows on top of the needle.
8. Choose an open area, perhaps near your rain gauge, to place your wind vane. Ask an adult or use a compass to point the N label on the bottle towards North.

The arrow always shows the direction the wind is blowing from.

These instructions are taken from https://www.metoffice.gov.uk/weather/learn-about/met-office-for-schools/other-content/other-resources/weather-station/wind-vane

➢ Use the space below to record the weather for the days running up to and including the fieldwork live lesson. You could create a table or a Weather Diary