

## **Student 2.**

### **Method.**

1. Get a Tahitian Bridal Veil and get 25 cuttings 5 – 10 cm long, make each cut in on a diagonal just below the node.
2. Split the cuttings into 5 groups of 5 cuttings.
3. For the first group of cuttings; cut all the leaves off the cutting except one and place each cutting in a test tube.
4. Do this for the next 4 groups of cuttings leaving one extra leaf on the cutting per group, e.g. group 2 has 2 leaves per cutting, group 3 has 3 leaves per cutting etc.
5. Place the test tubes in a rack and name each test tube with its correct group number.
6. Put a lamp on opposite sides of the rack at a distance of about ½ a metre, if too close it will dry out the leaves.
7. Observe and record the length of the roots, number of roots and the general health of each cutting. Do this every day for 2 weeks.
8. Collect your findings and collate.
9. Use your findings to generate a report.

### **Variables.**

Independent variables - For this investigation there will be only one independent variable. The independent variable is the variable that is going to be changed. In this case **the independent variable will be the number of leaves on each cutting** [1], each group as I am trying to find out if the number of leaves on a cutting effects the production of roots.

Dependent variables - For this investigation, there is more than one dependent variable necessary for me to achieve my aim. **The dependent variable is the variable/s that will be measured. These variables include the length of the roots, the number of roots and the general health of the roots and the cuttings** [2] each of these variables will be recorded daily on a daily report chart.

Controlled variables - For this investigation the **controlled variables or the variables that aren't going to change are; the temperature of the room (20°C), the amount of light on each cutting (using a lamp about ½ metre from the rack), and the type of water that the cuttings are cultured in. I will keep these all the same at all times** [3]. The type of water is important as different types of water contain different quantities of minerals, e.g. bottled water will have fewer minerals than tap water as bottled water is filtered.

### **Validity of the investigation.**

For this investigation I will be putting five groups of five stem cuttings in a test tube and growing them in water. The aim of the investigation is to find out how the amount of leaves

on a cutting effects the production of roots for that cutting. To help to reduce the biased or incorrect results during this experiment I am setting up five cuttings per group. Each group will have the same number of leaves on the cutting as the group number, e.g. all five cutting in group 1 will have only 1 leaf per cutting. The aim of this is so that the data that I collect on the growth and health of the roots will not be affected if one of the cuttings die, I will be able to judge the outcome much more accurately than if I set up only two cuttings per group.

### **Trends and patterns.**

One of the obvious patterns that I have noticed about this investigation is that, **the number of roots that a stem cutting produced increased as the number of leaves on that plant went up** [4]. By this I mean that because the group 1 had 1 leaf per cutting and group 2 had two leaves per cutting, group 2 produced more roots than group 1 because all the cuttings in group 2 had 1 more leaf per cutting than group 1, therefore they produced more roots per cutting than group 1 did. As we can see in graph A, over the period of 14 days only 16 roots grew in total for all five cuttings in group 1, whereas in group 5 33 roots grew this show the trend of the investigation really well, because as we can see it is an upward trend that shows that the more leaves a cutting has the larger the quantity of root growth will be. In my second graph there is also an upward trend that shows that the total number of roots on a plant increase greatly over a period of 14 days and rise with a rather steep gradient.

### **Conclusion.**

**From the results of my investigation, I think that I can safely conclude that I have met the aim of my investigation, "To determine the effect of the number of leaves on the production of roots in stem cuttings", and to generate a report on the findings of my investigation. From the investigation, I have found out that the number of leaves that a plant or a cutting has does indeed have an effect on the number of roots that this plant or cutting produces** [5]. Further confirmation of this is if we look at graph A on page fourteen, we can see that the root the number of roots one each cutting did increase because of the number of roots. As well as satisfying my aim, I have also discovered that the hypothesis that I made in my statement of purpose was also accurate.

### **Discussion of biological ideas.**

**From my findings, I discovered that the biologically the plant needs more leaves to grow more roots faster, this is because the plant grows its leaves to photosynthesis and catch the sun's rays to produce energy so it can use its energy to grow roots. Photosynthesis is the process the uses to turn carbon dioxide from the air and water from the soil to make its food, which is sugar, photosynthesis also needs energy to occur, this energy is light from the sun, the green colour in leaves called chlorophyll traps the light energy for the leaf to use, the sugar that is produced is used for plant growth. I learnt from another source other than my findings that "plants with a higher proportion of roots can compete more effectively for soil nutrients, while those with a higher proportion of shoots can collect more light energy" (A Dictionary of Plant Sciences | 1998 | Michael Allaby) [6].**