



eNICLE Grade 1 & 2 Teacher Development Programme

Session Five Teacher Handbook

Name

School

DECLARATION

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“How I see it” number talks

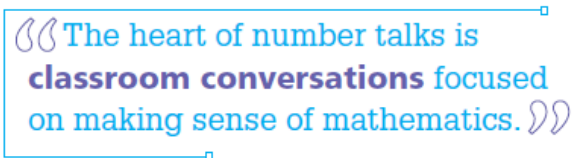
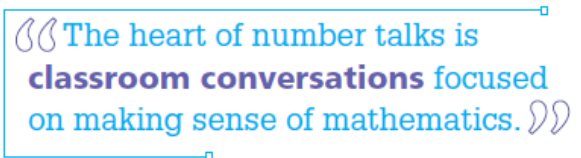
Mathematics is a language. How do you learn a language? You learn to talk, and you practice.

In this session, we introduce you to the concept of a number talk. This is a classroom strategy to help learners make sense of mathematics. In this session, you will take part in a number talk and receive resources that you can use in your own classroom.

In the next 6 sessions, you will experience different types of number talks. You will also be given examples that you can use with your learners. Today the number talk will be based on subitising patterns.

Number Talks¹

Classroom number talks are five- to fifteen-minute conversations around problems that learners solve mentally. They are a useful tool to include in your lessons to help learners to make sense of mathematics.

 The heart of number talks is classroom conversations focused on making sense of mathematics. 

During number talks, learners are asked to explain how they arrived at the solution. This leads to the development of more *accurate*, *efficient*, and *flexible* strategies.

What does this mean?

- Accuracy means the ability to find the correct answer.
- Efficiency is about choosing the method that requires the least effort.
- Flexibility refers to the ability to use an understanding of number relationships when doing the calculation².

¹ Adapted from “Number Talks Build Numerical Reasoning” by Sherry Parrish, 2011

² Adapted from Russell, 2000

Taking the first steps

Changing to teaching for understanding can be overwhelming. Many of us are comfortable telling learners how to solve a problem but do not allow learners to invent their own methods.

Start with smaller numbers and basic facts when you start to use number talks. This is an excellent way to show learners that there are many ways to look at a problem. For example, we can see a number of ways for students to think about the sum $6 + 7$:

USE DOUBLES $6 + 6 = 12$ plus one more; $7 + 7 = 14$ minus one	MAKE A QUICK TEN 6 can be split into $3 + 3$ and $3 + 7 = 10$ plus three more	COUNT ON OR COUNT ALL $7, 8, 9, 10, 11, 12, 13$
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Give yourself permission to be a learner along with your learners and ask the question: "*Does it make sense?*"

When learners improve in their mental maths strategies, you can then move on to their regular paper-and-pencil practice.

Encourage them to use the strategies they learn in the number talks as well as other methods by solving each problem in two different ways. This helps them to check their answers and to develop and maintain flexibility in thinking about numbers.

Number talks in our schools

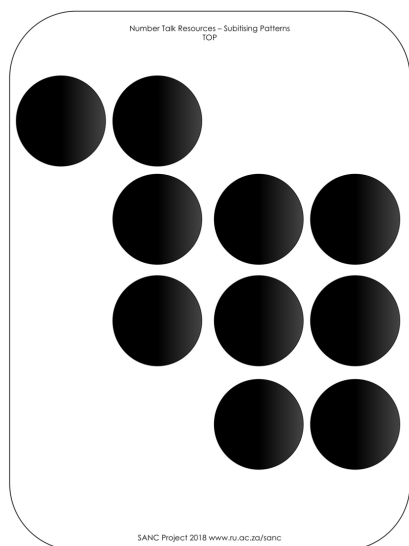
In 2014, we tried some number talks in a local school and then shared the idea and approach with our all of our NICLE teachers.

We want to do the same with you. The following pages include information about:

- The Talk Plan – how to structure a number talk in just 11 minutes, short enough for you to do during a mental maths slot in your lesson.
- Classroom strategies for hand signals and encouraging learner talk.
- Prompts for discussion and reflection after the number talk.
- Ideas for establishing a classroom culture during number talk sessions.
- Questions you can use to encourage learners to share their thinking.

Today's number talk

Today, we will look at this dot pattern and talk about the different ways we see the dots.



Questions as learners

- How many dots?
- How do you see it?
- Can you convince me?
- Can you give at least 2 different ways of checking how many there are?

Questions as teachers

- How many different ways can you see these dots?
- Can you think of some ways that might involve subtraction?
- What words could be added to the word bank from this talk?

See page 24 for discussion of this pattern.

The Talk Plan

Time	Section of talk	Comments and instructions
30 SECONDS	How many dots and how do you see them? OR Can you solve this problem? Think about how you will explain how you got your answer	Use the prompt (see separate examples on page 15) No touching (hands behind back) No writing (except for large multiplication problems)
1 MINUTE	Talk with a partner	Use think-pair-shares (see purple box below)
8 MINUTES	Whole class talk	Prompt learners with questions (see next page). Record learners' methods on the board (use coloured chalk if possible). Keep all records on the board so learners can see if their method is the same / different. Encourage use of hand signals (see next page)
1 MINUTE	Discussion of strategies	Discuss the strategies used. Which are more efficient? Accurate? As a class agree on the 2 most efficient strategies as key strategies. Write final strategies on flip chart to hang on class wall.
30 SECONDS	Recap of efficient strategies	Whole class to point and say the 2 most efficient strategies.
APPROX 11 MINUTES		

THINK, PAIR, SHARE

Work through the problem on your own, then, explain your thinking to your partner

Don't forget to: Listen to each other & ask questions

Number talks - hand signals

- Thumbs - I have an answer
- Thumb and finger shake - I agree / I did the same / Me too
- Snapping fingers for 'Ah-ha' moments

Number talks - encouraging learner talk about strategies³

If learners struggle to explain their answers or their thinking, here are some sentence starters:

- My answer is... I worked it out by...
- My answer is... To get my answer, I...
- To get my answer, I...
- First, I..., then I..., next I..., finally, I...
- To begin with, I...
- The first step I took was...
- This problem reminded me of..., so I...
- I noticed..., so I...

³ Source: <https://teachingtoinspire.com/2017/12/explaining-answers-math.html>

Number talks – Post-talk activities

- After each number talk, create a chart summarising the strategies used.
- Create a word bank and add to it after each number talk.
- Give quick problems similar to the ones in the week's number talks. Learners are required to solve each problem in 2 ways.
- Solve a 'homework problem': Give one example related to the number talk. Learners first solve the problem using one of the strategies discussed in a number talk and then use any strategy they wish.

Number talks – Teacher reflection

- Which key strategies emerged from the talk?
- What were the successes and challenges of the talk?
- How would you change the prompts or extend the problem for future talks?
- What type of questions did you ask during the talk? How did your learners react to these? Which questions worked best?
- Were there any learners who were not able to see and use the key strategies? What might be done for them?

Number talks – Classroom culture

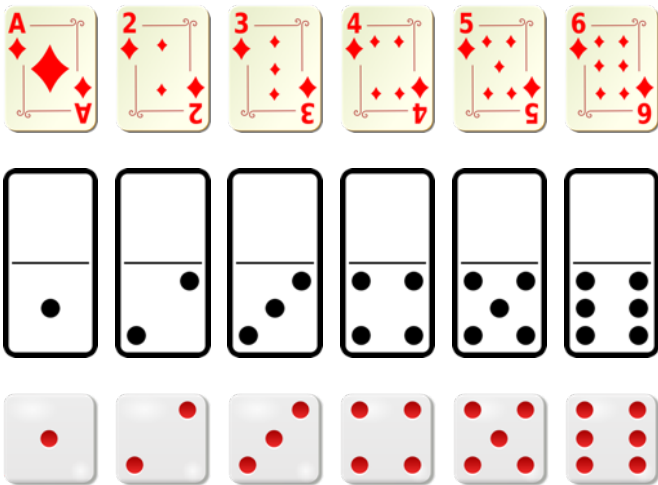
- Provide a safe environment where each child's thinking is valued.
 - Accept answers without criticism.
 - Encourage students to listen to each other.
 - Encourage students to use hand signals.
- Encourage students to self-correct. (ask: "Are you sure? Convince me.")
- Focus on HOW children get their answers.
- Provide time for thinking.
- Record strategies on the board, explain the strategy, restate the strategy.

Number talks – Learner question prompts

- What was the first thing your eyes saw?
- What did you do first? What did you next?
- How did you get your answer?
- How did you solve this problem?
- Who would like to share their thinking?
- Who did it another way?
- How many people solved it the same way as Mpho?
- Does anyone have the same answer but a different way to explain it?
- Can you describe your method to us all? Can you explain why it works?
- What do you think about what Mpho said?
- Do you agree? Why or why not?
- Do you understand what Mpho is saying?
- Can you convince the rest of us that your answer makes sense?
- What have you learned or found out today?

Subitising

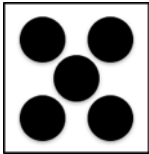

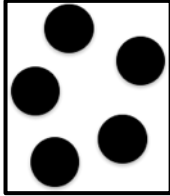
In this session, we focus on dot subitising with dice and flash cards. Subitising is the ability to recognise dot arrangements in different patterns. The most common dot patterns can be seen on dice, dominoes and playing cards, as can be seen in the examples below.



There are two types of subitising: perceptual and conceptual.

- **Perceptual subitising** is recognising the number pattern
- **Conceptual subitising** is recognising a number pattern as a combination of the *whole and its parts*. Conceptual examples are given in the discussion about *alternate* dot patterns.

The spatial arrangement of dot sets can change how difficult they are to subitise. For example:

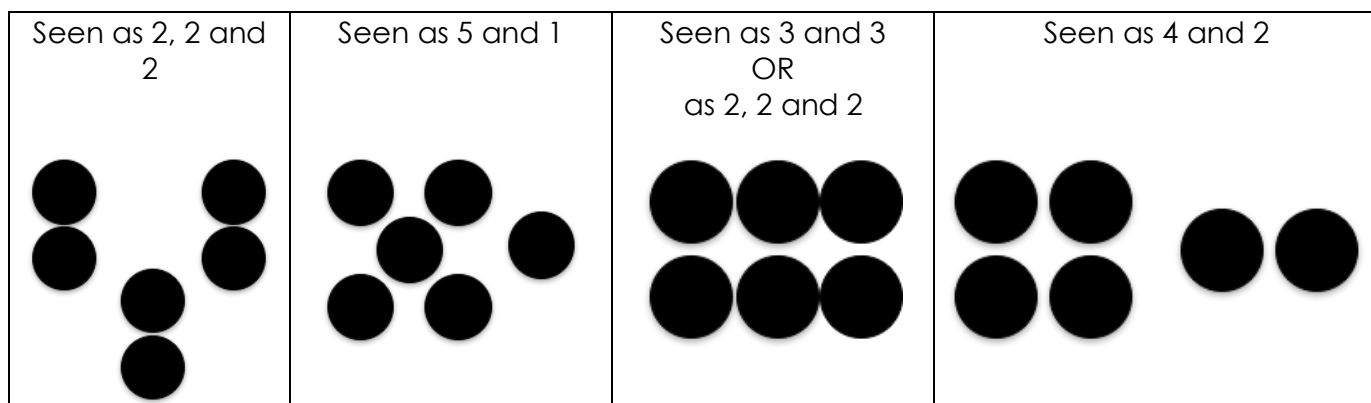
<p>Rectangular arrangement (commonly seen on cards, dominoes and dice) are easiest to subitise</p> 	<p>Linear arrangements are quite difficult to subitise</p> 	<p>Scattered (random) arrangements are the most difficult to subitise</p> 
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REGULAR AND ALTERNATE DOT PATTERNS

In this handbook, we refer to *regular* and *alternate* dot patterns.

- *Regular* dot patterns, especially from 1 to 6, are the easiest to recognise. These are those most commonly seen on dice, dominoes and playing cards.
- *Alternate* dot patterns work with other dot arrangements. They help the learners to 'see' different patterns. The way the dots are arranged leads to different ways of breaking up that number.

Here 6 dots can be seen in different ways:



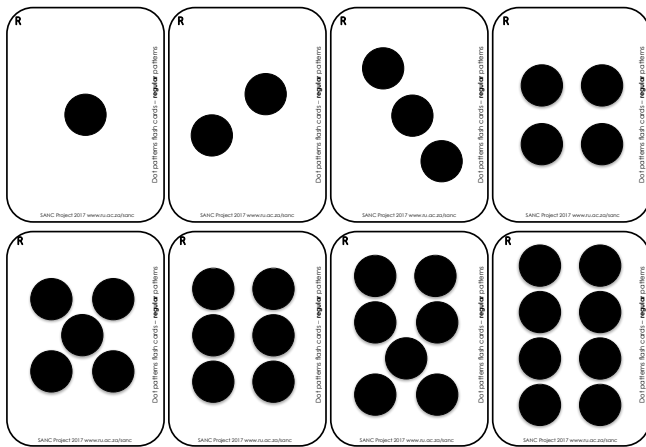
NOTES:

Dot pattern flash cards

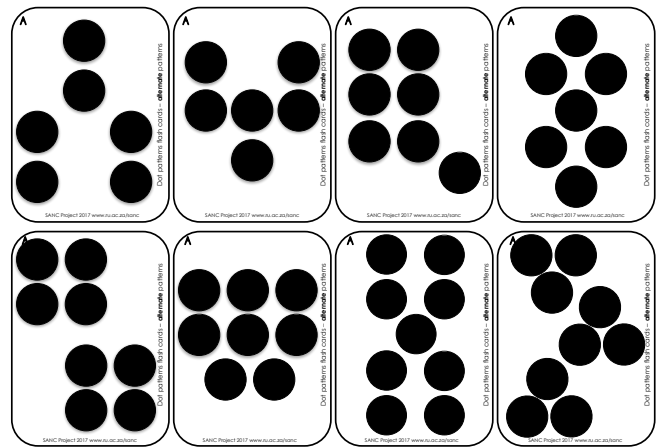
The suggested activities in the following pages will use both regular and alternate dot patterns. This set contains:

- 10 **regular** dot pattern cards marked with an 'R' in the top left corner
- 18 **alternate** dot pattern cards marked with an 'A' in the top left corner. There are 2 of each number from 2 to 10
- 3 spare cards

Example **regular** pattern cards



Example **alternate** pattern cards



USING THE FLASH CARDS

In the activities:

- Begin with using the set of *regular cards* in the range 1 to 5 or 1 to 6 until children are familiar with the patterns.
- Once the children are familiar with the *regular patterns*, mix in some of the *alternate pattern cards* in the same number range.
- Move on to using cards in the range **1 to 10** when learners are ready.

NOTES:

Visualising, subitising and early number strategies

Subitising is an important **visual** skill in the development of number sense. It supports a number of skills, including conservation, compensation, unitising, counting on, composing and decomposing numbers.

Young children can begin by learning the regular dot patterns up to 6. Learners can also connect the dot patterns to numbers, numerals, finger patterns, bead strings, etc. You can then give them alternate dot patterns and patterns up to 10 and beyond when they are ready.

Children begin to learn these patterns by counting each dot one at a time. It is useful to work with learners to see the patterns without counting in ones. This helps them to count on (from a known pattern set) or to learn combinations of numbers (noticing two known smaller patterns on the card).

Mathematical language development

Always encourage learners to talk about the dot patterns they see and what they are doing. This will help them to develop their language and make them aware of their actions and thinking. This also helps to develop their confidence.

For example:

- When learners are working on recognising dot patterns:
"I see 5 dots"
"I see 2 dots, 2 more dots and 2 more dots, I see 6 dots altogether"
- When learners are playing games:
"I see 5 dots at the end of the line. I will add a domino with 5 dots to that" etc.

NOTES:

Visual mathematics activities promote deep engagement, new understandings and visual brain activity. Perhaps most importantly, they also show students that mathematics can be an open, creative and beautiful subject that they can appreciate, see and understand deeply.

(Source: Jo Boaler
http://blogs.edweek.org/teachers/classroom_qa_with_larry_ferlazzo/2018/01/response_instructional_strategies_that_teachers_might_be_missing.html)

This section provides details of the activities that are presented in this workshop. Every workshop will have a similar section so you know where to look in the handbook.

Resources

Number talk activities

Page: 15

Cognitive control activities

Page: 16

Subitising activities

Page: 17

Number talk activities



Why use dot patterns for this number talk?

Visual activities help learners to build new understandings of mathematics. They also show learners that mathematics can be an open, creative and beautiful subject that they can appreciate, see and understand deeply.

This number talk also values the many ways that students see and experience mathematics.

TYPE OF TALK	Subitising (Visual patterns) <ul style="list-style-type: none"> Do not suggest methods All learners should participate Increase confidence in talking about maths Develop maths vocabulary & build a word bank Allow many solution strategies 			
OBJECT OF LEARNING	<ul style="list-style-type: none"> Learners explain their thinking: HOW they SEE it and WHY it makes SENSE Learners develop more flexible and efficient strategies 		Learners begin to: <ul style="list-style-type: none"> See and use numbers flexibly Reason abstractly Speak mathematically 	
PROMPTS				
MORE PROMPTS				
ANTICIPATE D LEARNER RESPONSES	Before a number talk, think about how your learners might respond to each dot pattern. How do you think they will see the dots? How do you see the dots?			
QUESTIONS FOR LEARNERS	How many? How do you see it? Can you convince me? Can you give at least 2 different ways of checking how many there are? The next questions must ask learners to explain what they see, not how they should see it: Does that make sense? Do you see a pattern? Can you explain the pattern? Which is the quickest for you? Why? Which allows you to be more accurate? Why?			

Cognitive control activities



'Spot the Difference' activities

The aim of these activities is for learners to compare two dot patterns. They need to look for what is the same and what is different between them.

Ask the learners to explain the differences that they notice. This helps them to develop their language of comparison. Use words about colour, shape, quantity, positions and so on.

Skills: To develop executive functions of: <ul style="list-style-type: none"> working memory and shifting attention to develop language of comparison 	You need: <ul style="list-style-type: none"> Pack of 10 'Spot the Difference' cards with dot patterns (see below) Dry wipe markers & cloth 	Work with: <ul style="list-style-type: none"> We suggest working with smaller groups sitting in a circle on the mat or around a table.

Using the activity

- Work with a group of learners in a circle.
- Each card is numbered. Learners work individually on one card at a time.
- When all learners are finished with a card, they pass the card on to the learner on their left.

Ask learners to:

- Look at the top picture (the one above the dotted line).
- Look at the bottom picture (the one below the dotted line).
- Look for the differences.
- Explain what they notice.
- Circle or draw the missing pieces / parts (with a whiteboard marker).

Language development – some question prompts if needed

Ask learners:

- What is the same in both pictures?
- What is different?
- What is missing in the bottom picture?

Noticing similarities and differences in shapes and designs is an important part of being mathematical.

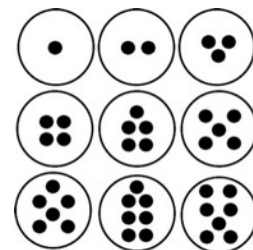
It is valuable for students to see that shapes and designs have many different characteristics and can be sorted in a variety of ways.

(Source: <https://www.youcubed.org/weeks/week-3-grade-1-2/>)

Encourage learners to talk about:

Using this card as an example: 	The number of dots they see How the dots are organised and positioned The colours of the dots The shape of the pattern	e.g. "There are 10 dots at the top. There are 9 dots at bottom." e.g. "The dots are in two rows – one with 5 and one with four." e.g. "There are 5 black dots at the top and only four at the bottom." e.g. "The dots at the top make a rectangle."
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Subitising activities with dot cards



REMEDIAL ACTIVITIES

These activities can be used to help learners who are struggling with the number range 1 to 6. You can increase the range to 10 later.

Finger Dot Match

<i>Mathematical object of learning:</i> Connecting dot patterns to finger representations	<i>You need:</i> <ul style="list-style-type: none"> • Dot pattern cards in range 1 to 6 to begin with 		<i>Work with:</i> We suggest working with smaller groups on the mat
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- Hold up a number of fingers (i.e. 2) and ask 'how many fingers?'
- Learners show the number of fingers on their own hands and say the number.
- Learners then find a dot card with that many dots.
- Then hold up 3 fingers i.e. 2 fingers and *one more*
- Learners show the number of fingers on their own hands and say the number.
- Learners find a dot card with 3 dots.
- Continue with other finger patterns to 5.
- Then extend the number range to 10.

Clothes Peg Match

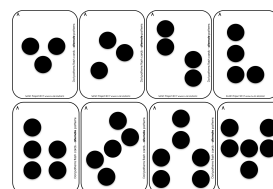
<i>Mathematical object of learning:</i> Relating dot patterns to a collection of physical objects and vice versa	<i>You need:</i> <ul style="list-style-type: none"> • Dot pattern cards in range 1 to 6 to begin with • Pegs 		<i>Work with:</i> We suggest working with smaller groups on the mat
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- Learners choose a dot card.
- They attach the same number of pegs on the edge of the card as shown →

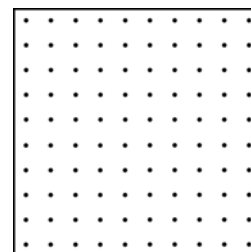


Extension ideas

- Use some of the alternate pattern dot cards (as shown to the right) in the range 1 to 6 to add a level of difficulty.
- As a separate activity, give a learner a number of pegs, for example five. Ask the learner to find the dot card with the same number of dots.



Subitising activities: Dots and boxes



This activity is a useful way to develop number sense. Learners can play with a partner or on their own. If they play with a partner, give them two different colour markers.

<p><i>Mathematical object of learning:</i></p> <ul style="list-style-type: none"> • Developing conceptual subitising (a combination of the whole and its parts) • Connecting dot patterns to addition • Developing number sense in how numbers are made up • Developing mathematical language 	<p><i>You need:</i></p> <ul style="list-style-type: none"> • Dots and Boxes laminated sheets • Dry wipe markers and cloth • 1, 2 or 3 dice per pair of learners (depending on the activity) 	<p><i>Work with:</i></p> <p>We suggest working with smaller groups on the mat.</p>
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① Introductory activity – number sense

- Children work in pairs with one dice and a laminated sheet.
- Take turns to throw the dice.
- The first learner draws around the number of dots shown on the dice and writes the number in the middle.
e.g. Throw a six and draw around a group of six dots.
- Each learner must explain how they see the dots they are drawn.
e.g. "I see this as 4 and 2. This makes 6".
- Encourage the learner to think of another way of describing their dots.
e.g. "Another way I see it is as 2 and 2 and 2 more"
- The other learner takes a turn and does the same, using a different colour marker.
- Continue until the sheet is full.

This activity is a useful way to develop number sense. Learners can play with a partner or on their own. If they play with a partner, give them two different colour markers.

One dice
Number sense

Dots and Boxes (1)

I see this as 4 and 2
This makes 6
Another way I see it:
I can see 2, and 2, and 2 more

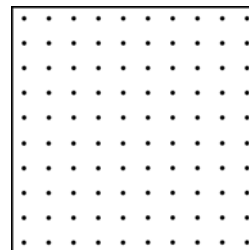
I saw 4 and 1 more
This makes 5
Another way I see it:
I see 2 and 3, which makes 5

Throw one dice

Source: <http://commoncoreconnectionusa.blogspot.co.za/2014/08/dots-and-boxes.html>

Encourage the learners to talk about two different ways of seeing the dot patterns they draw. This will help them to understand that numbers can be made up in many different ways.

Subitising activities: Dots and boxes continued



② Addition activity with two dice

- Children work in pairs with two dice and a laminated sheet.
- Take turns to throw the two dice.
- First learner draws around the number of dots shown on one dice and then on the other.
- The learner writes the number sentence in the middle e.g. Throw a 3 and 4; draw around a group of 3 and 4 dots.
- Each learner must explain how they see the dots they have drawn.
e.g. "3 and 4 is 7".
- Encourage the learner to think of another way of describing their dots.
e.g. "Another way I see it is as 3 and 3, which is 6 and 1 more, which makes 7".
- The other learner takes a turn and does the same, using a different colour marker.
- Continue until the sheet is full.

Two dice

Number sense, addition & mathematical language

Dots and Boxes (2)

Handwritten examples:

- $6+1=7$
- $4+2=6$
- $5+1=6$
- $3+4=7$ (with explanation: "3 and 4 is 7. Another way I see it: I see 3 and 3, which is 6. And 1 more, which makes 7.")
- $6+4=10$
- $3+4=7$ (with explanation: "5 and 3 is 8. Another way I see it: I see 3 and 3, which is 6. And 2 more, which makes 8.")
- $5+3=8$
- $3+2=5$
- $2+2=4$

Throw 2 dice

Source: <http://commoncoreconnectionusa.blogspot.co.za/2016/08/dots-and-boxes.html>

③ Addition activity with three dice

- Play as for two dice.
- This time learners draw lines around 3 sets of dots.
- Each learner must explain how they see the dots they have drawn.
e.g. "6 plus 4 is 10; 10 plus 3 is 13".
- Encourage the learner to think of another way of describing their dots.
e.g. "Another way I see it is as 3 + 3 + 3, which is 9. Then I see 2 and 2 more, which makes 13."

Three dice

Number sense, addition & mathematical language

Dots and Boxes (3)

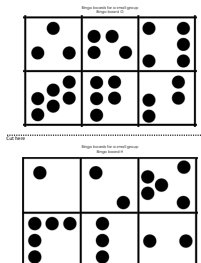
Handwritten examples:

- $6+4=10$
- $10+3=13$ (with explanation: "6 + 4 is 10. 10 + 3 is 13. Another way I see it: I see 3 + 3 + 3, which is 9. Then I see 2 and 2 more, which makes 13.")
- $3+3=6$
- $6+5=11$
- $5+4=9$
- $5+2=7$
- $6+4=10$
- $1+4=5$
- $5+5=10$ (with explanation: "1 + 4 = 5. 5 + 5 = 10. Another way I see it: I see 3 and 4 which is 8. Then I see 2 more, which makes 10.")
- $4+4=8$
- $8+1=9$
- $1+4=5$
- $5+5=10$

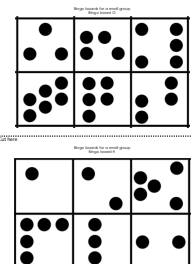
Throw 3 dice

Source: <http://commoncoreconnectionusa.blogspot.co.za/2016/08/dots-and-boxes.html>

Subitising activities: Bingo



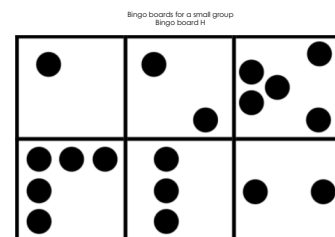
It is important to practice instantly recognising dot patterns. It is also important to develop the ability to recognise a number pattern as a combination of the whole and its parts (conceptual subitising). These both help to develop a sense of how numbers are made up.

<p><i>Mathematical object of learning:</i></p> <ul style="list-style-type: none"> • Developing conceptual subitising (a combination of the whole and its parts) • Developing number sense in how numbers are made up 	<p><i>You need:</i></p> <ul style="list-style-type: none"> • Bingo cards, laminated sheets, which have been cut into two pieces • Dry wipe markers and cloth 	<p><i>Work with:</i></p> <p>We suggest working with smaller groups on the mat.</p>
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Basic play

- You can work with a group of up to 10 learners.
 - Give each learner a bingo card and a marker.
- NB: one card is a 2 by 3 grid, as shown to the right**

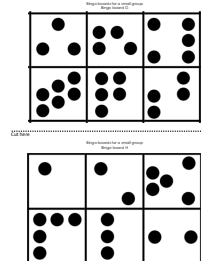
- Roll a dice and call out the number.
- Learners check their board to see if they have the number of dots that represent the number called.
- If so, they cross it out.
- The first learner to cross out three wins the round.



Extensions and variations

- Once learners know how the game works, choose one of the learners in the group to be the "caller".
- Make the game longer: the winner is the first person to fill the whole card.

Subitising activities: Add up the dots



This version uses the BINGO cards. It will encourage the learners to break the dots into groups and to add them up in different ways. It also helps to develop the ability to recognise a number pattern as a combination of the whole and its parts (conceptual subitising).

Encourage the learners to share how they added up the dots to develop mathematical language and sense making.

<p><i>Mathematical object of learning:</i></p> <ul style="list-style-type: none"> • Developing conceptual subitising (a combination of the whole and its parts) • Developing number sense in how numbers are made up • Developing mathematical language 	<p><i>You need:</i></p> <ul style="list-style-type: none"> • Bingo cards, laminated sheets, which have been cut into two pieces • Dry wipe markers and cloth 		<p><i>Work with:</i></p> <p>We suggest working with smaller groups on the mat.</p>
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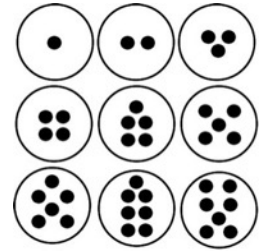
- Learners work in pairs.
- Ask the learners to find a quick way to add up all the dots on their boards.
 - encourage them not to count in ones, but rather to see the patterns in the dots.
- They can write their answer on the card, and their workings if necessary.

e.g. for this card, the learner may show one of these approaches, although there are other possibilities:

<p>3, 3, 3... 2, 2, 2... and 1 more</p>	<p>5, 5, 5, 2 and 1 more</p>	<p>8 and 10 (by rows)</p>	<p>6, 5 and 7 (by columns)</p>
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- Learners swap cards with a partner.
- Each learner must explain to the other learner how they saw the dots, to arrive at their total.

Subitising activities: Dot plate flash & How many altogether



Dot plate flash

<p><i>Mathematical object of learning:</i></p> <ul style="list-style-type: none"> • Recognition of dot patterns • Developing mathematical language 	<p><i>You need:</i></p> <ul style="list-style-type: none"> • Small paper plates • Dot pattern flash cards • Prestik • Counters for learners 		<p><i>Work with:</i></p> <p>We suggest working with smaller groups on the mat.</p>
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Attach some dot pattern cards to colourful paper plates with Prestik.

Provide learners with some counters.

- Flash a plate for 1 to 3 seconds.
- Ask the learners to make the pattern they saw with the counters.
- Discuss the layout of the pattern to encourage development of mathematical language.

How many altogether?

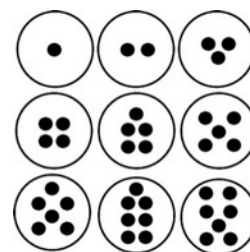
This variation will encourage learners to break the dots into groups.

- Show and keep up **two** plates with different dot patterns and ask learners to work out “How many altogether?”
- Without using the counters, encourage learners to break the patterns into parts and to use those to find a way to add up the dots.
- Also encourage the learners not to count all the dots.
- Discuss different methods offered by the learners.
- Learners who are struggling can build the two patterns with their counters and find the total.

Here are some examples:

<p>The repeated pattern of five can be used to add to 10 and then add 2 more.</p>	<p>The repeated pattern of four can be used to add in fours (or twos).</p>
<p>The repeated pattern of twos will encourage counting in twos.</p>	<p>The repeated pattern of five can be used to add 3 lots of five, plus 4 more.</p>

Subitising activities: The same and different

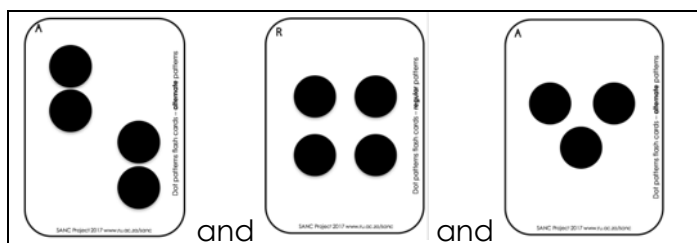


<p><i>Mathematical object of learning:</i></p> <ul style="list-style-type: none"> • Recognising dot patterns • Finding the difference between dot patterns by number and pattern 	<p><i>You need:</i></p> <p>Dot pattern cards from 1 to 6 prepared in sets of 3 (see below)</p>		<p><i>Work with:</i></p> <p>We suggest working with smaller groups on the mat.</p>
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PREPARATION

- Prepare a number of three dot pattern cards to work with.
- Two cards must have the same number of dots and one must not.

In this example, 2 cards show 4 dots and the other shows 3.



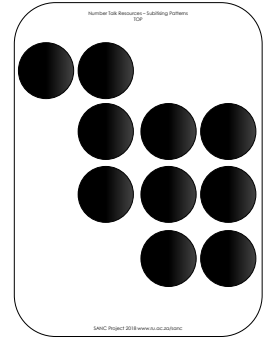
- Shuffle the set of 3 cards and lay them out.
- Children find the one card that **does not belong** and **say** why it doesn't belong.
- Encourage the use of language such as *more*, *less*, *groups of*, *left*, *right* and so on.

Extension

- When learners are comfortable with using 3 cards, work with a set of 4 cards (3 with the same number of dots and one not).
- Extend the range of cards from 1 to 10, starting with 3 cards and then moving onto 4 cards.

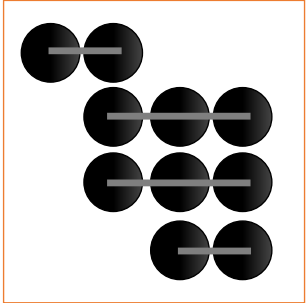
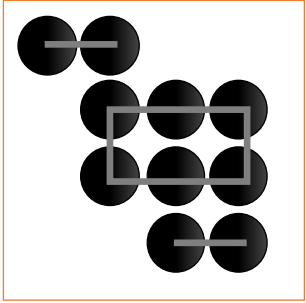
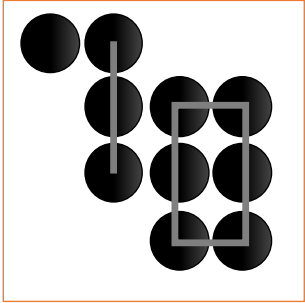
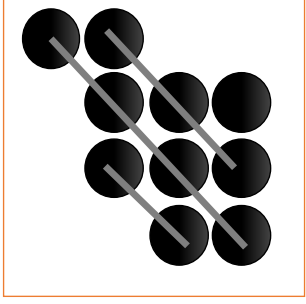
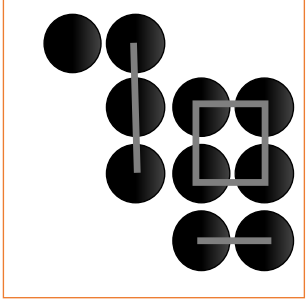
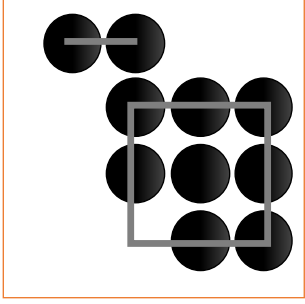
Note: the more cards you use and the bigger the number range, the more difficult the task is.

Today's number talk



Today, we spoke about this dot pattern and about the different ways we see the dots.

Here are some possible ways to see the dots:

<p style="text-align: center;">1</p>  <p style="text-align: center;">$3 + 3 + 2 + 2$</p>	<p style="text-align: center;">2</p>  <p style="text-align: center;">$6 + 2 + 2$ OR $6 + 4$</p>	<p style="text-align: center;">3</p>  <p style="text-align: center;">$6 + 3 + 1$ OR $6 + 4$</p>
<p style="text-align: center;">4</p>  <p style="text-align: center;">$4 + 3 + 2 + 1$</p>	<p style="text-align: center;">5</p>  <p style="text-align: center;">$4 + 3 + 2 + 1$</p>	<p style="text-align: center;">6</p>  <p style="text-align: center;">$(9 - 1) + 2$</p>

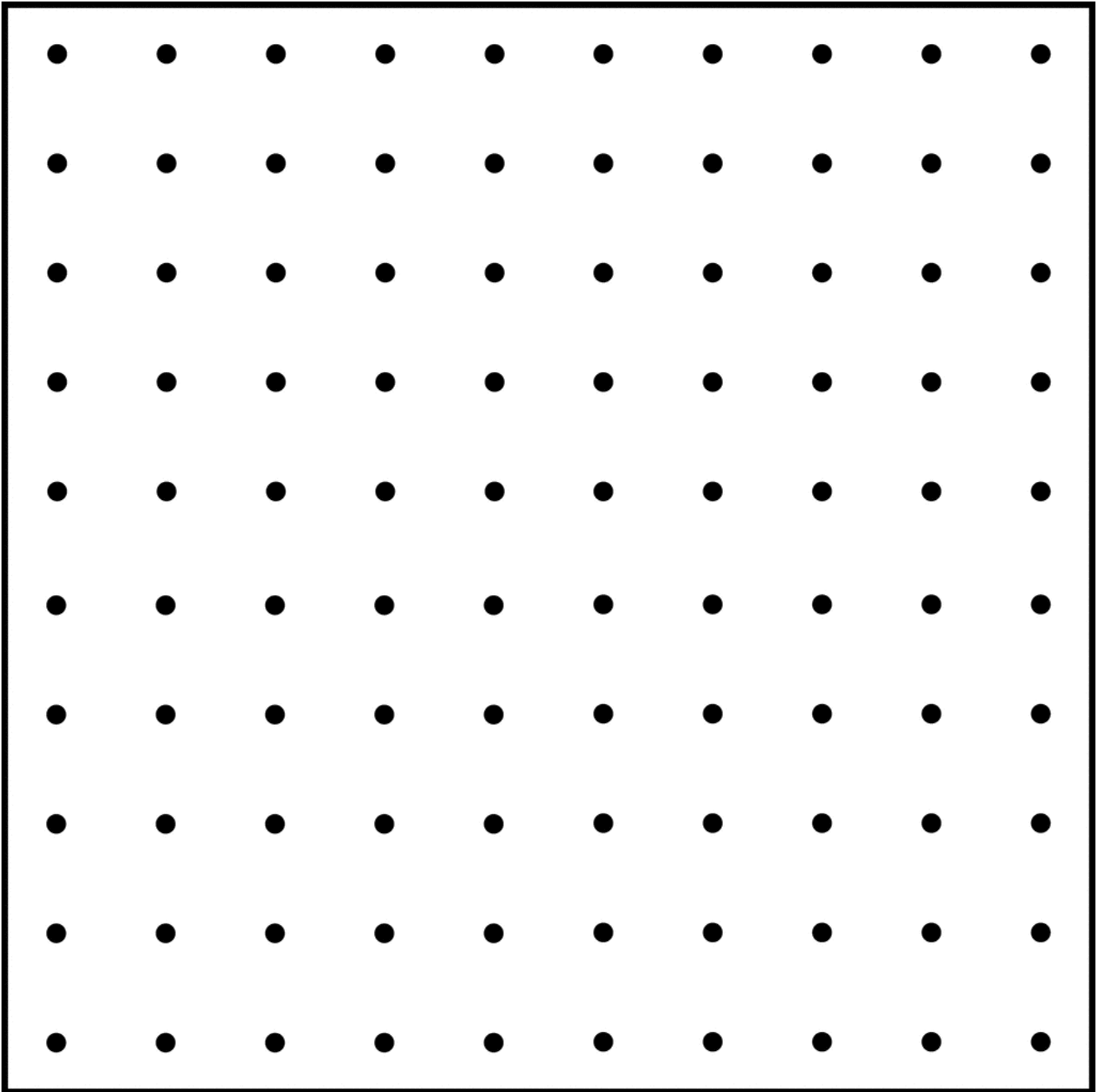
Reflection questions:

- How are methods 4 and 5 the same?
- How are methods 4 and 5 different?

Dots and Boxes printable

You have been provided with 10 laminated copies of this sheet, but if you want to photocopy it, you can do so from here.

Dots and Boxes



Source: <http://commoncoreconnectionusa.blogspot.co.za/2016/08/dots-and-boxes.html>