QUIZZES AND PROGRESS TEST

ON

METHODS OF TEACHING SCIENCE

EBS 203

FOSO COLLEGE OF EDUCATION

EBS 203: METHODS OF TEACHING SCIENCE QUIZ 1 20mins.

NAME:……..
INDEX NO. ……..
CLASS / GROUP: ……..……

Select the Correct Answers from Questions 1-8

1. The procedures used by scientists are often referred to as…….
   A. process of science √
   B. product of science
   C. scientific attitudes
   D. scientific skills
2. Scientific knowledge should be subject to change and therefore should not claim to be the final truth. Which of the following characteristics of science is the statement referring to?
   A. Historic
   B. Public
   C. Replicable
   D. Tentative √
3. Which of the following is not a process skill?
   A) Evaluation
   B) Humanistic √
   C) Hypothesis
   D) Raising questions
4. Which of the following is not a natural science?
   A) Economics
   B) Geology
   C) Political science
   D) Psychology
5. Which of these specific objectives would measure process skills?
   I Assemble a simple distillation set up
   II. Classify fruits as fleshly and dry fruits
   III. Determine when crops are ready for harvesting
   IV. Outline the methods for conserving heat energy
      A) I and II only √
      B) I and III only
      C) I and IV only
      D) II and III only
6. Stating a generalization that may be used to explain a number of events but which is subject to testing by experiment represents which one of theses process skills?
   A) Planning
   B) Hypothesizing √
   C) Predicting
   D) Generalizing
7. Scientific knowledge is ultimately derived from observation or experiment even though theory may be a useful guide to further work. This idea belongs to:
   A. empirism √
   B. experimentation
   C. generalisability
   D. replicability

Indicate Whether The Answer Is True Or False From Questions 9 – 13

8. Products of science tend to create human problems and technology is used to solve them.
   A. True
   B. False √
9. The scientific knowledge which is based on observation and experiment is termed empirical.
   A) True √
   B) False
10. Defining a problem and thinking of ways to solve it through experimentation or some structured investigation is called hypothesis.
   A) True
   B) False √
11. The products of natural scientist are universal, predictable and not reproducible.
   A) True √
   B) False
12. The process of extending conclusions of an experiment to other similar situations is known As generalizing.
   A) True √
   B) False

From Questions 14 – 17 Complete The Statements

13. Being able to use conclusions arrived at in an experiment to explain what would happen in similar situations is regarded as ……..**Generalizing**.
14. The field of science that deals with problems of nature is known as: ……

Answer: NATURAL SCIENCE

15. The use of scientific knowledge for our human comfort is called: ……

Answer: TECHNOLOGY

16. Placing a collection of objects/events in categories based on similar characteristics is known as ..... **Answer: Classifying**

Provide Answers For Questions 18 – 20

18. Mention four differences between science and technology.

Answer: Differences between Science and Technology

Science	Technology
Scientific knowledge can be demonstrated and understood	Knowledge here can be bought and used without understanding
Science knowledge, products changes with time gradually	Knowledge and products can be changed/improved on in relatively short term
Knowledge and products here are intangible	Products are tangible
New findings are published in journals, newspapers and freely distributed	Potency of findings is bought and kept secrete

19. Identify the product and process of science in the following definition of science: "Science is the gathering and recording of information to find answers to questions and challenges of human race.

QUIZ 2

1. …….answers the question: "What is it that your students should be able to do at the end of the class session and course that they could not do before?"
   A. Educational objectives
   B. Instructional objectives
   C. Learning objectives √
   D. Behavioral objectives
2. The general intentions one has towards achieving a desirable result is referred to as ……..
   A. Aim
   B. Objective
   C. Purpose
   D. Goal √
3. All the following are characteristics of educational objectives except ……
   A. Measurable
   B. Intangible √
   C. Specific
   D. Short term-frame
4. The lower order objectives of the cognitive domain are as below;
   A. Knowledge, Comprehension, Application, Analysis √
   B. Analysis, Knowledge, Comprehension, Application
   C. Knowledge, Application, Comprehension, Analysis
   D. Knowledge, Application, Analysis Comprehension
5. In stating learning objectives, which of the following is not a guideline to follow;
   A. The teacher should consider the use of Bloom's Taxonomy
   B. The stem statements should be a measurable verb
   C. One should understand the differences between educational goals and objectives
   D. One should understand the acronyms "SMART" √
6. The acronym "SMART" in the statement of objective stand for
   A. Scientific; Measurable; Action; Relevant Time-Bound
   B. Scientific; Measurement; Action; Relevant Time-Bound
   C. Specific; Measurable; Achievable; Realistic Time-Bound √
   D. Specific; Measurable; Application Realistic Time-Bound
7. Which of the following is not an importance for stating specific objectives in lesson plan preparation
   A. It helps in the choice of the method of teaching
   B. It helps in the selection of syllabus √
   C. It helps in the collection of teaching and learning materials
   D. It helps in the evaluation or assessment of pupils

8. All the stated objectives below are examples of specific objectives except;
   By the end of the lesson, the pupil will be able
   A. Recognize the variety of plants √
   B. Classify plants according to the characteristics of the stem
   C. List two uses of plants.
   D. Identify the three main parts of plants
9. The psychological unit for describing a particular learning behaviour is known as?
   A. Dimension √
   B. Profile Dimension
   C. Syllabus
   D. Taxonomy
10. The scientific attitude of pursuing an investigation in science until results are achieved is called?
   A. Curiosity
   B. Open-mindedness
   C. Perseverance √
   D. Reflection
11. Which one of these profile dimensions is **not** specified for teaching, learning and testing of natural and integrated science at the lower and upper level?
   A. Application of knowledge
   B. Experimental and process skills
   C. Integrated and process skills √
   D. Process skills and attitude
12. "By the end of the lesson, the pupil will be able to outline three activities that cause land degradation". Which profile dimension does this objective belong to?
   A. Application of knowledge √
   B. Application of understanding
   C. Attitudes and process skills
   D. Knowledge and understanding
13. Which one of the following is a general aim of teaching science at the upper primary level?
   A. Communicate scientific ideas effectively √
   B. Equip the pupils with the necessary process skills
   C. Generate in the pupils the interest to the pursuit of scientific work
   D. Provide pupils with strong foundation for further study in science
14. Which of these specific objectives would measure process skills?
   I Assemble a simple distillation set up
   II. Classify fruits as fleshly and dry fruits
   III. Determine when crops are ready for harvesting
   IV. Outline the methods for conserving heat energy
   A) I and II only √
   B) I and III only
   C) I and IV only
   D) II and III only
15. Some common tools used in basic schools to assess pupils understanding of Integrated Science includes;
   I Check – list and Project II Class tests and Quizzes
   III. Interviews and Observation IV. Assignment and Class exercise
   A. I and IV
   B. I, II, IV
   C. II and IV
   D. I, II, III and IV √

16. Match the following general instructional objectives to the corresponding dimension of learning

General Instructional Objectives	**Dimension Of Learning**
	Synthesis
Define Archimedes principles	Knowledge
Interprets your work with charts and graphs	Evaluation
Demonstrates correct usage of a microscope method	Application
Estimates future consequences implied in data	Comprehension
	Analysis

17. The generic skills which pupils need to acquire to enable them solve problems or obtain information are referred to as
    A. Attitudinal skills
    B. Process skills √
    C. Scientific skills
    D. Reflective skill
18. The summary of the specific objectives of the various units within a syllabus is called……
    A. General objectives.
    B. Pre –requisite skills.
    C. Scope of content
    D. Rationale. √
19. The lesson objectives which involve recognition of previously learned materials ranging from specific facts, terms acts to complete theories is referred to as…….
    A. Application
    B. Attitude.
    C. Comprehension √
    D. Knowledge
20. ‘’Pupils will be able to reproduce the diagram of a plant cell on page 8 of their Integrated science textbook’’. This objective will measure…….
    A. Application
    B. Attitude.
    C. Comprehension
    D. Knowledge √
21. Which of these dimensions of learning stipulates that learners will have ability to grasp and use what is communication to them without necessarily relating the material communicated to other materials or perceiving their implications?
    A. Application √
    B. Attitude
    C. Comprehension
    D. Knowledge
22. Which of the following is not a process skill?
    A. Evaluation
    B. Humanistic √
    C. Hypothesis
    D. Raising questions
23. At what stage should a science teacher discuss the usefulness of a concept to the learners?
    A. Development stage
    B. Introduction stage
    C. Application stage √
    D. Closure stage

For items 24 to 34, write the appropriate responses in the spaces provided

24. The underlying behaviours for teaching, learning and assessment is called: ……

    Answer: PROFILE DIMENSION

25. What name is given to the use of complex operations involving several basic process skills? ……***Integrated process*** ……

26. The question "Distinguish between solutions, colloids and suspension" falls under which level of the Bloom's taxonomy of learning? …….***Understanding*** ……..

27. The question "Outline 3 methods for conserving water" falls under which of the Bloom's dimension of learning? .....***Knowledge*** ……

28. The ability to put parts and pieces of information together to form a new whole refers to which of Bloom's dimension of earning? .....***Synthesis*** ……..

29. The process of analyzing a problem and choosing a novel but relevant solution is called: .....***Creative problem solving*** ……..

30. Which scientific attitude is concerned with the conscious act of truthfully reporting observation? …… **Honesty** ……

31. Scientists are expected to look for evidence and argument that supports another person's ideas. What name is given to this scientific attitude? …… **Critical mindedness** ……..

32. The field of science which searches for practical uses of scientific knowledge and from technology, through which applications are realized is known as… **Classification**……

33. The activities which indicate the extent to which the various aspects of each topic are expected to be cover at any particular stage in the lesson delivery is called… **General objectives** …….

34. In teaching and learning, our dimensions are the…… **Behavioural** …..changes in learners.

Items 35 to 40 are statements followed by True and False. Read each statement carefully and indicate whether it is True or False by circling the letter of the correct option

35. The objectives which usually focus on change and development in behaviour and skills is called the effective objective.
    A. True
    B. False √

36. General objectives emphasizes that teaching must be done well so that at the end of the lesson pupils will be able perform certain tasks or show certain behaviours.
    A. True
    B. False √

37. In the natural science syllabus (Basic stage 1 – 3) and the integrated science syllabus (Basic Stage 4 – 6 and Junior High School 1 – 3) three profile dimensions have been specified for teaching, learning and testing.

A. True
B. False √

38. Application, understanding and process skills all constitute higher level of learning.
A. True
B. False √

39. Synthesis is higher than analysis in Bloom's taxonomy of learning.
A. True √
B. False

SUBMISSION DATE: BEFORE 17TH AUGUST, 2020
THANK YOU AND GOOD LUCK

QUIZ 3

Answer ALL questions in this section by circling the letter of the correct or best option (20 MARKS; ONE MARK EACH)

1. The substituted material for trough is …….
A. bunsen burner
B. bowl √
C. infusion tubes
D. spatula

2. All the following are basic curriculum materials except ...
A. teaching and learning materials √
B. teacher's guide.
C. syllabus.
D. pupils textbooks.

3. The main predominant learning modes when using demonstration method in science teaching are...
A. visual and auditory √
B. oral and auditory.
C. visual and note taking.
D. kinesthetic and auditory.

4. Which of the following methods used in teaching science has the purpose of giving learners knowledge, skills and understanding related to a unique problem?
A. Activity
B. Discussion
C. Demonstration
D. Projects √

5. Improvised materials are generally less costly because they are …….
A. gathered by pupils
B. less attractive
C. readily available √
D. teacher made

6. Which one of these guidelines for designing and constructing an improvised material precede pilot-testing?
A. Specification of objectives
B. Finalization of work on item
C. Feedback on tested item
D. Construction of item √

7. One limitation of improvisation is that it…….……
    A. creates interest in science
    B. demystifies science
    C. engages many learners at a time √
    D. may be inappropriate for the lesson
8. The abilities expected to be exhibited by pupils on a project are:
    I. Selecting the project
    II. Planning the project
    III. Conducting the project
    IV. Selling the project
    A. I and II only
    B. II and III only
    C. I, II, and III √
    D. I, II, III and IV

9. In the guidelines for making an improvised material, pilot testing is required. 'Pilot testing' here means……..……
    A. inviting pilots to test the correctness of the constructed materials
    B. inviting students to use the material that has been made for the lesson
    C. trying out the material on a small scale to see the strength and weakness √
    D. using the constructed material for the intended purpose of teaching
10. All the following are examples of audio-visual aids except
    A. A videos,
    B. A television,
    C. A bird,
    D. A radio √
11. All the following are principles for selecting teaching aids except
    A. The aid should be relevant to the topic being taught.
    B. It should be suitable to the topic and make it interesting.
    C. The teaching aid used should be related closely to the learners experiences √
    D. The aid to be used should be simple and easy to manipulate.
12. Which of the following is not a disadvantage of computer simulation?
    A. Expensive to build a simulation model.
    B. Results are accurate in general, compared to analytical model. √
    C. Expensive to conduct simulation.
    D. Sometimes it is difficult to interpret the simulation results.
13. The odd option in the factors to consider when making improvised materials
    A. The age and intellectual ability of the learners that will use it.
    B. Enables students to learn through first-hand experience. √
    C. Availability of the basic materials in the locality.
    D. The assistance of local craftsman such as carpenters, welders, electricians.

14. The method of learning science which is organized, with structured learning activity, and governed by rules with a specific goal and an element of fun which may involve competition is known as …….. **Game** …… method.
15. Replacing the original or actual standard prototype material with one which is locally available and which can perform identical functions as the original one is called improvisation by **…… Substitution …….**
16. **……Teaching And Learning Materials ….**are the specific concrete objects to be provided by either the teacher or both the teacher and pupils for pupils to interact with in the course of the lesson to give them first hand experiences and also to help them develop process skills.

17. A program that attempts to simulate an abstract model of a particular system to gain insight into the operation of those systems, or to observe their behaviour is referred to as ……..**Computer stimulation** ……

18. Drinking straws and infusion tubes used in a distillation experiment are best described as ……. **Improvisation by substitution……..**

19. It is not necessary for an improvised material to be free from religious or gender bias.
    A. True
    B. False √

20. Pilot testing, large scale production, free from any form of bias, durable and finalization of an improvised apparatus are all guidelines for designing and constructing of an improvised apparatus.
    A) True
    B) False √

SUBMISSION DATE: BEFORE 25TH AUGUST, 2020

PROGRESS TEST

UNIT 1: NATURE OF SCIENCE AND ITS IMPLICATION FOR SCIENCE TEACHING

QUESTION 1. What is Science or define Science?

SOLUTION

Science is a way of generating knowledge through process, inquiry, problem solving, interpretation and communication of findings and the development of attitudes that promote this kind of working theories, laws, concepts, principles and facts

QUESTION 2. Why is science considered as a product and a process?

SOLUTION

Science is considered as a product and a process because in attempting to generate knowledge, scientists go through some working activity or methodology that involves skills like observation, experimentation, recording, measuring, manipulation etc. and eventually come out with some truth which are facts, concepts, principles, theories, laws, and generalizations. Thus the Product of Science involves the facts, concepts, principles, theories, laws, and generalizations whilst the process of science involves the observation, experimentation, recording, measuring, manipulation etc.. The product and the process are inter-related

QUESTION 3. State and explain any six characteristics of scientific knowledge

SOLUTION Characteristics of Scientific Knowledge include:

Tentative, Public, Replicable, Historic, Humanistic, Unique and Empirical.

Tentative: It is subject to change and therefore does not claim to be the truth in an absolute and final sense

Public: It is based on evidence that is public as opposed to personal

Replication: It is based on evidence which could be obtained by other investigators working in a different place at a different time given similar conditions

Historic: Scientific knowledge of the past has provided the basis for today's knowledge which in turn will provide the basis for tomorrow's knowledge

Humanistic: It is the product of mankind resulting form an effort to impose order or nature to find patterns in nature and involves creative imagination

Unique: Scientific knowledge is distinguished from other realms of knowledge by virtue of the nature of its knowledge and its procedures for generating new knowledge

Empirical: Scientific knowledge is based ultimately on and/or derived from observation or experiment even though theory may be a useful guide to further work. It has its origin in the real world and is dependent on sense experience.

QUESTION 4. Mention and explain three (3) scientific attitudes that can be developed in a Basic School Pupil.

SOLUTION : Scientific attitudes that can be developed in a Basic School Pupils are:

Objectivity, Open mindedness, Curiosity, Perseverance, Flexibility, Respect for evidence reflection, Honesty, Critical mindedness and Thoroughness.

Open Mindedness: Willingness to revise one's opinion and conclusions in the light of new evidence

Objectivity: Interpreting data or explaining observations by depending solely on the recorded information (evidence) without twisting the information to agree with what we believe or what we think is right

Curiosity: The inclination or feeling toward seeking information about how things work in a variety of fields.

Perseverance: The ability to continuously pursue an investigation until results are achieved

Flexibility: Willingness to change opinion in the face of more plausible evidence

Respect for Evidence: Willingness to collect and use data in one's investigation has been carried out

to see possible faults and other ways in which the investigation could be improved upon

Honest: Intellectual honesty is concerned with the conscious act of truthfully reporting observation. Report that is seen but not what is taught to be seen

Critical mindedness: Scientists look for evidence and argument that supports another person's ideas

Thoroughness: Scientists are not expected to draw hasty conclusions, Judgment is only pronounced after enough data and evidences have been covered to support the conclusion drawn

QUESTION 5. State the scientific methods you will use to make water safe for drinking.

SOLUTION:

The steps to be taken are as follows:

- Recognizing the problem (pond water is contaminated)
- Collecting information (finding out how to make pond water safe for dinking through research)
- Making hypothesis (using the information gathered to make speculation or guess work to solve the problem)
- Devising an experiment. (Design an experiment on purification of pond water).
- Observing and recording results. (Observing the experiment and recording findings)
- Analyzing the results (Result are evaluated to find out if it is satisfactory. If h
- Drawing conclusion and generalization (if the result satisfies the problem then conclusion is drawn and generalizations made)

QUESTION 6. Scientists use process skills to generate new knowledge and verify knowledge. List six (6) of such process skills

SOLUTION

i. Planning
ii. Observation
iii. Manipulation
iv. Classification
v. Communication

vi. Recording

vii. Measuring

viii. Interpretation

ix. Prediction

x. Hypothesizing

xi. Inferring

xii. Generalizing

xiii. Designing the experiment

QUESTION 7. Write the meanings or explain the process skills that have been listed above

SOLUTION

i. **Planning**: Defining the problem and thinking of ways to solve it through experimentation or some structured investigation

ii. **Observation:** Use of the senses, the microscope and other tools, to make accurate observations of phenomina

iii. **Manipulation**: Skillful handling of objects and tools in accomplishing a task

iv. **Classification**: Grouping or placing a collection of objects or events in categories based on similar characteristics

v. **Communication**: Being above to present information accurately either by oral or in written report so that it can be understood by others

vi. **Recording**: Draw or make graphical representation boldly and clearly, well labeled and pertinent to the issue at hand

vii. **Measuring**: Accurate use of measuring instruments and equipment with appropriate precision as required y the investigation

viii. **Interpretation**: The ability to evaluate data in terms of its worth: good, bad, reliable, unreliable or the ability to make inferences and predictions from written or graphical data

ix. **Prediction**: Going beyond the immediate evidence or past and using this to suggest what will happen at some future time

x. **Hypothesizing**: Suggesting reasons for events or phenomena which can be tested scientifically; involves applying concepts and ideas from previous experience

xi. **Inferring**: Putting several pieces of information together and making some sense of the whole.

xii. **Generalizing**: Extending the conclusion of an experiment to other similar situations. Or, being able to predict possible solutions to similar problems based on the results of a previous experiment

xiii. **Designing and Experiment**: Determining the nature of the experiment and listing the requirements and materials necessary for the experiment or investigation

SOLUTION:

The Scientist cannot:

i. Generate new knowledge
ii. Verify knowledge

QUESTION 9. Seven activities are described below: Use the following process skills to match the activities described in (i) to (vii)

Hypothesizing, measuring, recording, observing, handling apparatus, planning (resources) predicting, manipulating, generalizing.

i. Wire, dry cells, bulbs, keys
ii. Two dry cells and a bulb are connected by pieces of copper wire to make series and parallel circuits
iii. Dry cells in a series circuit produce brighter light than dry cells in a parallel circuit
iv. The series circuit has the dry cell arranged in a row whilst in the parallel circuit the cells are arranged side by side
v. Draw each circuit. The brightness of the bulbs is recorded by tabulating the number of sheets of paper that the light rays from each bulb passed through.
vi. The intensity of the light is measured by using a number of sheets of paper to block the light rays from each of the bulbs
vii. Dry cells in a series circuit produce brighter light because cells give more power when they are joined in series.

SOLUTION

i. Planning (resources)
ii. Manipulating
iii. Predicting
iv. Observing
v. Recording
vi. Measuring
vii. Hypothesizing

IMPORTANCE OF PROCESS SKILLS

- To generate scientific knowledge
- To verify knowledge

QUESTION 10. What is Technology?

SOLUTION

- Technology is the use of scientific knowledge for our human comfort OR
- Technology is a process by which scientific knowledge and discoveries an applied and used OR
- Technology is a disciplined process of using scientific materials and human resources to achieve human purposes. OR
- Technology is the totality of the means employed by people to provide material objects for human sustenance and comfort.

QUESTION 11. Briefly outline the similarities and differences between Sciences and Technology.

SOLUTION **Differences between Science and Technology**

SCIENCE	TECHNOLOGY
The products are intangible, i.e. cannot be seen or touched e.g. principles or facts laws, theories, etc.	The products are tangible i.e. can be seen or touched e.g. machines or other devices.
Can be demonstrated and understood	Can be bought and used without understanding.
Changes occur only gradually	Can be changed and improved upon in a relatively short time

Similarities between Science and Technology

i. They are both closely interwoven and intertwined.

ii. They are both reproduceable

iii. They both create or solve human problems.

QUESTION 12. State six traditional beliefs and for each of the traditional beliefs stated, justify the scientific implication, if any, in each case whether the belief should be abandoned or maintained by you students.

SOLUTION

Belief I: One's mother would die if one sang while bathing

Scientific implication or explanation: To produce sound, air must be expelled from the lungs. To obtain enough air for this singing activity, the singer must inhale large quantities of air. So when one sings while bathing, there is the possibility of inhaling water and soap into the lungs. The presence of these in the lungs could be harmful and might even cause death. The child is therefore deterred from singing while bathing "in order not to cause the death of the mother".

This Belief I should be maintained because it will instill good social habits and promote personal safety.

Belief II: If you place the palm of your left hand on the ground while eating, the food will pass through the hand into the ground instead of going into the stomach.

Scientific Implication or explanation: Children eating from the same bowl share meat place in left hand, if left hand being soiled by being place on the ground previously, it will contaminate the meat. This situation can cause disease, if meat or fish is eaten. The belief promotes hygiene (during meal) and therefore prevents some diseases. The belief II should therefore be maintained because it promotes personal hygiene during meal and therefore prevents some diseases.

Belief III: It is a taboo for pregnant woman to eat eggs

Scientific implication or explanation: Eggs are one of the food substances that contain protein and essential nutrients required by the body. When a woman gets pregnant and eats enough eggs the foetus will grow fat or big and there is the likelihood that when the woman is to deliver she may suffer so much for it. This means that the belief has no scientific significant and that it should be abandoned because eggs which contain protein and other nutrients are useful to the pregnant woman

Belief IV: At funerals we do not go round the corpse weeping else the corpse will decompose immediately

Scientific implication or explanation: At funerals, there is gradual decomposition of the corpse which gives bad odour due to heat in the crowded room. Inhaling such polluted air may give one an airborne disease especially if the corpse was not properly embalmed or preserved. To avoid this, people were deterred by the fact that the, corpse will decompose immediately. If you do not want your loved one or relative's corpse to decompose, you stop crying immediately

Belief V: Whatever elders say is indisputable truth and should not be questioned.

Scientific implication or explanation: It has no scientific basis. It is used to deter people form asking questions

Belief VI: One should not shout when a ghost is seen else you may have sores around your mouth

Scientific Implication or explanation: the belief has no scientific basis

QUESTION 13. What are the reasons for using traditional beliefs in teaching science?

SOLUTION

Reasons for using traditional beliefs in teaching science are for;

i. **Personal safety of the individual and society**. For example one should not sing, whilst bathing else the offenders mother would die
ii. **The maintenance of personal hygiene and to check the spread of disease**. For example, we do not cry around a corpse else the corpse will decompose immediately or if you place the palm of your left hand on the ground while eating, the food will pass through the hand into the ground
iii. **Preventing cruelty to other people and to animals**. For example we do not throw stones at pregnant animals else the offender's mother will get miscarriage.
iv. **Instilling good social habits**. For example, we do not have sex in the bush else the gods will curse you
v. **Preserving the environment and natural resources**. For example we don't go fishing from the sea on Tuesdays at the at the coastal towns in Ghana, else one would see the sea god "maame wata"

QUESTION 14. List FIVE widely held positive traditional beliefs and FIVE widely held negative beliefs in your locality

SOLUTION:

Positive traditional Beliefs

i. One should not sing whilst bathing or else the offender's mother will die
ii. One should not talk whilst eating
iii. One should not place his open palm (left) on the ground whilst eating or else all the food will pass through the hand into the ground and not into the stomach

iv. At funerals we do not cry around the corpse else the corpse will immediately to bad
v. Sweeping of rooms in the night is not permitted or you sweep your riches away
vi. Woman should not sweep the floor in front of seated elders without obtaining permission from them

Negative Traditional Beliefs

i. Children are to be seen but not be heard among elders
ii. Whatever elders say is indisputable truth which is unquestionable
iii. Girls should not touch a toad or else offenders will turn into boys
iv. Pregnant women are not supposed to eat snails
v. Children are not to be given eggs to eat or else they will steal when they grow up

QUESTION 15. Discuss how a science teacher can use each of these beliefs in his/her teaching

SOLUTION:

i. Write a very popular traditional belief on the chalkboard and using question and answer method discuss it in detail under one of the following reasons
a. Personal safety of the individual and the society
b. Maintenance of personal hygiene
c. Check spread of disease
d. Prevent cruelty to other people and to animals
e. Instilling good social habits
ii. Ask children to list as many traditional beliefs as they can remember in their culture
iii. Put children in groups to discuss traditional beliefs allocated to each group under the characteristics labeled above
iv. Have feed back by asking each to report on their discuss stressing particularly on any scientific or any explanation involved

UNIT 4: INSTRUCTIONAL OBJECTIVES PROFILE DIMENSIONS

Q1. (a) What are profile dimensions or what do you understand by "profile dimensions"?

(b) What profile dimensions have been specified in the primary science syllabus?

SOLUTION

a. Profile dimensions describe the underlying behavioural changes in pupils or learners during teaching, learning and testing/assessment

b. Profile dimensions specified in the primary syllabus

i. Knowledge and understanding

ii. Application of Knowledge

iii. Attitudes and process Skills

Q2. (a) List the dimensions of teaching and learning

(b) Explain why attitudes and process skills are considered as one of the important classes of profile dimensions that have been specified for teaching, learning and assessment in the basic schools

SOLUTION

a.

i. Knowledge

ii. Understanding

iii. Application

iv. Process Skills

v. Attitudes

Isaac Newton is associated with dimensions in science (physics) as

vi. Analysis

vii. Synthesis

viii. Evaluation

b. When making investigation in science, we go through a lot of processes which finally lead to acquisition of skills. Besides, we try not to allow our feelings, and belief systems influence the observations we record. We should therefore be objective, open-minded and so on in our recording-of our results

Q3. Indicate the dimension of learning in the cognitive domain (knowledge, understanding, application, analysis, synthesis, evaluation) of each of the following

i. What did I say we would do today?

ii. Using the rules, solve the following problems

iii. What does osmosis mean to you?

iv. Classify the following plants according to the ten categories learnt in class

v. How are these two, solutions similar?

vi. According to our definition of a mammal, which of the five animals listed would be considered a mammal?

SOLUTION

i. Knowledge

ii. Application

iii. Comprehension/ Understanding

iv. Application

v. Comprehension/ Understanding

vi. Application / Evaluation

Q4. For a named topic write two questions for each of the following profile dimensions

a. Knowledge and Understanding

b. Application of knowledge

c. Process skills and Attitudes

SOLUTION

a. Knowledge and understanding

Named Topic: The Flowering Plants

i. ***Explain*** three uses of the leaves of a plant to humans

ii. ***List*** four (4) agents of pollination

b***. Application of knowledge***

i. Determine two symptoms when tomato crops are ready for harvesting

ii. Demonstrate three ways to care for tomato crops

c. Process skills and Attitudes

i. Classify the given fruits as fleshy and dry fruits

ii. Record five rules for growth and development of a maize plant

Q5. State the level of learning of each of the five (5) dimensions of teaching and learning as well as their profile dimensions

SOLUTION

i. Dimensions of learning and their corresponding levels

- Knowledge: Lower level of learning
- Understanding or comprehension: Lower level of learning
- Application: Higher level
- Process skills: Higher level
- Attitudes: Higher-level

ii. Profile dimensions and their corresponding levels

- Knowledge and understanding: Lower levels
- Application of Knowledge: Higher levels
- Attitudes and process Skills: Higher levels

Q6. Classify the following ten 910) specific objectives under these profile dimensions:

a. Knowledge and understanding
b. Application of knowledge
c. Attitudes and presses skills

By the end of the lesson, the pupil will be able to:

i. Analyse three benefits of fertile soil to the nation
ii. Classify six given fruits as fleshy and dry fruits
iii. Determine four (4) possible substances that can dissolve in water
iv. Describe three ways by which heat energy travels
v. Apply the concept of the changes in the state of water to explain how rain is formed
vi. Give five reasons why clean water is preferred to dirty or muddy water
vii. Name five parts of a hibiscus flower
viii. Interpret five different sounds from five different sources
ix. Outline three methods for conserving heat energy
x. List three agents or pollination

SOLUTION

Classification of Specific Objects in Terms of Profile Dimensions

PROFILE	SPECIFIC OBJECTIVES
a. Knowledge and understanding	(iv), Describe three ways by which heat energy travels (vi) Give five reasons why clean water is preferred to dirty or muddy water (vii) Name five parts of a hibiscus flower (x) List three agents or pollination
b. Application of Knowledge	(i) Analyse three benefits of fertile soil to the nation (iii) Determine four (4) possible substances that can dissolve in water (v) Apply the concept of the changes in the state of water to explain how rain is formed (ix) Outline three methods for conserving heat energy
c. Attitudes and process skills	(ii) Classify six given fruits as fleshy and dry fruits (viii) Interpret five different sounds from five different sources

Q7. Determine the percentage weighting of the ten specific objectives above that ware given to the three profile dimensions

SOLUTION

Number of occurrence of the ten specific objectives according to the profile dimensions

Profile dimensions	Number of occurrence of specific objectives stated	Percentage Weighting
a. Knowledge and understanding	4	40%
b. Application of Knowledge	4	40%
c. Attitudes and process skills	2	20%

Calculating The Percentage Weighting For Each Profile Dimension

a. Percentage weighting on Knowledge = Number of specific objectives on Knowledge and Understanding + 100
Total number of specific objectives

= 4 x 100
10

= 40% this is the expressed as percentage

b. Percentage weighting on – Number of Specific objectives
Application of knowledge – on application of knowledge X 100
Total number f specific objectives

= 4 x 100
10

= 40% this is then expressed as Percentage

c. Percentage weighting on – Number of specific objectives
Attitudes and process skills – On Attitudes and process skill X 100
Total number of specific objectives

= 2 X 100
10

= 20% this as then expressed

Q8. Prepare a table to show the percentage weightings on the profile Dimensions for lower primary natural science, Upper primary integrated science and J.S.s. and J.H.S. science

SOLUTION

Percentage Weightings on the Profile Dimensions

PROFILE DIMENSION	**PERCENTAGE WEIGHTINGS**				
	Lower Primary Newly Introduced	Upper Primary P4-6		J.S.S	J.H.S
		Old-system	New system	Old system	New System
Knowledge and understanding	20	20%	20	30%	20%
Application of knowledge	20	20%	20	40%	40%
Attitudes and process skills	60	60%	60	30%	40%

Q9. Outline four (4) reasons why a basic school teacher should learn about profile dimensions

SOLUTION

i. To be familiar with the classes of profile dimensions that has been specified for teaching, learning and assessment

ii. To state instructional objectives to cover the various dimensions of teaching and learning

iii. To be able to identify each of the dimensions of teaching and learning and assessment processes.

iv. To give the required emphasis to each of the dimensions in the teaching learning and assessment processes

Q10. (a) Imaging you are a basic SIX (B.S 6) class teacher and you have taught the following topics

during the term

i. Kinds of seeds and their uses

ii. Germination of seeds

iii. Characteristics of mammals

iv. The digestive system and its functions

v. Food poisoning

a. Prepare a test specification table of 20 test-items (questions) for your terminal examination

SOLUTION

Specification to Table for a Basic Six (B.S. 6) Class

Units/Topic Treated	Learning Objectives/ Dimensions of Learning				
	Knowledge	Understanding	Process skills	Application	Total
1. Kinds of seed and their uses	1	1	3	1	6
2. Germination of seeds	1	-	2	-	3
3. Characteristics of mammals	-	-	3	1	4
4. Digestive system	-	1	2	1	4
5. Food poising	-	-	2	1	3
Total number of questions	2	2	12	4	20
% of the items	10%	10%	60%	20%	100%

UNIT 5:TEACHING DEVICES - IMPROVISATION

Q1. (a) What is improvisation?

(b) What are the types of improvisation? (Name them)

SOLUTION

(a) Improvisation is the preparation and use of low cost, readily available local materials in the environment, suitable enough to make teaching and learning meaningful to the pupils.

(b) There are two types of improvisation, namely:

(i) Improvisation by substitution

(ii) Improvisation by construction

Q2. What do you understand by improvised materials? Give two examples to illustrate your answer.

SOLUTION

Improvised materials are teaching / learning materials which are readily available in the environment when the original materials are not available or are expensive, delicate or sophisticated.

Examples of improvised materials

(i) Lower section of a plastic bottle as a beaker.

(ii) A section of a plastic bottle from the mouth to the neck as a funnel.

(iii) Strips of white paper soaked with petals as acid / base indicator.

(iv) Cotton wool / Foam / Nylon with a fine mesh used as filter paper.

Q3. (a) Differentiate between improvisation by construction and improvisation by substitution.

(b) List 5 teaching and learning materials that are improvised by construction and 5 that are by substitution.

SOLUTION

(a) Improvisation by construction is the type of improvisation n which the improvised material is made or prepared completely from either low cost, used or discarded locally available materials or made partially by modification of existing item or equipment whereas improvisation by substitution is the use of materials that are

readily available in the environment in place of the various sophisticated or protype equipment, chemical and containers which are normally used in the science laboratory or modification of existing

items / equipment.

(b) ***Teaching -- learning materials that are improved by construction are as follows:***

(i) Pinhole camera using plywood, tracing paper and nails.

(ii) Electrical circuit board using plywood, bolts and nuts, aluminium sheet and flash light bulbs.

(iii) Test tube holder from a metal wire.

(iv) Meter rule from wood.

(v) Funnel and beaker from a plastic bottle.

(vi) Beam balance using ply wood, nails, milk tin, thread. (vii) Tripod stand from bicycle spokes

Examples of improvisation by substitution

Original Material / Equipment	**Improvised Material (Substituted Material**
i. Distilled water	Rain water
ii. Filter paper	Nylon cloth / Cotton wool / Clean handkerchief
iii. Test- tubes	Injection bottles
iv. Water trough	Plastic bowl
v. Bunsen burner	Coal pot / Kerosene stove
vi. Delivery tube	Drinking straw / Infusion tubes
vii. Copper electrical wire	Aluminium sheet
viii. Reagent bottles	Injection bottles

Q4. Outline 5 principles that you will consider when constructing an improvised material for your lesson in science.

SOLUTION

Principles to consider when constructing improvised materials include:

(i) The workability of the improvised apparatus or material.

(ii) Where and how to get the bits and pieces of materials needed.

(iii) The need to co-operate with local craftsmen like carpenters, fitters, electricians for pieced of advice of every technical nature,

(iv) Level and age of the pupils or students.

(v) Affordability of materials or readily availability of material / equipment in the environment.

(vi) Safety of the materials to be used or improvised...

Q5. Give reasons why you consider improvisation as an important and useful aspect of teaching science J.S.S or J.H.S in Ghana.

SOLUTION

Importance or Advantages of Improvisation.

(i) Demystifies science / creates interest in science.

(ii) Less expensive / low cost / cheaper.

(iii) Helps to individualize learning / enables s many learners to, engage in practical activity at the same time.

(iv) Enables the learners to develop an appreciation of the use of everyday things in learning science.

(v) Develops self - reliance in the teachers.

(vi) It develops the appreciation of ones environment thus meeting an important objective of J. S. S or at J.H. S science.

(vii) It makes up for the scarcity of polished or imported foreign equipment or apparatus needed for the activity method in science lessons.

(viii) It is less prone to breakages and repairs thereby encourages co-operation among pupils or students.

Q6. What are the limitations or disadvantages of the use of improvised materials in science teaching?

SOLUTION

Limitations or Disadvantages of Improvisation

(i) Some improvised materials may be expensive so there may not be enough for the lesson.

(ii) Crude and sub-standard materials are produced.

(iii) Learners would not be abreast with the use of modem equipment.

(iv) Requires resourceful teachers.

(v) Use of improvised materials brings about lowering of standards.

Q7. Outline 5 guidelines for designing and constructing improvised materials.

SOLUTION

Guidelines for designing and constructing improvised materials

(i) ***Specification of the objectives***: Objectives should be specified in terms of the knowledge, skills and attitude to b{ developed or acquired by the pupils. ~

(ii) ***Designing***: A design of the apparatus / materials is drawn.

(iii) ***Collection of Materials from the environment:*** The teacher and the pupils can help in the collection of materials either free or at low cost from the environment.

(iv) ***Construction:*** The teacher and the pupils can now construct the apparatus either by themselves or with the help of a skilled craftsmen in the local community.

(v) ***Pilot testing:*** The constructed apparatus is then pilot - tested to test for the workability of the apparatus.

(vi) ***Feedback:*** The results of the pilot - testing are 'hen used to modify the design or material itself.

(vii) ***Finalization***: Finishing touches are then given to the apparatus for use in the classroom.

(viii) ***Large scale production***: An appreciable number of the improvised apparatus are that constructed with the number of target users or the allowed group size in view.

Q8. Write down 5 desirable characteristics or features of improvised materials.

SOLUTION

Desirable characteristics or features of improvised material

(i) Be attractive and appropriate for the objectives to be achieved.

(ii) Durable. i.e. made up of quality materials.

(iii) Safe to use..

(iv) Simple to operate by pupils.

(v) Easy to construct.

(vi) Available at low cost or free in the Local .environment.

(vii) Portable. i.e. can be carried about.

(viii) Free from any form of bias i.e. religious and, gender wise.

(ix) Workable.

UNIT 7: Assessment and Evaluation

QUE: State any three tools you would use to assess profile dimensions in science class

SOLUTION

Tools for Assessing Profile Dimensions are:

i. Class tests/ Examination
ii. Home work
iii. Projects
iv. Quizzes
v. Checklist
vi. Assignments etc.

Q12. (a) Differentiate between Assessment and Evaluation

(b) Why is it necessary for a science teacher to assess the progress of his or her pupils during a lesson?

SOLUTION

a. Assessment is a formal attempt top determine student's status with respect to educational variable of interest while evaluation is the progress of obtaining information and using it to form judgements that in turn are used in decision making

b. It is necessary for the teacher to assess the progress of the pupils or student during the lesson as it is to:

i. Screen or select individuals for admission, promotion, certification and other honours or determine pupils levels of achievement
ii. Motivate learners to improve their work
iii. Advise learners on how to direct learning efforts or for guidance and counseling
iv. advise individuals on their vocational choices
v. determine the effectiveness of instructional methods and materials or measure the effectiveness of his or her teaching
vi. discover individual or class problems and weaknesses
vii. determine how to group students for instruction in view of individual or modify instructional strategy

viii. determine the extent to which instructional goals are being achieved or modify instructional strategy

Q13. (a) Outline the method of assessment in science at the J.H.S level

(a) Write four advantages and four disadvantages or problems of continuous assessment

SOLUTION

a. Methods of assessment in science at the J.H.S level

i. Essay tests

ii. Multiple choice tests

iii. Short-answer tests

iv. Matching tests

v. True or False tests

i. **Essay test:** gives freedom to candidates to compose their own answer in their own words

ii. **Multiple choice tests:** This is a type of objective test normally containing many items. In each the candidate is given a statement or question called the stem and is then to select from among three or more suggested answers called options or responses that best fits the stem. The incorrect or less appropriate choices are called distracters and the correct answer or the most appropriate option, the key.

iii. **Short Answer test:** This involves series of questions written in such a way that the answers required are short, specific and precise. There are two basic types-the question type and the incomplete statement type.

iv. **Matching test:** this test is a set of two jumbled lists in which each idea is one list is related to an idea in the other list. The second list might contain answers to questions posed in the first list.

v. **True-False test:** In this test the student is given a statement which may be true or tales. The task of the student is to identify whether the statement is true or false

b. Advantages of Continuous Assessment

i. Continuous Assessment gives immediate and continuous feedback which is diagnostic in nature

ii. It encourager the students work assiduously through b out the teaching/ learning period

iii. Continuous Assessment minimizes fear and anxiety in students. The fear of failure is reduced

iv. The comprehensive nature of continuous assessment provides a more valid picture of student's performance

v. Examination malpractices may be better controlled since students are not so apprehensive on one test

vi. Continuous Assessment involves the measure of all the domains, namely cognitive, psychomotor and effective domains

vii. It discourages teaching to syllabus, since the teacher has a hand in the final assessment

viii. The teacher also has the opportunity to assess, his own teaching. The feedback obtained helps him to clarify his objectives and instructional procedure to make the necessary corrections

ix. It makes/ensures good coverage, planning and efficiency on the part of the teacher

Problems or Disadvantages of Continuous Assessment

i. Continuous Assessment increases the workload of teachers. The number of tests, assignments and projects coupled with large class size but unbearable pressure on teachers

ii. It is also time consuming. Examples are tests constructions, scoring and recording of grades

iii. There is lack of Uniformity in assessment when dealing with scores or grades from different schools or within the same school from different classes of the same form'

iv. Continuous Assessment tends to reduce credibility of teachers e.g. said to be inflated by most teachers

v. There is improper record keeping 'Teachers' carelessness in record keeping may lead to 'concoction' of grades fro students

vi. Ineffective supervisory role of heads due to over ladened of workload

vii. Usually, there is inadequate materials and equipment

Q14. Write down the criteria for JHS class Project Assessment

SOLUTION

Criteria for JHS class Project Assessment

i. Creativity 5mks

ii. Originality 5mks

iii. Ingenuity 5mks

iv. Discovery/Invention 5mks

v. Technical Skills 5mks

vi. Neatness/ Aesthetic 5mks

Q15. (a) What is a multiple choice test?

(b) Write down the advantages and disadvantages of multiple choice tests

SOLUTION

a. Multiple choice tests: Titus is a type of objective test normally containing many items. In each the candidate is given a statement or question called the stem and is then to select from among three or more suggested answers called options or responses that best the 40% (30%) which are awarded by the classroom teachers are fits the stem.

The incorrect or less appropriate choices are called distracters and the correct answer or the most appropriate option, the key

b. Advantages of multiple choice test

i. Marking of multiple choice items is objective

ii. Test can cover a greater part of the syllabus

iii. Test is easy and quick to mark large numbers

iv. They can be used for all subject areas

v. They can be marked by anyone using the scoring key

vi. It is easy to administer and score

Disadvantages of multiple choice test

i. Difficult to construct

ii. Time consuming in construction

iii. Very long question papers

iv. Answers are opened to guessing/ encourages rote learning

v. Easy to copy from friends during exams or test

Q16. ***Outline the Guidelines for Constructing Multiple Choice Tests***

SOLUTION

i. The central question or problem should be clearly stated in the stem

ii. All distracters should be feasible

iii. There should be no ambiguities in the stem or the distracters

iv. All options should follow grammatically from the stem

v. All options should be approximately the same length

vi. Responses should be constructed so that no clues can be obtained from other options

vii. No two options should be equivalent or opposite in meaning

viii. The stem should be written at the appropriate language level for the pupils answering the items

ix. Responses should be vertically arranged on the page

x. Avoid the repetition of words in the options

xi. Avoid using 'all of the above' as an option; rather, use 'none of the above' sparingly if at all

Q17. State in TWO criteria for writing multiple choice items which have been, overlooked by the science teacher in the following questions he gave to his pupils. Justify your answer in each case.

i. Which of the following is found in a typical cell?

(A) Kidney (B) Cytoplasm (C) Nucleus (D) Mushroom

ii. Who is the father of microbiology?

a. The Darwin brothers

b. Kofi Manu

c. Oliver Twist

d. Mr. Isaac Newton

UNIT 8: LESSON PLAN

Q1 (a) What is a scheme of work?

(b) State two importance of termly scheme of work to a teacher

SOLUTION

(b) A scheme of work is a weekly plan prepared by a teacher for the topics that are to be covered in a term. Or it is a plan of what the teacher is supposed to teach for the terms which is presented on weekly basis

(b) ***Important of scheme of Work***

i. It helps a teacher to prepare in advance topics to be covered in each term and week]
ii. It helps a teacher to prepare an effective lesson plan
iii. It helps the teacher to determine if he or she is lagging behind or moving forward in the teaching
iv. It enables any new teacher who takes over in the middle of the term to determine where to begin or continue the lesson from
v. It serves as a record of work for the periods
vi. It puts the syllabus into its natural logical sequence
vii. It ensures that the teacher bases his/her teaching on the approved curriculum or teaching syllabus but not on any other syllabus
viii. It helps the teacher to allocate appropriate time for teaching topics in a syllabus. This helps him or her to cover all or greater part of the syllabus
ix. It helps the teacher to select teaching aids, materials, tools and equipment which will enable him to teach the selected topics effectively.

Q2. **a.** What are the main features of a termly scheme of work?

b. Mention three (3) factors that are needed to be considered or that influence the preparation of a scheme of work

SOLUTION

a. Features Of Termly Scheme Of Work
i. Week
ii. Week-ending (Date of the end of the week
iii. Topic / subtopic
iv. References
v. Teaching and Learning materials / Advanced Preparation
vi. Remarks

b. Factors To Be Considered Or That Influence The Preparation Of A Scheme Of Work

i. The syllabus, pupils' textbooks and homily book
ii. The age of the students
iii. The social, physical, intellectual, emotional and moral development of the students' i.e.

the student's abilities

iv. The needs of the students. These include both felt and unfelt needs.

v. The number of students in the class

vi. The time available for teaching

vii. The previous and or background experiences of the students, in learning science

Q3 a. What is a lesson plan?

b. List and explain the features of lesson plan

SOLUTION

a. A lesson plan is a programme or outline of activities that a teacher will follow or guide the teacher in order to teach effectively in a class

b. The features and explanations of the lesson plan format include:

i. ***Topic/ Unit:*** A topic is a teachable Unit of the major topic of a section of the syllabus

ii. ***Day, Date, Time And Duration:*** The day and date show the particular day and date of the week for which a lesson is meant. The duration is a specification of the length of time allocated to the lesson.

iii. ***Specific Objectives or Instructional Objectives***.

Specific objectives indicate what is hoped to be based on the topic, the nature of the subject matter (main ideas) and the intellectual level of the learners. The instructional objectives should be stated in such a way that it can define what the pupils should be able to do by the end of the lesson. They must be (BOMSTRA or smart) that is, behavioural, observable, measurable, specific, time bound, relevant, and achievable for BOMSTRA or specific, measurable, achievable, relevant and time bound for smart.

iv. Relevant Previous Knowledge:

This is the knowledge, skill or idea, which the learners or pupils already know, and which relates to the new material or topic to be learnt. The RPK does not necessarily come from a previous lesson. It could be general knowledge acquired from experience or real life, and may also come from other subjects in the curriculum

v. References:

References refer to the various sources from which the teacher gathers information for the lesson. Such sources include the syllabus, the pupils textbooks, the teacher's handbook and other reading materials in which the relevant information can be found. A statement of reference should include the following: author, year of publication, title and page numbers

vi. ***Teaching And Learning Materials:***

These are the specific concrete objects to be provided by either the teacher or both the teacher and pupils for pupils to interact with in the course of the lesson to give them first hand experiences and also to help them develop process skills. Teaching learning materials can include physical objects such as counters, charts, maps, pictures and so forth, which the teacher might exhibit and refer to during the lesson

vii. Introduction

Introduction is usually is usually the first teacher-learner activity. Specifically, it should secure the interest and attention of the pupils. Introduction helps to link the relevant previous knowledge with the lesson topic and create a desire in the pupils

viii. Teaching And Learning Activities:

The term refers to the activities that the teacher and learners or pupils will do to achieve the objective of the lesson. They include the methods the teacher will use in teaching, the interaction with the teaching-learning materials the all other interactions in the classroom which may involve the teacher and pupils and among the pupils themselves

ix. Core Points:

These are the main ideas derived from practical activities and discussion during the teaching and learning activities. They are the summary of scientific concept, ideas and knowledge that were covered in the lesson and which pupils are expected to grasp. They include knowledge, skills and attitudes developed at every stage in the lesson

x. Application:

This refers to usefulness of concepts learnt in solving, everyday problems, and examples of use of the concept in everyday life as well as transfer of concept to other subject areas

xi. Evaluation / Exercise:

This is the section of the lesson notes where the teacher assesses the level of mastery of the lesson by the pupils. The evaluation may take place during the lesson delivery and at the end of the delivery process. Evaluation will include oral questions, class exercises, quizzes, class assignments, essays or project work

xii. Closure:

The closure is the post-delivery stage of a lesson. It may take the form of the following:

a. A review of the lesson through oral questions and answers on the evaluation exercise
b. Written exercise or quiz based on the evaluation exercise or a verbal summary by pupils
c. Writing of chalkboard summary by the pupils
d. Tidying up the place of work and arranging the furniture

xiii. Remarks:

This is the section of the lesson plan where a teacher gives a self evaluation of the entire lesson after the period. The teacher is expected to evaluate his/her lesson by:

a. Stating whether the lesson was successful or not giving reasons or stating the specific strength and weaknesses observed during the lesson with reasons
b. Giving reasons why the lesson was not taught
c. Giving reasons why the lesson was not completed

Q4. What is the importance of each of the following in a science lesson plan?

i. Introduction
ii. Presentation/ Development Stage
iii. Application
iv. Closure
v. Evaluation
vi. RPK (Relevant Previous Knowledge
vii. Specific objectives

SOLUTION

i. Importance of Introduction (Introductory) stage

i. Introduction enables the teacher to review the previous knowledge which ahs direct link with the new lesson to be taught or it helps the teacher to find out what learners already know

ii. Introduction helps the teacher to modify his or her teaching methods to fid the new lesson to be taught

iii. Introduction serves as a warm up exercise or motivation for the pupils to bet ready for the new lesson

iv. It helps to arouse and sustain interest

v. It also helps to focus the minds of the learners or pupils towards a particular direction

vi. It helps to concretize previous knowledge

ii. Importance of Presentation Stage

i. It enables the teacher to arrange his or her materials in an orderly and clear manner, dividing it into its natural logical parts

ii. It helps the teacher to outline systematically how he/she intends to use the chalkboard and teaching aids

iii. It enables the teacher to indicate how and when he/she intends to use the chalkboard and teaching aids

iv. It helps the teacher to outline questions he/she intends to ask and when he/she will allow students to ask him or her questions

v. It enables the teacher to indicate how he/she will attempts to involve the students in the lesson

iii. Importance of Application

i. To find out or compare what exactly the classroom knowledge looks like in real life situation or transfer the knowledge to new situation

ii. Learners make use of familiar and unfamiliar situation

iii. It tests the validity of the generalization arrived at by the learners so that knowledge acquired is made relatively permanent

iv. Enables pupils to relate concepts in one subject area to another

v. To learn about the usefulness of the knowledge to him/herself and society

vi. Concretizes learning or reinforces learning

vii. Use what they have learnt to solve problems

iv. Importance of Closure

i. To find out if the objectives are attained

ii. To find out if the methodology used was appropriate

iii. To find out the general individual learners capability

iv. It provides information that helps the teacher to bring out the main points of the lesson through review/ summary

v. Importance of Evaluation

i. Provides information that the teacher sues to determine whether the specific objectives of the lesson have been achieved or not

ii. It helps the teacher to assess the level of mastery of the lesson by the pupils

iii. It helps the teacher to identify areas of difficulty in the lesson

iv. It helps a teacher to draw up a remedial lesson

vi. Importance of RPK (Relevant Previous Knowledge)

i. Introduction enables the teacher to modify his or her teaching method to fit the new lesson to be taught

ii. It provides information on what the learner already knows in relation to the topic which the teacher can review

iii. It provides a link between the known and the unknown or makes knowledge more coherent and meaningful

iv. Produce the feeling of a need for new and additional knowledge/motivation to learn

v. It helps the teacher to introduce the lesson

vii. Importance of specific objects

i. Makes teacher more systematic and orderly in the selection and treatment of the subject matter (content).

ii. Gives self reliance and confidence to the teacher

iii. It helps to save time as repetitions are avoided

iv. Helps to sustain both teacher and student interest

v. Helps in the choice of the methods of teaching

vi. It serves as a guide to the teacher not to digress from the lesson

vii. Helps in the collection of materials

Q5. a. State any three advantages of promoting the use of teaching and learning activities in science

c. What is the relationship between learner objectives and core point in a lesson plan?

SOLUTION

a. Advantages Of Promoting The Use Of Teaching/ Learning Activities In Science

i. It helps children or learners to learn better through firsthand experience
ii. It helps learners to avoid rote learning
iii. It helps teachers to avoid drill-oriented methods
iv. It ensures maximum pupil participation in lessons
v. Children do not easily forget what has been taught
vi. It demystifies science or creates interest in science
vii. It enhance/promotes creativity or curiosity in children

b. The core points given are based upon or reflects the learner objectives

Q6. Outline four (4) importance of a lesson plan to a teacher

Solution

Importance of a Lesson Plan to a Teacher

i. It promotes efficiency during instruction
ii. It directs the attention of the teacher to the appropriate method of teaching the topic
iii. It helps the teacher to determine the specific objectives of the lesson that have been achieved
iv. It helps the teacher to select the appropriate teaching and learning activities that gives the pupils maximum participation in the lesson
v. It allows freedom in teaching by permitting little digression from the topic
vi. It aids in relating each lesson to the whole course
vii. It gives the teacher a feeling of self-confidence
viii. It encourages future improvement in teaching

UNIT 9: METHODS OF TEACHING SCIENCE

THE ACTIVITY METHOD

QUESTION 1.

(a) What do you understand by the Activity Method?

(b) Why do we have to use Activity Based Lesson at the basic level or write down the Rationale or give the reasons for using the activity Method to teach at the Basic Level

SOLUTION:

a. Activity method is a method of teaching science in which the child, is placed at the centre of the teaching-learning process and is made to interact with materials provided by either the teacher or pupils (student) themselves to discover concepts and facts unaided or with minimum of teacher interference

b. Reasons for using the activity Method to teach at the Basic Level

(i) Basic level pupils have the natural tendency to explore (curiosity) and play

(ii) The Activity Method makes use of the pupils' previous knowledge and experiences from their homes

(iii) The Activity Method makes use of the pupils' Familiar environment and play materials

(iv) Individual differences and abilities among the pupils

(v) Developmental stage (concrete operational state y-11 years)

QUESTION 2. What role are teachers expected to play before, during and after science Activity

SOLUTION:

The role of teacher before the lesson includes:

i. Selects topics and plans activities

ii. Selects and provides materials for the lesson

iii. Tries out the activities

During the lesson, the teacher

i. Introduces the lesson and gives out the materials

ii. Asks pupils questions as he or she moves round the ground and gives suggestions when necessary. In other words, the teacher supervises and guides the pupils in their activities. The teacher also gives encouragement when the need arises.

iii. Acts as a co-learner

iv. Evaluates pupils work

v. Gives precise and clear instructions

After the lesson, the teacher

i. Holds a general class discussion whit the pupils

ii. Marks assignments and exercises

iii. Supervises cleaning or tiding up of the classroom for the next lesson

QUESTION 3. What roles are students or pupils expected to play before, during and after science Activity

SOLUTION

Before the lesson

i. Pupils may be involved in the collection of materials

ii. Pupils may be asked to read around the topic

During the lesson; pupils

i. Interact with materials and try to find answers to their problems

ii. Communicate among group members and with their teacher

iii. Record their findings. For example, making models, sketching graphs, diagrams and writing reports

iv. Draw conclusion of their experiment

After the lesson, pupils

i. Participate in a general discussion with the teacher

ii. Carry out expression work and assignments or copy blackboard summary

iii. Tidy up the classroom

QUESTION 4. (a) Discuss the psychological foundation of activity lessons

(b) Discuss the features of Activity Method

(c) Explain the conduct of Activity lessons

SOLUTION:

a. Psychological foundation:

i. Generic and environmental factors make children differ in outlooks

ii. The child's accumulated knowledge already acquired over the years create in him sustained and vested interested to pursue a certain course of action

iii. The child's familiarity with his or her environment and the play materials in the environment promulgate and inculcate in him or her the spirit of exploration, discovery and experimentation

iv. Owing to individual differences, abilities and interest, activity method aims at developing diverse processes to cater for the needs of all types and shades of differences

a. Features of the activity method:
   i. Observing events and materials
   ii. Handling and using materials
   iii. Classifying or grouping materials according to similarities and differences
   iv. Using all the senses as safe as possible
   v. Communicating what was done and found to others
   vi. Comparing results with that of others

b. Conduct of activity method or lesson
   i. Appropriate and sufficient materials and equipment must be used
   ii. Pupils must be put into groups
   iii. Pupils must work in small groups of six 96)

QUESTION 5. (a) Discuss the planning and preparation of activity method

(b) Outline the advantages and disadvantages of activity method and how the disadvantage or the drawbacks can be minimize

SOLUTION:

a. Planning and Preparation
   i. The teacher should fully plan and prepare well before an activity lesson
   ii. The teacher reads through the syllabus for the specific activities
   iii. The teacher should consult as many textbooks and read through the topics
   iv. Collection of materials in advance

b. Advantages and Disadvantages of Activity Method

Advantages:-

   i. The pupils learn through firsthand experience
   ii. They do not easily forget what they have learnt/avoid rote-learning
   iii. Pupils are better introduced to the world of work

iv. The method demystifies science and creates interest and love for science at an early stage
v. It brings or fosters co-operation among children or learners
vi. The method enhances development of practical skills
vii. It ensures maximum pupil participation in lessons
viii. It promotes familiarity with materials in the environment.

Disadvantages or Drawbacks of Activity Method

i. It is more prone to breakages of equipment if care is not taken
ii. A lot of rehearsal has to be done or made where it entails experiments which need a lot of skills
iii. It is time consuming (notes not time wasting)
iv. It needs a resourceful and hardworking teacher
v. Students/Pupils are exposed to dangerous/harmful chemical
vi. It involves the liberal use of materials and may therefore be costly

How to minimize the above drawbacks

i. Avoid using fragile equipment and use more improvised materials which are not delicate
ii. Develop simple activity at a time in order not to consume too much time. Also encourage pupils to work in groups
iii. Avoid using too much dangerous/harmful chemicals

THE QUESTION AND ANSWER METHOD

QUESTION 6. (a) Outline two reasons why pupils ask questions

(b) State two reasons why teachers ask questions or why is questioning important to science teachers during science lessons?

SOLUTION:

a. Reasons why pupils ask questions are:
   i. To show relationship that exists between the teacher and pupils
   ii. To determine the level of understanding or intellectual ability of pupils
   iii. To show whether the teacher is communicating well or not
   iv. To clear pupils misunderstanding of ideas on everyday occurrences
   v. Learn more to satisfy their curiosity

b. Reasons why teachers ask questions

i. To stimulate students to think

ii. To diagnose students difficulties

iii. To determine students' progress

iv. To motivate students

v. To clarify answers

vi. To direct students' thinking

vii. To encourage self-evaluation

viii. As a means of feedback to the teacher

ix. Help pupils to revise what they have learnt

x. Make pupils draw logical conclusions

QUESTION 7. What guidelines should a science teacher follow to make the use of the questions and Answers method effective?

SOLUTION:

i. Scatter questions widely around the class or distribute questions in an irregular pattern

ii. Give positive reinforcement or motivation

iii. If a student gives an incorrect or incomplete answer, restate the question or provide a hint

iv. Listen attentively to all responses

v. Maintain eye contact during question-and-answer

vi. Pause after asking questions

vii. Keep questions short, clear and precise

viii. Take note of shy students or/involve shy students

ix. Respond to students' answers or questions to indicate acceptance o r rejection

x. Direct very difficult questions to the very bright students or questions should be challenging to students

xi. Ask questions before calling pupils to answer

QUESTION 8. Define and describe the advantages and disadvantages of question and answer method.

SOLUTION

Question and Answer method is a method of instruction or Oral testing based on teacher-formulated questions to be answered by students or pupils

Advantages:-

i. Students become mentally involved in the lesson
ii. Students realize their own mistakes when follow-up or probing questions are used
iii. It is an effective control device-when students know that they may be called upon anytime they are more apt to pay attention to what is going on in class
iv. It builds confidence in pupils
v. It determines progress towards specific goals
vi. Clarifies and expands concepts'
vii. Gives specific direction to thinking

Disadvantages

i. It is a slower method of dealing with information than the lecture method. That is, it is time consuming
ii. Constant use of questions requiring a factual answer encourages memorization in students
iii. Consistently answering questions incorrectly may lead to a lessened self-concept for students. (This means the pupils will be demoralized)
iv. Some pupils don't participate whiles other dominate
v. It cannot be used to measure practical skills

DEMONSTRATION METHOD

QUESTION 9. (a) What is demonstration method of teaching science?

(b) State the conditions that call for the use of this method in science lessons

SOLUTION:

a. Demonstration method is doing something in the presence of others in order to show them how to do it or illustrate a principle
b. Conditions for using Demonstration method in science lessons are as follows:
    i. Materials involved are scarce or limited
    ii. Materials are expensive

iii. Materials are delicate or fragile

iv. Operation involved is complex or dangerous

v. Skills involved is complex

QUESTION 10. State any four guidelines to be given to a newly appointed non-professional teacher on the effective use of Demonstration method

SOLUTION:

i. All the pupils should be placed so as to see and hear the demonstration well

ii. Articles liable to distract attention should be removed from the Demonstration bench

iii. All article essential for the Demonstration should be present before the Demonstration begins and should be arranged in order in which they will be used

iv. The teacher should run a commentary on the Demonstration as it takes place and ask questions to make sure that the students are following everything that is being done

v. The activity should be rehearsed before the Demonstration

vi. At the end of the Demonstration, conduct a brief review of the steps involved or give a short summary what has happened

vii. If time permits, have one or two students replicate the Demonstration

QUESTION 11. What are the advantages and disadvantages of demonstration Method?

SOLUTION:

Advantages:-

i. It trains students to be good observers and hearers

ii. It stimulates thinking and the formation of concepts and generalization

iii. It has high interest value since it often involves the use of gadgets and equipment which might be new to the students

iv. It is economical since only the demonstrator needs materials

v. It is very effective as an introduction to skill learning

vi. It is most appropriate when teaching students how to operate a machine or some other piece of equipment

vii. It can be used to illustrate ideas, principles and concepts for which words are inadequate

viii. It can reduce hazards before students begin to do it themselves

ix. It lead to a reduction in the length of trial-and error time

Disadvantages:-

i. Much planning and preparations required on the part of the demonstrator

ii. It can be ineffective if the demonstrator just carries on without asking for feedback

iii. It is not suitable for large classes or with extremely small objects

iv. It can leads to imitation without understanding

DISCUSSION METHOD OF TEACHING SCIENCE

QUESTION 12. (a) What is a discussion method of Teaching?

(b) Outline the role of the teacher and pupils when discussion method of teaching science is used.

SOLUTION:

a. Discussion method is an activity in which learners talk together in order to share information about a topic or problem, or to seek possible available evidence or a solution to a problem

b. Role Of The Teacher During Discussion Method

1. Poses the problem
2. Reminds participants of the rules of conduct to be observed:
   i. Talking only when given the floor or chance
   ii. Listening when someone is talking
   iii. Respecting other members' points of view, and guarding against arguments turning into personal conflicts
3. Initiates interaction
4. Directs and controls the discussion or serves as a moderator or facilitator
5. Gives a periodic summary, but most of the time stays in the background
6. Encourages pupils to participate fully
7. Discourages the tendency of few pupils dominating the discussion

Role of Pupils during Discussion Method

1. The pupils prepare very well for the lesson by reading and finding more about the topic or the problem
2. Listen attentively when someone is talking
3. Respect other members' points of view and guarding against arguments that turn into personal conflict
4. The pupils talk or share information
5. The pupils evaluate alternatives and draw conclusion or generalizations

QUESTION 13. (a) What four useful guidelines will you give to a newly appointed non-professional teacher on the use of discussion method of teaching?

(b) Write four advantages and three disadvantages of discussion method of teaching

SOLUTION:

a. Guidelines for conducting Discussion Method

i. Topics must be familiar, interesting and affect the lives of students

ii. Give students adequate time to prepare

iii. Prepare well – the teacher must be familiar with the content, characteristics of the group, and the resources available to the students

iv. Serve as a moderator for the discussion. The moderator clarifies ideas, makes summaries, states conclusions and keeps the discussion on track

v. Encourage many students to participate

vi. Discourage any tendency by one or few students to dominate the discussion

b. Advantages of Discussion Method:

i. It provides an excellent opportunity for students to practice their oral communication skills

ii. It gives students practice in critical and evaluative thinking and listening

iii. Students learn readily from each other

iv. It helps students clarify their thinking; ideas become clearer when they have to be expressed orally

v. It provides good practice for problem solving

vi. It gives training in the democratic process

vii. It give s training in organizing one's thoughts on one's feet or on the spot

Disadvantages or Limitations of Discussion Method

i. It does not easily lend itself to all types of subjects or topics

ii. It is difficult to achieve maximum interaction when the group is large

iii. It may give opportunities for the brighter students to show off

iv. When a discussion leader is weak, the discussion can result in chaos or becomes disorganized and an unproductive activity

v. A few may dominate; and some will never participate

vi. Time consuming

QUESTION 14. State four differences between "Discussion' and 'Question and Answer methods of teaching science

SOLUTION

Discussion Method	Question and Answer Method
i. Pupil-pupil interaction is dominant	i. Teacher-Pupil interaction is dominant
ii. Large number of pupils are involved	ii. Only one pupil involved at a time
iii. Its use in teaching is limited in scope	iii. Can be used in almost every teaching situation
iv. Pupils draw conclusions and generalization from the discussions	iv. Pupils give answers to a specific or particular questions
v. More time consuming	v. Less time consuming
vi. Probing and responses are mostly/solely done by the pupils	vi. The teacher asks the question whilst the pupils respond
vii. Pupils suggest solutions to their problems	vii. Pupils give answers to teacher's questions

DISCOVERY METHOD OF TEACHING SCIENCE

QUESTION 15. (a) Explain the terms pure and directed discovery

(b) State two advantages and two disadvantages of discovery method of teaching science

SOLUTION:

a. (i) Discovery is a teaching method which enable students to find out answers to problems fort themselves

(ii) Pure discovery is where pupils find out answers or facts for themselves based on a problem or something that already existed but w not known

(iii) Directed discovery is where teacher generally creates the conditions under which the pupils will discover for themselves that which someone else has previously discovered.

b. Advantages of Discovery Method

i. Since the pupil actively discovers information and knowledge, retention of knowledge is increased

ii. It helps pupils to learn how to follow instructions and record their findings

iii. When pupils discover knowledge for themselves they are motivated

iv. Pupils develop attitudes and skills essential for self-directed learning

Disadvantages of discovery Method

i. Leaving pupils to discover knowledge on their own is time consuming
ii. The pupils often get stuck to lose direction before the problem is solved
iii. Pupils often discover things other than what was intended to be discovered
iv. Requires a lot of materials to be effective

QUESTION 16.(a) Outline the roles of both the pupils and teacher when the teacher is using the Discovery Method to teach science

(b) Write down the procedures that you will use to help students to carry out an activity to discover facts for themselves

SOLUTION

a. Role of Pupils in the Discovery Method
   i. Identify a problem
   ii. Analyze the problem
   iii. Find alternative solutions to the problem
   iv. Record their own observations and findings (perform activities and record their findings)
   v. Participate in general discussion with the teacher
   vi. Communicate freely among group members and their teacher

Role of Teacher in the Discovery Method

i. Creates the necessary conditions for the learning to be successful and useful
ii. Ensures that the pupils understand the problem
iii. Supervises carefully to prevent chaos
iv. Acts as a co-learner
v. Serves as a facilitator

b. Procedures/guidelines for Effective use of Discovery Method
   i. Teacher puts pupils into groups or as individuals
   ii. He/ She instructs pupils or individuals to perform activities and record findings
   iii. He/ She holds a class discussion on their findings
   iv. Teacher explains the problem to pupils
   v. Teacher gives materials to group or individuals

PROJECT METHOD OF TEACHING SCIENCE

QUESTION 17. (a) What is project Work or Method?

(b) Write four important stages or steps or processes to be considered undertaking project work

SOLUTION:

a. Project work is a method of learning through experimentation, observation and showing how scientific knowledge should be used to solve a problem over a period of time.

b. Processes or stages or steps involved in the Organisation of Project Work.

i. Selecting the topic.

ii. Research i.e. the need for thorough research on the topic selected.

iii. Planning the project i.e. listing the objectives, and the necessary materiel of the.

iv. Costing the project i.e. to know the cost of the project.

v. Building the project i.e.

- Constructing work needed.
- Drawing up of questionnaire (if and).
- Experimentation and analysis of data.

QUESTION 18. (a) Write four abilities pupils should exhibit when working on a project or suggestions for effective use of a project.

(b) State the roles of the teacher in a project work.

(c) Give two reasons why project work is different from other teaching methods

SOLUTION

a.

i. Selecting the project – the pupils should be aware of what a project is and what it entails. Project goals and objectives should be clearly defined.

ii. Planning the project – the pupils should draw up the plans for attaining the projects goals which they have identified.

iii. Conducting the Project – the pupils should be allowed to try things teacher knows may not work out.

iv. Evaluating the project – at the completion of the project, the pupils and the teacher should assess the success of the project together and consider what modification need to be made to improve upon the end result.

b. The Teacher's Task

i. Helps pupils to select good project which are practicable and give s constant directions and attention to students.

ii. The teacher discusses usefulness of the project work.

iii. The teacher discusses various steps involved in the organization of project work.

iv. The teacher encourages the pupils to carry out actual science projects by showing keen interest in their work.

v. The teacher guides the pupils in the course of their project work or acts as a facilitator

vi. He or she assesses the value of the project by the quality of learning shown in what they produce or acts as a judge.

c. Project Work differs from other methods of teaching because the student has more freedom in deciding what to do or learn. It also allows pupils to get freedom to investigate and gather good data very well.

QUESTION 19. Outline three advantages and three disadvantages of the project work of teaching.

SOLUTION:

Advantages

i. Creates in learners sense of responsibility

ii. Develops in them such social skills as co-operation

iii. Learners become purposefully occupied

iv. Brings school work into close contact whit real life

v. Gives teacher opportunity to learn about learner's physical, mental, social and emotional behaviours

Disadvantages

i. It is time consuming

ii. The covering of the syllabus is a problem in project work

iii. It disorganizes the school time-table

iv. Can be chaotic in the hands of an inexperienced teacher, or order and discipline are sometimes difficult to maintain during activities

v. It is expensive in terms of building teaching and learning aids

vi. It demands the service of efficient, resourceful and knowledgeable teacher

FIELD TRIPS AS A METHOD OF TEACHING SCIENCE

QUESTION 20. (a) What is a field trip?

(b) Outline how you will organize a field Trip for a science class as a teacher or Roles of teacher before, during and after a field trip

SOLUTION:

a. A field trip is an educational planned visit sanctioned by the school to a place outside the regular classroom to obtain information directly and to study real situations

b. How to organize a field trip for a science class

Before you take your pupils to field trip, you must:

i. Have taught a science lesson in your class which is relevant to the intended field trip

ii. Visit the site and hold discussion with the people in charge

iii. Write to inform the people or department concerned of the following: the date and time of the intended trip and number of pupils and teachers involved in the trip

iv. Asking questions or giving advice or protecting pupils or maintain discipline.

After trip.

i. Discuss with pupils what was learnt on the trip

ii. Assign follow-up work to the pupils

v. Write to obtain permission to make the trip from the appropriate school authorities

vi. Make transport arrangements

vii. Establish dress, safety and behaviour standards

viii. Discuss the purpose of the trip with the pupils and give specific instructions to them on what they are to do. For example, collect specimens or sketch some features

During the Trip:

i. Draw the attention of pupils to the important features of the trip

ii. Sustain the interest of the pupils by being actively involved in every aspect of the trip

iii. Keep to the rear and ensure that all pupils are at where they are expected to be at all times

iv. Have the class send a ‘Thank you’ message to the hosts of the field trip. Or help the pupils to write a thank you letter and send to those who hosted the pupils during the field trip

QUESTION 21. (a) Give four examples of topics and suggested places of visit

(b) Discuss the educational benefits or advantages of a field trip

SOLUTION

a.

	Topic	Suggested places of visit
i.	Animals	Zoo, e.g. Accra, Kumasi, National Parks e.g. Kaakum
ii.	Plants	Gardens e.g. Immediate environment Aburi, Tema, Sunyani, Farms,
iii.	Water	Rivers, sea, lagoons, waterfalls and immediate surroundings.
iv.	Soil	Immediate environment
v.	Separation of Mixtures	Ghana Water Company, Breweries and Industries
vi.	Electrical and Light energy	Aksombo Hydro-electric Dam. Kpong Hydro-electric Dam, Aboadzie Thermal plant.
vii.	Magnetic and Sound Energy	Corporation, F.M Status, Ghana Telecom, Ghana Broadcasting coorporation

b. Benefits of a Field Trip

i. Provides the pupils with first hand information

ii. Enables pupils to link up school life with the outside world and the community

iii. Creates situations which help pupils to develop the spirit of scientific inquiry or which helps the pupils to observe the practical application of some of theories they have learnt in class

iv. Enables pupils to collect materials and preserve them for a science corner or museum

v. Develops planning skills, co-operation and tolerance of the pupils

vi. Arouses pupils' interest in future lessons related to the field trip

vii. Enables pupils' to learn to take notes and write reports

QUESTION 22. (a) What are the limitations or disadvantages or possible dangers associated with a field trip?

(b) How best can you as a teacher minimize or avoid the possible dangers in a field trip?

SOLUTION

Possible Dangers in a Field Trip

i. Pupils may come into contact with dangerous materials or chemicals or animals

ii. Pupils may stray to potentially dangerous places (restricted areas)

iii. Pupils may do things without authority, for example going to swim on their own

iv. Pupils may wonder away from the group

v. The vehicle conveying your pupils can be involved in a road accident

c. Avoiding Dangers in a Field Trip

i. Establish safety standards before the trip and ensure that the standards are strictly obeyed

ii. Brief pupils on the potential dangers of the as well as side attractions that could be dangerous

iii. Arrange with other teachers to accompany you to help in controlling pupils.

iv. You and the other teachers should always be at a position where you will have an eye on each pupil

v. Insist that your pupils wear protective clothing where necessary

vi. The driver must have a satisfactory record of safe driving and the vehicle must be road worthy

vii. You must sit in front of the vehicle and make sure that the vehicle is driven at a reasonable speed