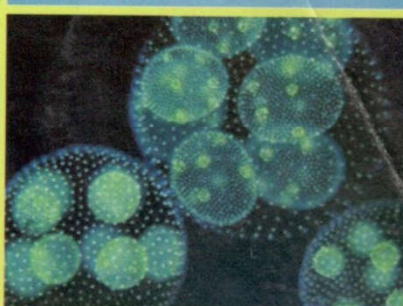
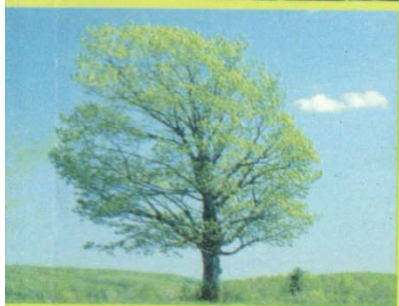


STAN

SCIENCE TEACHERS ASSOCIATION OF NIGERIA

BIOLOGY PANEL SERIES 2011



BIOLOGY AND LIVING THINGS

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UTILIZING LEARNER-CENTRED INSTRUCTIONAL STRATEGIES IN TEACHING THE CONCEPT OF LIVING THINGS.

BY

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Abstract

The paper elucidates how Learner-centred Instructional strategies can be employed to effectively teach and enhance meaningful learning of the concept of Living things. It demonstrates the use of ice-breaker, brainstorming, mind-map, hands-on activities and discussion in an integrated manner, in addition to how to conduct assessments in a non-threatening manner. The paper calls on biology teachers to move toward the use of Learner-centred Instructional strategies.

Introduction.

The primary focus of biology as a natural science is on organisms hence, meaningful understanding of concepts, laws, principles and theories in the field of biological sciences rests on meaningful learning of the concept of Living things. It is therefore, imperative to employ instructional strategies that would enhance effective teaching and meaningful learning of this fundamental concept in biology. A continuous interest by Biology educators in investigating ways that might improve students' academic achievement in biology is reflected by the large number of studies conducted in various aspects of Biology education such as the studies conducted by Bello (2004) ; Bello & Sanni (2006); Bob (2009); Brumby (1981), and Vandana, (2011) among several others. This paper is an extension of the on-going efforts to enhance meaningful learning of biology concepts, laws, principles and theories by the students. It elucidates how learner-centred Instructional strategies could be employed to enhance meaningful learning of the concept of living things.

The Learner-centred Instructional Approach stems from the works of cognitive psychologists with constructive epistemological perspectives. Cognitive psychologists are of the view that learning is a process of conceptual-change through which individual learners construct their own idiosyncratic knowledge (Ausubel, 1968; Brunner, 1966; and Novak, 1987). Instructional methods and strategies based upon Learner-centred approach therefore, provide avenues for the students to engage in creative thinking for new ideas. Teaching and learning strategies in Learner-centred classroom involves; providing opportunities to learn by doing things, working collaboratively in groups or pairs, exposing learners to ample activities to encourage them to search for

and share information, investigate and report on topics to discover for themselves new knowledge.(World Bank, Department For International Development,2008) Learners are equally frequently engaged in discussions to develop their ability to integrate new knowledge into what they already know, and to become critical thinkers as well as problem solvers. In a Learner-centred classroom, the teacher balances lesson with teacher-talk and learner-talk with the balance tending towards learner active participation.

Classroom Atmosphere.

Students have to work collaboratively in groups and pairs during class lesson hence, they have to sit in groups preferably with the seats arrange in circular shape. Ideally there should be between 6 and 8 students per group. The group roles are summarized below:

- **Group Leader:-** Ensures that every member contribute to group activities, and provides appropriate directives among other leadership responsibilities.
- **Peace Keeper:-** Prevent prolonged argument without reaching a conclusion and conflict between members of the group.
- **Recorder:-** keeps record of decisions made by the group.
- **Time keeper:-** Monitors the time given for every activities and alert members accordingly. Informs the group when time is up.
- **Reporter:-** Reports decision and findings of the group to the class at appropriate time.

In addition to the sitting arrangement, the socio-emotional atmosphere should be 'alive', and free from physical, social and psychological stress , and generally learner friendly. Mutual respect and trust between the learners and the teacher should prevail in the class. Indeed both the teacher and the learners are allowed to make mistakes without fear of ridicule. Class control by the teacher should be firm but flexible and sometimes learners should be involved in decision making such as in making rules of engagement in the class. (World Bank, Department For International Development.2008).

Instructional Materials:

- [1]. Assorted objects from the environment such as; maize grain, egg, stone, dry stick, candle, matches, beakers, grasshopper, bean seedling, and laboratory rat.
- [2]. Laboratory materials:- Dissecting set, stains, hand lens and microscopes.

Classroom Activities.

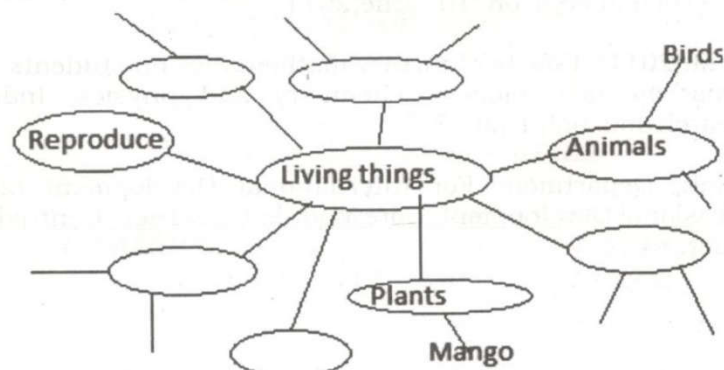
Teacher's Activities	Students' Activities	Time
STEP I		3min.
Ice-breaker:- A boy once sat on what he thought to be a rock under a tree. Suddenly he yelled, help!, Help !!,Help me, a rock is carrying me into the bush!!!. A man rushed to the scene to rescue him, but astoundingly he noticed that the boy was sitting on top of a big tortoise. The teacher asks the students to differentiate between a tortoise and a rock Learning Outcomes:-Teacher presents the following learning outcomes to the class: (i) identify / classify objects into Living things and Non-living things,(ii) Conduct simple laboratory experiments to determine whether an object is a Living thing, a non-living thing or a dead living thing, and (iii) Construct Mind-map on the concept of Living things.	Students are to state the similarities and differences between tortoise and rock	
STEP II		10min.
Brainstorming:- Teacher directs the students[working in pairs] to think about Living things and write down any thought/words that come to mind without worrying about the order of the thoughts/words, then share them within their group to see what their collective understanding of Living things is. Students are to repeat this activity for Non-living things. Mind-map:- Preview all the words that your group has come up with and cluster them into sets of words that are linked together. Each group should now complete the Mind maps on Living things and Non-living things shown on the chalkboard.[see appendix 1] Teacher asks the reporter from each group to present their Mind map and moderates discussion on the presentations. The Mind maps are then posted on class wall/bill boards	Students are to brainstorm on the concept of Living things individually and collectively in groups. Students[working in groups] are to complete Mind maps on Living things and Non-living things Students are to make comments of Mind maps presented by each group.	

STEP III		7min.
Clarification of concept words:- Teacher directs the students [working in pairs] to read about the characteristics of Living things on pages 3-6 of their STAN Biology textbook. They are to identify new/ misunderstood concept words, checkup the meanings of such words in biology dictionary / glossary and use them in sentences. The activity should then be shared at the group level. Teacher moderates discussion on group reports to ensure meaningful learning of the new/ misunderstood concept words.		Students are to embark upon word clarification exercise and contribute to discussions on group reports.
STEP IV		8min.
Discussion on concept of Living and Non-living things:- Teacher leads the class on a discussion on the concepts of Living and Non-living things as presented on pages 3-6 of STAN Biology textbook.		Students are to participate in whole class discussion on concepts of Living and Non-living things.
STEP V		25min
Hands-on Activities:- (a)Teacher directs the students [working in group] to identify and classify the objects on the table into Living and Non-living group and provide reasons for their classification. Teacher moderates discussion on the report from each group, and clarifies students' misconceptions [if any]. (b)Teacher guides the students on laboratory procedures to extract and examine cells from some of the Living things /objects provided on the table. They are to draw the observed cells (c) Students are to use similar procedures to look for cells in Non-living things. (d) Teacher lights the candle on the table of each group and directs the students to :(i) to blow the candle flame softly,(ii) wave hand over the flame,(iii) put a wooden splint on the flame, and		Students are to identify and classify the objects into Living and Non-living group and provide reasons for their response. They are to comment on the report from each group Students [working in groups] are to examine cells from parts of Living things on their table. They are to draw the observed cells. Students [working in groups] are to carry out a guided experiment on fire, suggest suitable tittle for

(iv) put a glass jar over the candle. Students are to record their observations and provide answers to the following questions based on their observations. Students are also to suggest a suitable title to the experiment and make appropriate conclusions. 1. Does fire reproduce, grow, respond and change?. 2. Does fire have a gas exchange, consume other organisms or require energy? Teacher moderates comment /discussion on the report from each group and clarifies students' misconceptions [if any].	the experiment and draw appropriate conclusion. Reporters are to present reports from their group	
STEP VI		
Ice- breaker:[The title of this ice-breaker is, Solving a Math Problem. It is about a student named Abioye.] On his way from school, Abioye stopped by the corner supermarket store and read the following list to the Sales clerk: 10 packets of sugar at ₦ 125 :50k a packet 4 sachets of powder milk ₦150 :70k a sachet 2 medium size butter tins at ₦ 110:30k each 2 bars soap at ₦8:30k each Abioye: "How much does that come to?" . Sales clerk: "Two thousand and ninety-five Naira." Abioye: "If I gave you three one thousand Naira notes, how much change would I get?" Sales clerk " Nine hundred and five Naira," stated the clerk who appeared to be irritated by all the questions. Abioye said, as he disappeared through the supermarket door, "I don't want to buy the items...that's our mathematics assignment for tomorrow, and I needed some help with it." [Adopted and modified from www.teacherplanet.com]		
Assessment:- students are to provide answers to the following questions: (a)A pupil once asserted that car is a Living thing because; [i]it moves,[ii]it feeds –petrol [iii] it respires –takes in O₂ gives out CO₂ [iv] it excretes – smoke [v] it has legs- tires and[vi] it has eyes-head lamps . Do you agree with this	Students are to work in group to provide appropriate responses to the tasks. Reporters are to present reports.	

assertion? Give reasons for your response. (b) You are presented with a strange object brought from the moon. Explain how you will determine if the object is (1) a Living thing (2) a Non-living thing (3) a dead living thing. (c) How would you prove that; eggs, bean seeds and maize grains are Living things while a dry stick is a dead Living things? Teacher moderates comments/discussion on the reports from each group. Clarifies students' misconceptions [if any].	They are to comment on reports from each group.	
STEP VII		10min.
Summary/Conclusion:- Teacher leads the class to revise the Mind-maps presented by groups in Step II on the concept of Living things to summarize the lesson.	Students [whole class] are to revise the Mind-maps.	
STEP VIII		2min.
Assignment:- Study the biology of Virus as presented on pages 258-259 of your STAN biology textbook. Then in not more than 250 words, argue for or against the classification of virus as Living thing.	Students are to present argument for or against classifying virus as Living thing.	
Conclusions There is no doubt that the traditional Teacher-centred instructional strategies are still relevant in the classroom today however, the modern Learner-centred instructional strategies provide ample opportunities for the students to develop critical and creative thinking skills as well as problem solving skills among other higher cognitive competencies. The paper hence, calls on Biology teachers to use the Learner-centred instructional strategies frequently.		

Appendix I: Sample Mind –map [to be completed by the students]



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