**Weather and Climate**

**Learning Objectives**

* Climate is the long term (30 year) average of weather.
* Data skills – average (mean), drawing line graphs.

**First, show this film to remind your students of the difference between weather and climate**: <https://youtu.be/e0vj-0imOLw>

Trees respond to the weather – the day to day availability of light, warmth and water. This affects their ability to grow, and is recorded in the tree rings they produce.

**Here are two summer rainfall (precipitation) records, obtained from two trees growing in very different locations**:

**Tree A**: Bristlecone Pine (*Pinus longaeva* Bailey.) White Mountains, California, USA.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Year | June-August Precipitation (mm) | Year | June-August Precipitation (mm) | Year | June-August Precipitation (mm) |
| 1910 | 15.8 | 1924 | 16.1 | 1938 | 17.5 |
| 1911 | 16.3 | 1925 | 16.7 | 1939 | 17.1 |
| 1912 | 15.5 | 1926 | 16.4 | 1940 | 16.8 |
| 1913 | 16.7 | 1927 | 17.3 | 1941 | 16.9 |
| 1914 | 16.7 | 1928 | 17.3 | 1942 | 16.1 |
| 1915 | 16.8 | 1929 | 17.6 | 1943 | 16.3 |
| 1916 | 16.4 | 1930 | 18.1 | 1944 | 16.3 |
| 1917 | 17.0 | 1931 | 18.7 | 1945 | 16.6 |
| 1918 | 15.8 | 1932 | 17.1 | 1946 | 17.1 |
| 1919 | 17.2 | 1933 | 18.3 | 1947 | 16.3 |
| 1920 | 16.8 | 1934 | 18.1 | 1948 | 16.6 |
| 1921 | 16.7 | 1935 | 17.2 | 1949 | 16.6 |
| 1922 | 16.3 | 1936 | 18.1 |  |  |
| 1923 | 16.2 | 1937 | 17.6 |  |  |

**Tree B**: Beech (*Fagus sylvatica* L.) Clyne Valley Woodlands, Wales, UK.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Year | June-August Precipitation (mm) | Year | June-August Precipitation (mm) | Year | June-August Precipitation (mm) |
| 1910 | 294 | 1924 | 798 | 1938 | 1874 |
| 1911 | 327 | 1925 | 967 | 1939 | 1588 |
| 1912 | 68 | 1926 | 1292 | 1940 | 1091 |
| 1913 | 179 | 1927 | 1287 | 1941 | 777 |
| 1914 | 322 | 1928 | 1019 | 1942 | 598 |
| 1915 | 458 | 1929 | 987 | 1943 | 714 |
| 1916 | 741 | 1930 | 974 | 1944 | 831 |
| 1917 | 907 | 1931 | 1112 | 1945 | 461 |
| 1918 | 1134 | 1932 | 678 | 1946 | 410 |
| 1919 | 1598 | 1933 | 732 | 1947 | 728 |
| 1920 | 1556 | 1934 | 942 | 1948 | 972 |
| 1921 | 1557 | 1935 | 1174 | 1949 | 1483 |
| 1922 | 1292 | 1936 | 1762 |  |  |
| 1923 | 956 | 1937 | 1639 |  |  |

1. In which year was the summer weather wettest for tree A? How much did it rain? 1931, 18.7mm
2. In which year was the summer weather driest for tree A? How much did it rain? 1912, 15.8mm
3. In which year was the summer weather wettest for tree B? How much did it rain? 1938, 1874mm
4. In which year was the summer weather driest for tree B? How much did it rain? 1912, 68mm
5. Draw a graph of rainfall against year for tree A. Do the same for tree B. (**for a lower ability group, replace the blank graphs in the worksheet with the graphs at the end, in which only some points need to be added**).
6. Look at the range of rainfall values for each tree. Which is growing in the wetter climate? Tree B.
7. What is the average (mean) summer rainfall for the period 1915 – 1944 for each tree? This is the climate for that period.

Tree A: 17.0mm

Tree B: 1101mm

**Graphs for lower ability groups**: