



**‘Are health drinks really
healthy?!’**

Are adverts fooling us?

**A presentation by
Bishop Douglass School**



Bishop Douglass School...

Thriving Secondary School in East Finchley

Preoccupied by a triple science course-

-but we took the time to contemplate over the current importance of drinks to young people.

Hello! 



AND...

OF COURSE....

WE LOVE
SCIENCE!!!



‘Are health drinks really healthy?!’

Stimulus: We have all seen many adverts telling us why we should spend £ on special drinks for breakfast or sports...but we wanted to ask, are we :

- 1. Wasting our money?**
- 2. Really getting a benefit?**
- 3. Actually causing harm?**

1.

SURVEY:What do teenagers think about drinks?

Do adverts affect our opinions?

The five drinks

We **chose 3 drinks** that have recently been in lots of adverts.

Along with **water** and **Coca-cola**, we asked a random range of 50 students to vote on which they thought were the **MOST** and **LEAST** HEALTHY.



RESULTS on the SURVEY

50% thought water was the **MOST HEALTHY...**



90% thought Coca-Cola was the **LEAST** healthy

...followed by 30% for Innocent Smoothies

...10% for Lucozade Sports

... and 10% for Hydro as **MOST HEALTHY**

Our analysis

We decided to divide up into groups and to do a series of TESTS on all 5 drinks:

1. Sugar content
2. pH
3. Salt content
4. Vitamin C levels





2.

Analysis of the drinks

i. sugar content

Significance of high sugar content:



High levels in drinks could lead to OBESITY, with many medical complications yet people persist to tell us some drinks are healthy. Are they?

How we did the sugar content test:

- To test the amount of sugar in a solution we used a **Brix hydrometer**. This is a small piece of equipment used to test the density of a solution, which is a measure of the % sugar.
- We used a measuring cylinder to measure out 100ml of a chosen solution, then placed the hydrometer in it and read off the scale.



HOW much sugar?

We first looked at readings with results to known concentrations of sugar.

Concentration of sucrose in water	Percentage of sugar (w/v)		
	Trial 1	Trial 2	Trial 3
1 molar sucrose	14.5	14.5	14.5
0.5 molar sucrose	7.5	7.5	7.5
0.25 molar sucrose	4.5	4.5	4.5
0.125 molar sucrose	2.7	2.7	2.7

As you can see in the table, there is a correlation of sugar % content shown by the apparatus, with the readings.

Thus when comparing these results to the sugar content of the original drinks we can predict the molar mass of sucrose to that it is equivalent. This gives us an understanding and comparison to as to each drinks sugar content.

RESULTS

Drink	Percentage of sugar (w/v)			
	Trial 1	Trial 2	Trial 3	Trial 4
Coke	5.5	4.2	5.5	5.5
Lucozade	3.5	3.5	3.5	
Innocent	5.5	5.5	5.5	
Water	0	0	0	
Hydro	0.5	0.5	0.5	

Here you can see that we performed repeats to make our results more reliable. We had to do an extra trial for Coke as there was an outlier (highlighted) within our results.

- As we thought, **water** had no sugar as it is a mineral drink, and '**Hydro**' the next lowest %
- **Lucozade** has a moderately high sugar content..
- It is well-known that **Coke** has a high sugar content in comparison to the other drinks,
- **HOWEVER**, what was most surprising was that '**Innocent**' also had a high sugar content even though it is advertised as a 'natural' drink- it was shocking that it had the same sugar percentage as Coke!
- We may even argue that the sugar in Coke is acceptable when comparing it to Innocent- they don't push the healthy option in adverts.

Conclusion:

The aim of this experiment was to find out the actual sugar content of the drinks.

Many of our drinks are advertised as healthy or unhealthy. We feel that most are honest, but that INNOCENT Smoothie- advertised as 'healthy'- is NOT with such a high SUGAR CONTENT!





2.

Analysis of the drinks

ii. pH

Significance of v low pH

Low pH could lead to **teeth decay** due to the enamel loss that protects the teeth, and also painful **stomach ulcers**



RESULTS

Drink	pH
Innocent	3.5
Hydro water	3.0
Coke	2.0
Lucozade	3.0
water	6.8

We used narrow range pH paper. We repeated this investigation 2 times to make sure it was accurate and reliable. We didn't get any outliers.

In our findings Coke was the most acidic. This was expected.

HOWEVER, we didn't expect 'Innocent' Smoothies and 'Hydro' water to have such a high acid level.

Conclusion:

The idea of this experiment was to measure the acidity of the drinks.

We knew that Coke and Lucozade would be low pH as they are fizzy.

HOWEVER, we were surprised at the low pH also of Hydro and 'Innocent'. As 'health drinks', these would not be good for your teeth or stomach!





2.

Analysis of the drinks

iii. salt content

Significance of high SALT content:



The water/salt balance in our bodies is important.

Low salt levels will lead to dehydration, as salts are lost when we sweat.

High salt levels can cause high blood pressure, and even strokes.

How we did the test:

Equipment:

-  Drinks
-  Metal rods
-  Ammeter
-  Cables
-  Power pack

Method:

- The metal rods were connected to the cables and power pack, and placed in each drink.
- The current flowed through the drink, which was detected by the ammeter and recorded.
- The drink that allowed the highest current to pass has the highest salt content as dissolved salt conducts electricity.



RESULTS

Drinks Used	Current (A)		
	Trial 1	Trial 2	Trial 3
Coke	0.6	0.8	0.6
Still Water	0.2	0.3	0.2
Hydro water	0.4	0.3	0.3
Innocent Smoothie	0.5	0.4	0.5
Lucozade Sport	1.2	1.5	1.4

Lucozade Sport was the drink with the highest salt concentration. This drink is advertised as a “hydrating” one, so adverts are not fooling us on this.

However, drinking too much could lead to high blood pressure. Coke also has a fairly high salt concentration, so it is hydrating to an extent.

Conclusion:

The aim of this experiment was to find out the salt content of the drinks.

Hydro is advertised as one to 'replace lost electrolytes'- it does have the highest salt (but tastes awful!).

Coke would be almost as good for hydrating, and certainly tastes better!





2.

Analysis of the drinks

iv. Vit C content

Significance of Vitamin C

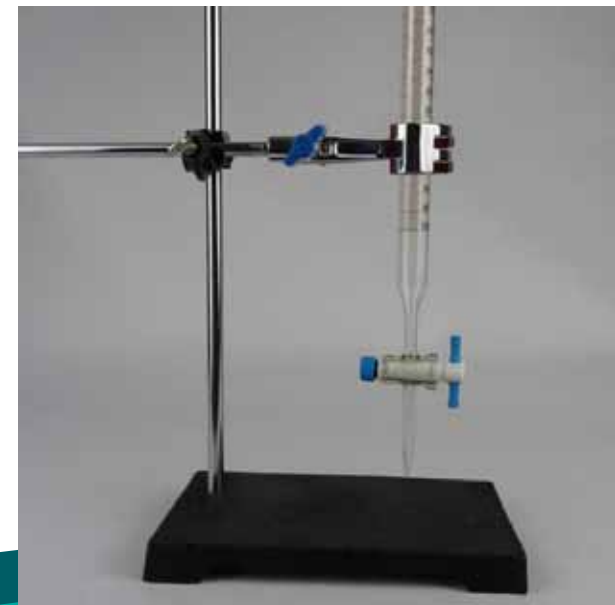


This vitamin is GOOD for general health. We are encouraged to eat fresh fruit and vegetables— remember **‘5 a day’?**

How we did the test:

DCPIP is a blue indicator, which goes colourless with Vitamin C.

We used 1cm^3 of 1% DCPIP and added the fruit juice accurately with a burette and measured the volume needed to decolourise the DCPIP. We repeated the experiment once.



RESULTS

	Volume of drink needed to decolourise DCPIP (cm ³)		
	Test 1	Test 2	Mean
Innocent	22	24	23
Hydro water	50+	50+	50+
Coke	50+	50+	50+
Lucozade	50+	50+	50+
water	50+	50+	50+

We used up the full 50cm³ of drink for Coke, water, 'Hydro' and Lucozade- this shows that **they contain no Vitamin C.** We were surprised to find that we needed a mean volume of 23cm³ of 'Innocent' Smoothie – this shows a **very low level of Vitamin C.**

We quickly tried pure lemon juice- only 0.5cm³ was needed!

Conclusion:

The idea of this experiment was to find out the Vitamin C content of the drinks.

We found that Innocent juice had very little Vit C- much, much less than pure lemon.

Again, INNOCENT Smoothie –bought the day before, and advertised as ‘healthy’ is not very good on the Vit C.






**What did we find?
What does it all mean?
What do we RECOMMEND?**




SUMMARY Main conclusions:

1. Fizzy drinks and Smoothies had HIGH SUGAR
 2. All drinks tested except water were very ACIDIC
 3. SALT Hydro has HIGH salt; Coke quite high
 4. None had much Vitamin C in them- even the Innocent Smoothie
- 



Our Investigation was **VALID** because:

- The values were close together and the spread of data was relatively small.
 - There were a few outliers, but these were excluded.
 - We conducted a reasonable amount of repeats to increase confidence in the data.
- 



Our Recommendations 1: **WHY?**


We recommend the regular drinking of WATER!

No sugar content: sugar consist of glucose and fructose, in which fructose can be metabolized (when in excessive amounts) into fat, particularly in the liver leading up to non-alcoholic fatty liver disease. Alsond insulin resistance which is caused by the build up of insulin in the blood, a stepping stone for type 2 diabetes.

Neutral pH: good for the teeth as it avoids the build up of plaque on the teeth which can lead to cavities and gum disease.

Some salt: aids blood sugar control by improving insulin senility

Cheap: Water is **free** even if you chose the bottled/filtered version, it's **STILL** cheaper than that high sugar soda.





Our Recommendations 2:

Regular intake of fruit and vegetables to get essential vitamins and minerals such as vitamins A, C and E, magnesium, zinc, phosphorous and folic acid. Vitamin C for the growth and repair of tissues.

Use **moderate salt** in your food as it avoids a higher blood pressure due to the extra water in the body.

AND DRINK LOTS OF WATER!



YES

**‘Are health drinks
advertises fooling us?’**

Example: **Innocent
Smoothies** was the
most unhealthiest.

Innocent: should it be? **“quest to make natural
delicious, unhealthy drinks that
help people live well and die young”**



Thank you!

Any questions?

