3 BASICS OF BIOLOGICAL ANTHROPOLOGY

Introduction

Anthropology is the discipline that studies human from both biological and social point of view. Biological Anthropology deals with the study of biological origin, evolution and variation of human beings. It focuses on comparative study of past, present and future of human life from the biological point of view. It also analyses the biological adaptation of different human population living in different geographical and ecological zones. It also uses general principles of biology.

The subject matter of biological Anthropology includes the study of human origin, growth, evolution, anatomy, human heredity, human variation, races, blood groups etc. Earnest attempt has been made to introduce this chapter in a meaningful way. Several pictures and charts related to evolution, blood groups are also facilitated. Teacher should make the learner create a positive attitude against all forms of discriminations including racism and make them aware of the importance of donation of blood.

Unit frame of this unit is given below. Detailed analysis of two Learning Outcomes is also attempted in this unit. Remaining Learning Outcomes are also to be transacted similarly, utilising the learning process given in unit frame.

Values and Attitudes

- Develop attitude against racial and all forms of discrimination.

Concepts & Process skills	Process/Activity with assessment	Learning outcome
Meaning and scope of biological Anthropology	• By recollecting the dispute regarding maternity of King Solomon, a general discussion is initiated focusing on: • Paternity issues • Forensic anthropological issues like identification of criminal human heredity etc. • Teacher interaction on meaning and scope of biological Anthropology • Participation in discussion, Conducting quiz for process assessment • Preparation of MCQ, Preparation of flowchart • Article, based on the scope and meaning for portfolio.	The learner will be able to: Explain and illustrate the meaning and scope of biological Anthropology.
Theories of human origin and evolution • Lamarckism • Darwinism • Mutation theory • Theory of Gregor Mendel • Synthetic theory	Video presentation on the origin of earth and life forms in it - General discussion. • Comparing earlier religious beliefs and earlier theories on the origin of organisms. • Teacher interaction on theories of organic evolution: Lamarckism. • Previous knowledge based discussion. • Effect of changes in environment among organisms • Use and disuse of organs. • Prepare flowchart on Lamarckism. (Discussion report - portfolio) ICT-Website search who was Lamarck in www.youtube.com http://www.scienceinseconds.com Darwinism: Previous knowledge based discussion • effect of environment on organisms • natural selection • survival of the fittest • emergence of new species • extinction of different species Books/video clippings on Darwin's journey and exploration in Galapagos archipelago. Prepare flowchart on Darwinism.	Compare different theories of organic evolution.

Concepts & Process skills	Process/Activity with assessment	Learning outcome
	• Presentation of seminar paper on Darwinism • Comparison of early theories on origin of life on earth and modern theories of organic evolution. Analyse the scientific nature of modern theories. Website: www.wikipedea.org/organic evolutionhttp://www.youtube.com/watch?v=UuZTqL...http://lifeevolution.wordpress.com Mutation Theory: • General discussion on inheritance of traits from parents to off springs. • Video clippings and paper cuttings on the effect of nuclear war/ toxics like endosulfan on inheritance. Teacher interaction on the theory of Hugo-de-Vries. (Discussion note to portfolio) Mendel's theory: Discussion based on the previous knowledge. Synthetic theory: Teacher interaction • Synthesizing the earlier modern theory of evolution - natural selection, mutation, Mendelian principle, genetic drift, gene recombination and population genetics.	
Human evolution • Classification of animal kingdom • Relationship between human and apes • Early Hominids and Humans • Early forms of homo-sapiens	• Taxonomic Classification of animal kingdom • General discussion on the similarities and differences among different organisms. • Group the organisms with similar traits • Identify the differences among these organisms in different traits. • Teacher interacts on the concept of taxonomy of organisms. • Preparing taxonomical chart of animal kingdom. portfolio • Relation between apes and human • Video presentation on human and apes teacher interaction -Prepare chart/ presentation, showing similarities and	Examine the stages of human evolution and categorise the human fossil evidences.

Concepts & Process skills	Process/Activity with assessment	Learning outcome
	differences on human and apes. Search Ict-www.anthro.palomar.edu/primate www.voices.yahoo.com/...relationship...humanswww.listverse.com/.../10-comparisons-between-chimps-and-humans, www.differencebetween.net/science/...between-apes-and-humans, www.news.nationalgeographic.com/news Early Hominids and Humans • Prepare a picture album or slide presentation on evolution of early hominids and humans by collecting pictures of fossil evidences from internet, library etc. • Group discussion based on handouts, internets etc. on the same • Prepare discussion note, chart comparing the features. • Preparation of postures on early hominids, evolutionary tree on the evolution of hominids for portfolio	
Human Genetics • Basic principles of heredity and variation • Mendel's Law of inheritance • Cell division and their genetic significance	• Recollecting previous knowledge on Mendel's experiment of pea plants - general discussion • Comparing physical features of children with parents and grandparents. • Discussion on genetically transmitted disease. - inheritance of blood groups to off-springs • Teacher interacts: Laws of Gregor Mendel with help of diagrams. • video show on meiosis and mitosis simulation or differences between meiosis and mitosis on www.youtube .com • Teacher interaction on the significance of genetic engineering, cloning, hybridization, genetic counseling. • Article on the significance of genetics.-(portfolio)	Identify the meaning of genetics and explain its basic principle of Mendelian inheritance.

Concepts & Process skills	Process/Activity with assessment	Learning outcome
Human variation Human races	• General discussion of the differences in physical appearance on people living in different parts of the world. • Pictures/video of different races. • Discussion points - colour variation, hair forms and colour, nose form, anthropometrical features, blood groups etc., • Effect of environment on physical differences (height, skin colour etc.) ICT-Search www.wikipedia.org/wiki/Race_(classification_of_human_beings) www.buzzle.com/articles/list-of-human-races.html Teacher interact on human variation Discussion report, Article: comparative features of different races, Essay writing: racial discrimination - (portfolio) • Attitude against discrimination (long term outcome)	Identify human physical differences as an adaptive variation by classifying into various races.
Blood groups	• General discussion on components of blood groups and ABO blood group system based on previous knowledge. • Teacher interaction - features of antigen and antibody • Slide show on blood transfusion and compatibility of blood groups • Blood group determination test - identifying the materials used, way of testing • Teacher interaction - Inheritance of ABO blood groups - genotypes and phenotypes • Preparation of chart and diagram on: antigen and antibody, genotype and phenotype, compatible and incompatible mating • Chart on genotypes of different blood groups (portfolio) • Blood group determination test	Identify blood group as a factor of human variation and diagrammatically represent the inheritance pattern.

Concepts & Process skills	Process/Activity with assessment	Learning outcome
	• Selecting blood groups (phenotype) of two couples and identify the possible blood groups of their off-springs with the help of diagrams (for process assessment) Teacher interaction - Rh incompatibility, MNS system and Bombay blood group ICT-websites: http://umm.edu/health/medical/ency/articles/rh-incompatibility, www.nlm.nih.gov/medlineplus/ency/article/001600.htm, www.nhlbi.nih.gov/health/health-topics/topics/rh and Rh incompatibility videos in youtube.com	

LO3.1: Explain and illustrate the meaning and scope of biological Anthropology.

Concepts:

Meaning and scope of biological Anthropology

Teacher narrates the story of King Solomon and how he solved the dispute over maternity. Students are asked to share similar cases. In a general discussion they identify the problems of the modern ways of resolving such disputes. To supplement, the teacher narrates cases referred in the text book or for more information refer the book 'Detective DNA'. To make the discussion more interesting teacher can narrate the story of Sherlock Homes written by Arthur Cannon Doyle. Discussion is conducted highlighting the point that biologically we all are different from one another and heredity and environment play a vital role in physical variation.

Teacher interacts to examine the meaning and scope of biological Anthropology. After these different video clippings related to different sub branches like paleontology, primatology, forensic Anthropology and serology are shown. In a group discussion students identify different subjects relating to different areas with the assistance of the teacher and by referring to library books and text books. The discussion is consolidated and report is entered in portfolio.

Meaning and subject matter of each of the specialised areas are internalised through a general discussion with the inputs and assistance by the teacher. The process are consolidated and entered in portfolio.

The students are asked to prepare article/flowchart or any other material related to the meaning, scope and branches of biological Anthropology.

Consolidation Points

- *Biological Anthropology deals with the study of biological origin, evolution and variation of human being.*
- *Different specialisations of these branches are paleontology, primatology, forensic Anthropology, serology, dermatology, anthropometry, paleopathology, neuro-Anthropology and bio- archaeology.*

Self assessment: Students prepare questions and answers on the meaning scope and branches of biological Anthropology and conduct quiz in the class. The suitable indicators/assessment tool can be utilised for self assessment.

ICT: Student prepares a slide presentation showing different areas of biological Anthropology.

CWSEN: Working model of different branches of biological Anthropology.

LO 3.6: Identify blood group as a factor of human variation and diagrammatically represent the inheritance pattern.

Concepts:

Blood groups

In a general discussion students recollect the subject matter of serology and examine the need of the study of blood group. They recognise the importance of blood in human body and list its functions. Teacher evokes the interest of the students to know more about blood groups. Teacher shows an animation video of different components of blood and the functions of each of the components. In a group discussion students identify different diseases caused by the deficiency of these components.

Art Education: Students prepare a chart showing the components of blood and its functions. Laboratory experiments to identify different components of blood can also be resorted.

Consolidation

- *Blood is a special kind of tissue with varied functions.*
- *It contains RBC, WBC and Platelets.*
- *All these components have different functions to perform.*

Teacher shows the picture of Karl Land Steiner and a group discussion is initiated to examine his contributions. The students are asked to collect information pertaining to serology from library, book, internet etc. and

prepare a report. This is followed by the interaction between the teacher and students on antigen antibody and Rh factor. Students are divided into groups and prepare a chart showing the presence and absence of antibody in each blood groups. Based on the knowledge they are asked to determine the blood groups of themselves and their friends for which the assistance of local laboratories, PHCs etc can be sought. A blood group determination camp can also be conducted to the whole students and a directory of blood group is prepared. In the releasing ceremony of the directory, a pledge for organ and blood donation can be arranged.

After this, the students are asked to narrate a case of blood transfusion of his/her relatives. Then a general discussion is initiated in which they can identify persons of each blood group who can donate and receive blood. Then the teacher shows the animation video and compatibility of blood groups. With the assistance of the teacher the students identify the compatibility and incompatibility of blood groups and prepare a diagram on it. They also identify universal donor and recipients.

CONSOLIDATION

- *A, B, AB and O blood groups contains Antigen A, B, A&B and No antigens respectively.*
- *A, B, AB and O blood groups contain antibodies anti-b, anti-a, Nil and anti-a&b respectively.*
- *Persons with different blood groups can donate and receive blood as follows:*

Blood group	*Receive from*	*Donate to*
A	A, O	A, AB
B	B, O	B, AB
AB	A, B, AB, O	O
O	O	A, B, AB, O

Repository of CE Activities

a. Process assessment

Participation in discussions and class room activities has to be evaluated by fixing indicators for each learning process. In order to fulfil the process of continuous evaluation self assessment, peer assessment and teacher assessment has to be done prudently. The indicators like participation, conceptual understanding, attainment of skills, performance/presentation, and recording/preparation are to be fixed for assessing learning process. For self assessment appropriate tools may be adopted.

b. Portfolio Assessment

Indicators like conceptual clarity, assimilation of concepts, appropriate layout, design, structure, completion originality etc. may be fixed for assessing portfolio. Items from the following products are to be assessed.

1. Article on meaning and scope of biological Anthropology.
2. Taxonomical chart on animal Kingdom.
3. Chart on Evolutionary tree of hominids.
4. Article on comparative features of races.
5. Chart on genotypes of different blood groups.
6. Chart and diagram on antigen/antibody/genotypes and phenotypes.
7. Chart on similarities and differences on human and apes.
8. Seminar report on theories of organic evolution.
9. Article on significance of genetics.

TE Questions

1. Find the pair. (LO 3.1) Score 2

   a. Serology: Study of blood Dermatogliphics: _____

   b. Paleontology: _____ Osteology: Study of bones

2. Prepare a chart showing the subdivisions of biological Anthropology. Explain any two subdivisions from them. (LO 3.1) Score 5

3. Prepare a seminar paper on different theories of organic evolution. (LO 3.2) Score 8

4. List out different stages of human evolution and explain any two stages from the list. (LO 3.3) Score 6

5. "Racial classifications are made on the basis of certain genetic traits referred to as racial criteria". List out the criteria mentioned in the above statement. (LO 3.5) Score 4

6. Prepare a table showing the features of major races of the world. (LO 3.5) Score 4

7. Your school NSS unit is conducting a blood group detection camp. Prepare two slogans for blood donation for the camp. (LO 3.6) Score 2

8. Imagine that your friend met with an accident. His blood group is 'A'. Identify the persons from whom he can receive blood. (LO 3.6) Score 1

9. Prepare a chart showing the classification of the order primate. List out at least four salient features of primate. (LO 3.3) Score 2

10. The blood groups of two couples are given below. Find out the possible blood groups, genotypes and phenotypes their off-springs with the help of a diagram.

    a. AB x O

    b. A x B (LO 3.6) Score 4

11. Match the column 'A' with column 'B' and 'C'. (LO 3.3) Score 3

A	B	C
Charles Darwin	Use and disuse of organs	Inheritance of acquired characters
Jean Baptist Lamarck	Heredity and variation	Natural selection
Gregor Mendel	Struggle for existence	Law of inheritance