

Pedagogy of Biological Science: Part - I

Course Code: BED505

Credit: 02 (L-2, T-0, P-0)

Contact Hours: 30

MM: 50

After going through the course the teacher trainee will be able:

- To develop insight on the meaning and nature of biological science for determining aims and strategies of teaching-learning;
- To appreciate various approaches of teaching-learning of biological science
- To explore the process skill in science and role of laboratory in teaching-learning
- To use effectively different activities / experiments / demonstrations / laboratory experiences for teaching-learning of biological science;
- To review the contributions of Biologists to the knowledge domain of Biological Science.
- To develop learning materials on selected units/themes that facilitate learning of biology in the classroom

Unit I: Nature, Scope, Aims and Objectives of Biological Science:

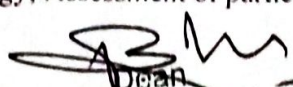
- Meaning and branches of biological science. Nature of knowledge in Biological Science- empirical, experiential, knowledge categories: Biological concepts, facts, principles, generalizations and theories.
- Contributions of Indian and International Biologists to the knowledge domain of biological science. Origin of life and evolution, biodiversity, observations and experiments in biological sciences; Interdisciplinary linkages of biological sciences and society.
- Justification for including Biological Science as a subject of study in school curriculum.
- Aims and objectives of Science teaching at upper primary and secondary level school. General objectives, specific objectives, Need for stating objectives, classification of learning objective - cognitive (revised taxonomy);
- Writing objectives in behavioural terms in content areas of Biological Science. Developing scientific attitude, scientific temper and environmental values through the processes of learning Biology.

Unit II: Approaches, Strategies and Teaching Aids:


- Process of constructing knowledge: Scientific method (Observation, enquiry, hypothesis, experimentation, data collection, generalization).
- Communication in biological sciences; Problem solving, investigatory approach, concept mapping, collaborative learning, cooperative learning, Project based learning, experiential learning, Simulation, micro-teaching.
- Preparation and use of learning aids contextually. Principles of selection and steps for effective use of teaching aids. Using ICT in learning biology, websites on biology, interactive websites, online learning, and preparation of projects on Biology units.
- Audio-visual materials: charts, models, aquaria, terraria, school garden, museum, herbarium, supplementary books, handbooks, laboratory guides, science kits, etc. Self-learning materials and planning of worksheets.
- Field trips, National parks, study tours and community as a resource sites for learning biology.

Unit III: Assessment of and for Learning Biological Science:

- Performance-based assessment; Developing indicators for performance assessment in biological sciences; Learner's record of observations; Field diary, herbarium and collection of materials;
- Oral presentation of learner's work in biological science, Portfolio; Assessment of project work experimental work in biology; Assessment of participation in collaborative learning;


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□ Construction of different types of test items to assess content specific- simple factual knowledge, higher order thinking and application abilities; preparation of blue print/table of specifications; Planning for a Unit test in Biology;


- Exploring content areas in biological science not assessed in formal examination system and their evaluation through various curricular channels;

Suggested Reading:

- Agarwal D.D.: Modern Methods of Teaching Biology, New Delhi: Sorup and Sons, 2002
- Aggarwal, D. D. (2008). Modern Method of Teaching Biology, Karanpaper Books. New Delhi
- Devereux, Jane (2000): Primary Science – Developing subject knowledge, Sage publications Inc, London.
- Esler, K. William & Mark. K. Esler (2001): Teaching Elementary Science (8th edition) Wadsworth group, Thomas learning, Printed in the USA.
- Heiss, E.D. Obourn E.S and Hoffmann C W (1961): Modern Science teaching by Macmillan publication, New York.
- Jakab, Cheryl (1990): Exploring together (Revised Edition) – A science course for Primary schools, Phoenix Education Private Limited.
- Jennings T (1986): The young scientist investigates- Teacher's Book of Practical work, Oxford University Press, Oxford.
- Judith Beunet (2003): Teaching and Learning Science – A guide to recent research and its applications
- K.Yadav "Teaching of Life Sciences"
- Keith skamp (ed) (2004): Teaching primary science constructively -2nd edition, Thomson, by Nelson Australia Private Ltd.
- Mangal S. K.: Teaching of science, New Delhi: Arya Book Depot, 1992
- Mason M & Ruth T. Peters: Teacher guide for Life sciences, Published by D. Van Nostrand Company, Inc, New york.
- Miller and Blaydes "Methods and Materials for Teaching Biological Sciences.
- Mohan, Radha (2004): Innovative Science Teaching, Prentice Hall of India, New Delhi
- NCERT: Teaching of Science in Secondary Schools. New Delhi: NCERT, 1982
- New UNESCO Source Book for teaching science, UNESCO, Paris, Richardson, J.S. Science teaching in secondary schools; New York; prentice hall.
- Novak. D.J & D. Bob Gowin (1984): Learning how to Learn, published by the press syndicate of the University of Cambridge, Printed in the USA.
- Robin Millan (1984): Doing Science: Images of Science in Science education, the Falmer Press, London.
- Saunders, N.H. (1962) The teaching of General science in Tropical secondary schools; London; Oxford University press.
- Sharma, R.C. (2006). Modern Science Teaching. New Delhi: Dhanpat Rai Publications.
- State text Books for classes VIII to X.
- Steve Alsop, Keith Hicks (2007): Teaching Science: A Handbook for Primary and Secondary school teachers, Kogan Page, N. Delhi
- Synik, K.M: Living in the Environment – A source book for Environmental Education, UNESCO.
- Turner, T & W. Dimarco (1988); learning to teach science in the secondary school – a companion to school experience, Published by Routledge, USA.
- Yadav Seema and Singh A.K.: Teaching of Life Science, New Delhi: Dominant Publications
- Yadav, M.S. (2003) Teaching of Science. New Delhi: Anmol Publications


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