

Pedagogy of Mathematics

Mathematics helps to:

- ✦ quantify ideas,
- ✦ communicate precisely,
- ✦ be logical ,
- ✦ solve problems,
- ✦ visualize and understand the space

Mathematics Education develops inner resources of growing children and make them thinking individuals in the society,

Mathematical Competencies

- × Problem Solving
- × Critical Thinking
- × Representation and Interpretation
- × Communication

Objectives of the module:

- ✕to develop competencies in mathematics at the elementary level through learner-friendly pedagogies
- ✕to relate the competencies as given in the Learning outcomes document with the state syllabi
- ✕to conduct appropriate pedagogical processes to help children in achieving the class level learning outcomes
- ✕to integrate assessment with pedagogical processes to continuously ensure the progress in learning by all children

Nature of Mathematics

- × Mathematics has its own language. e.g. Mathematical concepts, terms, symbols, formulae and Principles.
- × Mathematical ideas are universal.
- × Mathematics is an exact science. It is precise, logical and systematic.

Nature of Mathematics

- × It involves Inductive and deductive reasoning and can be used to generalize propositions.
- × Mathematics involves the conversion of abstract concepts into the concrete form. It is applied in the study of science and its different branches. Example: Physics, Chemistry, Biology, Economics, Geography, Geology etc

Pedagogical processes at Primary Stage

The pedagogy at this stage includes the following sequence of activities while dealing with different concepts and competencies:

Experiences:

Individually/in pairs/groups of three or more, provide lot of experiences with concrete objects and manipulatives like toys, learning aids etc. The experiences at this stage should have strong linkage with the activities inside and outside the class rooms.

Pedagogical processes at Primary Stage :

Language:

Provide appropriate opportunities to all children to verbally describe their experiences, observations and hypothesis. During such discussion children will also develop language skills like-framing/posing questions, acquiring new vocabulary and terminology related to the subject.

Pedagogical processes at Primary Stage :

Pictorial presentation:

Encouraging children to use pictorial forms for representation. Also, involve them in interpreting pictures and finding relevant information.

Symbols:

Provide opportunities to represent and interpret information using symbols.



In early school classes i.e. classes 1 and 2, following components are required to be integrated to study the subjects in these classes:

- ✦ understanding their surroundings,
- ✦ mathematical language as a tool for better communication
- ✦ using mathematical terms and ideas in problem solving

Pedagogical processes at Upper Primary Stage

Provide opportunities to relate and apply the abstract ideas like integers, rational numbers, 2-D shapes, angles etc. in their daily life contexts.

The knowledge of mathematics and how to teach mathematics together is commonly known as Pedagogical Content Knowledge (PCK).

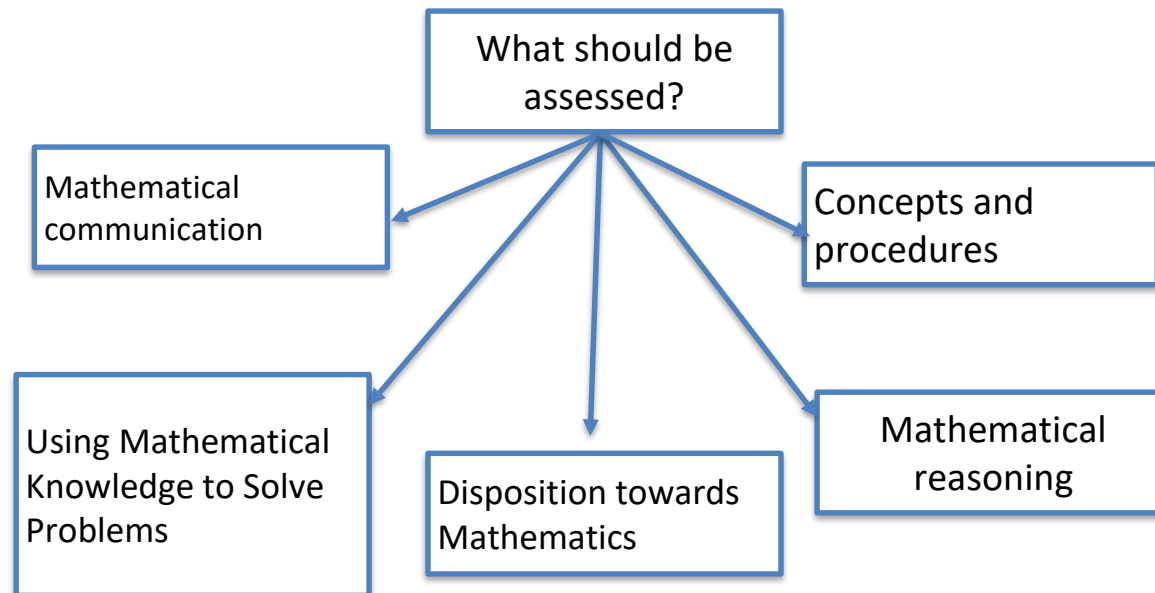
Following are some key actions required for making mathematics joyful:

- Participation
- Engagement
- Observations
- Making hypotheses and verifying them
- Problem solving
- Visualization and representation
- Making connections
- Systematic reasoning
- Mathematical communication

Assessment in Mathematics at elementary Stage:

The focus of assessment of mathematics learning at primary stage should be on:

- ✦ Understanding of how children learn mathematics
- ✦ Understanding of the mathematical concept
- ✦ Understanding the child's understanding of mathematics



Exemplar 1

Learning Outcomes:

- ✦ Explores the idea of angle
- ✦ Classifies angles into right angle, acute angle and obtuse angle

in the following activities :

Activity 1:

- Ask the students to observe the two hands of a clock at different times and describe the openings between two hands.
- Ask the students to observe and express in terms of the kind of angle formed between the hands of the clock (shown in the figures presented)

Learning Outcomes:

- ✦ Explores the idea of angle
- ✦ Classifies angles into right angle, acute angle and obtuse angle

Activity 2:

Ask the learners to observe objects like scissors, compasses, divider, etc. and to describe the openings in terms of angle formation in their own words.

Activity 3:

Ask the learners to observe the opening and closing of a door in the room and to describe it in terms of angles made by movement of the door at different points during its motion in their own words.

Learning Outcomes:

- ✦ Explores the idea of angle
- ✦ Classifies angles into right angle, acute angle and obtuse angle

Activity 4:

Ask the learners to observe the opening and closing of a lid of a box and to describe the angles visible in their own words

- More such activities can be conducted in the classroom.
- Observation of student's replies will form the assessment part.



THANKS