**Student 5.** **Are Leaves Really Necessary?**

**Aim:** I want to find out if leaves are really necessary for cutting to grow.

**Prodiction:** I think with more leaves on a stem, it will mean that more roots that will be produced [1].

**Independent viriable:** The independent variable is the variable that will be changed with each cutting. I will have a different number of leaves on every stem that I will put in the test tubes. There will be cutting with either 0, 2, 4, 6 and 8 leaves [2].

**Dependent variable:** The dependent variable is the variable that does not change. I will count how many roots grow on every stem and put into my data [3].

**Controlled variables:** Water – water daily so that it is a fair test and there will be a even amount of water in every test tube.

Temperature – the test tubes were in the science lab, this meant that they had even amount of sunlight, out of the wind. This meant it would be a fair test

To make this a fair test I will put the same amount of water in to the test tubes. I will also cut all the stems evenly so it is fair. I will find the average number of number of roots and assure they are accurate [4].

**You will need:** Ruler, 16 test tubes, 1 test tube stand, 15ml of water per tube, scissors, a health Tahitian Bridal Veil plant, camera, pen, measuring cylinder.

**Starting the experiment.**

1. Get all the equipment together and ready to do the experiment.

2. Cut the stem on a 45 degree angle away from the node and about at least 6cm long. Re-measure to see if they are at the right length.

3. Separate them into five different groups.

4. In one of the five groups strip all the leaves off it.

5. With one of the five groups, leave two leaves on the stem.

6. With one of the five groups, leave four leaves on the stem.

7. With one of the five groups, leave six leaves on the stem.

8. With one of the five groups, leave eight leaves on the stem.

9. Water your cuttings.

10. At this stage you should be checking and watering the cuttings about everyday. Make sure the test tubes are always topped up to 15mls with water and making sure they are living and are healthy.

11. Record data. Measuring how long the roots on the stems have grown, and what ones are doing the best. To make this a fair test I got two people to help me count the root growth.

**Results:** I drew up a graph showing the number of roots at the end of the two weeks we had to do our experiment. I clearly shows that the test tubes with eight leaves on it has the most roots that have grown and with zero leaves it has the least number of roots. [5].

| Number of leaves on the stem | Average number of roots at the end of two weeks |
|:---:|:---:|
| 0 | 11 |
| 2 | 14 |
| 4 | 13 |
| 6 | 17 |
| 8 | 23 |
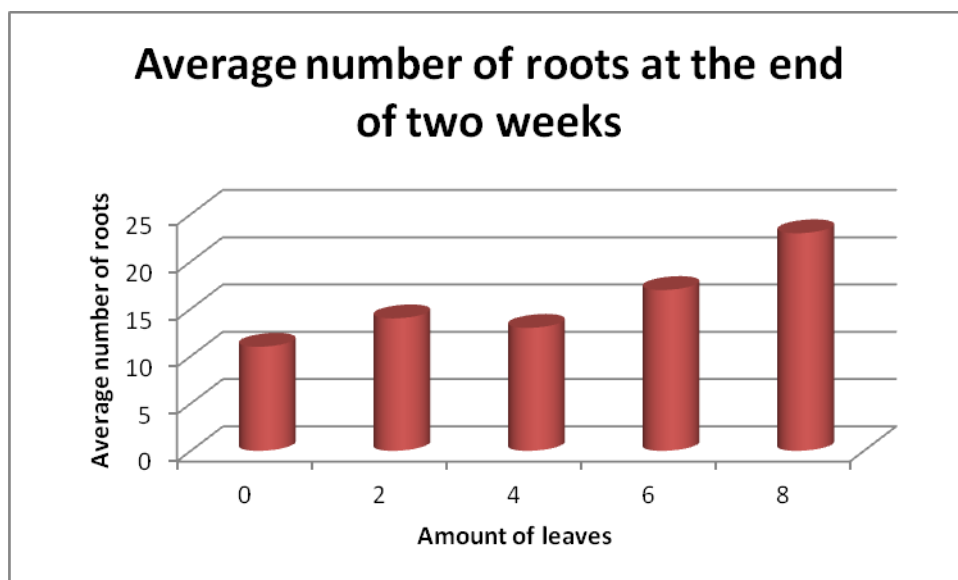


**Conclusion:** Throughout this practical investigation we were seeing if leaves were really necessary. We found out that leaves are really necessary, because the plant with the most leaves grew the most roots. We experimented with a plant with no leaves, it had the least leaves, averaging 11 roots that grew over the practical investigation. The plant with eight leaves, which was the largest amount of leaves averaging 22.9 roots that grew over the practical investigation. I predicted that more leaves in the stem there would be more roots growing [6].

**Relevant findings:** After a Google search, I could not find any other investigations on shoot and root, but I did find that there is a relationship called the root:shoot ratio. This is used to measure the overall health of your plants. My findings linked to the www.myfarm.co.nz article because my cuttings grew roots and it was influenced by the carbonhydrates supplied by the leaves. The cuttings that had the most leaves produced the most roots because they had more leaves to photosynthesize therefore had more carbonhydrates to encourage root growth [7].