P3 and P4 Parents' Workshop 2022

Every Navalite A Leader

Self-Discipline | Integrity | Respect | Compassion | Learning

"Helping your child to Understand and Solve Word Problems"

Slides of the workshop will uploaded on the school's website ***after 3 working days***

Outline of Workshop

Part 1

- MOE Math Framework
- Areas of Concern
- STAR Framework

Part 2

- Model Drawing
- Guess and Check
- Working Backwards
- The Must Have Approach
- Integration of ICT with Math

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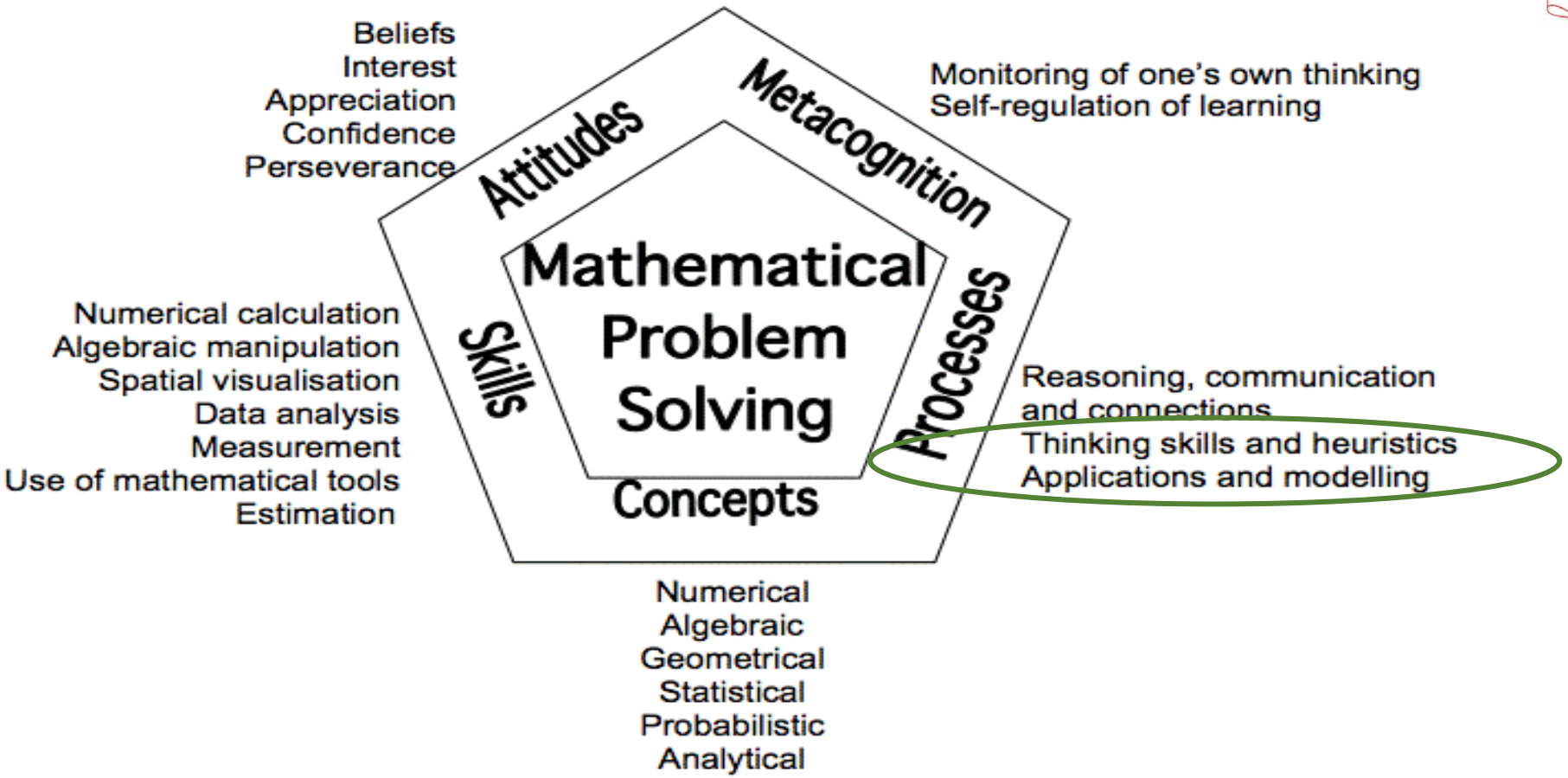
MOE Math Framework



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Heuristics

- Act it out
- Use a diagram/model
- Guess and check
- Make a systematic list
- Look for pattern(s)
- Work backwards
- Make a supposition
- Simplify the problem

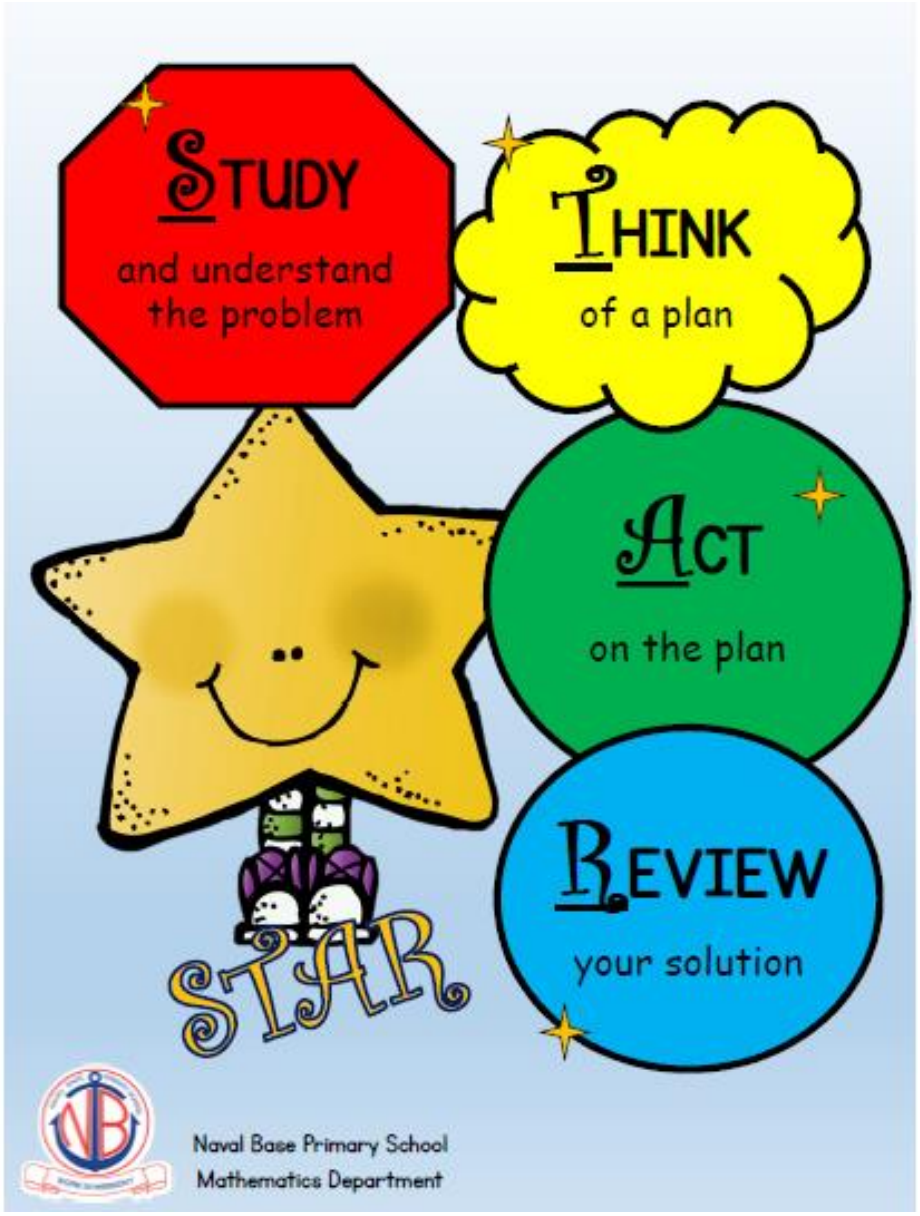
Thinking Skills

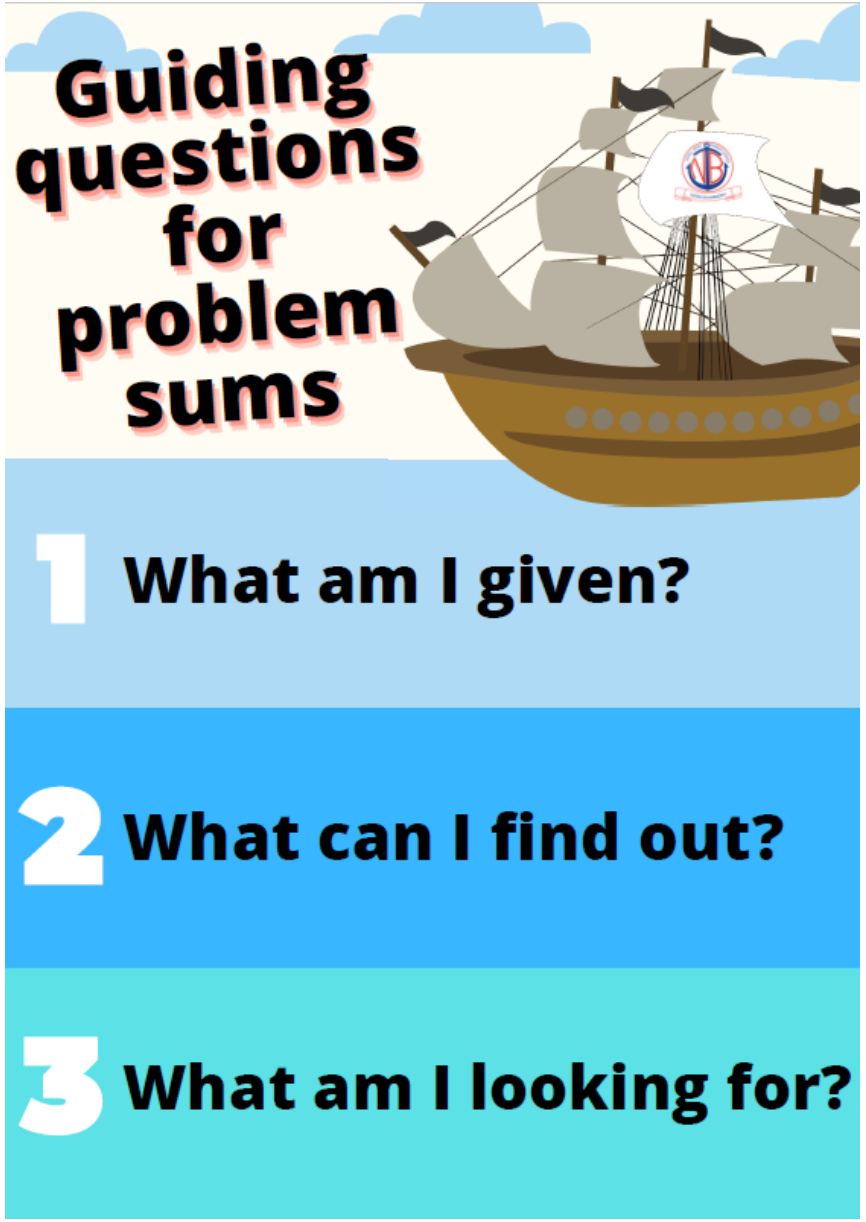
- Classifying
- Comparing
- Sequencing
- Analysing parts and whole
- Identifying patterns and relationship
- Induction
- Deduction
- Spatial visualisation

P3 – P4 Areas of Concern

- **Problem Solving**
  - Students' understanding of word problems
  - Annotation / Chunking
  - Applying the relevant heuristics to the problems
  - Need to reinforce on model drawing skills
  - Does not check on the reasonableness of their answers
- **Careless mistakes**
  - Computation errors (multiplication and division)
  - Number transfer errors
  - Incomplete answers without units

STAR Framework



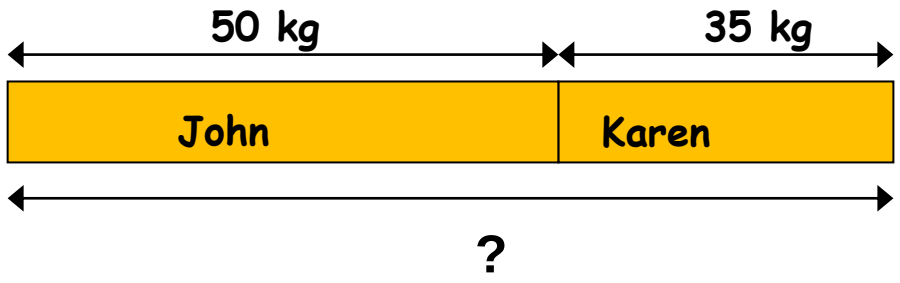


Heuristic Skills

- Drawing a diagram (Model Drawing)
  - ❑ Part-whole model
  - ❑ Comparison model

Part Whole Model

John is 50 kg. Karen is 35 kg.
What is their total mass?



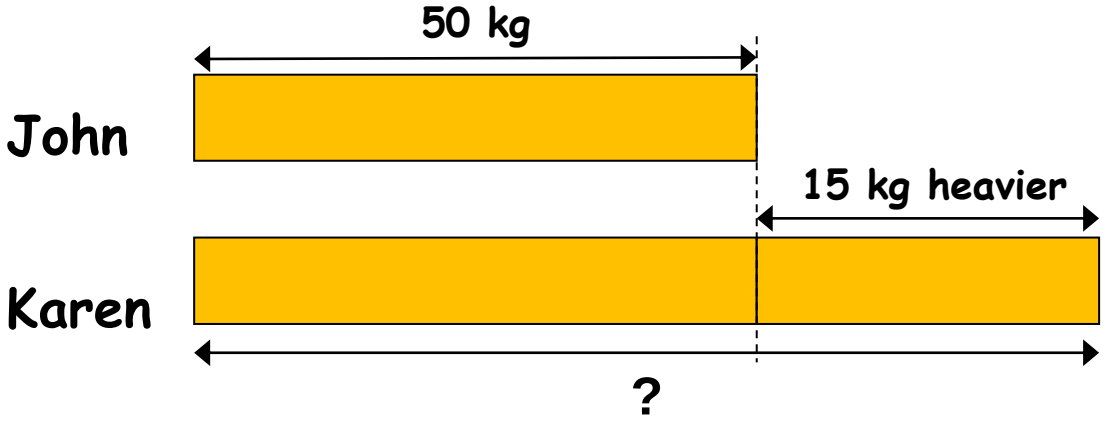
Equations

Final Statement

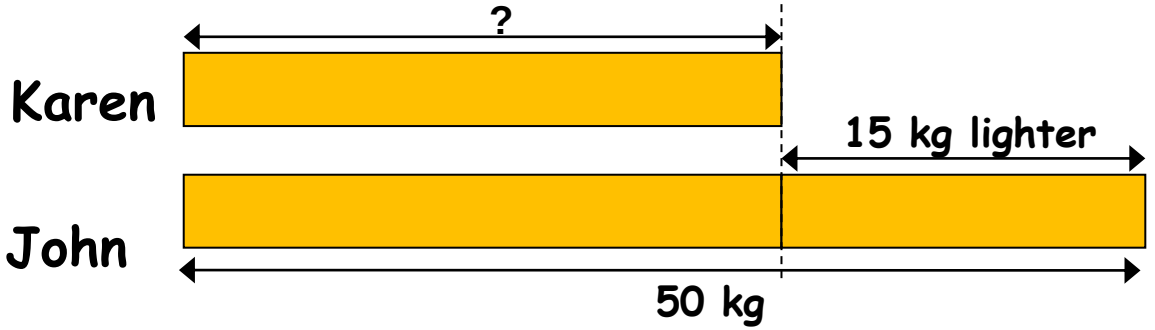
Workings:

Comparison Model

John's mass is 50 kg. Karen is 15 kg heavier than John. What is the mass of Karen?



John's mass is 50 kg. Karen is 15 kg lighter than John. What is the mass of Karen?



WHY Model Drawing?

- **Visual representation** of given information
- **Helps students think logically** using visual models to determine their computations
- **Empowers students to think systematically** and master more difficult problems
- Makes multi-step and multi-concept problems **easy to work**

Standardisation across P2 – P6

1. Pencil & Ruler
2. Location: Start of the solution
3. 2 models: same starting line
4. Each unit must be of the same length (unitary model)
5. Label model

STAR Approach to Problem-Solving			
Step 1: **<u>Study</u> and understand**	**Step 2:** **<u>Think</u> of a plan**	**Step 3:** **<u>Act</u> on the plan to solve your problem**	**Step 4:** **<u>Review</u> – Check your answer**

Whole Numbers

Question 1

Danny has $321.

John has $465 more than Danny.

How much money do they have altogether?

<u>Step 1:</u>

- What am I given? (facts/ information/ data)
- What can I find out?
- What am I looking for?

*We can use **comparison model** to show who has more money and find the total amount they have.*

STAR Approach to Problem-Solving			
Step 1: **Study and understand**	**Step 2:** **Think of a plan**	**Step 3:** **Act on the plan to solve your problem**	**Step 4:** **Review – Check your answer**

Question 1

Whole Numbers

Danny has $321.

John has $465 more than Danny.

How much money do they have altogether?

Question	Visualising the model
How many quantities should there be in the model? What are they?	➢ Two quantities ➢ Bigger number, smaller number
How will the bars of each quantity look like?	➢ One shorter bar ➢ One longer bar
What values should I include in the model?	➢ One short bar is $321. ➢ Difference between longer and shorter bar is $465
Where should I place the question mark in the model?	➢ Right hand side of the model

STAR Approach to Problem-Solving			
Step 1: <u>Study</u> and understand	**Step 2:** <u>Think</u> of a plan	**Step 3:** <u>Act</u> on the plan to solve your problem	**Step 4:** <u>Review</u> – Check your answer

Question 1

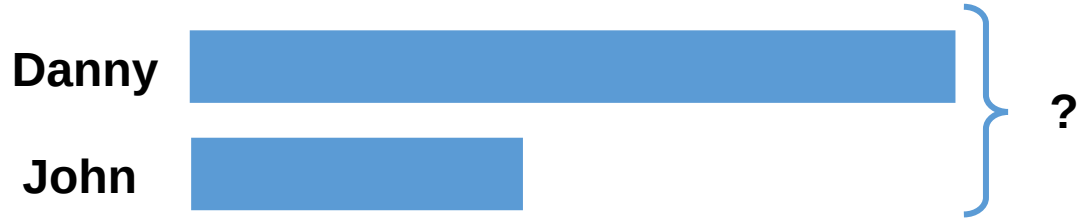
Whole Numbers

Danny has $321.

John has $465 more than Danny.

How much money do they have altogether?

MODEL A



MODEL B

Which one is the correct model?

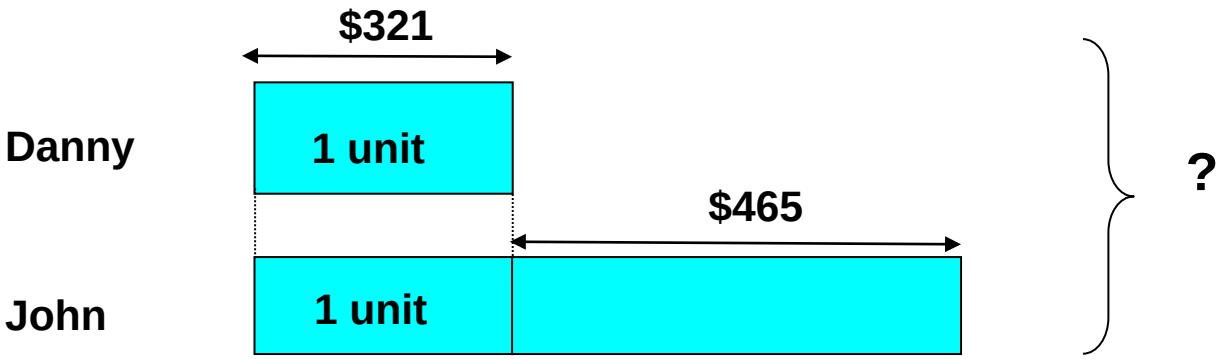
Whole Numbers

Question 1

Danny has $321.

John has $465 more than Danny.

How much money do they have altogether?



1 unit = $321

John = $321 + $465

= $786

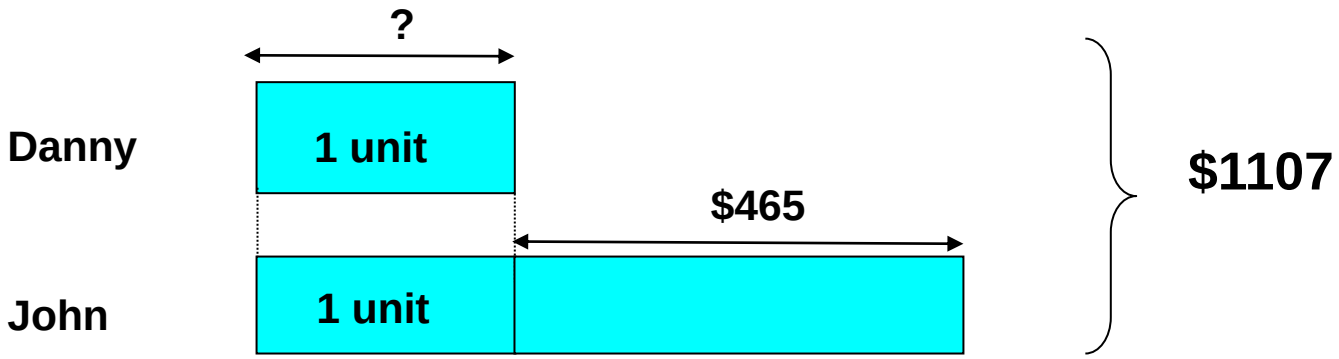
Total = $321 + $786

= $1107

They had $1107 altogether.

STAR Approach to Problem-Solving

Step 1: <u>Study</u> and understand	Step 2: <u>Think</u> of a plan	Step 3: <u>Act</u> on the plan to solve your problem	Step 4: <u>Review</u> – Check your answer



Total = $1107

2 units = $1107 - $465

= $642

1 unit = $642 ÷ 2

= $321

Danny has $321 at first.

Q2

Whole Numbers

Question 2

The difference between two numbers is 80.

The bigger number is 92.

Find the sum of the two numbers.

Step 1:

- What am I given? (facts/ information/ data)
- What can I find out?
- What am I looking for?

There are 2 numbers.
A bigger number and a smaller number.
The bigger number is 92.

Value of the two numbers

sum
add
altogether

STAR Approach to Problem-Solving

Step 1: Study and understand	Step 2: Think of a plan	Step 3: Act on the plan to solve your problem	Step 4: Review – Check your answer

Whole Numbers

Question 2

The difference between two numbers is 80.

The bigger number is 92.

Find the sum of the two numbers.

Draw a comparison model

.

Question	Visualising the model
How many quantities should there be in the model? What are they?	➢ Two quantities ➢ Bigger number, smaller number
How will the bars of each quantity look like?	➢ One longer bar ➢ One shorter bar
What values should I include in the model?	➢ One longer bar is 92. ➢ Difference between longer and shorter bar is 80
Where should I place the question mark in the model?	➢ Right hand side of the model.

Whole Numbers

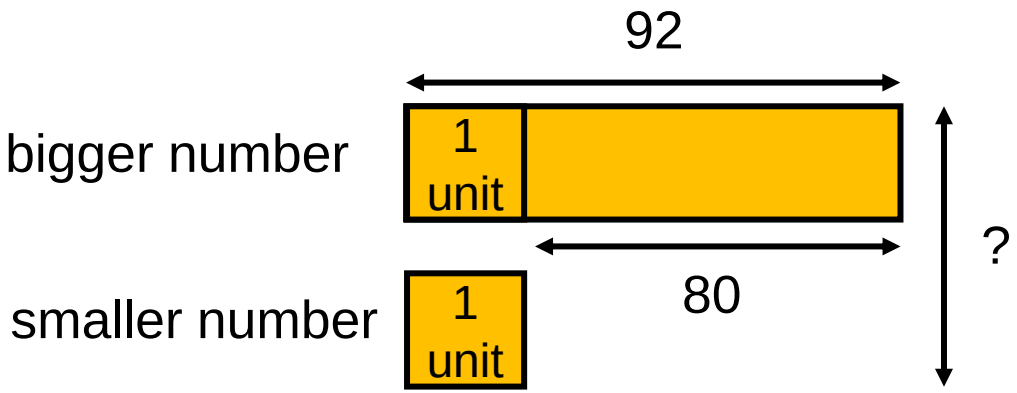
Question 2

The difference between two numbers is 80.

The bigger number is 92.

Find the sum of the two numbers.

Draw a comparison model .



- Two quantities
- Bigger number, smaller number
- One longer bar
- One shorter bar
- One longer bar is 92.
- Difference between longer and shorter bar is 80
- Right hand side of the model.

Whole Numbers

Question 2

The difference between two numbers is 80.

The bigger number is 92.

Find the sum of the two numbers.

Draw a comparison model

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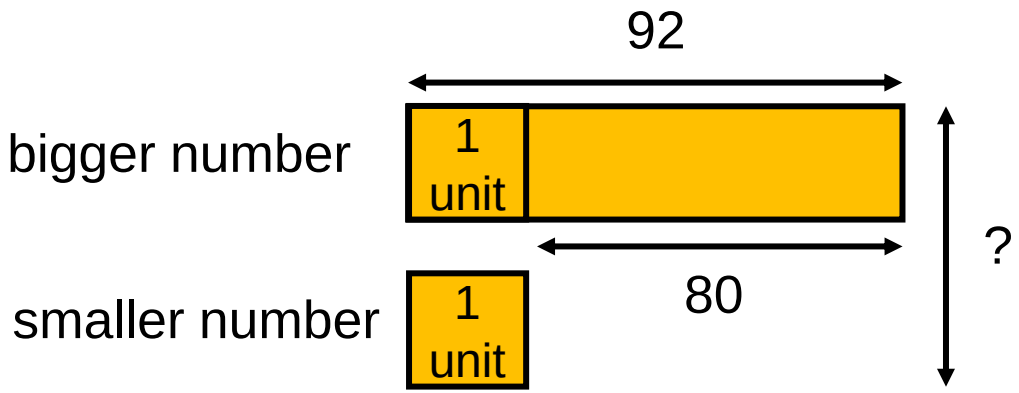


bigger number = 92

smaller number = 92 – 80
= 12

12 + 92 = 104

Ans = 104

$$\begin{array}{r} 92 \\ -\ 80 \\ \hline 12 \end{array} \qquad \begin{array}{r} 12 \\ +92 \\ \hline 104 \end{array}$$

Whole Numbers

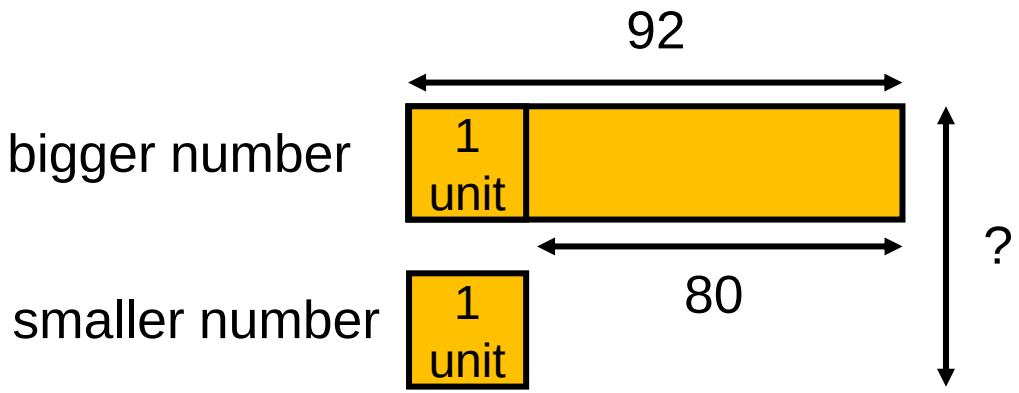
Question 2

The difference between two numbers is 80.

The bigger number is 92.

Find the sum of the two numbers.

Draw a comparison model .



bigger number = 92

smaller number = 92 – 80
= 12

$$\begin{array}{r} 92 \\ -\ 80 \\ \hline 12 \end{array} \qquad \begin{array}{r} 12 \\ -\ 92 \\ \hline 104 \end{array}$$

12 + 92 = 104

Ans = 104

$$\begin{array}{r} 104 \\ -\ 12 \\ \hline 92 \end{array} \qquad \begin{array}{r} 92 \\ +\ 12 \\ \hline 104 \end{array}$$

Whole Numbers

Question 3

Janice, Imran and Krishnan had a total of 126 marbles.

2 x 1

Janice had twice as many marbles as Imran.

2 x 1

Krishnan had twice as many marbles as Janice.

How many marbles did Imran have?

Step 1:

- What am I given? (facts/ information/ data)
- What can I find out?
- What am I looking for?

twice means
2 x 1

Figure out the number of units that each person had.

STAR Approach to Problem-Solving

Step 1: Study and understand	Step 2: Think of a plan	Step 3: Act on the plan to solve your problem	Step 4: Review – Check your answer

Whole Numbers

Question 3

Janice, Imran and Krishnan had a total of 126 marbles.

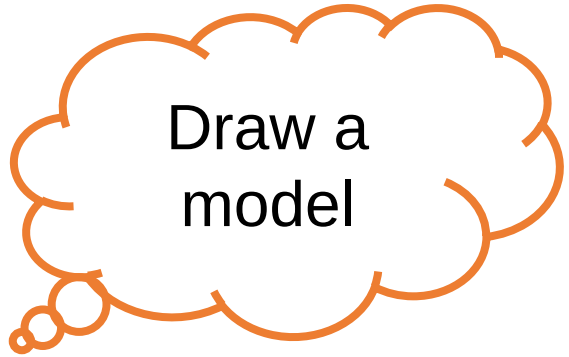
2 x 1

Janice had twice as many marbles as Imran.

2 x 1

Krishnan had twice as many marbles as Janice.

How many marbles did Imran have?



Question	Visualising the model
How many quantities should there be in the model? What are they?	➢ Three quantities ➢ J, I, K
How will the bars of each quantity look like?	➢ J: 2 units , I: 1 unit ➢ K: 2 units , J: 1 unit.
What values should I include in the model?	➢ J, I, K has 126 marbles.
Where should I place the question mark?	➢ on I

Whole Numbers

Question 3

Janice, Imran and Krishnan had a total of 126 marbles.

2 x 1

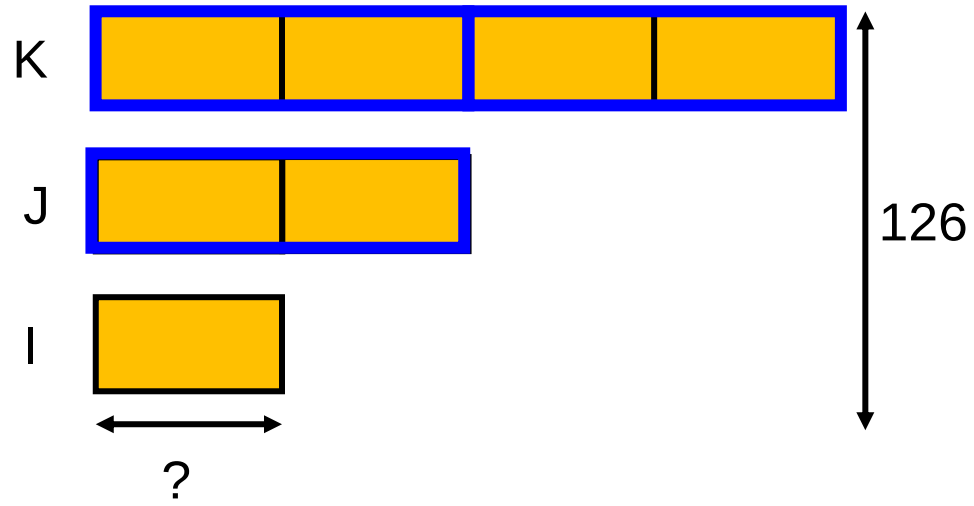
Janice had twice as many marbles as Imran.

2 x 1

Krishnan had twice as many marbles as Janice.

How many marbles did Imran have?

Draw a model



- Three quantities
- J, I, K
- J: 2 units , I: 1 unit
- K: 2 units , J: 1 unit.
- J, I, K has 126 marbles.
- on I

Whole Numbers

Question 3

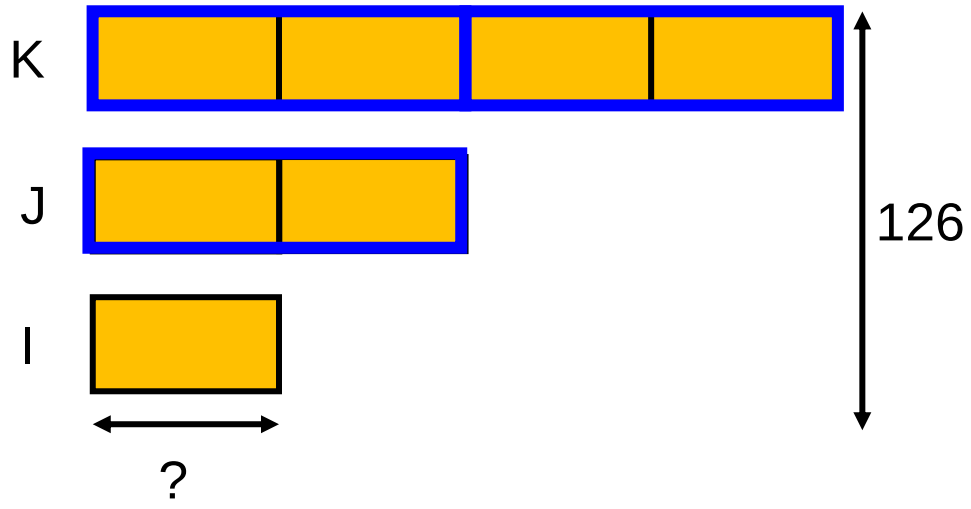
Janice, Imran and Krishnan had a total of 126 marbles.

Janice had twice as many marbles as Imran. (2 x 1)

Krishnan had twice as many marbles as Janice. (2 x 1)

How many marbles did Imran have?

Draw a model



7 units = 126

1 unit = 126 ÷ 7

= 18

Ans = 18

```
   18
7) 126
 - 7
   56
 - 56
   00
```

Whole Numbers

Question 3

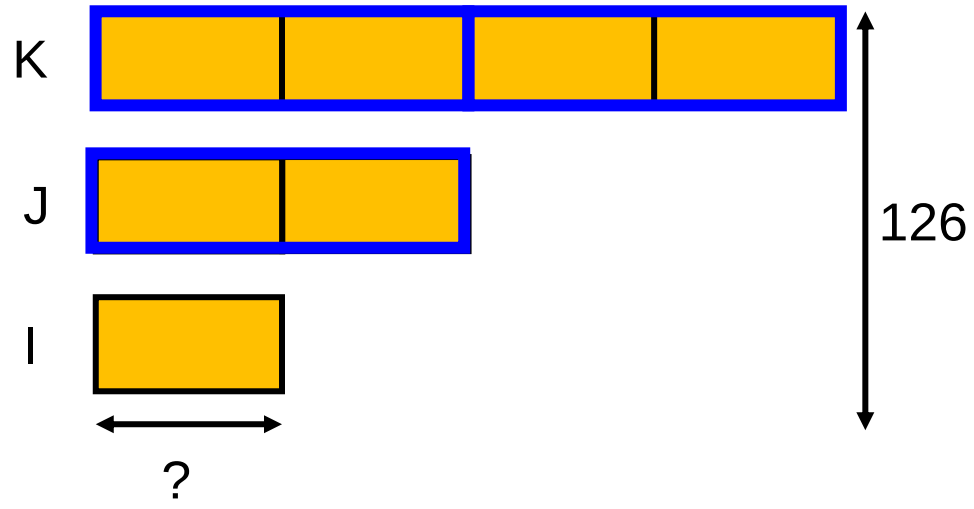
Janice, Imran and Krishnan had a total of 126 marbles.

Janice had twice as many marbles as Imran. (2 x 1)

Krishnan had twice as many marbles as Janice. (2 x 1)

How many marbles did Imran have?

Draw a model



7 units = 126

1 unit = 126 ÷ 7

= 18

I → 18

J → 18 x 2 = 36

K → 18 x 4 = 72

```
   18
7) 126
 - 7
   56
 - 56
   00
```

Total → 18 + 36 + 72 = 126

STAR Approach to Problem-Solving			
Step 1: **Study and understand**	**Step 2:** **Think of a plan**	**Step 3:** **Act on the plan to solve your problem**	**Step 4:** **Review – Check your answer**

Question 4

Whole Numbers

Rebecca, Akid and Bala had a total of 135 stamps.

Rebecca had twice as many stamps as Akid.

Bala had three times as many stamps as Rebecca.

How many stamps did Rebecca have?

Step 1:

- What am I given? (facts/ information/ data)
- What can I find out?
- What am I looking for?

What am I given? (facts/ information/ data)

There are 3 people.
The total number of stamps that the 3 people had was 135.
Rebecca: 2 units; Akid 1 unit.
Bala: 3 parts; Rebecca 1 part.

What can I find out?

The number of equal units each of them had.
The number of equal units that represent 135 stamps.

What am I looking for?

The number of stamps that Rebeca had (how many units?).

Question 4

Whole Numbers

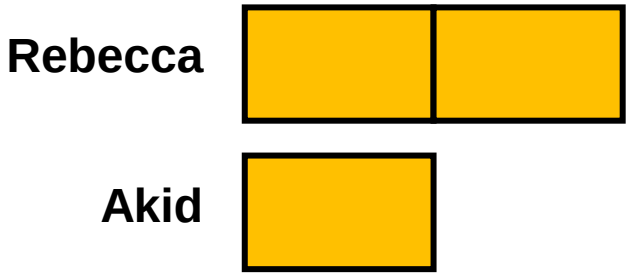
Rebecca, Akid and Bala had a total of 135 stamps.

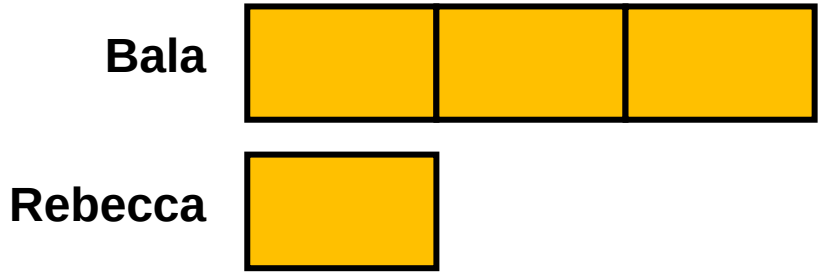
Rebecca had twice as many stamps as Akid.

Bala had three times as many stamps as Rebecca.

How many stamps did Rebecca have?

MODEL APPROACH!





Whole Numbers

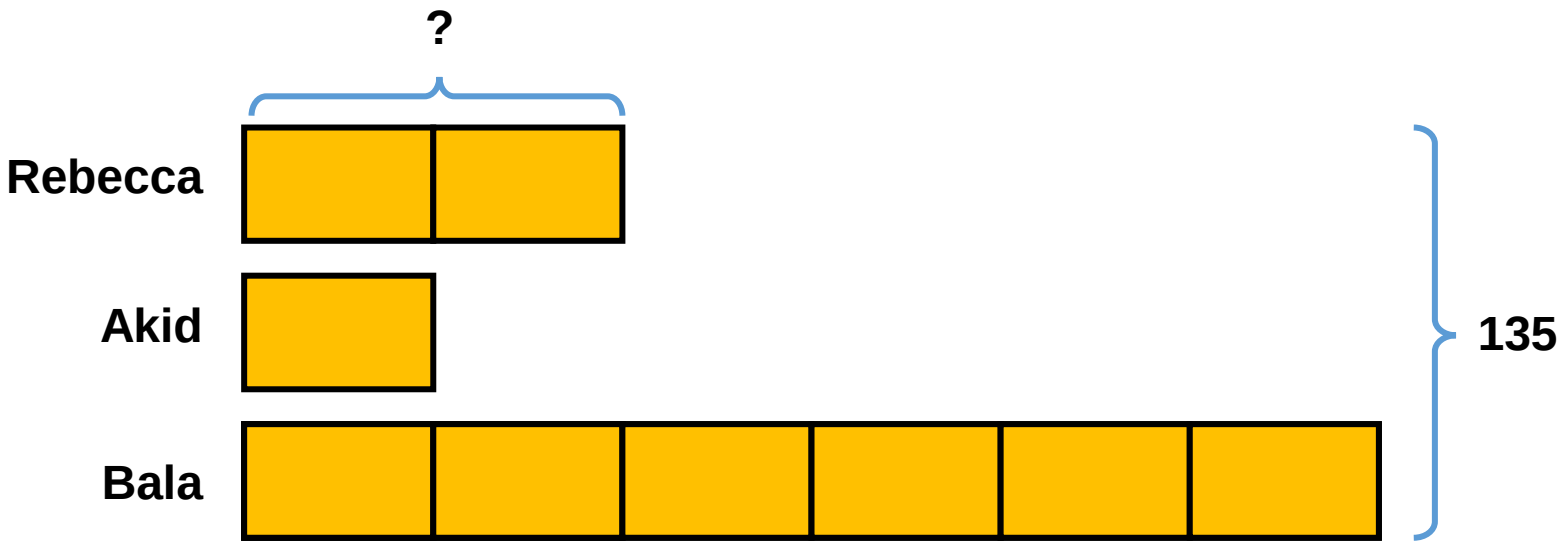
Question 4

Rebecca, Akid and Bala had a total of 135 stamps.

Rebecca had twice as many stamps as Akid.

Bala had three times as many stamps as Rebecca.

How many stamps did Rebecca have?



$9\ u = 135$

$1\ u = 135 \div 9$

$= 15$

$2\ u = 15 \times 2$

$= 30$

Whole Numbers

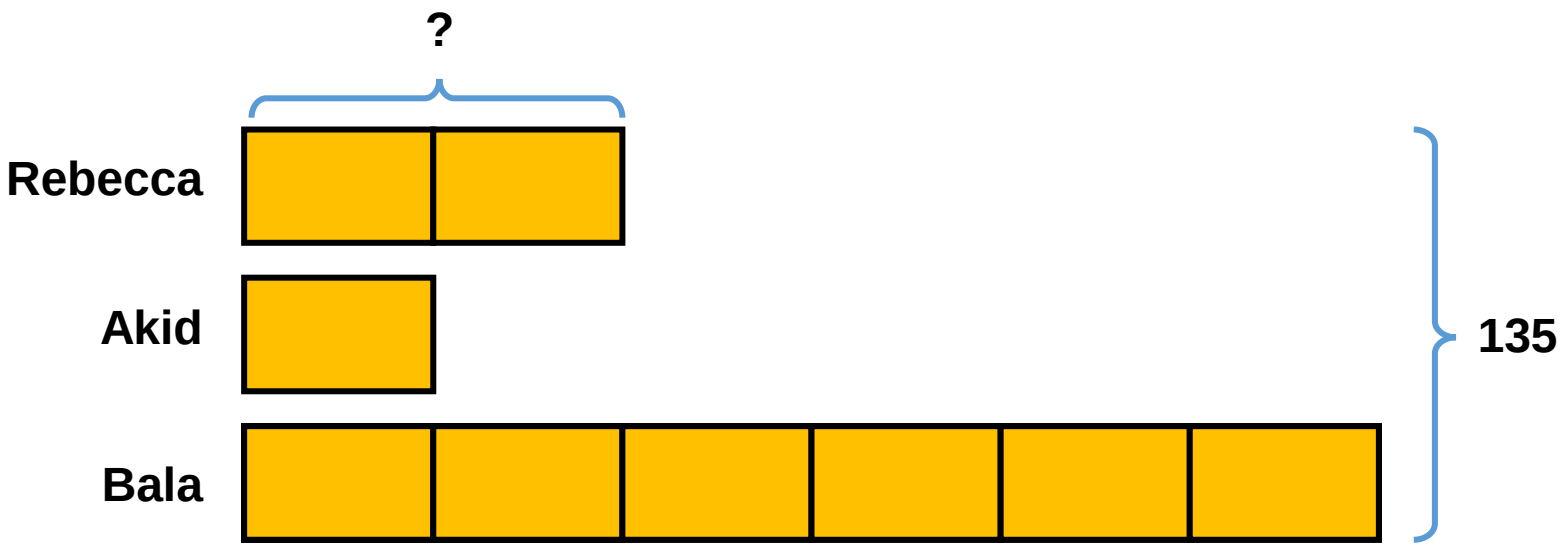
Question 4

Rebecca, Akid and Bala had a total of 135 stamps.

Rebecca had twice as many stamps as Akid.

Bala had three times as many stamps as Rebecca.

How many stamps did Rebecca have?



$9\ u = 135$

$1\ u = 135 \div 9$

$= 15$

$2\ u = 15 \times 2$

$= \underline{30}$

Review:

$1\ u = 15$

$15 \times 9 = 135$ (✓)

STAR Approach to Problem-Solving			
Step 1: **Study** and understand	**Step 2:** **Think** of a plan	**Step 3:** **Act** on the plan to solve your problem	**Step 4:** **Review** – Check your answer

Question 5

Whole Numbers

Shelley, Keene and Chris had a total of 104 sweets.

Shelley had twice as many sweets as Keene.

Chris had 24 more sweets than Shelley.

How many sweets did Chris have?

Step 1:

- What am I given? (facts/ information/ data)
- What can I find out?
- What am I looking for?

What am I given? (facts/ information/ data)

There are 3 people.
The total number of sweets that the 3 people have is 104.
Shelley: 2 units; Keene: 1 unit.
Chris has 24 sweets more than Shelley.

What can I find out?

Number of equal units and 'known part' that is equal to 104. (Known apart = 24)

What am I looking for?

The number of sweets that Chris had. (How many units and known parts?)

STAR Approach to Problem-Solving			
Step 1: <u>Study</u> and understand	**Step 2:** <u>Think</u> of a plan	**Step 3:** <u>Act</u> on the plan to solve your problem	**Step 4:** <u>Review</u> – Check your answer

Whole Numbers

Question 5

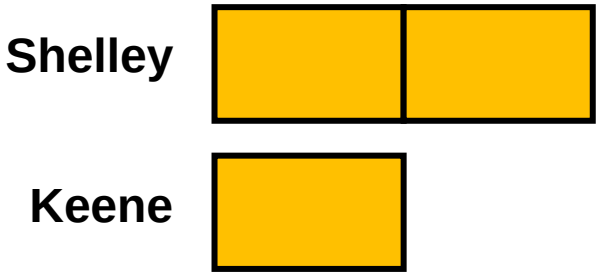
Shelley, Keene and Chris had a total of 104 sweets.

Shelley had twice as many sweets as Keene.

Chris had 24 more sweets than Shelley.

How many sweets did Chris have?

MODEL APPROACH!



Whole Numbers

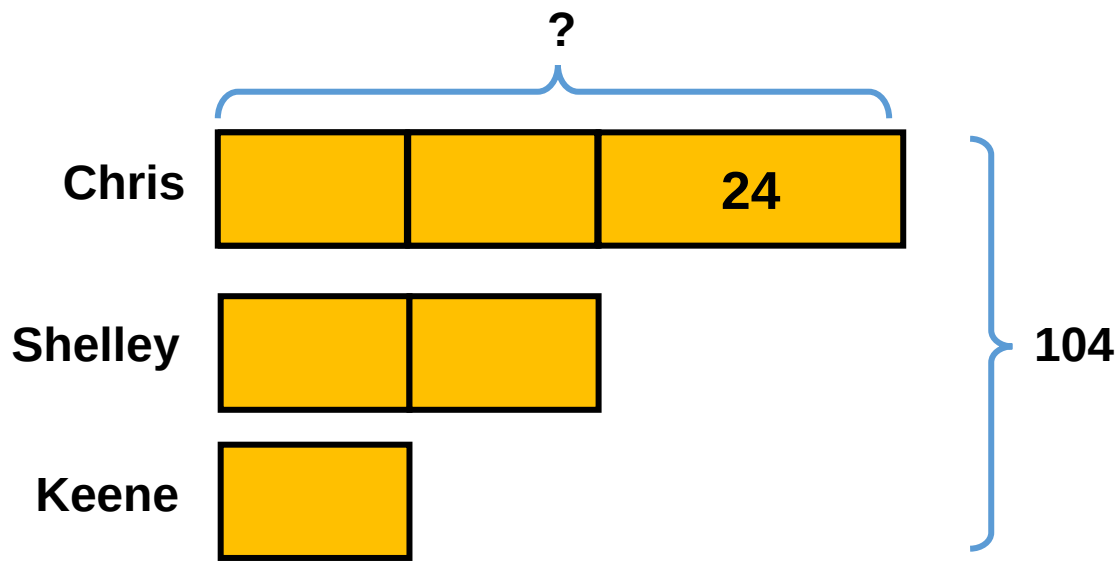
Question 5

Shelley, Keene and Chris had a total of 104 sweets.

Shelley had twice as many sweets as Keene.

Chris had 24 more sweets than Shelley.

How many sweets did Chris have?



5 u = 104 – 24
= 80

1 u = 80 ÷ 5
= 16

2 u = 16 × 2
= 32

Chris → 32 + 24 = 56

STAR Approach to Problem-Solving			
Step 1: Study and understand	**Step 2:** Think of a plan	**Step 3:** Act on the plan to solve your problem	**Step 4:** Review – Check your answer

Whole Numbers

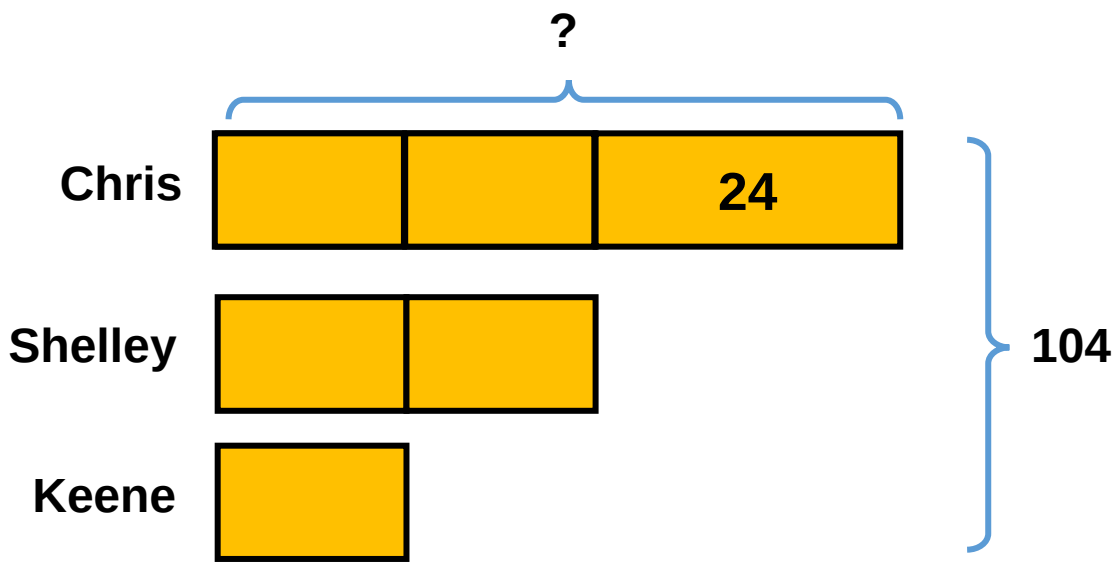
Question 5

Shelley, Keene and Chris had a total of 104 sweets.

Shelley had twice as many sweets as Keene.

Chris had 24 more sweets than Shelley.

How many sweets did Chris have?



$5\ u = 104 - 24$

$= 80$

$1\ u = 80 \div 5$

$= 16$

$2\ u = 16 \times 2$

$= 32$

Chris → 32 + 24 = 56

Review:

Total → 56 + 32 + 16 = 104 (✓)

Whole Numbers: *Before-and-After* Concept

- 2 quantities are equal at first, in the end, or receive the same quantity of something in the middle.
- Keywords like "after", "at first" , "in the end" and "equal".

➢ Do not be confused with *Work Backwards* method, where information of "before" situation is not given at all.

A) Before-and-After Concept: *Difference Unchanged*

Ahmad had $130 and his sister had $45. After their father gave each of them an equal amount of money, Ahmad had twice as much money as his sister. How much did their father give to each of them?

Before-and-After (Difference Unchanged)

Question 6

Ahmad had $130 and his sister had $45. After their father gave each of them an equal amount of money, Ahmad had twice as much money as his sister. How much did their father give to each of them?

Step 1:

- What am I given? (facts/ information/ data)
- What can I find out?
- What am I looking for?

Example

- *$135 - $50 = $85*
- *$140 - $55 = $85*

- *Ahmad had $85 more than his sister.*
- *As their father gave them the same amount of money, Ahmad will still have $85 more than his sister.*

STAR Approach to Problem-Solving

Step 1: Study and understand	Step 2: Think of a plan	Step 3: Act on the plan to solve your problem	Step 4: Review – Check your answer

Question 6

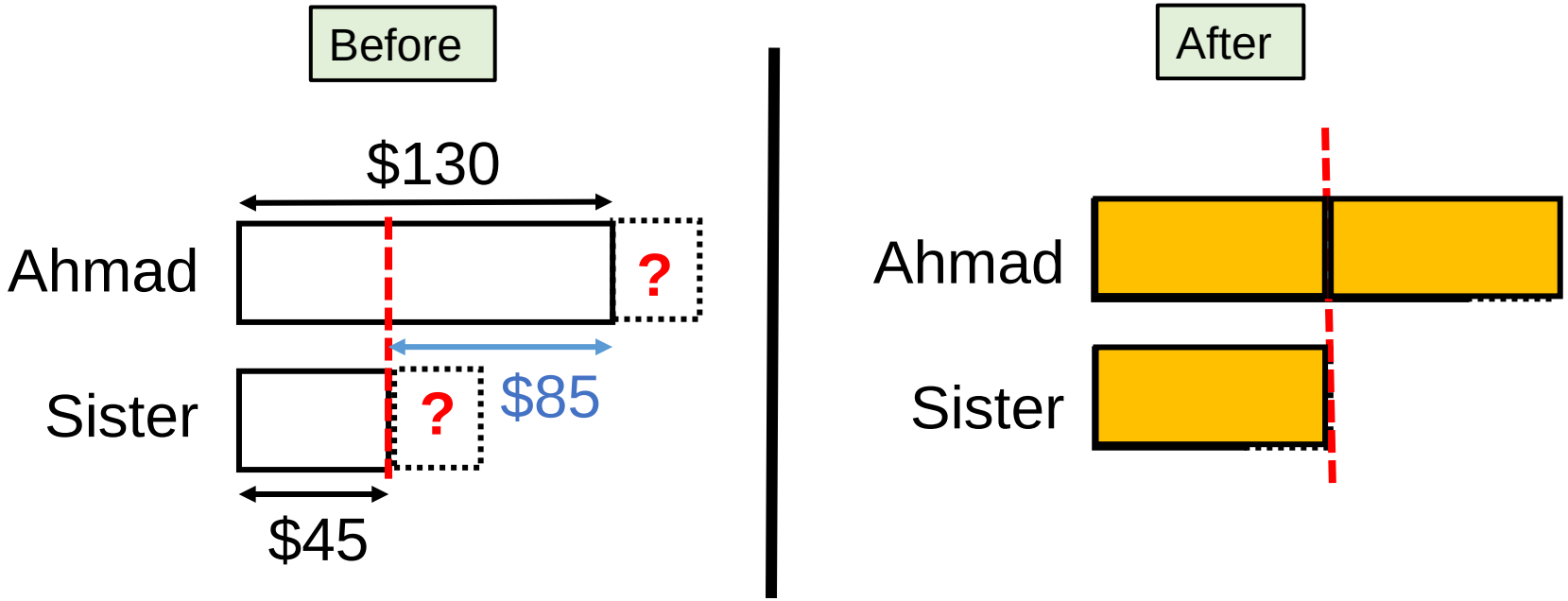
Ahmad had $130 and his sister had $45. After their father gave each of them an equal amount of money, Ahmad had twice as much money as his sister. How much did their father give to each of them?

Question	Visualising the model
How many quantities should there be in the model? What are they?	➢ Two quantities ➢ Ahmad, Sister
How will the bars of each quantity look like?	➢ Ahmad's bar will be longer ➢ His sister's bar will be shorter
Do I need to add extra bars in the model later? How will that look like?	➢ Yes. Their father gave them some money. ➢ The part of money their father gave them must be the same.
How will the model look like in the end?	➢ Ahmad's bar will show 2 units ➢ His sister's bar will show 1 unit

Whole Numbers: Before-and-After Model (Difference Unchanged)

Question 6

Ahmad had $130 and his sister had $45. After their father gave each of them an equal amount of money, Ahmad had twice as much money as his sister. How much did their father give to each of them?

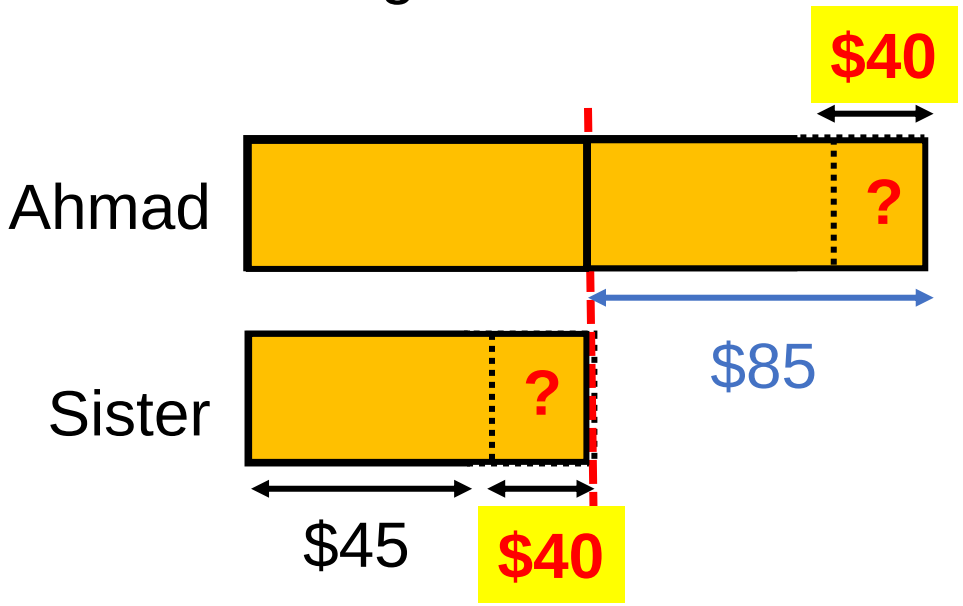


Whole Numbers: Before-and-After Model (Difference Unchanged)

Question 6

Ahmad had $130 and his sister had $45. After their father gave each of them an equal amount of money, Ahmad had twice as much money as his sister.

How much did their father give to each of them?



$130 - $45 = $85

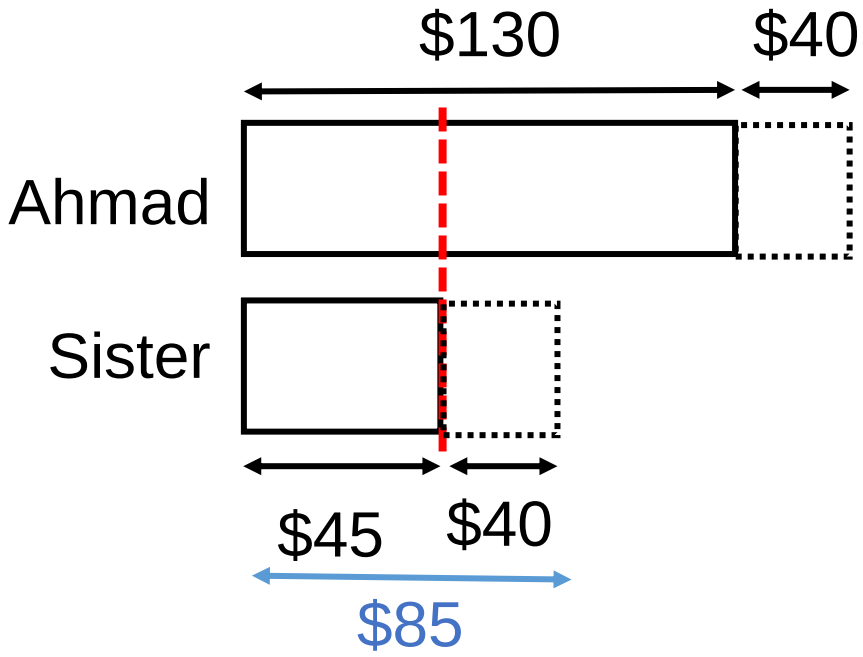
$85 - $45 = **$40**

Question 6

Whole Numbers: Before and After (Difference Unchanged)

Ahmad had $130 and his sister had $45. After their father gave each of them an equal amount of money, Ahmad had twice as much money as his sister.

How much did their father give to each of them?



$130 + $40 = $170
(Ahmad's money)

$45 + $40 = $85
(Sister's money)

$170 ÷ 2 = $85 *or*
$85 x 2 = $170

B) Before-and-After Concept: Total Unchanged (*Internal Transfer*)

Ali had 1260 stickers. Bala had 480 fewer stickers than Ali. Ali gave some stickers to Bala. In the end, Bala had 3 times as many stickers as Ali. How many stickers did Ali have in the end?

Q7

Before and After Model: Total Unchanged (Internal Transfer)

Question 7

Ali had 1260 stickers. Bala had 480 fewer stickers than Ali. Ali gave some stickers to Bala. In the end, Bala had 3 times as many stickers as Ali. How many stickers did Ali have in the end?

Step 1:

- What am I given? (facts/ information/ data)
- What can I find out?
- What am I looking for?

Total number of stickers both of them had is the same no matter how many Ali gave to Bala.

- *How many stickers did Bala have?*
- *What was the total number of stickers they had?*

STAR Approach to Problem-Solving

Step 1: Study and understand	Step 2: Think of a plan	Step 3: Act on the plan to solve your problem	Step 4: Review – Check your answer

Question 7

Ali had 1260 stickers. Bala had 480 fewer stickers than Ali. Ali gave some stickers to Bala. In the end, Bala had 3 times as many stickers as Ali.

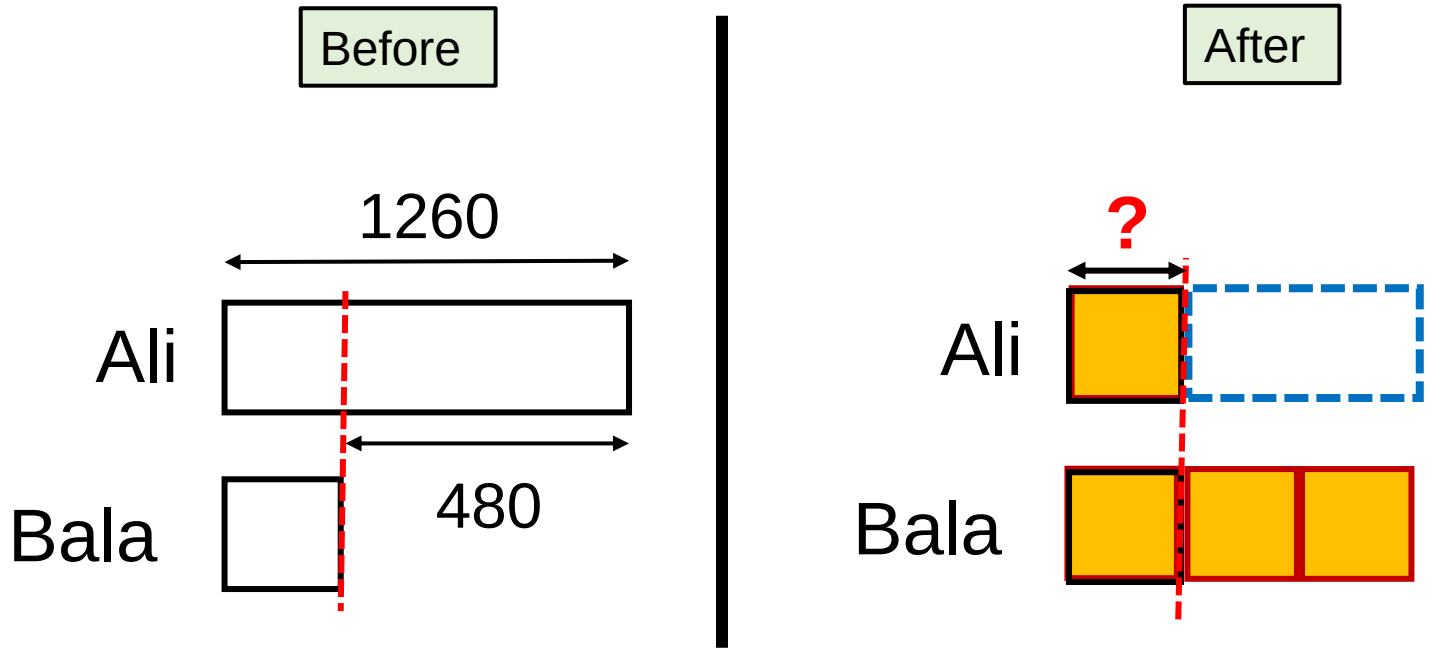
How many stickers did Ali have in the end?

Question	Visualising the model
How many quantities should there be in the model? What are they?	➢ Two quantities ➢ Ali, Bala
How do the bars of each quantity look like?	➢ Ali's bar is longer ➢ Bala's bar is shorter (fewer stickers)
Must I make some changes to the bars later? Why?	Yes, because Ali gave some of his stickers to Bala.
How will the model look like in the end?	➢ Bala's bar will be longer than Ali's. ➢ Bala will have 3 parts while Ali will have 1 part.

Question 7

Before-and-After Model: Total Unchanged (Internal Transfer)

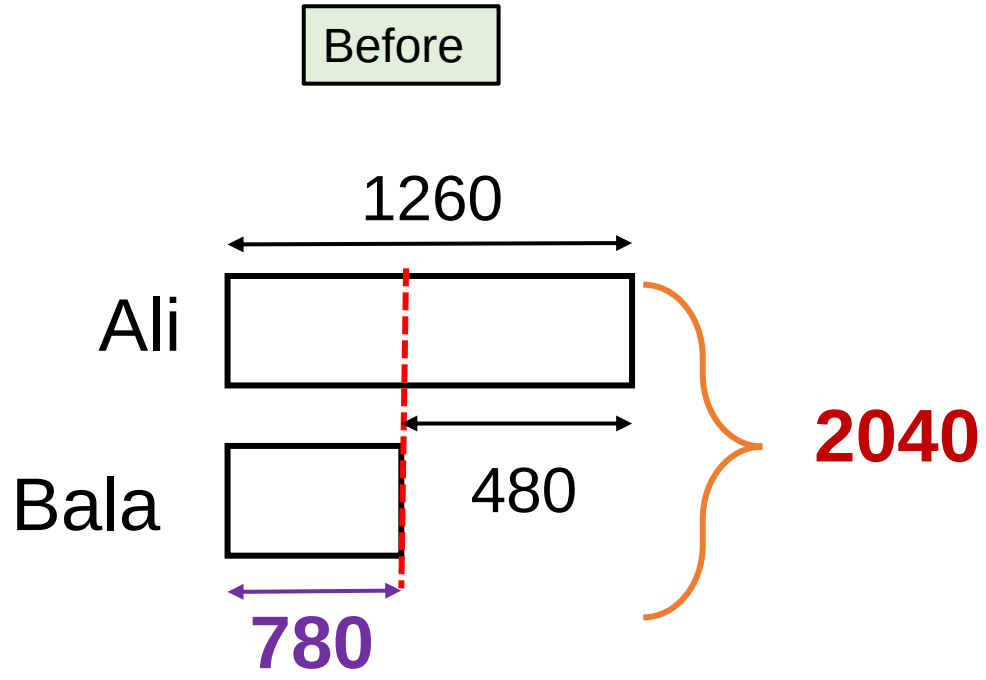
Ali had 1260 stickers. Bala had 480 fewer stickers than Ali. Ali gave some stickers to Bala. In the end, Bala had 3 times as many stickers as Ali. How many stickers did Ali have in the end?



Question 7

Before-and-After Model: Total Unchanged (Internal Transfer)

Ali had 1260 stickers. Bala had 480 fewer stickers than Ali. Ali gave some stickers to Bala. In the end, Bala had 3 times as many stickers as Ali. How many stickers did Ali have in the end?



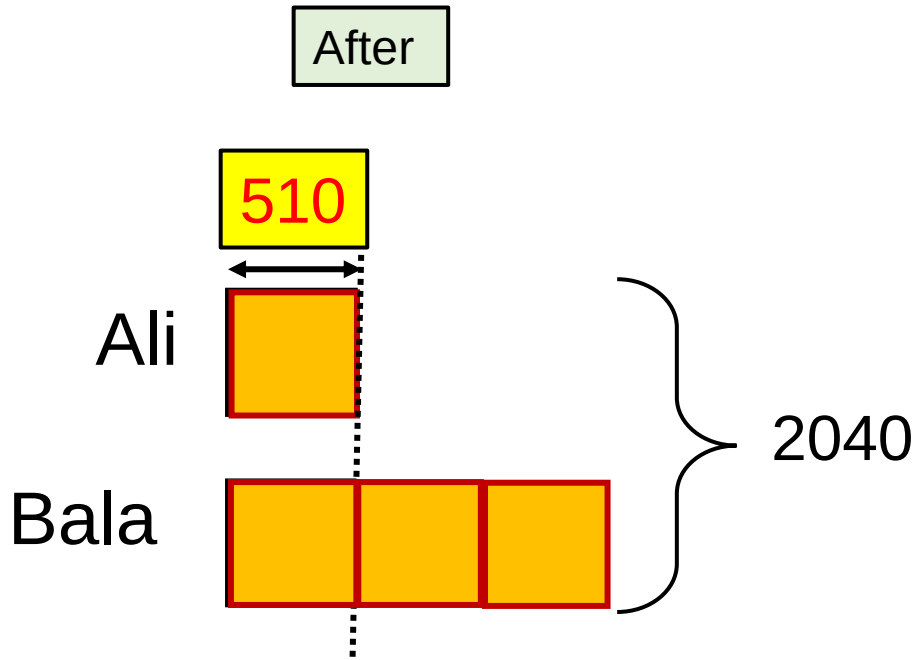
1260 – 480 = 780
(*Bala had 780 stickers*)

1260 + 780 = 2040
(total number of stickers)

Question 7

Before-and-After Model: Total Unchanged (Internal Transfer)

Ali had 1260 stickers. Bala had 480 fewer stickers than Ali. Ali gave some stickers to Bala. In the end, Bala had 3 times as many stickers as Ali. How many stickers did Ali have in the end?



1260 – 480 = 780
(*Bala had 780 stickers*)

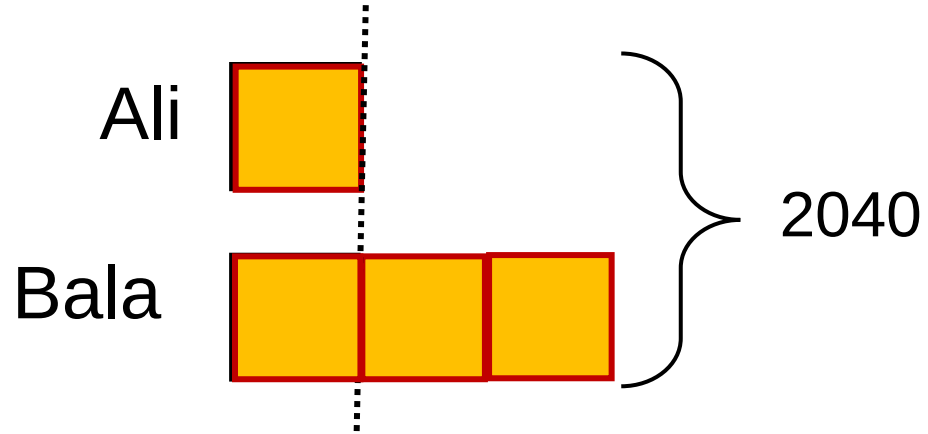
1260 + 780 = 2040
(total number of stickers)

2040 ÷ 4 = **510**

Question 7

Before and After:Total Unchanged (Internal Transfer)

Ali had 1260 stickers. Bala had 480 fewer stickers than Ali. Ali gave some stickers to Bala. In the end, Bala had 3 times as many stickers as Ali. How many stickers did Ali have in the end?



510 x 4 = 2040

Heuristic Skills

- Guess and Check
- Working Backwards

Guess and Check

This is also called 'trial and error'.

- We guess the answer to a problem and check if the answer fits the **given conditions**.

- We repeat this process with **reasonable guesses** until we reach an answer that satisfies all the conditions.

- **2 variables**
- **Total number** of the 2 variables
- **Total value** of all the variables

STAR Approach to Problem-Solving			
Step 1: **Study and understand**	**Step 2:** **Think of a plan**	**Step 3:** **Act on the plan to solve your problem**	**Step 4:** **Review – Check your answer**

Guess and Check

A farmer has 24 rabbits and ducks in his farm.

There are 66 legs in all.

How many ducks does he have?

- ✓ 24 animals (rabbits and ducks)
- ✓ 66 legs

- ✓ Number of ducks

- ✓ Number of rabbits
- ✓ Number of ducks
- ✓ Rabbit has 4 legs
- ✓ Chicken has 2 legs

} 66 legs in all

Question 8

Step 1:

- What am I given? (facts/ information/ data)
- What can I find out?
- What am I looking for?

Question 8

Guess and Check

A farmer has 24 rabbits and ducks in his farm. } 2 variables

There are 66 legs in all.

How many ducks does he have?

Step 2:

- What strategy should I use?

✓ 2 variables – Rabbits and ducks
✓ Total **number** of the 2 variables – 24 animals
✓ Total **value** of all the variable -66 legs } condition

We will use Guess and Check Strategy to find possible combinations of correct number of rabbits and ducks.

Guess and Check

Question 8

DRAW A TABLE

Step 3:

I will draw a guess and check table

A farmer has 24 rabbits and ducks in his farm.

There are 66 legs in all.

How many ducks does he have?

No. of rabbits	No. of rabbit legs	No. of ducks	No. of duck legs	Total no. of legs	Check
12	12 X 4 = 48	12	12 X 2 = 24	48 + 24 = 72	X
10	10 X 4 = 40	14	14 X 2 = 28	40 + 28 = 68	X
9	9 X 4 = 36	15	15 X 2 = 30	36 + 30 = 66	√

Guess and Check

A farmer has 24 rabbits and ducks in his farm.

There are 66 legs in all.

How many ducks does he have?

Answer : 15 ducks

No. of rabbits	No. of rabbit legs	No. of ducks	No. of duck legs	Total no. of legs	Check
12	12 X 4 = 48	12	12 X 2 = 24	48 + 24 = 72	X
10	10 X 4 = 40	14	14 X 2 = 28	40 + 28 = 68	X
9	9 X 4 = 36	15	15 X 2 = 30	36 + 30 = 66	√

Question 8

Step 4:

- Have I answered the question?
- Is my answer reasonable / make sense?
- Have I checked my answers?
- Review

Review

9 + 15 = 24 rabbits and ducks √

9 x 4 = 36 rabbit legs

15 x 2 = 30 duck legs

36 + 30 = 66 legs √

STAR Approach to Problem-Solving			
Step 1: **Study and understand**	**Step 2:** **Think of a plan**	**Step 3:** **Act on the plan to solve your problem**	**Step 4:** **Review – Check your answer**

Guess and Check

Question 9

Susie bought 16 books and pens for a total of $102.

Each book cost $7 and each pen cost $5.

How many books did she buy?

Step 1:

- What am I given? (facts/ information/ data)
- What can I find out?
- What am I looking for?

✓ 16 books and pens
✓ Total cost - $102
✓ Book - $7
✓ Pen - $5

✓ Number of books

✓ Number of books
✓ Number of pens

} 16

Guess and Check

Question 9

Susie bought 16 books and pens for a total of $102. } **2 variables**

Each book cost $7 and each pen cost $5.

How many books did he buy?

Step 2:

- What strategy should I use?

- ✓ 2 variables – Books and pens
- ✓ Total **number** of the 2 variables - 16
- ✓ Total **value** of all the variable - $102 } **condition**

We will use **Guess and Check Strategy** to find possible combinations of correct number of books and pens.

Guess and Check

DRAW A TABLE

Question 9

Step 3:

I will draw a guess and check table

Susie bought 16 books and pens for a total of $102.

Each book cost $7 and each pen cost $5.

How many books did he buy?

No. of books	Cost of books	No. of pens	Cost of pens	Total Cost	Check
8	8 X 7 = 56	8	8 X 5 = 40	56 + 40 = 96	X
9	9 X 7 = 63	7	7 X 5 = 35	63 + 35 = 98	X
11	11 X 7 = 77	5	5 X 5 = 25	77 + 25 = 102	√

Guess and Check

Susie bought 16 books and pens for a total of $102.

Each book cost $7 and each pen cost $5.

How many books did he buy?

Answer : 11 books

No. of books	Cost of books	No. of pens	Cost of pens	Total Cost	Check
8	8 X 7 = 56	8	8 X 5 = 40	56 + 40 = 96	X
9	9 X 7 = 63	7	7 X 5 = 35	63 + 35 = 98	X
11	11 X 7 = 77	5	5 X 5 = 25	77 + 25 = 102	√

Question 9

Step 4:

- Have I answered the question?
- Is my answer reasonable / make sense?
- Have I checked my answers?
- Review

Review

11 + 5 = 16 books and pens

11 x 7 = $77 cost of books

5 x 5 = $25 cost of pens

$77 + $25 = $102

Working Backwards

- Used when none or little information is given to understand the 'Before' situation

- All or most the information given is for the 'After' situation

STAR Approach to Problem-Solving			
Step 1: **Study** and understand	**Step 2:** **Think** of a plan	**Step 3:** **Act** on the plan to solve your problem	**Step 4:** **Review** – Check your answer

Working Backwards

Question 10

2 characters

total amount remains constant

Cindy and Eve had $60 altogether. After Cindy gave Eve $12 and Eve gave Cindy $10, Cindy had three times as much money as Eve.

How much money did each of them have at first?

Cindy has more money, three times more

an exchange happened, amounts are different

Step 1:

- What am I given? (facts/ information/ data)
- What can I find out?
- What am I looking for?

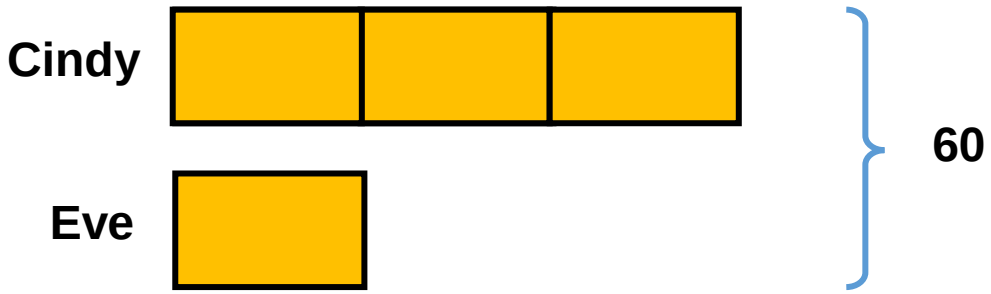
Working Backwards

Question 10

Cindy and Eve had $60 altogether. After Cindy gave Eve $12 and Eve gave Cindy $10, Cindy had three times as much money as Eve. How much money did each of them have at first?

Using model to visually represent data

After



4 units = 60
1 unit = 15

After the exchange, Eve had $15 and Cindy had $45.

Using data from the model and a diagram to work backwards

Working Backwards

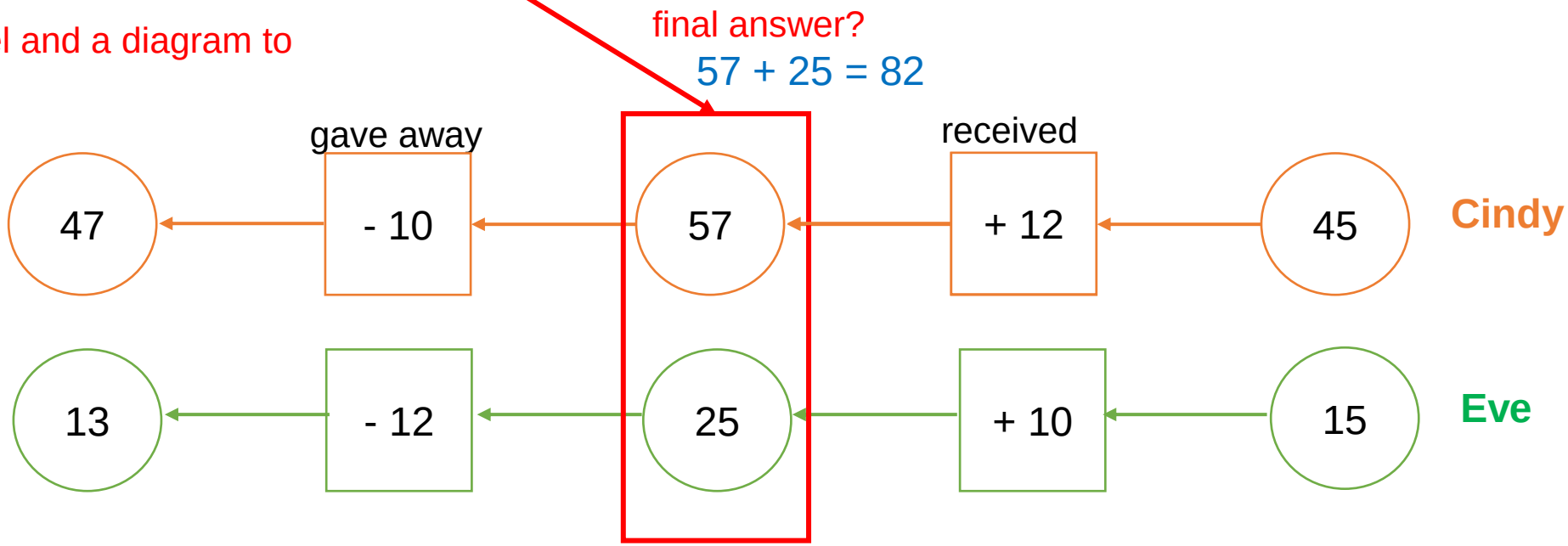
Question 10

Cindy and Eve had $60 altogether. After Cindy gave Eve $12 and Eve gave Cindy $10, Cindy had three times as much money as Eve. How much money did each of them have at first?

Using data from the model and a diagram to work backwards

4 units = 60
1 unit = 15

After the exchange, Eve had $15 and Cindy had $45.

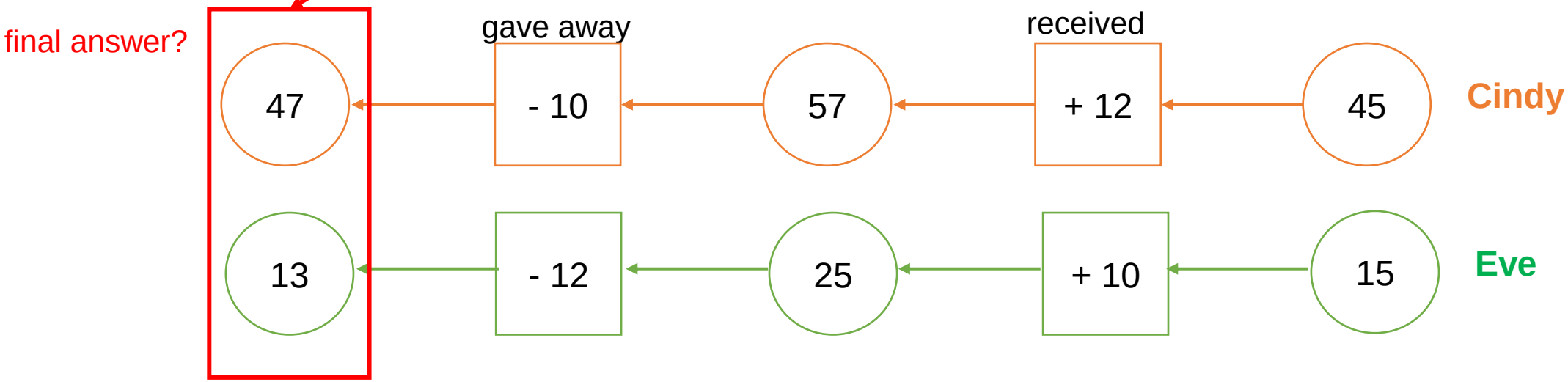


STAR Approach to Problem-Solving			
Step 1: **Study** and understand	**Step 2:** **Think** of a plan	**Step 3:** **Act** on the plan to solve your problem	**Step 4:** **Review** – Check your answer

Question 10

Working Backwards

Cindy and Eve had $60 altogether. After Cindy gave Eve $12 and Eve gave Cindy $10, Cindy had three times as much money as Eve. How much money did each of them have at first?



47 + 13 = 60

Cindy had $47 while Eve had $13 at first.

The Must Have Approach

- ✓ **Encourage Growth Mindset**
  Be positive about Math. Allow and learn from mistakes.

- ✓ **Provide guidance, not the solutions**
  Give a step and ask a question to lead your child towards solving the problem.

- ✓ **Give encouragement**
  Praise your child.

The Must Have Approach

- ✓ **Make Math relevant in real life**
  Application of math knowledge and skills

- ✓ **Teach concepts**
  Guide your child in understanding the concepts first and reinforce with practice

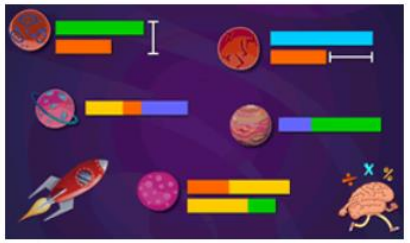
- ✓ **Choice of learning resources i.e. assessment books**

Integration of ICT with Mathematics

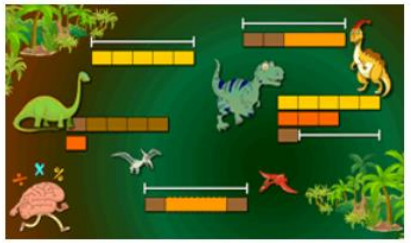
- Math Playground - Thinking Blocks

(https://www.mathplayground.com/thinkingblocks.html)

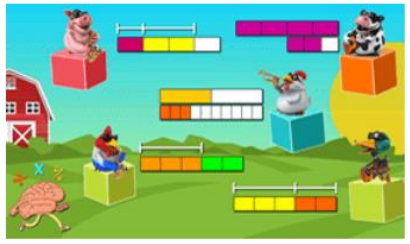
Thinking Blocks Junior



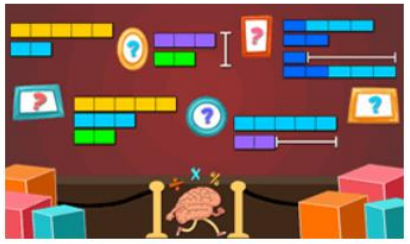
Thinking Blocks Addition



Thinking Blocks Multiplication



Thinking Blocks Fractions

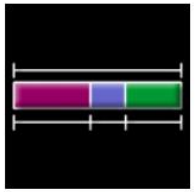


Thinking Blocks Ratios

Thinking Blocks Tool

Addition and Subtraction Videos

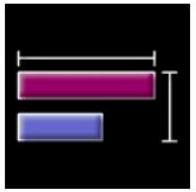
Part-Whole A



Part-Whole B

Two Steps

Compare A



Compare B

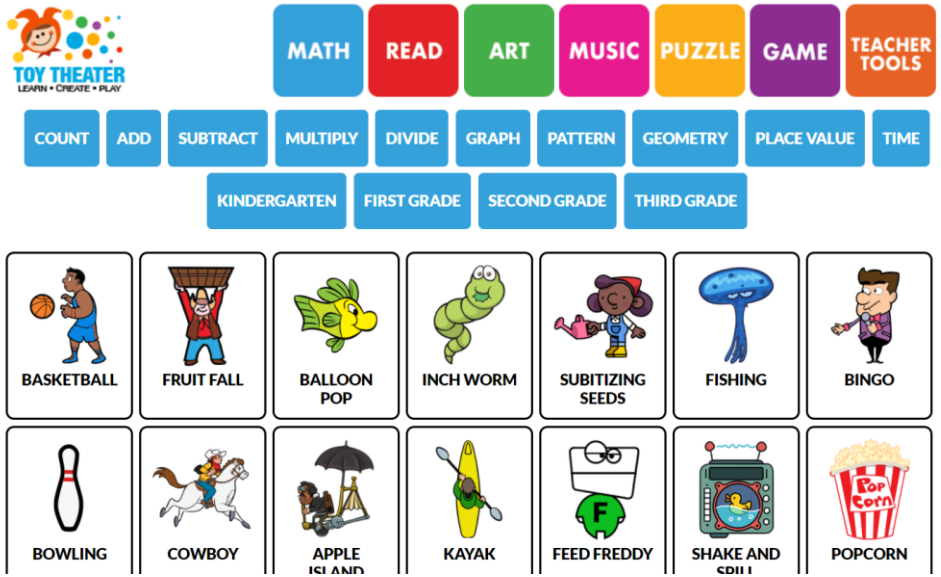
Compare C

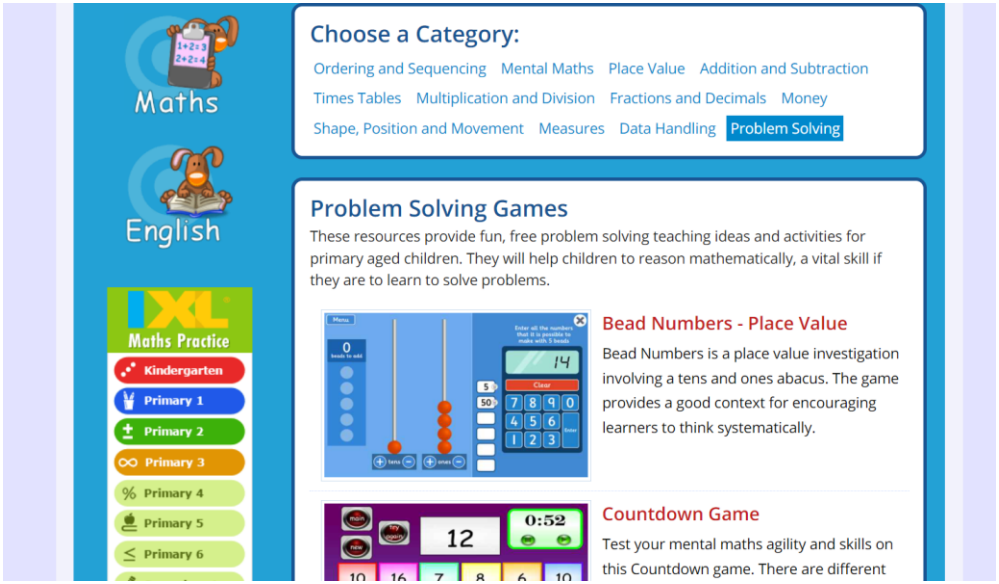
Integration of ICT with Mathematics

- Math Games

  (https://toytheater.com/category/math-games/)

  (https://www.topmarks.co.uk/maths-games/)





FAQ

1. Will ‘assumption method’ be taught to the students?

Assumption method is also known as ‘making suppositions’ in the list of heuristics. It will be taught to the students at the upper primary (P5 & P6) levels.

2. Do teachers encourage students to use Guess and Check to solve problems?

There are different ways to solve a problem. Students are often introduced to alternative solutions for each problem in daily lessons. Some solutions may be more efficient than another depending on the given problem. Overall, students can choose how they want to solve a problem as long as the method is reasonable.

FAQ

3. What is the working that students need to show on the paper other than the model are students marked on working to present?

Students need to show their equations clearly to show their thinking process in solving the problem. This allows teachers to understand the students' thoughts and method marks will be awarded for correct steps taken should the final answer be incorrect.

4. How can parents help students who take a longer time to understand word problems?

We would strongly encourage parents to guide your child to draw models as a visual representation of what they have understood. After which, use the 3 guiding questions to scaffold their thinking process. This has to be done regularly for students to get better in the problem-solving process.

Every Navalite A Leader

Self-Discipline | Integrity | Respect | Compassion | Learning

https://go.gov.sg/p3p4mathworkshop2022

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Self-Discipline | Integrity | Respect | Compassion | Learning

Thank you!

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Self-Discipline | Integrity | Respect | Compassion | Learning