SUBJECT:

**BASIC SCIENCE & TECHNOLOGY – BASIC SCIENCE**

CLASS:

**JUIOR SECONDARY SCHOOL 1**

TERM**:**

**SECOND**

**SCHEME OF WORK**

WEEK TOPIC

1. Reproductive system – Male and female internal and external organs, Functions and Care of the female reproductive organs
2. Environmental pollution I – Definition and causes of air, soil and water
3. Environmental pollution II – Consequences and control measures of pollution
4. Sexually Transmitted Infections (STIs) – Definition, Transmission, Signs and symptoms, Effects and prevention of Sexually Transmitted Infections (STIs)
5. HIV/AIDS (I) – Meaning, Differences between HIV and AIDS, Mode of transmission, Prevention of HIV

* ***Mid-term project***

1. HIV/AIDS (II) – Counseling and Testing, Care and support, Myths and facts about HIV/AIDS
2. Energy – Meaning, Sources, Forms, Transformation and uses of Energy
3. Energy – Meaning, Sources, Forms, Transformation and uses of Energy
4. Renewable and Non-renewable Energy – Meaning, Examples, Use and misuse
5. Energy and Society – Energy for working, Energy from hydroelectricity for electric supply, Uses of solar energy
6. Revision and Examination
7. Revision and Examination

**WEEK ONE**

**REPRODUCTIVE SYSTEM**

**CONTENT**

* Definition
* Male and female internal and external organs and their Functions
* Care of the male and female reproductive organs

DEFINITION

Reproduction is the ability of living things to produce young ones like them. Reproduction is one of the characteristics of living thing which is for the continuation of life.

There are two types of reproduction. These are:

1. Asexual reproduction
2. Sexual reproduction
3. Asexual reproduction – this kind of reproduction involves a single parent to produce young ones. In asexual reproduction, the individual grows and splits into two and this process continues. Examples are binary fission, vegetative reproduction (as in potato, cassava, yam etc.) and so on
4. Sexual reproduction – this is the kind of reproduction which involves two sexes. The male produces a sex cell and the female does that too. This is the most common means of reproduction in animals but also found in plants.

THE MALE REPRODUCTIVE SYSTEM

The male reproductive system is made up of organs found both outside and inside the body. Such as the penis, scrotum, testes etc.

The male sex cell is called the ***sperm***. This is what fusses with the female sex cell at fertilization.

The following are the male reproductive organs, their location and respective functions

|  |  |  |  |
| --- | --- | --- | --- |
|  | ORGAN | LOCATION | FUNCTION |
| 1 | Testes | Outside the body | Production of sperm (the male sex cell) |
| 2 | Scrotal sac | Outside the body | Houses the testicles or testes |
| 3 | Penis | Outside the body | The male copulating organ. It penetrates into the vagina and conveys the sperm there |
| 4 | Urethra | Inside the body | It is the passage of urine and sperm |
| 5 | Seminal vesicles | Inside the body | Produces fluid that forms part of the semen |
| 6 | Vas deferens | Inside the body | Transfers the sperm into seminal vesicle |

THE FEMALE REPRODUCTIVE SYSTEM

The female reproductive system is made up of both external and internal organs that are used for reproductive processes. Examples are the ovary, vagina, fallopian tube etc.

The following are the female reproductive organs, their location and respective functions

|  |  |  |  |
| --- | --- | --- | --- |
|  | ORGAN | LOCATION | FUNCTION |
| 1 | Ovaries | Inside the body | Produces eggs and the female sex hormones |
| 2 | Ova (egg) | Inside the body | This is the female sex cell |
| 3 | Uterus (womb) | Inside the body | Houses the foetus |
| 4 | Vagina | Inside the body | Receives the penis during copulation |
| 5 | Cervix | Inside the body | The opening in the womb that leads to the vagina |
| 6 | Hymen | Inside the body | A thin sheet that covers the vagina of a female child who is a virgin |

Care of the female reproductive organs

1. Bath at least twice daily
2. Avoid taking illegal drugs
3. Use clean toilets
4. Wear clean and neat panties
5. Visit the gynecologist in case of any abnormalities

Care of the male reproductive organs

1. Bath daily
2. Avoid tight underwear and clothing
3. Eat a healthy and balanced diet
4. Wear protective gear when playing contact sports

**CLASSWORK 1**

1. What is reproduction?
2. Explain the two types of reproduction

**ASSIGNMENT 1**

**SECTION A**

1. These entire list of living things does not breast feed their young ones except….. (a) lizard (b) hen (c) snake (d) squirrel
2. The male sex cell is called ….. (a) ovum (b) gamete (c) sperm (d) penis
3. Which of these is a component of the male reproductive system? (a) uterus (b) sperm (c) vagina (d) ovary
4. The doctor that specializes on female reproductive health is called ….. (a) gynecologist (b) gyneacologist (c) gynecologyst (d) ginecologist
5. The fusion of the male and the female sex cell is called (a) fermentation (b) fertilization (c) pregnancy (d) reproduction

**SECTION B**

1. Mention two parts of male and female reproductive system each and state their functions
2. Explain these: (a) zygote (b) fertilization

**WEEK TWO**

**ENVIRONMENTAL POLLUTION I**

* Definition of pollution
* Air pollution
* Soil pollution
* Water pollution

**Definition of pollution**

Pollution is the contamination of our environment with dirty, poisonous and dangerous or hazardous substances. It is also defined as the release of waste products or materials into the environment that is harmful to life.

These dirty, poisonous and dangerous or hazardous substances are called pollutants

Types of pollution

1. Air pollution
2. Water pollution
3. Soil pollution
4. **Air pollution**

This is defined as the release of poisonous gases into the air (or atmosphere). Examples of air pollutants are sulphur (iv) oxide, carbon (ii) oxide, hydrogen sulphide, smoke etc.

Causes of air pollution

In many domestic and industrial processes, air pollutants are released into atmosphere. The sources of these air pollution differs so also the pollutants emitted into the atmosphere.

|  |  |  |
| --- | --- | --- |
|  | Pollutants | Sources |
| 1 | Sulphur dioxide | Burning of fuel |
| 2 | Carbon mono oxide | Burning of carbon in gas e.g. car exhaust, exhaust from factory chimney |
| 3 | Carbon dioxide | Exhaust from vehicles and factory |
| 4 | Hydrogen sulphide | Industrial processes like mining |
| 5 | Dust | Coal mining, quarry activities, site work, untarred roads etc. |
| 6 | Smoke | Domestic and industrial burnings, smoking of cigarettes, etc. |
| 7 | Smog | Sunlight effect on nitrogen (ii) oxide and nitrogen(iv) oxide |
| 8 | Radioactive rays | Nuclear power plants and nuclear reactions |

1. **Soil pollution**

Soil pollution is the contamination of the land with poisonous materials. It is a times called land pollution. The major soil pollutants are refuse, sewage, agricultural waste.

1. **Water pollution**

Water pollution is the contamination of water bodies with poisonous substances. This is usually as a result of both domestic and industrial activities. These pollutants are

1. Refuse and sewage e.g. leftover food, urine, feaces, etc.
2. Industrial and agricultural waste e.g. chemicals, fertilizers, insecticides, etc.
3. Oil spillage e.g. breaking of oil pipe
4. Thermal or heat source

**CLASSWORK 2**

1. Define pollution
2. Mention 3 water pollutants and soil pollutants that you know

**ASSIGNMENT 2**

**SECTIONA**

1. The following are pollutants except? (a) dust (b) trees (c) carbon monoxide (d) smoke
2. the organization in Nigeria responsible for the protection of the environment is (a) NAFDAC (b) FEPA (c) NDLEA (d) ICPC
3. Which of these brings about pollution? (a) burning (b) recycling refuse (c) landfill (d) reuse refuse
4. The following are air pollutants except (a) dust (b) exhaust from cars (c) oil spillage (d) bush burning
5. Agricultural waste can cause what kind of pollution? (a) noise (b) air (c) land (d) none of the above

**SECTION B**

1. What are pollutants?
2. How many types of pollution do we have? Mention them

**WEEK THREE**

**ENVIRONMENTAL POLLUTION II**

* Consequences of pollution
* Control measures of pollution

**CONSEQUENCES OF POLLUTION**

**Effects of air pollution**

1. It can lead to respiratory diseases (when smoke, soot and dust is inhaled)
2. Smog can reduce visibility and cause respiratory diseases
3. High concentration of carbon (ii) oxide can cause brain damage
4. It can cause cancer

**Effects of soil pollution**

1. Ill-health to man and terrestrial animals
2. Stunted growth in plants
3. Barrier to water passage
4. Changes in soil structure
5. Offensive odour

**Effects of water pollution**

1. Untreated sewage in water causes diseases such as cholera, dysentery etc.
2. It leads to the death of aquatic animals
3. Offensive odour
4. Oil spillage destroys farm land
5. Pesticides and herbicides makes the water poisonous
6. Fertilizers can lead to overgrowth of aquatic plants which blocks water way
7. Taking in radioactive wastes can bring about genetic mutation

**CONTROL MEASURES OF POLLUTION**

**Control of air pollution**

1. Locating industries far from human habitation
2. Educating people on the dangers of air pollution
3. Keeping houses well ventilated
4. Using tall chimneys to discharge waste gases high up in the sky
5. Burning of refuse in incinerators

**Control of soil pollution**

1. There should be refuse recycling
2. Organic fertilizers should be used effectively not excessively used
3. Government should create an avenue for proper refuse and sewage disposal

**Control of water pollution**

1. Proper disposal of sewage
2. Refuses can be buried
3. Oil spillage should be prevented
4. Sewage should be converted fertilizers
5. Educating the public on the danger of water pollution
6. Fishing with chemicals should be discouraged
7. Oil pipeline vandalisation should be curbed.

**CLASSWORK 3**

1. Highlight three control of air pollution
2. Enumerate two effects of water pollution

**ASSIGNMENT 3**

**SECTION A**

1. Which of this is a cause of water pollution (a) oil pipeline vandalization (b) weathering (c) erosion (d) rainfall
2. Which of these is not a control of soil pollution (a) There should be refuse recycling (b) effective fertilizer use (c) proper refuse and sewage disposal (d) urinating in the toilet
3. Educating the public on the danger of pollution can bring about a control of pollution (a) true (b) not sure (c) false (d) don’t agree
4. Which of these animals is not effect when there is water pollution? (a) crabs (b) crayfish (c) fish (d) none of the above
5. The following are causes of water pollution except (a) feaces (b) oxygen (c) sewage (d) agricultural waste

**SECTION B**

1. State three control of soil pollution
2. Enumerate three effect of air pollution

**WEEK FOUR**

**SEXUALLY TRANSMITTED INFECTIONS (STIS)**

* Definition Sexually Transmitted Infections (STIs)
* Sexually Transmitted Infections (STIs)
* Signs and symptoms Sexually Transmitted Infections (STIs)
* Effects Sexually Transmitted Infections (STIs)
* Prevention of Sexually Transmitted Infections (STIs)

**Definition Sexually Transmitted Infections (STIs)**

Sexually transmitted infections (diseases) are infections that can be spread from one person to another through sexual intercourse with an infected person.

**Examples, Causative agents and symptoms Sexually Transmitted Infections (STIs)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **EXAMPLES OF STIs** | **CAUSATIVE AGENT** | **TRANSMISSION** | | **SYMPTOM** | **PREVENTION** |
| 1 | Gonorrhea | Bacterium (Neisseria gonorrheae) | - Sexual intercourse  - At delivery through infected mother to baby | | - In women, it causes painful urination and increasing amount of discharge from the vagina  - In men, it causes painful urination and discharge during urination | - Abstinence  - Regular medical test  - In case of infection, see the doctor  - Regular use of condom |
| 2 | Chlamydia | Bacterium (Chlamydia trachomais) | - Sexual intercourse | | In women, there can be abnormal vaginal discharge, burning feeling during urination, lower abdominal pain, pain during intercourse or bleeding between menstruation  In men, there can be discharge from the penis, burning/itching around the penis opening or pain and swelling in the testes | - Abstinence  - In case of unusual sore or burning effect of urination, see the doctor  - Regular use of condom |
| 3 | Syphilis | Bacterium (Treponema palladium) | - Direct contact with sore (in the vagina, anus or lips)  - Sexual intercourse  - From pregnant women to babies | - chancres (primary stage)  - rashes (secondary stage)  - damage to the nervous system (latent stage)  - damage to tissues and organs (tertiary stage) | | - Abstinence  - Seek for medical attention when infection is suspected |

**Effects Sexually Transmitted Infections (STIs)**

1. It can damage the reproductive organs
2. It can break down the immune system
3. It can be associated with cancer of the reproductive organs
4. Premature labour or still birth (gonorrhea)
5. Blindness and birth defects in new babies (syphilis and gonorrhea)

**Prevention of Sexually Transmitted Infections (STIs)**

1. Public enlightenment
2. Abstinence
3. Early treatment in identified cases
4. Strengthening the immune system
5. Avoid multiple sexual partners

**CLASSWORK 4**

1. Give the full meaning of STIs
2. Mention three STIs that you know
3. Highlight three methods of preventing STIs

**ASSIGNMENT 4**

**SECTION** **A**

1. The following are not examples of STIs except (a) stomachache (b) bleeding the nose (c) chylamydia (d) catarrh
2. Which of the following is the effect of sexually transmitted infections (a) breathing problem (b) death (c) loss of appetite (d) healthy body
3. Behavior that put people at the risk of contracting STIs includes the following except….. (a) unprotected sex with an infected person (b) multiple sex partner (c) abstinence (d) contact with infected blood
4. Which of these is a causative agent of STIs (a) Neisseria gonorrheae (b) mosquito (c) AIDS (d) sexual intercourse
5. Which of these is a means of contacting STIs (a) Neisseria gonorrheae (b) anopheles mosquito (c) AIDS (d) sexual intercourse

**SECTION** **B**

1. Mention four effects of sexual transmitted infections
2. Give four ways of preventing STIs

**WEEK FIVE**

**HIV/AIDS (I)**

* Meaning of HIV and AIDS
* Differences between HIV and AIDS
* Mode of transmission of HIV and AIDS
* Prevention of HIV and AIDS

**Meaning of HIV and AIDS**

HIV means Human Immunodeficiency Virus while AIDS means Acquired Immune Deficiency Syndrome. HIV/AIDS is a deadly disease which has no cure yet. The virus, HIV is the cause of AIDS. This virus attacks the body immune defense system and breaks it down.

**Differences between HIV and AIDS**

HIV is the virus that causes AIDS. A person with AIDS is said to be HIV positive while a person who is HIV negative does not have the disease, AIDS. Thus, HIV is the causative agent of the disease called AIDS.

**Mode of transmission of HIV and AIDS**

The following are some of the ways by which HIV/AIDS can be transmitted:

1. Sexual intercourse
2. Use of contaminated sharp objects
3. Transfusion of infected blood
4. Use of infected injection needles and syringes
5. Piercing the body (e.g. ear-piercing, circumcision, tribal mark etc.)
6. From infected mother to baby

**Signs of HIV and AIDS**

1. Weight loss
2. Fever
3. Frequent tiredness
4. Diarrhea
5. Cold sores all over the body
6. Swollen glands

**Prevention of HIV and AIDS**

1. Abstinence
2. Avoid sharing sharp objects
3. Don’t have unprotected sex
4. Having multiple sexual partner

**CLASSWORK 5**

1. Give the full meaning of the following:

* HIV
* AIDS

1. Differentiate between HIV and AIDS

**ASSIGNMENT 5**

**SECTION A**

1. Which of these options fully depict the meaning of HIV? (a) Human Immunodeficiency Virus (b) Human Infection Virus (c) High Immune Virus (d) Human Immutability Virtue
2. Children cannot easily contact HIV even when they have contact with the blood of an infected person (a) weakly disagree (b) false (c) maybe (d) true
3. AIDS can be cured medically(a) weakly disagree (b) false (c) maybe (d) true
4. Which of these is not a medium by which on can contract HIV/AIDS (a) sharing blade (b) engaging in sexual intercourse(c) abstinence (d) blood transfusion
5. Validate this statement “AIDS is an example of STI” (a) weakly disagree (b) false (c) untrue (d) true

**SECTION B**

1. Highlight four modes of transmitting HIV/AIDS
2. List three signs of a person with HIV/AIDS

**MID TERM PROJECT**

Using a sheet of paper, answer these questions:

1. Mention five myths about HIV/AIDS
2. Highlight five facts about HIV/AIDS

**WEEK SIX**

**HIV/AIDS (II)**

* Counseling and Testing
* Care and support
* Myths and facts about HIV/AIDS

**Counseling and Testing**

Places to go for counseling and medical tests are:

1. School guidance and counselor
2. Health centers
3. Specialized institutions
4. Youth center
5. Adolescent-focused NGOs

**Care and support**

The support and care that can be given to people living with HIV/AIDS are:

1. Compassion and understanding which create a sense of love and build self confidence
2. Emotional support and nurturing which is important in maintaining positive sense of self
3. Familiar surrounding with loved ones which create sense of security and thus break isolation

**Myths and about HIV/AIDS**

Myths are beliefs that are not true or scientifically proven. These include:

1. HIV/AIDS can be contacted by hugging and infected person
2. It can be cured
3. HIV/AIDS can be contacted by sharing comb and hairbrush
4. HIV/AIDS patients can be facially detected
5. HIV/AIDS can be contacted through mosquito bites
6. It can be contacted by sharing the same toilet with an infected person
7. Some birth control pills can prevent HIV transmission

**Facts about HIV/AIDS**

1. AIDS is real and medically proven
2. Anyone can contact HIV/AIDs
3. Most people who get AIDS die
4. AIDS is caused by a virus
5. Having sexual intercourse with many people increases the chance of getting HIV
6. HIV is not transmitted by casual contact
7. At present, there is no cure for AIDS

**CLASSWORK 6**

1. Mention 4 places a student can go for counselling on AIDS
2. Highlight three myths about HIV/AIDS

**ASSIGNMENT 6**

**SECTION A**

1. Which of these people is recommended to see for counseling on HIV/AIDS (a) your boyfriend (b) your classmate (c) school counselor (d) the security guards
2. HIV is not transmitted by casual contact(a) true (b) false (c) barely untrue (d) indifferent
3. Students can visit the following paces for counsel on HIV/AIDS except…. (a) Market (b) specialized institutions (c) youth center (d) adolescent-focused NGOs
4. HIV/AIDS can be contacted by sharing comb and hairbrush (a) true (b) false (c) barely untrue (d) indifferent
5. Which of these virus can cause AIDS (a) Human Immunodeficiency Virus (b) Human Immune-efficiency Virus (c) Human Immutable Virus (d) Human Immune-duo Virus

**SECTION B**

1. Highlight three ways of care and support for HIV/AIDS patient
2. Enumerate four means of transmitting HIV/AIDS

**WEEKS SEVEN AND EIGHT**

**ENERGY**

* Meaning of Energy
* Sources of Energy
* Forms of Energy
* Transformation of Energy
* Uses of Energy

**Meaning of Energy**

Energy is defined as the ability or capacity to do work. The unit of energy is Joules (J)

**Sources of Energy**

There are two main sources of energy, the natural and the artificial sources of energy.

1. The natural sources of energy are:
2. Sun
3. Food
4. Natural gas
5. Coal
6. Wind
7. Crude oil
8. Wood
9. Water
10. The artificial sources of energy are:
11. Batteries
12. Electrical generator
13. Petroleum products (e.g. diesel, kerosene etc.)

**Forms of Energy**

1. Light energy
2. Sound energy
3. Heat energy
4. Chemical energy
5. Electrical energy
6. Mechanical energy (potential and kinetic energy)

**Transformation of Energy**

Energy can be converted or transformed from one form to another. This is governed by the law of conservation of energy. The law of conservation of energy states that, energy can neither be created nor destroyed but can be converted from one form to the other.

Examples of energy conversion includes

1. Electrical energy to heat energy – pressing iron, boiling ring, etc.
2. Electrical energy to light energy – bulb, television, etc.
3. Chemical to electrical energy – battery, etc.
4. Electrical to kinetic energy – fan,
5. Electrical to sound energy – electric bell, telephone ear piece, etc.
6. Mechanical to light energy – bicycle dynamo
7. Sound to electrical energy to sound energy – telephone

**Uses of Energy**

The following are some of the uses of energy

1. Walking
2. Cooking
3. Playing
4. Operating appliances
5. Running
6. Household work

**CLASSWORK 7&8**

1. Define energy?
2. Mention five forms of energy

**ASSIGNMENT 7&8**

**SECTION A**

1. The energy conversion in phone is ….. (a) sound – electrical – sound (b) electrical – sound – sound (c) sound – electrical – electrical (d) electrical – electrical – sound
2. The bicycle dynamo converts ….. energy to ….. energy (a) electrical – chemical (b) electrical – light (c) light – mechanical (d) mechanical – light
3. Energy is the …….. to do work (a) power (b) ability (c) vision (d) hope
4. The following are artificial sources of energy except ….. (a) wood (b) batteries (c) electrical generator (d) petroleum product
5. The foods we eat contain which form energy? (a) chemical energy (b) mechanical energy (c) kinetic energy (d) potential energy

**SECTION B**

1. State the law of conservation of energy
2. Highlight four uses of energy
3. Mention four devices and the energy conversion in their usage

**WEEK NINE**

**RENEWABLE AND NON-RENEWABLE ENERGY**

* Meaning ofrenewable and non-renewable energy
* Examples of renewable and non-renewable energy
* Use and misuse of renewable and non-renewable energy

**Meaning of renewable and non-renewable energy**

Renewable energy is the energy resources that can be replaced as they are used up.

The non-renewable energy is the energy resources that cannot be replenished as they are used up.

**Examples of renewable and non-renewable energy**

Examples of renewable sources of energy are:

1. Sun
2. Wind
3. Water
4. Biomass
5. Sea (tides)
6. Biofuel

Examples of non-renewable sources of energy are:

1. Radioactive or nuclear materials
2. Petroleum or natural gas
3. Coal and wood
4. Fossil fuel

**Use of renewable and non-renewable energy**

1. Used as forms of transportation
2. In information communication technology
3. In agriculture
4. Source of energy for operating domestic equipment

**Misuse of renewable and non-renewable energy**

1. Greenhouse effect
2. Global warming
3. Oil spillage
4. Acid rain

**CLASSWORK 9**

1. Explain non-renewable source of energy
2. List four renewable sources of energy

**ASSIGNMENT 9**

**SECTION A**

1. The renewable source of energy that uses the force of tides and waves is from (a) sea (b) wind (c) rain (d) car
2. The increase in the temperature of the earth’s atmosphere is caused by certain gases called …… (a) greenhouse gases (b) global warming gases (c) acid rain gases (d) special gases
3. Radioactive or nuclear materials is a renewable source of energy (a) true (b) false (c) not yet (d) undefined
4. Which of these is not a natural source of energy (a) sun (b) wind (c) water (d) kerosene
5. The following are not effect of misuse of renewable and non-renewable source energy except (a) acid rain (b) regular water flow (c) traffic congestion (d) fire outbreak

**SECTION B**

1. Differentiate between renewable and non-renewable energy sources
2. List three non-renewable energy source

**WEEK TEN**

**ENERGY AND SOCIETY**

* Energy for working
* Energy from hydroelectricity for electric supply
* Uses of solar energy

**Energy for working**

Energy is a key factor in national development. For instance, electrical energy is needed to do a lot of things. Poor management of the energy resources in a nation might cause it to remain in a state of underdevelopment

The three main societal need of energy are for mechanical work, heat supply and heat removal (cooling system)

**Energy from hydroelectricity for electric supply**

In generating hydroelectricity, the kinetic energy of falling water from the top of a dam causes the turbines to turn. This in turn drives the generators leading to the production of electrical energy

**Uses of solar energy**

Solar energy can be used for the following

1. Heating
2. Drying clothes
3. Warm water
4. Dry farm products
5. Generate electrical energy

**CLASSWORK 10**

1. What is solar energy?
2. State three things you know you can do with solar energy

**ASSIGNMENT 10**

**SECTION A**

1. The heat from the sun reaches the sun by (a) conduction (b) radiation (c) convection (d) reflection
2. Which of the following is not an artificial source of energy (a) batteries (b) kerosene (c) generator (d) food
3. Which of these is a key factor to society development (a) energy (b) rain (c) sea (d) network
4. The following are natural sources of energy except ….. (a) battery (b) sun (c) wind (d) food
5. The energy source that power the windmill to produce electricity …… (a) battery (b) sun (c) wind (d) food

**SECTION B**

1. Explain energy conversion that takes place in hydro-electricity
2. Mention three types of societal needs

**WEEK ELEVEN**

**REVISION**

**WEEK TWELVE**

**EXAMINATION**