TWO OF MY FAVOURITE MATHEMATICAL TASKS FOR THE EARLY YEARS

Matt Sexton
Australian Catholic University

As junior primary teachers, past and present, we all have stories of students in our classrooms engaging with, learning about, and experiencing success with mathematics in varying degrees.

I have had many opportunities of teaching mathematics in the early years of primary school as a classroom teacher, mathematics curriculum advisor, and researcher. Like all teachers, I have gathered a number of mathematical tasks that have become my favourites.

These favourite tasks are ones that I have read about, innovated upon and used in classrooms. Others have been ones where I thought about the mathematics first, and then wondered about the most effective way of presenting the opportunity for the students to access and think about those ideas.

Like many teachers, I have also collaborated with my colleagues in the planning, discussion of, and recording ideas about tasks that could be used to engage young learners with important mathematical ideas.

These tasks have become my favoured ones for a number of reasons. Some of these reasons are:
- they provide opportunities for the students to engage with important mathematics;
- they provide suitable challenge for young learners that require them to engage with 'hard thinking';
- they require young learners to explain, elaborate, justify, and generalise which are important skills related to the Reasoning proficiency of the Australian Curriculum;
- they provide opportunities for students to choose their own way of representing their thinking about the mathematical ideas;
- they are engaging tasks for young learners; and,
- they can be adapted to meet the diversity of learning needs of the students.
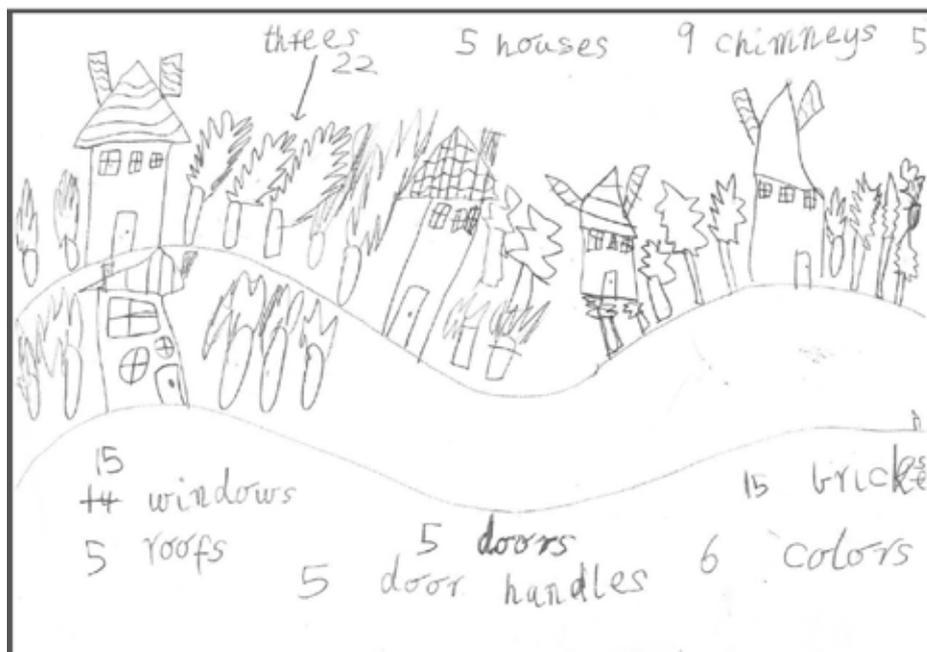

Figure 1. A Year 1 student's response to the task where five houses are shown in the street.

On the following pages, I present two of my favourite mathematical tasks that can be used with young mathematics learners in junior primary classrooms.

THE HOUSE PROBLEM

Mathematics: Algebraic thinking including representing, conjecturing and explaining counting patterns; counting items without counting by ones; problem posing and solving.

Materials:
- house cards
- house image for IWB
- recording paper

Group setting: Individual, pair or triads

Links to the Australian Curriculum:

Foundation:
ACMNA001: Establish understanding of the language and processes of counting by naming numbers in sequences, initially to and from 20, moving from any starting point

ACMNA002: Connect number names, numerals and quantities, including zero, initially up to 10 and then beyond

Level 1:
ACMNA012: Develop confidence with number sequences to and from 100 by ones from any starting number. Skip count by two, fives, and tens

ACMNA013: Recognise, model, read, write and order numbers to at least 100

ACMNA018: Investigate and describe number patterns formed by skip counting and patterns with objects

Level 2:
ACMNA026: Investigate number sequences, initially those increasing and decreasing by twos, threes, fives, and ten from any starting point, then moving to other sequences

ACMNA031: Recognise and represent multiplication as repeated addition, groups and arrays

ACMNA032: Recognise and represent division as grouping into equal sets and solve simple problems using these representations

ACMNA035: Describe patterns with numbers and identify missing elements

Instructions:
- Show the house image on the IWB or give each student a house card.
- Ask 'What do you notice?' Expect that students will attend to the attributes and features of the house.
- Record nouns (e.g., trees, chimney, etc.) of the house that are noticed on the whiteboard.
- Draw attention to quantities of the house features, e.g., 'How many trees are there? How do you know without counting by ones?'
- Discuss the responses from students
- Ask the student to imagine a street with three houses that look exactly like the one on their card or on the IWB.
- Ask the students questions about: how many chimneys, or how many trees, or how many windows? Follow up with asking the students to explain how they know how many there of each house feature, encouraging the use of strategies other than counting by ones.
- Tell the students that they are to choose any number of houses in the street and to find out how many of each item altogether in the street. Encourage students to work with numbers of houses that might be just beyond the number range with which they are 'comfortable'. Tell the students that you will be looking for ways of thinking that does not rely on counting all or counting by ones.
- As the students are working on the task, ask them 'What questions could we pose and solve about the houses in your street?' Ask the students to record their questions as best as they can, and then set about solving them.

- Encourage the students to determine the best way of representing their thinking about the problem.
- During the lesson, encourage the students to think about questions, like the following ones, to support their generalisations:
  - How many doors would there be for 10 houses and how can you tell how many there are without counting? What about how many chimneys for 12 houses? What about 20 houses? What about 100 houses?
  - How many houses would there be if there were 12 chimneys? How do you know?
  - How many houses would there be if there were 9 windows? How do you know?

MORE OR LESS

Mathematics: Counting, quantifying and comparing collections

Materials:
- Lima beans/counters/Unifix blocks
- 'more or less' cards

Group setting: 2 players

Links to the Australian Curriculum:

Foundation:
ACMNA001: Establish understanding of the language and processes of counting by naming numbers in sequences, initially to and from 20, moving from any starting point.

ACMNA002: Connect number names, numerals and quantities, including zero, initially up to 10 and then beyond.

ACMNA003: Subitise small collections of objects.

ACMNA289: Compare, order and make correspondences between collections, initially to 20, and explain reasoning.

Level 1:
ACMNA012: Develop confidence with number sequences to and from 100 by ones from any starting number. Skip count by two, fives, and tens.

ACMNA013: Recognise, model, read, write and order numbers to at least 100.

ACMNA014: Count collections to 100 by partitioning numbers using place value.

Level 2:
ACMNA026: Investigate number sequences, initially those increasing and decreasing by twos, threes, fives, and ten from any starting point, then moving to other sequences.

Instructions:
- Place a large pile of Unifix blocks on the table
- Player A shuffles the cards well and places them face down on the table
- Both players take a large handful of Unifix blocks (possibly two if hands are small!)
- Both players estimate how many blocks are in their piles and say this number out loud to the other player
- Taking turns, each player counts the number of blocks and tells the other the number of items in his/her pile
- Each player rearranges the items in a way so that someone could tell how many are in the collection without counting by ones
- Player B turns over one of the cards
- If the card is 'more', the player with more in his/her pile wins the card. If the card is 'less', the player with less in the pile wins the card
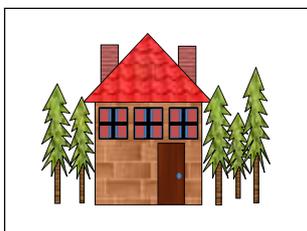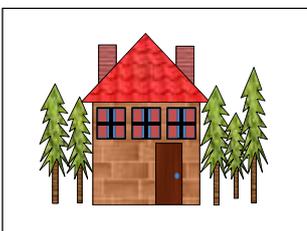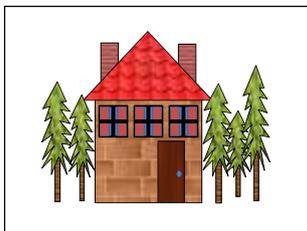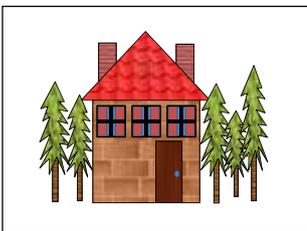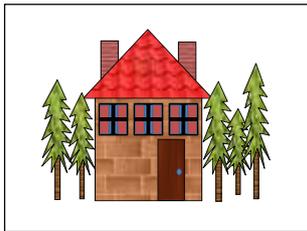- Continue until all cards have been won.

CONCLUDING COMMENTS

These are just two of my favourite tasks that I have used with young learners in junior primary classrooms. In many cases, the students have been given more than one mathematics lesson to engage with the mathematics that underpins these tasks. I have always used them having high expectations of the students, telling them they that will be challenged and their 'brains might hurt'. I tell them that if this happens, it is really exciting because it means that we are learning something new.

The other important teacher practice associated with these tasks is the use of questions for explicit teaching. I ensure that I plan a series of important questions that I use often in the lessons to help students notice important mathematical ideas. I am always conscious of not telling the students how to think, not telling them which strategies to use, and not telling them how to record their thinking.

Figure 2: This student is counting and grouping by twos to quantify the collection. He was later asked if he could count and group the collection in another way that would be quicker.

more	less
more	less
more	less
more	less
more	less
more	less