

## HIGHER SECONDARY LEVEL TECHNO-PEDAGOGIA IN BIOLOGY

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### **Abstract**

*Students will be prepared by the curriculum for entry into university education, career-related education, or the workforce in a variety of life science professions. Botany and zoology are both branches of biology, and they play crucial roles in our daily lives. Plants and animals provide us with food, medicine, research material, and energy. Good biology diagram practise was set up in the classroom, and the teacher used a variety of teaching strategies with an emphasis on helping the students understand rather than simply transmitting information through lectures and rote learning.*

**Keywords:** *techno-pedagogy, biology, curriculum, vocation courses, life science.*

### **Introduction**

Biology is all of the information about living creatures that has been passed down to us over time. Consequently, it is the science of life. Biology education is the process of imparting or transferring biological knowledge to students through teaching and learning. As a subfield of science, biology offers a variety of well-balanced learning opportunities that help students gain the scientific expertise, understanding, and skills, as well as the values and attitudes embodied in the "Life and Living" and other strands of science education, that they will need for their own growth as well as for the advancement of a technological and scientific society. The government should help students who are having a difficult time learning biology by improving biology teaching and learning through the provision of adequate laboratory and teaching materials, qualified biology teachers, a good learning environment in biology classes, and the use of effective teaching techniques by biology teachers.

### **Benefits of Biology Learning to Student**

The study of life, or biology, informs us about our own selves and the natural environment in which we live. We examine the tools students can use to prepare themselves for this subject as the focus on back to school this week shifts to it. Biology, sometimes known as life science, is the study of all forms of life, including both plants and animals. According to Townsend, life science is fundamental to all life and stimulates awareness, so choosing biology or life science as one of your subjects can open up a lot of opportunities.

Life science is a multidisciplinary field that necessitates actual labour as well as learning, application, and evaluation on the part of the student. Townsend asserted that while many people think of life science as one of the most difficult and tedious courses, this

is untrue. The key to mastering this material is to pay close attention in class, go over what was taught right away, and keep reading. One thing students should keep in mind is that there are many employment choices available to them once they have mastered the topic.

Townsend advised students who choose this subject to buckle down and get ready for a lot of work. "They can either decide to become social or medical researchers or go the industry route, which is vast and includes tourism, conservation, agriculture, journalism, veterinary science, environmental law, biotechnology, biochemistry, and medicine," he said. There is a lot to learn, so the workload may at times feel excessive, but students must also be able to apply their knowledge in addition to assessing and comprehending it.

### **Importance of Biology Learning**

- It enhances our comprehension of the world's natural processes.
- It is the study of life's evolution, survival, and transformation.
- It provides information on how cells interact with organs, organisms, the environment, and ecosystems.
- It demonstrates how each system and organ in the human body functions as well as how everything is interconnected.
- From a medical standpoint, it's crucial to identify diseases and their treatments.
- Understanding biology contributes to creating a better living environment.
- The extensive knowledge of biology has aided in agricultural advancement.

### **Difficulties in Learning Biology at Higher Secondary Level**

The latest study of biological subjects that students find challenging, the causes of secondary school students' struggles with biology learning, The topic's nature and the biology diagram's difficulty for the student were the main causes of learning challenges. practises of learning and studying among students Participants recommended teaching biology using visual materials, practical work, reducing the content of the biology curriculum, using various study techniques, teaching biology topics for use in daily life, making biology learning interesting, and increasing the number of biology questions in the university entrance exam in order to get around these challenges and make their biology learning more effective.

There are numerous causes for why pupils struggle to understand biological topics. Learning science can be challenging for a variety of reasons, including the nature of science and its teaching techniques. For example, learning biology can be challenging due to the biological level of structure and the abstract nature of the concepts. Difficulties with the diagram, overcrowded biology curricula, and the abstract and interdisciplinary nature of biological concepts,

## **Learning Methods to Overcome Learning Difficulties in Biology Teacher using Various Teaching Style**

It became clear that being an innovator was not always enjoyable or simple as we saw teachers at work in the classroom. Very few professors had excellent computer setups or total availability. Many teachers have trouble coming up with creative methods to modify their usage of computers to aid in their instruction. As was already indicated, the majority of the teachers had not regularly or as a crucial part of instruction used computers with the pupils. Many teachers had to modify their typical teaching methods in order to use the prototype materials.

### **Authority, or Lecture Style**

The authority model is centred on the teacher and typically consists of drawn-out lectures or one-way presentations. It is expected of students to take notes or learn the material.

**Advantages:** This approach is appropriate for some fields in higher education as well as big student audiences in auditoriums. For disciplines like history that demand recall of important information, dates, names, etc., the pure lecture format works best.

**Disadvantages:** Because there is little to no connection with the teacher, it is a dubious approach for teaching kids.

### **Demonstrator, or Coach Style**

The demonstrator retains the formal authority role while allowing teachers to demonstrate their expertise by showing students what they need to know.

- **Pros:** This style gives teachers opportunities to incorporate a variety of formats including lectures, multimedia presentations and demonstrations.
- **Cons:** Although it's well-suited for teaching mathematics, music, physical education, arts and crafts, it is difficult to accommodate students' individual needs in larger classrooms.

### **Activity Type or Facilitator**

Facilitators encourage self-learning, assist students in acquiring knowledge that leads to self-actualization, and help them retain it.

**Advantages:** This method encourages pupils to ask questions and fosters the ability to investigate problems and find solutions; it is particularly effective for teaching biology and related disciplines.

**Disadvantages:** Makes it difficult for teachers to engage with students and guide them toward discovery as opposed to lecturing students on information and testing their memorization of it.

## **Confidence Building**

Students must be inspired to exercise their critical thinking abilities and discover that they are capable of analysis. This can be carried out gradually. For instance, something is not always true just because it is written in a document. The findings of this study would provide insight into how to inspire kids to learn in circumstances that involve group problem-solving. Although educators are now urged to incorporate project-based learning in their classrooms,

In conclusion, utilising active learning techniques can help students become more adept at problem-solving, critical thinking, and information integration. Teachers should give students plenty of chances to participate in a range of educational activities, including investigations, conversations, demonstrations, hands-on activities, projects, field studies, model-making, case studies, oral reports, assignments, debates, and role-playing. The variety of experiences that would be most suited for their students should be taken into consideration by teachers. To make biology exciting and significant to students, the learning setting should be made relevant to daily life.

## **Active Education**

Especially in the classroom, active learning requires students to participate in worthwhile learning activities. It is a student-centered approach to instruction. Active learning can be done by an individual or a group, but it always calls for participants to be alert and energetic while gathering information, evaluating their prior knowledge, and solving problems. Expository instruction, which is typically characterised by the passive transmission of information from the instructor to the student, contrasts sharply with active learning.

## **Web-Based Student Projects and CD-ROMs**

As in the case of CD-ROMs that investigate subjects like human anatomy, computers could be utilised expressly for classroom learning. These programmes typically include interactive, highly visual elements in a lesson. There are a tonne of websites that can be utilised to explain ideas during a lesson. Examples include working through genetics challenges and viewing images of cells going through mitosis. While allowing students to visit these websites during class time is advantageous, it would be even better if students could do so at other times. Different assignments might be offered if this is a fair expectation. For instance, professors might provide students a website address and specific instructions to follow instead of assigning genetics questions just on paper. This could be a great motivational tool for students who enjoy using computers to encourage them to study genetics.

## **Function of the Teacher**

The traditional roles of the teacher and the student are modified in problem-based learning. The students take on more and more responsibility for their education, which increases their motivation and sense of achievement and paves the way for them to become successful lifelong learners. The faculty then takes on the roles as resources, tutors, and assessors, assisting the students in their efforts to solve problems. Instead of being knowledge holders, teachers take on the role of cognitive and metacognitive coach. Based on intended curriculum outcomes, learner characteristics, and compelling, challenging events from the actual world, teachers create an unstructured problem. In order to prepare for students' learning needs, teachers create a rough outline or template of the teaching and learning events. Teachers look into the variety of materials that are crucial to the issue and make arrangements for their availability. Teachers promote and make clear the learning processes of their students through modelling, coaching, and fading.

## **Professionalism at Highest Level in All Fields**

Clear lesson objectives; Effective discipline; Effective classroom management; Good communication with parents; High expectations; Knowledge of the curriculum and standards; Knowledge of the subject; Passion for working with children and teaching; Strong rapport with students.

## **The Students' Role**

Instead of acting as passive listeners, students take on the roles of active problem-solvers, decision-makers, and meaning-makers. The students become self-regulated learners who are empowered to conduct necessary research, pursue logical lines of inquiry, and engage in active learning as they are mentored in their roles as real-world investigators and learners. The pupils grow into independent problem-solvers and learners.

By engaging in experiences and reflecting on those experiences, students build their own knowledge and understanding of the world. When individuals discover something new, they have to make sense of it in relation to their prior beliefs and experiences. This may require them to revise their opinions or to disregard the new knowledge as unimportant. In any case, they actively contribute to the creation of our knowledge. To do this, they must investigate, evaluate what they already know, and pose questions. They are in charge of all of their education. PBL gives students a supervised opportunity to learn while tackling challenging, real-world issues. It's intended to support students; build a comprehensive and flexible knowledge foundation; develop effective problem-solving techniques; cultivate a passion for lifelong learning; become successful team players; and develop your desire to learn.

## Role of Thinking Skills

When properly planned and executed, a PBL activity should promote critical thinking. Problems should not have a clear solution and should challenge pupils to think from many angles. Teachers should guide pupils in the process of thinking critically about the issue at hand. Through problem-based learning, students gain knowledge and develop their problem-solving, self-directed learning, and teamwork skills. PBL prepares pupils just as effectively as conventional approaches, according to studies. On national exams, PBL students perform on par with those from traditional classrooms, but they actually make for better professionals.

In problem-based learning, students engage in intricate, realistic learning scenarios where they take the initiative to gather data, make inferences, come to conclusions, and simulate processes that occur outside of the classroom. Instead of serving as the primary method of instruction, problem-based activities may appear in contexts or for periods of time for specific purposes within a given subject or learning area.

## Conclusion

The biology teacher employs a variety of technological techniques, the students comprehend the material and increase their knowledge, and the teacher encourages positive student attitudes and activity-based learning. The government should enhance biology teaching and learning by providing sufficient laboratory and teaching resources, qualified biology teachers, a good classroom environment, effective biology teaching techniques, and emphasis on student demonstration and activity-based learning, which are crucial for students' lifelong learning.

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