

Model Plates that Support Developmental Thinking and Attitudes

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1 What is the Model Plate?



A MP is a collection of actions that serve as a model for learners, as well as actions that serve as a model for learners to think in a progressive manner.

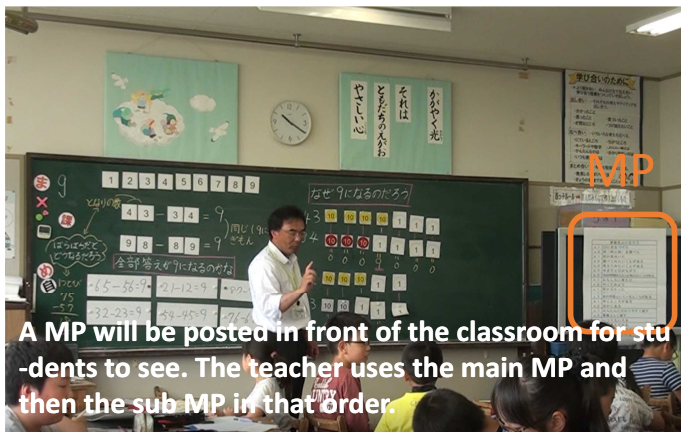
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2 Structural overview of the MP

Steps	Mathematical activity	Psych	Model Plate (Partial example)
Nothing	a. Focus on quantities and figures, and focus on their relationship	Notice	a1. What are you looking at?
	b. Analyze the quantity and figure of interest, and also analyze their relationship	Notice	b1. Did you notice anything?
	h. Intentionally focus on and analyze quantities and figures, and unintentionally focus on and analyze their relationships	Notice	h1. That's an interesting idea.
Structuring	c. Looking back on the process of heuristic development, revealing the mathematical structure	Notice	c3. Is there anything similar to the previous study?
	d. Review and integrate the known information		d1. Is there the same place?
	e. Express concise, clear and accurate		e2. How do you express it like math?
	f. Generalize		f1. Can you say it anytime?
New Ideas	g. Review the revealed mathematical structure and known and personal problems, and think even more explosively	Notice	g1. What can you do after this?

A MP consists of two categories and three steps such as "a phase of concrete Mathematical Activities", "Students' Psychology" and "Nothing", "Structuring", "New Ideas".

3 How to use the MP?



A MP will be posted in front of the classroom for students to see. The teacher uses the main MP and then the sub MP in that order.

4 What is the effect of the MP?

1 2 3 4 5
6 7 8 9

e.g. $43 - 34 = 9$
 $98 - 89 = 9$

Why is it always 9?

By operating the Number card
 $(10a+b) - (10b+a) = 9(a-b)$

(g1) What can you do after this?

e.g. What happens if you use a 3-digit Number?

$323 - 323 =$

Development of mathematics

e.g. What happens if it is additive?

$54 + 45 =$

The MP was effective in supporting the promotion of developmental thinking and attitudes. It also had the effect of improving teacher's support.

5 Awareness of Student

Case 1

⑤ 今日、分かったことは、1つとばしだと答えが $9 \times 1 = 9$ 。2つとばしは、 $9 \times 2 = 18$ 。3つとばしは27というふうにな、ている。自由研究で、今日、学習したこと、の3けたをや、てみたいです。

When the difference between the Number cards is 1, $9 \times 1 = 9$. When the difference between the Number cards is 2, $9 \times 2 = 18$. When the difference between the Number cards is 3, $9 \times 3 = 27$. I want to think about 3-digit subtraction as an independent study.

6 Awareness of Student

Case 2

⑤ 2つとばしたとかならず18になる〜
 $91 - 19 = 8$ 1になるて分かりました!!
調べてみたのは $9 \times$ とばした数で答えがでるのか? 自分でや、てみたい。
3けたも4けたもできまうになりたい!!
2けたなら、いつでも、えそう、です。

When the difference between the Number cards is 2, the subtraction difference is always 18. It turned out that $91 - 19 = 81$. I want to find out if the answer to subtraction can be found by the difference between 9 times Number cards. I want to think for myself so that I can find the answer to the 3-digit and 4-digit subtraction. The two-digit subtraction is perfect.