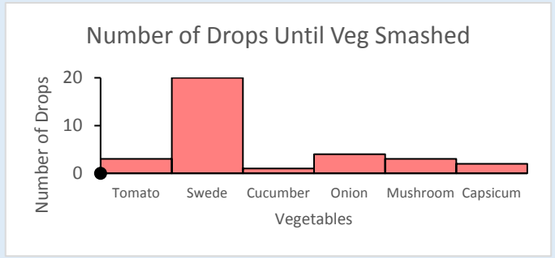
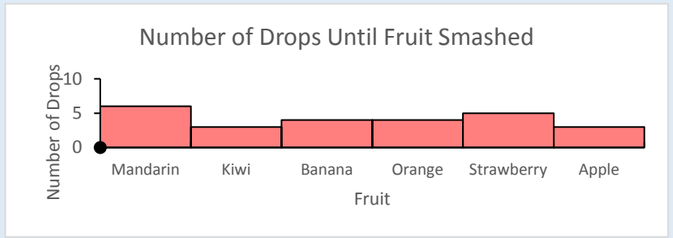
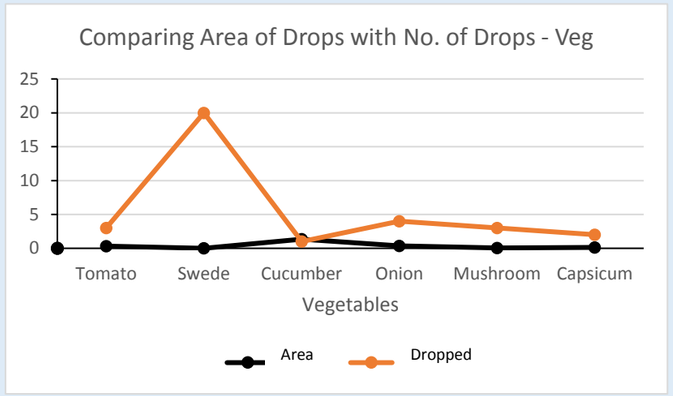
SMASHABILITY

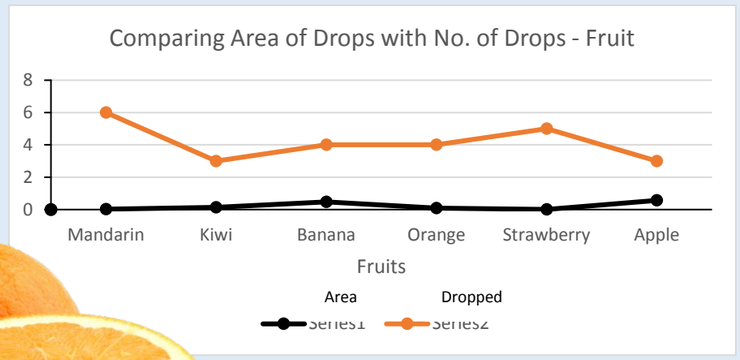
FRUIT VS. VEGETABLE

Are fruits or vegetables more smashable?







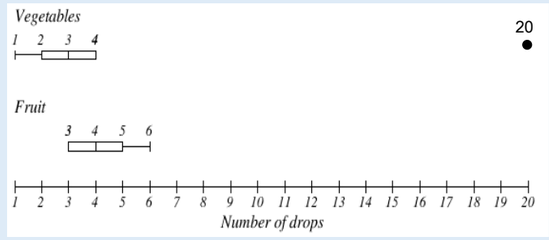


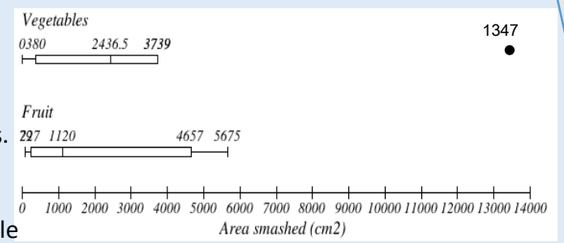
Aim: To discover whether fruits or vegetables smash more easily, through analyzing the number of times a fruit/vegetable had to be dropped from the window before it smashed and the diameter of the mess made by the fruit/vegetable when it did smash.

Hypothesis: If fruit is softer than vegetables then, on their first drops then fruit will be more prone to smashing and will cover a larger area.

Method:

1. 6 pairs, a fruit and a vegetable of similar shapes and sizes, were purchased and weighed.
2. One by one each of the twelve fruits and vegetables were dropped 3.53 m out of a window onto paved bricks.
3. If the fruit/vegetable smashed, the diameter of the mess it made was recorded. If not, the remaining fruit and vegetables were dropped again.
4. This was repeated until all of the fruits and vegetables were smashed, or the number of times a fruit/vegetable was dropped exceeded 20.





Number of times dropped before smashed:	Diameter of mess made by smash	Area (cm^2) of mess made	Area ($m^{2)}$) of mess made (2dp)
Fruits:			
Mandarin	6	17	227	0.2
Kiwi Fruit	3	42	1385	0.14
Banana	4	77	4657	0.46
Orange	4	33	855	0.09
Strawberry	5	10	79	0.008
Apple	3	85	5675	0.57
Mean:	**4.17**	**44**	**2146.3**	**0.21**
Standard Deviation:	**1.07**	**28.23**	**2196.96**	**0.20**
Vegetables:				
Tomato	3	66	3421	0.34
Swede	20+*^	0	0	0
Cucumber	1	131^	13478^	1.35^
Onion	4	69	3739	0.37
Mushroom	3	22	380	0.04
Capsicum	2	43	1452	0.15
Mean:	**5.5**	**55.17**	**3745**	**0.37**
Mean excluding outliers:	**2.6**	**40**	**1798.4**	**0.18**
Standard deviation:	**6.55**	**41.53**	**4572.42**	**0.46**
Standard Deviation excluding outliers	**1.02**	**26.27**	**1533.94**	**0.15**

* The swede had still not smashed after 20 drops, so the number was recorded as 20
^ Outliers

Analysis of Results

To measure the smashability of fruit we used two types of numerical data; continuous (the area of the mess the fruits and vegetables made when the smashed) and discrete (the numbers of times the fruit/vegetables had to be dropped before the smashed.

It can be seen that while the data collected for the fruits was mostly regular, and as a result the data is close to symmetrical; not skewed wither way. In the vegetables, the number of times the swede had to be dropped and the mess the cucumber made are both outliers; these both had a big impact on both the standard deviation and the mean. When comparing the number of times fruit was dropped, the swede outlier also positively skewed the otherwise mostly symmetrical data. Because of this, we have also calculated the standard deviation and mean excluding outliers.

The results show that, when outliers are excluded, on average fruit took more drops before smashing than the vegetables; but the vegetables made less mess than the fruits.

Conclusion

Overall, contrary to our hypothesis, our investigation produced no clear answer as to whether fruits or vegetables are more smashable. However, it can be concluded that vegetables smash more easily, but fruits make more mess.

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