Ms. Maclean

H N C

grade 9

Nov. 4 2019 to Dec. 6 2019

P

Savannah

Organic Chemistry

B

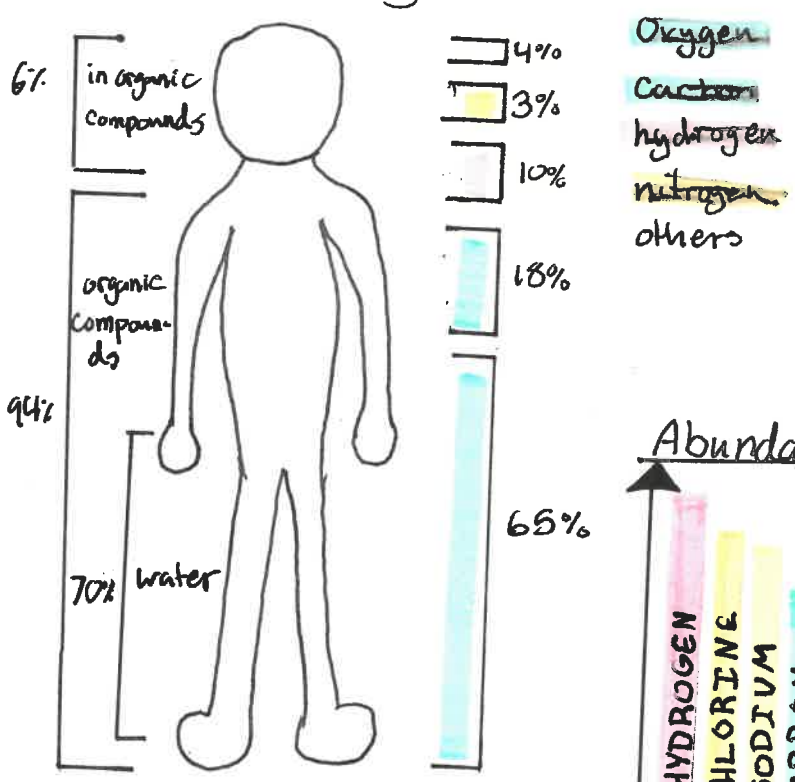
O F

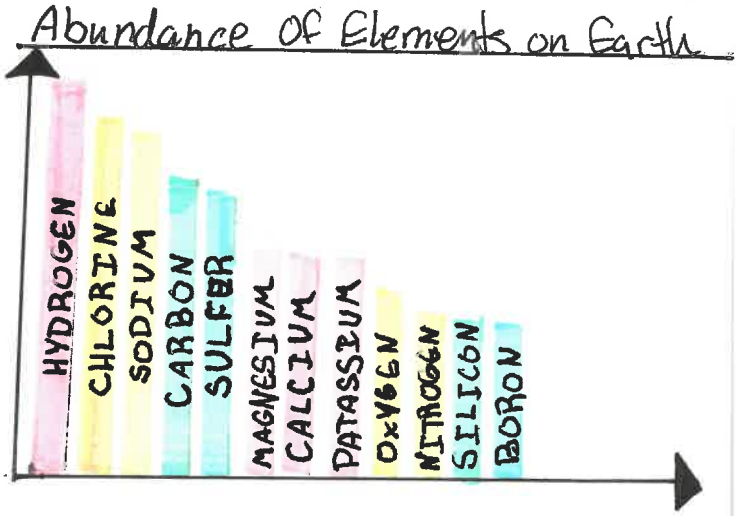
TABLE OF CONTENT

Chemistry | Organic Elements on Earth | grade 9 | Nov. 4-5 2019

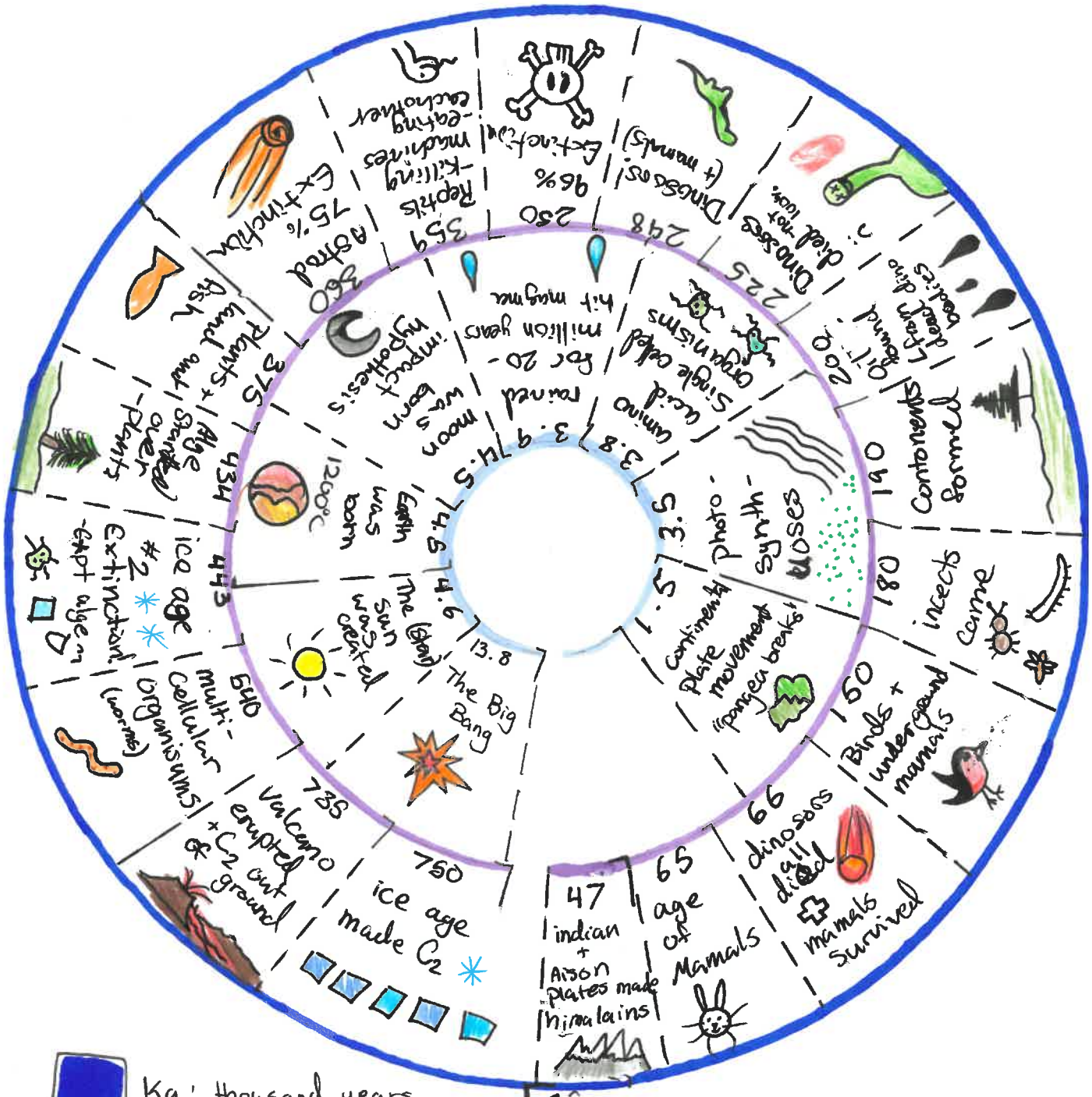
After the Big Bang things in the universe started to happen. The first elements were hydrogen and helium. They were here because of the Big Bang. Then lithium, carbon and nitrogen joined the party. They came because low-mass stars burned out and died. Next on the list came boeryllium and boron. Which came from cosmic ray fission. It started get a bit easier. Later these massive stars exploded and they brought Oxygen → phosphrus → sulfur.... → rubidium. Since all these elements where here, life started to form.

in the human body we have.....





Chemistry | History of Planet Earth | grade 9 | Nov. 5 2019



Ka: thousand years ago

Ma: million years ago

Ga: billion years ago

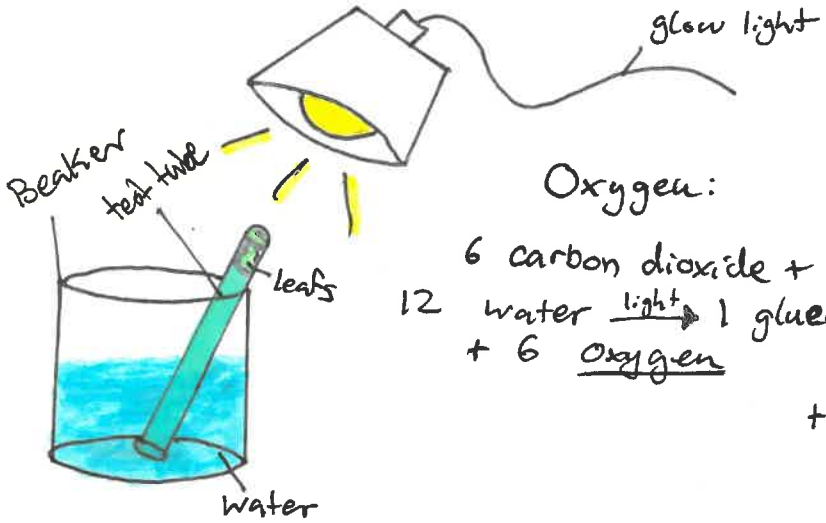
Chemistry grade 9

Solar energy and Radiation

Nov. 7 2019

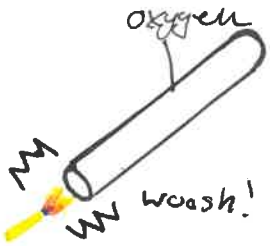
Solar energy can effect the living on earth to a mass amount. There are three levels of the ocean. ① The Euphotic (daylight) zone is at the top and is where photosynthesis can happen because sun light can reach there. ② The Dysphotic (twilight) zone is at 660 ft under and almost no sunlight can reach here, but photosynthesis can not accure. ③ The Aphotic (midnight) zone is 3300 ft below sea level and no sun light can reach down there, so no photosynthesis can accure. The only source of light is caused by bioluminesents organisms. When sunlight hits water it scatters. 5 to 10% of sunlight that goes into the water is scattered. 90% of sunlight is absorbed at 1 meter of sun depends on the position of the sun. Through convection and wind heat transfers to all the oceans top. Under the water microscopic organisms produce oxygen and absorb C_2. Fish closer to the top are able to see colour (better), because they get sunlight. Fish with UV vision see clear fish in the deep waters, because they dont get sunlight. The majority of photosynthesis comes from the ocean. PAR is the light range for photosynthesis. It is 400 to 700 nm range. It is important for all living organisms for photosynthesis to happen because it is why we live. UV, UVA, UVB will effect this process. If water is covered by snow or ice it will stunt the process of photosythesis as well. The earths surface reflects and traps radiation, which warms the earth making the air warm. Then the hot air rises. UV light is from the sun. It decresses photosynthesis by 20%, but our clouds and atmosphere block most of the radiation. Infered light is 49.9% solar and can not go through the ocean.

chemistry | gases of life | grade 9 | Nov. 9 2019

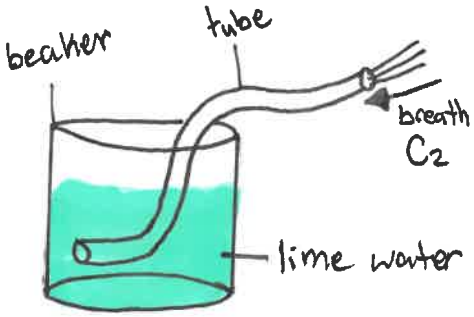


Oxygen:

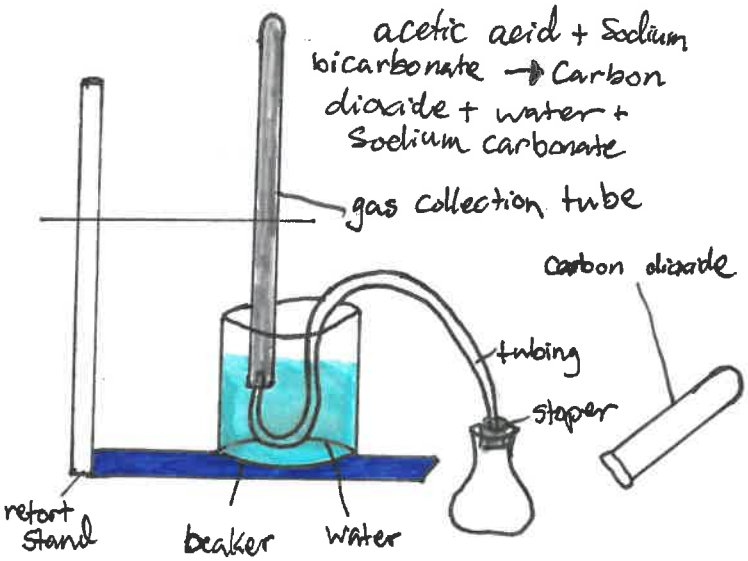
6 carbon dioxide + 12 water $\xrightarrow{light}$ 1 glucose + 6 <u>Oxygen</u> + 6 water



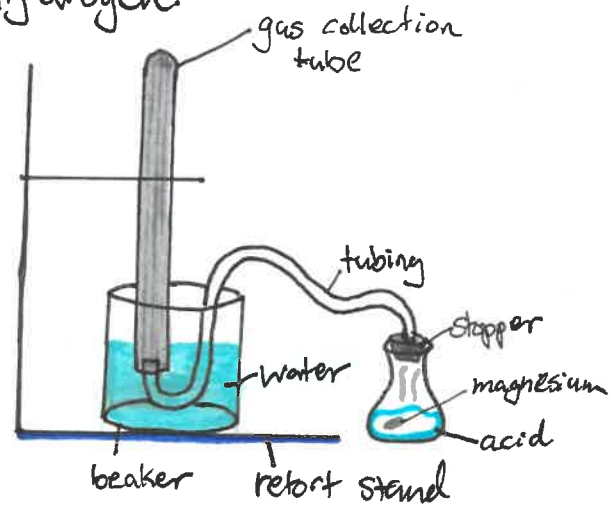
Carbondioxide:



acetic acid + Sodium bicarbonate → Carbon dioxide + water + Sodium carbonate



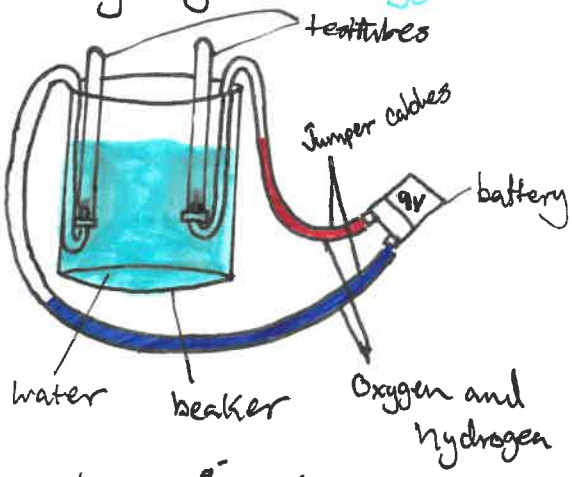
Hydrogen:



metal + acid → hydrogen + metal

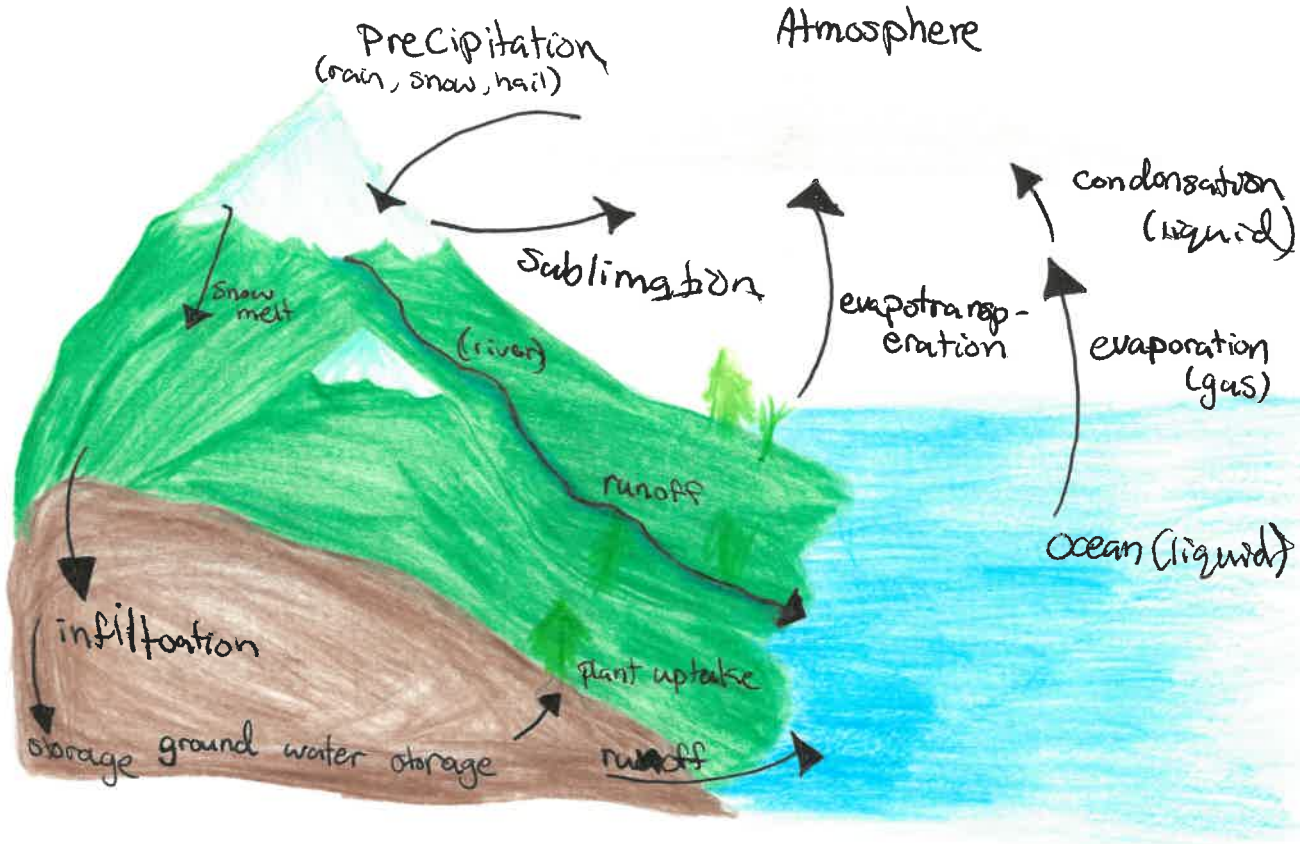
magnesium + muratic acid → hydrogen + metal

hydrogen + Oxygen:



water $\xrightarrow{e^-}$ hydrogen gas + Oxygen gas

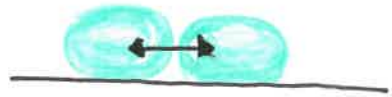
Chemistry | The water Cycle | grade 9 | Nov. 18 2019



Properties of water

Surface tension is waters ability to hold together (through attractive forces) at its surface. It creates a film or connected bridge, which can hold up (floating) solid objects.

Cohesion is waters ability (desire) to form a whole and merge with other bodies of water. Due to the polar nature of H_2O.



Behaviors of water

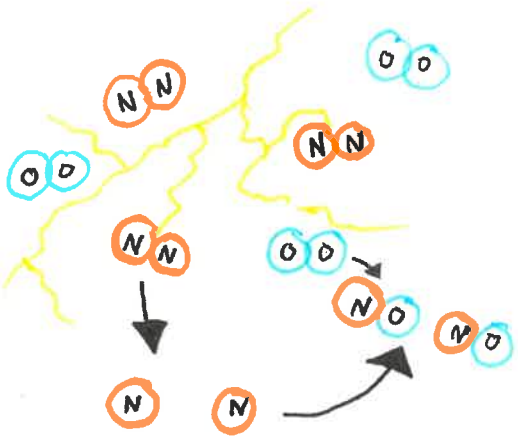
① liquid water travels down due to gravity (driven by mass).

② water will form due to surface tension.

③ water will stick together and merge with other water, due to cohension.

chemistry | The Nitrogen Cycle | grade 9 | Nov. 20 2019

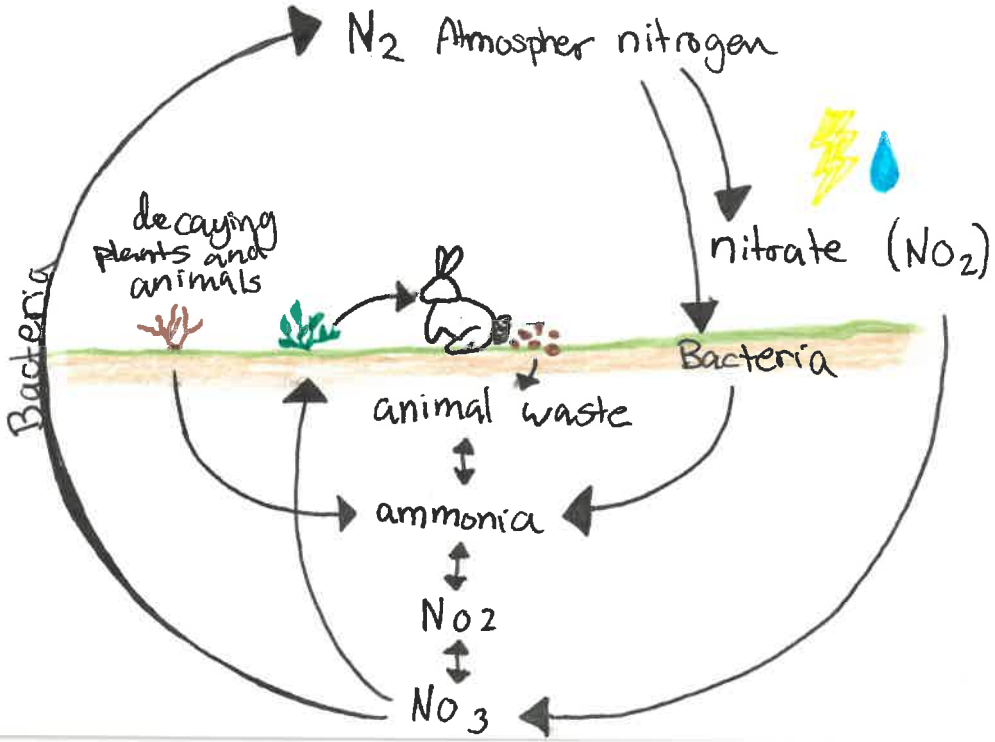
Nitrogens natural form is gas. It's all in the air in the clouds. Nitrogen gets transferred to the earth through lightning and rain. When lightning strikes it splits nitrogen making it unstable. The unstable nitrogen then often bonds with Oxygen creating a bionurient called nitrate, which gets put into the air. (NO_3^-). When it rains it takes the extra nitrogen (cold/water/ice) and falls to the earth. It also pulls down the nitrate in the air. It falls into the soil and onto plants. The plants absorb it through their roots and leaves. We then eat the leaves and plants giving our bodies nitrogen.



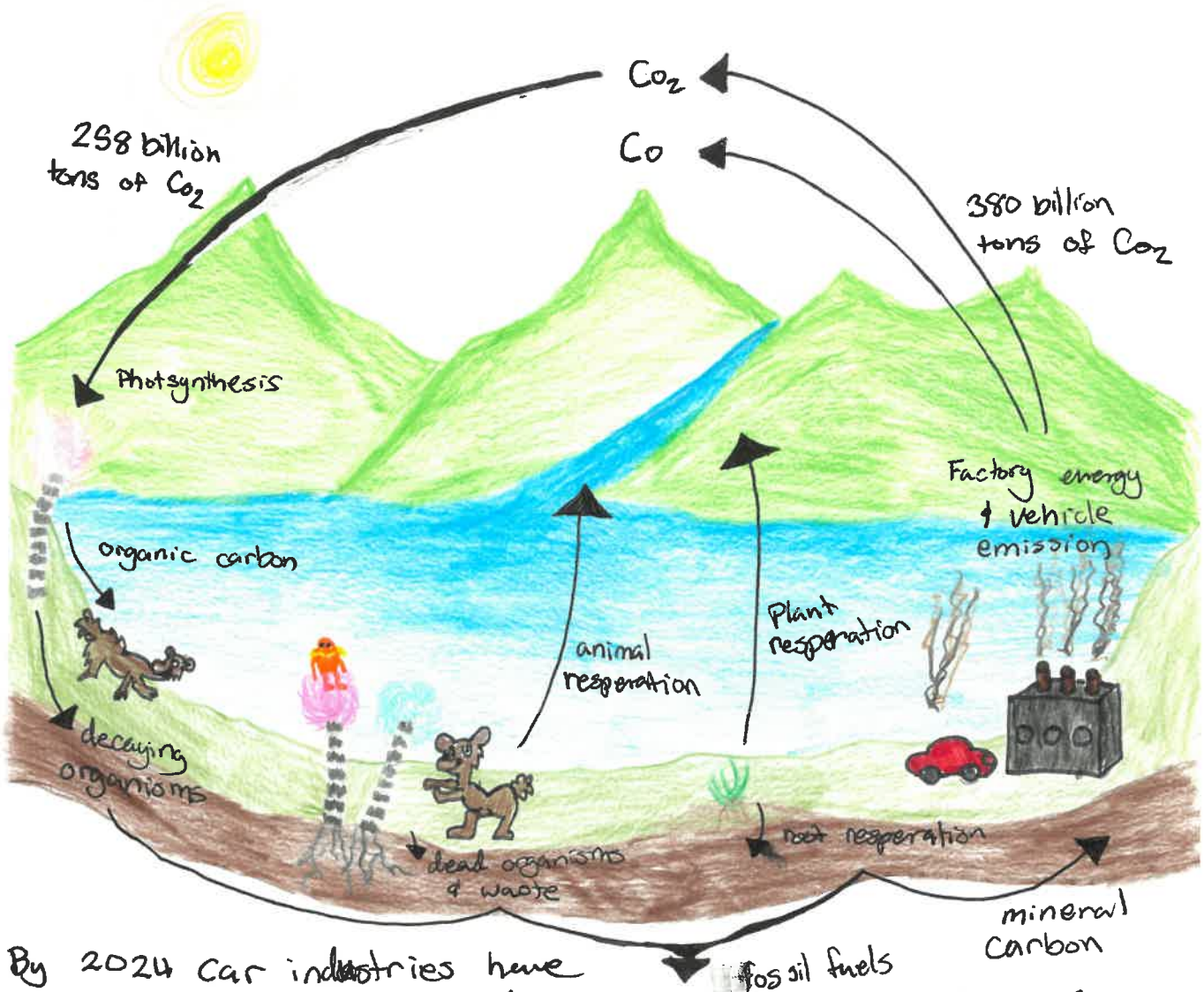
$$N_2 + O_2$$

$$N + N + O_2 \rightarrow 2NO$$

nitrate



Chemistry | The Carbon Cycle | grade 9 | Nov. 21 2019



By 2024 car industries have to create sustainable and renewable car modles and engines. That would bring the Co_2 emitions down by 7% Also by 2024 all houses need solar panles to produce 50% of their energy per month this would cut down electricity by 8%.

Co_2 emmited in year

2024: 400 Co_2

8% of 7% = 15% saved Co_2

years till wer balance

2025 - 340

2026 - 289

2027 - 245.6

2025

400 x .15 = 60 (Saved in 2025)

400 - 60 = 340

2026

340 x .15 = 51 (Saved in 2026)

340 - 51 = 289

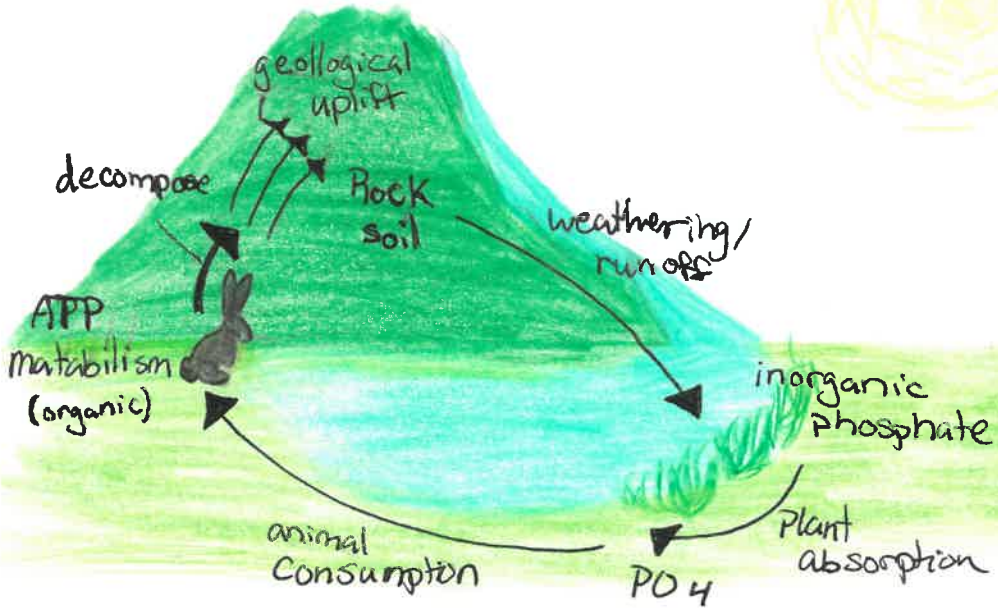
2027

289 x .15 = 43.35 (Saved in 2027)

289 - 43.35 = 245.65

If humans cut down their Co_2 emmisons by 15% starting in 2024 by 2027 we can reach a sustainable ecosystem.

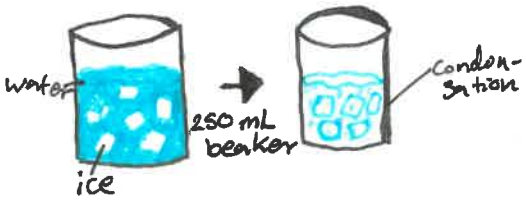
Chemistry | The Phosphorus Cycle | grade 9 | Nov. 22 2019



These past few weeks my main lesson has been chemistry. We've learnt about many different cycles and procedures. I found that I was very surprised by the Nitrogen Cycle and I found it quite interesting. I thought it was surprising about how it gets to the ground through lightning. It was fasinating to hear that lightning splits molecules making them unstable creating a new molecule.

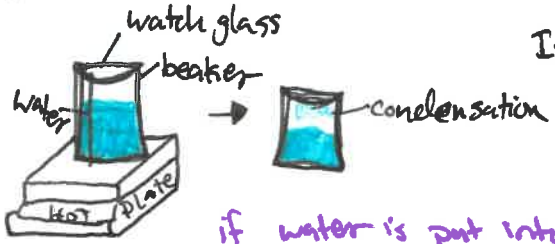
It made me think more about that we breath and how everything in this world (mostly) runs in a perfect Cyrcle. I Started thinking about what the air is made up of, and how I dont really do anything for the cycle. Because it just happens and I dont ever have to worry about it. Putting this with the Carbon Cycle, it makes me care more about our air and how we should do our very best to make sure our air/atmosphere is clean.

Chemistry | Condensation & Distillation | grade 9 | Nov. 25 2019



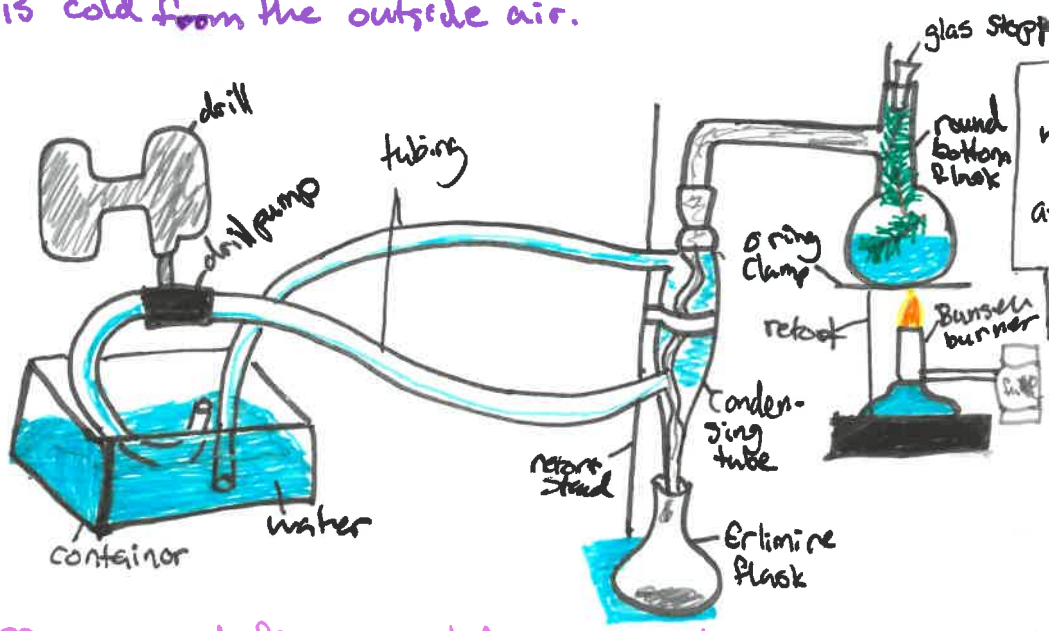
Inference: Ice water a beaker in a warm room will melt & water will form on the outside.

If ice and water are put into a beaker in a warm room then on the outside of the beaker condentation will form Because the tempitures of the outside and inside of the beaker are drastically different (warm air around it and cold water inside) Since the temeratures are so different the mosture in the air is drawn to it and it makes the gas turn to liquid.



Inference: A beaker with water heated will evaporate, then condenses on the watch glass

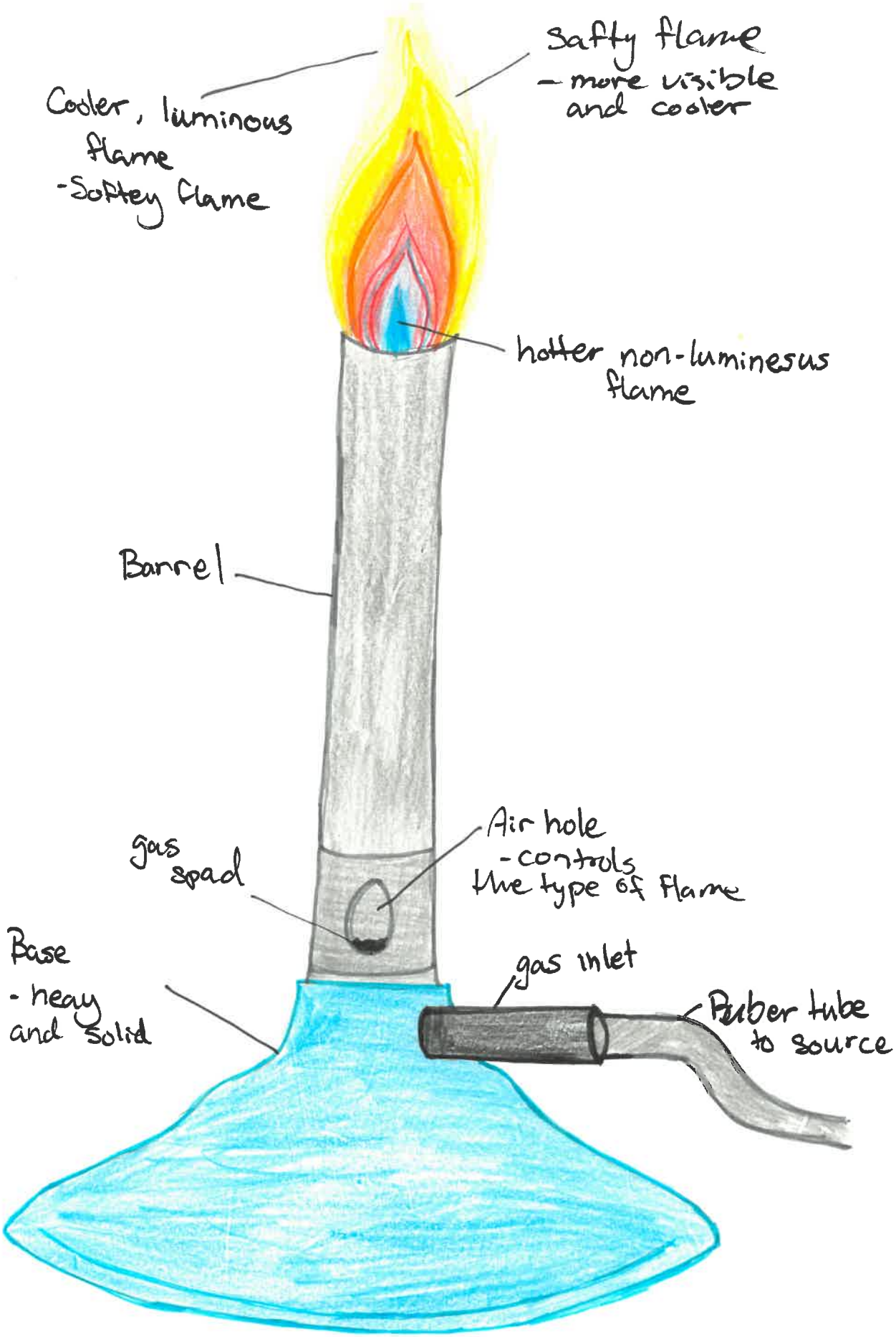
if water is put into a beaker on a hot plate with a watch glas over it then the inside will start to heat making condensation form on the inside of the beaker, because the water get's heated turning it into a gas (evaporation) and since there is a watch glas it is traped so it forms on the inside of the lid because the glas is cold from the outside air.



Inference: water heated over fir into a distillation apparatus will create "fir" essential oil

If water and fir are heated together it will push the condensation out. At the same time water pushed up a tube going into a condensation tube that the gas of the fir water goes into then the results will be a sented liquid with what ever material you use (we used fir) because in the condensation tube the cold water sorounding the spiral inside where the gas is pushing both of them down into an erlimire flask mixing them together, (creating sented oils).

chemistry | Bunsen burner | grade 9 | Nov 26 2019

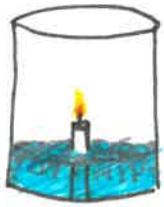


Chemistry | 4 Combustion demonstrations | grade 9 | Nov. 26 2019

Candle with water

The erlimire flask came down over the candle. The flame went out before the flask hit the water.
Condensation started to form in the flask. When the flask hit the water, the water filled the flask in the rim.

Candle with limewater



Something started to form at the top of the lime-water. Which had a dusty (looking) techture and it took a long time to form.
after a while it started to fall, at the edges, down to the bottom.

flame on metal

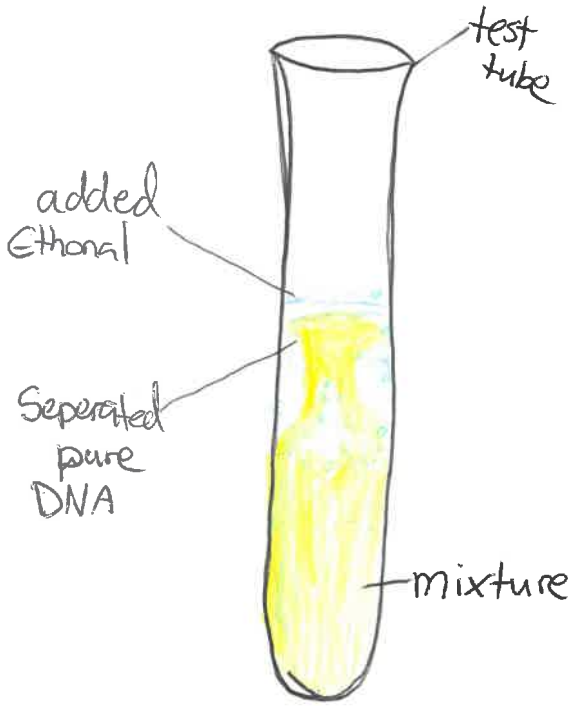
the flask was held on the top of the flame it only touched the very top of it. A black tinted resadu formed on the bottom of the flask.
Aswell, condensation formed inside the flask.
+ you can whipe of the resadu.

Steel wool

Beaker 101.83g
Beaker + wool 109.86g
Beaker + wool 110.49g
mass of wool 8.03g
mass of wool 8.66g

the wool became brittle and easy to break. It turned a blue/black colour after burning it. Aswell as it gained .63g in its mass

Chemistry | DNA Precipitation | grade 9 | Nove 28 2019



materials

- beaker
- banana
- test tube
- Stic stick
- Soap
- Salt
- water
- Strainer
- plastic zip lop bag
- test tube rack

METHOD

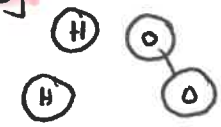
1. water was poored into a plastic bag (30mL)
2. 1/4 of a banana was put into the bag aswell
3. 3 squirts of soap were put in as well
4. then 3 pinches of salt were added
5. with the bag closed we proceded to mush the ingredients together
6. Then the test tube was held in a beake and a strainer was placed over top
7. The mixture (in the bag) was poored into the test tube with the strainer over top of the test tube
8. Ethonal was added to the test tube with a pipet 2-3 squarts.
9. it was stird gently for 30 seconds
10. Then the test tube was left to sit in a test tube rack
11. DNA will start to seperate from the mixture
12. Then you could take it out and hold it.

Chemistry | Organic Molecules | grade 9 | Dec 2 2019

elements vs Compounds

elements
- Single atom of one type

eg



(Still element because same O=O)

Compounds
- more than one type of element

eg NO_3^-, Co_2, H_2O, Na_4Co_3, Chlovyphill

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physical change vs Chemicall change

physical change

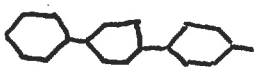
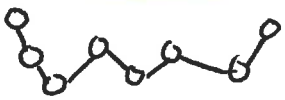
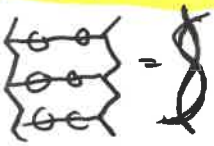
Change of State, or physical property, without Changing the arangment of elements/ Compounds

eg
- percipitation (rain).
- distillation
- Combustion
- water cycle

Chemicall change

result of a reactor where a new chemical is formed
- Changing the arangment of elements/compounds

eg
- nitrogen cycle
- photosyntheis
- Combustion
- percipitation (DNA)
- Co_2 + limewater
- fermintation
- Carbon Cycle

	Carbohydrates	proteins	lipids	nucleic acids
eg	grains, Sugars, fibers, starch	protein building blocks, enzymes	Fats, phospholipids, waxes, steroids	DNA, RNA, mRNA
building blocks	monosaccharides 	amino acids 	fatty acids 	nucleotides 
functions	instant energy fuel	medium-term energy building blocks	long-term energy insulation	information Storage, & transfer

Chemistry | Organic Naming Rules 1 | grade 9 | Dec 3 2019

Rules

1. Know number of bonds.
2. Carbon forms the backbone.
3. name the backbone depending on the prefix.

1 - meth -	6 - hex -
2 - eth -	7 - hept -
3 - prop -	8 - oct -
4 - but -	9 - non -
5 - pent -	10 - dec -

4. add ending depending on molecule type.
5. any spaces (bonds) left, fill with hydrogen.

Bonds

eg 1 hydrogen

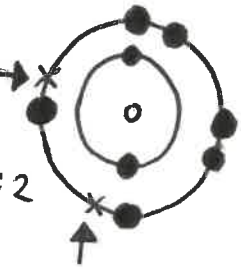
H

atomic: 1
electrons: 1
Valence shell: 1
bonds: 1

eg 2 oxygen

O

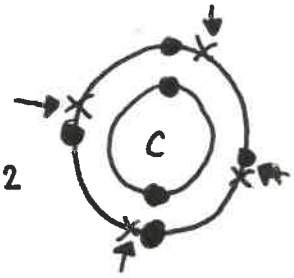
atomic: 8
electrons: 8
valence shell: 2
bonds: 2



eg 3 carbon

C

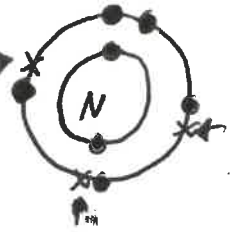
atomic: 6
electrons: 6
valence shell: 2
bonds: 4



eg 4 Nitrogen

N

atomic: 7
electrons: 7
Valence shell: 2
bonds: 3



Elements	bonds
hydrogen	1
carbon	4
Nitrogen	3
oxygen	2

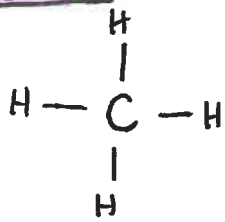
Continued.....

Organic Naming Rules 1 - Continued.....

Alkanes

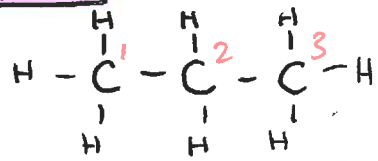
(ane) - single bonded 'hydro carbon' molecules

eg 1



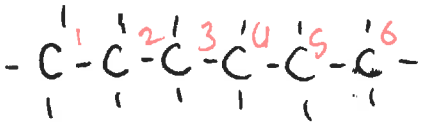
methane

eg 2



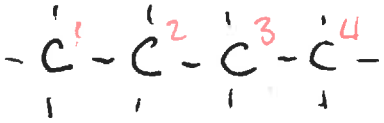
prop ane

eg 3



hex ane

eg 4

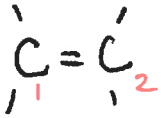


butane

Alkenes

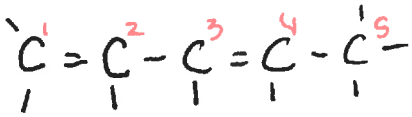
(ene) - double bonded 'hydro carbon' molecules

eg 1



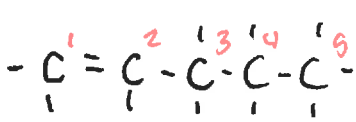
ethene

eg 3

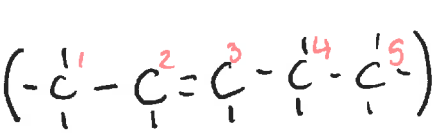


1, 3 - pentene

eg 2

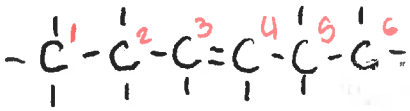


1 - pentene



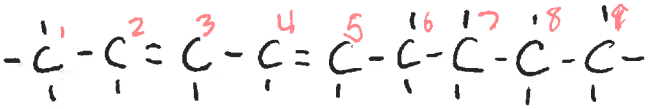
2 - pentene

eg 4



3 - hexene

eg 5



2, 4 - nonene

Chemistry | Naming Rules 2 | grade 9 | Dec 4 2019

Rules (addition)

1. The Backbone is always the longest (even if it bends)
2. always use the lowest number possible
3. be aware of this when numbering the carbon backbone.

How To Get The Lowest Number

because of the numbers

$C^6-C^5-C^4-C^3=C^2-C^1$ is equivilent to $C^1-C^2=C^3-C^4-C^5-C^6$

going this way — puts the (=) at 2

going this way — puts the (=) at 2

So both are called

2-hexene — 2-hexene

$C-C-C-C=C-C \longleftrightarrow C-C=C-C-C-C$

Alkynens

-(yne) triple bond hydro Carbon

eg 1

$H-C\equiv C-H$ ethyne

eg 2

$-\overset{|}{\underset{|}{C}}-C\equiv C-C\equiv C-\overset{|}{\underset{|}{C}}-$

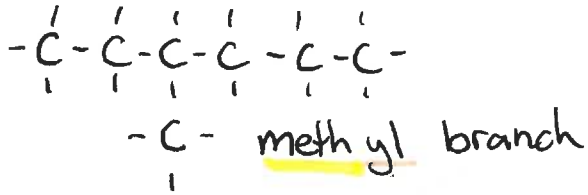
2,4-hexyne

Naming Rules 2 continued.....

Branching

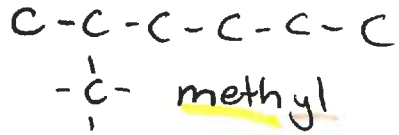
hydro carbon side chain (-yl)

eg 1



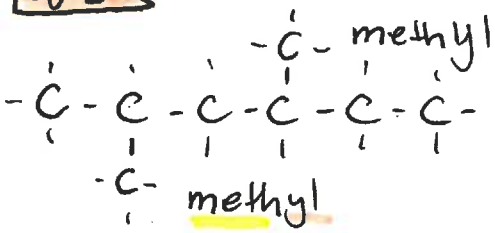
3-methyl hexane

eg 2



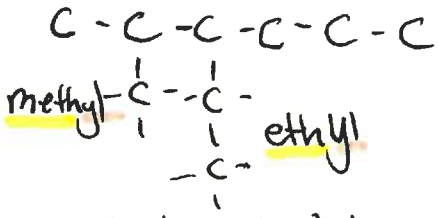
2-methyl hexane

eg 3



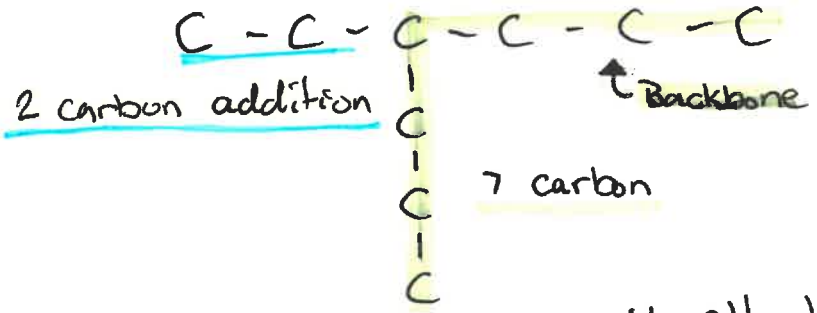
2, 4-di methyl hexane

eg 4



2-methyl 3-ethyl hexane

eg 5



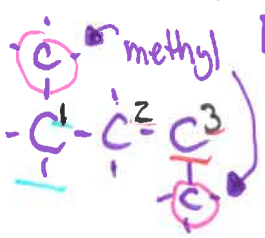
4-ethylheptane

dis and tris

di = 2 of

tri = 3 of

if had 2 methyls in different places on your back bone you cand put di to tron to make it shorter.



1, 3 dimethyl propane

Marine Biology

Description of Career

Marine Biology is Perfect for people who are fascinated and interested in the ocean. Marine biologists work with the ocean and animals and sometimes weather. They work with animals in the in the ocean like how other species affect each other. They study water temperatures, sea levels, basically anything about the ocean. Some biologist study Climate change and how it affects the ocean. Also, some biologist work in zoos and labs. They work in labs to analyze data and projects research findings. As well as some work with business managers, lab tech and engineers.

Work Place and time

Marine biologists tend to work 40 to 60 hours a week. When working in the field you can have uncomfortable living conditions and physically difficult demand. Also, may travel to remote locations for field research. Some may work with other marine biologists, students (if you're a proffessor), research crews. As well as they might work in labs offices and libraries. If working in a lab will most likely be working with Computers, microscopes and any other lab equipment.

Works core tasks

Some core tasks would include collecting samples and analyzing the chemical make up of marine plants and animals, and study population levels and other characteristics of marine life. Proffessors will teach students and others can care for animals in zoos and aquariums.

Education & training

To become a marine biologist there is education required (since marine biology is such a big field). To do any level of marine biology you'll need a bachelor's degree in marine biology which can take 4 years to earn. Also, graduated degrees can help. Such as a masters degree if you want to work in a lab and with equipment. This can take another 2 years to earn. If it is an independent study of marine biology, it will require a PhD. Which can take 4 to 5 years to earn. You can also prepare for the training in high school such as learning how to scuba dive and, or boat pilot training can help. Also, participating in any biology, physics, chemistry, and math will be beneficial.

Hans Hass

Austrian Biologist

He was born on January 23, 1919 in Vienna Austria. His father was an attorney and so it pushed him to study law. He studed law for a long time but then he got interested in a deep sea diver and so in 1940 he switched his studies to zoology. He studied at the University of Berlin (Faculty of Biology) and graduated with a PhD.
He went on to become a underwater diving pioneer and biologist.

Known for....

He is known for many things. The most popular thing he's known for is being among the first scientists to popularize coral reefs, stingrays and sharks. He and his team made 2000 dives from 1942 to 1953.
He is also referred to as a diving icon.
He is also known for his under water filmmaking. He was the ~~filmmaker~~ for many under water documenturies, his most popular one is The Red Sea. Which is about marine animals that live in the Red sea.
He is also known for leading the creation of the Rebreather. The Rebreather is a divice for going under water and It's somewhat of a more developed snorkeling gear.
He is also known for his extreame devotion to the environment.

The Rebreather →