

SECOND TERM E-LEARNING NOTE**SUBJECT: BASIC SCIENCE****CLASS: JS 3****SCHEME OF WORK**

WEEK	TOPIC
1.	Electrical Energy
2.	Skill Acquisition
3.	Teenage Pregnancy and Abortion
4.	Elements, Compound and Atomic Structure
5.	Radioactivity
6.	Chemical Formula
7.	Writing and Balancing Chemical Equations.
8.	Simple Machines
9.	Digestive System
10.	Circulatory System

REFERENCES

- Basis Science Made Easy for JSS Three by F.I Kehinde et al
- Basis Science Made Easy for JSS Two by F.I Kehinde et al
- STAN Integrated Science for JSS Three
- Precious Seeds Basic Science for JSSThree by J.O Otugboyega et al.

WEEK ONE**TOPIC: ELECTRICAL ENERGY****CONTENT**

- Introduction.
- Concept of Electron Flow.
- Concept of Current, Resistance and Potential Difference.
- Series and Parallel Arrangement in Electric Circuit.
- House Circuit: Fuse and Circuit Breaker.
- Electric Meter Reading and Billing.

INTRODUCTION

Electricity is the flow of electric current. Electric Current is the continuous flow of charges (electrons). It is also the rate of flow of charges. Electricity has several applications in the modern day society. Electrical energy is needed by industries, hospitals, offices, homes, schools, research institutes and so on. Power generation in Nigeria is by electricity Distribution Company of Nigeria (EDCN), which is saddled with responsibility of generating power, distribution of power and billing of power consumption.

Concept of Electron Flow

When current is flowing in a wire, electrons are moving rapidly. Electrons have negative charges. Negative charge is usually shown with a minus sign. Electrons flow round a path called circuit.

Concept of Current, Resistance and Potential Difference

Current: current is the continuous flow of electrons. It is also defined as the rate of flow of charges. It is represented as **I**. It measured in **ampere (A)**. It is measured using an instrument called ammeter. Depend on the source of generation, there are two types of current: Direct current (DC) and alternating current

Name: _____

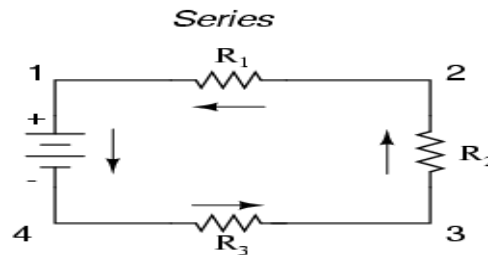
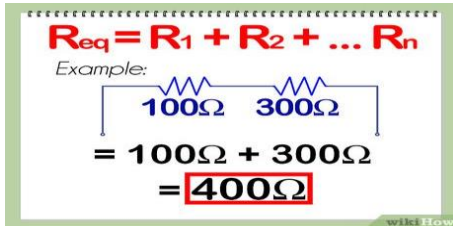
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(AC). Direct current is gotten from small generators, batteries and inverters while the alternating current comes from the transmission lines and transformers.

Resistance: this is the opposition to the flow of electric current in a circuit. It is represented as **R**. It is measured in **ohms** with an instrument called **ohmmeter**. An electrical component designed to introduce a known value of resistance into a circuit is called a **resistor**.

Potential difference (P.D): This is the energy required to move charges from the positive terminal to the negative terminal. P.d is represented as **V** and measured in volt using an instrument called **Voltmeter**.

Series and Parallel Arrangement in Electric Circuit.

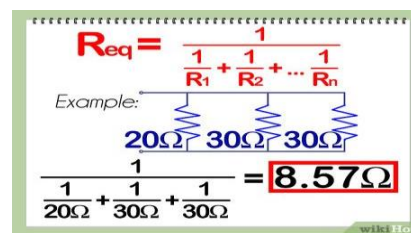
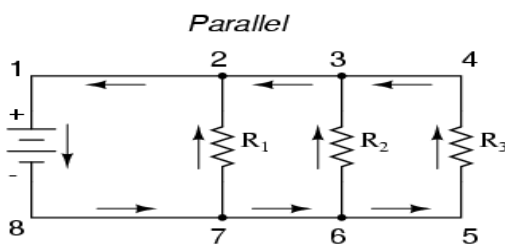


Series Arrangement of Resistors.

Series connection is the connection of resistors from one end to another.

$$R_T = R_1 + R_2 + R_3$$

R_T means total or effective resistance.



Parallel Arrangement of Resistors.

This is the arrangement in which resistors are arranged side by side such their corresponding ends join together at two common junctions.

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

EVALUATION

1. Differentiate between parallel and series arrangement.
2. Define the following (a) current (b) potential difference (c) Resistance.
3. What is electricity?

HOUSE CIRCUIT: FUSE AND CIRCUIT BREAKER.

220V of electricity enters our homes from the transformer and it is sent into the meter.

In order to prevent power surges or electrical problems, fuses and circuit breakers are used. A fuse is a safety device in an electric circuit. It consists of a thin resistance wire that will permit only a certain amount of electric current to pass through it, otherwise it will melt. Fuses are placed in the main electrical supply to protect wiring in the house. A circuit breaker has a switch that automatically goes off when there is an electrical problem it can be turned on later.

Billing of Electric Meter Reading

At home, electrical power is measured and billed. Power is the rate at which work is done.

Electrical power = current \times voltage

Name: _____

Class: _____

Electrical power is measured in **watt** using an instrument known as **wattmeter**.

One watt is the power consumed in an electric circuit when one joule of work is done in one second. Larger units of power are the kilowatt (kW) and megawatts (MW).

$$1\text{KW} = 1000 \text{ watts} = 10^3 \text{ W}$$

$$1\text{MW} = 1000000 \text{ watts} = 10^6 \text{ W} = 10^3 \text{ KW}.$$

In order to bill an electric Meter, electric energy consumption is measured and sold by the Electricity Distribution Company of Nigeria (EDCN) in units of kilowatt-hour.

Example: A radio set is used for 12 hours per day for 65days. Find the quantity of energy consumed and the cost, if the radio set is rated 35W. Assume that the cost of 1 kWh is 50 kobo.

Solution

Quantity of energy consumed = power \times time

$$\text{Energy consumed} = 35\text{W} \times 12\text{hours} \times 65\text{days}$$

$$\text{Energy consumed} = 27300\text{Wh}$$

$$\text{Dividing by } 1000 \text{ to make it kWh} = \frac{27300\text{Wh}}{1000}$$

Therefore, the quantity of energy consumed = 27.3kWh

Cost = quantity of energy consumed \times the cost of 1 unit of energy

$$\text{Cost of 1 unit of energy} = 50\text{kobo}$$

$$\text{Cost of energy consumed} = 27.3\text{kWh} \times 50\text{kobo} = 1365\text{kobo} = 13.65$$

Electric meter reading

Electric meter is a device installed in homes, industries, schools and offices to read the quantity of electrical energy used by local consumers of electricity. To read the meter, the previous unit is subtracted from the current unit, which will give the actual meter reading of the meter.

For example, if the previous unit or reading on the meter is 48,626.8 units and the current reading is 59,014.1 units, the actual meter reading for the month will be given as follows:

$$\text{Current reading} - \text{Previous reading} = \text{Actual reading}$$

$$59,014 - 48,626.8 = 1,387.3$$

Therefore, the meter reading for the month is 1387.3

EVALUATION

1. State the difference between fuse and circuit breaker.
2. What device is used to measure electrical power?

GENERAL EVALUATION/REVISIONAL QUESTIONS

1. What is electrical power?
2. State the use of: (a) ohmmeter (b) ammeter (c) wattmeter
3. What is work?
4. State the features that adapt (a) birds (b) fishes to their habitat
5. What is genetic counselling?

READING ASSIGNMENT

Precious Seeds Basic Science for JSS three by J.O otugboyega et al. Chapter 16. Pg 99-101

WEEKEND ASSIGNMENT

1. The instrument used for measuring electric current is A. Ammeter B. Wattmeter C. Voltmeter D. Ohmmeter

Name: _____

Class: _____

2. The kind of current generated by EDCN is ____ current A. Parallel B. Series C. Direct D. alternating
3. ____ is the opposition to electric current A. Potential difference B. Electrical power C. Resistance D. Fuse.
4. A device which is used to prevent power surges from damaging appliances is called A. Meter B. Fuse C. Coil D. Wattmeter
5. The type of connection commonly used at home is ____ A. Parallel B. Series C. Direct D. alternating

THEORY

1. What is electricity?
2. Explain electron flow.

WEEK TWO

TOPIC: SKILL ACQUISITIONS

CONTENT

- Meaning Skill Acquisition
- Reasons for Skill Acquisition
- Types of Skill
- Importance of Skill Acquisition

Meaning of Skill Acquisition

A skill is a special ability acquired through training in order to do something in a better way. Skill is also defined as the ability to bring about some end result with maximum certainty and minimum outlay of time and energy. There is a difference between talent and skill. Skill is usually acquired through training from either a formal or an informal setting. Talent is an inborn ability to do certain things. It is possible to be talented but not skilled. The training acquired will help the talented individual to improve on his/her ability. An acquired skill is perfected through constant practice and training. Psychologists believe that when you practice a skill continuously for seven years or 10,000 hours it becomes part of you. Someone who has undergone training to acquire a skill is called a professional or an expert while someone who knows little or nothing about a skill is called a novice. The process of moving from being a novice or unskilled person to a skilled person or a professional is called skill acquisition. Skill acquisition is the process of learning and mastering a particular skill.

Reasons for Skill Acquisition

1. **To earn a living:** Skill could be acquired in order to provide a means of livelihood for the individual. The individual uses the money earned from using his skills to meet basic needs.
2. **For employment:** Acquiring a skill provides an individual with the opportunity of being self-employed. Skill acquisition reduces the stress of seeking for a job all over the place. The more engaged a person is in a profession, the more skillful he/she becomes. Such a person can even earn more money by training others. The person becomes a decision maker and a manager of emergencies.
3. **For independence:** skill acquisition enables one to be independent, not relying on friends and family for survival.

Other reasons for skill acquisition include:

1. Risk taking
2. Decision making
3. Managing emergency situation
4. Survival strategy

Name: _____

Class: _____

5. Learning to live together
6. Improvement of quality of life.
7. Appreciating human capacity

EVALUATION

1. What is skill?
2. What are the reasons for skill acquisition?

Types of Skills

There are different skills that can be acquired and they include:

1. Automobile repairs (mechanical works)
2. Painting
3. Hair dressing/barber's work
4. Photography
5. Publishing
6. Catering
7. Panel beating
8. Book binding
9. Farming
10. Computer literacy
11. Fine art
12. Welding
13. Brick laying
14. Plumbing
15. ICT
16. Metal work
17. Electrical installation
18. Video coverage
19. Fish farming
20. Trading
21. Shoe making
22. Fashion designing
23. Upholstery/carpentry
24. Hat/bead making
25. Desktop publishing

Importance of Skill Acquisition

1. Improvement in skills and knowledge.
2. Improvement in communication.
3. Improvement on the quality of life.
4. Survival strategy.
5. Means of livelihood.
6. Self-gratification and independence.
7. Meaningful contribution to the society.

Evaluation

1. State five importance of acquiring skills.
2. State ten skills that can be acquired.

GENERAL EVALUATION

1. State ten types of skills.

Name: _____

Class: _____

2. What are the reasons for acquiring skills?
3. State four cause of flooding.
4. What is light energy?
5. State the laws of refraction.

READING ASSIGNMENT

Basis Science Made Easy for JSS Three by F.I Kehinde et al. Chapter 14. Page 61-64

WEEKEND ASSIGNMENT

1. A special ability acquired through training is called A. Method. B. Process. C. Entertainment. D. Skill.
2. One of the following is not an acquired skill A. Photography B. Sleeping C. Catering D. Weaving
3. Someone who has acquired a skill is called a A. Professor B. Cohesion C. ProfessionD. Professional
4. Which of the following is not a reason for acquiring skills? A. Survival strategy B. Dependency on friends C. Self-employment D. Training others
5. A person who has little or no knowledge about a particular skill is called A. Professional B. Expert C. Guru D. Novice

THEORY

1. Define skill acquisition.
2. Mention five types of skills.
3. State four reasons for acquiring skills.
4. State four importance of skill acquisition.

WEEKTHREE

TOPIC: TEENAGE PREGNANCY AND ABORTION

CONTENT

- Meaning of Teenage Pregnancy
- Consequences of Teenage Pregnancy and Delivery
- Myths and Facts About Pregnancy

Teenage pregnancy refers to pregnancy in a girl between the ages of 10-19. Teenage pregnancy is usually unintended and unwanted. The fact that you are at pubertal age and can get pregnant physically does not mean that you are really mature to be pregnant socially, emotionally, educationally even financially.

Teenage pregnancy can be dangerous for both the mother and the unborn child. Complication at child birth, and unsafe abortion, usually result from teenage pregnancy.

CONSEQUENCES OF TEENAGE PREGNANCY AND DELIVERY

The following are some of the consequences of a girl who got pregnant at the unripe age of teens.

1. **Health Risks:** Pregnancy induced hypertension, which can cause heart failure and death of both mother and the child. This type of pregnancy can lead to a condition whereby the girl's pelvic opening is too small to allow the infants head to pass during delivery. This may cause tear between the vagina and the urinary tract (vesico vagina fistula) or rectum(recto vagina fistula). Caesarian section (C.S) may result because the hips are not widened enough for the baby to come through the pelvis.
2. **Unsafe Abortion:** Since teenage pregnancy is unwanted, they are likely to seek abortion from untrained health care providers or can go on self-medication for self-induced abortion.
3. **Socio-economic:**

Name: _____

Class: _____

- i. Termination of education.
- ii. Stigmatization
- iii. Life span and career goals are disrupted
- iv. Early marriage due to pregnancy
- v. Isolation from peers and low self esteem
- vi. Low income and economic dependence
- vii. Force marriage
- viii. Poverty
- ix. Emotional feeling of guilt and fear
- x. Loose of childhood and adopting to adulthood.

MYTHS AND FACTS ABOUT PREGNANCY

1. **Myth:** Girls should not use contraceptives.
Fact: Girls should abstain from sexual intercourse so as to prevent themselves using contraceptives but if they have sexual intercourse and use contraceptive, it is safe and can prevent teenage pregnancy. Thus contraceptives are not for bad girls.
2. **Myth:** The contraceptives causes the following:
 - a. It destroys the womb.
 - b. It makes one infertile for life.
 - c. It makes one thin.
 - d. It reduces one's breast size.**Fact:** Only a few contraceptive may cause delay in fertility. Contraceptives do not damage the womb but drug overdose or abuse and unsafe abortion may damage the womb.
3. **Myth:** The condom reduces sensitivity during sexual intercourse.
Fact: There are very thin latex condoms and textured condoms that favour sensitivity in sexual relation.
4. **Myth:** A woman can get pregnant as a result of kiss.
Fact: Spermatozoa must penetrate the vagina for fertilization to take place somewhere in fallopian tube.
5. **Myth:** It is better for a woman to have children while still young as she can see them grow.
Fact: The ideal age for pregnancy is between 25 and 35.
6. **Myth:** For a woman to obtain the love of a man, she must have child for him.
Fact: Pregnancy does not guarantee a good relationship. A partner can leave even after there is a child in the relationship.

EVALUATION

1. Mention five reasons why you will not engage in sexual intercourse now as a JSS 3 student.
2. Mention five ways teenage pregnancy can be prevented

CONTENT

- Meaning of Abortion
- Types of Abortion
- Reasons for Abortion
- Unsafe abortion and it Consequences
- Ways to Prevent Abortion
- Where to get help

Meaning of abortion

Abortion is the deliberate termination of a human pregnancy, most often performed during the first 28 weeks. It is the ending of pregnancy by removing a foetus or embryo before it can survive outside the uterus. An abortion that occurs spontaneously is also known as a miscarriage. An abortion may be caused purposely and is then called an induced abortion.

TYPES OF ABORTION

There are two main types of abortion and they are;

- (i) Spontaneous Abortion (ii) Induced Abortion

Spontaneous Abortion is an unintentional abortion caused as a result of faulty development of embryo, abnormality of placenta, hormonal disturbances, acute infection, severe trauma or shock. It is commonly called miscarriage.

Induced Abortion is the intentional removal of foetus. Induced abortion can either be surgical or medical.

(a) Medical Abortion: This is the abortion done or induced with the use of one or more pills

(b) Surgical Abortion: This form involves minor surgical operation to induce abortion.

REASONS FOR ABORTION

The following are some of the reasons why people engage in abortion:

1. Teenage pregnancy or unwanted pregnancy.
2. Pregnancy as a result of rape.
3. Poverty and lack of financial capacity to care for the unborn child.
4. Medical complication at the onset of the pregnancy that may endanger the life of the mother or the foetus.
5. Lack of readiness.

UNSAFE ABORTION AND ITS CONSEQUENCES

An unsafe abortion is the abortion done without proper medical supervision. Unsafe abortion is usually by using over-the-counter drugs or carried out by quack medical practitioners.

Teenagers are lured to unsafe abortion for the following reasons:

1. The fears of letting someone know about their pregnancy.
2. To avoid social stigma.
3. To protect their education and future.

As convincing as they sound, these reasons don't weigh up to the consequences that comes with unsafe abortion. The following are the consequences of unsafe abortion:

1. Unsafe abortion may lead to the damage of internal organs like the womb.
2. It is painful and horrible.
3. Teenager can get infected from the unsafe process of abortion which may cause more severe disease like uterine fibroid.
4. It leads to the death of the teenagers.
5. It endangers the teenager as the quack doctor may further molest her.
6. There is a psychological breakdown if the teenager cannot endure going through the abortion.

EVALUATION

1. What is abortion?
2. State four consequences of unsafe abortion.

WAYS TO PREVENT ABORTION

Name: _____

Class: _____

The following can help prevent abortion or reasons to abortion:

1. Abstinence: Teenagers should avoid having any until they are physically and psychologically matured to take responsibility.
2. Avoid unsafe and unprotected by using condoms.
3. Women should go for medical checkup to prevent medical complication during pregnancy.
4. Keep responsible friends and partner.
5. Create a mindset against abortion.
6. Meet your school counselor for advice on abstinence.
7. Avoid sex promoting/pornographic content.
8. Always remember that the negative consequences of abortion outweigh the benefits.

WHERE TO GET HELP

Teenagers need help on what to do when faced with abortion related challenges. Here are some of the things you can do when faced with a challenge:

1. Talk to your parents about the about the situation
2. Meet a counselor for an advice on what to do.
3. There are also teenagers-support NGOs that can help.
4. Join a school social club against teenage pregnancy and abortion. E.g. anti AIDS club.
5. Join a true religious or social body that can help with teenage pregnancy and abortion related issues.

EVALUATION/REVISIONALQUESTIONS

1. Mentionsevenimplicationsofteenagepregnancy
2. Whatarehormones?
3. Whatisabortion?
4. Mentionfourreasonsforengaginginabortion.
5. Explainwhylighteningisseenbeforethunder.
6. Whatisamachine?

READING ASSIGNMENT

Basic Science for Junior Secondary School by J.O. Otugboyega et al. Page 127-130

WEEKEND ASSIGNMENT

1. The type of abortion that involves taking over-the-counter drugs is (a) Traditional (b) Medical (c) Surgical (d) None of the above
2. A developing child in the womb is called a (a) Baby (b) Foetus (c) Zygote (d) None of the above
3. Which of the following is **not** a way of preventing abortion (a) living reckless life (b) Abstinence (c) safe sex (d) None of the above
4. Where does the foetus develop (a) fallopian tube (b) uterus (c) vagina (d) None of the above
5. A person who constantly performs illegal abortion is called (a) Oncologist (b) Therapist (c) Abortionist (d) None of the above

THEORY

1. Explain with reason why abortion should or should not be legalized in Nigeria.
2. What advice will you give to a pregnant teenager based on your knowledge of the topic?

WEEK FOUR

TOPIC: ELEMENTS, COMPOUND AND ATOMIC STRUCTURE

CONTENT

- Element

Name: _____

Class: _____

- Compound
- Formula of Binary Compound
- Fundamental Particles of Atom

Element

An element is a substance which cannot be further divided into simpler substances. Over 100 chemical elements are known. They fall into two main categories, namely: Metals and Non-metals.

Metallic elements have their ending with letter M while non-metal element may not have named ending with letter M but with other alphabets except very few.

Compound

Chemical compounds are formed when two or more elements combine together. On this basis, two major categories of chemical compounds are known: (a) Binary Compound (b) Non-Binary Compounds.

BINARY COMPOUNDS	NON-BINARY COMPOUNDS
Their names end with-ide	Their names often end with-ate
They are made of only two elements	They are made of 3 or more elements

EXAMPLES OF ELEMENTS AND SYMBOLS

Hydrogen, H	Sodium, Na
Helium, He	Magnesium, Mg
Lithium, Li	Aluminium, Al
Berilium, Be	Silicon, Si
Boron, B	Phosphorous, P
Carbon, C	Sulphur, S
Nitrogen, N	Chlorine, Cl
Oxygen, O	Argon, Ar
Flourine, F	Potassium, K
Neon, Ne	Calcium, Ca

EXAMPLES OF COMPOUNDS AND FORMULA:

Water	H ₂ O
Sand	SiO ₂
Chalk	CaCO ₃
Lime	CaO

The elements in a chemical compounds cannot easily be separated for they are chemical combined. The ratios of combination of atoms of these elements in compounds are fixed unlike in mere mixture.

EVALUATION

1. Define (a) element (b) Compound.
2. What are binary compounds?
3. State five examples each of metals and non-metals.

FORMULAE OF BINARY COMPOUNDS

Binary Compounds are compounds of elements only and names ending with-ide. E.g. Magnesium chloride. Magnesium Chloride = Magnesium + Chlorine.

Elements	Atomic Electronic Number	Group Configuration	Valency	Oxidation number
H	1	1	1	+1
He	2	2	0	0

Name: _____

Class: _____

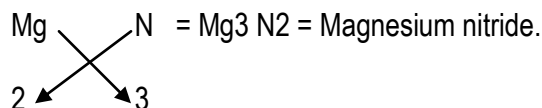
Li	3	2,1	1	+1
Be	4	2,2	2	+2
B	5	2,3	3	+3
C	6	2,4	4	+4
N	7	2,5	3	-3
O	8	2,6	2	-2
F	9	2,7	1	-1
N	10	2,8	0	0

Combinations of elements are made on the basis of their combining Capacities called valencies. Besides, every atom of element contain electrons by which distribution in a given order termed **ELECTRONIC**

CONFIGURATION, the group and hence valency of each element in combination is decided. For example, Magnesium nitride.

Mg = 12 = 2, 8, 2 = Group = 2, valency = +2

N = 7 = 2, 5 = Group = 5, valency = -3



EVALUATION

1. What is electronic configuration?
2. Define the term Valency.
3. What is the valency of an element found in group 6?
4. Work out the formulae of Aluminum oxide and carbon dioxide.

Fundamental particles of Atom

The atom is made up of a number of different particles.

There are three fundamental units namely;

1. The electron (discovered 1897)
2. The proton (discovered 1920)
3. The neutron (discovered 1932)

THE ELECTRON

The electron carries a negative electric charge and indeed a very small fraction of the mass of even the smallest atom, hydrogen.

They are at a comparatively great distance from the centre of the atom and travel rapidly and continuously in orbits around its centre known as the nucleus.

The electrons were discovered first in 1897 by Sir J.J. Thomson.

THE PROTON

The proton is a positively charged particle found in the nucleus of an atom although the positive charge on the proton has same magnitude charge on the electron mass of the proton which is about 1800 times larger than that of the electron.

The number of protons in the nucleus of an atom is called atomic number. All atoms of the same element have the same atomic number but those of different elements have a different number of protons in their nuclei.

Name: _____

Class: _____

The sum of the protons and neutrons in the nucleus of an atom is called the mass number with the symbol. The proton was discovered by Sir, Ernest Rutherford in 1920.

THE NEUTRON

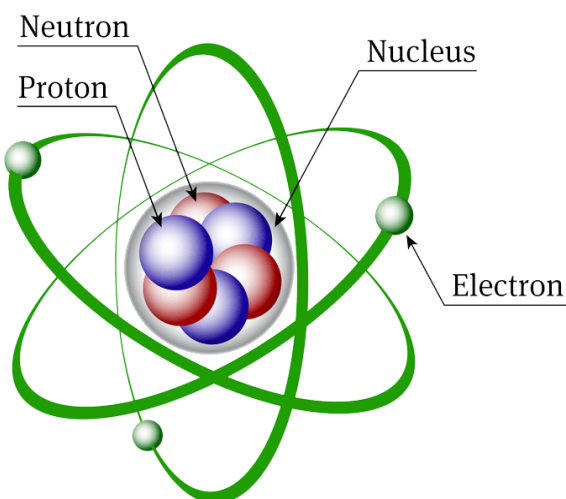
The neutron was discovered in 1932 by a British Scientist, James Chadwick. It has almost the same charge.

Whenever the neutron number in the nucleus of an atom of the same element varies, its mass number also varies and hence we have 'Isotopes'.

Isotopes are atoms of elements of the same atomic number but different mass number because of the difference in their neutrons number. The three common isotopes of hydrogen are:

- a) Proton – 1 proton
- b) Deuterium – 1 Proton + 1 neutron
- c) Tritium – 1 Proton + 2 neutrons

The particles proton and neutrons which make up the nucleus are – called Nucleons



EVALUATION/REVISIONAL QUESTIONS

- 1. What are isotopes? Name the three isotopes of hydrogen.
 - 2. How many neutrons are present in the following atoms?
(a) ^{23}Na , (b) ^{31}P , (c) ^{39}K (d) ^{35}Cl .
 - 3. Name the three fundamental particles of an atom.
 - 4. What is light energy?
- 1) State the difference between echo and reverberation.

READING ASSIGNMENT

Basis Science Made Easy for JSS Three by F.I Kehinde et al. Chapter 12. Page A43-44.

WEEKEND ASSIGNMENT

- 1. A substance which cannot be further divided into simpler substances is.....(a) Elements
(b) Compound (c) Radical (d) Mixture
- 2. One of these is NOT a binary compound(a) Sodium chloride (b) Magnesium nitride
(c) Aluminium oxide (d) Calcium Phosphate
- 3. The positively charged sub atomic particle is (a) element (b) electron (c) neutron (d) proton
- 4. _____ discovered the electron (a) James Chadwick (b) Sir, Ernest Rutherford (c) Sir J.J.
Thomson (d) Issac Newton
- 5. The sub atomic particle involved in chemical reaction is (a) electron (b) neutron (c) shell

Name: _____

Class: _____

(d) proton

THEORY

1. Explain the term 'atom'.
2. Differentiate between a binary compound and non-binary compound.

WEEKFIVE

TOPIC: RADIOACTIVITY

CONTENT

- Meaning of Radioactivity
- Discovery of Radioactivity
- Types of Radioactivity
- Radioactive Elements
- Types of Radiation and Their Properties
- Nuclear Transmutation
- Uses of Radioactivity

Meaning of Radioactivity

Radioactivity is the spontaneous disintegration or breaking down of the nucleus of an atom which makes it give out or emit radiation. Any element that disintegrates spontaneously and release rays is called a **radioactive element**

Discovery of Radioactivity

Radioactivity was discovered by a French physicist called Henri Becquerel in 1896. He discovered that atoms of some elements gave out some kinds of ray which penetrated a thick black paper. He used uranium for his study. His discovery was confirmed by the couple, Marie and Pierre Curie.

Types of Radioactivity

There are two types of radioactivity. i. Natural radioactivity ii. Artificial radioactivity.

Natural radioactivity occurs on its own without man's influence.

Artificial radioactivity is caused by man's activity.

Radioactive Elements

Radioactive elements are elements that give out rays from the nuclei of their atoms. Natural radioactive elements include uranium, radium, plutonium, radon, thorium etc. Artificial radioactive elements are produced by bombarding nonradioactive elements (like sulphur-35, iodine-137, cobalt-60 etc.) with radioactive particles to form **radioactive isotopes**.

EVALUATION

1. What is radioactivity?
2. What are the types of radioactivity?
3. What are radioactive elements?

Types of Radiation and Their Properties

There are three types of rays, they are; i. Alpha particles ii. Beta particles iii. Gamma rays

Alpha particles (α -rays)

Alpha particles or rays are helium nucleus consisting of two protons and two neutrons (I.e. atomic number and atomic mass are 2 and 4 respectively).

1. Alpha particles are positively charged.

Name: _____

Class: _____

2. They have the heaviest radiation.
3. They have the lowest penetrating power and can be stopped by a thin sheet of paper.
4. They have the highest ionization power.

Beta particles (β -rays)

Beta particles or rays consist of a stream of fast moving electrons.

1. They are heavier than gamma rays.
2. They are negatively charged.
3. They have higher penetrating power than alpha rays. They can be stopped by aluminum foil.

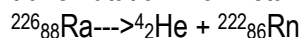
Gamma rays (γ -rays)

Gamma rays are electromagnetic radiation.

1. They do not carry any charge.
2. They have negligible mass.
3. They have the highest penetrating power and can only be stopped by lead block.
4. They have the lowest ionization power.

Nuclear Transmutation

The changes in the nucleus of the atom of an element caused by radioactive emission are called nuclear transmutation. For instance, Radium-226 emits α -rays and turns to radon-222.



If the changes in the nucleus are caused by man, it is called **artificial nuclear transmutation**.

EVALUATION

1. Differentiate between alpha, beta and gamma radiations.
2. What is nuclear transmutation?

Uses of Radioactivity

Radioactivity has application in the following fields;

1. The medical field.
2. Agricultural and scientific research.
3. The industrial field.

In medical field

Radioactivity is used in;

1. Sterilization of syringes and medical equipment.
2. Treatment of cancer.
3. Sterilization of bottled drinks and canned food.

In agricultural and scientific research

Radioactivity is used as;

1. Radioactive tracers.
2. Radioactive or carbon dating.

In industrial field

Radioactivity is used to;

1. Study defects in metals and welded joints.
2. Check metal weaknesses.
3. Trace underground pipe leakages.

Effect or dangers of using radiation

Name: _____

Class: _____

1. Long exposure to radiation can destroy body cells.
2. Exposure to radiation can lead to gene mutation.
3. It can cause deformities to foetus in the womb.
4. Radiation from nuclear weapons can kill.
5. Radioactive wastes pollute and destroy the environment.

EVALUATION

1. State the uses of radioactivity in (a) medical field (b) industries (c) agricultural and scientific research.
2. List the hazards of radioactivity.

EVALUATION/REVISIONAL QUESTIONS

1. What is radioactivity?
2. What is reproduction?
3. Mention three benefits of acquiring skills.
4. What is ozone layer depletion?
5. What is reflection?

READING ASSIGNMENT

Basic Science for Junior Secondary School by J.O. Otugboyega et al. Page 102-103

WEEKEND ASSIGNMENT

1. _____ is referred to as the father of radioactivity. (a) Henri ford (b) Pierre Currie (c) Marie Curie (d) Albert Einstein
2. Positively charged radiation that can be stopped by a thin sheet of paper is (a) X-ray (b) Beta particles (c) Alpha particles (d) Gamma rays
3. Blood moves out of the heart to the lungs through _____. (a) Aorta (b) Pulmonary artery (c) Vena Cava (d) hepatic artery
4. Which of the following is an electronegative element? (a) Na (b) F (c) Hg (d) Au
5. Which of the following is not a result of excess exposure to radiation? (a) HPV (b) cancer (c) Mutation in foetus (d) Radioactive poisoning

THEORY

1. State five benefits of radioactivity.
2. Should Nigeria embark on nuclear power as alternative source of electricity? Give reasons for your answer.

Name: _____

Class: _____

WEEKSIX**TOPIC: CHEMICALSYMBOLSANDFORMULAE****CONTENT**

- Symbolsof Elements.
- ElectronicConfiguration.
- Groupand Valencyof Compounds.
- Formulasof Compounds.
- IUPAC Nomenclature.
- Fundamental Particles of Atom.

SYMBOLSOFELEMENT

An element is a substance which consists of only one kind of matter. Over 100 elements are known, these elements are usually represented by symbols instead of writing their names in full.

The abbreviation for each element is called **Symbol** for that element.

The brief name of that element it represents also one atom of the element it stands for. (Element 1–20)

There are 4 groups of symbols:

Symbols formed from the first letter of element

Element	Symbols
Hydrogen	H
Carbon	C
Nitrogen	N
Oxygen	O
Sulphur	S
Phosphorus	P
Iodine	I
Fluorine	F

(b) Symbols formed from the first two letters of the element.

Elements	Symbols
Helium	He
Lithium	Li
Beryllium	Be
Neon	Ne
Aluminum	Al
Calcium	Ca
Barium	Ba
Bromine	Br

(c) Symbols formed from the first and any letter in the name of the elements

Elements	Symbols
Magnesium	Mg
Chlorine	Cl
Manganese	Mn
Zinc	Zn
Cadmium	Cd
Platinum	Pt

(d) Symbols derived from Latin name of the elements

Element	Latin Name	Symbols
Sodium	Natrium	Na

Name: _____

Class: _____

Iron	Ferrum	Fe
Copper	Cuprum	Cu
Gold	Aurum	Au
Potassium	Kalium	K
Silver	Argentum	Ag
Lead	Plumbum	Pb
Mercury	Hydrargyrum	Hg

EVALUATION

1. Define the terms symbol of an element.
2. Mention the four groups of symbols that we have.

ELECTRONIC CONFIGURATION

Electronic Configuration is the representation of how electrons are arranged on the shells of an element.

The pattern of how electrons are arranged is of the fashion:

K	1 st shell – 2 electrons
L	2 nd shell – maximum of 8 electrons
M	3 rd shell – maximum of 8 electrons
N	4 th shell – maximum of 8 electrons

This pattern works for at least the first 20 elements.

The electronic configuration helps us to correctly place elements into their groups and periods within the periodic table. This information also helps in the determination of combining powers of elements.

EVALUATION

1. What is electronic configuration?
2. Write the electronic configuration of Na=11, P=15.

GROUP AND VALENCY

The group refers to the vertical arrangement in columns of elements in the periodic table. Valency is the combining power of an element. It must be correctly determined and the correct chemical formulae of compounds are to be determined.

Group	Valency
I	+1
II	+2
III	+3
IV	-4
V	-3
VI	-2
VII	-1
O	0

EVALUATION

1. Define the term valency.
2. What is the valency of (a) Group III element (b) Group IV element.

FORMULAE OF BINARY COMPOUND

Formulae of binary compound

A compound is a substance made of two or more elements chemically combined together. Compound of two elements only are known as binary compounds and have the following characteristics.

- Names end with –IDE.
- Composed of only two elements.

Name: _____

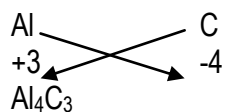
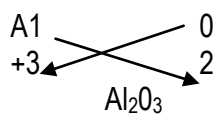
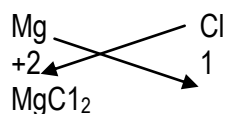
Class: _____

E.g. Carbon dioxide, Magnesium chloride, Aluminum Oxide, Aluminum Chloride.

C=6 _____ 2,4 Al=13 _____ 2,8,3

Mg=12 _____ 2,8,2O=8 _____ 2,6

Cl=17 _____ 2,8,7



NON-BINARY COMPOUNDS

These are compounds of 2 or more elements whose names end with ATE. Examples are: Magnesium trioxocarbonate (IV)

Beryllium trioxonitrate (V)

Calcium tetraoxosulphate (VI)

Potassium heptaxodichromate VI

Sodium hexachloroplatimatell

Non-binary compounds have these characteristics:

EVALUATION

1. What are non-binary compounds?
2. Give two of their characteristics.
3. State any five examples of non-binary compounds.

DETERMINATION OF VELENCIES OF RADICALS

Radicals are groups of atoms bearing a

charge. They are the polyatomic ions, i.e. ions which contain more than one type of atom. Examples include:

- | | |
|-------------------------------------|--------------------|
| 1. Trioxonitrate (V) ion | NO_3^- |
| 2. Trioxocarbonate (IV) ion | CO_3^{2-} |
| 3. Tetraoxosulphate (VI) ion | SO_4^{2-} |
| 4. Hydroxide ion | OH^- |
| 5. Cyanide ion | CN^- |
| 6. Tetraoxophosphate (V) ion | PO_4^{3-} |
| 7. Hydrogentrioxocarbonate (IV) ion | HCO_3^- |

The charge on each polyatomic ion is determined thus:

$\text{S}+4(\text{O})$

But $\text{O}=-2$ and $\text{S}=6$

$\text{S}+4(-2)$

$6-8=-2$

SO_4^{2-}

CO_3^{2-}

$\text{C}+3(\text{O})$

But $\text{C}=4$, $\text{O}=-2$

$4+3(-2)$

$4-6=-2$

CO_3^{2-}

Name: _____

Class: _____

FORMULAE OF NON-BINARY COMPOUNDS

Sodium hexachloroplatinate

Na = 11 _____ 2, 8, 1

Valency of sodium = 1

Hexachloroplatinate = PtCl_6

$\text{Pt} + 6\text{Cl}$

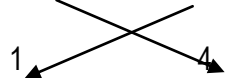
$2 + 6(-1)$

$2 - 6$

$= -4$

Valency of $\text{PtCl}_6 = -4$

Na PtCl_6



Na_4PtCl_6

EVALUATION

- Name the following (i) CaCO_3 (ii) Na_3PO_4 .
- Work out the charge on the following polyatomic ions
(a) SO_3^n (b) NO_3^n .

IUPAC NOMENCLATURE

International Union of Pure and Applied Chemistry have agreed to a common way of naming chemical compounds according to a set of rules, this naming system is termed IUPAC nomenclature.

The rules involved in IUPAC nomenclature are as follows:

Oxygen as -2 .

Hydrogen as $+1$ with non-metals.

Hydrogen as -1 with metals.

These numbers are the oxidation number.

CO_3^{2-}

$\text{C} + 3(-2) = -2$

$\text{C} - 6 = -2$

$\text{C} = -2 + 6 = +4$

Name = trioxocarbonate (IV) ion, i.e. 3 atoms of oxygen and carbon oxidation number is 4.

EVALUATION/REVISIONAL QUESTIONS

- What are binary compounds?
- Give the correct chemical formulae of (a) Aluminium Sulphide, (b) Sodium Phosphate
- Define the term accommodation.
- Describe briefly what is meant by (a) Hypermetropia (b) Myopia

READING ASSIGNMENT

Basis Science Made Easy for JSS Three by F.I Kehinde et al. Chapter 19. Page 68-71.

WEEKEND ASSIGNMENT

- The symbol Ag represents element (a) Argon (b) Silver (c) Gold (d) Arsenic
- The electronic configuration 2, 8, 3 is that of _____ (a) Sodium (b) Aluminium (c) Silicon (d) Argon
- The correct formula of tetraoxophosphate (V) ion is (a) SO_4^{2-} (b) PO_3^{3-} (c) SO_3^{2-} (d) PO_4^{3-}
- The compound Na_3AlF_6 has the IUPAC name (a) sodium trioxoaluminatell (b) sodium hexafluoroaluminatell (c) sodium heptafluoroaluminatell (d) sodium tetrafluoroaluminatell

Name: _____

Class: _____

5. The acronym IUPAC represents (a) International Usage of Pure and Applied Chemistry (b) Initiative Unity for Pure and Applied Chemistry (c) International Union of Pure and Applied Chemistry (d) Indoor Union of players, Actor and Corps

THEORY

1. What are binary compounds?
2. State any two examples of binary compounds.
3. Write the electronic configuration of (a) silicon (b) potassium.
4. Work out the oxidation number of chromium in $\text{Cr}_2\text{O}_7^{2-}$.
5. What are radicals?
6. State three examples of radicals.

WEEK SEVEN

TOPIC: SIMPLE CHEMICAL EQUATIONS

CONTENT

- Chemical Equations
- Equations and Law of Conservation of Matter
- Writing Chemical Equations
- Balancing Chemical Equations

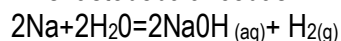
If the law of conservation of matter is to be kept, it means that there must be the same number of atoms in each half of the equation. There must be the same number of atoms in reactants and in the products.

The law of conservation of matter states that matter is neither created nor destroyed in the course of chemical reaction. This is the main reason why the number of atoms of products must balance those of reactants and vice versa.

So, the equation:

$\text{Na} + \text{H}_2\text{O} = \text{NaOH} + \text{H}_2$ is considered unbalanced and hence not acceptable.

This has to be balanced as:



S = solid L = Liquids Aq = aqueous g = gas

EVALUATION

1. State the law of conservation of matter
2. What is a balanced equation?

WRITING CHEMICAL EQUATIONS

Chemical equations are written using chemical symbols and formulae. It is necessary to have as much detail as possible about what is going on in a reaction. e.g. hydrogen gas reacts with oxygen gas to produce water.

We translate this information into a word equation.

Hydrogen (gas) + Oxygen gas = water

(Reactants) _____ (Product)



Balanced equation

Common chemical reactions include (a) Combustion of hydrocarbons (b) Neutralization reactions (c) Double decomposition

Name: _____

Class: _____

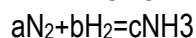
Examples:

- a) $C_3H_8 + O_2 \longrightarrow CO_2 + H_2O$
b) $HCl + NaOH \longrightarrow NaCl + H_2O$
c) $AgNO_3 + NaCl \longrightarrow AgCl + NaNO_3$

EVALUATION

1. What kind of reaction is neutralization reaction?
2. What are the usual products of combustion of hydrocarbons?

BALANCE CHEMICAL EQUATIONS



$$N: 2a = c \dots (i)$$

$$H: 2b = 3c \dots (ii)$$

$$Let a = 1$$

$$\text{From equation (i)} \quad 2(1) = c$$

$$2 = c$$

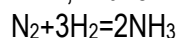
$$c = 2$$

$$\text{From equation (ii)} \quad 2b = 3(2)$$

$$2b = 6$$

$$b = 3$$

$$A = 1, \quad b = 3 \quad c = 2$$



Two methods are commonly employed in chemical equations:

1. Balancing by inspection.
2. Balancing by the use of simultaneous equations.

EVALUATION/REVISIONAL QUESTIONS

1. What two methods are commonly used in balancing chemical equation?
2. Give the balanced equation for the formation of water from hydrogen and oxygen.
3. What are hormones?
4. What glands produce them in animals?

WEEKEND ASSIGNMENT

1. A short story which tells us what happens in a chemical reaction is known as: (a) chemical reaction (b) chemical formulae (c) chemical formulae (d) chemical balance
2. The subscript (aq) in a written chemical equation symbolizes: (a) Aquiline (b) Aquarium (c) Aquarius (d) Aqueous
3. What law governs the written balanced chemical equation? (a) law of constant composition (b) law of conservation of matter (c) law of multiple proportions (d) law of reciprocal proportions
4. $aN_2 + bH_2 = cNH_3$. What do a, b, and c represent in the equation written respectively?
(a) $a=3 \quad b=1 \quad c=2$ (b) $a=2 \quad b=3 \quad c=1$ (c) $a=1 \quad b=3 \quad c=2$
(d) $a=1 \quad b=2 \quad c=3$
5. The reaction involving an acid and a base to form salt and water only is known as _____ (a) Combustion reaction (b) Neutralization reaction (c) Redox reaction (d) precipitation

THEORY

1. Write out the chemical equation of reaction described below. (a) Magnesium ribbon reacts with hydrochloric acid to form magnesium chloride and hydrogen gas.
2. What are the products of combustion of hydrocarbons?

WEEK EIGHT**TOPIC: SIMPLE MACHINE****CONTENT**

- Definition of Simple Machine
- Types of Machine
- Importance of Simple Machine

Definition of Simple Machine

A machine is a tool or device that makes work easier. It is defined as a tool which uses force applied (effort) at one point to overcome another resisting force (load) at another point. Examples of machine include: a plier, the human arm, a gear, a pulley etc.

Types of Machine

There are six types of simple machines. They are;

1. Lever
2. Wheel and axle
3. Pulley
4. Wedge
5. Inclined plane
6. Screw

Lever

A lever is a simple machine built on the principle of a stiff bar resting on a pivot or fulcrum with a load placed at one end and effort applied on the other end.

There are three parts of the lever;

- A. Load: This is the point of the resisting force.
- B. Effort: This is the point where force is applied.
- C. Fulcrum: This is the turning point of the lever.

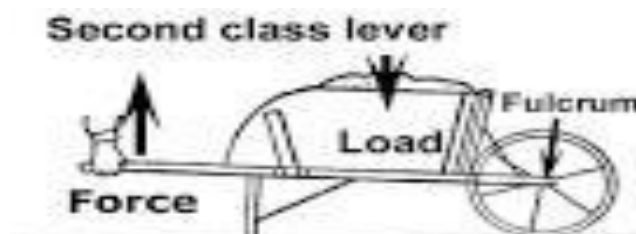
Types of Lever

There are three classes or order of lever. They are;

1. First Order Lever: In this lever, the fulcrum is between the load and effort (LFE). Examples include: scissors, claw hammer.



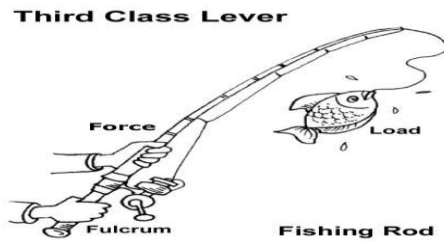
2. Second Order Lever: In this lever, the load (L) is between the effort (E) and the fulcrum (F) (FLE). Example of this including; wheelbarrow, nutcracker, bottle opener etc.



Name: _____

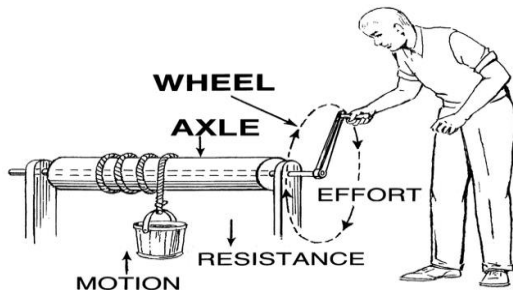
Class: _____

3. Third Order Lever: In this lever, the effort is between load and effort. (FEL). Example of this include; fore arm.



Wheel and Axle

This simple machine is used to lift heavy load from depth. It consists of a Large wheel on a small axle that turns in the same axis. Examples of wheel and axle include: bicycles, fan, wagon etc.



Use

1. It is used to draw out heavy load from depths
2. It is used to create the turning effects in bicycle

EVALUATION

1. Define simple machine.
2. List two uses of (a) Lever (b)Wheel and Axle.

Pulley

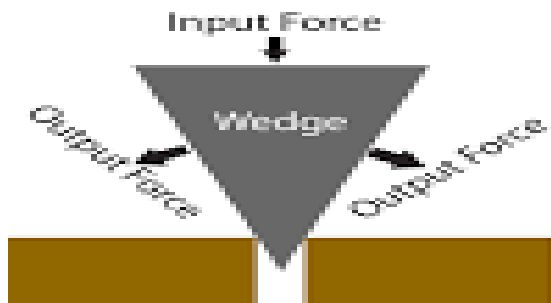
A machine consisting of a wheel over which a pulled rope or chain runs to change the direction of the pull used for lifting a load. Combinations of two or more pulleys working together reduce the force needed to lift a load.

Uses

1. It is used lift and move load in cranes
2. It is also used in lifts (elevators)

Wedge

A wedge is a triangular shaped tool, and is a portable inclined plane. It can be used to separate two objects or portions of an object, lift up an object, or hold an object in place.



Use

It is used to split objects open especially wood.

Screw

A screw is a type of fastener characterized by a helical ridge known as thread. Most screw rotate in clockwise manner but few rotate in anticlockwise manner.

**Use**

It allows drilling into hard surfaces

Inclined plane

An inclined plane is a flat supporting surface tilted at an angle, with one end higher than the other, used as an aid for raising or lowering a load. The inclined plane is often used to lift a load over a vertical obstacle.

**Importance of Simple Machine**

1. Simple helps man to overcome friction in doing work.
2. It helps to move load over a long distance.
3. It helps to save time and effort
4. It is more efficient.
5. Simple machines are basic and simple to operate.

GENERAL EVALUATION\REVISIONAL QUESTIONS

1. What is a machine?
2. Categorize the following to the class of lever they belong to: fore arm, plier, nutcracker, fishing rod.
3. State five effect of radiation.
4. State four reasons for abortion.
5. What is nuclear transmutation?

READING ASSIGNMENT

Basis Science Made Easy for JSS Three by F.I Kehinde et al. Chapter 17. Pg 70-82.

WEEKEND ASSIGNMENT

1. An example of a first order lever is (a) fore arm (b) nutcracker (c) seesaw (d) pulley
2. The principle of inclined plane is used in the construction of which of the following (a) pulley (b) staircase (c) lift (d) crane
3. ___ has the load between the fulcrum and effort (a) First Order lever (b) Second Order Lever (c) Third Order Lever (d) Wedge

Name: _____

Class: _____

4. Which of the following radiation has the lowest penetrating power? (a) alpha rays (b) beta rays (c) gamma rays (d) X-ray
5. The clear outer layer of the eye is (a) iris (b) cornea (c) retina (d) lens

THEORY

1. Explain the three types of lever giving an example for each.
2. State the importance of machine.

WEEK NINE

Date:.....

TOPIC: DIGESTIVE SYSTEM

CONTENT

- Parts of the Digestive System
- Digestion at Various Parts
- Functions of the Enzymes
- Simple Food Tests

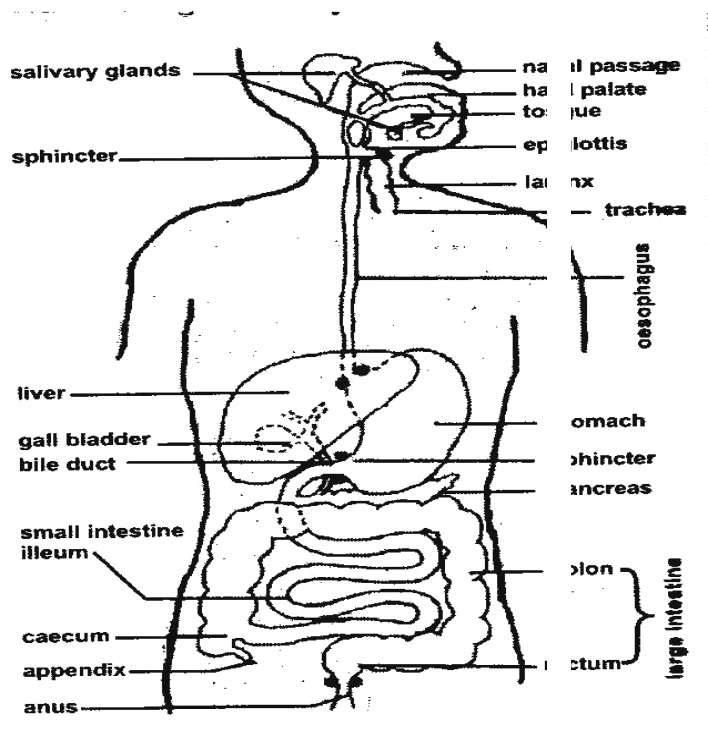
PARTS OF THE DIGESTIVE SYSTEM

The digestive system consists of the alimentary canal, which is a long tube from the mouth, attached to various organs and ends at the anus.

The alimentary canal is a long tube through which food substances pass, become digested (broken down), partly absorbed and the rest passed out.

The alimentary canal has five main parts: (i) The mouth (ii) The gullet (or Oesophagus) (iii) The stomach (iv) The small intestine (v) The large intestine.

THE HUMAN ALIMENTARY CANAL



THE MOUTH

It comprises three prominent structures for digestion namely the teeth, salivary glands and the tongue.

Name: _____

Class: _____

TEETH: Structures for food mastication.

SALIVARY GLANDS: Secrete SALIVA (A digestive juice)

TONGUE: Organ of taste.

THE GULLET

It is also known as the Oesophagus. It is lined with smooth involuntary muscles by which contraction of food from the mouth is regulated into the stomach by PERISTALSIS. **Peristalsis** is the motion by which food is pushed along the gullet and the rest of the digestive tract.

THE STOMACH

This is a muscular organ, which serves in the digestion of food and also acts as temporary food store. A digestive juice called the **GASTRIC JUICE** is secreted into the stomach by both the **PEPTIC** and **OXYNTIC CELLS**.

THE SMALL INTESTINE

The longest portion of the digestive tract (about 9m in length if fully stretched out) which begins with the C-shaped **DUODENUM** on which the **LIVER** and **PANCREAS** are attached. Both discharge their secretions – **THE BILE** and the **PANCREATIC JUICE** respectively to the duodenum.

THE LARGE INTESTINE

Also known as COLON. It processes undigested food portion as FAECES for export outside the body through the ANUS. No digestion occurs in it. Excess water is also removed through the faeces by large intestine.

EVALUATION

1. Mention the five main parts of the human digestive system.
2. What digestive juices are present along the digestive tract?

DIGESTION AT VARIOUS PARTS

A balanced diet consists of carbohydrates, fats & oils, proteins, mineral salts, vitamins and water. The carbohydrates, proteins and fats are large complex molecules. They must be broken down into small simpler molecules before the body can use them.

The conversion of large complex molecules to small simpler molecules is the process of digestion.

Digestion is defined as the breakdown of large complex molecules in foods into small simpler absorbable molecules by the enzymes. Digestion takes place in the mouth, stomach and the small intestine. There are four digestive juices along the digestive tract. These are:

- (i) SALIVA
- (ii) GASTRIC JUICE
- (iii) PANCREATIC JUICE
- (IV) INTESTINAL JUICE

Each of them contains one or more digestive enzymes, which converts specific food complex to simpler forms.

The following are the components of each digestive juice.

Parts of Alimentary Canal	Digestive Juice	Components
Mouth	Saliva	Ptyalin + Water
Stomach	Gastric juice	Pepsin + Rennin

Name: _____

Class: _____

S.I (Duodenum)	Pancreatic Juice	Amylase + Lactase + Sucrase + Trypsin
S.I (Ileum)	Intestinal Juice	Maltase + Lactase + Sucrase + Erepsin + Lipase

FUNCTIONS OF THE ENZYMES

Ptyalin – converts cooked starch to maltose.

Pepsin – converts protein to peptones and polypeptides.

Rennin- coagulates liquid proteins (milk) into thick digestive form.

Trypsin – breaks down protein to peptones and polypeptides.

Amylase – breaks down starch into maltose.

Lipase – breaks down fats into fatty acid and glycerol.

Maltase – breaks maltose to glucose.

Lactase – breaks lactose to glucose & fructose.

Sucrase – breaks sucrose to glucose & galactose.

Erepsin – breaks polypeptides into amino acid.

Mouth: Digestion of starch begins in the mouth. Ptyalin converts starch to maltose sugar in the mouth.

Stomach: Only proteins are digested in the stomach. Pepsin converts solid proteins into peptones and polypeptides while Rennin curdles milk proteins.

Small Intestine (Duodenum): The three major classes of foods are all digested here.

Trypsin – converts protein to peptones and polypeptides.

Amylopsin – converts starch to maltose.

Lipase – converts fats & oil to fatty acid & glycerol.

Small Intestine (Ileum) – Digestion is completed here as all partially digested food substance are completely digested.

Maltase – breaks down maltose to glucose.

Erepsin – breaks down polypeptides to amino acid.

Lipase - breaks down fats & oil to fatty acid and glycerol.

These final products of digestion in the Ileum are the small simple molecules which can be absorbed into the body.

ABSORPTION OF FOOD

When food has been finally digested to simple absorbable forms, they are simply absorbed in the small intestine into the blood stream by diffusion through several finger like projections on the internal surface area of the ileum.

These projections are known as **VILLI**. Each villus comprises a network of capillaries and the lateal vessels. Glucose and Amino acid diffuse into the network of capillaries of villi into the blood stream while the lateal vessel takes up fatty acid and glycerol.

Indigestible portion of the food is regulated into the larger intestine where it is dehydrated and processed into semi solid faeces for egestion.

EVALUATION

1.
 - a. Name the components of a balanced diet.
 - b. State which components of the balanced diets are large complex molecules that require digestion?
2.
 - a. Name the four digestive juices.
 - b. Mention the enzymes present in each juice.
3. Explain the following (a) absorption of food (b) egestion.

Name: _____

Class: _____

SIMPLE FOOD TESTS

1. Test for starch
Starch + Iodine solutions
Result: Blue – black colour confirms the presence of starch
2. Test for reducing sugars e.g. glucose
Glucose + Fehling solutions
Boil the mixture
Result: Brick – red precipitate confirms the presence of reducing sugar
3. Test for Non-reducing sugars eg Sucrose
Sucrose + Dil HCl acid
Boil for about 5 minutes
Cool the mixtures
Add some NaHCO_3 until there is effervescence
Now add Fehling's solution
Warm the tubes
Result: Brick – red precipitate obtained

N.B: If Sucrose is not first heated as described, it would give no colour with Fehling solution for it is a non-reducing sugar. The HCl breaks down the sucrose into simpler sugar, which reacts with the Fehling solution.

4. Test for protein
2cm³ of protein (milk) + 2-3 drops of Million's reagent
Boil the mixture
Result: Orange colour or Brick red precipitate confirms presence of protein.
5. Test for lipids
oil + Sudan III solution
Result: Red stains confirm presence of oil or fat
OR: oil + paper
Result: Paper turns translucent to show that lipid is present
6. Test for water
Water + white anhydrous CuSO_4
Result: Blue colour confirms presence of water
OR: Water Blue cobalt II chloride paper
Result: Pink colour confirm the presence of water

GENERAL EVALUATION

1. Classify the following sugars either as reducing or non-reducing (a) Sucrose (b) Maltose. (c) Glucose (d) Lactose (e) Galactose (f) Fructose.
2. Mention the reagent needed to test for each of the following: (a) Starch (b) protein (c) reducing sugar (d) Lipid (e) water (f) non-reducing sugar
3. (a) Name the components of a balanced diet (b) State which components of the balanced diets are large complex molecules that require digestion?
4. (a) Name the four digestive juices. (b) Mention the enzymes present in each juice.
5. Explain the following (a) absorption of food (b) egestion.

READING ASSIGNMENT

Integrated Science Made Easy, bk two by F.I. Kehinde. Pgs 13-15.

WEEKEND ASSIGNMENT

1. The process by which complex molecules in food are reduced into simpler absorbable one is
A. Egestion B. ingestion C. digestion D. absorption
2. One of these is NOT a digestive enzyme A. Mucin B. ptyalin C. pepsin D. amylase

Name: _____

Class: _____

3. Which reagent is most suitable for testing for presence of starch in heat? A. Osmic acid B. iodine
C. million's reagent D. Sudan III solution.
4. All of these are digestive juices except A. Salivary glands B. pancreatic juice C. Bile pigment
D. succus entericus
5. Oxyntic cells secrete into the stomach A. Dilute HCl B. Trypsin C. pepsin D. rennin

THEORY

1. Mention the five main parts of the digestive system.
2. Define the following (a) peristalsis (b) egestion.

WEEK TEN

Date:

TOPIC: THE CIRCULATORY SYSTEM

CONTENT

- Blood Components and Functions.
- The Heart and Blood Vessels.
- The Human Circulatory System
- Blood Defects and Diseases

Blood Components and Functions

Blood is a liquid connective tissue, which is maintained in constant circulation round the body. In certain organisms, blood flows within a closed system of inter connecting vessels while the reverse holds in other organisms.

The human blood is of PH 7.4 and comprises four components:

1. Plasma [liquid part of blood]
2. Red Blood cells [Erythrocytes]
3. White Blood Cells [Leucocytes]
4. Blood platelets [Thrombocytes]

PLASMA

This is the liquid part of blood, which makes up about 55% volume of blood. The plasma itself is made of about 90% water, proteins and mineral salts. It takes digested food from the small intestine to places where needed and also takes waste product to the excretory organs for removal.

RED BLOOD CELLS: These are the most numerous cells in the blood. They account for the redness of blood. Each red cell contains HEAMOLOGIN, a respiratory pigment which enables Red Blood Cells to transport oxygen in the blood. Red blood cells are also called ERYTHROCYTES. They are formed in the BONE MARROW and destroyed in the LIVER and SPLEEN when too old to perform their functions completely after about 120days of existence.

WHITE BLOOD CELLS

They are the least numerous cells in the blood. They fight microorganisms and infections in the blood. WBC also helps the body to destroy bacteria and viruses through the agency of ANTIBODIES in the blood plasma.

PLATELETS

The second most numerous blood cells which help blood to clot in wounds. They are also called THROMBOCYTES. They are tiny cells, which are much smaller than either the RBCs or WBCs. Most often they are found as fragments.

EVALUATION

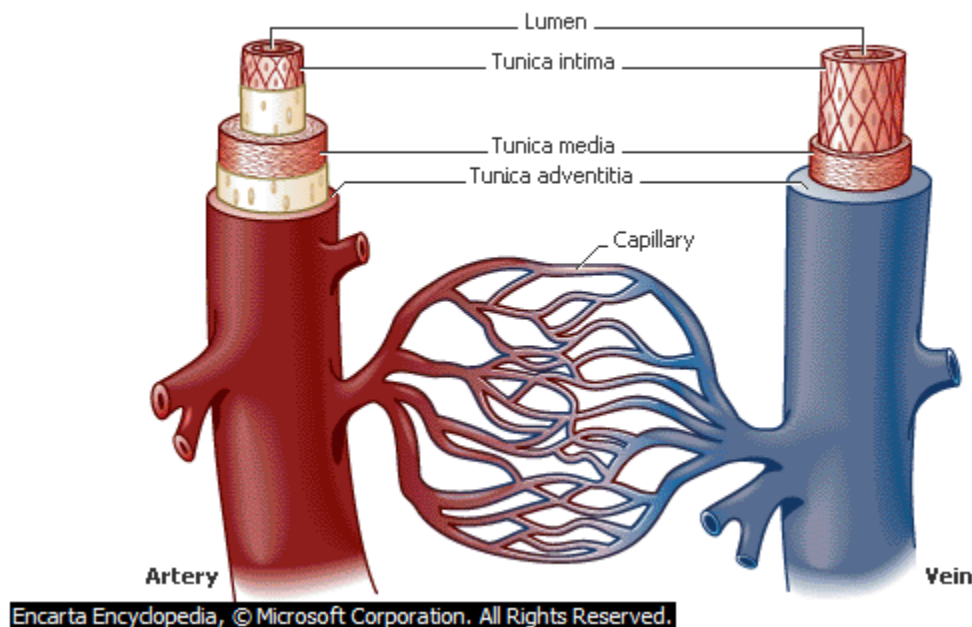
1. What is Blood?
2. State the components of blood.
3. Explain briefly each blood component.

The Heart and Blood vessels

The heart is the muscular pumping organ, which maintains a continual flow of blood round the body. The human heart comprises four chambers namely:

- a. The 2 upper and smaller chambers [ARTRIA or AURICLES]
- b. The 2 Lower and bigger chambers called VENTRICLES

The heart is connected to blood vessels within which blood is transported round the body.

THE BLOOD VESSELS

Three types of blood vessels known are:

Veins : Return blood to the heart

Arteries: Carry blood away from the heart.

Capillaries: Link arteries with venules

Differences between Arteries and Vein

ARTERIES	VEINS
1. Carry blood away from the heart	Returns blood to the heart
2. Carry oxygenated blood at high pressure	Carry deoxygenated blood under low pressure
3. Are deeply located under the skin.	Are superficially located beneath the skin

EVALUATION

1. Mention the chambers associated with blood vessels and valves of the human heart.
2. State two differences between arteries and veins.

THE HUMAN CIRCULATORY SYSTEM

Name: _____

Class: _____

It is described as a closed circulatory system in that blood is circulated round the body through a system of interconnecting blood vessels. The human circulatory system is also described as double circulation in that blood has to flow twice through the heart before one complete circulation can be made through each time it does. It flows through separate pathways.

The two pathways are known as the:

- a. Lung or Pulmonary pathway.
- b. Body or systemic pathway.

The lung pathway ensures re-oxygenation of the blood while the body pathway ensures delivery of oxygen to the tissues and cells of the body.

EVALUATION

1. What does it mean to describe the human circulatory system as:
a. Closed circulation
b. Double circulation?
2. What kind of blood is conveyed by the
a. Pulmonary artery b. Pulmonary vein
c. Aorta d. Vena cava?

Blood Defects and Diseases

Some people may suffer through not having enough RBCs and hence are unable to get sufficient supply of oxygen. These people can be said to be Anaemic. Thus, anemia is a serious blood defect. Other blood diseases abound and are named below viz:

1. Leukaemia
2. Haemophilia
3. Sickle cell
4. Septicemia
5. Hypertension
6. Hypotension

Leukaemia: Imbalance of red and white blood cells as there is a preponderance of defective and cancerous WBCs. This is caused by exposure to radioactive fall-out from atomic bombs or by over exposure to x-rays.

Sickle Cell: This is a disease which arises from the formation of sickle shaped red blood cells in the blood and which are unable to deliver the oxygen requirement of the body promptly and effectively. It is hereditary.

Haemophilia: Inability of the blood to check blood loss automatically when minor injuries are sustained. It is also hereditary.

Septicemia: Blood poisoning due to certain bacterial infections and which results in lacking of the blood

Hypertension: Describes the clinical condition of high blood pressure.

Hypotension: Low blood pressure. Occasionally, bleeding may occur when blood vessels are damaged or ruptured in accidents, wounds and certain illnesses.

GENERAL EVALUATION

1. Mention two heritable blood diseases.
2. Distinguish between hypertension and hypotension.
3. What is Blood?

Name: _____

Class: _____

4. State the components of blood.
5. Explain briefly each blood component.

READING ASSIGNMENT

Integrated Science Made Easy, bk two pgs 21-25

WEEKEND ASSIGNMENT

1. Which one of these is NOT a Blood compound cell? A. Plasma B. Erythrocytes C. Leucocytes
D. Thrombocytes
2. A disease caused by a preponderance of cancerous and defective white blood cells in the blood describes A. Septicemia B. Leukemia C. Hemophilia D. Hypertension
3. The blood vessels, which look arterioles up with venules, are known as A. Arterioles B. Vena cava
C. Capillaries D. Venules
4. The chamber of the heart with the thickest wall is the A. Left ventricle B. right auricle C. left
auricle D. right ventricle
5. The largest artery in the body is the A. Pulmonary artery B. aorta C. hepatic artery D. renal artery

THEORY

1. Draw and label the human heart.
2. Write briefly on the human circulatory system.