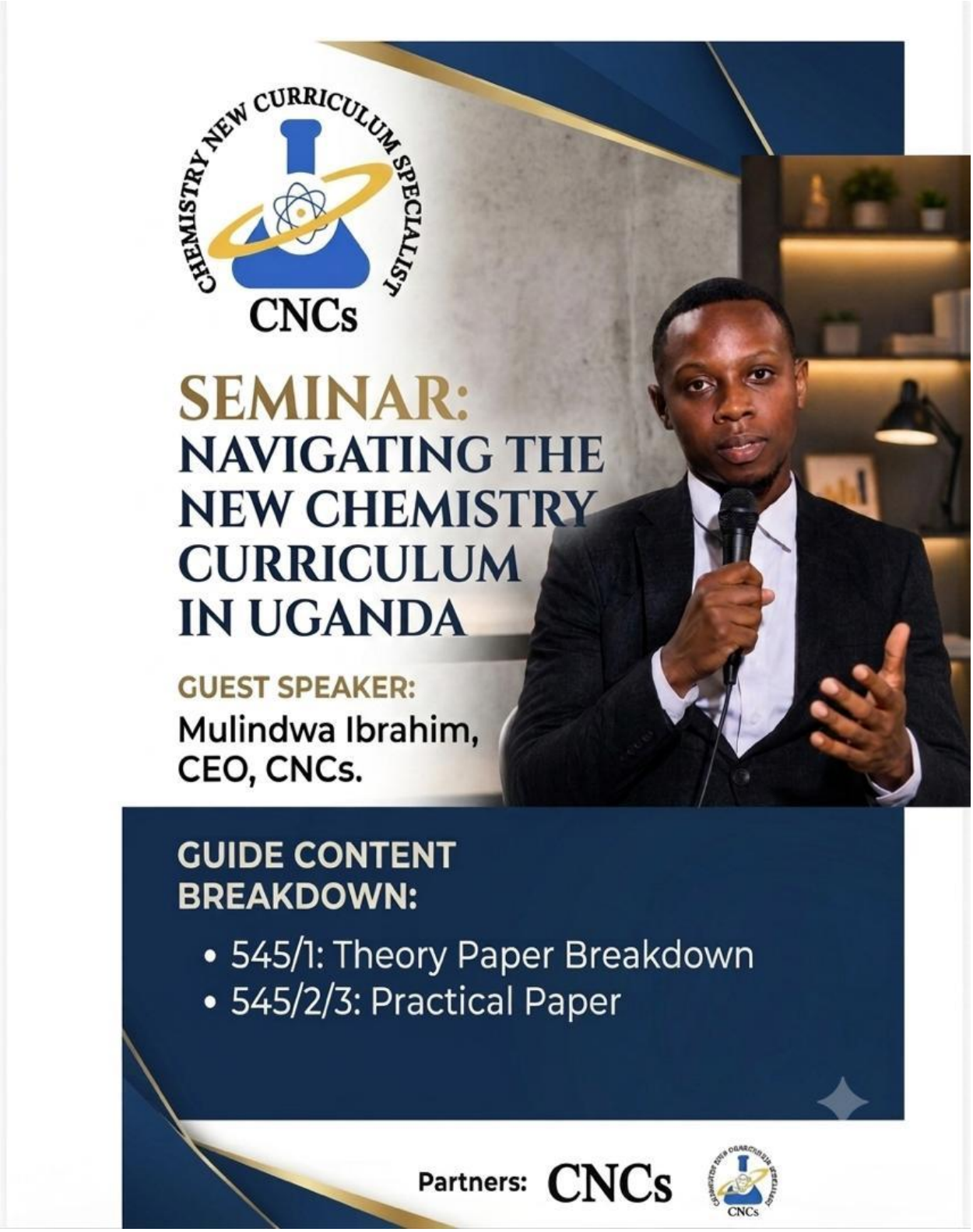


CEO CNCs 0788574980

CHEMISTRY NEW CURRICULUM SPECIALISTS

CHEMISTRY 545/1, 2&3 SEMINAR ITEMS 2026

APPLICATION OF KNOWEDGE OF CHEMISTRY IN DAILY LIFE (ITEM1 IN 545/1)

Food additives, drugs or medicine, detergents, nuclear processes, acids and alkalis, salts, beverages, additives in detergent.

Item 1 (food additives)

When preparing fresh fruit juice at home, Moses simply blends whole fruits and serves the liquid immediately. However, when he visited a newly established local beverage factory, he noticed that their bottled juices maintained a uniform mixture without separating, kept their bright color, and stayed fresh on the shelf for weeks.

The factory manager explained that their processing involves adding specific chemical substances to achieve these results. He shared that they add Sodium benzoate, acacia gum and sodium nitrite to the juices.

Recently, the factory's products have received numerous praises from the community for their consistent quality, rapidly increasing their consumer base. Moses wants to understand how these factory additions relate to what he does at home. He has consulted you for further explanation.

Task

As a learner of chemistry;

(a) State the category and function of each product used in the commercial juices.

(b) Describe the side effect(s) associated with the products.

(c) State the;

(I) Similarities of the products.

(Ii) Differences between the products.

Item 2 (food additives)

A popular beverage company has introduced a new product on the market. However, the company is already receiving complaints from customers regarding the need for constant refrigeration, the need to consume the entire juice 24 hours after opening and that the juice has less noticeable aroma. The production team is concerned about the potential loss of clients. Their manager has sought your guidance.

Task

As a chemistry learner;

(a) Guide the production team on the key aspects they should consider during the production process.

(b) Identify the value of your guidance in ensuring consumer satisfaction.

(c) What challenges are consumers likely to face resulting from your advice?

(c) Evaluate the products in your advice in (a) above.

Item 3 (drugs or medicine)

During a school term, three students sharing a dormitory room fell ill. They tried resting for two days without any treatment, but by the third day, their conditions worsened as they had developed persistent fevers, severe headaches and chest discomfort. The school medical personnel immediately referred them to the nearby health facility for medical tests. The students were diagnosed with tuberculosis following the medical assessments. The clinician prescribed streptomycin tablets to treat the infection. After completing the initial treatment phase, the students' health improved significantly. The school health department is now reviewing the medication to better understand its nature and safety.

As a learner of chemistry;

(a) Categorize the product that was given to the students.

(b) State the function of the product.

(b) What are some of the dangers of the long term use of the product?

(d) Compare the product with home-made remedies.

Item 4 (drugs or medicine)

After a long and demanding shift at the ginnery, Juma experienced severe joint pain and stiffness in the knees, shoulders and the back. His mother suggested product X, an extract of a mixture of leaves from two species of plants which Juma had used for similar encounters in the past. However, it provided temporary relief with the effects fading after four hours. The next morning, still in discomfort, he visited a local clinic where he was given product B which provided complete and lasting relief.

Task

(a) Categorize the products used by Juma.

(b) State how the new product made him feel better.

(c) Advise him on the side effects associated with the use of product B

(d) Evaluate the products by stating their difference and Similarity.

Item 5 (drugs or medicine)

Maria and Jane are two senior one students in your school who are faced with different medical conditions. Maria is struggling to stay focused and alert during morning study sessions. She has been feeling fatigued and this is affecting her performance. Meanwhile, Jane has been experiencing symptoms of major depressive disorder, including persistent loss feeling of sadness, loss of interest in activities and changes in appetite and sleep patterns.

The two visited a nearby health care provider where Maria was given stimulant capsules while Jane was given antidepressant capsules. They noticed changes in their conditions after days of using the products. They now need further information on the products they were given.

Task

As a student of Chemistry;

(a) State the nature of the products given to the two ladies.

(b) Give the functions of the products.

(b) What are the side effects of using the products? Give the mitigations.

Item 6 (detergent)

Otim and Steven are two friends who decided to wash their clothes together using harvested rain water. Both friends were pleased to find out that they achieved excellent results, with plenty of lather being produced and their clothes looking bright and clean after utilizing two different products for their laundry.

However, after hanging the clothes to dry, Otim noticed that his hand had developed small, painful burns. In contrast, Steven experienced minimal such irritations. Curious of about the differences noticed, the two have consulted you for clarification.

Task

As a student of Chemistry;

(a) Identify the form of cleaning agents used by the two friends.

(b) Explain how the product used by Otim ensures removal of dirt.

(c) Explain the impact(s) of the product(s) and give the mitigation(s)

(d) State the similarities and differences of the products.

Item 7 (detergent)

Sanyu and Evelyn live in a rural, rocky terrain where their primary water source is a stream flowing directly from a spring within nearby granite rocks. On a given day, they cleaned their school shirts using the same stream water and different commercial cleaning products.

However, they observed that Sanyu had to use a significantly larger amount of her cleaning agent than Evelyn to achieve the same level of cleanliness. Additionally, Sanyu's basin developed a grey, sticky substance while Evelyn's water formed a rich lather immediately.

Task

(a) Categorize the product used by each person.

(b) Describe how the cleaning product used by Evelyn functions.

(c) Advise Evelyn on the challenges associated with the use of the cleaning agent.

(d) Evaluate the products.

Item 8 (Nuclear processes)

Students from the Heritage Club of a given school visited the National Museum, where curators explained how nuclear Chemistry is used to determine the age of ancient organic artifacts.

The curators demonstrated how certain unstable isotopes within archeological wood or bone samples spontaneously emit particles and energy over time.

During the demonstration, the students monitored a laboratory simulation tracking how a sample of a short lived radioactive tracer isotope decays over time. The mass remaining at specific intervals was recorded in the data table below;

Time(s)	0.0	10.0	20.0	30.0	40.0
Mass of substance(g)	80.0	50.0	24.0	12.5	7.0

One student became curious about how long it takes for exactly half the initial material to disappear, while others raided concerns about whether the energy emitted during such processes could pose health risks to museum staff handling the samples.

Task

As a Chemistry learner;

(a) Identify the process that occurred as the mass of the substance decreased over time.

(b) Identify any other use of energy produced during the occurrence of the process.

(c) Using a graph, determine the time taken for the mass of the substance to reduce to 30g

(d) Guide the learners on the possible dangers of prolonged exposure to the energy emitted during the decay process.

Item 9 (Nuclear processes)

I'm the mid-20th century, breakthroughs in Chemistry led scientists to unlock an incredibly powerful form of energy contained within the atomic nucleus. While this energy was quickly recognized for its immense potential in peaceful applications, like electricity generation, it's deployment in warfare demonstrated unprecedented catastrophic destruction. Today, international bodies continuously monitor the use of these weapons and work through global treaties to prevent their use, given the devastating long term environmental and biological consequences they pose to the planet. Your friend is studying the Chemistry behind these weapons and the energy they use.

Task

As a learner of chemistry;

(a) Identify the type of energy utilized in these weapons.

(b) Suggest any other use of the form of energy contained in such weapons.

(c) Explain the dangers associated with this type of energy and give the mitigations

Other items

At a graduation party, a variety of beverages were served. Joan chose one type which after she drank it, initially made her feel excited and relaxed. However, her movements later became unconditional and lacked self control. Her friends who were taking other types of beverages that didn't have the same effect on them, repeatedly warned her to stop consuming any more of that beverage.

Task

As a learner of chemistry;

(a) State the category of the product Joan took.

(b) Suggest any other use of the active ingredient contained in the product Joan took.

(c) Explain how excess consumption of such products Joan used can have serious consequences.

(d) Compare the products at the party.

A local youth football team just finished a match on a muddy, clay-heavy field during a rainy afternoon. The team manager collected all the stained white jerseys and took them to a community laundry group that uses traditional, locally made liquid soap.After washing and drying the jerseys, the cooks and cleaners noticed two major problems: the jerseys still looked dull and yellowish rather than bright white, and a strange, sour smell remained on the fabric. To help them, a local shopkeeper donated a modern commercial washing powder.Upon looking at the ingredients list on the packaging, the team manager noticed that besides the main soap ingredients, the powder contained several specialized chemicals labeled as:

Component A (Bleaching agent)

Component B (Fluorescent brightener)

Component C (Perfumes and Enzymes)

He failed to understand them and has come for advise.

Task

As a chemistry learner help the manager know

(a) The category of the chemicals on the labels.
(b) State commercial or household uses of detergents containing enzymes (Component C) other than washing sports clothing.
(c) (b) Explain the side effects of continued use of the donated product and its mitigation
(d). Explain why traditional liquid soap failed to restore the bright white color of the jerseys, while the commercial powder succeeds.

A local community sports center operates an outdoor swimming pool. Over a weekend of heavy rainfall, a large volume of rainwater mixed into the pool, causing the water to become irritating to the swimmers' eyes. The pool attendant knows that for safe swimming, the water must be treated to make it safe for the neighborhood children.

To correct the water, the attendant finds two bags in the store. Bag X contains soda ash (sodium carbonate), and Bag Y contains powdered citric acid. The attendant is completely stuck, afraid of making the water worse, and needs your urgent scientific help to fix the pool safely.

Tasks.

As a chemistry learner,

(d) Help the attendant identify and classify the chemical categories of the products in Bag X and Bag Y as well as the current category of the pool water based on its chemical behavior.
(e). Chose the best product and explain to the attendant how the chosen corrective chemical works to restore the pool water to its safe, healthy pH level.
(f). Discuss the side effects if this chemical treatment is used continually for long time and Suggest practical mitigation measures to prevent these issues.
(d) Give the similarities and differences between the two products.

A local youth farmers' cooperative operates a community garden where they grow maize. Over the last two seasons, they noticed that their maize plants have been stunted, with the lower leaves turning a sickly yellowish color and drying up early. A visiting agriculture officer tested the soil and explained that continuous farming had completely exhausted the essential soil nutrients required for healthy leaf growth and green pigment formation.To fix the problem, the cooperative received two bags of commercial treatments from a government storage facility. Bag A contains ammonium nitrate pellets (nitrogen-rich compound), and Bag B contains agricultural lime (calcium carbonate, a mined mineral base). Additionally, a local cattle herder has offered them a large truckload of dry cow manure. The cooperative members are completely stuck, confused about which treatment supplies the missing nutrients and how to use them safely. They need your urgent scientific help to save their farm.

Tasks

As a Learner of chemistry,

(a)Give the categories of the recommended products and choose the product(s) the farmers can use to restore the missing nutrient.

(b) Explain to them how the chosen product(s) in task (a) work to solve the maize plant growth problem.

(c) Explain the side effects of continued use of the chosen product(s) on the soil and surrounding environment, and suggest practical mitigation measures.

(d) Evaluate the recommended products by highlighting their key similarities and differences to help the cooperative make a sustainable choice for their farm.

DIVERSITY AND INTERACTION OF SUBSTANCES IN EVERYDAY LIFE (ITEM 2 IN 545/1)

Elements, compounds and mixtures, rusting and combustion, periodic table, carbon in environment, alloys, carbon in life, structures and bonding, mole concept, electrolysis, redox reactions, trends in periodic table and heat changes.

Item 10 (Bonding and structures)

An archeological conservation team has been called to analyze a site where ancient metal working activities occurred. The presence of significant deposits of a black powder, identified as Copper(I) sulphide has been discovered. They believe the ancient artisans were producing copper metal from this mineral. One possible historical method involves roasting the copper(I) sulphide in controlled amounts of air according to the equation below;

$Cu_2S(s) + O_2(g)$ ----------> $2Cu(s) + SO_2(g)$

The team is trying to model the potential scale of this ancient process and understand the environmental footprint of the ancient workshop.

Prior to full scale analysis, an investigation was done on the sample, where 24.0g of Copper(I) sulphide was reacted with excess air. The team wants to use this experiment to estimate material outputs of the process.

Task

As a student of Chemistry;

(a) Explain the category of;

(I) Structure in the solid product.

(ii) bond that exists in the gaseous product.

(b) Suggest the properties of the solid product that make it useful in daily life applications resulting from its structure.

(c) Calculate the;

(I) Mass of the solid product formed (Cu=64, S=32)

(ii) Volume of the gaseous product measured at s.t.p that was formed.

(1 mole of a gas occupies 22.4dm^3 at s.t.p)

Item 11 (materials)

Sarah is designing a new line of eco-friendly outdoor furniture and wants to ensure the product manufacturing of the highest quality. She is overwhelmed by several materials available on the market, among which are steel, wood and plastics. She is particularly concerned about choosing materials that are of good quality and needs to understand their impact so as to ensure environmental sustainability. She has invited you for guidance.

Task

As a chemistry learner;

(a) Explain the type of the materials.

(b) Guide him on the suitability of the materials.

(c) Advise her on the environmental challenges associated with the use of any material.

Item 12 (carbon in life)

A high school science Club is preparing an entry for a national green energy competition. They are investigating the production of sustainable biofuels using glucose extracted local food waste. The team is running a small trial based on the chemical process represented by the equation below;

$C_6H_{12}O_6(aq)$ ----------> $2C_2H_5OH(l) + 2CO_2(g)$

The students are highly motivated by the potential of this organic liquid to serve as an eco-friendly alternative to fossil fuels. Before they can present their project to the judges, they need to verify the theoretical mass of the organic product that can be generated by starting from exactly 0.8Kg of glucose. Your chemistry class has been asked to help them analyze their data and finalize their report.

Task

As a learner of chemistry;

(a) Explain the category of the organic product.

(b) Suggest the properties of the organic product that make it useful in everyday life.

(c) Explain the environmental impacts of the gaseous product.

Item 13 (carbon in life)

A regional eco-innovation exhibition is showcasing how different organic chemicals drive modern sustainable industries. Three neighboring exhibition booths are displaying their primary process materials.

Booth A; features propane used as an alternative fuel for forklift transport.

Booth B,; demonstrates how ethene gas is utilized to precisely control commercial crop ripening cycles.

Booth C; Showcases ethanoic acid, used as an organic raw material for creating biodegradable polymers.

Some visiting student interns mistakenly think all these substances belong to the same class of organic compounds and are confused about their structureal properties. They have approached you as a Chemistry learner at the exhibition to clarify the science.

Task (trends in periodic table)

Help the student interns to;

(a) Explain the homologous series to which each of the substances belongs.

(b) Give the properties of any one of the substances that determine its uses.

(c) Explain the challenges associated with the use of any one of the substances and the mitigation.

Item 14

During a Chemistry class activity, aimed at exploring the melting and boiling points of period 3 elements, a given group of learners came across the information below in a Chemistry pamphlet.

Element	Na	Mg	Al	Si	P	S	Cl	Ar
Atomic number	11	12	13	14	15	16	17	18
Melting point	97.8	650	660.6	1410	44.1	112.8	-101.5	-189.5
Boiling point	882.8	1091	2470	2355	280.5	444.6	-34.04	-185.6

The students encountered difficulties in understanding the details about the elements. They've approached you for further guidance.

Help the students to;

(a) Understand the class of the first three elements.

(b) Graphically interpret the data and use it in explaining the trend in melting and boiling points of the elements.

(c) Predict the trends in density across the period.

(d) Suggest the possible use of the element with atomic number 13 and its impact on the environment.

Item 15 (periodic table)

Magnesium Chloride and carbon dioxide are two common compounds with a variety of applications. A group of S.3 learners would like to know how these compounds are formed from their constituent elements and how useful they are.

As a result, the class teacher has tasked Atom and Mary to find how the two compounds can be formed from their constituent elements and how useful the compounds are. The table below shows the summary of the constituent elements of the two compounds.

Element	Magnesium	Carbon	Oxygen	Clorine
Atomic number	12	6	8	17

Atim and Mary are required to give a presentation before the class. They have approached you for guidance.

Task

As a chemistry learner, write a short message that Atim and Mary can use in the presentation. In your response;

(a) Explain the categories of the elements

(b) Help the ladies to understand how the compounds are formed from their constituent elements using dot-cross structures.

(c) Advice Atim and Mary on the use of the compounds.

SECTION B

PART I; CONTRIBUTION OF CHEMISTRY TO OUR ECONOMY

Industrial Processes

Oxygen Gas

Oxygen is a crucial gas used in welding, medical support and other various industries. While oxygen production has improved lives globally, its large-scale manufacture can pose environmental, safety and social challenges.

A new oxygen production plant has been established in your town to supply oxygen gas for welding metals in workshops. While the plant provides jobs and ensures a steady supply of oxygen for industries that utilize it, some community members are concerned about the environmental effects and other social benefits of the production plant. Other community members are curious about how the process of production of oxygen takes place.

Task

As a chemistry learner, make a write-up addressing the community members' curiosity and concerns.

Cement

Cement is a key construction material used as a binder in concrete and mortar. However, its production process has benefits and negative effects.

During the construction of a new classroom building at a local school, a group of local builders started a heated argument on how cement is made.

Some believe that cement is simply crushed stones mixed with sand and others claim that it is a mixture of ash, sand and water.

These misconceptions are causing delays and confusion on the site.

A teacher supervising the project has called on you, a learner with knowledge on cement manufacture.

Task

As a learner of chemistry, help the builders on the construction site resolve the issue

Sulphuric acid.

Sulphuric acid (H_2SO_4) is a highly valuable industrial chemical used in fertilizer production. It is produced mostly through the Contact Process.

Farmers in your community have raised an issue about poor crop yields due to exhausted soils. The government has decided to construct a sulphuric acid manufacturing plant in their village to be used in the manufacture of fertilizers that can improve the crop yields. The residents are now confused about how the manufacturing process of sulphuric acid occurs, the associated side effect and how the community members will benefit from the process

The E.C 1 chairman has called for a community meeting to address the issue and you are among the members to give a speech

Task

As a chemistry learner make a write up of your speech

Iron

Iron is one of the most abundant and widely used material in construction in Uganda.

Farmers in the rural village noticed strange reddish-brown particles scattered on a hillside. Curious about their observations, they sent a sample to a nearby laboratory, where it's confirmed to be an iron ore.Due to this, the district local authorities have proposed to set up an iron extraction plant in the area, however, the community members are interested in knowing how the manufacturing process will occur, the benefits and the dangers associated with it.

The village local council has been advised to seek for guidance in a nearby school and your class teacher has selected you to offer guidance.

Task

As a learner of chemistry, prepare a presentation for the council

Copper

Copper is the material used for making electricity conducting cables.

Due to the government policy of massive rural electrification, copper cables have come to a high demand.

The government has discovered copper deposits in Kidepo areas and has partnered with an investor to carry out the project of getting the copper.

However, the locals are resisting the plan because they do not know how the process is going to be done, how they are going to benefit or be affected. The district leaders have called for a meeting with the concerned locals and have requested you to be one of the speakers about the project.

Task

As a learner of chemistry, make a write up that you can use during your speech

Aluminium

Aluminium is widely used in construction industry in Uganda. This has resulted into need for the material to meet the demands. According to a U.S. Geological Survey report, ore occurrences have been identified in the northern and eastern regions of the country. The government has cleared a local investor to set up a factory to produce the material so that he can tap into the opportunity.

The community is puzzled about the process of extracting the mineral together with its effect on the environment and benefit other than employment and taxes.

Through school Head Teachers, the Government has organized for Radio and Television talks for faster sensitization of the community and you have been chosen to represent your school.

Task

Make a write up of the presentation you will make.

Biogas

Biogas is a renewable source of energy that can be used for cooking, lighting among others.

Your school relies on firewood as the main source of energy for preparing student' meals. This takes a lot of money from the school. Your head teacher was advised to setup a biogas production plant near the livestock shed within the school to reduce on the cost.

However, he is seeking for more information about the process of production, benefits and the potential environmental concerns involved in its production.

Your chemistry teacher has asked you to assist the school director with his concerns.

Task

As a chemistry learner, prepare a write up that you will share with the director during a brief meeting with him.

Sodium hydroxide

Sodium hydroxide is a vital chemical used in making soap.

Uganda has large deposits of rock salt in Kasese district. Communities around Lake Katwe harvest salt by allowing water to evaporate leaving behind salt crystals, but scientists have proposed setting up an electrolysis plant to obtain sodium hydroxide from the salty water. However, the locals/community members lack background knowledge about the process of production of sodium hydroxide, its environmental impacts and how they can benefit from the process. You have been chosen to help them.

Task

Make a write up that you are to use when briefing them.

SECTION B

PART II; NATURAL RESOURCES

Air, Water, Carbon Based Fuels, Fossil Fuels, Rocks and Minerals, Forests/Trees

Water

Water is one of the most essential substance for life on the earth covering about 71% of the earth

In a certain village, near Lake Kyoga, people rely on the Lake as their main source of water for domestic use and source of fish. Recently the community has noticed that the taste and colour of water is changing.

You have been invited to a community meeting to share knowledge about water as a natural resource.

Task

As a chemistry learner, make a write up of what you will share to the community

Air

Air is one of the most essential natural resources, making up the atmosphere that surrounds the Earth. Air is used in industries and energy production but it can be degraded in quality through pollution and unsustainable human activities.

In Bukuya, a fast-developing town, the number of vehicles has increased greatly, releasing large amounts of exhaust fumes. Factories in the industrial area of the town also emit smoke and gases, while some residents burn waste in the open. Meanwhile, some community members are looking for ways to use air in better ways, like producing clean energy and supporting farming. The situation has raised concerns about how human activities are affecting air and how best the resource can be conserved for future use.

Task

As a learner of chemistry, you are required to analyse the situation and make a write-up about the raising concerns.

Forests

Forests are some of the natural resources in Uganda.

Uganda's forests have severely been affected by activities like charcoal burning, and firewood use. People are not aware that these activities lead to climate change.

NEMA has come up with a sensitization program in villages. In your village, the chairman knowing that you are in secondary school has requested you to be part of the sensitization team.

Task

As a chemistry learner, make a write up of what you will use in your sensitization

Fossil Fuels

Petroleum is a naturally occurring flammable liquid found beneath the earth's surface.

There has been a gradual increase in the atmospheric temperatures in Uganda over the past years and this has left the locals worried. The National Environment Management Authority has

attributed this to excessive use of petroleum products as sources of energy in industries, vehicles and most homes especially in rural areas.

The L C.1 chairperson has called for a village meeting to sensitize the locals about their concerns. You have been selected by the chairperson as a person who has the knowledge of environmental conservation to help sensitise the locals about the issue at hand.

Task

As a chemistry learner, make a presentation that you will use during the meeting.

Rocks

Rocks form the foundation of earth's crust and provide valuable resources such as building materials.

In Tororo district, rocks such as limestone are quarried on a large scale for cement production. Many local people also break rocks into aggregates for road construction and building. However, uncontrolled quarrying has led to various environmental issues.

Most of the citizens that carryout the above activities are unaware about the importance of preservation of such natural resources.

Your school has selected you to present on a radio talk show aimed at sensitizing the local community and you are one of the speakers.

Task

Prepare a write up you are to use

PRACTICAL ITEM

In a pharmaceutical laboratory, sodium thiosulphate is utilized as a raw material to produce finely divided sulfur, an essential active ingredient used to manufacture therapeutic sulfur skin ointments. One of the production technicians has advised that the temperature of the mixing vessel must be precisely adjusted and monitored, as it directly affects the rate of reaction and how quickly the sulfur precipitates, which is crucial for preventing production line delays. Other team members do not fully understand his argument and want to investigate the matter.

Sodium thiosulphate reacts with hydrochloric acid to precipitate sulfur according to the equation:

$Na_2S_2O_3(aq) + 2HCl(aq) \text{ ----------> } 2NaCl(aq) + S(s) + H_2O(l)$

You are provided with the following;

Dilute Hydrochloric acid labelled, BA1

Sodium thiosulphate solution labelled, BA2

Task

(a) Design an experiment you can carry out to help the technicians.

(Your design should include the aim, hypothesis, variables, apparatus and materials, procedure, risks and their mitigations)

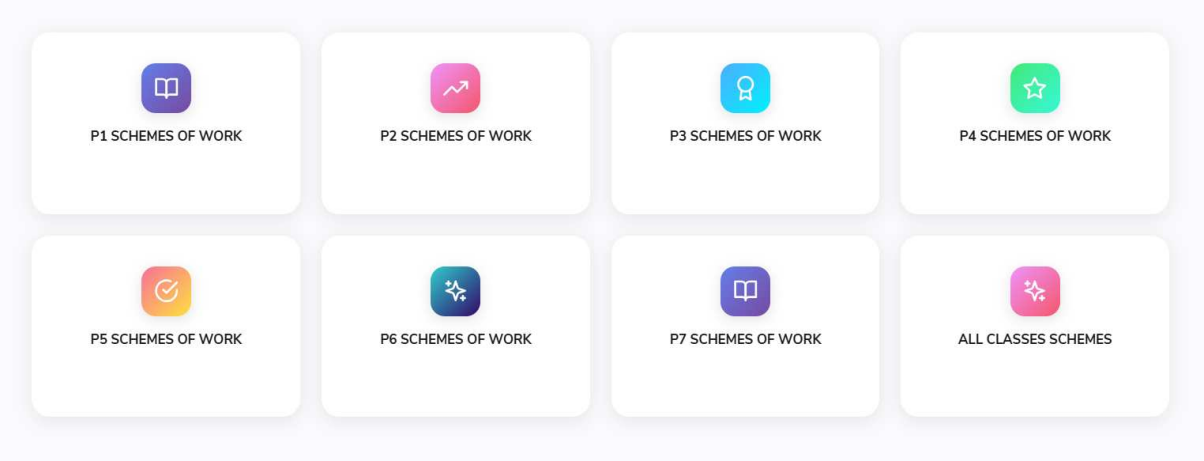
(b) Carry out the experiment and record your results.

(A minimum of six readings required)

(c) Analyze your results and inform the workers accordingly

CNCS ORGANIZATION WISHES YOU THE BEST IN YOUR UCE CHEMISTRY EXAMS 2026

This document was downloaded from https://exoticnotes.com



Do you need more!

SCHEMES OF WORK for Primary (All Subjects)

Click
https://exoticnotes.com/schemes_of_work/primary/

For LESSON NOTES P.1 – P.7
Click
https://exoticnotes.com/notes/primary/

For Papers and Exams P.1 – P.7
Click
https://exoticnotes.com/papers/primary/

For Holiday Packages P.1 – P.7
Click
https://exoticnotes.com/holiday-work/primary/