Stage A and B Testing Sequence

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How to use the tests

Running the Tests:

This test is best completed with small groups or individuals. There are eight questions to complete (A1-A8, B1-B8). Complete all eight questions with every child and record their results in the tables provided at the end of this document. Use your judgement about the appropriateness of the test for students. If they complete the questions fairly easily, try the next Stage Test in the sequence. If they complete very few questions successfully, try the previous Stage Test in the sequence. Once you have completed the testing, record student results in the spreadsheet. This will calculate their "Pre-test" score, which will be used to track growth throughout the year.

Resources needed for Stage A:

- a box containing at least 30 counters or cubes
- blank paper and drawing tools
- cards with pictures of dots (1, 2, 3, 4, 6, 8 – see Resources to Print)
- seven toys to attend a toys' picnic (e.g., dolls, bears, dinosaurs)
- at least 12 plates for use with a toys' picnic (can be paper plates or picnic plates)
- 16 cubes to arrange into arrays and draw

Resources needed for Stage B:

- a box containing at least 30 counters or cubes
- an opaque cup or mug
- a copy of the "Stage B Sheet to Print" for each child, along with writing tools. Note: students will draw arrays on the back of their sheet for question B8.
- cards as shown in B3 and described in B4

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Stage A Test

A1. **Collecting quantities** (3, 6, 8)
Students collect the quantity of counters or blocks that you ask for from a box with many.

For collecting 3 objects: Indicate the box of counters and say, "Go to the box and get three counters. Put the counters on the floor in front of you."

If the student forgets how many to get, remind them.
Ask them to check that they have three counters.
Check the quantity that the student has then return the counters to the box.

☑ If successful: Repeat the instructions for six and eight counters.

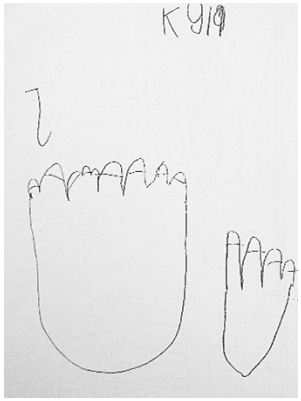
This is an example of a student trying to collect 5 blocks. They could correctly collect 3 blocks, but could not collect 5.

A2. **Drawing quantities** (draw your foot, draw 8 counters)
Students draw their foot with the correct number of toes without looking at their foot, then draw 8 counters without having the counters to look at.

For drawing the toes on their foot: Give the student a piece of paper and drawing tool. Say "Draw what your foot looks like, including all your toes. Make sure you have the right number of toes." *Please note: you cannot ask the student how many toes they have or indicate that they need to draw five toes. Students cannot take their shoe off to check their toes or to trace around it.*

Check that the drawing has the correct number of toes.
Check that the student does not trace their foot.

☑ If successful, say, "Draw eight counters near your foot." *Please note: Students need to draw 8 counters from memory without having the counters to look at.*



This is an example of what to look for in the drawing of a foot. Kyla knows that she has 5 toes and has written 5 on the drawing. However, she cannot draw 5 toes yet. This may be because she does not understand how many 5 is, or because she has not yet transferred her understanding of quantity from concrete to a visual form. This implies that even if she can count and collect 5 objects, she will have trouble holding that amount in her head for calculations.

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A3. **Conserving quantities** (3, 6, 8)
Moving counters around in front of the student to see if they conserve the amount, or if they need to count every time to check. Rotating cards with dots in front of the student to see if they conserve the amount, or if they need to count every time to check.

For three counters: Take three counters out of the box and place them randomly in front of the student. Ask, "How many counters are there?" Allow the student to count the counters to confirm that there are three. Rearrange the counters and ask, "how many now?"
Please note: Students should not need to count the counters again – they should know that there are still three, however sometimes they think you are requiring them to count. If required, prompt by saying, "It's ok to just tell me how many without counting them if you already know".

Rearrange the counters three times (spread them out, bunch them together, place two closer together than the third, organise them into a different shape). Ask "How many now?" each time you move the counters. *Please note: If students can conserve 3 they are likely to look at you as if you are crazy. It is ok to just move on once it is clear that they understand.*

For the card with three dots pictured: Show the student the card. Ask "how many?", rotate the card and repeat the question. Students should not need to count the dots again.

Students demonstrate conservation if they can say how many there are without counting to confirm the quantity, both for the physical objects and the image. Both are required to tick the box for each quantity.

☑ If successful: Repeat the instructions using six and eight counters, and images on cards. Note: the cards with 3 and 6 are without frames, the card with 8 is in a tens frame.

A4. **Matching Quantities** (4, 7)
Working out how many plates they need to collect so that each toy at a picnic to has one, then moving away and collecting exactly the correct quantity of plates from a pile.

For four toys and plates: Place the pile of plates off to the side of the space so that the student has to move away to collect the quantity required. Place four toys in front of the student. *Do not say how may toys you have, or ask the students to count them.* Explain that the toys are going to have a picnic and that each toy needs to have one plate. Say, "Please go and get enough plates so the toys have one each – you need to bring back exactly the right number. Make sure you know how many you need before you get any plates."

Students need to get exactly the correct number of plates from the pile rather than taking one at a time until each toy has one. If they do not understand this, have them return all the plates to the pile, clarify the instructions and try again. Tell them that they need to decide how many plates they will need before bringing them back. If you need a demonstration, use 2 toys. Say, "I have 2 toys, so I need 2 plates". Demonstrate collecting the plates.

☑ If successful: Repeat the instructions with seven toys.

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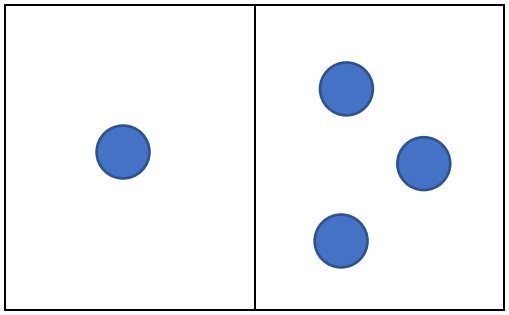
A5. **Comparing Quantities** (3 and 4, 6 and 5, 7 and 9)
Comparing two groups of objects to decide which one has more. Counting is fine.

For groups of three and four: Place two groups of counters or cubes in front of the student, one with three and the other with four. Say, "Point to the group that has the most counters."

Allow students to rearrange and/or count the quantity in each group to confirm how many there are. They must clearly indicate that the group of four has more.

☑ If successful: Repeat the instructions with groups of six and five counters or cubes, then with groups of seven and nine counters or cubes. Make sure that the larger quantity is not always in the same position.

A6. **Mental Objects (holding a quantity in your head even when you can't see it)**
Show one card and work out the quantity shown. Show a second card and work out the quantity. Show both cards together. Flip the one with the bigger quantity over, then ask, "how many altogether?" Students work it out without being able to see/count all the dots.



For cards showing one and three dots: Place one card in front of the student, showing one dot. Point to the first card and say, "I have this one". Replace the first card with a second card down with three dots. Point to the second card and say, "I also have these three". Allow the student time to verify how many are on each card if needed. Place the first card back on the table, next to the three. Flip the card with three dots over before you ask this question: "I have the dots on both cards – the one dot here and the three dots that you can't see. How many do I have altogether on both cards?"

Do not allow them to flip the card back, but you can remind them of the number of dots on the card that they can't see. You may need to explain that you still have the dots that are on the card you flipped over. Students are correct if they indicate that there are four dots altogether.

☑ If successful: Repeat the instructions using the cards with two dots and four dots. Flip the card with four dots.

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A7. **Missing Add-End** (Show 5 then cover 2, Show 6 then cover 4)
Showing a group of counters or blocks, then covering some. Asking students how many you have hidden.

For showing 5 then covering 2: Take out five counters and show them to the student. Say "I have five counters." Let the students count them to verify if needed. Quickly cover or hold two of the counters in your hand so that the student can't see them, or see how many you have hidden. Say, "I still have five counters, but now some are hiding. You can see these three counters. How many are hidden?"

Students are correct if they can tell you that there are two counters hidden without physically getting out counters to work it out. It is ok if they use their fingers.

☑ If successful: Repeat the instructions using six counters where you cover four.

A8. **Draw arrays** (4, 6, 9)
Drawing a quantity when it is structured into an array, rather than just drawing the right amount. Drawing a geometric arrangement of squares.

For drawing a square made of four cubes: Take out four cubes and arrange them in two rows of two cubes that are touching each other as shown in the picture below. Tell the student that they are going to make a copy of your four cubes. Allow time for the student to examine the cubes so that they can replicate the array. Remove your blocks. Give students the blocks to use to make a copy.

☑ If successful: Cover the student's blocks so that they no longer have an array to look at and say, "Draw the four blocks exactly how you arranged them."

Students are only correct if they draw the array with two rows of two squares. Making a copy of the blocks physically is not adequate, nor is drawing 4 squares in some other geometric arrangement. It is ok if the cubes are separated, but students do need to draw two rows of two squares, not a row of four, or a row of three with another one underneath. The squares need to be roughly the same size as each other and aligned correctly.

☑ If successful: Repeat the instructions making and drawing an array with two rows of three blocks, then with three rows of three blocks. It does not matter if the student draws the array of 6 in rotated form, but they do need a 2x3 or 3x2 array.

A8.1 4 (2x2)	A8.2 6 (2x3)	A8.3 9 (3x3)

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Stage B Test

B1. **Collect and draw quantities** (12, 18)
Collecting a given quantity of counters or blocks. Then drawing that same quantity of counters or blocks from memory without having the objects to refer to.

For collecting and drawing 12: Indicate the box of counters and say, "Go to the box and get twelve counters/blocks. Put them on the floor in front of you."

If the student forgets how many to get, remind them. Ask all students to check that they have twelve, even if they have the right quantity. It is ok if they self-correct at this point, but you cannot tell them that they have not collected the correct amount. Check the quantity, then return the counters to the box.

☑ If successful, remove the objects and give the student paper and a drawing tool and say, "Draw twelve counters."

Ask all students to check that they have drawn twelve counters, even if they have the right quantity. Students are correct if they draw exactly twelve counters. It is ok if they count to check how many they have drawn and self-correct, but you cannot point out that they have not drawn the correct amount. The counters can be arranged in any manner.

☑ If both questions are completed successfully: Repeat the instructions for eighteen counters.

B2. **Conserve quantities in the teens**
Conserving a quantity of counters or blocks when they move. This is tested when the students can still see the objects, and when the objects are shaken in a cup so that they cannot be seen.

Take twelve counters out of the box and place them randomly in front of the student. Ask, "How many counters are there?" Allow the student to count the counters to confirm that there are twelve.

☑ If successful: Put the counters into a cup. Shake them. Ask "How many now?"

Students demonstrate conservation if they can say how many there are without counting to confirm the quantity. If you are unsure, or suspect students of copying answers, change the number of counters (any quantity between 13 and 19).

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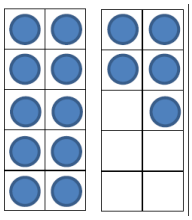
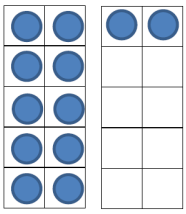
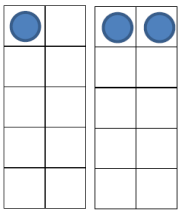
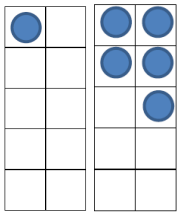
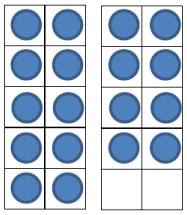
B3. Match quantities in the teens

Working out which cards show matching amounts and which do not match. Ordering the cards from smallest to largest.

Place the cards pictured below in front of students. Say, “Some of these cards have numbers written on them. Some of these cards show pictures of amounts. Please match up the numbers to the pictures. Leave any out that do not match.”

	16		21	
12		6		15

☑ If successful: Say, “Arrange the cards in order starting with the smallest number.”

B4. Mental Objects (holding a quantity in your head even when you can’t see it)

Show one card and state the quantity shown. Show a second card and state the quantity. Show both cards together. Flip the one with the bigger quantity over, then ask, “how many altogether?” Students work out the total without being able to see or count all the dots.

For cards with four and six: Place the card showing four dots in front of the student. Say, “I have these four”. Allow the student time to verify how many are on the card if needed. Remove the card and replace it with the card showing six dots. Say, “I have these six”. Allow the student time to verify how many are on the card if needed. Put both cards next to each other. Flip the card with six dots over before you ask this question: “I have the dots on both cards – the four dots here and the six dots that you can’t see. How many do I have altogether on both cards?”

Do not allow them to flip the card back, but you can remind them of the number of dots on the card that they can’t see. You may need to explain that you still have the dots that are on the card you flipped over. Students are correct if they indicate that there are ten dots altogether.

☑ If successful: Repeat the instructions using the cards with five dots and seven dots. Flip the card with seven dots.

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B5. Pre-marked number line to 10

Correctly position two, three and eight on a pre-marked number line from 0-10.

Show the student the following number line on their sheet.

Say, "This line has space for all the numbers from 0 to 10. I want you to write just some of the numbers on the line for me without writing them all on. Please write the number two where it would go on this number line." When the student has completed the task, ask them to write three and eight on the line as well.

Please note: all three numbers must be in their correct positions, without you indicating that students should check their position.

B6. Missing addend task

Showing a group of counters or blocks, then covering some. Asking students how many you have hidden.

For show 9 objects then cover 6: Take out nine counters and show them to the student. Say "I have nine counters." Allow time for them to verify the quantity. Quickly cover or hold six of the counters in your hand so that the student can't see them, or see how many you have hidden. Say, "I still have nine counters, but now some are hiding. You can see these three counters. How many are hidden?"

Students are correct if they can tell you that there are six counters in your hand without physically getting out counters to work it out. Note: if they take a long time to work it out or have several attempts, mark it as incorrect. It is ok if they use their fingers, but it should not take more than about 20 seconds altogether.

☑ If successful: Repeat the instructions using twelve counters. Cover or hold seven of the counters.

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B7. Complex partitioning with multiple parts

Work out how to partition counters between three cups, without having physical objects to refer to. Each task has constraints that make the partitioning more complex.

For 8 counters split between 3 cups: Show the student the image of three cups on their sheet. Say, "I want you to draw some counters in each of these cups so that there are 8 counters altogether. **All** of the cups must have at least one counter in them. **None** of the cups can have exactly two counters in them." *Do not give them the counters to use.*

Ask all students to check and make sure that they have drawn eight counters and that no cups have two counters, even if they have solved the problem correctly. Allow them to self-correct once if required, but if they take a long time to work it out or need several attempts, do not mark the question as correct.

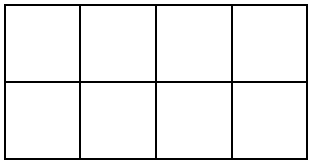
For 12 counters split between 3 cups: Show the student the second image of three cups on their sheet. Say, "I want you to draw some counters in each of these cups so that there are 12 counters altogether. There needs to be a different amount/number of counters in each cup. No cup can have more than six counters." *Do not give them counters to use.*

Ask all students to check and make sure that they have drawn twelve counters, that no cups have the same number of counters, and that no cup has more than 6 counters Allow them to self-correct once if required, but if they take a long time to work it out or need several attempts, do not mark the question as correct.

B8. Draw arrays

Draw arrays with 10 squares and with 12 squares, without using physical objects.

Show the student the following image of an array with 8 squares.



Say, "This is a picture of a rectangle made from eight squares." Cover the image or flip it over so that the student can no longer see it. Give the student paper and a drawing tool (e.g., the back of their previous sheet). Say, "Draw as many rectangles as you can made from ten squares. You need to draw more than one rectangle that has 10 squares."

Students are correct if they draw a 2x5 rectangle (either vertically or horizontally). If they just draw a row of 10, encourage them to think of another rectangle of 10 they could draw.

☑ If successful: Repeat the instructions using 12 squares. *They need to find 3x4 and 6x2.*

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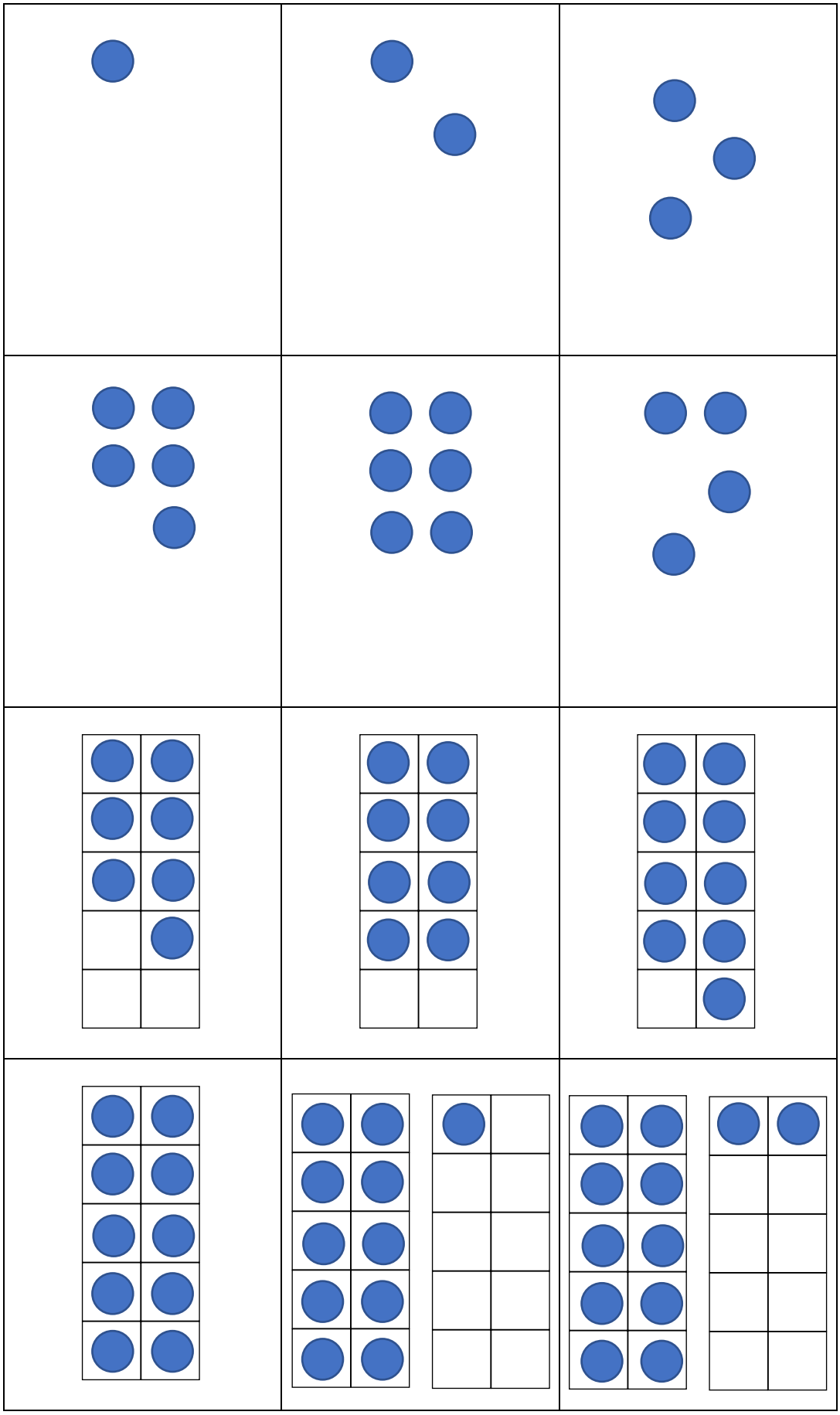
Resources to Print



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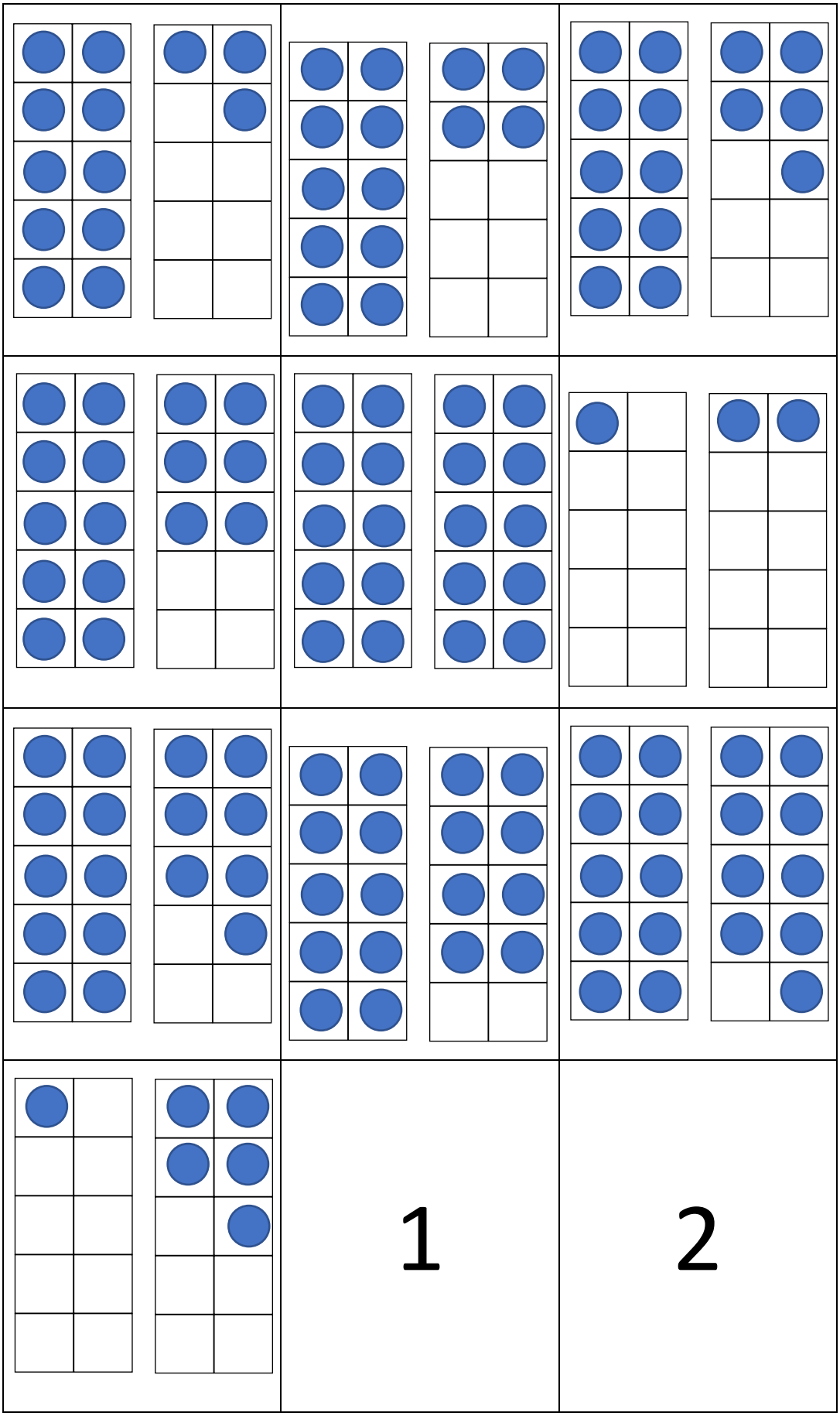

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3	4	5
6	7	8
9	10	11
12	13	14

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15	16	17
18	19	20
21	22	23
24	25	26

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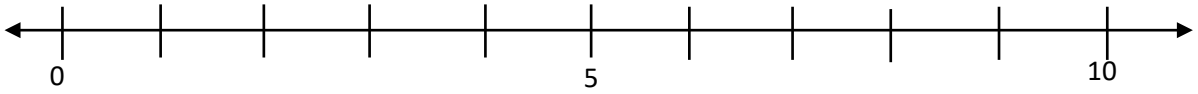
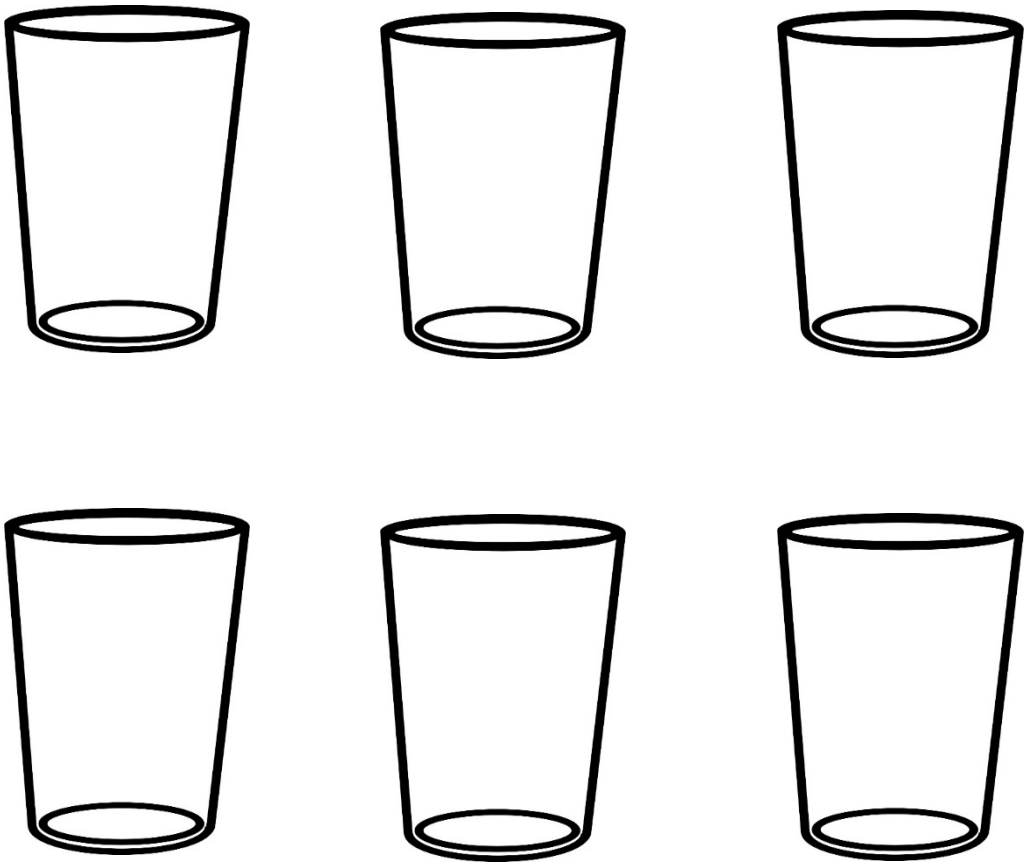
Name





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Recording sheet	Stage A: Quantity of single digit numbers, Partitioning and Arrays to 6																		
	1. Collects this quantity			2. Draws this quantity from memory, without objects		3. Conserves this quantity (physical objects and image rotation)			4. Match this amount (toys needing plates for a picnic)		5. Compare, then identify which is the most			6. Mental objects: How many altogether task (2 cards, then flip one)		7. Missing addend task (how many are covered?)		8. Draw arrays made from cubes: show blocks first, then cover and draw from memory		
	A1.1	**A1.2**	**A1.3**	**A2.1**	**A2.2**	**A3.1**	**A3.2**	**A3.3**	**A4.1**	**A4.2**	**A5.1**	**A5.2**	**A5.3**	**A6.1**	**A6.2**	**A7.1**	**A7.2**	**A8.1**	**A8.2**	**A8.3**
Student Name	**3**	**6**	**8**	**foot**	**8**	**3**	**6**	**8**	**4**	**7**	**3, 4**	**6, 5**	**7, 9**	**1+(3)**	**2+(4)**	**Show 5, cover 2**	**Show 6, cover 4**	**2x2 array**	**2x3 array**	**3x3 array**

Recording sheet	Stage B: Quantity of teen numbers, Partitioning and Arrays to 12												
	1. Collects and draw this quantity		2. Conserve this quantity (physical)	3. Match and order these quantities	4. Mental objects: How many altogether task (2 cards, then flip one)		5. Place these numbers on 0-10 pre-marked number line (0, 5, 10 labelled)	6. Missing addend task (how many are covered?)		7. Complex partitioning of amount listed using instructions		8. Draw arrays for each quantity listed (minimum 2)	
	B1.1	**B1.2**	**B2.1**	**B3.1**	**B4.1**	**B4.2**	**B5.1**	**B6.1**	**B6.2**	**B7.1**	**B7.2**	**B8.1**	**B8.2**
Student Name	**12**	**18**	**Teen numbers**	**Teen numbers**	**4+(6)**	**5+(7)**	**2, 3, and 8**	**Show 9, cover 6**	**Show 12, cover 7**	**8**	**12**	**10**	**12**