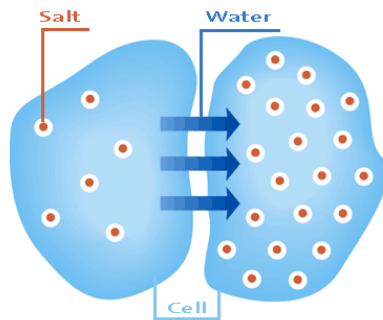**Aim- To find if the concentration of the external solution affects osmosis in plant tissue.**

I will be investigating how molrality of a salt solution affects the mass and length of potato chips during osmosis.

<u>Background information.</u>

Osmosis is a special kind of diffusion involving the movement of water molecules. Water molecules are small and can pass easily through a particularly permeable membrane that will prevent the movement of larger molecules.

This special kind of diffusion only occurs when a partially permable membrane seperates two solutions. So osmosis is the movement of water through a partially permable membrane from a region of high water concentration to a region of lower water concentration. The water is said to move down a concentration gradient.

<u>Preliminary work</u>

Aim- To find if the concentration of the external solution affects osmosis in plant tissue.

I will be investigating how morality of a salt solution affects the mass and length of potato chips during osmosis.

I am going to put potato chips into a solution of 0m water (distilled water) and 2m solution. From this I will record how the potato chips are affected by this. I will record the mass and length and see how it has changed, and how they were affected. Doing this will illustrate osmosis in the plants tissue.

Mass

Solution	Before	After
0M	3.6cm	4cm
2M	3.6cm	3.5cm

Length

Solution	Before	After
0M	2.02g	2.16g
2M	2.03g	1.49g

Percentage change increase.

We use this for a clear representation of how it has changed and increased

Percentage change increase =   Change in mass
                                     Original mass   x 100.

0M Percentage change increase = 0.14
                              2.02 = 0.069 x 100 = 6.9 An increase.

2M percentage change increase = 0.45
                              2.03 = 0.22 x 100 = 2 2.1 A decrease.

Method

I will get 2 potato chips, I will measure there size and weight, I will then put them in 2 test tubes full 20ml, one being 0M, the other being 2M. I will leave them in the the test tubes for around 20 minutes, then take them out at the same time, and take of any excess water, if the water is not taken of the results could not be fair, I take this water of by dabbing it with a paper towel. From that I will way and measure my results again, and then work out the percentage increase, of the 2 potato chips, that way I can see how the morality of a salt solution affects the mass and length of potato chips during osmosis.

Conclusion

The potato chip in the 0M grew in size and mass, it also remained solid. The 2M became smaller in size, and smaller in mass, it also became weaker and more unstable, this tells us the 2M affects the potato chip for the worse making it go bad, but the 0M solution keeps it strong and makes it slightly larger.

I feel my preliminary work helped me to understand this practical before I did my main piece and it helped with my overall work. It helped because it is a smaller version of the main one, and helped me understand the experiment better.

Method

I will start of by gathering the following equipment:
Cork borer,
Chopping board,
Measuring cylinder,
ruler,
boiling tubes,
test tube rack,

scalpel,

0M and salt solution,

2M salt solution,

cutting board,

goggles,

potato,

scales,

ruler.

I will then cut out 6 potato chips, using the cork borer. I will measure them, using a ruler they will all be 4cm in length. I shall then weigh them, using the scales, recording my results. I shall then place them in the 6 solutions of: 0M, 0.2M, 0.4M, 0.6M, 0.8M and a 1M. I will make these using a 1M and a 2M, and mix them to there appropriate Morality's. They will all have 20ml of solution. I will leave them for 24 hours, when I come back the following day I shall take them out, dry off any excess water and I will measure, and weigh them; I will then record my finding and make a graph, I will show my percentage change.

The experiment will be repeated 3 times and I will get the average. This will give me a more accurate idea of how the morality of a salt solution affects osmosis in plant tissue. I will use mass change because it shows how much the mass of the potato chip changes in mass which is the main change we are looking at in this experiment.

Hypothesis

Judging from what I know from my preliminary results, the more morality of the solution, the more the potato chip is affected; it becomes floppy and shorter with less mass.

In the solutions with a lower amount of salt they are affected less and become slightly longer and get a larger mass.

I think the 0M solution will grow in mass and length I no this because I have already done it. I think the 1M will be affected for the worse and a little less then the 2M in my preliminary

work. The 0.2, 0.4, 0.6, 0.8 I think will be affected accordingly, from 0M they will decrease in length and mass because the salt solution increases.

Apparatus:

Cork borer,
Chopping board,
Measuring cylinder,
ruler,
boiling tubes,
test tube rack,
scalpel,
0M and salt solution,
2M salt solution,
cutting board,
goggles,
potato,
scales,
ruler.

Safety

   Safety is very important when doing a practical experiment. In this experiment, such devices which could be dangerous are scalpels, the possibility of cutting yourself, boiling tubes, they called break be sharp and Cork Borers. Because of these safety hazards, goggles should be worn, and care should be taken, such as holding the equipment with care such as the: scalpel, boiling tubes and also care must be taken when carrying the solutions, if spilt they could make the floor slippery, and you could trip on the wet floor, so be sure to take caution at all time whilst doing this experiment.

Results

These are the results from my experiment; they are the averages from 3 experiments. I repeated them 3 times to get a better more accurate score, if I only did one or 2 they could vary slightly, but I think 3 is a good amount to average at.
Bellow is the length, and then mass.

Length

Solution	Before	After
0M	4cm	4.1cm
0.2M	4cm	3.8cm
0.4M	4cm	3.7cm
0.6M	4cm	3.6cm
0.8M	4cm	3.4cm
1M	4cm	3.1cm

Mass

Solution	Before	After
0M	3.1g	3.8g
0.2M	3.2g	3.6g
0.4M	3.4g	3g
0.6M	3.2g	2.7g
0.8M	3.3g	2.7g
1M	3g	2.5g

Conclusion

My results show that I was right in my hypothesis. The results are accurate and steady, with no glitches.

I am happy with this experiment, the only thing I would change next time is the amount of solutions I used and times I used repeated them, it was hard recording all the results and they could easily be lost or got wrong.

I had no problems whilst doing it, and would be confident doing a similar thing another time.