

LESSON STUDY:

Promoting Student Thinking on the Concept of Least Common Multiple (LCM) Through Realistic Approach in the 4th Grade of Primary Mathematics Teaching

To Be Presented at APEC Sapporo International Seminar

By

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Aim of the study:

to encapsulate, through Lesson Study, the picture of mathematical thinking

i.e.

**students thinking on the concept of
Lowest Common Multiple (LCM)**

at the 4th Grade Students of Primary School
in Indonesia.

We define Mathematical Thinking:

Mathematical thinking is defined as students' activities to communicate mathematical ideas in which it involves the using of symbols, tables, diagrams and other sources in other that the students are able to solve their problems.

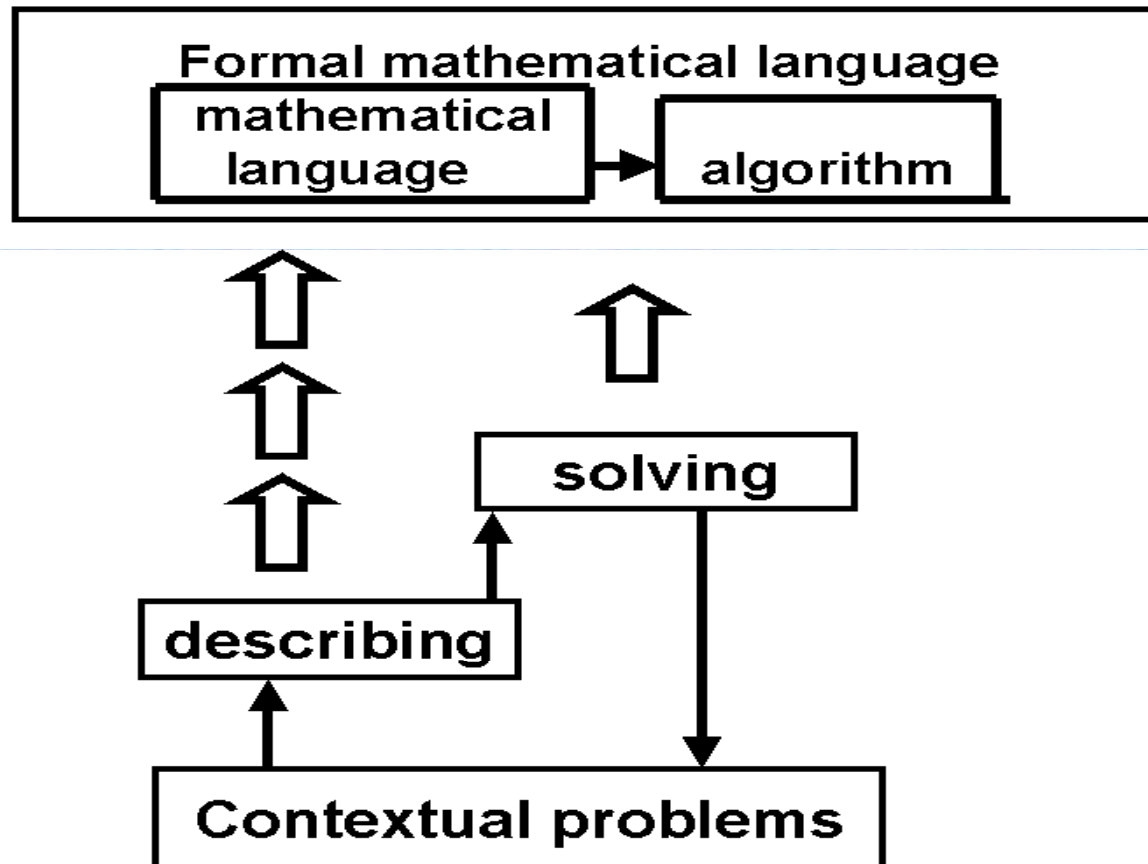
Specifically, our primary mathematics curriculum outlines the aims of teaching learning of mathematics are as follows:

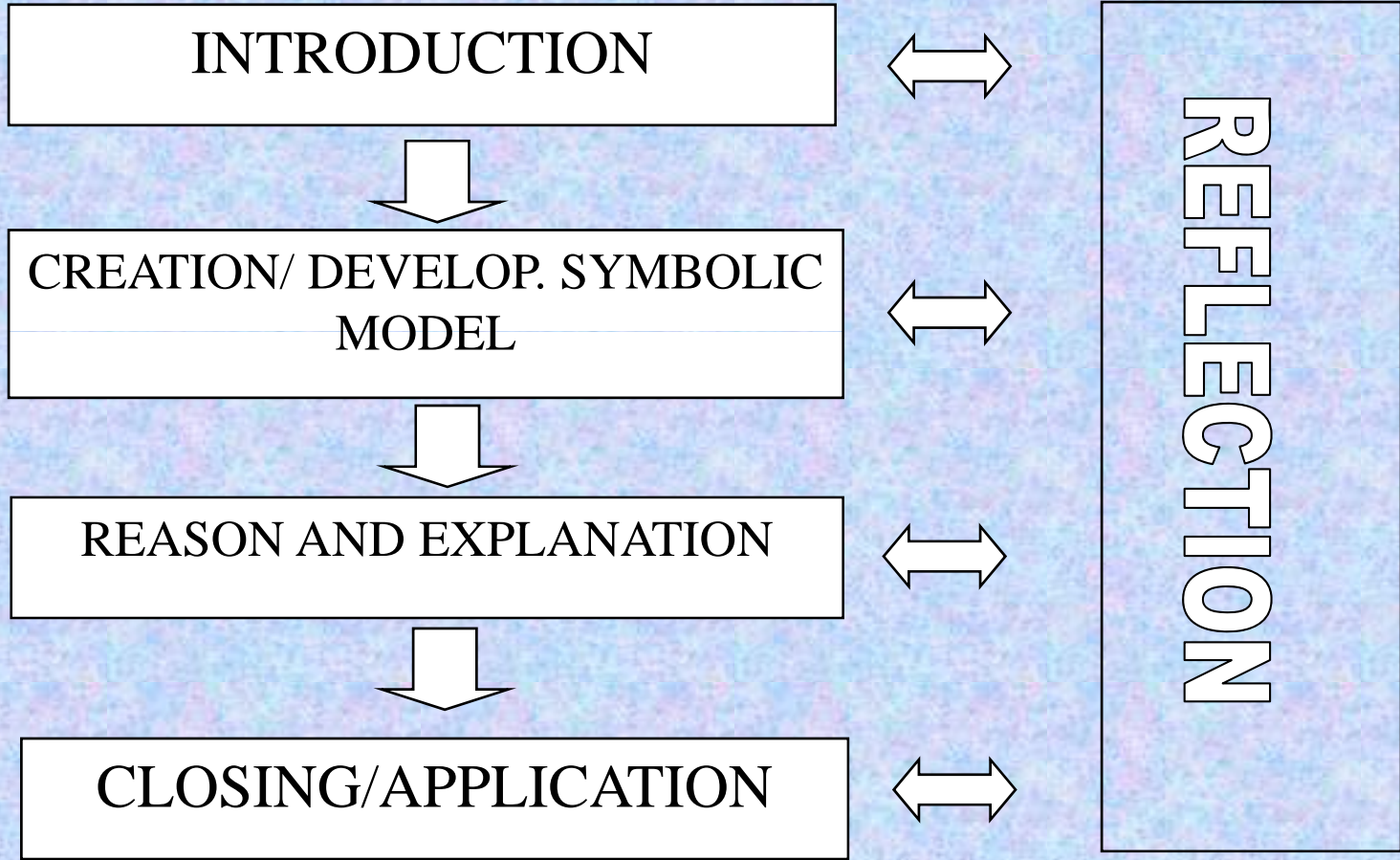
- to understand the concepts of mathematics, to explain the relationships among them and to apply them to solve the problems accurately and efficiently.
- to develop thinking skills to learn patterns and characteristics of mathematics, to manipulate them in order to generalize, to proof and to explain ideas and mathematics propositions.
- to develop problems solving skills which covers understanding the problems, outlining mathematical models, solving them and estimating the outcomes.
- to communicate mathematics ideas using symbols, tables, diagrams and other media.
- to develop appreciations of the uses of mathematics in daily lives, curiosity, consideration, and willingness to learn mathematics as well as tough and self-confidence.

Realistic approach,

a real-world situation or a context problem is taken as the starting point of learning mathematics.

Guided Reinvention model (Gravenmeijer, 1994)





OBSERVATION

Primary School	:	SD Percobaan 2 Yogyakarta, Indonesia
Grade/Sem/year	:	IV/Sem I/2006
Teacher	:	Budiyati
Number of Students	:	44
Standard Competency:		To Understand and to apply factors and multiple of numbers to solve problems.
Base Competencies	:	

1. to understand the Least Common Multiple (LCM)
2. to determine the Least Common Multiple (LCM)
3. to solve problems which is related to LCM

Aim: Students are to understand Common Multiple (CM)
(Day: Tuesday, 12 October 2006, Time: 07.00 – 09.00)

contextual problems (problems situated in reality as follow):

ember 2006 *Since the early of the year 2006, Shinta has two activitis i.e. swimming and gardening. She is periodically going to swim once a week and gardening every 8 days, as shown in the following callendar:*

Shinta

Monday	Tuesday	Wednes d	Tuersda y	Friday	Saturday	Sunday
		1	②	3	△	5
6	7	8	⑨	10	11	△ 12
13	14	15	⑩	17	18	19
△ 20	21	22	⑬	24	25	26
27	△ 28	29	⑮			



: Gardening (8 hari sekali)



: Swimming (7 hari sekali)



Identifying Or Describing The Specific Mathematics :

In the routine activities there are the concept of addition and subtraction i.e.

$7 + 7 + 7 + 7 \dots$ or subtracting by 7 (for swimming)

$8+8+8+8+8\dots$ or subtracting by 8 (for gardening)

In the question of “ how many times common activities” there is the concept of “frequency” or “repeating addition or subtraction” i.e. th concept of multiple of number:

- *For 10 month, Shinta goes to swim $10 \times 5 = 50$ times*
- *For 10 month, Shinta goes to gardening $10 \times 4 = 40$ times*



Schematizing, Formulating And Visualizing A Problem In Different Ways:

There are various ways in determining the multiple number of 7 and 8 e.g. using calendar, using series of numbers, using calculator and manipulating different symbols for 7 and 8.

There are different schemas on determining the common multiple of 7 and 8 i.e. some students calculate the multiple of 7 for the whole year first then multiple for 8; and followed by counting the number of common activities in one year.

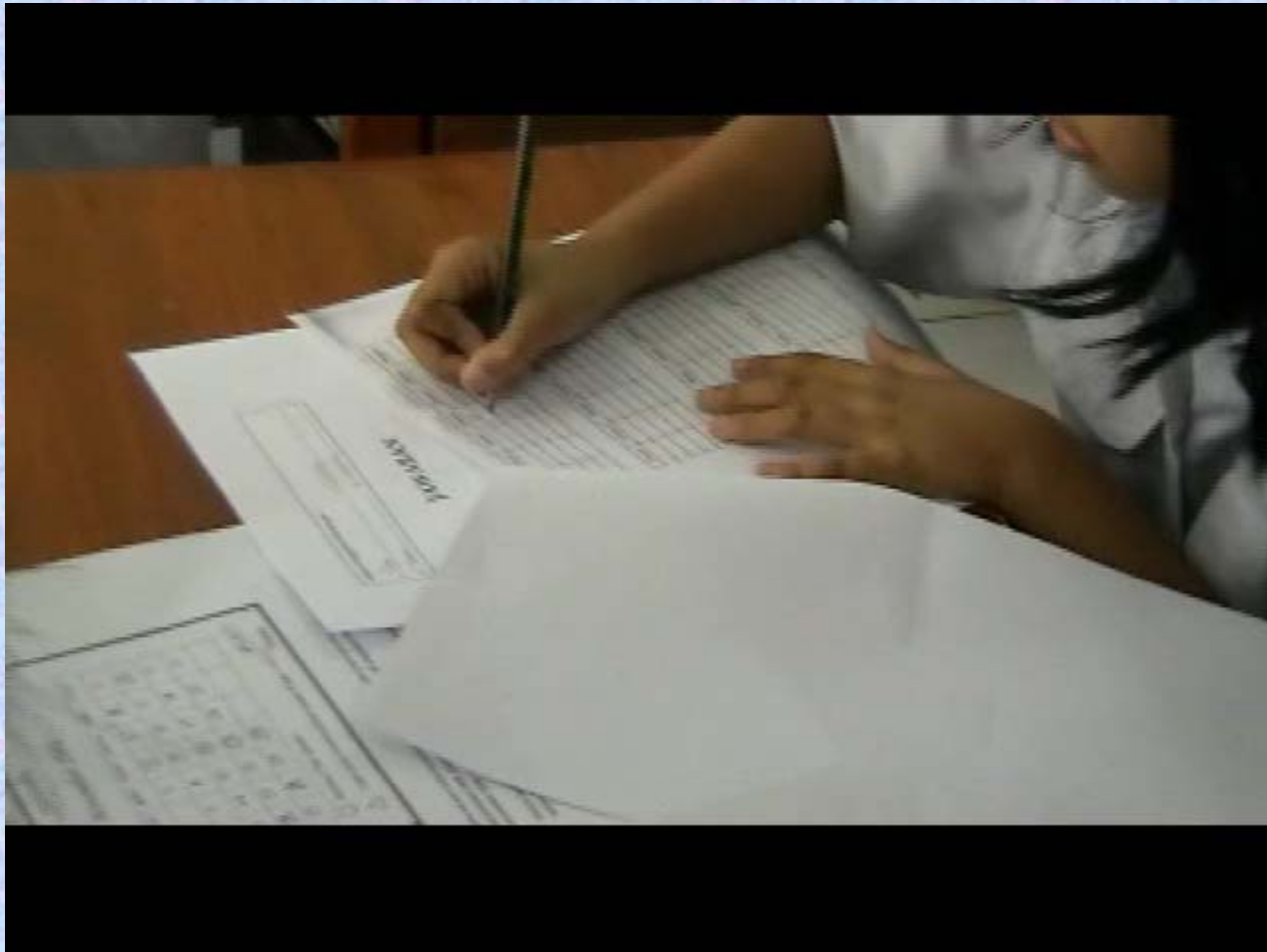
Some students indicated first the common multiple of 7 and 8 (i.e. 56) and then counting the number of common activities in one year.



Discovering Relations:

The students discovered the relationship between “common activities” and “common multiple” i.e.

7 days and 8 days
compare with
“multiple of 7 and 8 = 56”



Discovering Regularities:

The concepts of regularities
arouse from the concepts of
“routine activities”

... pada tahun 2000 ... jadi pada
... sebanyak 6 kali

2008
Pembay
31
rumah



KPK =

312365
500

Recognizing Isomorphic Aspect In Different Problems:

The students identified that the activities to be manipulated were not only about “swimming” and “gardening”, but also for others their daily activities such as “study club”, “laboratory activities” or “going to library”



Transferring A Real World Problem To A Mathematical Problem:

There are the key concepts reflecting by the key word of how the students can transfer the real world problems to mathematical problem e.g. the concepts of “common”, “regular”, “routine”, “number of”, etc.

- regular → to add regularly: $7 + 7 + 7 + 7 + 7 \dots$
- common activities → common multiple (56)
- number of common activities → number of common multiple.

CONCLUSION:

Through Realistic Approach. The striking results of the study illustrated that :

1. Students' thinking of the concept of LCM were much contributed by teacher's employing real-life contexts as a starting point for their learning.
2. The "calendar format problem" was the useful models for the students to bridge mathematical thinking between abstract and real, and helped students to learn LCM at different levels of abstractions.
3. Students' thinking of the concept of LCM simultaneously affected by the use of their own productions of formulas and strategies
4. In thinking the concept of LCM, interactions between teacher and students, students and students are the essential activities.
5. Students' thinking of the concepts of LCM were influenced by the connection among the strands of mathematical concepts developed previously e.g. the concept of factor of numbers and by the connection with meaningful problems in the real world.

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