Contexts in Mathematics Teaching-Why and How?

Ruchi S Kumar Homi Bhbha Centre for Science Education Teacher development workshop -23-27 Nov. 2010

Contexts in Mathematics Teaching

What is our purpose in using contexts for teaching mathematics?

NCF 2005

- Mathematical concepts can be represented in multiple ways..(pg 39)
- Children learn better when pictures and constructions provide proof for the operations they are doing on numbers.(pg 39)
- Modelling situations using quantities, shapes and forms is the best use of mathematics. Such representation aid visualization and reasoning, clarify essentials, help us discard irrelevant information

Contexts in Mathematics Teaching

 Can you give examples of contexts in real life where students do better mathematics than in classroom?

• Why are they better in these contexts as compared to mathematics classroom?

Contexts in Mathematics Teaching

- How can we use contexts to develop mathematics using students' own reasons?
- What do we need to know to develop mathematics in this way?
 - Know how students of particular age think, common misconceptions/errors
 - Know which contexts they are familiar with
 - Develop and design contexts in which mathematics can make sense to students
 - Use contexts where we not just introduce maths but develop it through mathematization

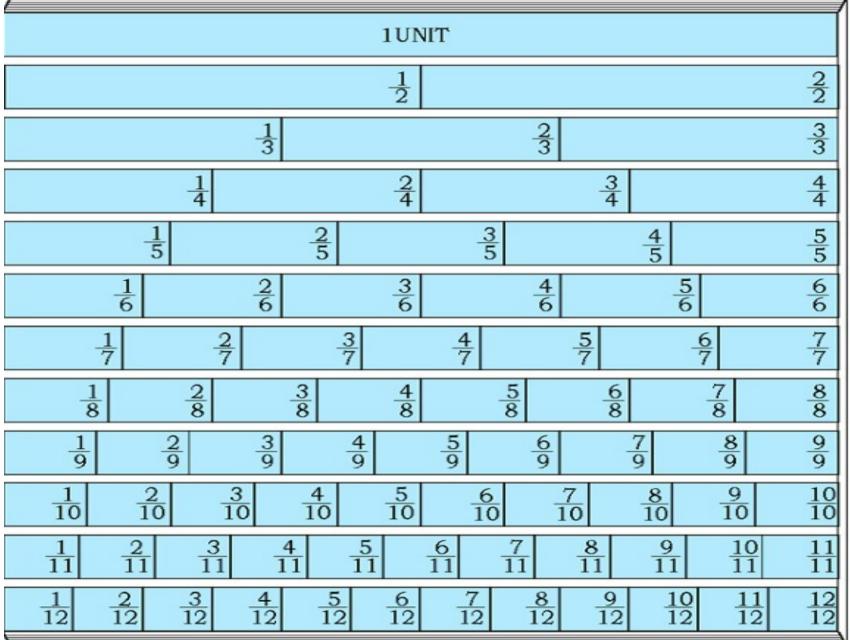
Mathematization of childs thought

- Students perform actions while doing activity
- Students are able to translate their actions into mathematical language
- Students explore activity through variations possible within the activity and explore mathematics related to it.
- Students make observations/conjectures
- Conjectures lead to verification/generalization

Fraction wheel Activity

- What teacher needs to think and plan before doing this activity in class?
- What concepts student should know before doing this activity?
- What should a teacher do with students responses?
- What other questions can be asked after this activity?
- What mathematics students can learn by doing this activity?

FRACTION CHART



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Fraction Chart

- What are the different ways you can think of for using this fraction chart to develop concepts related to fraction?
- Using Fraction Chart students can
 - Represent Unit fractions
 - Represent Composite fractions
 - Compare fractions magnitude
 - Generalize that size of fraction becomes smaller as number of pieces increase.
 - Find equivalent fractions
 - Compare composite fractions with 1/2

Context for developing measure meaning of fraction

Context to develop sharing meaning of fraction

Example of student reasoning using contexts

- Comparison of fractions with the same denominator:
 - As the number of children to share the chapaties are same, children from the group with more number of cakes get bigger share.
 - As the unit piece is same in both the fractions more number of pieces represents the bigger fraction.

Student Responses : Equivalent fractions to half

- 8/16 is equal to ½ because 8 X 2 =16
- 8/16 equal to ½ because 16 parts banaye hai aur adhe shade kare hai.
- 2 Rs me se 1 Rs kharch kiya toh ½ kharch kiya
- Paper folding activity to show equivalent fractions allowed students to check if 2/4 is equal to 1/2.

Student Responses : Equivalent fractions to half

- *Teachers question:* 3/4= 6/8 = ---/16
- Responses from students : 12/16 , 8/16
- Both students asked to explain their answer
- 12/16: 8X2 =16 isliye 6 X 2 =12
- Teacher used the strip used in paper folding to convince second student that his answer is equal to ½ and not ¾. Student was able to relate how 12/16 is equal to ¾ and 6/8.

Another context

Marks: 40/100 understood as 40 marks out of 100 marks.

Some questions to ponder

- What possibilities does a context offers for doing and understanding mathematics?
- In what way does the context help students overcome the common misconceptions/ errors related to the concept?
- How comfortable are students while working with a context?
- Is more than one context needed to get deeper understanding of the concept?
- When and how rules should be introduced to students?