

20. Statistics and Box Plots

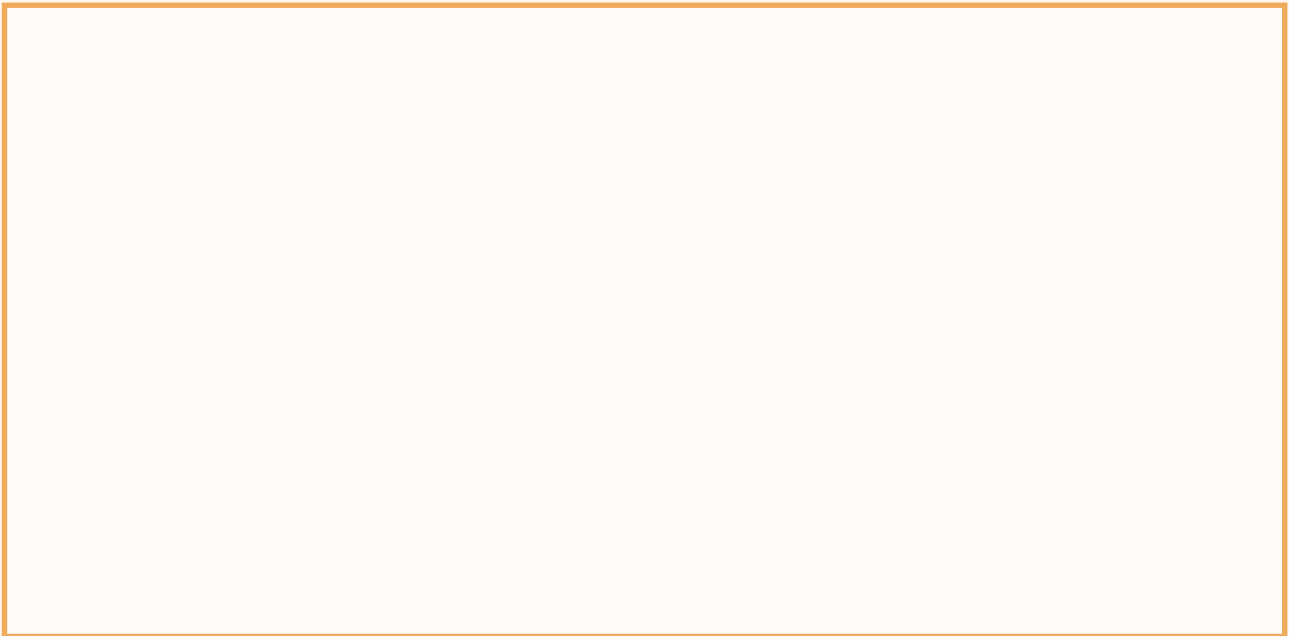
The Mauna Loa Observatory in Hawaii constantly monitors CO₂ levels in the atmosphere. You contact them to obtain datasets that you can use as part of your upcoming research project on changes in atmospheric CO₂ over the past decade.

1. The Mauna Loa Observatory has sent you the table below containing information relating to atmospheric CO₂ levels over the past 10 years but the file has been corrupted and is missing some data. Fortunately, the observatory has also sent you raw data. Use the raw data provided in Appendix 1 to complete the table below.

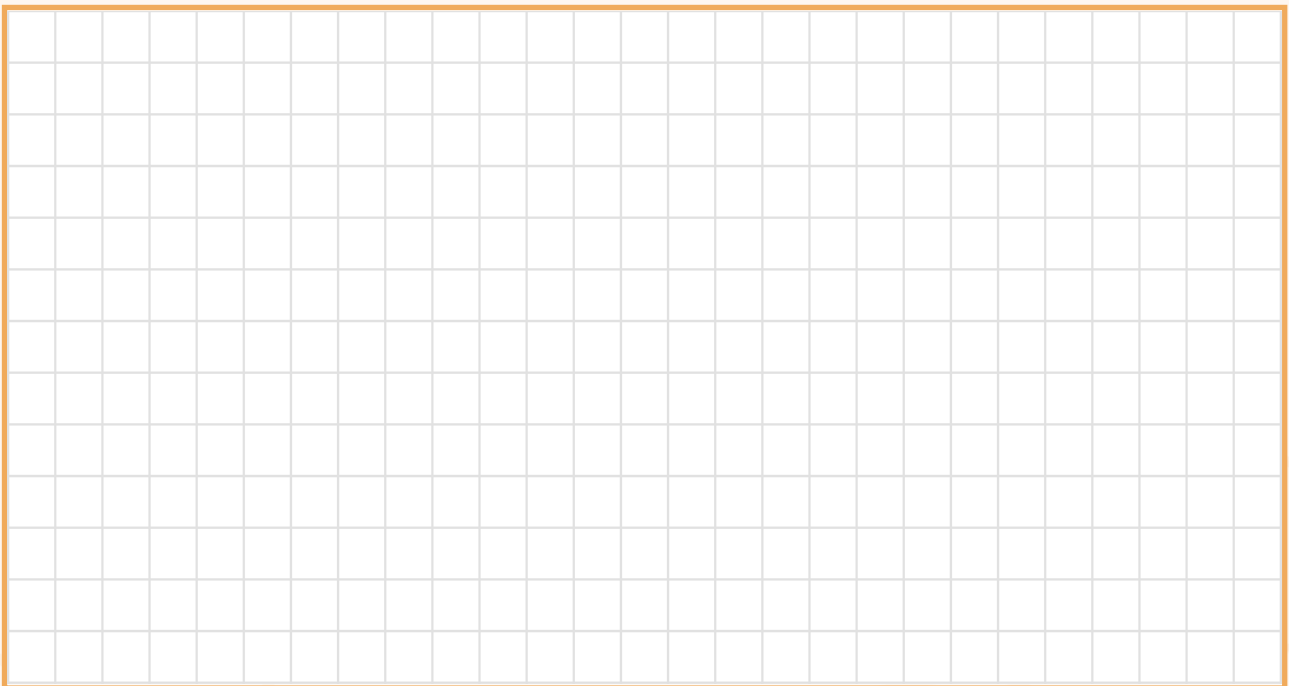
Year	Min	Lower quartile	Median	Upper quartile	Max
2010					
2011	389	390	392	393	394
2012					
2013	393	395	397	398	400
2014	395	397	399	400	402
2015	397	400	401	402	404
2016	401	402	404	405	408
2017	403	405	407	408	410
2018					
2019	408	410	412	412	415
2020	411	413	414	415	417

NB: The unit used for CO₂ in the table above is the concentration of atmospheric CO₂ in parts per million.

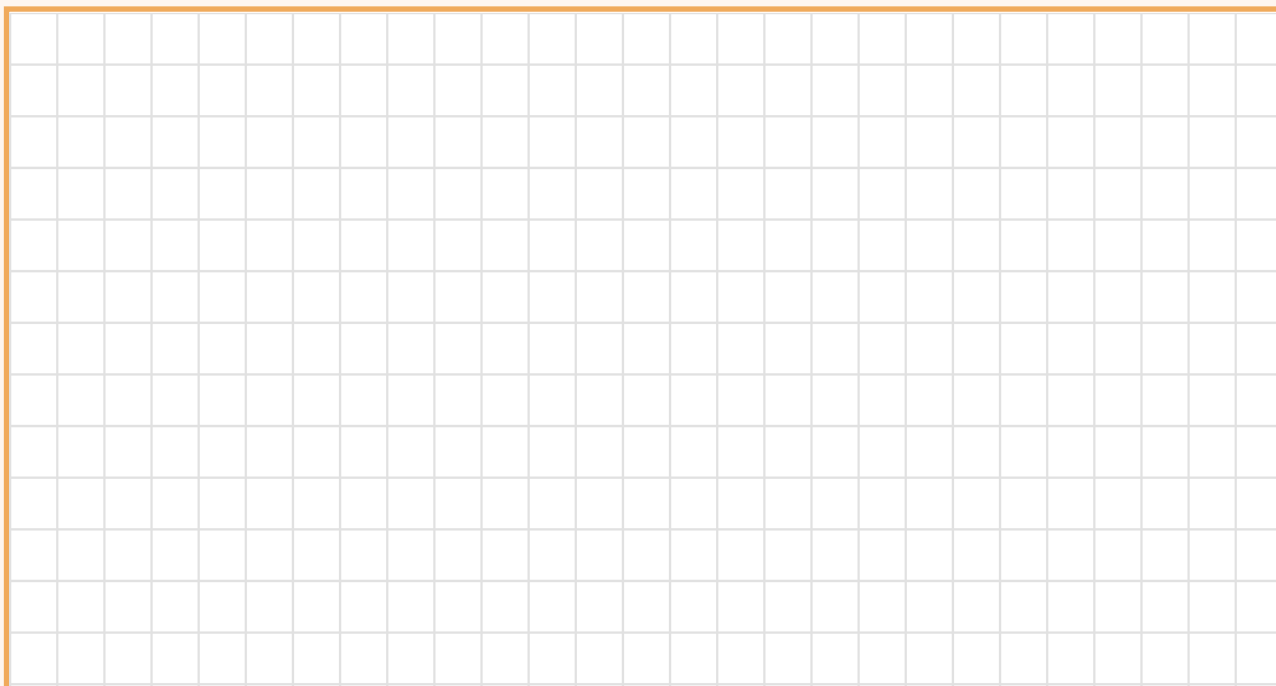
2. Comment on any seasonal patterns that you observe in this data.

A large, empty rectangular box with an orange border, intended for the student's written response to question 2.

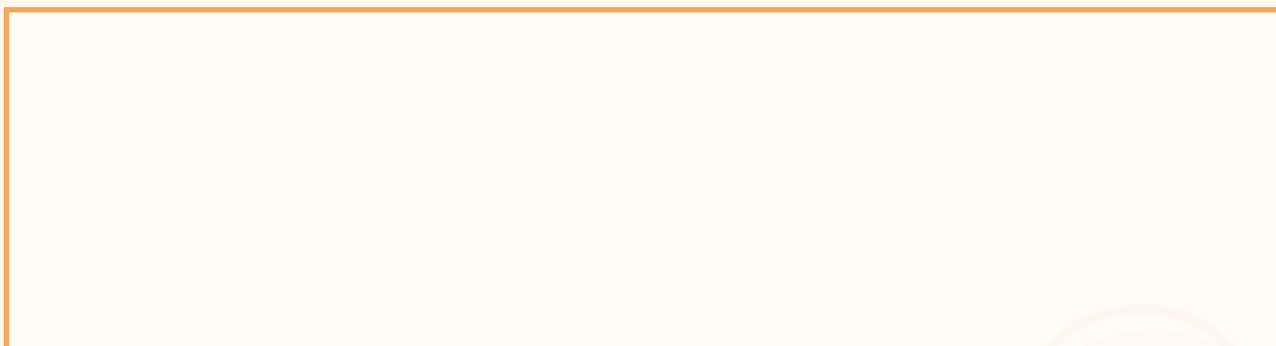
3. Draw a box plot summarising the 2010 data that you provided in the table above as part of your answer to question 1.

A large rectangular area with a light blue grid, intended for drawing a box plot. The grid consists of 20 columns and 20 rows.

4. Draw a box plot to display the 2014 data in the table on page 1.



5. Compare the distribution of atmospheric CO₂ recorded in 2010 to the distribution of atmospheric CO₂ recorded in 2014.



6. The graph in Appendix 2 displays the data recorded from 2010 to 2021. Use the graph to infer the minimum, maximum, median, and lower and upper quartiles in 2021.



Appendix 1: Raw monthly data

NB: The unit used for CO₂ in the below tables is the concentration of atmospheric CO₂ in parts per million.

Year	Month	CO ₂
2010	1	389
2010	2	390
2010	3	391
2010	4	392
2010	5	393
2010	6	392
2010	7	390
2010	8	389
2010	9	387
2010	10	387
2010	11	389
2010	12	390

Year	Month	CO ₂
2012	1	393
2012	2	393
2012	3	394
2012	4	397
2012	5	397
2012	6	396
2012	7	395
2012	8	393
2012	9	391
2012	10	391
2012	11	393
2012	12	394

Year	Month	CO ₂
2018	1	408
2018	2	408
2018	3	409
2018	4	410
2018	5	411
2018	6	411
2018	7	409
2018	8	407
2018	9	406
2018	10	406
2018	11	408
2018	12	409

Appendix 2: Graph

