SEAMEO
REGIONAL CENTRE FOR EDUCATION IN SCIENCE & MATHEMATICS

Realistic Mathematics Education (RME)

Developing Context Problems

RC-SM-144-2: Mathematical Problem Solving in Real-World Situation for Secondary Mathematics Classrooms

05 - 30 August 2019

Warabhorn, Leong Chee Kin & Teoh Boon Tat
Mathematics Education Specialists
SEAMEO RECSAM

Differentiating Word Problems and Context Problems

WE WANT *SUBWAY IN MALAYSIA* !!! Facebook

FAIR SHARE – Word Problems

- When 15 submarine sandwiches are divided among 10 children, how much sub would each child get ?
- When 5 submarine sandwiches are divided among 4 children, how much sub would each child get ?
- When 8 submarine sandwiches are divided among 7 children, how much sub would each child get ?

FAIR SHARE – Context Problems

Submarine Sandwiches

FAIR SHARE or REASONABLE SHARE

Putting the problem in context

Last year there was a field expedition organised by MOE Malaysia to gather research about Malaysia culture. The school children who came were divided to visit four places of interest: five children visited Penang Hill, four the World Heritage Site, eight cross Penang Bridge to mainland and five Penang Butterfly Farm (Entopia).

Some of the children had however submitted their consent forms very late, making the number of submarine sandwiches ordered for break to be distributed to the groups respectively as follows: 4, 3, 7 and 3.

FAIR SHARE or REASONABLE SHARE

Putting the problem in context

They had their breaks at the places of visit. The next day, several children complained that it hadn't been fair that some kids got more to eat.

Please help the MoE figure out why the children say so.

Can you help suggest how the sharing of food can be further improved for this year?

FAIR SHARE or REASONABLE SHARE

Putting the problem in context

Last year there was a field expedition organised by MOE Malaysia to gather research about Malaysia culture. The school children who came were divided to visit four places of interest: five children visited Penang Hill, four the World Heritage Site, eight the cross the Panang Bridge to mainland and five the Butterfly Farm. Some of the children had however submitted their consent forms very late, making the number of submarine sandwiches ordered for break to be distributed to the groups respectively as follows: 4, 3, 7 and 3.

They had their breaks at the places of visit. The next day, several children complained that it hadn't been fair that some kids got more to eat. Please help the MOE figure out why the children say so. Can you help suggest how the sharing of food can be further improved for this year?

Role of Context in RME

The role of context in RME is twofold.

- As the source of conceptual mathematics
- As a field of mathematical concepts

Figueiredo (1999) indicated that to allow students to engage in more meaningful context problem practices, the nature of contexts and how they need to be used must be different.

Characteristic of Context in RME

- Easy to imagine, easy to recognize and appealing,
- Familiar to the students,
- The problem itself can come to the fore out of the described situations,
- Demand mathematical organization (progressive mathematisation),
- Not separated from the process of problem,
- solving but it must lead students to arrive at a solution.

Functions of Context Problem in RME

- Help students to understand the purpose of the problem quickly;
- Provide students with strategies that are based on their own experiences and informal knowledge;
- Offer student more opportunities to demonstrate their abilities;
- Motivate pupils to solve the problems.

Adapting a Context Problem

Hafiza's friend Faisal is staying for dinner, now there are 5 packets of durian cake for 6 people (father, mother, Hafiza, her brothers & Faisal).

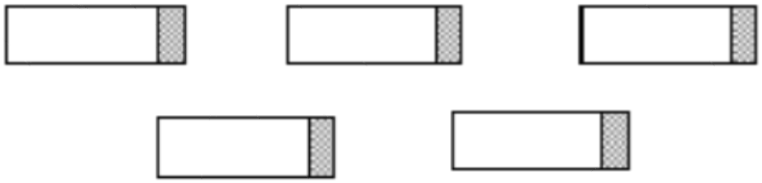
> How should they share the durian cake ?

Possible student strategies … Observing their thoughts

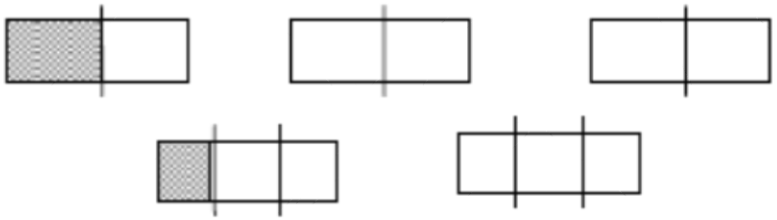
- **Hafiza should share with her friend, it is her friend!**

1. Go to the shop and buy one extra.
2. **She may have everyone, except her mother, get a durian cake each, and all give a small piece to her.**
3. First she divides three durian cake into two, which gives her halves, then divide the remaining two each three parts.
4. **Divide all durian cake into six pieces and give everyone five pieces.**

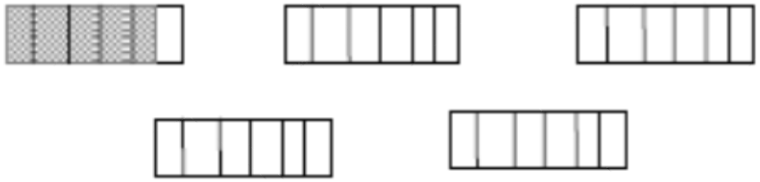
Possible student strategies
… a hypothetical learning trajectory



$5 : 6 = 1 - {}^{1}/6$



$5 : 6 = ź + {}^{1}/3$



$5 : 6 = {}^{5}/6$

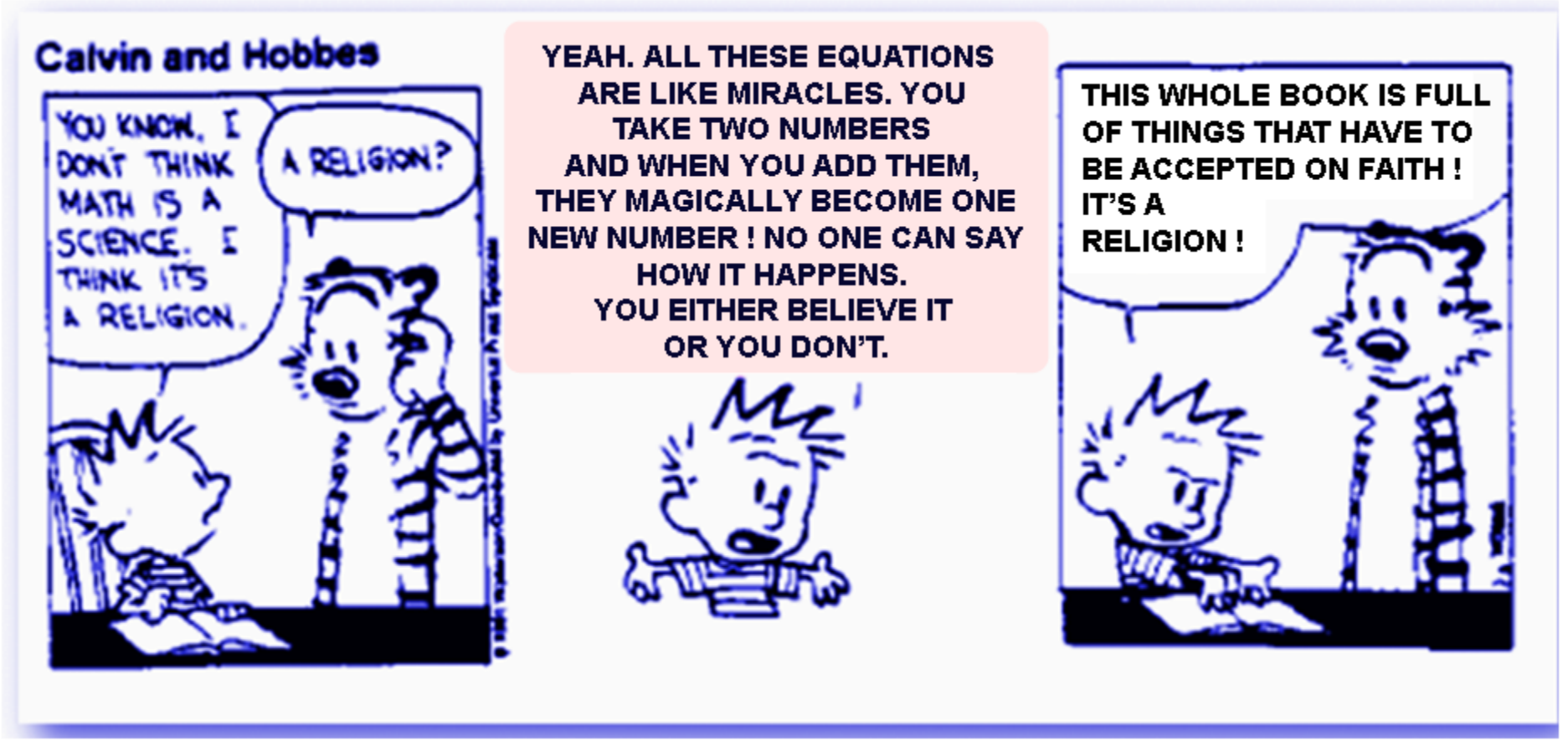
Let’s explore more context problems…

Designing your own CONTEXT PROBLEMS

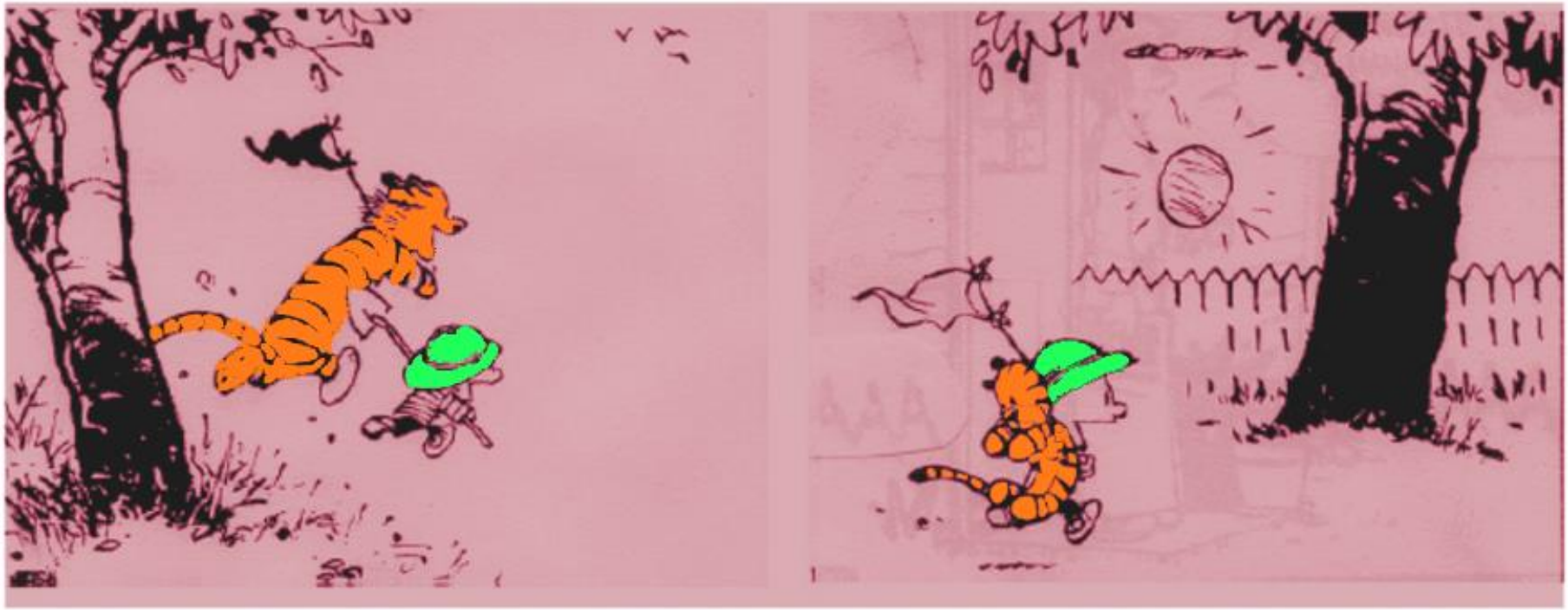
Question Guide

- Is the problem 'real' to the student?
- Will the students be engaged in the problem?
- Are they learning mathematics or are they mathematising?
- Is reinvention found ? Guided?
- Are the models self –emergent by the students?
- IS the context meaningful?
- Does the context enhances HOTS – creative, critical, reasoning, problem solving skills ?

Why CONTEXT PROBLEM, and not any Problem?



Making it REALISTIC



Engaging students in
REALISTIC Context Problem

Engaging students in
Word Problem

Q&A

Realistic Mathematics Education (RME)

Developing Context Problems

RC-SM-144-2: Mathematical Problem Solving in Real-World Situation for Secondary Mathematics Classrooms

05 - 30 August 2019

Warabhorn, Leong Chee Kin & Teoh Boon Tat
Mathematics Education Specialists
SEAMEO RECSAM