

LEARNING AND ASSESSMENT FRAMEWORK ZONE 3
INTRODUCING TARGETED INTERVENTIONS



LIST OF TARGETED INTERVENTIONS

MULTIPLICATION STRATEGIES EXPLAINED

DOUBLE TROUBLE

MULTIPLYING MENTALLY

CARD MULTIPLICATION GAME

THINK BOARD

MULTIPLICATION & PLACE VALUE IDEAS

SCHOOL RUBBISH

IF I KNOW

THE MAGICIAN'S COSTUMES

MULTIPLICATION STRATEGIES EXPLAINED*

Specific Teaching Focus:

To introduce **mental strategies for multiplication** through doubling (2s facts), doubling and one more group (3s facts), double doubles (4s facts) and so on.

Materials/Resources Required:

- Cuisenaire rods
- 10 sided dice

How to Implement:

***NOTE: these strategies are built on over time and would not be implemented in one lesson**

1. Teacher rolls two 10 sided dice and reads aloud numbers rolled. Eg. "7, 2."
2. Students choose either 7 twos or 2 sevens and discuss "*which situation is easier to model and why.*"
3. Students model both 7 twos and 2 sevens with Cuisenaire to explore the above issue and to demonstrate that these are the same.
4. Show through modeling with materials, and explore the following strategies:
 - 2s facts (2 ones, 2 twos, 2 threes ... 2 of anything) are doubles.
 - 3s facts (3 ones, 3 twos, 3 threes ... 3 of anything) are doubles and one more group.
 - 4s facts (4 ones, 4 twos, 4 threes ... 4 of anything) are double, doubles.
 - 5s facts (5 ones, 5 twos, 5 threes ... 5 of anything) are half of 10 of anything, or double doubles and one more group.
 - 6s facts (6 ones, 6 twos, 6 threes ... 6 of anything) are double 3s.
 - 7s facts (7 ones, 7 twos, 7 threes ... 7 of anything) are double 3s and one more group or 6s and one more group.
 - 8s facts (8 ones, 8 twos, 8 threes ... 8 of anything) are double, double, doubles or double 4s.
 - 9s facts (9 ones, 9 twos, 9 threes ... 9 of anything) are 10s less one group.

DOUBLE TROUBLE

Specific Teaching Focus:

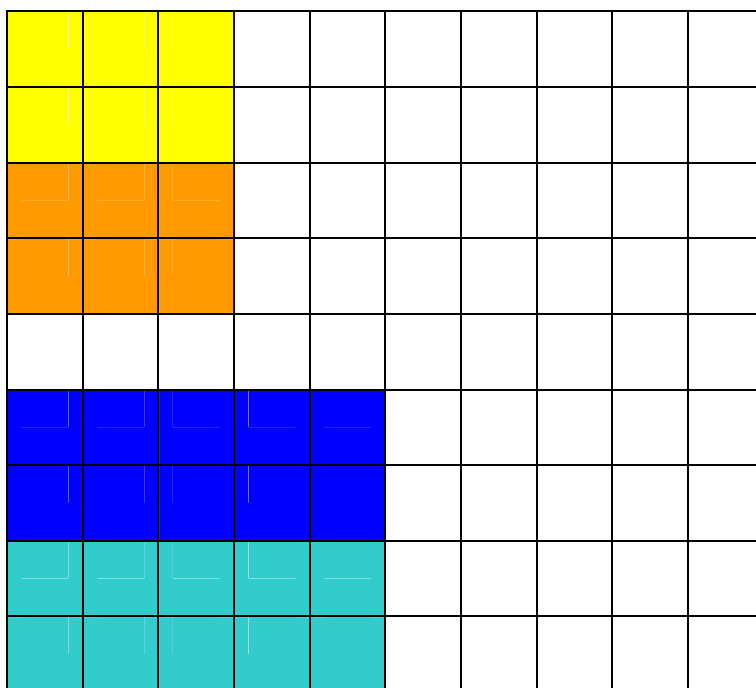
To introduce **mental strategies for multiplication** through doubling (2s facts), doubling and one more group (3s facts), double doubles (4s facts) and so on.

Materials/Resources Required:

- Square grid paper
- 10 sided dice

How to Implement:

1. This activity is designed to visually demonstrate an efficient mental strategy based on doubling for learning 4s facts (4 ones, 4 twos, 4 threes ... 4 of anything) THINK double 2s facts (ie. double doubles). 2s facts are best learnt through doubling. Understanding this concept demonstrates how the 4s facts strategy can be described as *double doubles*.
2. Teacher should first initiate a review of doubles to 10 using tens-frame (eg. 6 is double 3, 8 is double 4), then review doubles to 20 using two rows of a bead frame.
3. Using an enlarged version of 1cm grid paper, teacher demonstrates 2 threes by shading 2 rows of three as an array. Now shade 4 threes. Ask students, what do you notice? (4 threes are just double 2 threes),
4. Students can then shade their own arrays of various numbers chosen by teacher or by a throw of dice. Cuisenaire can also be used to show the double double strategy.
5. In pairs students take turns to throw a 10 sided dice, calculating 4 times the number thrown using the double double strategy (see below). Products can be shown on 1cm grid paper (winner is person with the largest amount of grid covered after say 6 throws) or alternatively products can be recorded and summed progressively (winner is person with the highest total).



MULTIPLYING MENTALLY

Specific Teaching Focus:

Mental strategies for multiplication- doubling (2s facts), doubling and one more group (3s facts), double doubles (4s facts)

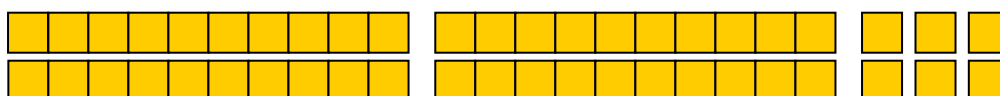
Materials/Resources Required:

- MAB
- 10 sided dice

How to Implement:

1. Teacher rolls two 10 sided dice to create a two digit number. Students and teacher construct a model of this number with MAB. Ask students to think about double this number and model it with the MAB.

Eg. a 2 and 3 are thrown, 23 is decided upon and doubled (see below).



THINK: double 23, 2 by 2 tens, 4 tens 40, 2 threes, 6, so 46.

2. Students work in pairs and throw their own dice to create 2 digit numbers. Do this a couple of times in order to visually demonstrate this more efficient mental strategy of dealing first with the tens, then with the ones.
3. Encourage students to identify and justify their thinking.

CARD MULTIPLICATION GAME

Specific Teaching Focus:

To introduce **mental strategies for multiplication** through doubling (2s facts), doubling and one more group (3s facts), double doubles (4s facts) and so on.

Materials/Resources Required:

- MAB
- Cuisenaire rods (label with appropriate numeral and word for the number to be represented eg, orange rod, with word 'ten' on two sides and the digit '10' on two sides)



- Playing cards (using cards 1-9 where Ace=1)
- Paper
- Pencils

How to Implement:

1. Consolidate efficient strategies for multiplication facts through Cuisenaire:

Work in small groups with lots of Cuisenaire material available and ask students to select from the pile "*two of anything*" and describe. Eg. 2 sevens (shown with Cuisenaire) could be described as 'double seven'.

Ask students to select “*two of something else*”, and repeat discussion.

Repeat selecting ‘three of something’ (double and one more group) and ‘four of something’ (double and double again) ensuring students model with Cuisenaire.

2. Teacher models the procedure and thinking for the following situation:

Select two playing cards from the deck

“Using these numbers, (Eg. 3 and 7) what two digit number can I make so that when I double it I get the largest number possible?” Discuss.

Model the thinking for double 73: THINK double 7 tens, 14 tens, 140 and 6 more, 146.

In pairs students repeat this activity together. To make this into a game, a point can be scored by the student with the highest number. Continue until one student has scored 5 points (or a set target).

Follow up suggestions:

- The above activity can be implemented in the same way by creating the smallest number with the playing cards.

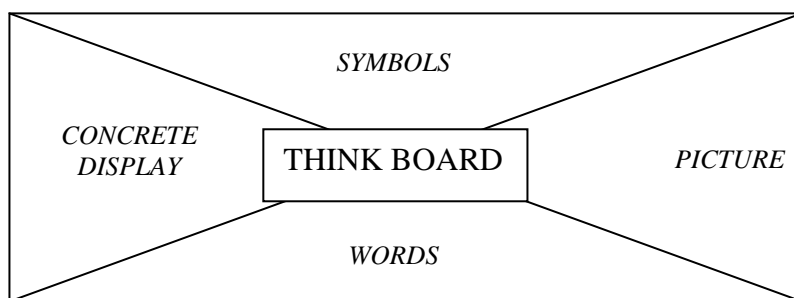
THINK BOARD

Specific Teaching Focus:

To introduce **place-value based strategies** for informally solving problems involving single-digit by two-digit multiplication, mentally or in writing.

Materials/Resources Required:

- MAB
- Cuisenaire rods
- Playing cards (using cards 1-9 where Ace=1)
- Large paper
- Pencils
- Think board (teachers need to familiarise students with the four sections)



SYMBOLS: Algorithm showing the formal recording. Eg. 3×35 .

PICTURE: Visual representation of the real life situation. Eg. A drawing of 3 buses with 35 children in them.

WORDS: Real life story describing the situation. Eg. "Students were transported to the school sports day in three buses, each bus carried 35 children."

CONCRETE DISPLAY: Model using for example Cuisenaire or M.A.B.

How to Implement:

1. Draw a 'Think Board' on the board and discuss with students the four areas.
2. From the playing cards teacher selects 3 cards to be used to create a 2 digit by 1 digit multiplication situation. This will provide the focus for completing the Think Board modeled by the teacher. Work as a group to complete the four sections of the Think Board.
3. Students work in pairs and create their own multiplication problems using the playing cards. On the large sheet of paper they create a Think Board and fill in each section. Once each pair has completed all tasks, a whole group sharing session takes place.

Follow up suggestions:

- Use the Think Board for division situations. Eg. $105 \div 3$.

MULTIPLICATION & PLACE VALUE IDEAS

Specific Teaching Focus

To introduce **place-value based strategies** for informally solving problems involving single-digit by two-digit multiplication, mentally or in writing.

Materials/Resources Required:

- Cuisenaire rods or MAB



How to Implement:

1. Using 6×14 and 14×6 as an example, teacher can show and explain (using Cuisenaire rods) the different ways in which equations can be modelled:

Present as 6 fourteens and 14 sixes using Cuisenaire rods. Discuss which is more efficient/easier and why.

2. Invite students to share the different ways that this can be conceptualized. Eg. for 6 fourteens:

6 tens, 60 and 6 fours, 24 so total 84, or

3 fourteens, 42, double 42, 84, or

5 fourteens is half of 10 fourteens, 140, so 70 and one more fourteen, 84.

Follow up suggestions:

- Explore efficient thinking for other situations.

Eg. 8×23 is 8 twenties 160 and 8 threes 24, so 184,

Or eight of anything is double, double, double so 46, 92, 184.

SCHOOL RUBBISH

Specific Teaching Focus:

To introduce **initial recording to support place-value** for multiplication of single digit by 2 digit numbers.

Materials/Resources Required:

- Concrete materials representing 'rubbish'
- MAB
- White board

How to Implement:

1. To introduce the use of formal recording when working out 2 digit by 1 digit multiplication, the teacher poses the following problem.

“There are 28 students in a small rural school. If each person creates 3 pieces of rubbish from their lunch box, how many pieces of rubbish does the whole school produce in one day?”

2. Encourage students to use mental strategies to solve the problem first before moving on to formal recording. After this discussion, show students the formal method using the language to support formal recording as detailed below:

$$\begin{array}{r} 28 \\ \times 3 \\ \hline \end{array}$$



Use concrete materials such as MAB to model the region for 3 twenty eights.

Language to support formal recording:

3 ones by 8 ones, 24 ones, which is 2 tens and 4 ones, record 4 ones with the ones and 2 tens to regroup.

3 ones by 2 tens, 6 tens and 2 more tens, 8 tens, record with the tens

Ensure that you highlight the fact that the order of computation is reversed in formal notation. Eg. if you were doing this mentally, you'd encourage 3 x 2 tens, 6 tens (60) and 3 x 8, 24, so 84.

IF I KNOW

Specific Teaching Focus

To introduce **renaming number of groups** by developing the ability to re-name composite numbers in terms of equal groups, 18 is 2 nines, 9 twos, 3 sixes, 6 threes.

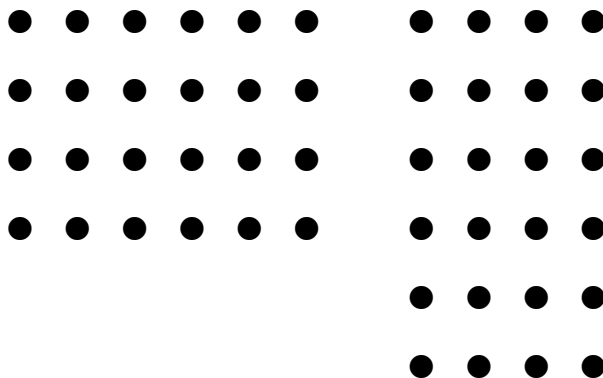
Materials/Resources Required:

- Counters

How to Implement:

1. Teacher and students discuss: *"If I know 6 fours are 24, what else do I know?"*

Explore and record all possible options. Counters can be used to model these situations and students may note that a given model can be described in more than one way (see below)



Some possible responses are presented below:

4 sixes are 24

24 is 6 fours

24 divided by four is six

24 divided by six is four

4 threes and 4 threes

2 sixes and 2 sixes

6 and 6 and 6 and 6 is twenty four

$$4 + 4 + 4 + 4 + 4 + 4 = 24$$

$$4 \times 6 = 24$$

$$24 = 6 \times 4$$

This list is by no means exhaustive and note that student responses can be recorded both formally and informally.

2. Students explore these ideas for other known facts. Working with a partner encourages discussion and reinforces associated language. (Eg. 48 is double 24, what facts can we deduce from our knowledge of 24. Eg. 4 twelves, 8 sixes, etc).

Follow up suggestions:

- Build on the above to find more efficient strategies for two digit by one digit multiplication.

Eg. teacher poses the following problem written on white/blackboard:

“If I know $6 \times 4 = 24$, how can this help me with 41×6 ?”

Lead discussion to 4 by 6 tens are 24 tens (240) and 6 more, 246.

THE MAGICIAN'S COSTUMES

Specific Teaching Focus

To introduce **cartesian product idea** to systematically list or determine all possible options.

Materials/Resources Required:

- Large sheets of paper for recording
- Costumes similar to ones identified in the problem (if desired)

How to Implement:

1. Introduce Sam the Stupendous, the magician. For the magician's next show, there will be a number of costume changes. Sam always wears a hat, a cape and a magic wand and can choose from the following:

| Cape | Hat | Magic wand |
|--------------|------------|-------------------|
| Black velvet | Top hat | Gold |
| Red satin | Beret | Silver |

2. Pose the question: *"How many different costumes can Sam wear?"*
3. Students work in small groups to respond to the above question. They record their thinking on a large piece of paper (using words and/or pictures). All efficient strategies are accepted and encouraged. Eg. lists, tables, diagrams. As a class, share the group work and explain their solutions. Eg. *"I know I have all possible options because ..."*