



‘Straws That Stay’

Year 5

Abstract

What did we do?

We tested how long it would take for plastic and paper straws to decompose. We averaged their weights out, and then worked out which type of straw lost the most weight.

Why did we do this?

We know from experience that adults and children use plastic straws nearly every day. We use them when we are drinking poppers at school, when we have parties or even just going out to lunch. If we are not littering our straws everywhere, the garage trucks are dumping them in a hole, getting blown away into the ocean and on our roads leaving the straws to get eaten by animals.

How did we do this?

Our group conducted a series of tests which included, burying 4 paper straws as well as 4 plastic straws with 1 control for each type of straw. We left them in the compost and mulch to decompose. We left the straws inside the mulch and compost for a certain amount of time. After that we weighed the straws and proceeded to write down our results.

What did we find out?

Our group witnessed some extremely interesting results that blew all of our minds. In the first test the paper and plastic straws decomposed the fastest compared to all of the other tests. The paper straws had a difference of 1.9g, and the plastic straws had a difference of 0.35g. We were all astonished that the plastic straws lost any weight.

Conclusion

This interesting experiment shows that paper straws lose much more weight much faster than plastic straws. On top of that this also shows that plastic straws will take up to 300 years to fully decompose or even more. The best part of this experiment is that this information will change people's minds about using plastic straws, if we change our way of thinking about deadly plastic straws we can then save plenty of animal's lives.

Introduction

Our group wanted to see if we could decrease the population of plastic straws because plastic straws can take over 500 years to fully decompose and they are killing hundreds of animals each day. Most drink cartons have a plastic straw attached to it on the side which ends up on the ground, in an animal's throat or is washed into the ocean to be consumed by marine animals. We thought it would be interesting to investigate the difference between plastic straws versus cardboard straws to find out which one decomposes more and at a faster rate.

Aim / Purpose

The purpose of this particular experiment was to determine how long paper/cardboard and plastic straws take to decompose inside compost and mulch. We were all interested in this topic because hundreds of different kinds of animal's species die each day because of plastic straws. As well as that we found out that 1 single plastic straw can take over 500 years to fully decompose no matter what size it is. The aim of this experiment is to decrease the amount of plastic straws being used and paper straws replacing them, because paper straws take a lot less time to decompose.



Hypothesis

If we **change** the types of straws (*Independent Variable*) by choosing one type of paper straw and one type of plastic straw, (*describe how you intend to change it*), then we **predict** that the four paper straws will biodegrade into the compost at a more rapid rate than the plastic straws, and both of the control straws which are placed on top of the mulch, which will maintain the same mass.

Materials & Methods / Procedure

While we were preparing our experiment we used the following materials such as: 5 Paper Straws, 5 Plastic Straws, 1 Plastic Tub [55.5cm [L] x 37.5cm[W] x 33cm [H], 1 Triple Beam Balance Scale, approximately 1 ½ Kg of compost and 500g of Sugar Cane Mulch.

Procedure

We followed this procedure:

First we all carefully put the compost inside the plastic tub about $\frac{3}{4}$ of the way. After that we put the sugar-cane mulch on top of the smelly compost until there was about 3cm worth of space till the mulch would reach the top. After that we all measured each type of straw on the 'triple beam balance scale' and recorded their original weight inside our science books. We then carefully placed 4 of each type of straw under the mulch and then we placed our control straws on top of the mulch. After waiting until the correct date to test the weight of our straws we had to clean each and every one of them. We repeated the process until we got to our final weight measurement [Test 3]. After that we were typing our document as well as our log/journal.

Variables

Independent Variable

The independent variables of 'Straws That Stay' included':

-The types of straws. [Plastic, Paper]

-How many of each type of straws. [3 plastic straws and 1 control, 3 paper straws as well as 1 control]

Dependent Variable

The dependant variables of 'Straws That Stay' included:

-The mass of the plastic and paper straws. We measured the starting mass of the plastic and paper straws and the final mass after a few weeks. We worked out the difference in the mass of each type of straw. We did this twice and then calculated the average difference in both types of straws.

Controlled Variables

The controlled variables of 'Straws That Stay' included:

-How much compost and mulch there is in the tub.

-The time that they were in the compost and mulch for.

Fair Testing - We made sure our investigation was a fair test by, changing only ONE thing, and that was the type of straw. We kept everything else the SAME.

Fair Testing, Trial Tests & Sample Size

We ensured our test was a fair test by changing only one thing and that was the type of straws that we used. We conducted several trial tests and averaged our results to increase the accuracy of our results. We also had several samples to increase the accuracy and fairness. This included having 5 different plastic straws and 5 different paper straws and we kept the straws in the compost and mulch for the same amount of time.

Risk Assessment

The risk assessment for our experiment 'Straws That Stay' is very important, because this assessment shows how we were kept safe while have lots of fun conducting the 'Straws That Stay' experiment.

We wore plastic gloves when we were taking out the two types of straws, also while cleaning the compost off of them.

We held the equipment/straws with care, just in case we broke or twisted them.

We didn't flick the straws around because the compost could get on someone's uniform or get into their eyes.

We were all careful while using the Triple Beam Balance scale because it was extremely heavy and that could have caused us dropping it and possibly hurting someone or damaging the equipment.

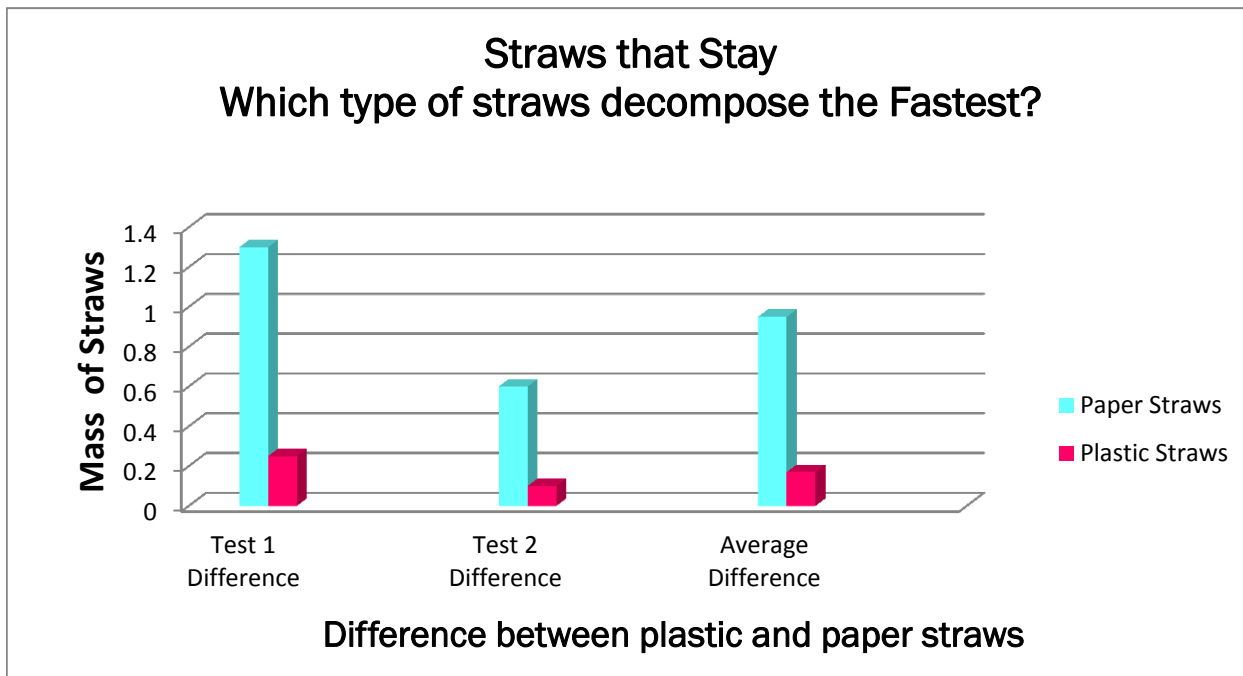
Table of Results & Results Explanation

‘Straws That Stay’					
Dates:	Starting Mass Test 1 24/06	Test 2 22/07	Difference	Test 3 27/07	FINAL Difference In Grams (Test 1 to Test 3)
Paper Straws	5.3g	4g	1.3g	3.4g	1.9g
Plastic Straws	2.95g	2.7g	0.25g	2.6g	0.35g

We believe that we got the results we have because of the time that we left the straws inside the compost and mulch for. In the 1st test we left the straws inside the compost for approximately 3 weeks, in the 2nd test we left the straws inside the compost for approximately 1 week and in the 3rd test we left the straws inside the compost for approximately 5 days.



Graph & Graph Explanation



This graph explains the interesting results we got in our experiment. The first difference of the straws was 1.3 grams. The second difference was 0.6 grams. The bars are in different colours on the graph to resemble the different types of straws.



Discussion

Describe any trends / patterns

We all noticed a trend in the experiment, that there was a much greater decrease in the mass of the paper straws compared to the mass of the plastic straws.

Can you explain the trends?

We think this happened because the microorganisms in the compost were able to eat the material in the paper straws far more successfully. The decomposition of the paper straws was more successful than the plastic straws because paper straws are a natural product made from wood and wax whereas plastic is artificial and made from chemicals, so therefore the organisms in the compost would avoid eating the plastic straws.

Were there any anomalies?

The paper straws weighted more than the plastic straws at the beginning, and the paper straws lost more than the plastic straws. However the plastic straws did not weigh as much as the paper straws and loss far less weight.

How could you improve the study?

We thought we could improve our experiment by using a different type of brand of straw, seeing if there is another way of putting the 2 types of straws in the compost, if we could use a different type of compost or soil, maybe even try water. As well as keep them in the compost for a longer amount of time.

Discussion continued...

Fairness, bias, accuracy, replication

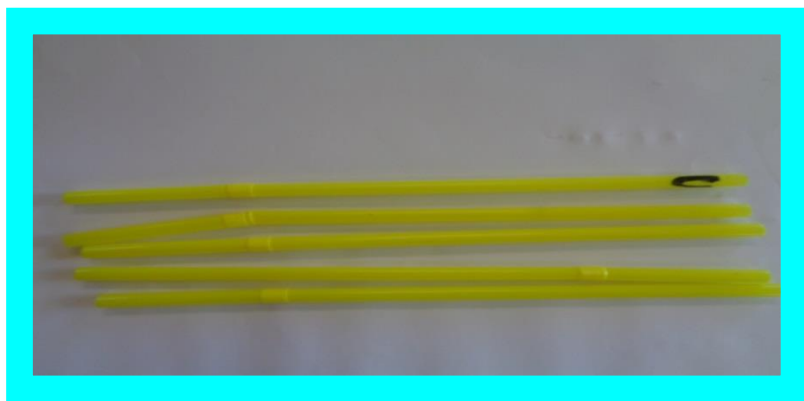
We insisted that our entire test was going to be fair but one thing. For the test to be 100% accurate we measured the straws on a Triple Beam Balance Scale so the measurements would be completely correct. We also had all of the straws in the same box of compost so there would be no difference in the amount of soil, as well as that we had the straws in the soil for the same exact amount of time.

Any ideas for future work.

In future work we have some ideas that improve our experiment, our ideas include; Leaving the plastic and paper straws in the compost for a longer amount of time, weighing the straws individually and having more types of each straw.

Conclusion

Our interesting results have supported our hypotheses because the paper straws have lost more weight than the plastic straws but strangely the plastic straws have still lost a slight bit of weight. We think we that the plastic straws lost some weight because the microorganisms could have eaten some of the plastic straws. Overall, it was alarming to find out how much more weight the paper straws lost compared to the plastic straws, and that using paper straws is far better for our environment.



References

<http://austraw.com.au/biodegradablepaperstraws/>

<http://www.scientificamerican.com/article/bring-science-home-biodegradable-products/>

http://www.sciencebuddies.org/science-fair-projects/project_ideas/EnvSci_p058.shtml#summary

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- 3) Other students- Ava. B helped provide paper straws and Plastic straws and other equipment .Other friends have helped us with understanding our work and how to set our work out.