

What is the relationship between the weight of an onion and its circumference?

Student 3: Low Merit
NZQA Intended for teacher use only

**Question:** I wonder if there is a relationship between the weight (g) and circumference (cm) of an onion. 1

**Prediction:** I predict that as the weight of an onion increases the circumference of the onion will also increase.

**Planning:**

My partner and I have decided to find out the relationship between the weight and circumference of an onion, I expect that the bigger the circumference the more mass of the onion making it heavier.



**Weight:** I will check if the onion is clean and fully peeled and has nothing else



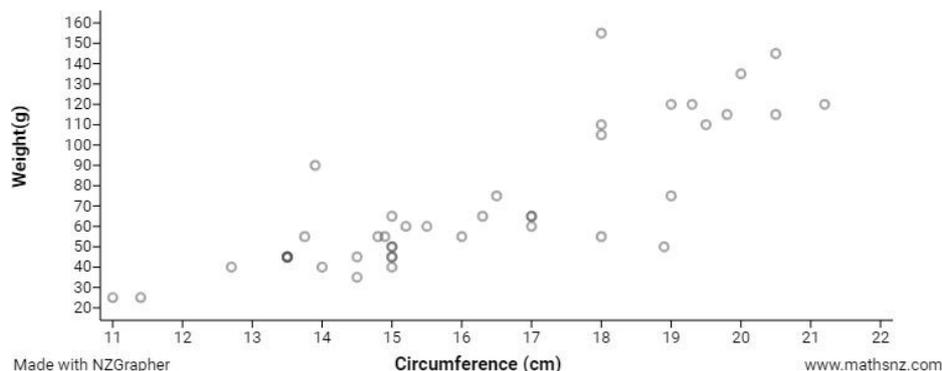
attached to it to make sure this doesn't give an incorrect measure and effect the weight. We will place our first onion on the scale, after making sure it is set to zero. I will then read out the number to Amy and she will then check the measurements and write it down on a piece of paper. 3

**Circumference:** I will take a piece of string and a ruler over to our desks, I will then wrap the string around the largest part of the onion which we decided was from the top to the bottom making sure the string is pulled tight and meets up with the beginning of the string on the other side. Carefully I will mark where the string ends with my finger and pull the string up against the ruler. Again, making sure the string is pulled tight. I will read the number in cm to Amy and she will write it down. 2

We will repeat this for each onion we are given to make sure that the measurements for each onion are taken the same way. We will then transfer our results into a table ready to be made into a scatter plot graph. We think that some onions may not be from the same area as we are getting them from the supermarket where they sell onions by the bag on the bags weight, this means that there might be some outliers. 3



Circumference and Weight of Onions

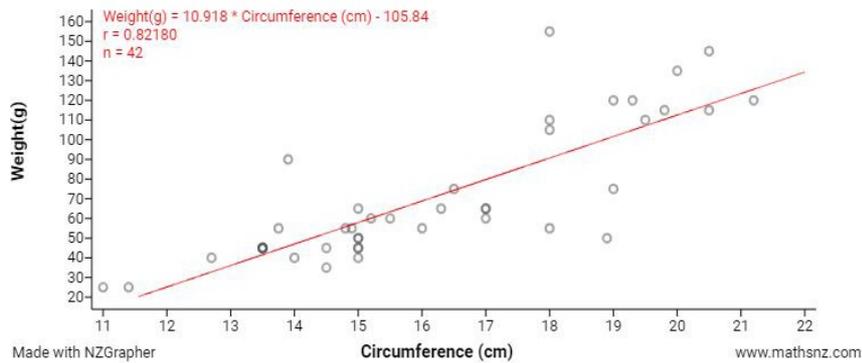


The graph shows that as the weight of an onion increases the circumference tends to increase also. The graph also shows the trend line sloping upwards meaning there is a positive relationship. Most points are fairly close to the line of best fit, so I feel there is a moderately strong relationship. Most onions have a circumference between 14.5cm and 17cm. There are quite a few points that have a circumference of 15cm they are all close in weight. 5

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### Circumference and Weight of Onions



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However, there are two points quite far from the line of best fit (18,155) This onion is surprisingly heavy for its circumference and could be a very long rather than round and fat onion this could be because of its growing conditions. I would consider that onion to be an outlier. Another onion that doesn't quite fit the line of best fit is (18.9, 50) it happens to be very light for its circumference this could be because the onion was not getting enough nutrients where it was growing. I would also assume that this onion is an outlier and does not fit the trend line.

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Some things that could possibly impact the relationship could be where the onions are grown. I know that some onions are grown in different spots where they might not get enough nutrients, therefore they never grow to their full potential. This could impact both the weight and circumference of the onions. We were lucky to get 42 onions from the same supermarket, otherwise the results would have been all over the place as different supermarkets have different suppliers. But also, some onions seemed a bit dry and could be older.

#### Data:

Number	Weight(g)	Circumference (cm)
1	75	16.5
2	75	19
3	55	14.9
4	115	20.5
5	120	21.2
6	110	19.5
7	25	11
8	65	17
9	115	19.8
10	40	12.7
11	35	14.5
12	110	18
13	120	19.3
14	145	20.5
16	55	18
17	55	16
18	155	18
19	135	20
20	65	15
21	40	14
22	45	15
23	60	17
24	40	15
25	45	13.5
26	120	19
27	45	13.5
28	55	13.75
29	105	18
30	25	11.4
31	55	14.8
32	45	13.5
33	90	13.9
34	50	18.9
35	60	15.2
36	65	16.3
37	60	15.5
38	45	14.5
39	50	15
40	50	15
41	45	13.5
42	45	15

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