



DEVELOPING FOUNDATIONAL NUMERACY

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OBJECTIVES



After end of the session the participants will be able to

- Describe the objectives of FLN
- List the aspects of Foundational Numeracy
- Describe the components of Foundational Numeracy
- Devise various pedagogical strategies for developing Foundational Numeracy
- Devise various strategies for assessing Foundational Numeracy

VI) Circle the smallest number

1. 39, 42, 67

2. 17, 71, 15

3. 96, 60, 86

0/3

What are we going to assess? What is the learning outcome?
Is the Learning outcome achieved?

UNIVERSAL FLN - OBJECTIVES

- ▶ Making learners competent in doing meaningful reading and writing by the time they enter grade 3.
- ▶ Developing the basic understanding and competencies related to numeracy and its related concepts among young learners till grade 3.
- ▶ Developing skills among the learners to amalgamate their outside school experiences in their classroom learning to attain foundational literacy and numeracy in a better way.

4.5.2 Teaching Mathematics

Children bring various mathematical skills from their surroundings and culture into the classroom, which must be the basis of learning mathematics.

Mathematics learning goals can be categorised into higher goals such as mathematization of a child's thought processes (e.g., ability to handle abstract thinking, problem-solving, visualisation, representation, reasoning, and making connections of mathematics concepts with other domains) and content-specific goals (those related to different concepts in mathematics (e.g., understanding numbers, shapes, pattern)).

GOALS OF MATHEMATICS LEARNING

HIGHER GOALS:-

Mathematization of a child's thought processes (e.g., ability to handle abstract thinking, problem-solving, visualization, representation, reasoning, and making connections of mathematics concepts with other domains)

CONTENT-SPECIFIC GOALS:-

Those related to different concepts in mathematics (e.g., understanding numbers, shapes, pattern).

PROCESS OF MATHEMATICS LEARNING

- ▶ Learning mathematical skills must follow the **simple to the complex path**. It means that in the initial years, children learn mathematical vocabulary (e.g., matching, sorting, pairing, ordering, pattern, classification, one-to-one correspondence) and mathematical concepts related to numbers, shapes, space, and measures. These skills gradually **move to more complex and higher skills** (e.g., quantity, shapes and space, measurement) at later ages. In the mathematics teaching-learning process, those mathematical skills which are more focused on **applying mathematical skills in a real-life situation to understand, solve, reason, communicate, and make decisions need emphasis.**

LET US SOLVE SOME PROBLEMS

- **Sita had 8 biscuits. She ate 3 of them. How many biscuits does Sita have left?**
- **Sita has 3 biscuits. How many more biscuits does she need to have 8 biscuits?**
- **Sita has 3 biscuits. Sunita has 8 biscuits. How many more biscuits does Sunita have than Sita?**

LET US SOLVE SOME PROBLEMS

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- **Sita has 3 biscuits. Sunita has 8 biscuits. How many more biscuits does Sunita have than Sita?**
- **How do you solve this?**

LET US SOLVE SOME PROBLEMS

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Most adults will solve all these the same way.

$$8 - 3 = 5$$



But do children look at them in the same way?

Actually Not!

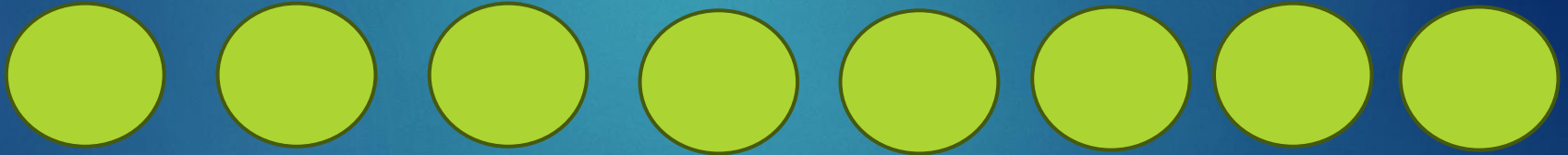


*When this problem was given to Tanya,
a student in first grade.....*

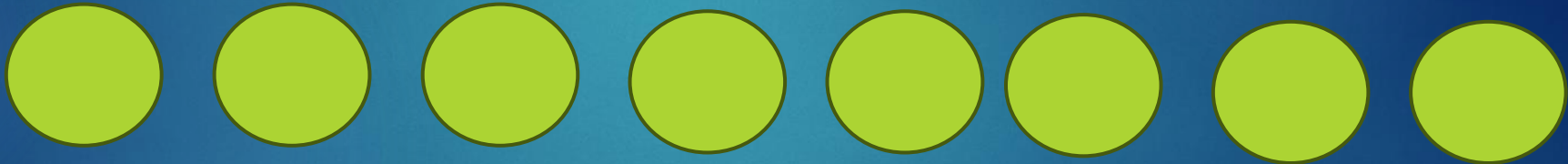
This is what she did.

“Sita had 8 biscuits. She ate 3 of them. How many biscuits does Sita have left?”

She put 8 biscuits like this.

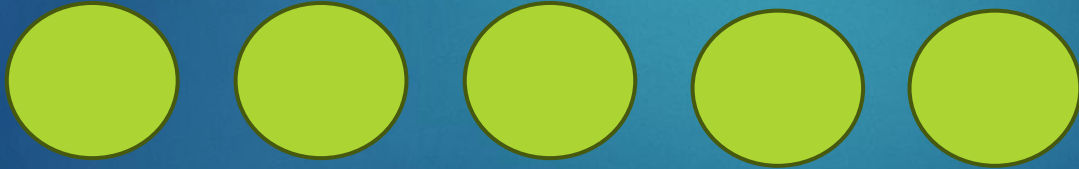


“Sita had 8 biscuits. She ate 3 of them. How many biscuits does Sita have left?”
Then remove 3 biscuits.



“Sita had 8 biscuits. She ate 3 of them. How many biscuits does Sita have left?”

Then remove 3 biscuits. And count the remaining to get the answer 5.





Sita has 3 biscuits. How many more biscuits does she need to have 8 biscuits?

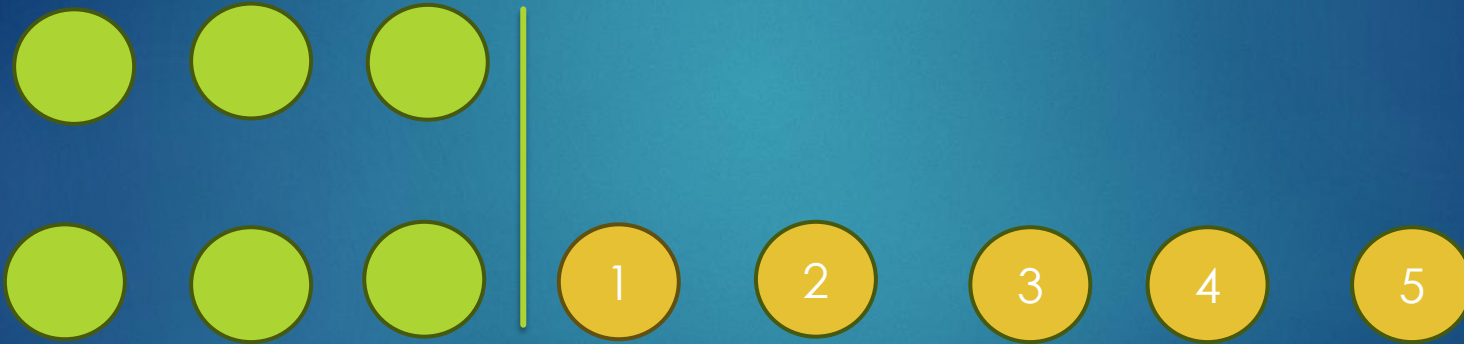
Sita has 3 biscuits. How many more biscuits does she need to have 8 biscuits?





Sita has 3 biscuits. Sunita has 8 biscuits. How many more biscuits does Sunita have than Sita?

Sita has 3 biscuits. Sunita has 8 biscuits. How many more biscuits does Sunita have than Sita?



Q. Fill in the appropriate sign $<$ or $>$ or $=$, in the following comparison of expressions.

$$59 \div 42 \square 359 \div 342$$

A student said he would write the "equal to" sign because

" **$59 \div 42 = 1 \text{ Remainder } 17$**

$359 \div 342 = 1 \text{ Remainder } 17$

So in both the expressions the answer is 1 and the remainder is 17, and that is why they are equal.'

How would you respond to this student?

Let's see another problem.

$$\frac{3}{7} + \frac{2}{3} = \frac{5}{10}$$

The teacher marked the student's answer as wrong. However, the next day mother of the student arrived in the school with a complaint. He pointed out that the method her child followed was exactly the same that the teacher follows. She gave an example, marks in history $\frac{35}{50}$, marks in Geography $\frac{28}{50}$, are and therefore total marks in Social Sciences are $\frac{63}{100}$

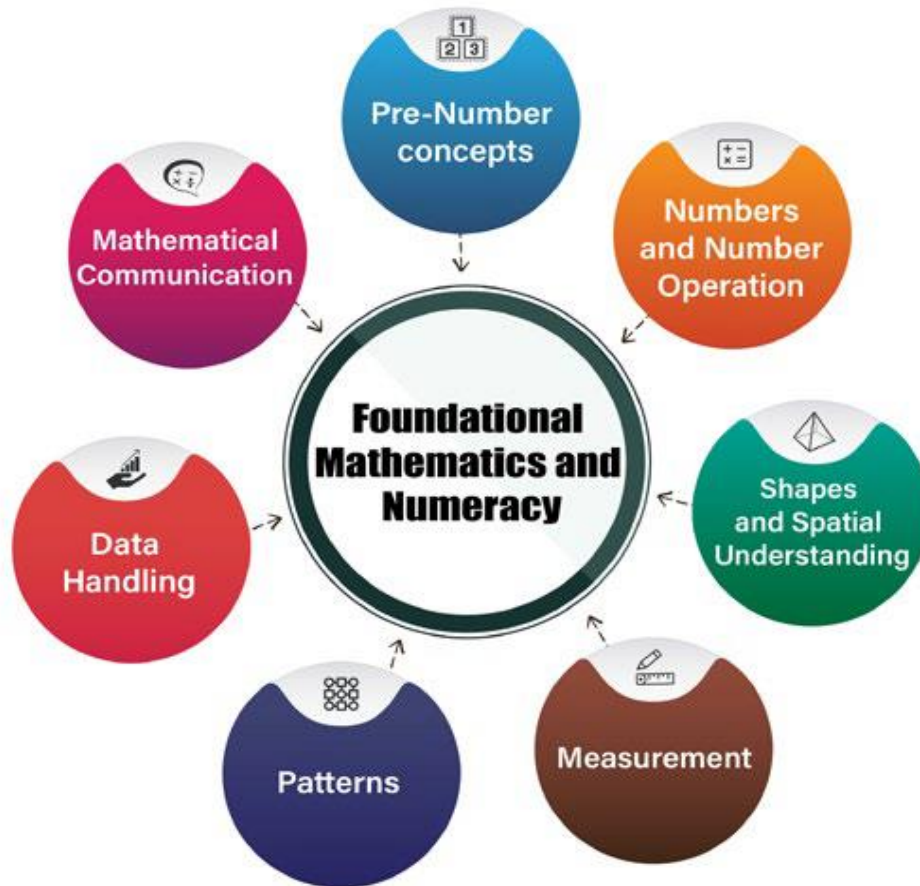
- 
- Meaning/ concept
 - Calculation

Aspects of Foundational Numeracy

During the learning of mathematics in early stages, a child is expected to:

- Count and understand the numeration system.
- Learn conventions needed for the mastery of mathematical techniques such as the use of a base 10 system to represent numbers.
- Perform simple computations up to three-digit numbers and apply these to their day-to-day activities in different contexts.
- Understand and use standard algorithms to perform addition, subtraction, multiplication and division on numbers up to three digits.
- Learn vocabulary of relational words to extend understanding of space & spatial objects.
- Identify and extend simple patterns starting from repeating shapes to patterns in numbers.
- Collect, represent and interpret simple data/information in daily life activities.

Components of Foundational Numeracy



Developing mathematical abstract ideas (concepts) through concrete experience (ELPS)

- CONCRETE
- SEMI-CONCRETE
- SEMI-ABSTRACT
- ABSTRACT

ELPS Approach

E – **Experience** with physical objects/भौतिक वस्तुओं के साथ अनुभव



L – spoken **Language** that describes the experience/ बोली जाने वाली भाषा जो अनुभव का वर्णन करती है



P – **pictures** that represent the experience/ चित्र जो प्रतिनिधित्व करते हैं अनुभव

one	1	●
two	2	●●
three	3	●●●
four	4	●●●●
five	5	●●●●●
six	6	●●●●●●
seven	7	●●●●●●●
eight	8	●●●●●●●●
nine	9	●●●●●●●●●
ten	10	●●●●●●●●●●

S – written **symbols** that generalize the experience/ लिखित प्रतीक जो अनुभव का सामान्यीकरण करते हैं

Pedagogical Processes to Enhance Foundational Mathematical (Numeracy) Skills

- **Learner centric pedagogy**
- **Providing scope for exploration and mathematical thinking**
- **Use of manipulative/toys (toy pedagogy)**
- **Mathematics in daily life**
- **Medium of instruction**
- **Integrating mathematics with other subjects**
- **Communicating mathematically**
- **Giving space to alternate strategies supporting problem solving**
- **Joy in mathematics (recreation with mathematics)**
- **Space for errors in the child's room: Collaborative learning**
- **Assessment**

Assessment

- Connecting mathematics learning with children's real-life and prior knowledge
- Multiplicity of assessment tests and techniques
- Development of model assessment test based on learning outcomes
- Development of question bank
- Creation of audio-visual tools for assessment
- Learning levels assessment tests

(Teachers can also devise their own learning levels assessment test for learners, where they can identify the learning gaps in learners and help them in their better understanding. These tests can also help teachers in reflective understanding of their pedagogy.)



