

A module  
on  
**ROLE OF SCHOOL LEADERSHIP IN BUILDING COMPETENCIES  
AMONG STUDENTS THROUGH PROBLEM BASED LEARNING**



Grade 3 Math IPBL Bread slice tangram



National Centre for School Leadership



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# **ROLE OF SCHOOL LEADERSHIP IN BUILDING COMPETENCIES AMONG STUDENTS THROUGH PROBLEM BASED LEARNING**

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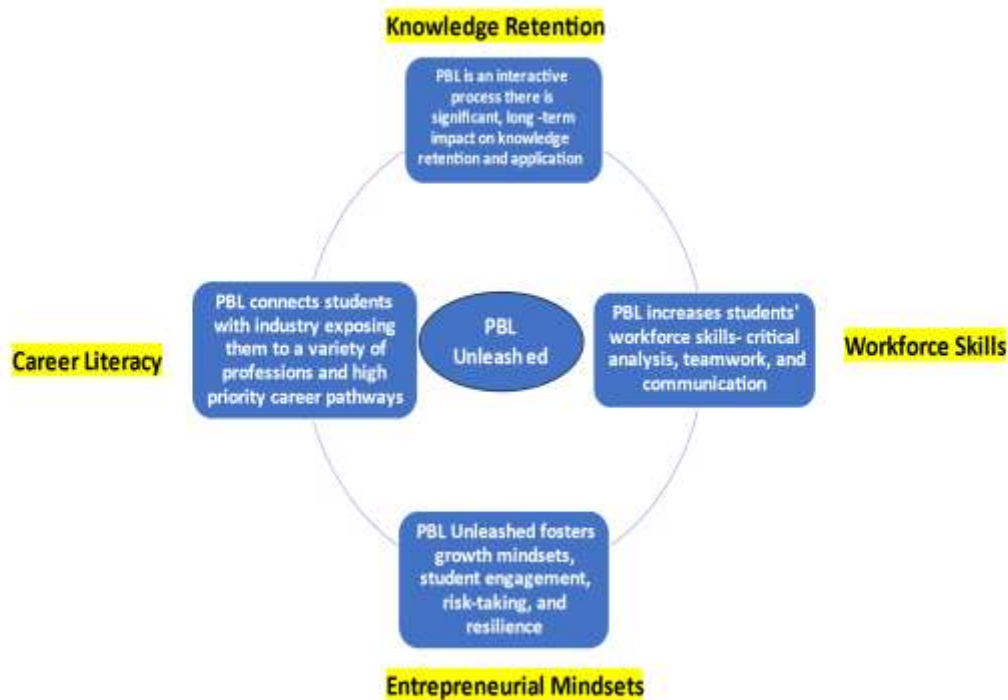
## **INTRODUCTION**

The ushering of 21<sup>st</sup> century, has made the educationist realize the importance of leading the futuristic schools with the help of knowledge, skills, and attitudes to build competencies among students. Igniting their minds to think and learn with the help of active learning techniques is certainly the responsibility of school leadership. **Problem based learning (PBL)** comes across as a progressive strategy to adopt in classroom in a bid to bring about holistic development of students. Rather than only having traditional classes dominated by mathematics, physics, social studies etc., the shift is required towards learner-centred teaching approaches like Flip learning or PBL, that helps to develop critical thinking and self-directed learning skills of students. Instead of bookish problems, the shift towards real world problem is much needed to develop the skills of 21<sup>st</sup> century learners.

PBL is a student-centred approach, in which a group of students collaborate to find an optimum solution to a problem that affects them. In the process they read, research, think critically, make decisions, and draw conclusions with the help of available resources. The role of the teacher is not merely to present to the class, what needs to be studied, rather pose a problem statement and allow learning to happen or facilitate it.

It has been realized across the country that too many young people are entering the workforce without the skills, knowledge, and experiences required by employers, and too few schools offer the experience to provide real-world, work-based skills and identities. The bulk of the skills gap is the result of an educational system that hasn't had the opportunity to connect and evolve with industry. It's time to start thinking about systems as a fluid network that break boundaries, cross-pollinate, and keep moving towards the same goal of innovation. PBL promises to unleash the conduit between education and industry.

Problem-based learning (PBL) is a holistic educational approach that promotes entrepreneurial mindsets in agile learners who contribute fully to a diverse, interconnected, and changing world. The impact leads to evolving educational and economic landscapes by engaging students, schools and communities in authentic problems solving.



## TITLE OF THE MODULE

Role of school leadership in building competencies among students through Problem Based Learning

## OBJECTIVES

Through this module, the school leaders will be able to

- Understand the working of PBL module.
- Appreciate the learning competencies as a result of its implementation.
- Facilitate the teaching -learning process of PBL
- Lead in the process of integration of problem-based learning approach in the existing curriculum

## SIGNIFICANCE

Apart from the basic responsibilities of implementing policies and procedures it is inherent responsibility of a school leader to develop organization's capacity for change. A school leader of today (and tomorrow) should be able to:

- understand the demands of the changing times and adapt accordingly, like taking recourse to online education during COVID'19 lockdown and blended learning in post COVID phase.

- adapt new educational policies and practices to the needs of student population coming from diverse background.
- identify and find solutions to the significant problems that face their schools.
- develop and maintain an empathetic and effective working environment that fosters the leadership and learning of self and others.

It can be deciphered that all these capacities entail the active application of knowledge, skills, and attitudes in a changing workplace.

This module has been divided into the following subheadings:

- Background of PBL,
- Implementation issues of PBL in the Classroom,
- The PBL model and example
- How PBL makes a difference
- Assessment & challenges

## **BACKGROUND OF PBL**

According to Driscoll (1994), learning is defined as a persisting change in human performance or performance potential. There should be a change in performance brought about as a result of the learner's interaction with the environment. The way we teach is governed by what we know about how people learn. Because learning is a complex process, there is not a single learning theory that can explain the process (Driscoll 1994). Although this is the case, three broad approaches are generally acknowledged (Newby et al 1996; Alessi & Trollip 2001). These are behavioural, cognitive and constructivist theories.

Many of the principles of constructivist learning are evidenced in PBL. Studies have shown that PBL offers a significant advantage over traditional lecture-based learning environments.

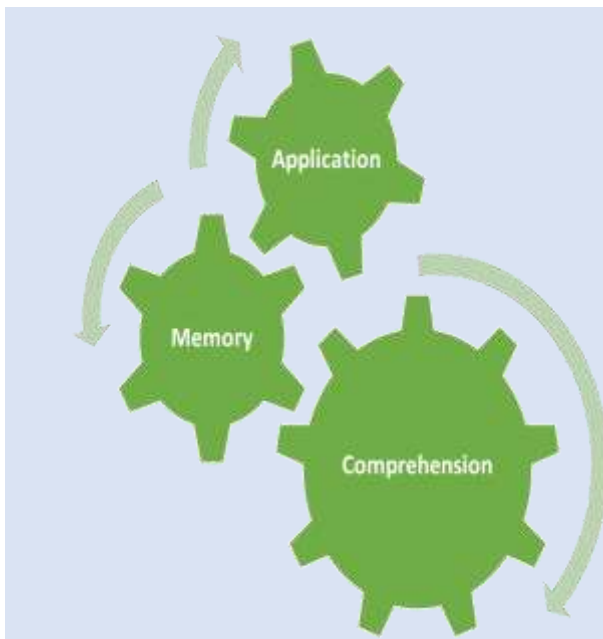
## **TRADITIONAL VERSES PBL CLASSROOMS**

1. The typical traditional classroom resembles a one-person show with a captive, but bored audience. Such classes are typically driven by teacher talk, or as information giver, and depend heavily on textbooks for the structure of the course. PBL empowers students to think independently and become drivers of their own learning.
2. In Traditional classrooms, it is generally accepted that there is a subject content that the students must come to know. Information is often divided into discrete parts and builds into a whole



## BEHAVIORISM

People learn through repetition. Learner is a passive blank slate shaped by environmental stimuli, both positive and negative reinforcement.



## COGNITIVISM

This is a learning theory that was in response to behaviorism. Psychologist who promoted this idea claimed that behaviorism failed to explain cognition.

Cognitive learning is a style of learning that focuses on more effective use of the brain. Cognition is the mental process of gaining knowledge and understanding through the senses, experience and thought. Instead of emphasizing memorization as in the traditional classroom method of learning, cognitive learning focuses on past knowledge. It trains you to reflect on the material and connect it with past knowledge for more robust learning

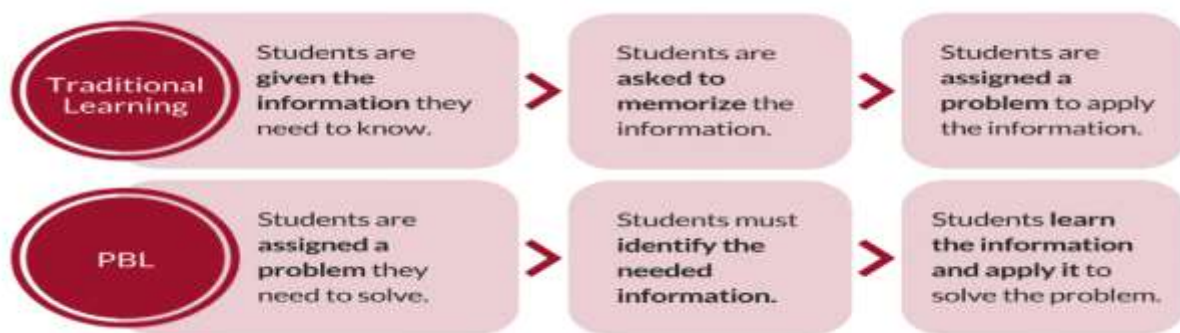


## CONSTRUCTIVISM

Students learn new things through experience. They build knowledge through experiences and interactions. In cognitive learning, the students are taught to do something in constructivism. The students are encouraged to discover something on their own; this is known as self-directed learning. The major difference is that cognitive learning is about building on prior knowledge, and constructivism is about building new ideas and concepts based on your own discoveries.

concept. Whereas in a PBL, students are given problems to do that allow them to practice skills in environments like those in which the skills will be used.

3. Another problem associated with traditional type of learning is that students often perceive what they have learned as detached from real world cases. The content is often presented to the learner in simplified, decontextualized, isolated chunks that encourage memorization rather than problem-solving or higher-level thinking. PBL appears to be effective in imparting long-term retentivity. PBL encourages students to formulate new ideas based on scientific evidence. It coaches students to understand natural phenomena and find solutions to existing challenges and is efficient in developing critical thinking and collaborative skills.



## IMPLEMENTATION OF PROBLEM BASED LEARNING IN CLASSROOMS.

### How To Put Together A PBL Activity

A school leader is the most dynamic resource provider in any institution. The following steps can be followed by the leaders and the supporting staff to bring about the desired change:

- Explain Problem-Based Learning to students: its rationale, daily instruction, class expectations, grading.
- Serve as a model and resource to the PBL process; work in-tandem through the first problem.
- Help students secure various resources when needed.
- Supply ample class time for collaborative group work.
- Give feedback to each group after they share via the established format; critique the solution in quality and thoroughness.
- Reinforce to the students that the prior thinking and reasoning process in addition to the solution are important as well.

While working with a PBL, Students generally must:

- Examine and define the problem.
- Explore what they already know about underlying issues related to it.

- Determine what they need to learn and where they can acquire the information and tools necessary to solve the problem.
- Evaluate possible ways to solve the problem.
- Solve the problem.
- Report on their findings.
- Getting Started with Problem-Based Learning
- Articulate the learning outcomes of the project

### **HOW TO BEGIN PBL**

- Establish the learning outcomes (i.e., what is it that you want your students to really learn and to be able to do after completing the learning project).
- Find a real-world problem that is relevant to the students; often the problems are ones that students may encounter in their own life or future career.
- Discuss pertinent rules for working in groups to maximize learning success.
- Practice group processes: listening, involving others, assessing their work/peers.
- Explore different roles for students to accomplish the work that needs to be done and/or to see the problem from various perspectives depending on the problem (e.g., for a problem about pollution, different roles may be a mayor, business owner, parent, child, neighboring city government officials, etc.).
- Determine how the project will be evaluated and assessed. Most likely, both self-assessment and peer-assessment will factor into the assignment grade.
- Take the curriculum and divide it into various units. Decide on the types of problems that your students will solve. These will be your objectives.
- Determine the specific problems that most likely have several answers; consider student interest.
- Arrange appropriate resources available to students; utilize other teaching personnel to support students where needed (e.g., media specialists to orientate students to electronic references).
- Decide on presentation formats to communicate learning (e.g., individual paper, group PowerPoint, an online blog, etc.) and appropriate grading mechanisms (e.g., rubric).
- Decide how to incorporate group participation (e.g., what percent, possible peer evaluation, etc.).

### **A TEACHER'S ROLE IN PBL**

- As previously mentioned, the teacher determines a problem that is interesting, relevant, and novel for the students.
- It also must be multi-faceted enough to engage students in doing research and finding several solutions.

- The problems stem from the unit curriculum and reflect possible use in future work situations.
- The best PBL teachers seek to understand their students, and then craft driving questions or projects aimed at igniting wonder, passion & action.
- Teachers should be able to mix digital, project-based and face-to-face instruction in a wider variety of ways, allowing students to dive deeper into topics of interest and express their thinking in more varied ways.

## **THE SCHOOL LEADER/PRINCIPAL'S ROLE IN PBL**

To improve and produce a sustainable model of PBL integration, it is necessary for the school leaders to provide the following support:

- Professional development and time for teachers to collaborate, curate, and iterate on rich, deep, rigorous student-centered learning experiences.
- Nurturing and amplifying the curricular/instructional talent of PBL design teachers
- Working on the school culture towards integration of PBL's in classroom teaching learning
- Building trust through clear communication and expectations and creating a commonly owned plan for success
- Building external networks and partnerships like PLN's (professional learning networks) for providing learning & sharing platforms
- Setting priorities and re-evaluating policies of the institution towards the mission
- By creating a mindset of teacher ownership in all PBL designs
- Having a commitment for continuous improvement for self and the organization

Overall, the school leader should model PBL practices such as collaboration, consensus building, problem solving, and effective communication.

## **THE PBL MODEL**

- **Read & Address the problem scenario in a group.**

Students should be in the habit of discussing it within their group. A group effort will probably be more effective in deciding what the key factors are in this situation. Because this is a real problem-solving situation, your group will need to actively search for the information necessary to solve the problem.

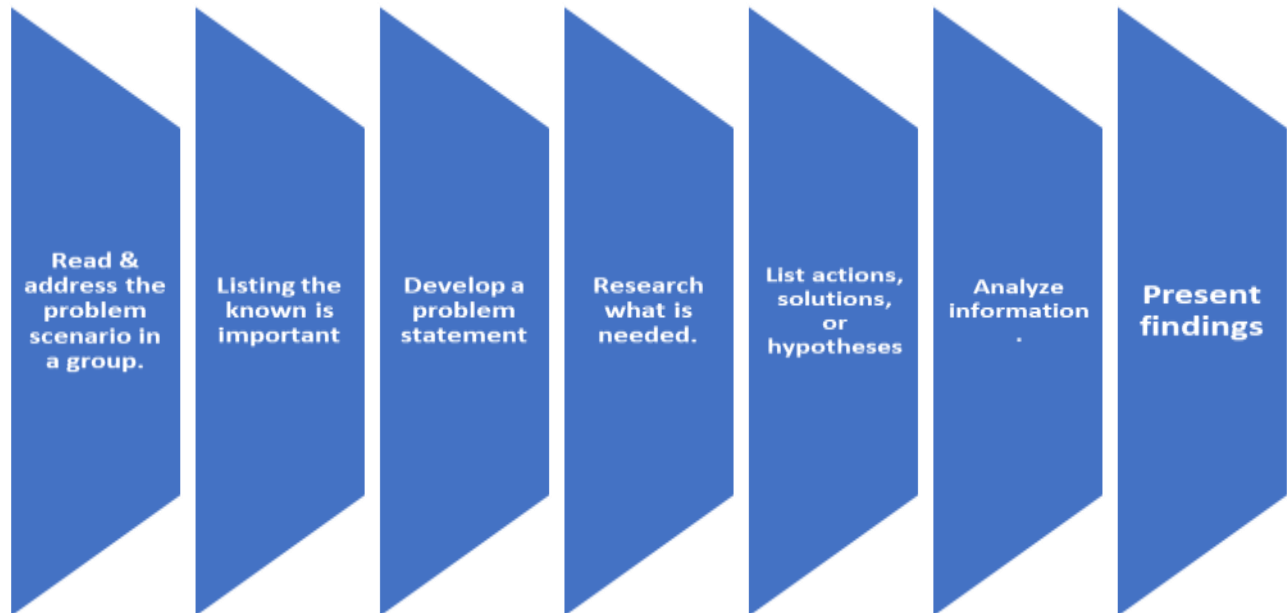
- **Listing the known is important.**

Start a list in which you write down everything you know about this situation. Begin with the information contained in the scenario. Add knowledge that group members bring.

- **Develop an appropriate problem statement**



A problem statement should come from your analysis of what you know. In one or two sentences you should be able to describe what it is that your group is trying to solve, produce, respond to, or find out. The problem statement may have to be revised as new information is discovered and brought to bear on the situation.



- **Research what is needed.**

Prepare a list of questions you think need to be answered to solve the problem. Record them under a second list titled, "What do we need to know?" Several types of questions may be appropriate. Some may address concepts or principles that need to be learned in order to address the situation. Other questions may be in the form of requests for more information. These questions will guide searches that may take place online, in the library, or in other out-of-class searches.

- **List actions, solutions, or hypotheses.**

List recommendations, solutions, or hypotheses under the heading, "What should we do?" List actions to be taken, e.g., question an expert, get online data, visit library.

- **Analyze information.**

Analyze information you have gathered. You may need to revise the problem statement. You may identify more problem statements. At this point your group will likely formulate and test hypotheses to explain the problem. Some problems may not require hypotheses; instead, a recommended solution or opinion (based on your research data) may be appropriate.

- **Present findings.**

Prepare a report in which you make recommendations, predictions, inferences, or other appropriate resolution of the problem based on your data and background. Be prepared to support your recommendation.



Essential elements of a PBL includes a challenging question or problem, in-depth research-based inquiry by students using reflective techniques, multiple opportunities with students to use their creative energies, exercising 21st century skills like collaboration, critical thinking and communication, making interactive presentation before the class and curriculum content above all.

Some examples of PBL are:

- Real-life problem solving: Students in second grade are given the task of studying the causes of potholes and creating ways to fill them.
- Solving real-life mathematical problems: Fourth graders use math to estimate crop yields of a hypothetical farm and then represent the results graphically.
- Tell me Why? Students of grade 3 are given a PBL on Migration of Birds/Animals, wherein they wrote about human migration in English , Monarch Butterfly's life cycle and migratory route of Siberian Crane in Science, and the speed and route of migratory bird etc.

#### **More Examples of Integrated Problem based learning**

Integrated Problem based learning (IPBL) is a way to enhance decision making and problem-solving skills with the interplay of scholastic and co-scholastic activities. Grade 7 students are asked to work on the central theme of the process of weaving in the textile industry, with the question as 'Why is Weaving Together important? The essential questions asked are:

- How is fabric produced?
- Which are the various plants that are used for making fibers?
- Where in India are the industries related to fabric production located?

- What are the different types of waste that are generated by textile industries?
- Which are the diseases that are caused in workers who work in textile industries?
- What are the problems that are faced in textile industries?
- What can be done to revive the glory of Indian cotton industry?



## SUBJECT WISE INTEGRATION OF PBL

The example of how a PBL can be integrated with all the subjects in a class for the topic Weaving Together for class 6 ,is given here.

1) **ENGLISH-** Introduce the IPBL through video or story -What people wore in ancient times?

Activity: Autobiography- Write an autobiography of their favorite dress.

2) **MATHS-**

- Activity 1. Collect information and find out the percentage of textile industry in India for GDP and export earnings. Take any 4 leading textile companies in India and compare their yearly production for the last five years and compare the percentage of the market share by them. (Useful link) <https://www.moneycontrol.com/stocks/marketinfo/marketcap/bse/textiles-woollen-worsted.html>
- Activity 2 Case study -Study 2 shirt brands (one international and another local brand) Compare their prices explore why there is a disparity in cost, profits etc. Identify the path they follow to reach to end user from manufacturer respectively.

**3) SCIENCE-** Connected to course Chapter-Fiber to Fabric

- Activity 1- SDG 14,15 Case Study <https://www.youtube.com/watch?v=NXTIfcfzSnE> Make a project report on how textile industries cause air and water pollution and depletion of aquatic flora and fauna.
- Activity 2- SDG- 3 Case Study: <https://www.youtube.com/watch?v=V1XHea82Mog>. Prepare a Fact file: Find out the major diseases caused in workers of Textile (Sericulture and wool) Industries. List its causes and symptoms.

**4) SOCIAL SCIENCE-** (Connected to text lesson A Shirt in the Market) : Introduce the SDGs and revise them using a video. Link: SDG: <https://vimeo.com/137728737>

- ACTIVITY 1 Types of fiber plantations in different states of India (map location). •Locate major cotton producing states in India (map location).
- ACTIVITY 2 Research Work -Based on SDG: 8 Decent work and economic growth) •Present in the class -'How government of India will help the cooperative sector to grow'. How we can revive the glory of the Indian cotton textile industry?

**5) HINDI-** connected to text book chapter Jumman Darzi

- दर्जी और वस्त्रों की व्यथा पर अपने शब्दों में एक लघु नाटिका प्रस्तुत करे
- बाल श्रम पर आधारित जानकारी एवं आंकड़े इकट्ठा कर कक्षा की सहभागिता में वाद विवाद के लिए वादी एवं प्रतिवादी का अभिनय करे | (Individual)

**6) ART-** Bandhani Print, Block print Tie and die / vegetable print activity.



PBL prepares students to think critically and analytically, and to find and use appropriate learning resources. Students learn best when outcomes are clear and integrated into relevant context. They need practical – not hypothetical learning experiences. In PBL, learners are engaged by problems which are:

PBL recognizes that life experiences impact the way people learn. PBL develops transferable life skills

**HOW A PBL MAKES A DIFFERENCE**

Problem-based learning uses complex, real-world issues as the classroom's subject matter, encouraging students to develop problem-solving skills and learn concepts instead of just absorbing facts.

**How PBL makes a difference...**

According to Forbes-Two new large-scale reports provide convincing empirical evidence that problem- or inquiry-based learning is effective, and that teachers, students and parents prefer it as an instructional method - along with other active, immersive techniques

- Real Versus Artificial Data Sets
- Group Collaboration Versus Individual Homework Assignments
- Service Learning Versus Classroom Learning
- Quizzes Versus Examinations

## ASSESSMENTS

During the PBL assessment step, evaluate the groups' products and performances. Use rubrics to determine whether students have clearly communicated the problem, background, research methods, solutions (feasible and research-based), and resources, and to decide whether all group members participated meaningfully. Some ways to assess are:

- **Self, peer and collaborative assessment**-The use of self, peer and collaborative assessment is worth a little more consideration.
- **Self-assessment**-Self-assessment involves students judging their own work. It may include essays, presentations, reports, and reflective diaries.



- **Peer assessment**-Peer assessment, by contrast, involves students making judgment about other students' work. This is generally used for presentations and practicals but it can also be used for essays and exam scripts.
- **Collaborative assessment**-In collaborative assessment, the student assesses her/himself in light of the criteria agreed with the tutor.

## **CHALLENGES**

Implementing a problem-based learning method to a curriculum is challenging and poses certain questions, including, how can PBL be scheduled within the curriculum, will it meet course objectives, how will student learning outcomes be evaluated, and what methods will be included to organize and monitor groups. Studies indicate that most of the challenges faced by educator's stem from controlling course content, devising unique problems and questions, as well as ensuring that the problems meet academic standards. Despite its challenges, the PBL approach also serves as an avenue for educators to learn new teaching skills, and design and evaluate meaningful, high-quality projects.

## **CONCLUSION**

PBLs allow school leaders space to practice, collaborate, share, and intentionally reflect on how they make decisions and lead their schools. They empower leaders to look at each moment in their school day as an opportunity to lead in alignment with their values. Problem-Based Learning activities provide a safe space for school leaders to practice taking risks, have critical conversations, and strategically plan responses to situations they'll face in the field. PBL is a great way to shift from rote learning to competency-based learning, as envisaged by our New Education Policy'2020. To achieve the best results PBL should be used as a part of a repertoire with other methods depending upon a program's learning goals though it is strongly supported in the New Education Framework by our policymakers too.

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