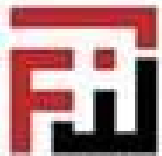


Which Sport Drink will you drink for your "elect" for your lite?

By: Alli and Alyssa



FOX WEST
ACADEMY

A Collaborative Learning Community

What is our project?

Our project is about how many electrolytes are in sports drinks and what electrolytes to your body.

We will be surveying students, live experts, and maybe even family members.



Why did we decide to do this project?

We decided to do this project for many reasons. When we were reading the list of options, this one popped out to us. It sounded really interesting. We also really like sports drinks so we were wondering what was all in them.



All about electrolytes



First of all, what are electrolytes?

Definition:

1. A liquid or gel that contains ions and can be decomposed by electrolysis, e.g., that present in a battery
2. The ionized or ionizable constituents of living cell, blood, or other organic matter.

Examples of electrolytes:

- sodium (Na^+)
- potassium (K^+)
- chloride (Cl^-)
- calcium (Ca^{2+})
- magnesium (Mg^{2+})
- bicarbonate (HCO_3^-)
- phosphate (PO_4^{2-})
- sulfate (SO_4^{2-})

Electrolytes are things your body needs to keep you energized. Some people drink sports drinks to stay energized for a sport event or something they need to be "hipper" for.

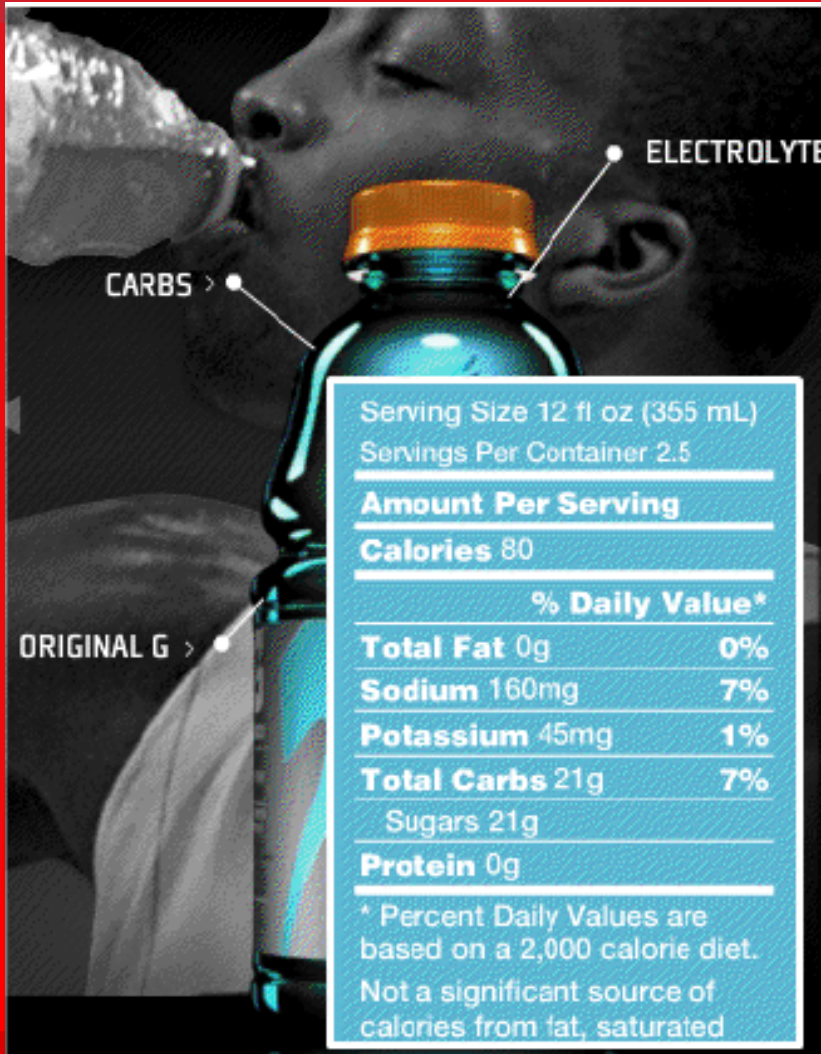
What do electrolytes do to your body?

Electrolytes are things like potassium and sodium. You need the right balance of them in order to stay active and feel energized. Without electrolytes you will feel tired. That is why sport drinks have electrolytes, they help you feel awake and active. They also carry an electric charge, that is why you can charge your ipod using an onion and gatorade.

Types of Sports Drinks

and their electrolyte count.

Gatorade



The image shows a person drinking from a Gatorade bottle. A nutrition label is overlaid on the bottle. The label includes the following information:

Serving Size 12 fl oz (355 mL)
Servings Per Container 2.5

Amount Per Serving

Calories 80

% Daily Value*

Total Fat 0g	0%
Sodium 160mg	7%
Potassium 45mg	1%
Total Carbs 21g	7%
Sugars 21g	
Protein 0g	

* Percent Daily Values are based on a 2,000 calorie diet.
Not a significant source of calories from fat, saturated

Labels in the image: CARBS >, ORIGINAL G >, ELECTROLYTE

The electrolytes in this drinks are Sodium, and Potassium.

The total electrolyte count is 205 mg in a 12 fl oz bottle.

Propel

The highlighted ingredients are electrolytes.

The total electrolyte count is 80 mg in a 8 fl oz. bottle.

Nutrition Info:				
	Per Serving		Per Container	
Serving size 8 fl oz (240 mL)				
Servings per 16.9 fl oz container: About 2				
Learn about serving sizes.	8 fl oz	%DV*	16.9 fl oz	%DV*
Calories	0	-	0	-
Total Fat (g)	0	0	0	0
Sodium (mg)	80	3	170	7
Total Carbs (g)	0	0	0	0
Sugars (g)	0	-	0	-
Protein (g)	0	-	0	-
Vitamin A	-	0	-	0
Vitamin C	-	20	-	40
Calcium	-	0	-	0
Iron	-	0	-	0
Vitamin E	-	10	-	20
Niacin	-	25	-	50
Vitamin B6	-	25	-	50
Pantothenic Acid	-	25	-	50

Powerade

POWERADE ZERO MOUNTAIN BLAST

Servings per package: 1

Serving size: 600 mL

Ave. Quantity	per Serving	%DI*	per 100mL
Energy	41kJ	0.5	6.8 kJ
	9.6Cal	0.5	1.6Cal
Protein	0.3g	0.6	0.05g
Fat, total	0g	0	0g
- saturated	0g	0	0g
Carbohydrate	0.6g	0.2	0.1g
- sugar	0g	0	0g
Dietary Fibre	0g	0	0g
Sodium	306mg (13.2mmol)	13	51mg (2.2mmol)

*% Daily Intake per serve is based on an average adult diet of 8700kJ.

Your daily intake may be higher or lower depending on your energy needs



The electrolytes in this powerade drink are sodium, and energy.

The total electrolyte count is 57.8 per 100 mL.

Vitamin Water(Energy)

The electrolytes in this drink are sodium, potassium, and magnesium.

The total electrolyte count is 0...

20 fluid ounce vitaminwater , nutrition facts serving size 20 fl oz (591 mL)		 power-c (vitamin e & taurine) dragonfruit*	 energy (b vitamins & guarana) tropical citrus*
calories		120	120
total fat	g	0	0
sodium	mg	0	0
total carbohydrates	g	32	32
sugar	g	32	32
protein	g	0	0
daily value			
potassium	3500 mg	†	†
vitamin a	5000 IU	-	-
vitamin c	60 mg	150%	100%
calcium	1000 mg	†	†
vitamin e	30 IU	-	-
niacin (vitamin b3)	20 mg	-	100%
vitamin b6	2 mg	100%	100%
vitamin b12	6 µg	100%	100%
pantothenic acid (vitamin b5)	10 mg	100%	100%
magnesium	400 mg	†	†
zinc	15 mg	25%	-
chromium	120 µg	25%	-
manganese	2 mg	-	-
plus ups			
glucose	g	-	-
taurine	mg	25	-
natural caffeine	mg	-	50
guarana	mg	-	25
choline	mg	-	-
herbs and fruit extracts	mg	-	-

Questions to answer...

Is coconut water a good thing to drink after sports or workout?

The coconut water outburst may have taken health-conscious exercisers off guard, but there are some health bonuses from drinking Coconut water. Five electrolytes are in one bottle of coconut water! One surprising fact is that there is more potassium than a banana! coconut water seems like an great citrus fluid to refuel your body after a great workout or sports activity. Researchers, and scientists found that coconut water may live up to what they thought. Coconut waters huge overload of potassium may not make it a good sports drinks. As Liz Applegate, sport-nutrition director at UC Davis, told Mother Jones, "Even though the belief is that when you exercise you need a lot of potassium, sodium is more important. When you sweat, you lose a lot more sodium than potassium."

Read more: <http://www.foxnews.com/leisure/2012/08/05/sports-drinks-myths-busted/#ixzz2JNE6uSD3>

More on coconut water...

How Does Coconut Water Benefit You During Exercise?

Coconut water is an all natural isotonic beverage, meaning its rich in minerals your body needs to replenish during and after physical activity.

Coconut water is especially rich in potassium and sodium electrolytes, which are the main electrolytes lost when you sweat. Coconut water also contains:

- Magnesium
- Calcium

Phosphorus: *Its rich electrolyte content makes coconut water one of the best drinks you can consume while working out.*

-

Additionally, coconut water contains essential vitamins, including vitamin C and B vitamins.

Vitamin C works to boost your immunity. When you workout, you can become fatigued more easily.

What is the purpose of drinking sports drinks??

This explanation is pretty short, but it is because sports drinks are mainly meant to replenish electrolytes which are lost through perspiration.

(perspiration is the process of sweating)

According to nutritionists-how long does your workout have to last in order to get the benefits from drinking a sports drink?

Here is what Doctor Oz says:

Sports drinks may have some of the coolest commercials, but they're necessary only if you exercise vigorously for more than sixty minutes in a row. They rehydrate your body faster than plain water after long periods of exercise because they contain minerals and electrolytes that hasten the absorption of water. But if you drink non-diet sports drinks regularly or after short or not particularly strenuous workouts or as pick-me-ups in the morning or afternoon, you'll end up consuming more calories than you've burned.

How many teaspoons of sugar are in a typical sports drink?

There are normally around 40 mg of sugar in a normal sports drink.

How many teaspoons of sugar are in Gatorade G Orange?

14 grams per serving or 35 grams per container.

www.gatorade.com





Sugar	Ingredients	Sugar-Free	39 grams	31 grams	27 grams	52 grams
Sodium		39 mg	140 mg	40 mg	180 mg	260 mg
Caffeine		150 mg	114 mg	160 mg	160 mg	260 mg
Niacin		10 mg	28 mg	20 mg	20 mg	not listed
Vitamin B-6		5 mg	7.2 mg	2 mg	2 mg	4 mg
Vitamin B-12	Vitamins	125 mcg	7.2 mcg	6 mcg	6 mcg	0.6 mcg
Vitamin C		50 mg	--	--	--	--
Vitamin E		12.5 IU	--	--	--	--
Ready to Drink		--	✓	✓	✓	✓
Antioxidants	Additional Info	✓	--	--	--	--
Different Flavors		--	--	✓	✓	--
No Crash		✓	--	--	--	--
Cost per serving		\$1.15	\$2.99	\$1.25	\$1.25	\$2.50

Questions that we asked Lambeau Field

(with Brett
Pinaro)



What do your football players drink on the field?

They provide:

- Water
- Gatorade original
- Gatorade endurance
- Sugar Free Osmo

They actually add electrolytes to all of these and then they also have plain types too.

Why did you choose to use these drinks and does it have to do with electrolytes?

They like getting the packers full with electrolytes.

They also want the packers to stay hydrated.

They do this to avoid cramps and dehydration.

Do the players like this and do they have any input??

They players are provided with what the Lambeau Field coaches think is best for them. They have a variety of drinks that they can choose from. The players do not get to pick what Lambeau puts out for them.



Our Experiment

What do we need??

Materials:

- 1) Conductivity Probe
 - 2) iPad
 - 3) Labquest
 - 4) 5 Large Graduated Cylinders
 - 5) Distilled Water
 - 6) Sink
 - 7) Large counter space
 - 8) Propel
 - 9) Gatorade
 - 10) PowerAde
 - 11) Vitaminwater
 - 12) Tap water
 - 13) Goggles
 - 14) Flash Drive
 - 15) One wide container that measures about 140
- *USE ALL OF THE SAME FLAVOR OF DRINK***



First of all, how do you use a CONDUCTIVITY PROBE??

Instructions

1. Connect and secure the conductivity probes to the adapter. Screw the adapter to the data logger's input.
2. Dip the probe into a beaker solution of 0.01M potassium chloride (KCl). Make sure the cell portion of your conductivity probe is submersed in the solution. Stir the solution with the probe inside with a metal stirring rod to remove any air bubbles.
3. Analyze the readings. The conductivity is measured by the standard conductance value, microSiemens (mS). Depending on the temperature of your solution, the conductivity of the solution will change.
4. Calibrate the conductivity probe by controlling the temperature of solution and submerging the probe in 0.01 M KCl. Set the temperature to 5 degrees Celsius and measure the conductivity. If it does not read 896 mS, turn the calibration screw with a flat head screwdriver to adjust the measurement to 896 mS.

Alli's Hypothesis

My hypothesis is that the PowerAde will have more electrolyte than the Gatorade, vitaminwater, propel, water, and coconut water. I also think that the tap water will have barley any electrolytes. When we do the taste testing, I think that 60% of the people will know what the drink is.

Alyssa's Hypothesis

I think that the Gatorade will have more electrolytes than all the other sports drinks because Gatorade has a lot of electrolytes and Gatorade is one of the biggest sellers for sports drinks. I drink Gatorade and it really helps recharge your body and I believe it will have most.

Our Experiment Instructions

1. Turn on the Labquest by pressing the red button on the top.
2. Then, on the screen, press Labquest app. A screen that pops up should look at this. If it is already a screen that has a play button on the bottom left hand corner, and file and sensors on the top, you do not have to do this step.
3. Plug in the white plug in on the conductivity probe into CH. 1 on the left side of the Labquest. It should click and there should be a red text box that has CH. 1: Conductivity on the Labquest screen, and there will be numbers on it.
4. On the right side of the screen, there is 3 boxes that say mode , rate and duration. Click on duration. Now a different screen will pop up.
5. Click on the duration. It will have a number highlighted on the screen and Duration on the top. Change the number to 600 by clicking the backspace and then using the numbers to 6-0-0.
6. Then, click DONE in the bottom right hand corner.
7. Then click OK in the bottom right hand corner.
8. Now, change the view by clicking the graph which is located in the top right hand corner. A blank graph should pop up.
9. Now, set the Labquest aside and take out the 5 graduated cylinders.
10. Rinse out each graduated cylinder with distilled water very good.
11. Measure out each drink in a different graduated cylinder so each drink measures to 100 mL.

12. Now, line up the different drinks in a row so you can quickly clean the probe and put it into the last one.

13. On the conductivity probe cord, there is a put that has a notch on them. Make sure it is on the middle so it is pointing to/ next to the 0-200 range.

14. On the bottom left hand corner, there is a play button. Push that button. It should start recording.

15. Rinse the probe off with distilled water but make sure that the metal stick is FULLY rinsed off.

16. Put the Probe in one of the drinks and count it for 30 seconds. Make sure the metal stick is FULLY in the drink that you are doing. Then, swirl it and let it sit.

17. Take it out and rinse it out with the distilled water. Make sure the little metal stick in the tester is rinsed fully.

18. Dip the stick in the rest of the drinks but make sure to FULLY clean the stick with distilled water before doing the next drink.

19.

When you are finished, click the red square in the bottom left hand corner.

20. Now, plug in your flash drive in on the top of the Labquest. The plug in is called DIG 1.

21.

Now, push file on the top left hand corner of your Labquest screen.

22. Then, push save.

23. Now, there is a picture of a Flash Drive on the top. Click on that.

24. You can now name it whatever you want by clicking the text box that has untitled.

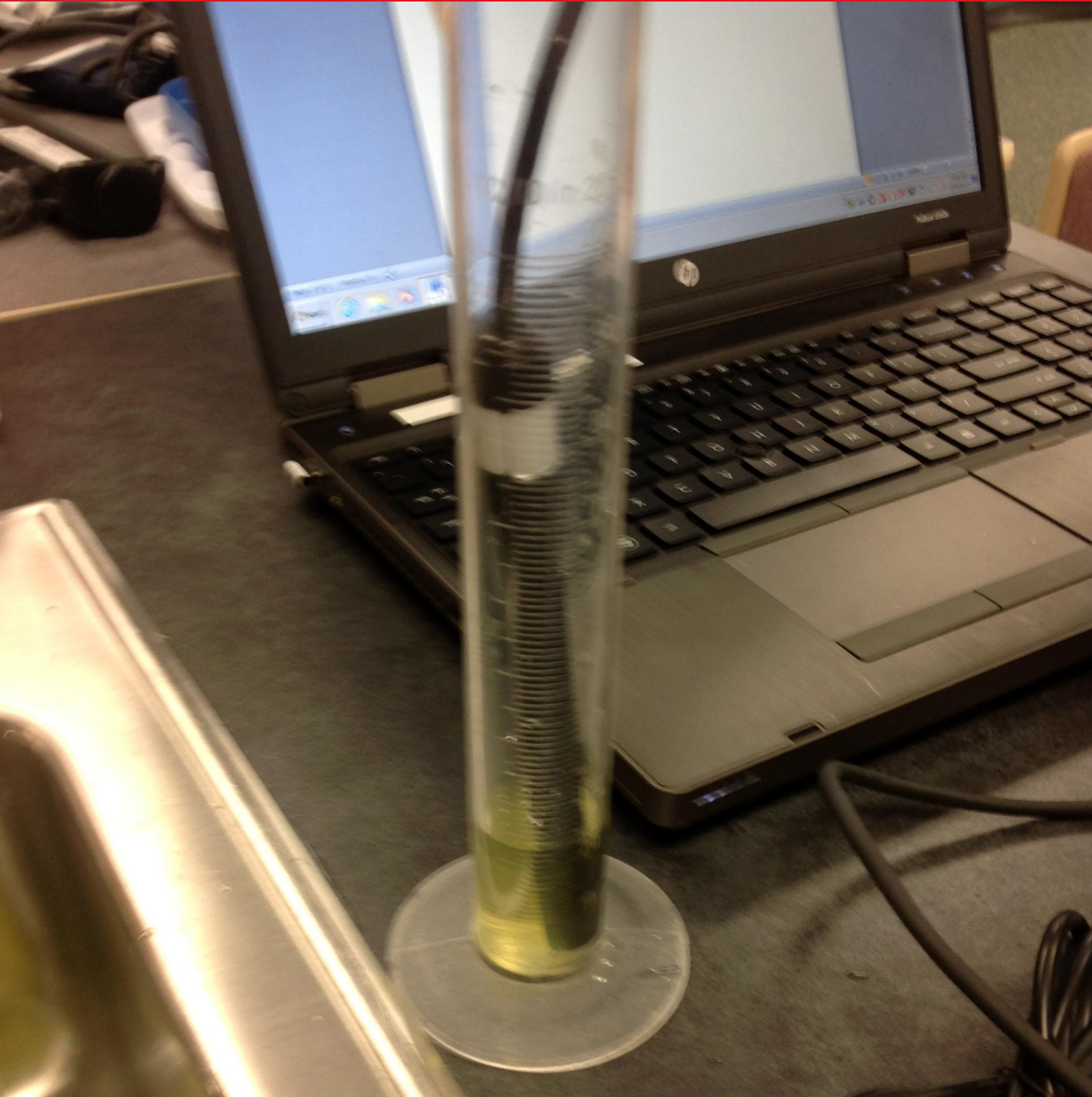
25. When you are finished naming it, press save in the bottom right hand corner.

Now, you can go onto the computer and edit the graph by opening it on your flash drive.

Instructions made by: Alli

Pictures





RANGE (μS)

0-20000

0-200

0-2000

The main electrolytes in Body Fluid.



Na^+	Sodium Ion
Cl^-	Chloride Ion
Mg^{2+}	Magnesium Ion
Ca^{2+}	Calcium Ion
K^+	Potassium Ion

Each ion has its own rules, and body movement is a result of the function of these ions.

Alli's Conclusion

In class, we have been doing an experiment with measuring electrolyte levels of different sports drinks. We learned how to use a conductivity probe and how to find out levels on a graph.

In my hypothesis, I thought that PowerAde would have the most electrolytes, and water would have some electrolytes. I was exactly right. PowerAde had the most of all and water had a total of 217.2 uS/cm. I was really surprised that water had electrolytes in them. I have learned that even though many people think sports drinks are not the best choice to drink, it is a good way to balance your electrolyte count in your body.

The purpose of sports drinks is to replenish the body of what it has lost during exercise, such as fluids and minerals. Sports drinks also contain electrolytes, which are substances containing ions that the body needs to have good blood chemistry and muscle action. Since sports drinks contain sugar and calories, they may not be the right thing for people who are looking to lose weight. Instead, water with electrolytes may be consumed. Because I found out that there are electrolytes in water, you can drink water to also "fuel" you up with electrolytes. If sports drinks are not the thing for you, consider drinking water.

I think this information would be helpful to any sports player or any athletic person that is wondering about what they are drinking if they drink Powerade, Gatorade, Propel, coconut water, Kwikade, or any drink that has electrolytes in it. If there are people who are on a diet and are wondering what to drink during their workout, this would also be very helpful.

If someone is working out daily not hard for 1 hour on a treadmill and drinking sports drinks, and wondering why they are GAINING weight, I learned that you need to be working out vigorously for more than sixty minutes in a row to get the full benefit of sports drinks. Otherwise, the purpose of sports drinks is useless.

If I would do this experiment again, there is not much I would change, I would probably change the flavors though and see if that has to do with the electrolyte count. Then, I would get more containers to make sure that any left over electrolytes is not in the container.

One thing that I think was an error was the electrolyte count in the water. I was unsure if that was the correct amount, so I re-tested it. The first time I got 217 electrolytes and then the second time I got 279.2. Next time, I will make sure that it is accurate.

Alyssa's Conclusion

In class, we have been working on our sports drink experiment also I learned how to use a conductivity probe and measure the electrolytes in a sports drink bottle.

My hypothesis was that I think that Gatorade will have the most electrolytes because Gatorade is the main sports drink. So I would think that Gatorade will have the most out of the seven. My hypothesis was proven WRONG. :(

In the end, PowerAde had the most electrolytes, and I thought that Gatorade would have the most electrolytes. PowerAde had the most out of all seven sports drinks we chose: Powerade, Gatorade, Coconut water, Vitamin water, Kwikade, and tap water. The biggest thing learned in this experiment is what electrolytes are and how many are in each sports drink and what they do to your body.

If we would do this again, I would use different flavors but from the same brand to see if the flavor really matters. Such as all gatorade but the flavors would be lemonade, berry, grape, orange, and blueberry.

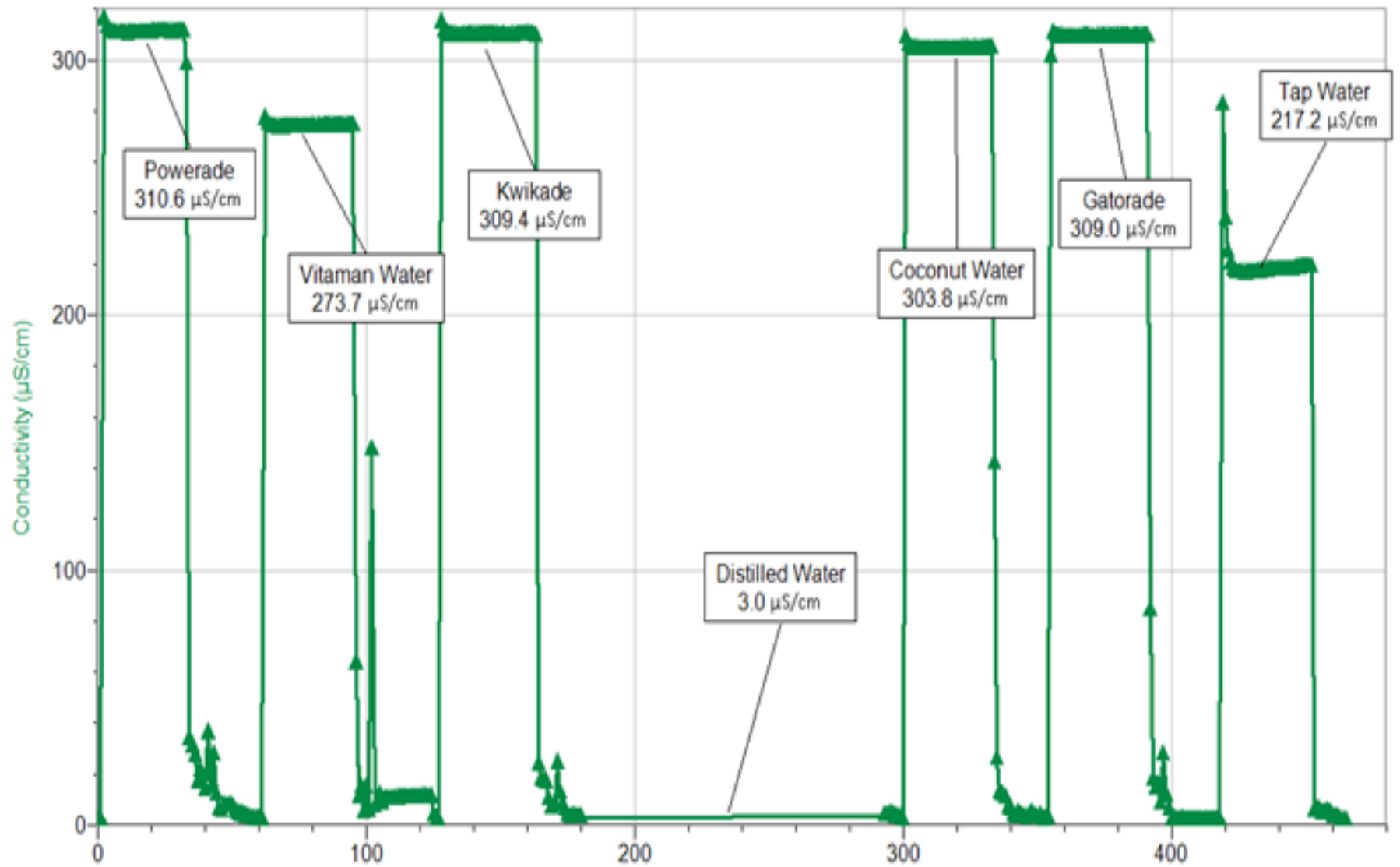
The one error in our experiment is that the tap water electrolytes may not be correct, the first time we tested it there was 217 and the second time we got 279.2

Errors...

One error that we might have made would be measuring the electrolytes in water. We thought this because the graph looked a little weird. The line went up and then down and then back up into a straight line. Because we thought this, we tested it again.

We think we got a more accurate number because the graph was one straight line and there was only one number.

Results



A summary the results...

- Our graph shows that powerade had the most electrolytes which is 310.6 $\mu\text{S}/\text{cm}$.
- The second greatest just beating gatorade by .4. Kwikade electrolyte count was 309.4 $\mu\text{S}/\text{cm}$, and Gatorade had 309.0 $\mu\text{S}/\text{cm}$.
- Next was coconut water with 303.8 $\mu\text{S}/\text{cm}$.
- Then, Vitaminwater with 273.7 $\mu\text{S}/\text{cm}$.
- Finally, Tap water was 217.2 $\mu\text{S}/\text{cm}$.
- And surprisingly, the distilled water, (what we rinsed everything of with,) had 3.0 $\mu\text{S}/\text{cm}$.

Results

Sports Drink	Electrolytes Present	Electrolyte Amounts on bottle (in mg.)	Electrolyte total mg/fluid oz.	Sugar Content	Tested Electrolyte Levels
PowerAde-Orange	Potassium	87.5	7.4	20g	310.6 μ S/cm
	Sodium	150			
	Magnesium	*			
Kwikade-Orange	Sodium	440	17.5	14g	309.4 μ S/cm
	Potassium	120			
Vitamin Water-Tropical citrus	Sodium	0	0	32g	273.7 μ S/cm
	Potassium	*			
Gatorade Thirst Quencher-Orange	Sodium	400	403.5	21g	309.0 μ S/cm
	Potassium	112.5			
Tap Water	????	???	??	0	217.2 μ S/cm
Coca-nut water-Mango Mandarin	Sodium	900	120	8g	303.8 μ S/cm
	Potassium	1500			

QR code- MNT.com (If you want more information)



Extra experiment

Taste testing.

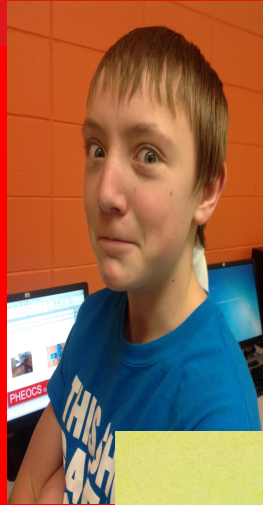
Taste testing experiment

For our extra experiment, we will be doing a taste testing test. We will have coconut water, gatorade, powerade, and Kwikade. We will be surveying different student around the school and see how well they know their sports drinks. We will be doing it in certain order and will not be changing it for every person.

p.s. We WILL be having different cups for each experiment on different people. Don't worry. :)

People we tested:

1. Josh
2. Nicole
3. Makenna
4. Lauren
5. Rick
6. Sam



Order of our operation:

1. Powerade Orange



2. Gatorade Orange

3. Coconut Water- mango



4. Vitaminwater- Tropical Citrus



5. Kwikade- Orange

Results: Josh

5/5

Name of Sports Drink	Guess correct?	Guessed answer if wrong:	What flavor?
Powerade Orange	Yes	_____	Orange
Gatorade Orange	Yes	_____	Orange
Coconut Water	Yes	_____	Mango
Vitamin Water Tropical Citrus	Yes	_____	Flavored Juice
Kwikade Orange	Yes	_____	Orange

2/5

Results: Nicole

Name of Sports Drink	Guess correct?	Guessed if answered wrong:	What flavor?
Powerade Orange	No	Kwikade	Orange
Gatorade Orange	No	Vitamin Water	Yellowish
Coconut Water Mango	Yes	_____	Mango
Vitamin Water- Tropical Citrus	Yes	_____	Tropical Citrus
Kwikade- Orange	No	Powerade	_____ Does not know

4/5

Results: Makenna

Name of Sports Drink	Guess correct?	Guessed if answered wrong:	What flavor?
Powerade orange	No	Kwikade	Orange
Gatorade	Yes	_____	Orange
Coconut Water -Mango	Yes	_____	Mango
Vitamin Water	Yes	_____	Tropical citrus
Kwikade	Yes	_____	Orange

Results: Lauren

1/5

Name of Sports Drink	Guess correct?	Guessed if answered wrong:	What flavor?
Powerade Orange	No	Gatorade	Orange
Gatorade Orange	No	Vitamin Water	Lemon
Coconut Water	Yes	_____	Mango
Vitamin Water- Tropical Citrus	No	Kwikade	Orange
Kwikade- Orange	_____	_____	_____

Results: Rick

Name of Sports Drink	Guess correct?	Guessed if answered wrong:	What flavor?
Powerade Orange	No	Gatorade	Orange
Gatorade Orange	No	Kwikade	Orange
Coconut Water Mango	Yes	_____	Mango
Vitamin Water Tropical Citrus	No	Powerade	Fruit Punch
Kwikade	Yes	_____	_____

3/5

Results: Sam

Name of Sports Drink	Guess correct?	Guessed if answered wrong:	What flavor?
Powerade Orange	Yes	_____	Orange
Gatorade Orange	Yes	_____	Orange
Coconut Water Mango	Yes	_____	Orange
Vitamin Water Tropical Citrus	No	Sobi Water	Orange
Kwikade Orange	No	Powerade	Orange