

# UNIT – 1

## THE SCIENCE OF BIOLOGY

### 1.1 The Methods of Science

#### What is the science of Biology?

- ✓ Biology is the science of life and all living things from unicellular bacteria to multicellular organisms.
- ✓ Biology comprises several branches of study dealing with wide ranges of sciences. For example
  - Astrobiologist - try to find evidences of life on other planets
  - Biomedical researchers – dealing with the development of new drugs and vaccines
  - Microbiologist - engage in all forms of microorganism life and their functions.
  - Paleobiologists – biologists engaged in finding out the way how life began on earth and how the present complex life forms evolved from simple life form by using evidences from fossils and chemistry of ancient rocks.

#### What is science?

- ✓ Science is a unique system of acquiring knowledge using scientific method. Both research types (applied research and basic research/experimental research) generate scientific knowledge by using scientific methods. Discuss how Gregor Mendel and Issac Newton formulated the law of inheritance and the law of gravitation respectively.
- ✓ Scientists first suggest possible explanations for new or existing phenomena, and, then collect evidences to prove or disprove their suggested explanations by using specific approach called scientific method.

#### Scientific Method

- ✓ It is an approach or process by which scientists test their suggested explanations. Ancient people use observation to explain events around them without testing their ideas. The commonest example is “*the theory of spontaneous generation of life*”, which suggest that non-living objects can give rise to living organism.

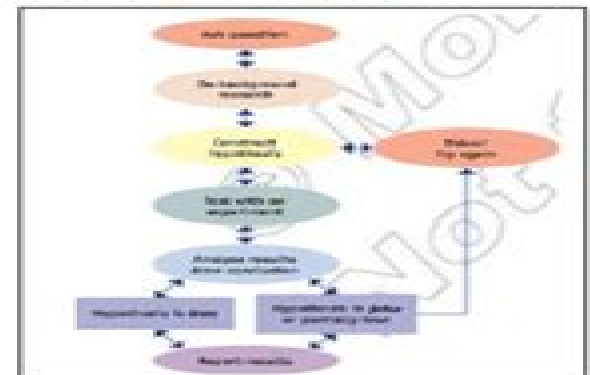
Example 1- the large number of frogs in the Nile Delta of Egypt during spring was believed to be created from the muddy soil itself.

Example 2: The creation of flies from decayed meat

#### Steps of scientific method

The major steps in a scientific method are the following.

- Ask question / Identification of problems
- Do background research
- Formulate hypothesis
- Design and conduct an experiment test the hypothesis



# Grade 11 Biology Study Guide

**J Elliott**



## Grade 11 Biology Study Guide:

**Biology**, 1990 *Health Occupations Education Instructional Materials* Ohio State University. Center for Vocational and Technical Education, 1972 **State Curriculum Guides for Science, Mathematics, and Modern Foreign Languages** Elizabeth Anne Putnam, Ralph Paul Frazier, 1960 Study Guide Cathy Berendt, 2003 Circular - Office of Education United States. Office of Education, 1930 **Resources in Education**, 2001-10 **Resources in Vocational Education**, 1977 *Revise GCSE History* Alan Scadding, Colin Shephard, 2005 New editions of the bestselling Revise GCSE Study Guides with a fresh new look and updated content in line with curriculum changes Revise GCSE contains everything students need to achieve the GCSE grade they want Each title has been written by a GCSE examiner to help boost students learning and focus their revision Each title provides complete curriculum coverage with clearly marked exam board labels so students can easily adapt the content to fit the course they are studying Revise GCSE is an ideal course companion throughout a student's GCSE study and acts as the ultimate Study Guide throughout their revision **Research in Education**, 1972 National Union Catalog, 1978 Includes entries for maps and atlases **El-Hi textbooks in print** R. R. Bowker LLC, 1983 *Pacific CRYSTAL Centre for Science, Mathematics, and Technology Literacy: Lessons Learned* Larry D. Yore, Eileen Van der Flier-Keller, David W. Blades, Timothy W. Pelton, David B. Zandvliet, 2011-10-25 The University of Victoria Pacific Centre for Scientific and Technological Literacy is one of five Centres for Research into Youth Science Teaching and Learning CRYSTAL funded for 5 years 2005 2010 by the Natural Sciences and Engineering Research Council Canada NSERC Pacific CRYSTAL intended to promote scientific mathematical and technological literacy for responsible citizenship through research partnerships with university and educational communities Pacific CRYSTAL's functional structure consisted of 3 research and development nodes connected to a leadership and administrative node which was charged with facilitating the activities of 19 projects and 42 principal investigators partners and research associates Node 1 an incubation centre involved extracurricular authentic science mathematics and technology experiences Node 2 a classroom testing environment field tested instructional ideas and strategies to develop evidence based practices and Node 3 lighthouse schools involved systemic change and leadership opportunities that adapted demonstrated and disseminated tested ideas resources and strategies to a much broader education community and attempted to influence public policy This book provides descriptions of the target goals research and development projects and lessons learned **Current Curriculum Materials from Representative School Publications** Association for Supervision and Curriculum Development, 1957 **A Guide to Teaching in the Active Learning Classroom** Paul Baepler, J. D. Walker, D. Christopher Brooks, Kem Saichaie, Christina I. Petersen, 2023-07-03 While Active Learning Classrooms or ALCs offer rich new environments for learning they present many new challenges to faculty because among other things they eliminate the room's central focal point and disrupt the conventional seating plan to which faculty and students have become accustomed The importance of learning how to use

these classrooms well and to capitalize on their special features is paramount. The potential they represent can be realized only when they facilitate improved learning outcomes and engage students in the learning process in a manner different from traditional classrooms and lecture halls. This book provides an introduction to ALCs briefly covering their history and then synthesizing the research on these spaces to provide faculty with empirically based practical guidance on how to use these unfamiliar spaces effectively. Among the questions this book addresses are: How can instructors mitigate the apparent lack of a central focal point in the space? What types of learning activities work well in the ALCs and take advantage of the affordances of the room? How can teachers address familiar classroom management challenges in these unfamiliar spaces? If assessment and rapid feedback are critical in active learning, how do they work in a room filled with circular tables and no central focus point? How do instructors balance group learning with the needs of the larger class? How can students be held accountable when many will necessarily have their backs facing the instructor? How can instructors evaluate the effectiveness of their teaching in these spaces? This book is intended for faculty preparing to teach in or already working in this new classroom environment for administrators planning to create ALCs or experimenting with provisionally designed rooms and for faculty developers helping teachers transition to using these new spaces.

Highlights in Educational Psychology: Teacher-student Relationship Claudio Longobardi, Alberto Crescentini, Elisabetta Sagone, 2024-12-16. We are pleased to introduce the collection *Frontiers in Psychology: Highlights in Educational Psychology: Teacher-student Relationship*. This collection will welcome and showcase a selection of articles about this timely topic authored by leaders in the field. The work presented here highlights the broad diversity of research performed across education and aims to put a spotlight on the main areas of interest.

**International Journal of Educational Reform**, 1993 *IJER Vol 2-N2* International Journal of Educational Reform, 1993-04-01. The mission of the International Journal of Educational Reform (IJER) is to keep readers up to date with worldwide developments in education reform by providing scholarly information and practical analysis from recognized international authorities. As the only peer-reviewed scholarly publication that combines authors' voices without regard for the political affiliations, perspectives, or research methodologies, IJER provides readers with a balanced view of all sides of the political and educational mainstream. To this end, IJER includes but is not limited to inquiry-based and opinion pieces on developments in such areas as policy administration, curriculum, instruction, law, and research. IJER should thus be of interest to professional educators with decision-making roles and policymakers at all levels, since it provides a broad-based conversation between and among policymakers, practitioners, and academicians about reform goals, objectives, and methods for success throughout the world. Readers can call on IJER to learn from an international group of reform implementers by discovering what they can do that has actually worked. IJER can also help readers to understand the pitfalls of current reforms in order to avoid making similar mistakes. Finally, it is the mission of IJER to help readers to learn about key issues in school reform from movers and shakers who help to study and shape the power base directing educational

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