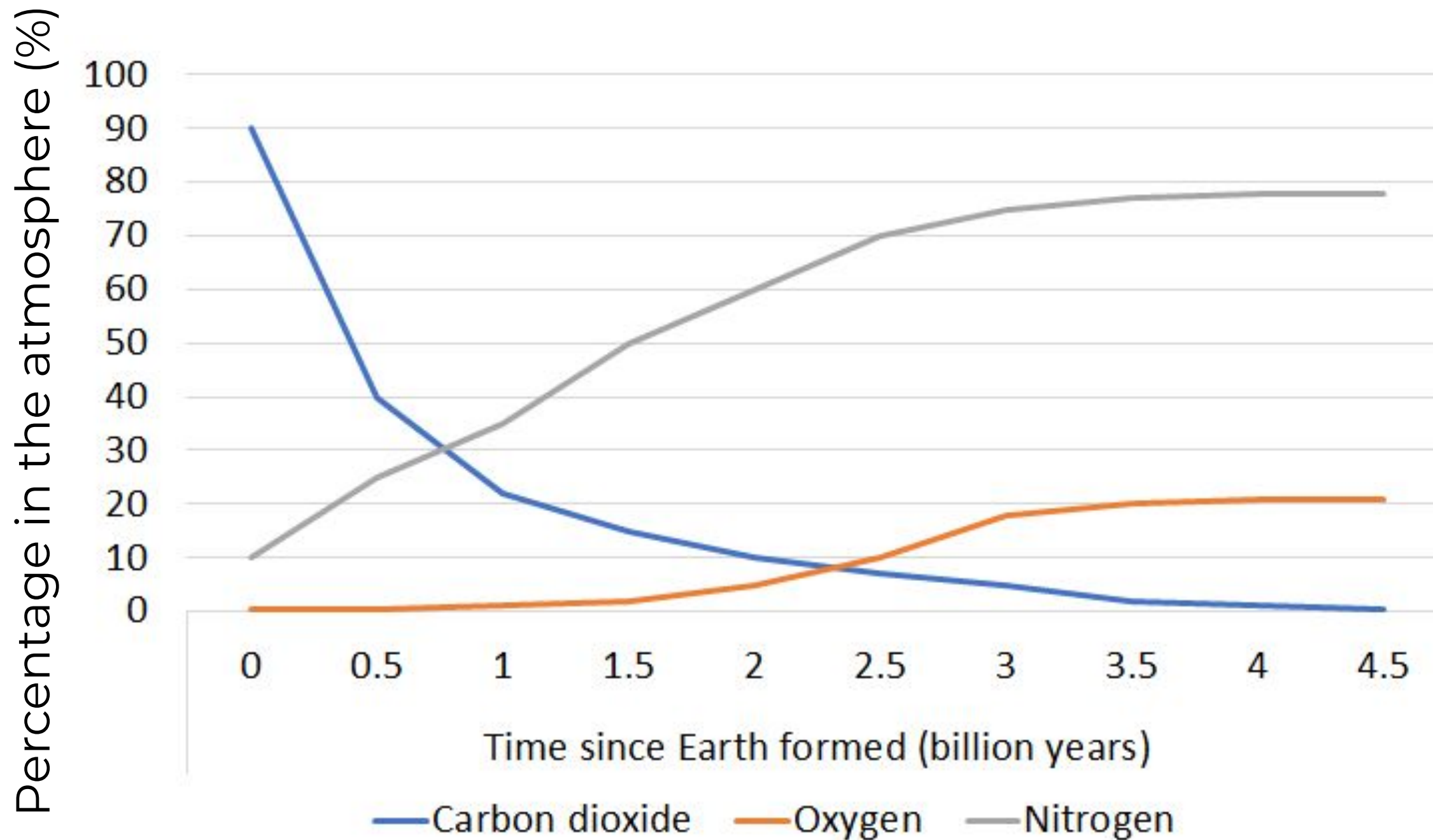# Maths skills Worksheet

Combined Science - Chemistry - Key Stage 4

C9 - Chemistry of the Atmosphere

Miss Fenner

Graph to show how the composition of gases in the atmosphere has changed over time.
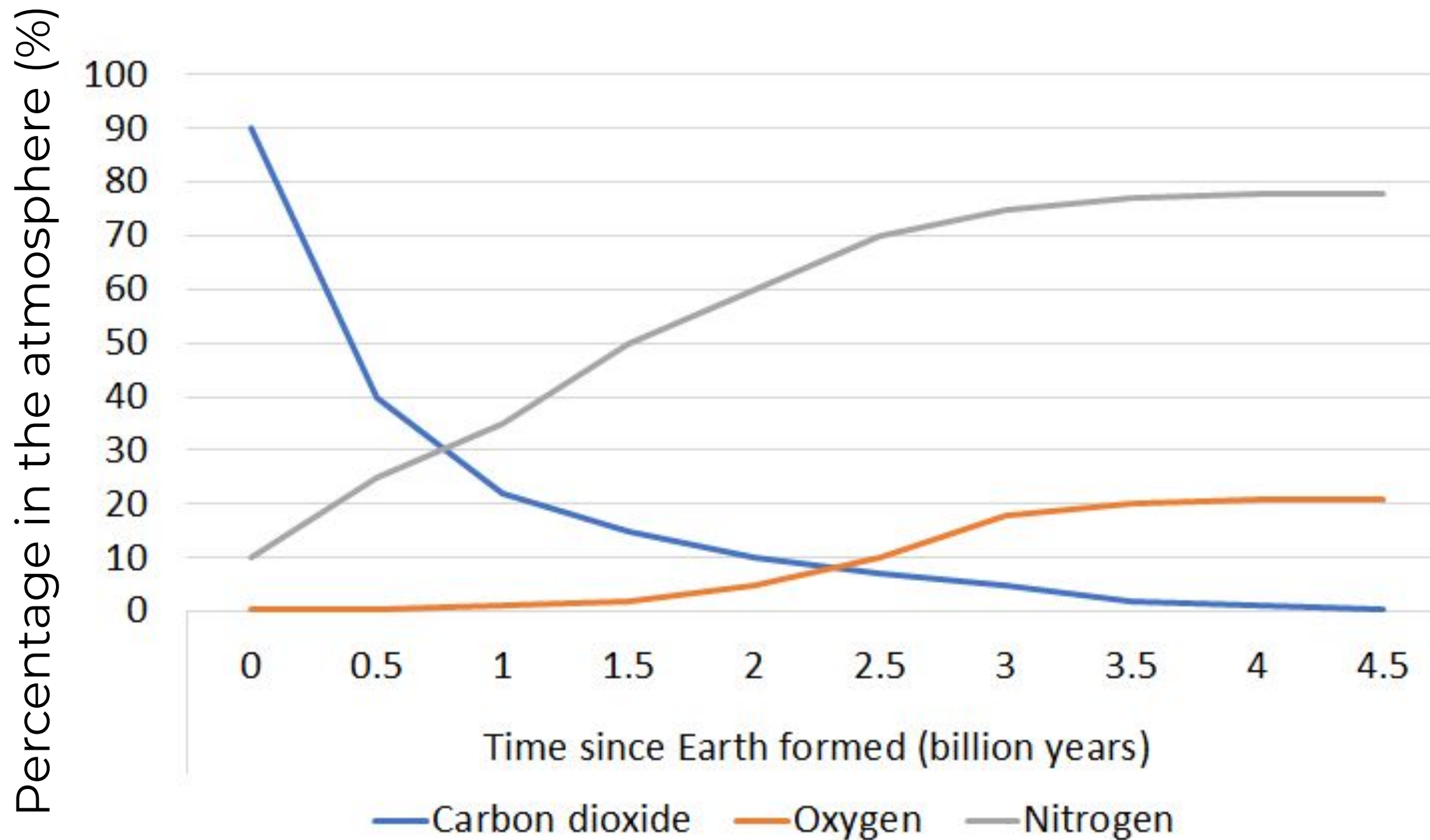

1. Read the title.
   What does the graph show?

Source: Miss Fenner

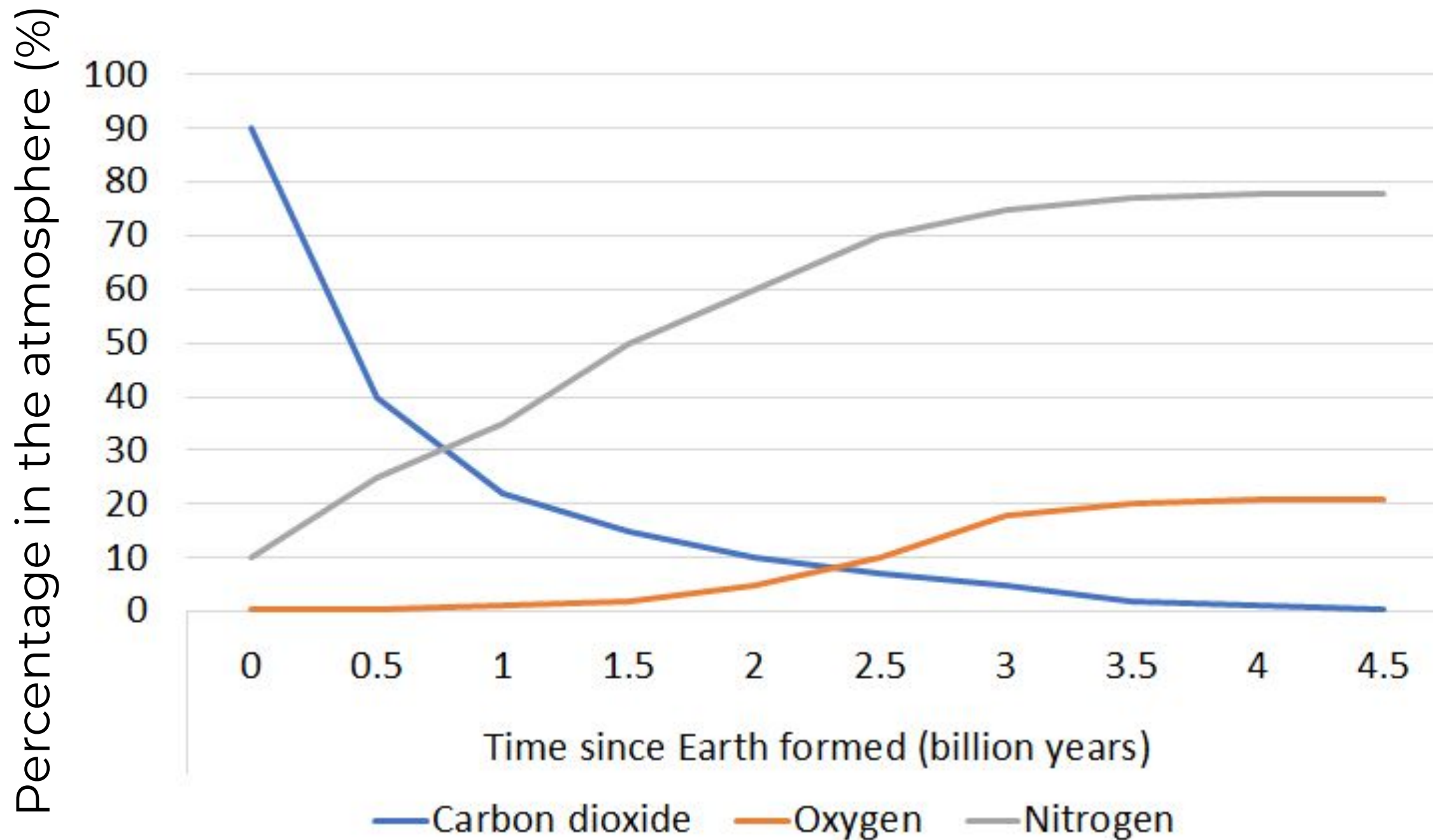# Graph to show how the composition of gases in the atmosphere has changed over time.

Percentage in the atmosphere (%)

Time since Earth formed (billion years)

— Carbon dioxide   — Oxygen   — Nitrogen

2. Check the axis.
   What are the two axis?

Source: Miss Fenner

3

Graph to show how the composition of gases in the atmosphere has changed over time.
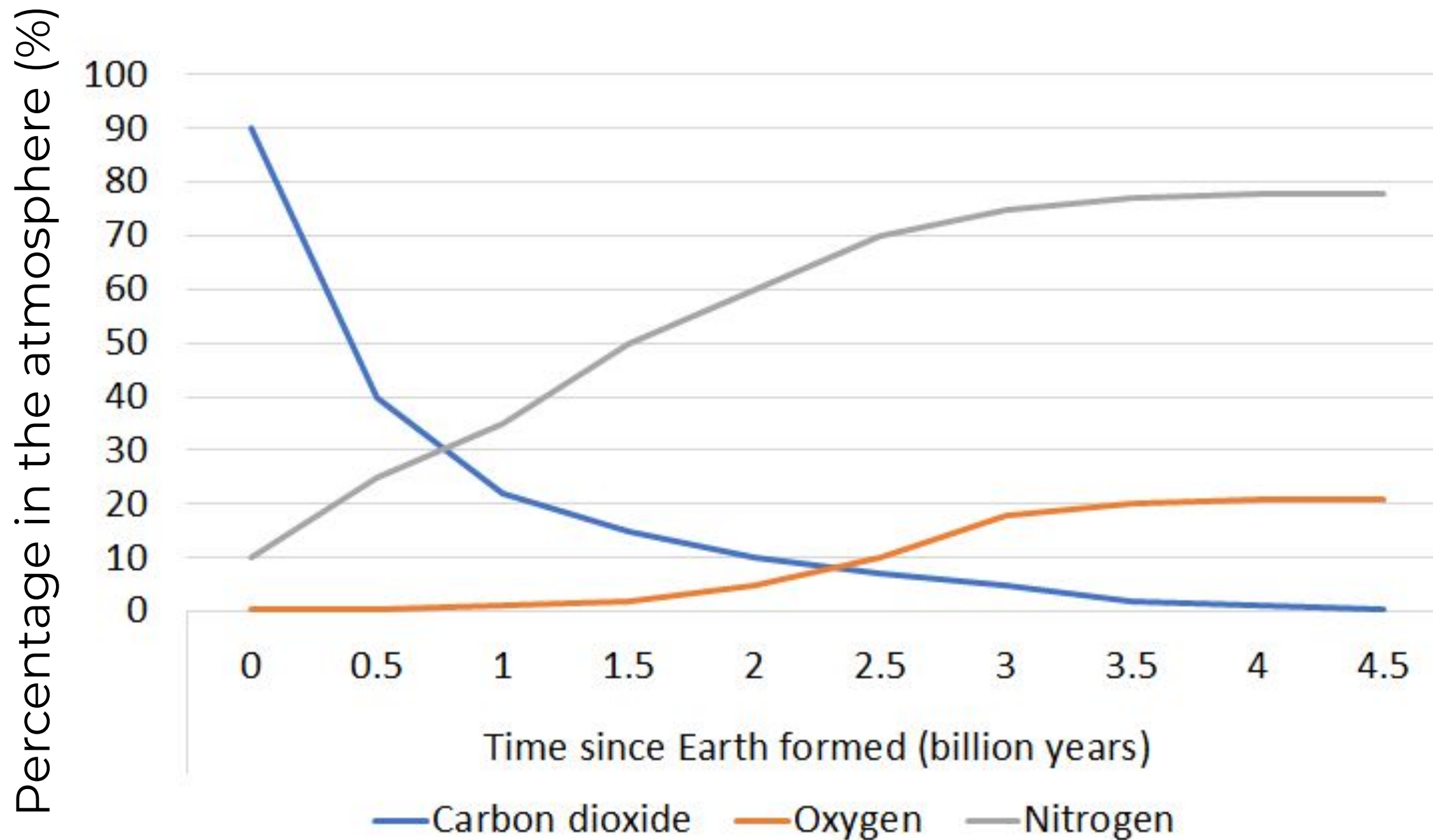

3. Check the units.
   What are the axis units?

Source: Miss Fenner

Graph to show how the composition of gases in the atmosphere has changed over time.
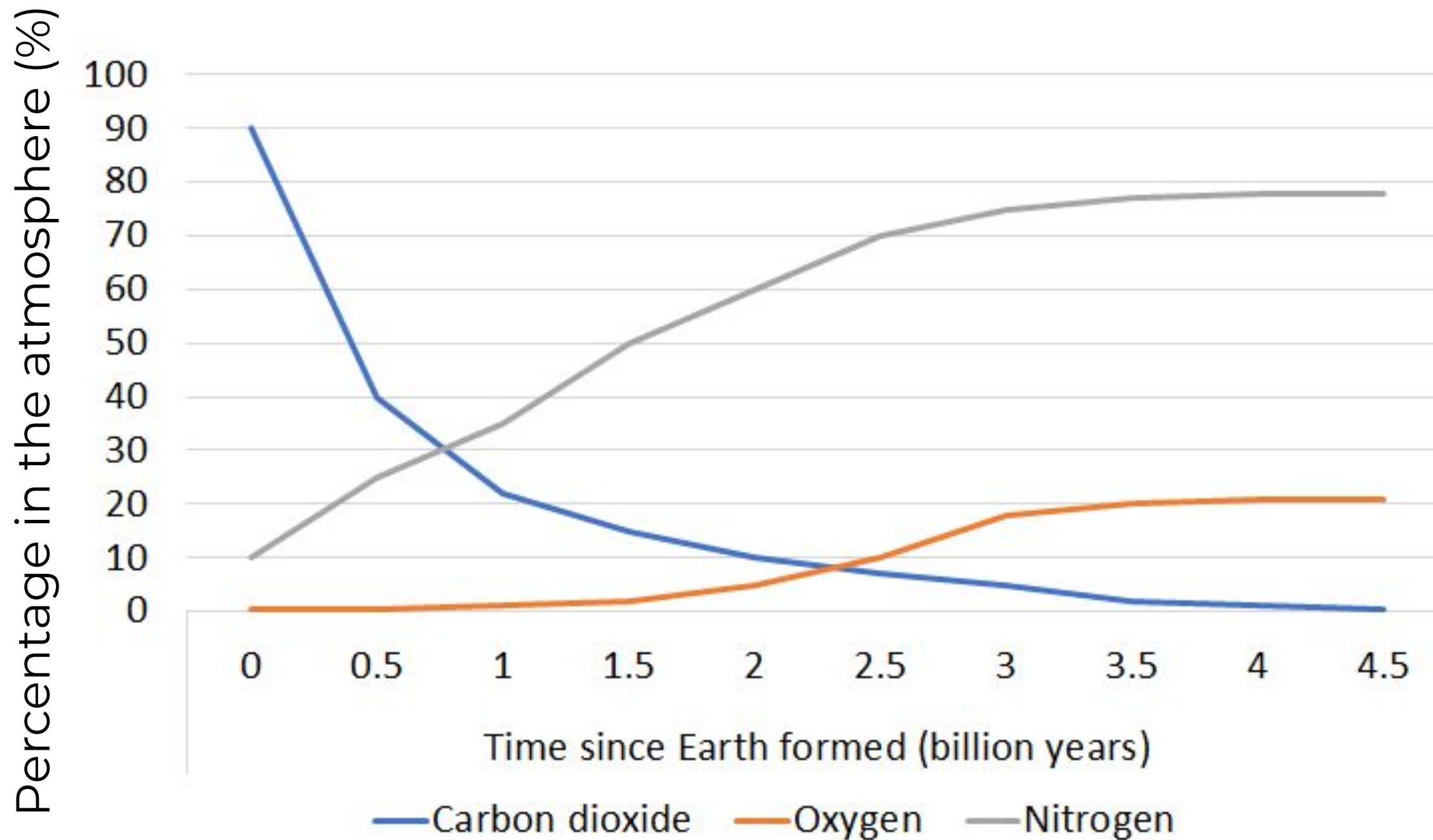
Percentage in the atmosphere (%)

100
90
80
70
60
50
40
30
20
10
0

0   0.5   1   1.5   2   2.5   3   3.5   4   4.5

Time since Earth formed (billion years)

—Carbon dioxide   —Oxygen   —Nitrogen

4. Look at each graph line Which graph line belongs to each gas?

Source: Miss Fenner

Graph to show how the composition of gases in the atmosphere has changed over time.

5. Think about the trend. Have you noticed any trends in the graph lines?

Source: Miss Fenner

Independent Practice

1. What was the percentage of nitrogen in the atmosphere when the Earth first formed?

2. Which gas made up most of the atmosphere when the Earth first formed?

3. Which gas have the biggest change in percentage composition of the atmosphere?

4. Describe the trend in the percentage of carbon dioxide in the atmosphere over time.

Graph to show how the composition of gases in the atmosphere has changed over time.

Percentage in the atmosphere (%)

Time since Earth formed (billion years)

—Carbon dioxide —Oxygen —Nitrogen
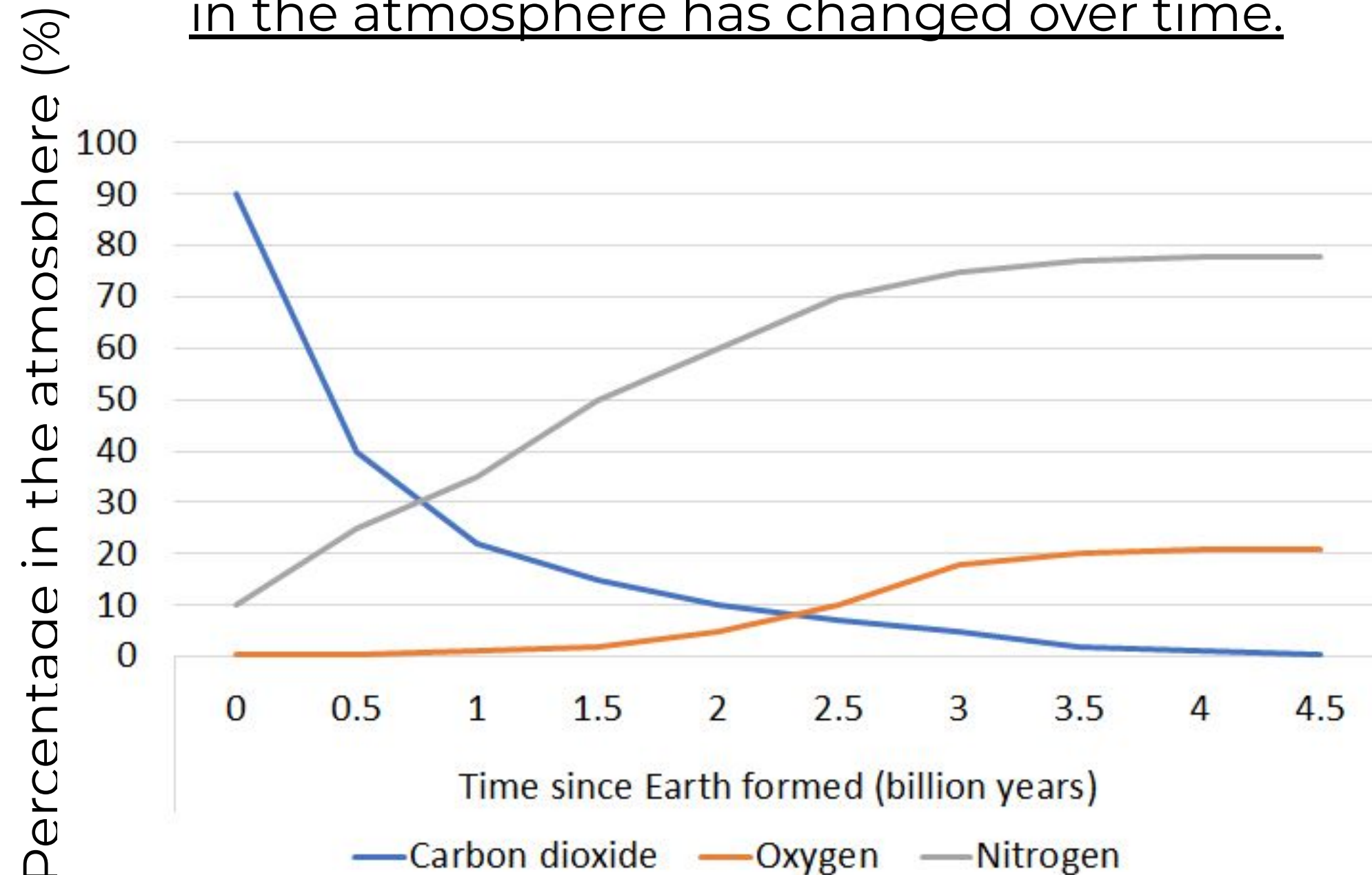
Source: Miss Fenner

Independent Practice

1. The atmosphere contained **10%** nitrogen when the Earth first formed.

2. **Carbon dioxide** made up most of the atmosphere when the Earth first formed.

3. **Carbon dioxide** had the biggest change in percentage composition of the atmosphere (**from 90% to almost 0%**).

4. **Over time the percentage of carbon dioxide in the atmosphere decreased** (sharply to begin with and then more steadily) until it plateaued at almost 0%.

Graph to show how the composition of gases in the atmosphere has changed over time.
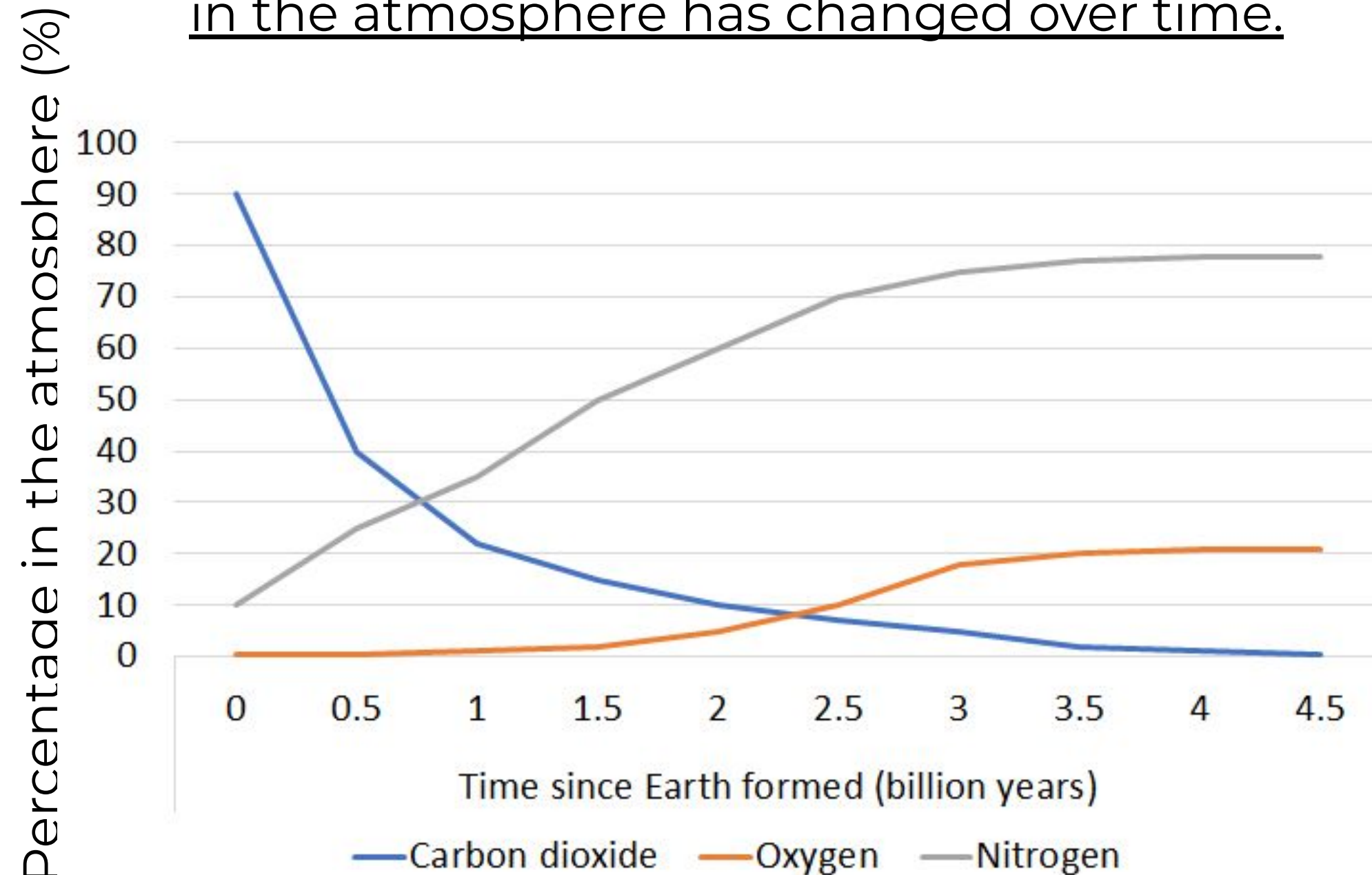
Source: Miss Fenner

Is there an anomaly?

102, 164, 113, 100, 111, 105

Is there an anomaly?

17, 18, 17, 19, 16

No anomaly!

Is there an anomaly?

4.12, 4.14, 4.10, 4.57, 4.11

Independent Practice

Calculate A, B, C, D and E.

Location	Temperature (℃)				
	Day 1	Day 2	Day 3	Day 4	Day 5
1	12.2	12.4	12.4	13.0	12.7
2	24.1	24.8	25.2	24.2	25.0
3	7.9	7.6	5.4	6.3	6.9
4	15.4	31.1	15.2	16.8	15.1
5	19.8	20.5	21.1	19.2	E
Mean	A	B	C	D	16.1

Independent Practice

Location	Temperature (°C)				
	Day 1	Day 2	Day 3	Day 4	Day 5
1	12.2	12.4	12.4	13.0	12.7
2	24.1	24.8	25.2	24.2	25.0
3	7.9	7.6	5.4	6.3	6.9
4	15.4	31.1	15.2	16.8	15.1
5	19.8	20.5	21.1	19.2	E = 20.8
Mean	A = 15.88	B = 16.325	C = 15.86	D = 15.9	16.1

Graph to show the carbon dioxide levels and average global temperature over time.

Year

Source: CO2-Temp, Hanno, Wikimedia

1. Read the title.
   What does the graph show?

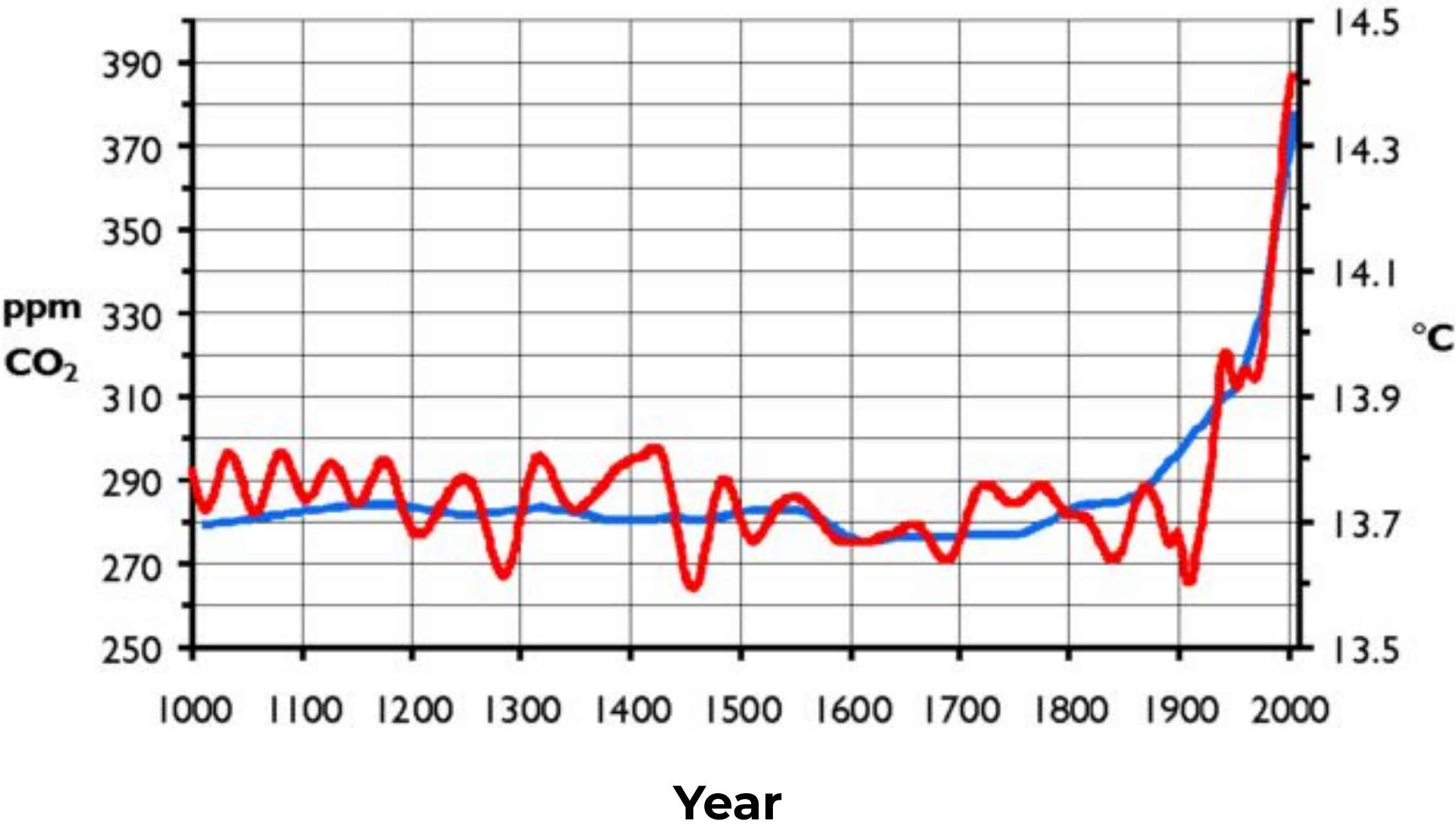# Graph to show the carbon dioxide levels and average global temperature over time.
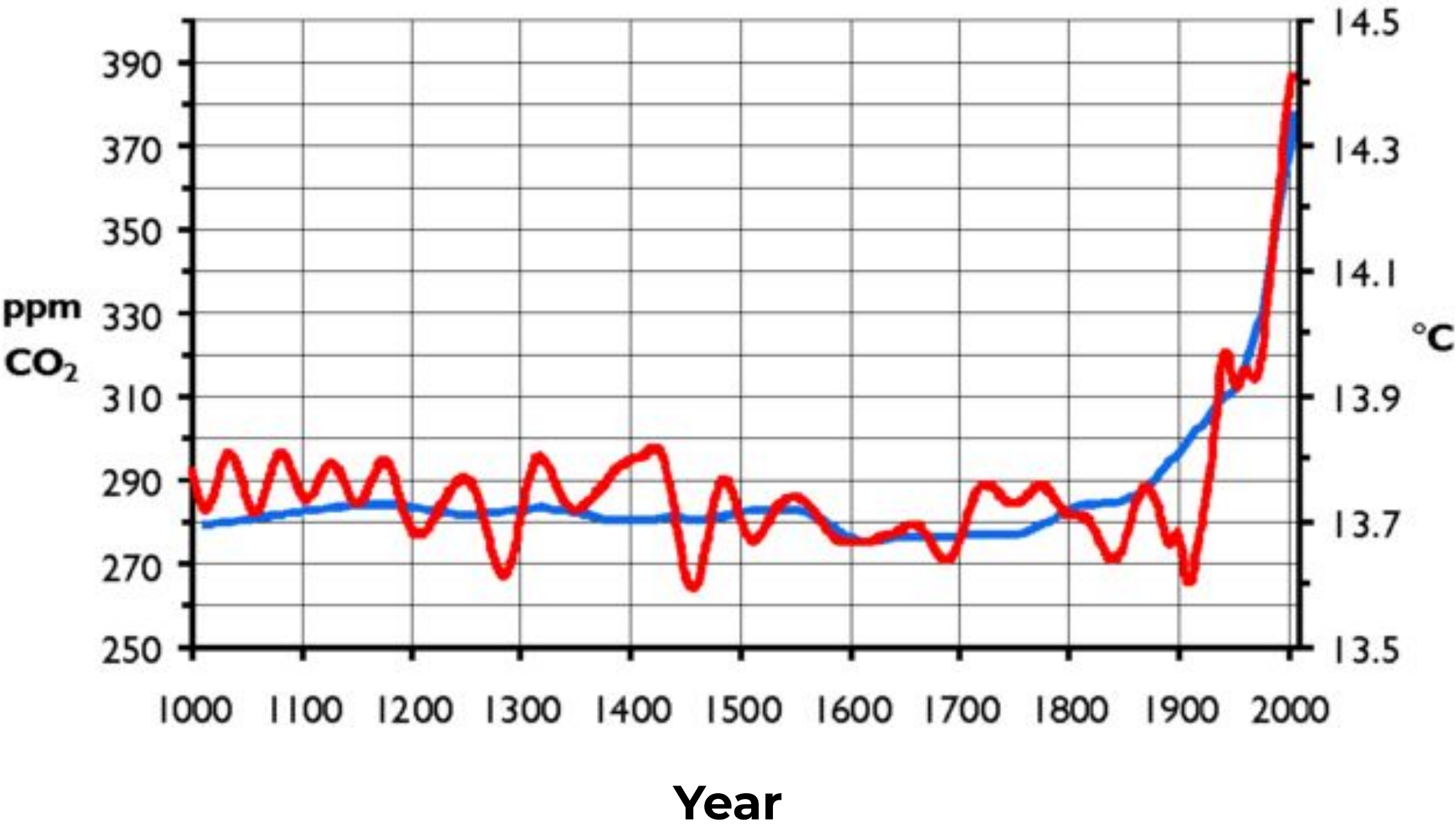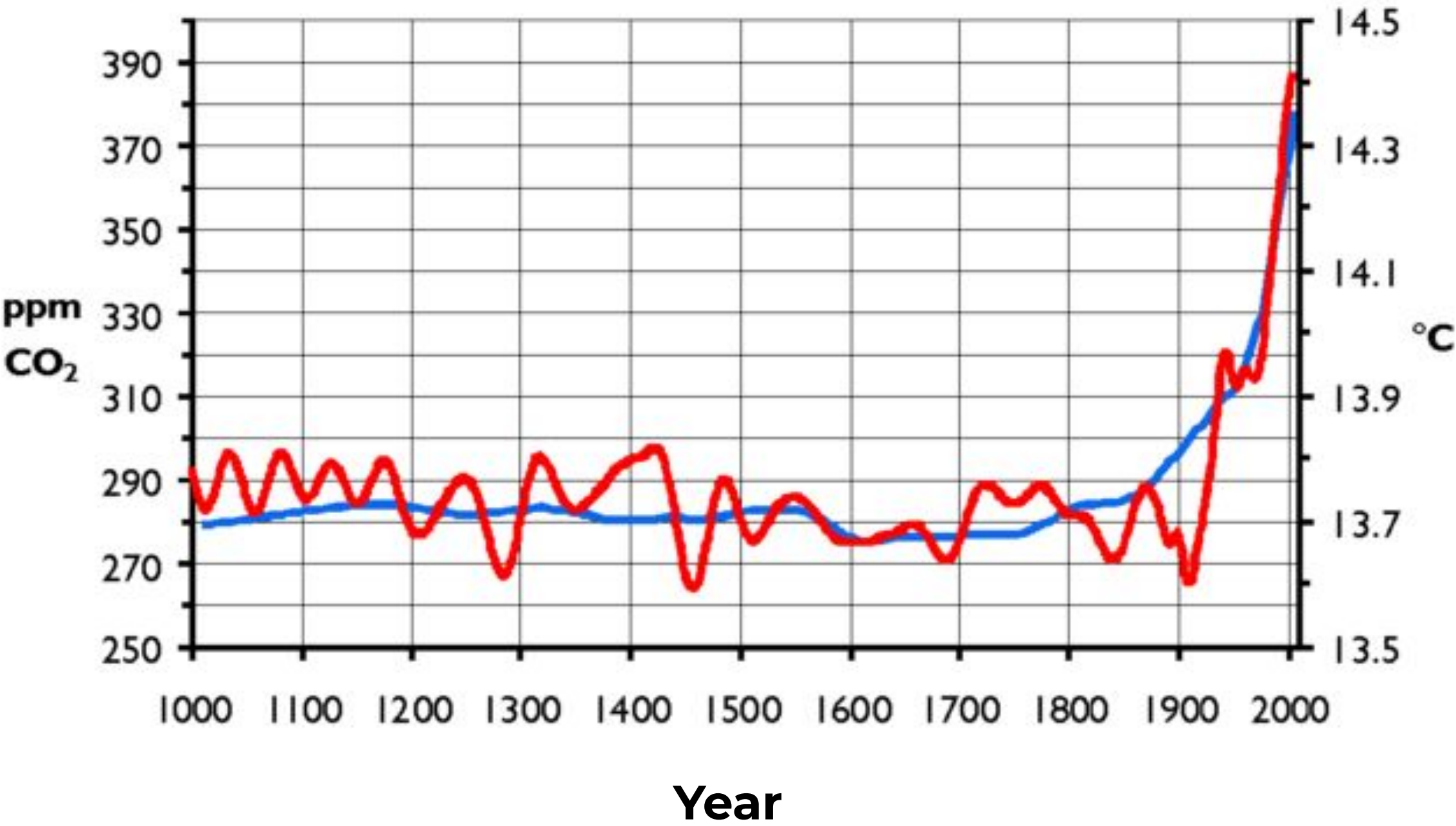
Year

2. Check the axis.
   What are the two axis?

Source: CO2-Temp, Hanno, Wikimedia

Graph to show the carbon dioxide levels and average global temperature over time.

Source: CO2-Temp, Hanno, Wikimedia

Temperature - red line
Carbon dioxide - blue line

3. Check the units.
   What are the axis units?

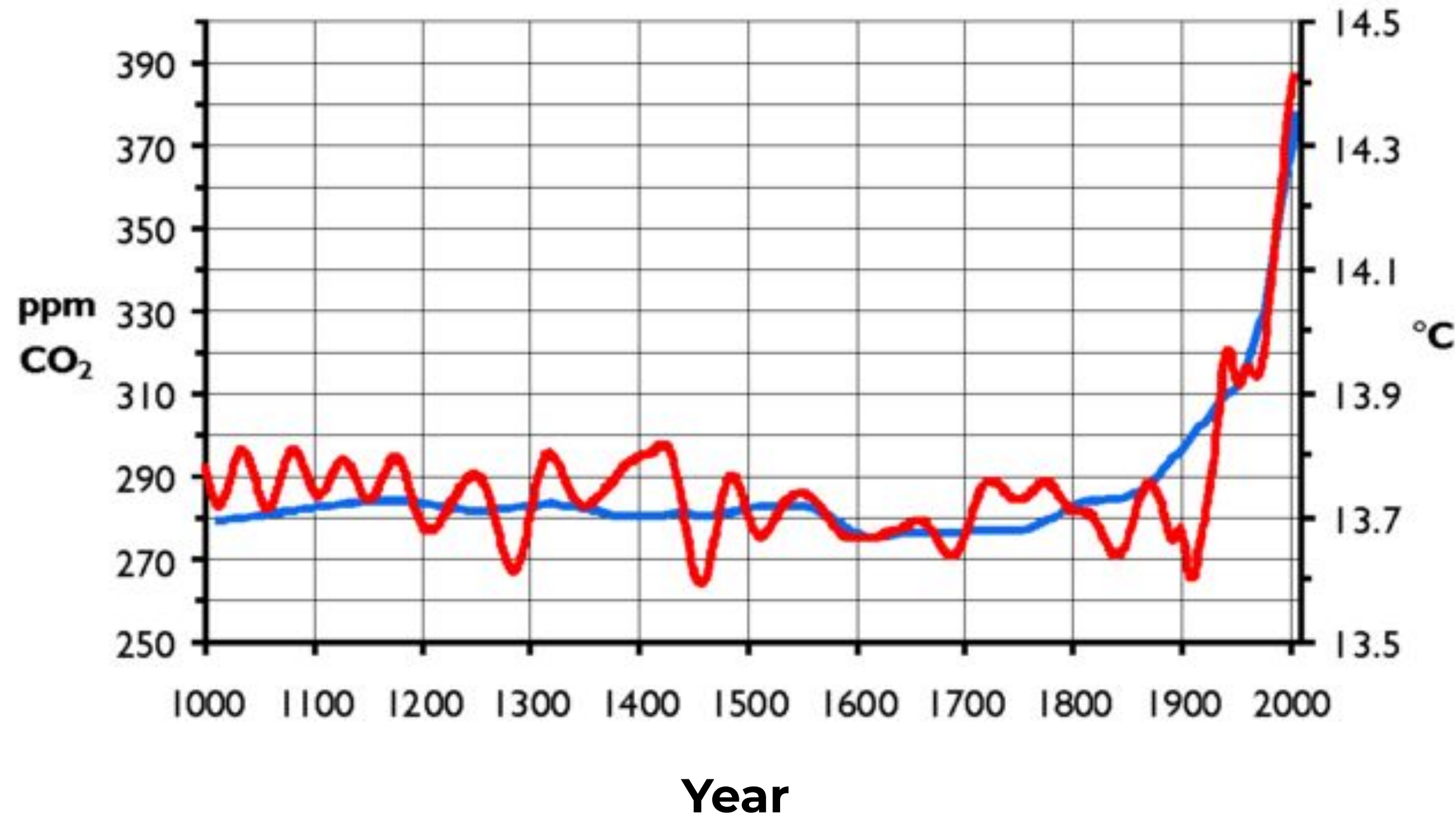## Graph to show the carbon dioxide levels and average global temperature over time.

Year

Source: CO2-Temp, Hanno, Wikimedia

4. Look at each graph line Which graph line belongs to each gas?

Graph to show the carbon dioxide levels and average global temperature over time.

Year

Source: CO2-Temp, Hanno, Wikimedia

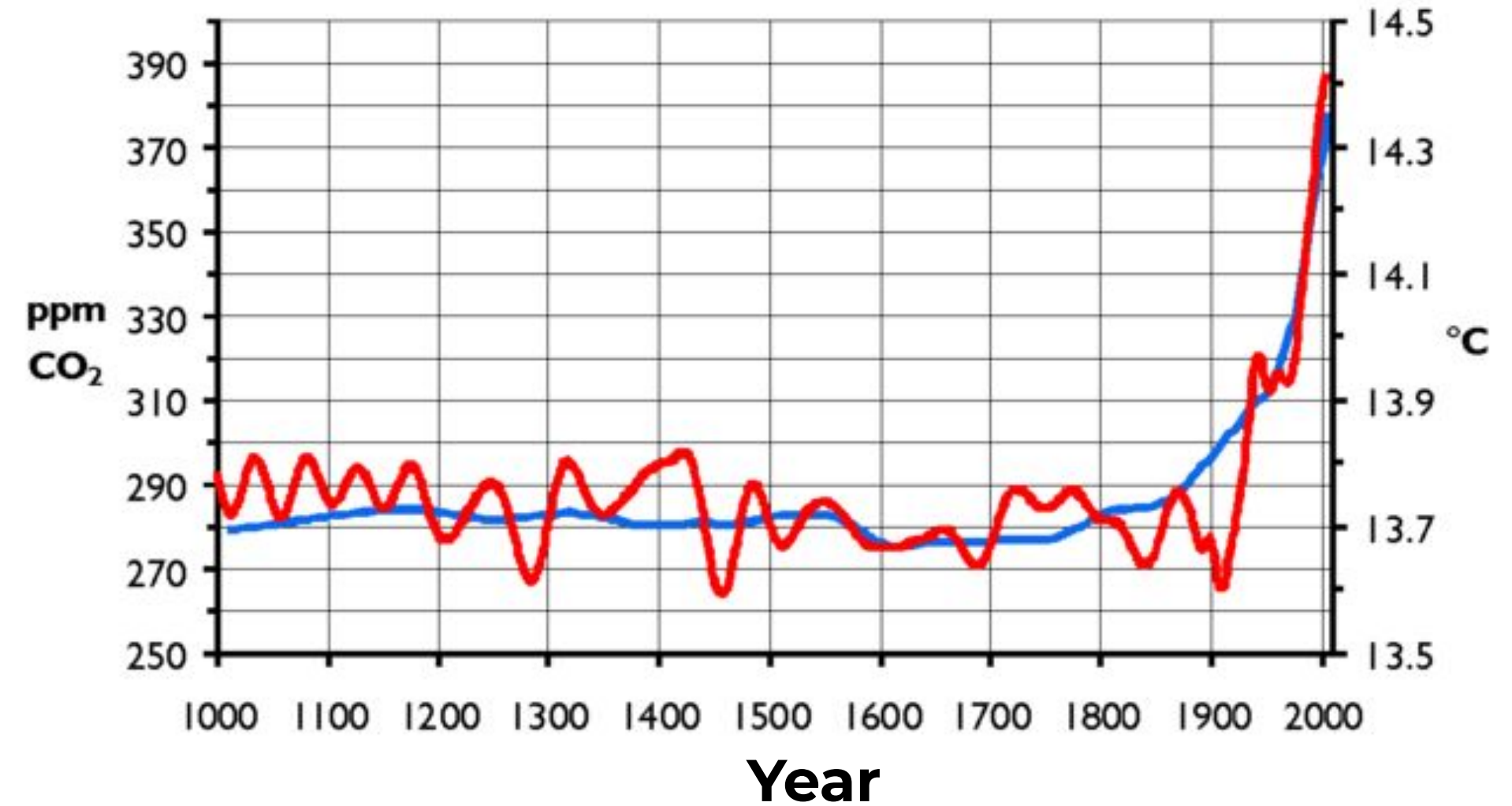5. Think about the trend. Have you noticed any trends in the graph lines?

Independent Practice

Write a conclusion about this graph.

Success criteria
- Describe the trend
- Use data to back up the trend
- Explain the trend
- Improving data collection

Graph to show the carbon dioxide levels and average global temperature over time.

Source: CO2-Temp, Hanno, Wikimedia

Independent Practice

Success criteria
- As the concentration of carbon dioxide increased, so did the average global temperature. There is a positive correlation between these two variables.
- For example, when the carbon dioxide level was at its highest (about 370 ppm) in the year 2000, the average global temperature was also at its highest (about 14.4 ℃).
- Carbon dioxide is a greenhouse gas. The higher the level of carbon dioxide in the atmosphere the more longwave infrared radiation is absorbed in the atmosphere and prevented from escaping into space. This is the greenhouse effect and causes the Earth to heat up.
- In the future, even more repeats could be taken. The more repeats that are takes, the more reliable the data and the easier it is to identify anomalies.

See you next time.