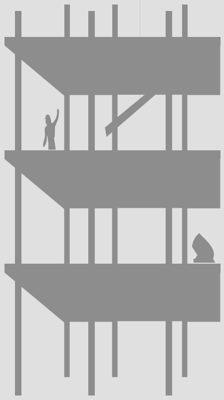


LEARNING PLANS

LEARNING AND ASSESSMENT FRAMEWORK ZONE 5

INTRODUCING TARGETED INTERVENTIONS

LIST OF TARGETED INTERVENTIONS

DASHING DECIMALS

DECIMAL COMPARISONS

FACTOR FIND

CHOCOLATE PARTITIONING

DIVERSE DIMENSIONS

HOW MANY WHOLES

BRANCHING OUT WITH TREE DIAGRAMS

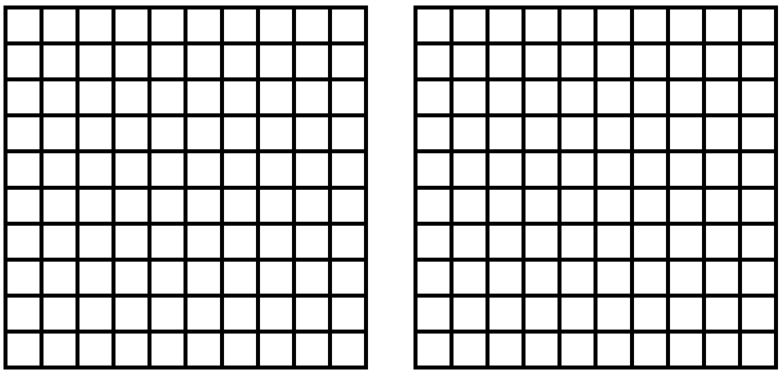
DASHING DECIMALS

Specific Teaching Focus:

To introduce **place-value ideas and strategies** for tenths and hundredths; make, name, record.

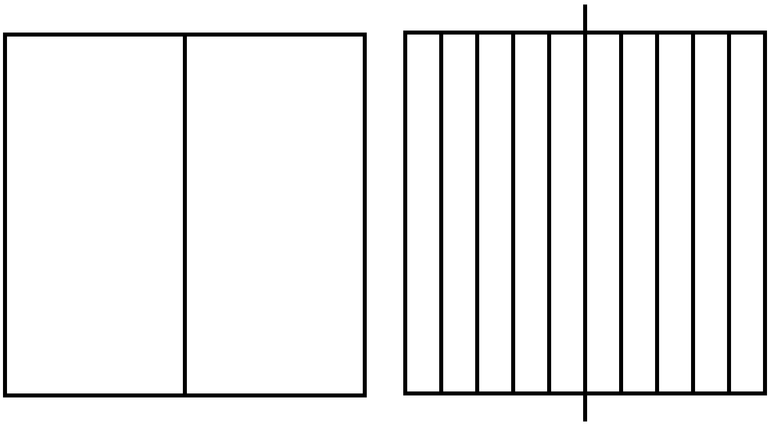
Materials/Resources Required:

- Kinder squares
- Two different coloured 10 sided dice, for pairs of students
- Recording sheet with ten (10) 10 x 10 grids (see part example below)

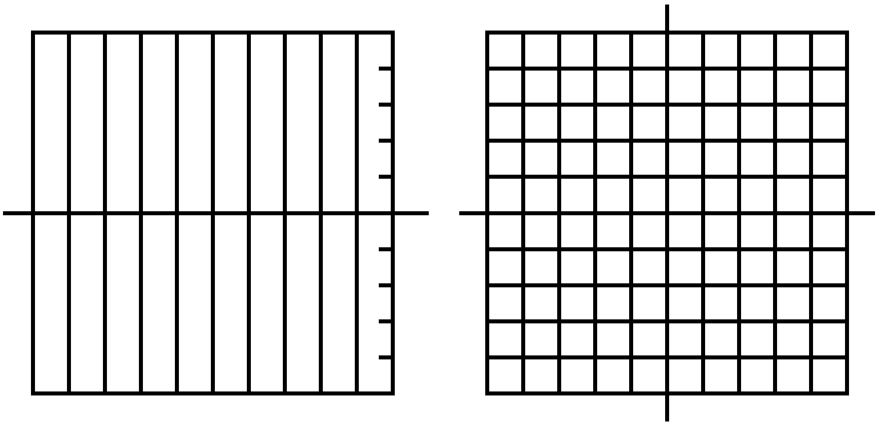


How to Implement:

1. Using kinder squares students' partition their square to show tenths using halving then fifthing strategies (make sure students partition their square in one dimension only, see below)



2. Discuss with students how they could make hundredths from this. (Eg. tenths by tenths, or ten rows of ten, 100 parts gives hundredths)



3. Allow students time to create their own fraction diagram showing tenths and hundredths (noting each row or column is tenths while each square is hundredths).

4. Provide each student with a recording sheet containing ten (10) 10 x 10 grids. In pairs, students toss 2 different coloured 10 sided dice to play the game. Students determine which coloured dice will represent tenths and which will represent hundredths. Students take turns throwing the dice and shading in their grids accordingly (remind students that, tenths can be represented as columns or rows).

5. Students also record their throws as decimal fractions and fractions (ie, if a 5 is thrown on the tenths dice and an 8 is thrown on the hundredths dice, student would record 0.58 and 58/100. If a 0 is thrown on the tenths dice and 7 is thrown on the hundredths dice, student would record 0.07 and 7/100). Game continues until one student has shaded all ten grids.

6. As students play the game, the teacher roves among the groups and asks, *"How much have you shaded so far? How much do you have left to shade?"*

DECIMAL COMPARISONS

Specific Teaching Focus:

To introduce **place-value ideas and strategies** for ordering tenths and hundredths.

Materials/Resources Required:

- 1 mm graph paper
- 2 metre measuring tapes
- Rope, pegs and blank cards

How to Implement:

1. Students work co-operatively in small groups (3-5 students) to find out how tall they are. Students document results and arrange these in order from shortest to tallest. Discuss the various ways in which this information can be recorded. Eg. 165 cm, 1 m 65 cm, 1.65 m.
2. Students then draw each of these measurements to scale using 1mm graph paper, where 1mm equals 1cm. Students can now compare their original ordering by comparing these with the scale drawings.
3. Model an open number line with rope and pegs, labeled 0 to 2. Record each student's height on a card and have students locate these on the rope. Students should justify their decisions by explaining their thinking. Eg. *"I know that 165 cm is more than 3 quarters of the way along the rope."*
4. Swap results with another group and record these heights on an open number line in their workbooks.

FACTOR FIND

Specific Teaching Focus:

To introduce **formal terminology** associated with multiplication and division such as factor, product, divisor, multiplier.

Materials/Resources Required:

- Counters

How to Implement:

1. Discuss with students how 8 counters can be represented as an array (2 rows of 4, 4 rows of 2, 8 rows of 1, 1 row of 8).

2. Discuss with students that the numbers 2 and 4, 1 and 8 are called *factors* of 8, that is quantities that divide a given number exactly.

3. Repeat the above, for collections of 12, 21, 36, 19, 72. Discuss the factors as students construct models in the form of arrays. Ask students how can we check that we have all the factors for a number (this may lead to a systematic method as below).

   Eg. Possible systematic thinking to assist with solutions for the number 8.

   1 by what gives 8, 8, 1 eight

   2 by what gives 8, 4, 2 fours

   3 by what gives 8, something more than 2 but less than 3, therefore 3 isn't a factor.

   4 by what gives 8, 2. We have this pair already so these are all the factors, so there are 4 factors of 8, 1, 2, 4, and 8.

4. Students can use this method to determine the factors for a variety of numbers, going as high as is appropriate, based on students' understanding.

Follow up suggestions:

- This is only one way of working and introducing factors to students - teachers can also use factor trees and the game 'MULTO' (Curriculum Corporation, Maths 300) to increase the understanding of factors.

CHOCOLATE PARTITIONING

Specific Teaching Focus:

To introduce **formal terminology** associated with multiplication and division such as factor, product, divisor, multiplier.

Materials/Resources Required:

- One 250g block of chocolate wrapped in newspaper
- 1cm grid paper

How to Implement:

1. Start with a block of chocolate (based on 250g block of Cadbury diary milk) wrapped in paper. Pose the question *"How many pieces of chocolate might there be and how might these pieces be arranged."* Have the children explore and record possible solutions. Eg. 5 rows of 6, 4 rows of 12 etc.

2. Once they have come up with a few possibilities, students select the solution they think is most accurate. Students draw this on grid paper.

3. Tell the children that there are 54 pieces (based on 250g block of Cadbury diary milk) *What might the block look like?* Explore, record and discuss. Reveal the block and check against student responses.

4. Now pose the following problem:

   "If a 250g block of chocolate has 54 pieces (9 sixes), what might a 400g look like?" Reasoning can be based on ratio and proportion and need not be totally accurate. (Eg. from calculations for 100g, a block would be approximately 22 pieces so 400g would be 88 pieces or a 250g block is 5/8 of a 400g block. A 400g block might be useful to check against).

DIVERSE DIMENSIONS

Specific Teaching Focus:

To introduce **formal terminology** associated with multiplication and division such as factor, product, divisor, multiplier and introduce **metacognitive strategies** to support problem comprehension, strategy monitoring/checking, and interpretation of outcomes relevant to context.

Materials/Resources Required:

- 1 cm grid paper if required for explanation

How to Implement:

1. Pose the following problem to students and then lead them through a discussion guided by the solution below, explaining any new terms that are introduced, reviewing concepts of area and perimeter.

   "A rectangle has a perimeter of 28 cm. What might the area be?"

2. Allow students to explore possible solutions using the 1cm grid paper.

3. One possible solution could be:

   Think, half the perimeter is a length and a width together which would be 14cm (length x width is area, remind students of the concept of arrays). Think of all the possible combinations to make 14 (Eg. if the width is 1cm the length would be 13 cm, see table below).

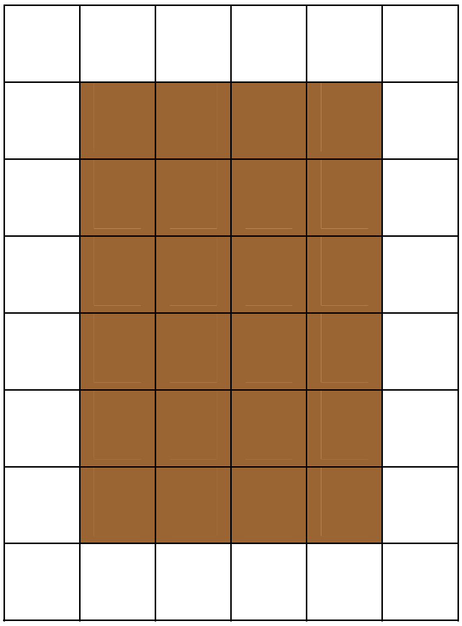
Width cm	Length cm	Area cm^2
1	13	13
2	12	24
3	11	33
4	10	40
5	9	45
6	8	48
7	7	49

So, there are seven different dimension combinations that will give a perimeter of 28cm.

4. Discuss, *"Why does 7 by 7 give a greater area than 1 by 13?"*

Follow up suggestions:

- Pose the following problem to students: If the problem above referred to a block of chocolate with 28 pieces around the outside, how many pieces would be left if the outside pieces were removed? (see diagram below) Describe and discuss for each of the alternative dimensions referred to above. Encourage students model their approach using grid paper or tiles.



HOW MANY WHOLES

Specific Teaching Focus:

To introduce **partitioning strategies** to support fraction renaming (equivalent fractions).

Materials/Resources Required:

- Use "How Many Wholes Can We Make" resource in 'Support Materials' section of this CD-ROM

How to Implement:

1. Make enough sets of fraction word cards and number cards for the game "How Many Wholes Can We Make" to be able to play the game in pairs. Each player has their own fraction wall.

2. Players take turns picking up a number card (How many) and a fraction word card (How much). Eg. a '3' card and 'fifth' card. Then shade their fraction wall sheet accordingly. Eg. shade in '3 fifths' on their fraction wall. The end of the game is when one player has covered their entire wall.

3. During the game discuss with students the fractions they have covered on their wall and what fraction they will need to complete a row. Encourage students to rename fractions to assist them to complete their wall. Eg. *"3 fifths selected, but there are no more fifths left to shade. Are tenths available? Yes, so rename 3 fifths as 6 tenths."*

4. The winner is the student who has the most wholes completed. (A more difficult scoring system is where the winner is the person who has covered the greatest amount of area. This requires renaming fractions and may lead to quite complex fraction addition. In this event a more direct method of comparing, is to cut out the rows and line up the rows to see who has the longest.

BRANCHING OUT WITH TREE DIAGRAMS

Specific Teaching Focus:

To develop more efficient strategies for representing and solving an **expanded range of Cartesian product problems** involving three or more variables and **tree diagram representations.**

Materials/Resources Required:

- Sandwich Task (written on board or overhead, see below)
- Gina's Pizza Task (written on board or overhead, see below)
- Develop a Blank Tree Diagram sheet (see below for example)

How to Implement:

1. Teacher poses the **Sandwich Task** problem. Students work individually or in pairs to solve the problem. Students share individual group ideas with a view to identifying the most efficient strategies, lists, tables etc. Then model process for tree diagram strategy.

Sandwich Task

Nick's dad is making him a sandwich to take to school for lunch. He can choose one ingredient from each category:

- **White or brown bread**
- **Margarine or butter**
- **Tomato, cheese or lettuce**

How many different sandwiches can he make?

2. Teacher poses **Gina's Pizza** problem. Students work independently using a tree diagram to solve it. When everyone is finished students share their answers and their thinking. Notice key features of tree diagrams that help with efficiency. Eg. 2 x 2 x 3. Discuss the "for each" idea to develop the multiplicative nature of finding the total number of different combinations. (eg, for each type of bread, you can use two different spreads, 4 different combinations (2x2) and for each of these combinations you can choose three different fillings,12 different combinations in all (2x2x3).

Gina's Pizza

You've just begun working at Gina's Pizza Shop. She's a fussy boss and you know you will have to work quickly and accurately to keep your job.

Customers can order pizzas with:

- **a thick or thin crust**
- **tomato or barbecue sauce**
- **salami or olive or mushroom toppings**

A family comes into the shop. How many different pizzas are possible?

3. Give students a **Blank Tree Diagram sheet** as illustrated below, a choice of two can be provided according to student ability.

4. Ask students to write a story or scenario that relates to the tree diagram. Share students' stories and tree diagrams.

5. Discuss the ‘for each’ idea for multiplication and how it differs from the ‘equal groups’ idea.,