**AGRICULTURAL SCIENCE JSS 2**

**THIRD TERM**

## **SCHEME OF WORK**

**WEEK TOPIC**

1. Revision of last term’s work
2. Fishery: Meaning and Importance
3. Classification of Fishes

4 Establishment of Fish Pond

5. Method of Fishing

6 Forest: Meaning and Types of Forest

7 Forest Resources and their uses

8. Effect of forest on the Environment

9. Human activities that affect the forest

10. Revision

11 - 12 Examination

**REFERENCES**

1. Junior secondary agriculture for Nigerian Schools BK 2 by A. Youdeowei, S.O Adesiyan, J.N Ogbazi, Terry Olowu et al.
2. Junior secondary agriculture for Nigerian Schools BK 3 by A. Youdeowei, S.O Adesiyan, J.N Ogbazi, Terry Olowu et al.
3. Essential Agricultural Science for Senior Secondary Schools.

**WEEK ONE**

**TOPIC: REVISION OF LAST TERM’S WORK**

1. Feed that contain high proportion of nutrients and low proportion of fibre and water are

A. Concentrates B. Roughages C. Succulents D. Carbohydrates

1. The following are mineral elements except A. Chromium B. Potassium C. Oxygen

D. Sulphur

1. The chemical symbol for calcium, carbon and chromium is A. Ca, C, Cr B. ca, c, cr

C. CA, C, CR D. CA, C, Cr

1. Which of the following disease is characterized by the enlargement of bowel A. Kata

B. Bloat C. Coccidiosis D. Diarrhea

1. Which of the following is not a method of preventing disease A. Isolation of sick animals

B. Preventing animals from lying on cold floor C. Spraying or dipping animals in insecticides D. Administration of drugs indiscriminately

1. The signs of the presence of disease in an animal is referred to as A. Signs B. Signals

C. SymptomsD. Behaviours

1. Frequent defecation in farm animals is referred to as A. Diarrhea B. Anorexia

C. Anaemia D. Pneumonia

1. Ringworm is a \_\_\_\_ disease A. Fungal B. Bacterial C. Protozoa D. Viral
2. The causal organism of trypanosomiasis is \_\_\_\_ A. Tsetsefly B. Aphids C. Trypanosome

D. Earthworm

1. Brucellaabortus is the causal organism for which of the following bacteria disease

A. Mastitis B. Anthrax C. Cowpox D. Contagious abortion

1. Shortage of blood is also called A. Anaemia B. Fever C. Diarrhea D. Constipation
2. Which of the following mostly affect the intestine of the birds A. Ringworm B. Cowpox C. TyphoidD. Contagious abortion
3. The following are ecto parasites except A. Tick B. Mite C. Lice D. Tapeworm
4. Feeds that are low in nutrient but high in fibre and not easily digested by animals is

A. Concentrates B. Roughages C. Succulents D. Manure

1. The following are not easily digested by animal except A. hay, B. groundnut hulls

C. bean pods D. silage.

1. \_\_\_\_ are required by the animals in large quantities A. Mega-elements B. Nano-elements C. Macro-elements. D. Micro elements.
2. A \_\_\_\_\_ is a feed constituent that contains all essential nutrients in their appropriate quantities A. balanced ration B. imbalanced ration C. maintenance ratio D. diet
3. The following are bacteria diseases except A. Anthrax B. Typhoid C. Mastistis

D. ringworm.

1. Another name for contagious abortion is A. Anthrax B. Typhoid C. Mastistis

D. Brucellosis

1. The following are symptoms of worm infection except A. Coughing B. Diarrhea C. Loss of weight D. tuberculosis.

**SECTION B**

1. Differentiate between disease and symptom.
2. List five common symptoms.
3. List five general guidelines for prevention and control of animal diseases.
4. List 3 bacteria and viral diseases each.
5. Write short note on trypanosomiasis under the following headers i. Mode of transmission ii. Symptoms iii. Prevention and control
6. List three animal feeding tools.
7. List 10 mineral element and their symbols.
8. List three types of feed and give two examples each.
9. List four classes of feed nutrient with two sources each.

**WEEKEND ASSIGNMENT**

1. Which of the following is a common symptom of disease in animal? a. uremia b. normal blood c. Anaemia d. increase food consumption.
2. A change in the normal function or well-being of farm animals caused by another organism is known as \_\_\_\_ a. pest b. parasite c. disease d. symptoms.
3. The following are mode of transmission of farm animal disease except a.Air (airborne)

b. Water c.direct contact with organism d. in-direct contact with organism.

1. The following are bacteria diseases except a. Anthrax b. Typhoid c. Mastistis

d.ringworm.

1. Which of these farm animal disease shows with the appearance of lesions on the skin?

a. ringworm b. cowpox c. mastitis d. anthrax.

**THEORY**

1. State the mode of transmission, Symptoms, Method of prevention and control of the following; A. Mastistis B. Aspergillosis
2. List types of protozoans diseases.

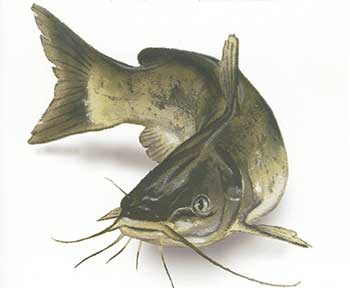
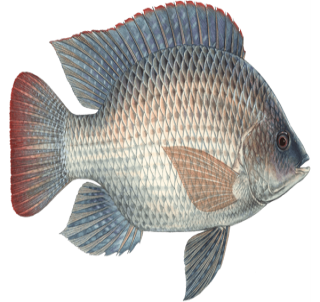
**WEEK TWO**

**FISHERY**

**CONTENT**

* Definition
* Importance of Fish Farming

Fishery is the scientific discipline dedicated to the cultivation of fish and various aquatic organisms in both natural and artificial water environments, encompassing their subsequent processing and marketing. Fish primarily inhabit diverse water bodies such as ponds, lakes, oceans, seas, and rivers. They respire through gills and are equipped with fins for swimming. Fish are ectothermic creatures, commonly referred to as cold-blooded, as their body temperature adjusts in response to environmental changes..



**TERMS ASSOCIATED WITH FISH FARMING**

Fry: young fish

Fingerling: newly hatched fish

Pond: artificial body of water where fishes are reared. It could be in plastic tanks, concrete structures or earthen structures.

Gears: equipment used for harvesting fish. It includes trawlers, nets, hooks, knifes, spear etc.

Fishing: the act of catching or harvesting fishes in natural water bodies.

Aquarium: this is a pond where fish are kept for entertainment, research or aesthetic purpose.

Aquaculture: this is the act of rearing selected aquatic organism (plant or animals) for food.

Pisciculture/Commercial fish farming: this is the act of rearing selected aquatic animals under specific conditions in enclosed or wild water bodies where they are grown, breed and harvested for consumption.

Examples of fish are cat fish, tilapia, croacker, herring (shawa), mackerel (titus), horse mackerel (kote), Alaska Pollock (stock fish/okporopo), argentinasilus (ojuyobo), blue whiting (panla), etc. other aquatic organism includes periwinkle, squid, oysters, prawn,

**EVALUATION**

1. Define fishery.
2. Mention five examples of cold blooded animals.

**IMPORTANCE OF FISH FARMING**

1. They serve as source of food for man.
2. They are included in animal feed constituent.
3. Fish bones are used for manufacturing glues and fertilizers.
4. Shells of some aquatic organism are sometimes mixed wit cement and sand to provide a strong and attractive structure.
5. Oil obtained from some fish species are used as raw materials for manufacturing soap and medicine e.g cod liver oil.
6. Scales of fish are used to make artificial pearl which can be worn as jewelries.
7. Skin of some cartilaginous fishes such as shark has been used to produce leather materials called shagreen.
8. Dried fish skin are sometimes used as glass-paper for polishing surfaces
9. It serves as source of income to the farmer.
10. It provides employment opportunity directly and indirectly e.g drivers, cold store owners, petty fish traders, aquarium owners etc.

**GENERAL EVALUATION**

1. What do you understand by fishery?
2. Differentiate between cold and warm blooded animals.
3. Mention eight importance of fish farming.

**WEEKEND ASSIGNMENT**

1. \_\_\_\_ is a very popular item consumed by many as a food supplements. A. Cod-liver oil B. Cod-bile oil C.liver oil D.Cod oil.
2. Fish eggs which are salted and prepared for eating are called A.ShagreenB. Caviar

C.CanivarD. Smoked egg.

1. Glues and fertilizers are produced by using \_\_\_\_ A. shells of oysters B. Fish bones

C. Scales of fish D. Cod-liver oil.

1. \_\_\_\_ contains pearls which are polished and worn as jewellery.A. Oysters B. Crocodile C. Turtle D. Lobsters.
2. The skin of sharks are dried and specially treated to produce very special leather called

A. Shannon B.ShagreenC.ShagreyD. Shy green.

**THEORY**

1. What is fishery?
2. State and explain four importance of fish farming.

**WEEK THREE**

**FISHERY**

**CONTENT**

* Classification
* Adaptive features of fishes

**CLASSIFICATION**

Fish can be classified broadly into classes:

1. According to Habitat
2. According to morphology (body structure)

**ACCORDING TO HABITAT**

Habitat refers to the environment in which an organism lives. Fish lives in three types of water habitat:

1. Fresh water
2. Salt water
3. Estuarine or brackish water habitat

**FRESH WATER**

This is a type of water that does not contain salt e.g springs, rivers, ponds, lakes e.t.c. examples of fish in this habitat are: electric fish, moon fish, cat fish, tilapia, crabe.t.c.

**SALT WATER / MARINE HABITAT**

A water body that has salt taste is called salt water. E.g oceans and sea, examples of salt water fish are: Mackerels, sharks, herring, sardine, cod (stock) fish, salmon, whales etc.

**ESTUARINE/ BRACKISH HABITAT**

Estuaries are sections of rivers that meet the sea, a place where salt and fresh water mix. The salt water of this habitat is in between that of fresh and marine water habitat. Fishes may not permanently live in this habitat, they migrate from fresh or salt water into the estuaries. An example in this category is mudfish.

**EVALUATION**

1. What is a habitat?
2. Mention and explain the types of water habitat you know.

**ACCORDING TO MORPHOLOGY**

Body structure/nature of bone

Fish can be classified into 2 based on the nature of their bone:

1. **Bony fishes:** they possess bony skeleton made of real bones e. g Tilapia, catfish, herring, mudfish, etc.
2. **Cartilaginous fishes:**possess soft bones or cartilages called biscuit bones e.g. shark, dogfish, dolphin, etc.

**Other types of aquatic organisms**

Aquatic animals are creatures that live in water. They include fishes and other aquatic animals which are of two classes:

1. **Invertebrates** e.g.

a) Crustaceans e.g. shrimps, crayfish, crabs and lobsters.

b) Molluscs e.g. clam, octopus, oysters, periwinkles, and squid.

1. **Vertebrates** e.g.

a) Mammals e.g. whales, dolphin.

b) Reptiles e.g. snakes, crocodile, turtle.

c) Amphibian e.g. frog, toad.

**ADAPTIVE FEATURES OF FISHES**

1. Streamlined body shape to move freely in water.
2. Possession of gills for gaseous exchange in water.
3. Possession of fins or swimming.
4. Possession of air filled sacs called swim bladder to maintain a level of buoyancy and stay at their current water depth.
5. They are cold blooded.

**GENERAL EVALUATION**

1. Classify fish according to habitat.
2. List two examples of aquatic invertebrates.
3. Mention five examples of aquatic vertebrates.

**WEEKEND ASSIGNMENT**

1. Which of these is not an example of bony fish? a. shark b Tilapia c. Cat fish D. Mackerel
2. Classification of fish according to habitat is \_\_\_\_ and \_\_\_\_.
3. Newly hatched fish used in breeding adult fishes are called? A. Fingerlings b. Prey C. Ray D. Tadpoles
4. The following are uses of fish and other aquatic animals except A, Food B. Leather

C. Metal D. Polish

1. Which of the following is not a reptile? A. Lobster B. Crocodile C. Snake D.Turtle

**THEORY**

1. What are cartilaginous fishes?
2. Explain fresh water fishes and bony fishes.

**WEEK FOUR**

**TOPIC: ESTABLISHMENT OF FISH POND**

**CONTENT**

* Definition and types of fish pond
* Features of a standard fish pond
* Factors to be considered before the establishment of fish pond

A fish pond is an artificial body of water in which fishes are reared for commercial purposes. It is a confined body of water where fishes are raised under controlled conditions. Fish can also be raised in plastics, fiber stars and wooden rafts.

There are three types of pond:

1. Earthen pond
2. Concrete pond
3. Plastic pond

**EARTHEN POND**

This involves digging the soil usually clay (25 %clay) to a depth ranging from 0.5 - 1.0 m at shallow end and 1.5 - 2.0m at the drain end to raise fish. Pond can be of any shape as long as it is well constructed. However rectangular or square shapes are considered the best. This is usually practicable in swamping environment. This rule away the problem of water maintenance as there is natural flow in and out of water in the pond

[](http://www.nafis.go.ke/wp-content/uploads/2011/12/earthen-ponds.jpg)[](http://fishconsult.org/wp-content/uploads/2011/11/Gravel-filter.jpg)

[](http://fishconsult.org/wp-content/uploads/2011/11/Fish-harvest-catch-pond.jpg)

**CONCRETE POND**

Here, 4-5 coaches of blocks are used to construct the pond above the ground level, using cement, sand and gravel in ratio 1:2:4 respectively with water. The pond floor should be well concreted to a thickness between 7.5cm- 10cm. Wall should be plastered to a thickness of 5cm. Water tap should be well connected to allow free flow in and out of water. This particular type has the advantage of you monitoring the hygiene of your fishes.



**3. PLASTIC POND**

Pond construction is expensive and this has led many entrants to fish farming in Nigeria to build

concrete tanks or to buy plastic tanks as production units. These are smaller units but are

believed to be easier to manage as production units. Nigerian farmers have limited land and tank fish farming adapts well to their conditions than larger, more expensive earthen ponds. It is also noted that the quantity of fish harvested from such smaller production units is more easily marketed than harvests from large fish ponds. There are different shapes and sizes of tanks used, as shown below:



**FEATURES OF A STANDARD FISH POND**

A standard fish pond should possess the following structures. These structures includes

1. Dam
2. Core trench (barrier to foreign materials)
3. Distribution channel
4. Spillway (passage of water flow over and around a dam)
5. Monk (water inlet)
6. Board (to regulate flow of water)
7. Screen (stop move of fishes into or out of the pond)

**FACTORS TO BE CONSIDERED BEFORE THE ESTABLISHMENT OF FISH POND**

1. Adequate water supply: water could be from boreholes, streams or lakes. Gravity flow water is cheapest and best source. The water must be unpolluted, uncontaminated. Borehole waters can be excellent, but may costly to pump and may require conditioning to remove carbon dioxide and improve oxygen content and temperature levels. Open waters from canals and streams may be polluted or be contaminated from runoff from farm lands or towns.
2. Soil in the area: Soil with enough clay content to hold water. Clay and silty clays are excellent soils for holding water because they stop water from seeping through. Clay should make up at least 20-25% of the soil. The soil should be checked for residual chemicals from previous farm activities which could have effect on the fish health.
3. Vegetation of the area
4. Topography of the area: Topography that allows for economical construction. It directly affects building costs and pond management. Pond should be constructed where enough water can be impounded with the least amount of earth fill. Areas with large shallow water should be avoided because they become too shallow to use during the dry season.
5. Availability of fast growing fish species
6. Availability of supplementary feedstuff
7. Nearness to market: There should be a fish market near-by to allow for high capacity of sale of fish from pond harvests. The market requirement is the first requirement for locating a fish farm. This will further help address issues relating to transportation of the fish to the market.

**STEPS IN ESTABLISHING FISH POND**

1. Site selection
2. General survey
3. Clearing and stumping of site
4. Construction of dam
5. Construction of core trench
6. Construction of spill way
7. Impoundment of pond
8. Liming: This involves the addition of limestone or calcium carbonate powder to the sides and bottom of the pond to seal pores and prevent water loss.
9. Pond fertilization: This is done by pouring organic fertilizers such as poultry droppings, cow dung or in-organic fertilizers such as N:P:K or super phosphate. Pond fertilization should be done 15 days before stocking pond with water.
10. Pond inoculation: This is the introduction of proper planktons species into the pond. This is done by obtaining some water from a plankton rich pond and pour into a newly fertilized pond.
11. Stocking of pond: This is introduction of the newly hatched fish called fingerlings or fries into the pond.

**EVALUATION**

1. Define the following:
2. Site selection
3. General survey
4. a. Which soil is best used for dam construction?

b. State four properties of the soil

**STEPS IN CONSTRUTING A FISH POND**

* Choose a suitable site considering nearness to market, road accessibility, topography, soil type (clay), availability of feed supplement etc
* Clear the vegetation on the land
* Mark out pond area
* Dig out pond to required depth (1-2m) ensure pond bottom slops towards outlet to help drainage during harvesting
* Construct drainage system consisting of outlets and ditches
* Construct water inlet at the shallow end.
* Construct pond wall with mixture of clay and sand
* Seal pond bottom with clay
* Grass the embarkment to prevent soil erosion
* Construct duke around the pond mouth to prevent inflow of run-off water.
* Fence pond with net to ward off pests.

**EVALUATION**

1. a. Mention four factors that should be considered when siting a fish pond

b. Explain six ways of maintaining a fish pond.

1. Describe the construction of a fish pond.
2. State three factors that influences the choice of suitable site for fish.

**MAINTENANCE OF FISH POND**

To ensure the continuous availability of fish in a pond or to maintain high yield of fish, the following activities should be carried out:-

1. Regular feeding: The fish should be fed twice daily from a selected point. Supplementary feeds should be given in sufficient quantity to ensure rapid growth and early maturity of the fish.
2. Constant water supply: The pond should be supplied with water to the fullest. The water should be clean and free of odour.
3. Deweeding: Weeds should be removed from the pond. This allows the dissolution of oxygen, penetration of sunlight to the bottom of the pond for the use of the planktons and preventing the buildup of pests and diseases in the pond.
4. Aeration: Adequate aeration should be provided as it enables oxygen to dissolve in water which is required by fish for respiration. Fish normally comes to the surface due to little or no oxygen in the water in some ponds.
5. Desilting: This is the removal or prevention of silt from entering the water. Desilting promotes easy movement of water, makes the water to be clean and prevent pollution of the water.
6. Control of predators: Predators like snakes or birds should not be given access to the pond as they could eat up the fishes on the pond surface.
7. Disease prevention: Disease should be prevented by adequate feeding, stocking, weeding, manuring of the pond. Sticking to these measures will prevent the attack of diseases.
8. Application of fertilizers: Fertilizers should be applied once in a month as this promotes the growth of planktons in the pond.
9. Regular Harvesting: Fish should be harvested regularly to prevent over population, outbreak of disease and cannibalism.

**EVALUATION**

1. Explain the following terms: a. Site selection b. General survey
2. Which soil is best used for dam construction?
3. State four properties of the soil

**READING ASSIGNMENT**

Junior Secondary Agriculture Bk 3 By A. Youdeowei, B.KKaigama, J.N Ogbazi, S.O

Adesiyanpgs 88, Essential Agricultural Science 254-259.

**GENERAL EVALUATION**

1. What are the factors to be considered before establishment of fish pond?
2. Explain any five mentioned above.

**WEEKEND ASSIGNMENT**

1. This addition of limestone or calcium carbonate powder to the sides and bottom of the pond to seal pores and prevent water loss is called a. pond fertilization b. pond inoculation c. liming d. limming.
2. Baby fish are otherwise known as a. planktons b. tadpoles c. fingerlings d. diatoms
3. The best preferred soil used in dam construction is known as a. loamy b. clay c. sandy

d.none of the above.

1. Awood and wire-meshed screen is use to construct a. core trench b. spill way c. dam d. spill trench.
2. N:P:K means a. Nitrogen, phosphorus and potassium B. Nitrogen, potassium and phosphorus C. Nitrate, phosphate and potash D. Neon, potassium and phosphorus.

**THEORY**

1. Differentiate between pond fertilization and Pond inoculation
2. Mention five examples of bony fishes.

**WEEK FIVE**

Fishing methods encompass a variety of techniques and equipment used for the harvest of fish. Harvesting in the context of fishery refers to the collection of fish from aquatic environments, whether for consumption, preservation, or sale.

**Methods of Fish Harvesting**:

1. Netting: Netting involves the utilization of nets to capture fish. Various types of nets are employed, including gill nets, clap nets, trawl nets, scoop nets, beach seines, drag nets, drifting or floating nets, and cast nets. These nets are intricately woven to different sizes and thicknesses, then deployed into the water to ensnare fish. Each type of net serves a specific purpose. Typically crafted from fine cotton or nylon, nets are lowered into the water with small lead weights attached to their edges, aiding in sinking them to the bottom. When the nets are raised, they enclose numerous fish within the mesh holes.

2. Trapping: Trapping entails the setting of traps to capture fish. Gears fashioned from ropes or raffia are woven into various sizes for capturing fish. These traps are positioned along water courses, and any fish that ventures into them becomes trapped. Fish traps come in various forms, constructed from materials such as bamboo, canes, raffia, oil palm or coconut palm fronds, wire, and wire mesh.

3. Hooks and Lines: The use of hooks tied to lines is another method where baited hooks are set along water courses to attract fish.

4. Ultrasonic Devices: Ultrasonic instruments generate sound in the water to attract fish. Subsequently, other means of harvesting, like nets, are employed to gather the attracted fish.

5. Electrofishing: This technique involves the application of an electric field to the water, electrocuting the fish. Electrofishing is typically employed for the complete harvest of fish.

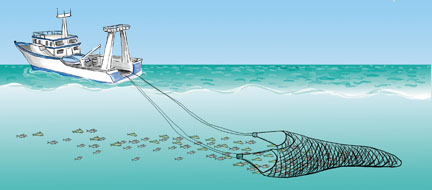
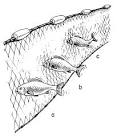
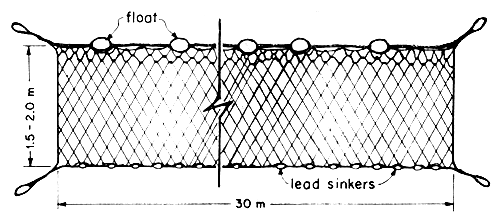
6. Impaling: Impaling entails the use of spears, harpoons, or sharp objects as weapons to attack and capture larger fish, such as sharks.

7. Pots and Gourds: In certain cases, fishermen in ponds and shallow lakes place clay pots and gourds in the water to ensnare fish when they enter these containers.

8. Screens or Barriers: Screens constructed from materials like bamboo, raffia, or oil palm fronds are employed to enclose sections of shallow water. Fish that enter these trap or enclosed areas during high tide are unable to escape when the water recedes during low tide, facilitating their collection.

9. Fishing Without Equipment: Some aquatic animals can be harvested without any fishing equipment. These creatures are gathered by hand, usually by dislodging them from the mud and plants to which they are attached by water currents. Examples include periwinkles, oysters, and clams.

These various methods cater to the diverse needs and environments encountered in the world of fishing.

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**PRESERVATION OF FISH**

This process involves keeping harvested fish long enough to ensure they maintain a high level of freshness before consumption. Preservation prevents spoilage, injury or destruction and this keeps the fish in edible condition for a long time. Harvested fish if not well stored will get spoilt and cause great loss to the farmer hence the need to elongate its shelf life. Preservation can be carried out in any of the following ways:

1. Salting/Curing: Application of salt in the fish which prevents the growth of spoilage organisms should be practiced. Well salted fish can stay long without spoilage provided the fish was originally fresh.
2. Smoking: This is the drying of fish over fire. This reduces the moisture content and improves the taste and flavour of the fish. It also gives colour to the fish. It is necessary that the fish be constantly reheated and aerated and kept away from flies to make it fit for consumption.
3. Canning: This involves the storage of the processed and consumable fish in cans under special conditions for future consumption and sealing the cans so that air cannot pass into them. For example Geisha, Sardine etc.
4. Sun Drying: This involves the drying of fish using the direct heat from sun called solar energy. Here, the fish can only be stored for a short time. It is common in the Northern Nigeria. It is simple and slow. It is not easily practiced in Southern part because of high humidity.
5. Freezing/Refrigeration: This is called chilling. This involves the use of cold storage like deep freezers and refrigerators to store fish over a long time at very low temperature, where bacteria become inactive until the fish are needed. Storage can be done as long as possible provided the system is on.
6. Conversion to feed meal: Parts of fish (especially parts that are damaged or not good for human consumption) are dried and ground into powder known as fish meal. This is used as essential ingredients of livestock feeds. Fish meal is useful to farmers in raising livestock.
7. Roasting: this involves burning fish over naked fire for a short moment.
8. Icing: this involves lacing ice block over harvested fish in a container this method is temporary.
9. Steam cooking: this involves cooking harvested fish over hot steam.
10. Irradiation: this involves the treatment of fish non harmful dosage of ionizing radiation this helps to slow down or halt spoilage by retarding enzymatic action and or destroying microbes.

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**Some of the aim of preservation is:**

1. To retain the quality and quantity of fish.
2. To increase the shelf life of the food.
3. To develop different types of fish food.
4. To maintain all season supplies.
5. To avoid spoilage caused by micro-organism.

**PROCESSING OF FISH**

Processing is the changing of food material fish from one form to another. It involves the removal of inedible part and changing the fish from one form into a preservable form. These are examples of things removed during processing gut, scales, gills, bones, and fins. By product of fish processing includes fish meal, fish scale, cod liver oil and fish skin.

**GENERAL EVALUATION**

1. What are wounding equipments?
2. State four examples of wounding equipments.
3. Describe the following: traps, screen, trawlers, gears.

**WEEKEND ASSIGNMENT**

1. Which of these is not wounding equipment? A. net B. spear C. hook and line D. arrow.
2. Throw net is used by \_\_\_\_ A. industrial fishermen B. town fishermen C. canoe fishermen D. backyard fishermen.
3. A \_\_\_\_ when added to the sides and bottom of pond helps to seal pores and prevent water loss. A. N:P:K B. Limestone C. Urea D. Poultry droppings
4. Example of water habitat that can be caught without the use of equipment are\_\_\_\_\_\_

A. periwinkle B. turtle C. oyster D. clam.

1. A \_\_\_\_ is anything that attracts the fish into trap set for the fish A. bat B. bait C. food

D. sweet.

**THEORY**

1. List five types of net you know.
2. Describe how to use a gourd to harvest fish.

**WEEK SIX**

**FOREST**

Definition:

A forest can be defined as a vast expanse of land covered with trees and bushes, which may either grow naturally or be cultivated by humans for various purposes. Forests also serve as habitats for numerous animal species. Within a forest, a complex ecosystem thrives, comprising various plants and animals.

Forestry involves the management of forests and their resources, while **silviculture** focuses on the cultivation and growth of trees.

Common Forest Trees:

Some common forest trees found in forests include Iroko, Obeche, Mahogany, Nigerian walnut, Ebony, Camwood, Opepe, Afara, Teak, and Abura.

Importance of Forest:

Forests hold significant importance and fulfill various roles, including:

1. Providing essential resources like fuel and wood.

2. Serving as recreational centers and reserves for outdoor activities.

3. Enhancing soil fertility and preventing soil erosion.

4. Generating revenue for the government.

5. Allowing licensed hunters to search for and hunt wild animals.

6. Creating employment and career opportunities.

Types of Forest:

In Nigeria, the vegetation can be broadly categorized into three major types: forest, savannah, and montane. However, forest vegetation can be further divided into three zones:

Zone 1: Coastal Forest and Mangroves

This zone is found along coastal creeks, estuaries, and lagoons. It typically features varieties of the red mangrove tree (Rhizophora racemosa). In some areas, coastal vegetation is dominated by palm trees and lianas (climbing and twining plants).

Zone 2: Deltaic Swamp and Moist Lowland Forest

This freshwater swamp forest zone is extensive in the floodplains of large rivers. It consists primarily of slender trees. However, the moist lowland forest zone is now mostly confined to a few forest reserves in Ondo and Benin areas and in the Cross River basin along the Nigerian border with Cameroon. This high forest zone has transformed into secondary forest due to human activities, primarily comprising oil palm trees. The high forest zone features three distinct layers:

A. The upper tree layer consists of very tall trees, typically ranging from 40 to 50 meters in height, which are scattered and do not form a continuous canopy.

B. The middle tree layer comprises trees ranging from about 16 to 40 meters in height, also scattered and not forming a continuous canopy.

C. The lower tree layer consists of trees from about 10 to 16 meters in height, closely packed to form a continuous canopy.

Zone 3: Forest-Savannah Mosaic

This zone is characterized by a vegetation pattern known as the "Derived Savannah." Here, increasing rural population densities and agricultural activities, such as shifting cultivation and annual bush burning, have contributed to the degradation of the original forest vegetation. Forest trees have been replaced by fire-tolerant savannah species.

General Evaluation:

1. What is a forest?

2. Mention and explain eight importance of forests.

3. State and explain three types of forest zones.

Reading Assignment:

Junior Secondary Agriculture for Nigerian Schools Book 3 by A. Youdeowei, S.O Adesiyan, J.N Ogbazi, Terry Olowu. Pages...

Weekend Assignment:

1. \_\_\_\_ is found along coastal creeks, estuaries, and lagoons.

A. Deltaic Swamp and Moist Lowland Forest

B. Coastal Forest and Mangroves

C. Forest Mosaic

D. Montane.

2. The upper tree layer that is scattered and does not form a continuous canopy is typically between:

A. 40-50 meters high

B. 16-40 meters high

C. 10-16 meters high

D. 16-30 meters high.

3. Secondary forests mainly contain:

A. Oil palm

B. Cocoa

C. Rubber

D. Coffee.

4. \_\_\_\_ is the study and care of all living organisms that reside in forests.

A. Fishery

B. Forestry

C. Silviculture

D. Aquaculture.

5. Forestry practiced solely for timber production is called:

A. Fishery

B. Forestry

C. Aquaculture

D. Silviculture.

Theory:

1. What is a forest?

2. List five importance of forests.

**WEEK SEVEN**

**EFFECTS OF FOREST ON THE ENVIRONMENT**

**Definition**:

The environment can be described as the collective sum of all living and non-living elements in an organism's surroundings. It encompasses the physical aspects, including soil, water, and air, in which organisms exist. The relationship between forest vegetation and the environment is a vital and intricate aspect of nature.

Positive Effects of Forest on the Environment:

Forests have a multitude of positive impacts on the environment, including:

1. Air Purification: Forests play a crucial role in purifying the air by absorbing carbon dioxide and releasing oxygen during photosynthesis.

2. Water Purity: Forests contribute to cleaner water sources by filtering and regulating water flow, reducing sediment runoff, and improving water quality.

3. Rest and Recreation: Forests provide serene environments for leisure and outdoor activities, promoting physical and mental well-being.

4. Scenic Enjoyment: Forests offer breathtaking landscapes and scenic beauty for aesthetic enjoyment and inspiration.

5. Reduced Noise Levels:Forests act as natural sound barriers, reducing noise pollution and providing quieter surroundings.

6. Spiritual Replenishment: Many people find solace, peace, and spiritual fulfillment in forested environments.

7. Increased Relative Humidity: Forests enhance humidity levels in the air, benefiting local climates.

8. Carbon Dioxide Conservation:Forests help conserve atmospheric carbon dioxide content by absorbing and storing it in trees and soil.

9. Improved Soil Fertility: Leaves and organic matter from trees contribute to increased soil fertility as they decompose.

10. Temperature Regulation: Forests reduce high atmospheric and soil temperatures, creating a more temperate microclimate.

11. Prevention of Erosion and Flooding: Forests serve as natural barriers against soil erosion and flooding by stabilizing soil and regulating water flow.

12. Sanitation: Forests contribute to a cleaner environment by producing oxygen through photosynthesis.

13. Groundwater Increase: Forests enhance groundwater levels and recharge aquifers.

14. Habitat and Food for Wildlife: Forests provide essential habitats and food sources for various animal species.

General Evaluation:

1. Define the term 'Environment.'

2. Mention three positive effects of forests on the environment.

Weekend Assignment:

1. \_\_\_ is defined as the physical surroundings in which organisms live, such as soil, water, and air.

A. Community

B. Niche

C. Habitat

D. Environment

2. The effects of overpopulation include the following except:

A. Depletion of resources

B. Environmental improvement

C. Impaired quality of life

D. Incidence of famine and disease.

3. F.E.P.A means:

A. Federal Environmental Protection Agency

B. Federal Environmental Protection Authority

C. Federation of Environmental Protection Agency

D. Federation of Environmental Protection Authority

4. D.P.R means:

A. Department of Petroleum Resources

B. Department of Petroleum Regulation

C. Department of Public Regulator

D. Director of Petroleum Regulation

5. \_\_\_ is the washing away of the topsoil layer, leading to the loss of soil nutrients.

A. Erosion

B. Percolation

C. Transpiration

D. Guttation.

Theory:

1. Define the term 'Environment.'

2. State five positive effects of forests on the environment.

**WEEK NINE**

**HUMAN ACTIVITIES AFFECTING THE FOREST**

**Introduction:**

Our forests, once abundant with lush greenery and rich resources, are now dwindling due to various human activities. The increasing demand for land, both for agriculture and non-agricultural purposes, has led to a substantial reduction in forested areas. Consequently, vast stretches of land that were once teeming with thriving forests have been transformed into barren, unproductive landscapes. This transformation can be attributed to several detrimental human activities, including:

1. Deforestation:

Deforestation involves the deliberate or indiscriminate felling of trees, leading to the loss of forest cover. This activity disrupts the balance of ecosystems, causing long-lasting environmental damage.

2. Overhunting:

Overhunting is the excessive or unsustainable killing of animals for various purposes, often leading to the depletion of wildlife populations.

3. Shifting Cultivation:

Shifting cultivation is a farming practice where people move from one place to another, establishing temporary clearings by slashing vegetation or burning forests and woodlands to create arable land. While it provides short-term gains, it can result in long-term soil degradation and deforestation.

4. Bush Burning:

Bush burning involves setting forests, weeds, and grasses on fire to prepare farmland for planting. This practice not only contributes to deforestation but also negatively impacts the soil and surrounding ecosystems.

5. Construction Activities:

Construction activities entail converting raw land into construction-ready sites for housing, commercial, or industrial purposes. This often involves activities like draining, dredging, excavating, filling, grading, and paving, which can lead to habitat destruction.

6. Overpopulation:

Overpopulation refers to the excessive increase in the number of people, exceeding the carrying capacity of their environment. The effects of overpopulation include resource depletion, environmental deterioration, impaired quality of life, and the prevalence of issues such as famine and disease.

Conclusion:

To mitigate the adverse effects of these activities on our forests, it is crucial to prioritize sustainable and responsible land use. Efforts should be directed toward the restoration of original vegetation, even though this may require substantial investments of time, resources, and management. It is imperative that we exercise vigilance and allocate sufficient resources to maintain and replenish these valuable natural resources.

Evaluation:

1. Define a forest.

2. Differentiate between deforestation and reforestation.

General Evaluation:

1. What is an environment?

2. Define a forest.

3. Explain briefly the term “Global warming”.

4. Mention and discuss eight activities of man on the environment.

Weekend Assignment:

1. A detrimental effect of bush burning is that it A. destroys soil organic matter B. destroys weed seeds C. sterilizes the soil D. adds potash to the soil

2. \_\_\_\_ is a type of farming where people make temporary clearings by slashing vegetation or burning forests and woodlands to grow food A. Crop rotation B. Shifting cultivation C. taungya D. Bush fallowing.

3. Which of the following is not an effective control of deforestation A. Afforestation B. Government regulations C. Prosecution of offenders D. None of the above

4. Which of the following has a detrimental effect on the forest? A. Crop rotation B. Shifting cultivation C. Taungya farming D. Bush fallowing.

5. A deliberate effort to establish a forest is termed A. Crop rotation B. Shifting cultivation C. Afforestation D. Bush fallowing.

Theory:

1. State eight effects of forests on the environment.

2. Mention and explain six human activities affecting the forest.

WEEK 10

REVISION

WEEK 11

EXAMINATION