S.E.A 2019/22 MATHEMATICS OBSERVATIONS

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Points of Interest

- Formatting adjustments
- Item adjustments
- Scoring adjustments
- Teaching emphases and adjustments

FORMATTING ADJUSTMENTS

Physical Changes in Mathematics Paper

- We already know that there will be 45 items
  - *Section 1 – 20 items*
  - *Section 2 – 20 items*
  - *Section 3 – 5 items (4 marks each)*

- What we did not know is that the restricted working column has been removed. Curriculum favours open space below each item as the new working canvas.

- The font throughout the Mathematics Paper is constant. i.e. There are no highlight, italics, increased font size, bolded or underlined text in any question.
  - *Caveat: Items were digit needs to be identified would have a different font.*
    - Ex. What is the value of the 5 in 3**5**,520

ITEM ADJUSTMENTS

Item Adjustments

- Construction of Items:
  - *Fewer items are being scaffolded for students. (emphasis is on reasoning)*
  - *Irrelevant information can be present in problems.*

- The thinking processes have changed
  - *NO MORE (K), (AT) and (PS)*
  - *Be familiar with these terms. They are not a swap of words, the semantics differ*
    - KNOWING
    - APPLYING
    - REASONING

Example of SEA – 2018 test Item.

*A vendor buys mangoes at $4. When customers buy 2 mangoes they get **1 free**. The vendor gives away 30 free mangoes. The vendor sells $516 worth of mangoes.*

a) How many total mangoes were given to customers who bought 2 mangoes?

Answer = _____ (2 marks)

a) How much money did the vendor receive from customers who bought 1 mango?

Answer = _____ (3 marks)

Example of SEA 2019/22

A vendor buys mangoes at $4. and sells them for $6 each. When customers buy 2 mangoes they get 1 free. The vendor gives away 30 free mangoes. The vendor sells $516 worth of mangoes.

How many customers bought 1 mango? *(4 marks)*

Answer = _____

Scaffolding versus No Scaffolding

A vendor buys mangoes at $4. and sells them for $6 each. When customers buy 2 mangoes they get 1 free. The vendor gives away 30 free mangoes. The vendor sells $516 worth of mangoes.

a) *How much profit did the vendor make on each mango? (1 mark)*

a) *How many total mangoes were given to customers who bought 2 mangoes? (2 marks)*

a) *How much money did the vendor receive from customers who bought 1 mango?*

(2 marks)

A vendor buys mangoes at $4. and sells them for $6 each. When customers buy 2 mangoes they get 1 free. The vendor gives away 30 free mangoes. The vendor sells $516 worth of mangoes.

How many customers bought 1 mango?

(4 marks)

SCORING ADJUSTMENTS

“If a equals b; and b equals c, then you do the math.”

Scoring adjustments

Instructions – Solve the problem below. The correct answer is worth 4 marks.

A vendor buys mangoes at $4. and sells them for $6 each. When customers buy 2 mangoes they get 1 free. The vendor gives away 30 free mangoes. The vendor sells $516 worth of mangoes.

How many customers bought 1 mango?

Scoring Adjustments *reflects less emphasis on correct process but more emphasis on reasoning and applying concepts.*

4 marks

30 free means =30 bought 2

$30 \times 2 = 60\ mangoes$

Total cost of 60 mangoes

$60 \times \$6 = \$360$

Money from those who bought 1

$\$516 - \$360 = \$156$

Customers who bought 1 mango

$\$156 \div 6 = 26\ mangoes$

3 marks

30 free means =30 bought 2

$30 \times 2 = 60\ mangoes$

Total cost of 60 mangoes

$60 \times \$6 = \$360$

Money from those who bought 1

$\$516 - \$360 = \$156$

OR

Customers who bought 1 mango

$\$156 \div 6 = WRONG\ ANSWER$

2 marks

30 free means =30 bought 2

$30 \times 2 = 60\ mangoes$

Total cost of 60 mangoes

$60 \times \$6 = \$360$

1 mark

30 free means =30 bought 2

$30 \times 2 = 60\ mangoes$

TEACHING ADJUSTMENTS

“A paradigm shift requires change not inertia”

Teaching Emphases

- Mirror S.E.A format in monthly and term tests.
- Teaching Approaches must suite mathematical processes
  - *Knowing, Applying, Reasoning.*
- Promoting varied methods of arriving at solutions
- Include mathematical specific language in items.
- If possible construct authentic mathematical items. These are often better than what is found in current textbooks.
  - *Teachers may have to alter problems in textbooks to accommodate less scaffolding.*

IMPROVING PROBLEM SOLVING SKILLS

“An authentic mathematical problem is a situation in which the mathematical sequence for solving it is too unfamiliar and novel to be considered routine.”

We can improve problem solving.

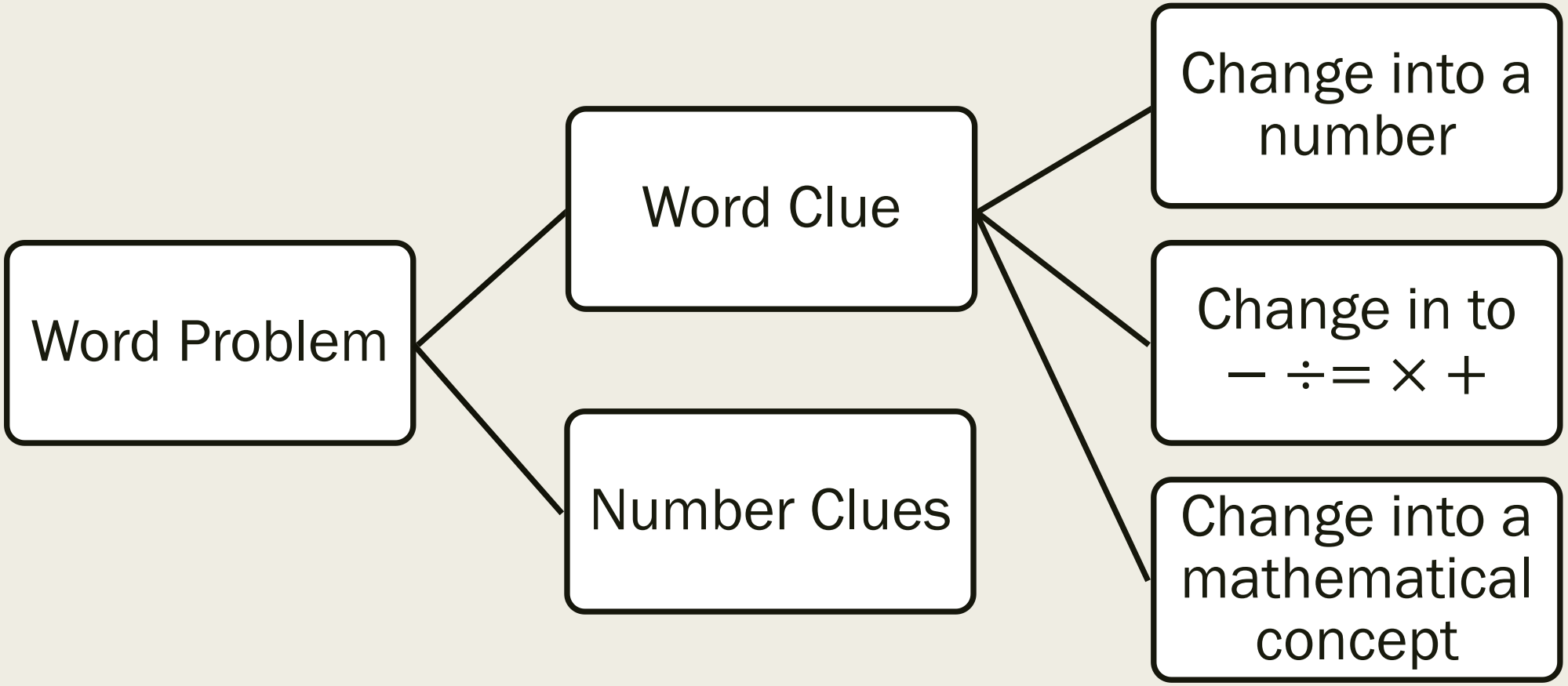
- …by following the four (4) step problem solving technique.
  - *Read, question, clues, plan, attempt.*
- …by decomposing clues in worded problems.
- …by exposing pupils to problem solving approaches.
  - *Bar models, number sentences, tables, guess and check, pre-algebra, drawing, etc.*
- … by exposing pupils to mathematical statements void of questions or guides.

Rationale for Polya's method to Problem Solving

This seems so obvious that it is often not even mentioned, yet students are often stymied in their efforts to solve problems simply because they don't understand it fully, or even in part. Polya taught teachers to ask students questions such as:

- Do you understand all the words used in stating the problem?
- What are you asked to find or show?
- Can you restate the problem in your own words?
- Can you think of a picture or diagram that might help you understand the problem?
- Is there enough information to enable you to find a solution?

Decomposing clues in worded problems



Exposing pupils to mathematical statements void of questions

What can we calculate?

Can you think of a diagram that explains the statement?

- A class has 45 students. 21 are girls.
- George runs 26km in a Marathon. He rides his bicycle for 7km.
- $\frac{3}{4}$ of the picture is shaded
- There are 4 green marbles, 5 red marbles and 3 blue marbles.
- Mr. John's pay is $8,500. He spends $1,200 on bills and $800 on entertainment.
- Archie is allowed to watch television for 1 hour. He wants to watch a show that lasts forty five minutes.
- Paul's book has 500 pages. He reads 125 pages from a book on Monday, 75 pages on Tuesday.
- Barry scores 10,000 points in a video game. His brother scores 3,000 fewer.
- Freddy eats $\frac{3}{8}$ of a pizza.
- A large dog eats 28 cups of chow in 1 week. A small dog eats 21 less cups of chow.
- Paul's book has 500 pages. He reads 125 pages from a book on Monday, 75 pages on Tuesday.
- Barry scores 10,000 points in a video game. His brother scores 3,000 fewer.