Punggol Green Primary presents...

Mathematics Model Drawing Workshop for Parents

03 February 2018
Objective of workshop

To demonstrate the use of model drawing in solving mathematical word problems.
Singapore Mathematics Framework

Beliefs
Interest
Appreciation
Confidence
Perserverance

Monitoring of one’s own thinking
Self-regulation of learning

Numerical calculation
Algebraic manipulation
Spatial visualisation
Data analysis
Measurement
Use of mathematical tools
Estimation

Reasoning, communication and connections
Thinking skills and heuristics
Applications and modelling

Numerical
Algebraic
Geometrical
Statistical
Probabilistic
Analytical

Mathematical Problem Solving

PGPS MATHEMATICS WORKSHOP FOR P3 & P4 PARENTS
PARENT LEARNING FEST 3 FEBRUARY 2018
Model drawing is a powerful problem-solving approach. Using the bar model, a child represents mathematical relationships in a problem in a pictorial form. The pictorial form helps him/her understand the problem and plan the steps for the solution. This approach is developmentally sound for young children, and is recognised internationally as an effective way for the children to have early exposure to algebraic concepts and to learn problem solving. Besides solving problems, model drawing also supports the learning of fractions, ratio and percentages. Children will find the model approach useful when they solve problems involving these concepts in upper primary. Here is an example of a word problem using the model method. The word problem involves the concepts of fraction and ratio. Alex gave 5/7 of his marbles to his sister. He gave the remaining marbles to his friends, Sam and Ann in the ratio 1:3. Ann received 45 marbles from Alex. How many marbles had Alex at first?
Tip 1 for model drawing:

- Size of bar should correspond with the represented quantity i.e. bigger bar for larger quantity vice versa.
- Bars should be proportional in size.

E.g. There are 280 English books and 170 Chinese books in the library.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>280</td>
<td>170</td>
</tr>
<tr>
<td>English books</td>
<td>Chinese books</td>
</tr>
</tbody>
</table>

- Correct representation:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>280</td>
<td>170</td>
</tr>
<tr>
<td>English books</td>
<td>Chinese books</td>
</tr>
</tbody>
</table>

- Incorrect representation:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>280</td>
<td>170</td>
</tr>
<tr>
<td>English books</td>
<td>Chinese books</td>
</tr>
</tbody>
</table>

PGPS MATHEMATICS WORKSHOP FOR P3 & P4 PARENTS
PARENT LEARNING FEST 3 FEBRUARY 2018
Let’s Practice

E.g. There are 350 Singapore stamps and 220 Malaysia stamps in the stamp album.
Tip 2 for model drawing:

- Repeated bars of the same units should be of the same size.

E.g. Ahmad has 5 times as much money as Jack.

Ahmad

Jack

Ahmad

Jack
Let’s Practice

E.g. John has 6 times as much money as Anne.

John

Anne
Tip 3 for model drawing:

- Bars should all be aligned to the left, with the same starting point for ease of comparison.
- Use dotted lines to show a partial unit/units that have been removed.
- Use shading to differentiate different unit groups to avoid confusion.

E.g. Sally baked 47 fewer cupcakes than Nurul.

Sally's cupcakes:

- Sally: 47 fewer than Nurul.

Nurul's cupcakes:

- Nurul: More than Sally by 47.

Diagram:

- Correct representation showing Sally's cupcakes.
- Incorrect representation showing Nurul's cupcakes with an extra 47 units.

PGPS MATHEMATICS WORKSHOP FOR P3 & P4 PARENTS PARENT LEARNING FEST 3 FEBRUARY 2018
Let’s Practice

E.g. Molly baked 50 more cookies than Andy.

Molly

Andy

50
Tip 4 for model drawing:

- Braces or arrows should be used to label the different parts of the model.
- Include question mark(s) to illustrate the part(s) that is/are to be found.

E.g. Mr Lim spent $370 on a printer and $690 on a handphone. How much did he spend altogether?

$370 printer $690 handphone

Correct:

$370 printer $690 handphone

Incorrect:

$370 printer $690 handphone

PGPS MATHEMATICS WORKSHOP FOR P3 & P4 PARENTS
PARENT LEARNING FEST 3 FEBRUARY 2018
Let's Practice

E.g. Ahmad spent $999 on a laptop and $380 on a camera. How much did he spend altogether?

$380  $999

camera   laptop

?
Common types of models encountered at P3 & P4 levels:
- Part-whole model
- Comparison model
- Fraction of a set model
Sample of a P3 word problem (comparison model)

Billy had 430 stamps. Muthu had 160 fewer stamps than Billy. Shafiq had 40 stamps more than Muthu. How many stamps did Shafiq have?

Solution:

\[ 430 - 160 = 270 \text{ (Muthu)} \]
\[ 270 + 40 = 310 \]

Answer: 310
Sample of a P4 word problem (comparison model)

Judy had $2440 more than Don at first. After spending $430, she had 4 times as much as Don. How much money did Judy have at first?

**After:**

<table>
<thead>
<tr>
<th>Judy</th>
<th>?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$430</td>
</tr>
<tr>
<td>Don</td>
<td>$2440</td>
</tr>
</tbody>
</table>

**Solution 1:**

1. 3 units = $2440 - $430 = $2010
2. 1 unit = $2010 ÷ 3 = $670
3. $2440 + $670 = $3110

**Solution 2:**

1. 4 units = $670 x 4 = $2680
2. $2680 + $430 = $3110

Answer: $3110
Mrs Lim bought some green bean paste. She used \( \frac{5}{6} \) of the paste and had 25 g of paste left. How many grams of green bean paste did she buy?

**Solution:**

1 unit = 25g  
6 units = 25 x 6  
= 150 g

Answer: 150g
Cultivating good work habits:

- Remind child to write down all steps taken to solve the problem, making notes about each step
- Stress upon the importance of neat and legible penmanship
- Help child develop good time management skills
THANK YOU