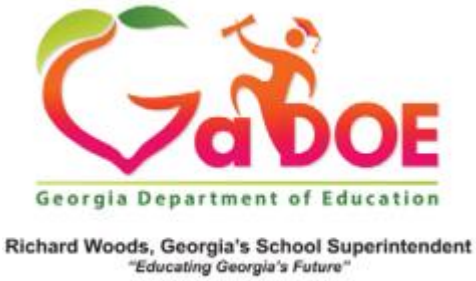
NUMERACY ASSESSMENTS AND INTERVENTIONS FOR ELEMENTARY AND INTERMEDIATE GRADES

These formative assessment and intervention strategies will help teachers increase the percentage of K-5 students with a strong knowledge of foundational skills and concepts in numeracy.

GEORGIA NUMERACY PROJECT

PART 1: DIAGNOSTIC ASSESSMENTS



Acknowledgements

This instructional resource was developed based on the collaborative efforts of several Georgia educators, university faculty and administrators.

Disclaimer: The Individual Knowledge Assessment of Number (IKAN) AND The Global Strategy Stage Assessment (GloSS) were created by New Zealand's Ministry of Education. These are part of New Zealand's Numeracy Project. Some documents included within this manual have been adapted from http://nzmaths.co.nz/numeracy-projects.

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PART I: DIAGNOSTIC ASSESSMENTS

OVERVIEW

What is the Georgia Numeracy Project?

The Georgia Numeracy Project is a free numeracy development resource provided by the Georgia Department of Education, which introduces teachers and teacher leaders to the trajectory by which learners acquire a solid foundation in numeracy. The Georgia Numeracy Project is focused on developing students' understanding of numbers, and their ability to use numbers to solve problems. Students may solve number problems by counting, adding, subtracting, multiplying, dividing, or any combinations of these operations. Students should develop strategies that support their use of these operations in computation problems.

As part of the Georgia Numeracy Project, students are engaged in learning ways to:

- enjoy working with numbers presented in a variety of ways
- make sense of numbers - how big they are, how they relate to other numbers, and how they associate with a quantity
- make sense of quantities - how much is in a set
- solve mathematical problems - whether real-life or imaginary
- use mental math strategies to calculate in their heads whenever possible, rather than using a calculator or pencil and paper
- show that they understand math, using a variety of appropriate tools
- explain and record the strategies and methods they use to work out problems
- accept challenges and work at levels that stretch them
- work with others and by themselves
- discuss their mathematical reasoning with others – (explain how they tackle mathematical problems)

Students are encouraged to learn a wide range of different strategies to solve problems. They are taught methods of choosing the most appropriate strategy for each problem.

The Georgia Numeracy Project uses a framework, called the Number Framework, which was modified from the New Zealand Ministry of Education Numeracy Framework. This Framework describes students' level of ability and ensures that the activities students are engaged in are suitable to meet their needs.

In addition to the Numeracy Framework, an Intervention Guide is provided as a part of the Georgia Numeracy Project to assist teachers and school staff with providing appropriate, timely interventions to students who are progressing towards a level of mastery within the Georgia Numeracy Project.

How It Works

Why the Georgia Numeracy Project?

The interviews are administered 3 times per year and serve as a diagnostic, formative, and summative assessment. The assessment is applicable to any K-8 students and students who are struggling in high school.

What assessments are a part of the Georgia Numeracy Project?

There are 2 separate assessments that can serve as universal screeners, diagnostic assessments, as well as benchmark assessments of numeracy development and strategy acquisition:

- **Global Strategy Stage Assessment (GloSS)**
  - Diagnostic interview, one-on-one with teacher and student
- **Individual Knowledge Assessment of Number (IKAN)**
  - IKAN Counting Interview (for stages 0 – 3 on GloSS – usually for grades pre-K – 2nd)
  - IKAN Written Assessment (for stages 4 – 8 on GloSS – usually for grades 3rd and higher)

In what order are the assessments administered?

- The GloSS Assessment is usually administered first.
- For students scoring within Strategy Stages 0 – 4 on the GloSS Assessment, teachers should administer the IKAN Part I: Counting Interview.
- For students scoring within Strategy Stages 5 – 8 on the GloSS Assessment, teachers should administer the IKAN Part II: Written Assessment.

What happens after these two assessments are administered?

- The information gathered from these 2 assessments will help inform teaching strategies moving forward such as small groups with differentiated lessons and interventions.
- Data from these assessments should be analyzed to determine the specific groups in the classroom and appropriate next steps to assist students as they progress along the continuum of numeracy development.

Intervention/Remediation/Acceleration

After the teacher identifies the strategy and number knowledge stages for individual students, he/she can find the corresponding tasks/activities in the **Resource Finder**. Additional resources and information can be found in the **Numeracy Development Project Books**, as well.

GEORGIA NUMERACY PROJECT ASSESSMENTS

GLOSS & IKAN
UNIVERSAL SCREENER/DIAGNOSTIC AND/OR BENCHMARK

GloSS: Global Strategy Stage Assessment &

IKAN: The Individual Knowledge Assessment of Numeracy

The GloSS and IKAN assessment package enables teachers to identify the number knowledge and strategy stages in which students are demonstrating proficiency across all knowledge and strategy domains. The assessments consist of a series of interview strategy and number questions, which can be administered to individual students in five to ten minutes. The students are then assigned an overall Strategy Stage based on their responses to the questions in the interview. The series of questions increase in difficulty and include questions in all knowledge and strategy domains. Students move through these questions until they become too difficult for them to answer correctly. Information regarding a student's specific strategy stage is supported by the information provided through the IKAN regarding the student's comprehension of number and quantity. This information supports the acquisition of efficient strategies for computation, and the efficiency of these strategies can be measured by the GloSS assessment. Hence, these two assessments go hand in hand.

GloSS and IKAN Overview

Many educators wish they could wave a magic wand and have an understanding of what their students know and understand about mathematics. An effective way to understand deeply what a student knows or does not know is for educators to engage students in a thorough diagnostic assessment. Diagnostic interviews provide teachers and support personnel with a wealth of information about a child's mathematical understanding. Screeners and benchmarks that provide information only on correct or incorrect answers, but do not provide any insight into why students choose answers, are not as effective in comprehensively diagnosing students' strengths and weaknesses. Diagnostic interview assessments, such as the GloSS, allow the reasoning of students, as well as any misconceptions they may hold, to be revealed during the assessment. Many other screeners do not provide this much detail into a child's thinking.

In the text *Solving for why: Understanding, assessing, and teaching students who struggle with math* published by Math Solutions, the author suggests that the most effective way to truly know what a child understands about mathematics is to have a deliberate, guided conversation with them about their thinking. "Though student interviews can take more time than other assessments, they are one of the most effective tools currently available to inquire deeply into students' conceptual understanding of mathematics." (Tapper, 2012)

According to Tapper (2012), when the assessment and intervention approaches focus on assessment and communication with students, it helps the teacher gain insight into student understanding in a remarkably different way than recipe-type approaches that assume the same solution applies to learners with similar struggles. Tapper suggests that it is important for teachers to identify learners of mathematics who struggle, identify reasons for why a learner may be struggling, and facilitate a Concrete — Representational — Abstract (CRA) Assessment. The GloSS and IKAN assessments do just that.

There are many benefits to using the GloSS and IKAN according to classroom teaching experts and teacher leaders who have used them, such as:

- The Numeracy Project, The Global Strategy Stages Assessment and The Individual Knowledge Assessment of Number (the GloSS and IKAN) and interventions are available *for free* from the Georgia Department of Education Mathematics Program (adapted from the Numeracy Project developed by New Zealand's Ministry of Education).
- The GloSS and IKAN are noteworthy because they provide an excellent source of information about student thinking and understanding. These may be used with students beginning in Kindergarten and up to at least 8th grade and are aligned with a wealth of interventions provided through the Georgia Numeracy Project and the New Zealand Numeracy Project.
- Teachers grow in numeracy understanding as they use the diagnostic tools and interventions.
- It is easy to flexibly group students by strategy stage and use interventions found in the Georgia Numeracy Project.
- If student portfolios are maintained and travel from grade to grade with students, information is readily available for a quick start at the beginning of the school year.
- Teacher conversations shift from concerns that students have no number sense to a focus on how to solve problems through developing student reasoning and strategy development.
- Student growth is easily tracked from stage to stage.
- The stages align with many of the Number and Operations, Operations and Algebraic Thinking, and Counting and Cardinality standards of GSE.
- Many of the early numeracy questions transfer to GKIDS and running records scoring.
- The IKAN and GloSS can serve as benchmarks and formative assessments throughout the year. The data gathered from the Numeracy Project also inform MTSS.
- There is evidence-based research to support the use of the GloSS and IKAN http://nzmaths.co.nz/annual-research-and-evaluation-reports-and-compendium-papers.

Source Cited:

Tapper, J. (2012). *Solving for why: understanding, assessing, and teaching students who struggle with math*. Math Solutions.

FREQUENTLY ASKED QUESTIONS:
GEORGIA NUMERACY PROJECT DIAGNOSTIC ASSESSMENTS

- ***How do I administer the initial assessments?***
  There is training available to support the administration of the initial assessments. This training can be found on www.georgiastandards.org and on the Georgia Mathematics Professional Learning Community Support Wikis, as well as the NZ Maths website.

- ***Do the assessments take too long to administer?***
  Teachers throughout Georgia have indicated that the small amount of time it takes to administer the GloSS and IKAN Assessments is minimal compared to the gain in information and insight into a student's mathematical understanding. Please find a video here where Georgia educators explain the value of administering these assessments: Video 1: https://bit.ly/2I6FA7k; Video 2: https://www.youtube.com/watch?v=PSF-o8K6gYc.

- ***How long does it take to administer the GloSS and IKAN assessments?***
  The GloSS takes 15 minutes if being administered to an older student who has developed some more sophisticated strategy stage knowledge and has no previous GloSS or IKAN data. If schools begin by assessing Kindergarten students, and add a grade each year, the information builds from year to year and the time to administer the assessments drops accordingly. The IKAN Counting Interview takes about 5 minutes to administer per child. This is paired with the GloSS Assessment; these two can be administered as a package all at once. The IKAN Written Assessment takes 10 minutes to assess an entire class, as it is administered whole group. Schools, who have seen the student and teacher benefits through the effective use of the GloSS and IKAN, feel it is well worth the time investment.

- ***Is the assessment system too difficult to administer to students with disabilities?***
  Teachers who use the GloSS and IKAN find that they learn more about the thinking of their students with disabilities through these tools than they do with multiple-choice or computer-based assessments. The GloSS and IKAN help teachers become aware of strategies their students may be using. Without this diagnosis, the teachers would not know these strategies were being used by their students.

- ***Once I administer these two assessments, then what?***
  Once you have determined the strategy stages and number knowledge stages for each student from these two assessments, you can begin grouping students and pulling Numeracy Project activities and interventions aligned to the strategy stages to support students' continued numeracy development.

GloSS

Global Strategy Stage (GloSS)

- This assesses the strategies known and mastered by your student. From this assessment, a strategy stage is determined for each of three domains: addition/subtraction, multiplication/division, and ratio/proportions. An overall global stage is also identified. These strategy stages inform you of how to assist your students develop more efficient strategies.

1st Interview Assessment *(beginning of year)*
2nd Interview Assessment *(middle of year)*
3rd Interview Assessment *(end of year)*

- As students are interviewed, the teacher records their responses to later identify where the student is in terms of their global strategy stage (Number Framework found on previous page).

Frequency of Administration

GloSS Administration: (3 times per year – BOY, MOY, EOY)

Teacher Guidance:

1. Administer the GloSS Assessment before administering the IKAN Assessment.

2. If a student scores within Strategy Stages 0-3 on the GloSS assessment, the teacher should then administer the IKAN Part I (Counting Interview). Any other student who has never had the Counting Interview administered, should begin with this portion of IKAN.

   If a student scores within Strategy Stage 4 or higher on the GloSS assessment and the student has shown mastery of the IKAN Counting Interview, the teacher should then administer the IKAN Part II (Written Assessment).

GLOSS RECORDING SHEET

Name: _____ Grade: _____ Date: _____

Interview Form: **1** **2** **3** **(circle as appropriate)**

Strategy Stage Summary

Addition and Subtraction	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Multiplication and Division	**Not Rated**			**3**	**4**	**5**	**6**	**7**	**8**
Ratios and Proportions	**Not Rated**				**4**	**5**	**6**	**7**	**8**
Global Strategy Stage *(highest stage from all domains)*									

Addition and Subtraction	**Multiplication and Division**	**Proportions and Ratios**
Task 1 **Stage: 0 / 1** Observation:		
Task 2 **Stage: 1 / 2 - 3 / 4** Observation:		
Task 3 **Stage: 3 / 4 / E5** Observation:	**Task 4** **Stage: 3 / 4 / E5** Observation:	**Task 5** **Stage: 4 / E5** Observation:
Task 6 **Stage: E5 / 5** Observation:	**Task 7** **Stage: E5 / 5** Observation:	**Task 8** **Stage: E5 / 5** Observation:
Task 9 **Stage: 5 / E6** Observation:	**Task 10** **Stage: 5 / E6** Observation:	**Task 11** **Stage: 5 / E6** Observation:
Task 12 **Stage: E6 / 6** Observation:	**Task 13** **Stage: E6 / 6** Observation:	**Task 14** **Stage: E6 / 6** Observation:
Task 15 **Stage: 6 / E7** Observation:	**Task 16** **Stage: 6 / E7** Observation:	**Task 17** **Stage: 6 / E7** Observation:
Task 18 **Stage: E7 / 7** Observation:	**Task 19** **Stage: E7 / 7** Observation:	**Task 20** **Stage: E7 / 7** Observation:
	Task 21 **Stage: 7 / E8** Observation:	**Task 22** **Stage: 7 / E8** Observation:

Adapted from New Zealand Numeracy Project

Global Strategy Stages Assessment (GloSS)

Interview 1

GENERAL INSTRUCTIONS

- For the initial assessment of a student, begin with Task 1. After the first assessment, start the assessment at the place where the student last responded accurately.
- Ask the student **all** the tasks within a section.
- Read each task to the student and show them the related Task Card.
- Give the student time to answer the question (you may need to wait for a few minutes).
- Prompt the student if you need to. For example, ask *"How did you work that out?"* or *"Can you talk me through what you were thinking?".*
- Allow the student the opportunity to demonstrate **higher level strategies** based on The Number Knowledge Framework. If they use a simple strategy (e.g., counting), ask *"Can you do it another way?"*.
- Use the scoring guide below each task to determine the Number Framework Stage associated with the student's response.
- Circle the relevant stage on the student's recording sheet.
- Record the student's strategy in the space under "Observations".
- Use the decision rule provided at the end of each section to decide whether to continue the interview. If there is any doubt or if you think the student may be capable of showing higher strategies, **continue** the interview.
- Questions are designed so that they can be answered mentally. Students should not be provided with paper and pencil or any other writing tool to solve the problems; they should be encouraged to use mental, quantitative reasoning to apply strategies learned to solve the problems.

ALL MATERIALS NEEDED

- 20 counters
- Two index cards to cover counters
- Flip Book
- One recording sheet per student

Section 1 TARGET: Stage 1
One-to-one counting

TASK 1

ACTION: ***Place 8 counters of the same color on the table.***

SAY: How many counters are there?

Stage	Strategy observed
0	**Student cannot count 8 objects**
1	**Correctly counts the 8 objects**

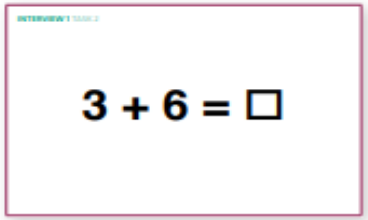
DECISION: If "1" is circled in **Task 1**, CONTINUE the interview.
If "0" is circled, rate the student at Stage 0 and STOP the interview.

INTERVIEW 1 TASK 2

$$3 + 6 = \square$$

Section 2 TARGET: Stages 2–3 or 4
Counting from one or Advanced counting

TASK 2



SAY:	Please hold out your hands for me.	**ACTION:**	*Place 3 counters in the student's hand.*
SAY:	Here are 3 counters.	**ACTION:**	*Place 6 counters in their other hand.*
SAY:	Here are another 6 counters.	**ACTION:**	*Close the student's hands to encourage imaging.*
SAY:	How many counters have you got altogether?	**ACTION:**	*Allow the student to open their hands if they find imaging difficult.*

Stage	Strategy observed
1	**Cannot solve the addition problem** (Stage 1)
2–3	**Physically counts all the objects from 1 on materials** (Stage 2) **Correctly counts all the items from 1 by imaging** (Stage 3)
4 or higher	**Counts on** e.g., 4, 5, 6, 7, 8, 9 **or** 7, 8, 9 **Knows** 3 + 6

DECISION: If **either** "2–3" **or** "4" are circled in **Task 2**, CONTINUE the interview.
If "1" is circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 1 TASK 3

$$9 + 7 = \square$$

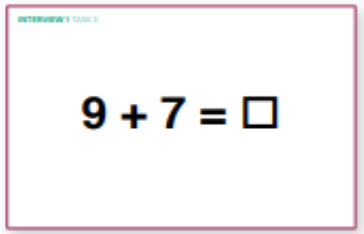
Section 3 TARGET: Stages 4 or Early 5
Advanced counting or Early additive part-whole

*Do all **three** tasks on these two pages.*

TASK 3

ACTION: *Place 9 counters under a card then place 7 under another card.*

SAY: Here are 9 counters, and here are 7 counters.
How many counters are there altogether?



Stage	Strategy observed
3	**Cannot solve the problem** (After removing the cards–Stage 1) **Counts all objects from 1 on materials** (Stage 2) **e.g.,** 1, 2, 3, …, 16 **Counts all objects from 1 by imaging** (Stage 3) **e.g.,** 1, 2, 3, …, 16
4	**Counts on** (Stage 4) **e.g.,** 10, 11, 12, …, 15, 16 **or** 8, 9, 10, …, 15, 16
Early 5 or higher	**Uses a part-whole strategy e.g.,** - Making to ten e.g., 9 + 1 = 10; 10 + 6 = 16 - Doubling with compensation e.g., 7 + 7 = 14; 14 + 2 = 16 **or** 8 + 8 = 16 **or** 9 + 9 = 18; 18 – 2 = 16 - Addition fact e.g., 9 + 7 = 16

INTERVIEW 1 TASK 4

There are 5 cups in each row.
There are 6 rows of cups.
How many cups are there altogether?

TASK 4

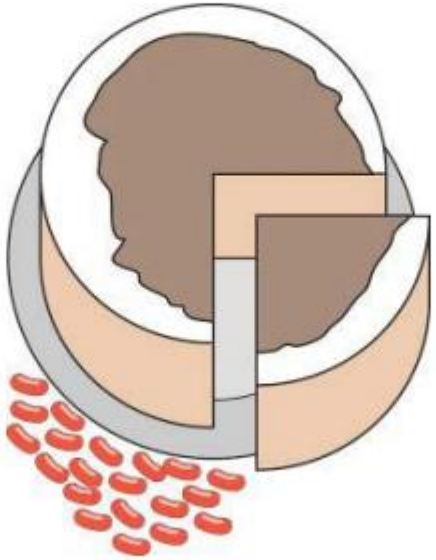
SAY: There are 5 cups in each row.
SAY: There are 6 rows of cups.
SAY: How many cups are there altogether?

ACTION: *Sweep one row with your finger.*
ACTION: *Point to each row one by one.*

Stage	Strategy observed
3	**Cannot solve the problem** **Counts all objects from 1 on materials** (Stage 2) **e.g.,** 1, 2, 3, 4, **5**, 6, …, **30** **Counts all objects from 1 by imaging** (Stage 3) **e.g.,** 1, 2, 3, 4, **5**, 6, …, **30**
4	**Skip counting** (Stage 4) **e.g.,** 5, 10, 15, 20, 25, 30 [**or** 6, 12, 18, 24, 30]
Early 5 or higher	**Uses an additive or multiplicative strategy e.g.,** - Repeat addition e.g., 5 + 5 + 5 + 5 + 5 + 5 = 30 **or** 5 + 5 = 10; 10 + 5 = 15; …; 25 + 5 = 30 - Multiplication strategies e.g., 4 × 5 = 20; 20 + 5 + 5 = 30 - Multiplication fact e.g., 6 × 5 = 30

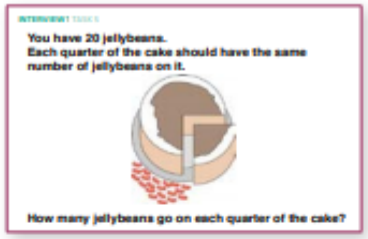
INTERVIEW 1 TASK 5

You have 20 jellybeans.
Each quarter of the cake should have the same number of jellybeans on it.



How many jellybeans go on each quarter of the cake?

TASK 5



ACTION: *Provide 20 counters (jellybeans).*
Allow the student access to these counters if necessary.

SAY: You have 20 jellybeans.

Each quarter of the cake should have the same number of jellybeans on it.

How many jellybeans go on each quarter of the cake?

Note: Say "fourth" instead of "quarter" if this is more familiar to your student.

Stage	Strategy observed
2–4	**Cannot solve the problem** **Equally shares the beans, on materials or by imaging** (Stage 2–4)
Early 5 or higher	**Uses an additive or multiplicative strategy e.g.,** - Additive partitioning e.g., 10 + 10 = 20; (5 + 5) + (5 + 5) = 20 - Multiplication strategy e.g., 5 × 2 = 10; 10 × 2 = 20 - Multiplication or division fact e.g., 5 × 4 = 20 **or** 20 ÷ 4 = 5

DECISION: If **any** "E5" are circled in **Tasks 3, 4** or **5**, **or** if the "4s" are circled in **both Task 3** and **Task 4**, CONTINUE the interview.

Otherwise STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 1 TASK 6

Tamati had 57 model dinosaurs.
He gives 25 to his cousin, Alice.

How many does he have left?

Section 4 TARGET: Stage 5
Early additive part-whole

*Do all **three** tasks on these two pages.*

TASK 6

SAY: Tamati had 57 model dinosaurs.
He gives 25 to his cousin, Alice.
How many does he have left?

Stage	Strategy observed
Early 5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Counting on** or **Counting back** (Stage 4) **e.g.,** 26, 27, …, 57 **or** 56, 55, …, 25 **Skip counting in tens and ones** (Stage 4) **e.g.,** [57] 47, 37, 36, 35, 34, 33, 32 **Repeat addition in tens and ones** (Stage E5) **e.g.,** 57 – 10 = 47; 47 – 10 = 37; 37 – 5 = 32 **or** 25 + 10 = 35; 35 + 10 = 45; 45 + 10 = 55; 55 + 2 = 57; 30 + 2 = 32 **Mix of counting and part-whole strategies** (Stage E5) **e.g.,** 25 + 5 = 30; 30 + 10 = 40; 40 + 10 = 50; 51, 52, …, 56, 57
5 or higher	**Uses a part-whole strategy e.g.,** - Doubling e.g., 25 + 25 = 50; 50 + 7 = 57; 25 + 7 = 32 - Place value partitioning e.g., (50 – 20) + (7 – 5) = 32 - Subtracting in parts e.g., 57 – 20 = 37; 37 – 5 = 32 - Making to ten e.g., 57 – 7 = 50; 50 – 20 = 30; 30 + 2 = 32

INTERVIEW 1 TASK 7

Malcolm has 24 pegs.
He uses 2 pegs to hang out each piece of clothing.

How many pieces of clothing can he hang out?

TASK 7

SAY: Malcolm has 24 pegs.
He uses 2 pegs to hang out each piece of clothing.
How many pieces of clothing can he hang out?

Stage	Strategy observed
Early 5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Skip counting** (Stage 4) **e.g.,** 2, 4, 6, …, 24 **Repeated addition** (Stage E5) **e.g.,** 2 + 2 + 2 + … + 2 = 24
5 or higher	**Uses an additive or multiplicative strategy e.g.,** - Doubling additively e.g., 2 + 2 = 4; 4 + 4 = 8; 8 + 8 + 8 = 24; 4 + 4 + 4 = 12 - Derive from multiplication facts e.g., 10 × 2 = 20; 2 × 2 = 4; 10 + 2 = 12 - Multiplication or division facts e.g., 12 × 2 = 24 **or** 24 ÷ 2 = 12

INTERVIEW 1 TASK 8

Alex and his friends ate 12 slices of pizza.
Each slice was one-quarter ($\frac{1}{4}$) of a pizza.

How many pizzas did they eat?

TASK 8

SAY: Alex and his friends ate 12 slices of pizza.
Each slice was one-quarter of a pizza.
How many pizzas did they eat?

Note: Say "fourth" instead of "quarter" if this is more familiar to your student.

Stage	Strategy observed
Early 5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Counting strategy** (Stage E5) **e.g.,** $\frac{1}{4}, \frac{2}{4}, \frac{3}{4}, \frac{4}{4}$ (one whole), $\frac{5}{4}$, ..., $\frac{11}{4}, \frac{12}{4}$ (three wholes)
5 or higher	**Uses a proportional approach e.g.,** - Addition strategies e.g., 4 pieces is 1 pizza; 4 + 4 + 4 = 12 so the answer is 3 - Rate strategies e.g., 4 quarters is 1 pizza, 8 quarters is 2, 12 quarters is 3 - Multiplication facts e.g., 4 × 3 = 12 **or** 12 ÷ 4 = 3

DECISION: If **any** "5" are circled in **Tasks 6, 7** or **8**, CONTINUE the interview.
If **only** "E5" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 1 TASK 9

Jodie had some pens.
She was given another 26 pens and she now has 86 altogether.

How many pens did she have in the beginning?

Section 5 TARGET: Early Stage 6
Advanced additive part-whole

*Do all **three** tasks on these two pages.*

TASK 9

SAY: Jodie had some pens.
She was given another 26 pens and she now has 86 altogether.
How many pens did she have in the beginning?

Stage	Strategy observed
5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Skip counting in tens** (Stage 4) **e.g.,** [26] 36, 46, 56, 66, 76, 86 **Repeat addition in tens** (Stage E5) **e.g.,** 26 + 10 + 10 + 10 + 10 + 10 + 10 = 86
Early 6 or higher	**Uses a part-whole strategy e.g.,** - Place value partitioning e.g., (80 – 20) + (6 – 6) = 60 + 0 = 60 - Addition in parts (with reversibility) e.g., 26 + 60 = 86 **or** 86 – 26 = 60

INTERVIEW 1 TASK 10

Zac has 8 packs of drink.
Each pack has 6 cans.

How many cans is that altogether?

TASK 10

SAY: Zac has 8 packs of drink.
Each pack has 6 cans.
How many cans is that altogether?

Stage	Strategy observed
5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses an additive strategy e.g.,** - Skip counting (Stage 4) e.g., 6, 12, 18, 24, …, 48 [**or** 8, 16, 24, 32, 40, 48] - Repeated addition (Stage E5) e.g., 6 + 6 + 6 + … + 6 [**or** 8 + 8 + 8 + … + 8] - Doubling additively (Stage 5) e.g., 6 + 6 = 12; 12 + 12 = 24; 24 + 24 = 48
Early 6 or higher	**Uses a multiplicative strategy e.g.,** - Derives from multiplication facts e.g., 8 × 5 = 40; 40 + 8 = 48 - Multiplication facts e.g., 8 × 6 = 48

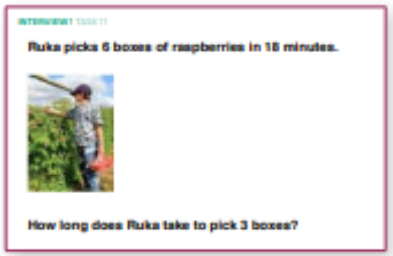
INTERVIEW 1 TASK 11

Ruka picks 6 boxes of raspberries in 18 minutes.

How long does Ruka take to pick 3 boxes?

TASK 11

SAY: Ruka picks 6 boxes of raspberries in 18 minutes.
How long does Ruka take to pick 3 boxes?



Stage	Strategy observed
5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses additive strategies only** (Stage 5) **e.g.,** 6 + 6 + 6 = 18 so 3 minutes per box; 3 + 3 + 3 = 9
Early 6 or higher	**Uses a mix of additive and multiplicative strategies e.g.,** 3 × 6 = 18 so 3 minutes per box; 3 + 3 + 3 = 9 **Uses multiplicative strategies e.g.,** 3 × 6 = 18 so 3 minutes per box; 3 × 3 = 9 **Proportional approach e.g.,** Equate fraction of boxes to fraction of time e.g., $\frac{3}{6} = \frac{1}{2}$; $\frac{1}{2}$ of 18 = 9

DECISION: If **any** "E6" are circled in **Tasks 9, 10** or **11**, CONTINUE the interview.
If **only** "5" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 1 TASK 12

**Tana got an iPod with some songs on it.
He downloaded another 148 songs, and he now has 176 songs in total.**

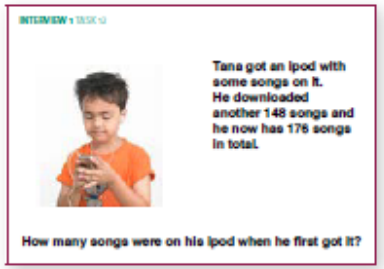
How many songs were on his iPod when he first got it?

Section 6 TARGET: Stage 6
Advanced additive part-whole

*Do all **three** tasks on these two pages.*

TASK 12

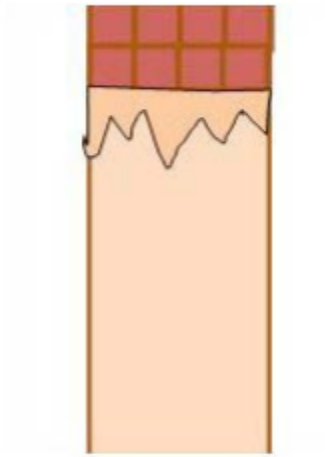
SAY: Tana got an iPod with some songs on it.
He downloaded another 148 songs, and he now has 176 songs in total.
How many songs were on his iPod when he first got it?



Stage	Strategy observed
Early 6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Mix of counting and part-whole strategies** (Stage E5) **e.g.,** [148] 158, 168; 168 + 2 = 170; 170 + 6 = 176; 20 + 2 + 6 = 28 **Attempts part-whole strategy with error** (Stage 5) **e.g.,** 176 – 150 = 26; 26 – 2 = 24 (compensates in the wrong direction)
6 or higher	**Uses a part-whole strategy e.g.,** - Place value partitioning e.g., (100 – 100) + (70 – 40) + (6 – 8) = 30 – 2 = 28 - Adding on in parts e.g., 148 + 20 = 168; 168 + 8 = 176; 20 + 8 = 28 **or** 176 – 20 = 156; 156 – 8 = 148; 20 + 8 = 28 - Rounding and compensation e.g., 148 + 30 – 2 = 176; 30 – 2 = 28 - Making to tens and compensation e.g., 148 + 2 = 150; 150 + 20 = 170; 170 + 6 = 176; 2 + 20 + 6 = 28

INTERVIEW 1 TASK 13

There are 40 small squares in the chocolate block.



How many rows are hidden under the wrapping?

TASK 13

SAY: There are 40 small squares in the chocolate block.
How many rows are hidden under the wrapping?

If the student does not understand that the question is asking for the number of rows, explain this to them.

Stage	Strategy observed
Early 6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses an additive strategy** (Stage 5) **e.g.,** - Doubling additively e.g., 4 + 4 = 8; 8 + 8 = 16; 16 + 16 = 32; 4 + 4 = 8
6 or higher	**Uses a multiplicative strategy e.g.,** - Derived from basic fact e.g., 10 × 4 = 40 so 8 × 4 = 32 so the answer is 8 **or** 10 × 4 = 40 so there are 10 – 2 = 8 - Multiplication facts e.g., 40 – 8 = 32 and 32 ÷ 4 = 8 (**or** 8 × 4 = 32)

INTERVIEW 1 TASK 14

Hanni uses 32 carrots to fill 4 bags.

How many carrots does he need to fill 12 bags?

TASK 14

SAY: Hanni uses 32 carrots to fill 4 bags.
How many carrots does he need to fill 12 bags?

Stage	Strategy observed
Early 6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses an additive strategy** (Stage 5) **e.g.,** - Doubling additively e.g., 32 + 32 = 64; 64 + 32 = 96
6 or higher	**Uses a multiplicative strategy** - Unitising e.g., 8 carrots per bag because 4 × 8 = 32; 12 × 8 = 96 - Using ratios e.g., Three times as many bags because 3 × 4 = 12; 3 × 32 = 96

DECISION: If **any** "6" are circled in **Tasks 12, 13** or **14**, CONTINUE the interview.
If **only** "E6" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 1 TASK 15

Kathie ran 4.3 kilometers on the first day.
She ran 5.15 kilometers on the second day.

How far did Kathie run altogether?

Section 7 TARGET: Early Stage 7
Advanced multiplicative part-whole

*Do all **three** tasks on these two pages.*

TASK 15

SAY: Kathie ran 4.3 kilometers on the first day.
She ran 5.15 kilometers on the second day.
How far did Kathie run altogether?

Stage	Strategy observed
6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Misunderstands decimal place value** (Stage 6) **e.g.,** - Ignores the decimal points e.g., 4.3 + 5.15 = 558 - Treats numbers after the decimal as whole numbers e.g., 4.3 + 5.15 "=" 9.18 [often said "nine point eighteen"]
Early 7 or higher	**Uses part-whole strategies with decimal place value understanding e.g.,** - Place value partitioning e.g., (4 + 5) + (0.3 + 0.1) + 0.05 = 9.45 - Adding on in parts e.g., 4.3 + 5 = 9.3; 9.3 + 0.15 = 9.45 **or** 9.3 + 0.1 = 9.4; 9.4 + 0.05 = 9.45

INTERVIEW 1 TASK 16

There are 33 boxes.
Each box holds 12 bottles of lemonade.

How many bottles are there altogether?

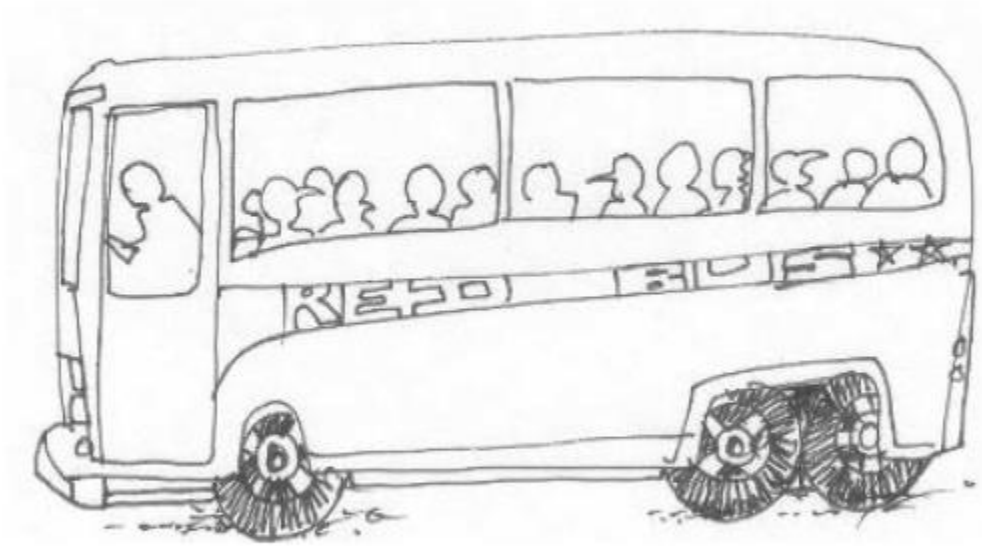
TASK 16

SAY: There are 33 boxes.
Each box holds 12 bottles of lemonade.
How many bottles are there altogether?

Stage	Strategy observed
6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses a mix of multiplicative and additive strategies** (Stage 6) **e.g.,** 12 + 12 + 12 = 36; 36 × 10 = 360; 360 + 36 = 396 **or** 30 × 12 = 360; 360 + 12 + 12 + 12 = 396
Early 7 or higher	**Uses a multiplicative strategy e.g.,** - Partitioning e.g., 33 × 10 = 330; 33 × 2 = 66; 330 + 66 = 396 **or** 30 × 10 = 300; 3 × 10 = 30; 30 × 2 = 60; 3 × 2 = 6; 300 + 30 + 60 + 6 = 396 - Derived from basic facts e.g., 3 × 12 = 36 and 30 × 12 = 360; 36 + 360 = 396 - Triples and thirds e.g., 12 × 33 = 4 × 99; 4 × 100 = 400; 400 – 4 = 396

INTERVIEW 1 TASK 17

There are 20 children who go to a county school. Three-fifths ($\frac{3}{5}$) of them travel to school by bus.



How many children is that?

TASK 17

SAY: There are 20 children who go to a county school.
Three-fifths of them travel to school by bus.
How many children is that?

Stage	Strategy observed
6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses additive strategies** (Stage 5) **e.g.,** $\frac{1}{5}$ of 20 is 4 because 4 + 4 + 4 + 4 + 4 = 20; $\frac{3}{5}$ of 20 = 4 + 4 + 4 = 12
Early 7 or higher	**Uses multiplicative strategies e.g.,** $\frac{1}{5}$ of 20 is 4 because 5 × 4 = 20 **or** 20 ÷ 5 = 4 **then** multiplies (or adds) to get $\frac{3}{5}$, i.e., 3 × 4 = 12 [**or** 4 + 4 + 4 = 12]

DECISION: If **any** "E7" are circled in **Tasks 15, 16** or **17**, CONTINUE the interview.
If **only** "6" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 1 TASK 18

In 1912 the world record time for the 100-meter sprint was 10.6 seconds.
It is now 9.69 seconds.

By how much has the record changed?

Section 8 TARGET: Stage 7
Advanced multiplicative part-whole

*Do all **three** tasks on these two pages.*

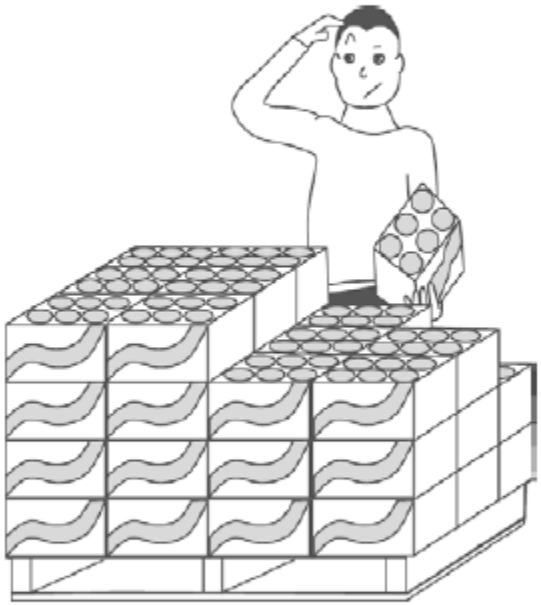
TASK 18

SAY: In 1912 the world record time for the 100-meter sprint was 10.6 seconds.
It is now 9.69 seconds.
By how much has the record changed?

Stage	Strategy observed
Early 7	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Misinterprets decimal place value** (Stage 6) **e.g.,** - Treats numbers after the decimal as whole numbers e.g., (10 – 9) + (0.6 – 0.69) "=" 1 – 0.63 = 0.37 **Attempts part-whole strategy with error** (Stage 6) **e.g.,** (0.6 – 0.69) = 0.09; 1 + 0.09 = 1.09 (compensates in the wrong direction)
7 or higher	**Uses part-whole strategies e.g.,** - Place value partitioning e.g., (10 – 9) + (0.6 – 0.69) = 1 – 0.09 = 0.91 - Making to ones e.g., 9.69 + 0.31 = 10; 10 + 0.6 = 10.6; 0.6 + 0.31 = 0.91 - Takes off a tidy number and compensates e.g., 10.6 – 1.0 = 9.6; 9.6 + 0.09 = 9.69; 1 – 0.09 = 0.91 - Takes off to get a tidy number and compensates e.g., 10.6 – 9.6 = 1.0; 1.0 – 0.09 = 0.91

INTERVIEW 1 TASK 19

Bas needs to buy 114 cans of soft drink.



How many 6-packs should he get?

TASK 19

SAY: Bas needs to buy 114 cans of soft drink.
How many 6-packs should he get?

Stage	Strategy observed
Early 7	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses a mix of multiplicative and additive strategies** (Stage 6) **e.g.,** $6 \times 10 = 60$; $60 + 60 = 120$; $120 - 6 = 114$; $10 + 10 - 1 = 19$
7 or higher	**Uses a multiplicative strategy e.g.,** - Basic facts with adjustment e.g., $10 \times 6 = 60$; $20 \times 6 = 120$; $120 - 6 = 114$; $10 + 10 - 1 = 19$ - Halving then basic facts with adjustment e.g., $114 \div 6 = 57 \div 3$; $60 \div 3 = 20$; $20 - 1 = 19$ - Nice (compatible) numbers e.g., $120 \div 6 = 20$; $120 - 6 = 114$; $20 - 1 = 19$

INTERVIEW 1 TASK 20

Three boys share two pizzas equally.

Eight girls share six pizzas equally.

Who gets more pizza, one of the boys or one of the girls?

TASK 20

SAY: Three boys share two pizzas equally.
Eight girls share six pizzas equally.
Who gets more pizza, one of the boys or one of the girls?

Stage	Strategy observed
Early 7	**Cannot solve the problem** or **Uses an earlier numeracy stage**
7 or higher	**Uses proportional approach e.g.,** - Uses equivalent fractions to get unit rate e.g., $2 \div 3 = \frac{2}{3} = \frac{8}{12}$ of a pizza **and** $6 \div 8 = \frac{6}{8} = \frac{3}{4} = \frac{9}{12}$ of a pizza, $\frac{9}{12} > \frac{8}{12}$ so girls get more each. - Uses equivalent ratios e.g., 2:3 = 6:9 so 9 boys would share 6 pizza and they get a lesser share than 8 girls sharing 6 pizza. - Rate argument e.g., 3 times as much pizza for the girls but fewer than 3 times as many girls. **Partial solution e.g.,** $2 \div 3 = \frac{2}{3}$ of a pizza, $6 \div 8 = \frac{6}{8} = \frac{3}{4}$ of a pizza, and $\frac{3}{4} > \frac{2}{3}$ [**Ask:** How do you know $\frac{3}{4} > \frac{2}{3}$? **Rate as "7"** if they can explain why.]

DECISION: If **any** "7" are circled in **Tasks 18, 19** or **20**, CONTINUE the interview.
If **only** "E7" are circled, STOP the interview If in any doubt, CONTINUE the interview.

INTERVIEW 1 TASK 21

The hairdresser has 4.5 liters of dye left.
Each tint uses 0.375 liters of dye.

How many tints can the hairdresser do?

Section 9 TARGET: Early Stage 8
Advanced proportional

Do both tasks on this page.

TASK 21

SAY: The hairdresser has 4.5 liters of dye left.
Each tint uses 0.375 liters of dye.
How many tints can the hairdresser do?

Stage	Strategy observed
7	**Cannot solve the problem** or **Uses an earlier numeracy stage**
Early 8 or higher	**Uses multiplicative strategies e.g.,** - Successive doubling e.g., $2 \times 0.375 = 0.75$; $2 \times 0.75 = 1.5$; $3 \times 1.5 = 4.5$; $2 \times 2 \times 3 = 12$ - Multiplication facts and compensation e.g., $3.750 \div 0.375 = 10$; $4.5 - 3.750 = 0.750$; $0.750 \div 0.375 = 2$; $10 + 2 = 12$ **or** $10 \times 0.375 = 3.75$; $2 \times 0.375 = 0.75$; $10 + 2 = 12$ **Turns decimals into fractions e.g.,** $0.375 = \frac{3}{8}$; $4.5 = 4\frac{1}{2}$; $4\frac{1}{2} = \frac{36}{8}$; $\frac{36}{8} \div \frac{3}{8} = 12$

INTERVIEW 1 TASK 22

Jacinda gets 32 of her 40 shots in.

What percentage of her shots does she get in?

TASK 22

SAY: Jacinda gets 32 of her 40 shots in.
What percentage of her shots does she get in?

Stage	Strategy observed
7	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Estimation strategies** (Stage 7) **e.g.,** Half of 40 is 20 (that's 50%) **and** 30 shots is three-quarters (that's 75%) **so** it is more than three-quarters.
Early 8 or higher	**Uses multiplicative strategies e.g.,** $2\frac{1}{2} \times 40$ is 100; $2\frac{1}{2} \times 32$ is 80; 80 out of 100 = 80% **Uses equivalent fractions e.g.,** $\frac{32}{40} = \frac{8}{10} = \frac{80}{100} = 80\%$

Stop the interview

Global Strategy Stages Assessment (GloSS)

Interview 2

GENERAL INSTRUCTIONS

- For the initial assessment of a student, begin with Task 1. After the first assessment, start the assessment at the place where the student last responded accurately.
- Ask the student **all** the tasks within a section.
- Read each task to the student and show them the related Task Card.
- Give the student time to answer the question (you may need to wait for a few minutes).
- Prompt the student if you need to. For example, ask *"How did you work that out?"* or *"Can you talk me through what you were thinking?".*
- Allow the student the opportunity to demonstrate **higher level strategies** based on The Number Knowledge Framework. If they use a simple strategy (e.g., counting), ask *"Can you do it another way?"*.
- Use the scoring guide below each task to determine the Number Framework Stage associated with the student's response.
- Circle the relevant stage on the student's recording sheet.
- Record the student's strategy in the space under "Observations".
- Use the decision rule provided at the end of each section to decide whether to continue the interview. If there is any doubt or if you think the student may be capable of showing higher strategies, **continue** the interview.
- Questions are designed so that they can be answered mentally. Students should not be provided with paper and pencil or any other writing tool to solve the problems; they should be encouraged to use mental, quantitative reasoning to apply strategies learned to solve the problems.

ALL MATERIALS NEEDED

- 20 counters
- Two index cards to cover counters
- Flip Book
- One recording sheet per student

Section 1 TARGET: Stage 1
One-to-one counting

TASK 1

ACTION: *Place 9 counters of the same color on the table.*
SAY: How many counters are there?

Stage	Strategy observed
0	**Student cannot count 9 objects**
1	**Correctly counts the 9 objects**

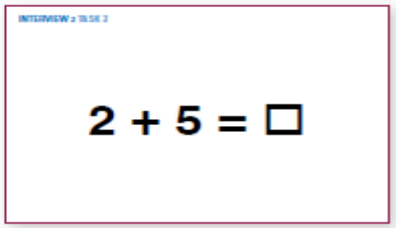
DECISION: If "1" is circled in **Task 1**, CONTINUE the interview.
If "0" is circled, rate the student at Stage 0 and STOP the interview.

INTERVIEW 2 TASK 2

$$2 + 5 = \square$$

Section 2 TARGET: Stages 2–3 or 4
Counting from one or Advanced counting

TASK 2



SAY: Please hold out your hands for me.
SAY: Here are 2 counters.
SAY: Here are another 5 counters.
SAY: How many counters have you got altogether?

ACTION: *Place 2 counters in the student's hand.*
ACTION: *Place 5 counters in their other hand.*
ACTION: *Close the student's hands to encourage imaging.*
ACTION: *Allow the student to open their hands if they find imaging difficult.*

Stage	Strategy observed
1	**Cannot solve the addition problem** (Stage 1)
2–3	**Physically counts all the objects from 1 on materials** (Stage 2) **Correctly counts all the items from 1 by imaging** (Stage 23)
4 or higher	**Counts on** e.g., 3, 4, 5, 6, 7 **or** 6, 7 **Knows** 2 + 5

DECISION: If **either** "2–3" **or** "4" are circled in **Task 2**, CONTINUE the interview.
If " 1" is circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 2 TASK 3

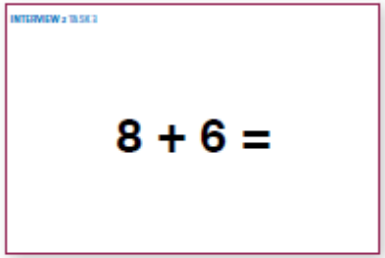
$$8 + 6 = \square$$

Section 3 TARGET: Stages 4 or Early 5
Advanced counting or Early additive part-whole

*Do all **three** tasks.*

TASK 3

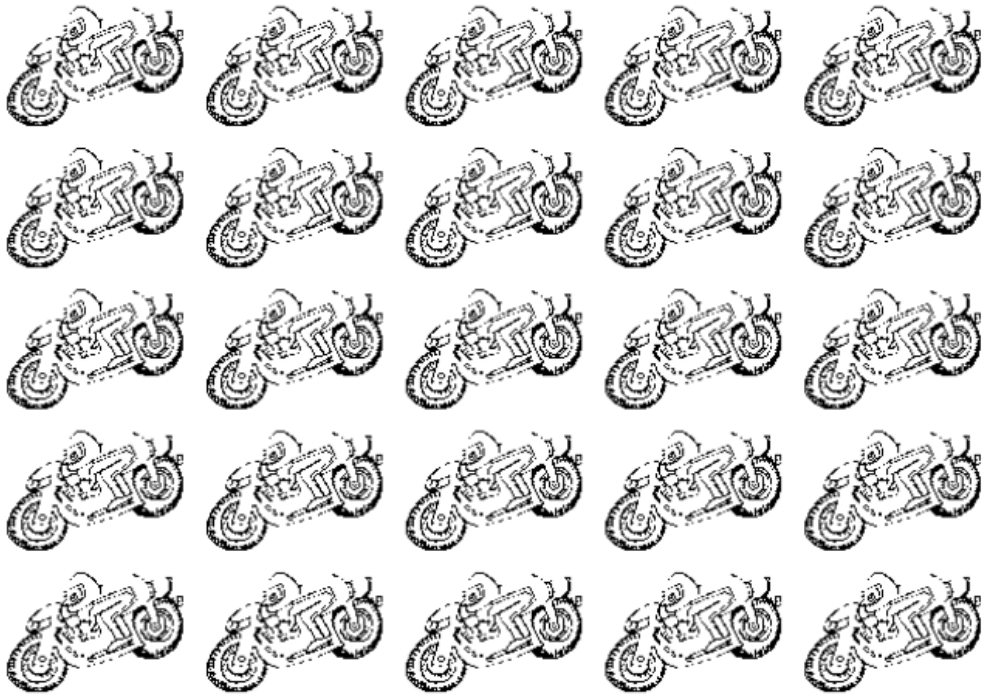
ACTION: *Place 8 counters under a card then place 6 under another card.*
SAY: Here are 8 counters, and here are 6 counters.
How many counters are there altogether?



Stage	Strategy observed
3	**Cannot solve the problem** (After removing the cards – Stage 1) **Counts all objects from 1 on materials** (Stage 2) **e.g.,** 1, 2, 3, …, 14 **Counts all objects from 1 by imaging** (Stage 3) **e.g.,** 1, 2, 3, …, 14
4	**Counts on** (Stage 4) **e.g.,** 9, 10, 11, 12, 13, 14 **or** 7, 8, …, 13, 14
Early 5 or higher	**Uses a part-whole strategy e.g.,** - Making to ten e.g., 8 + 2 = 10; 10 + 4 = 14 - Doubling with compensation e.g., 6 + 6 = 12; 12 + 2 = 14 **or** 7 + 7 = 14 **or** 8 + 8 = 16; 16 – 2 = 14 - Addition fact e.g., 8 + 6 = 14

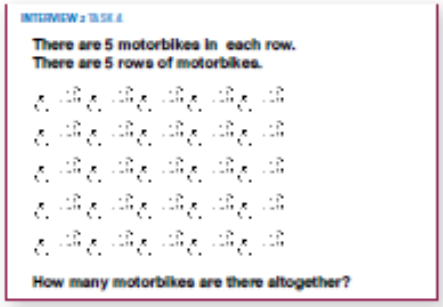
INTERVIEW 2 TASK 4

There are 5 motorbikes in each row.
There are 5 rows of motorbikes.



How many motorbikes are there altogether?

TASK 4



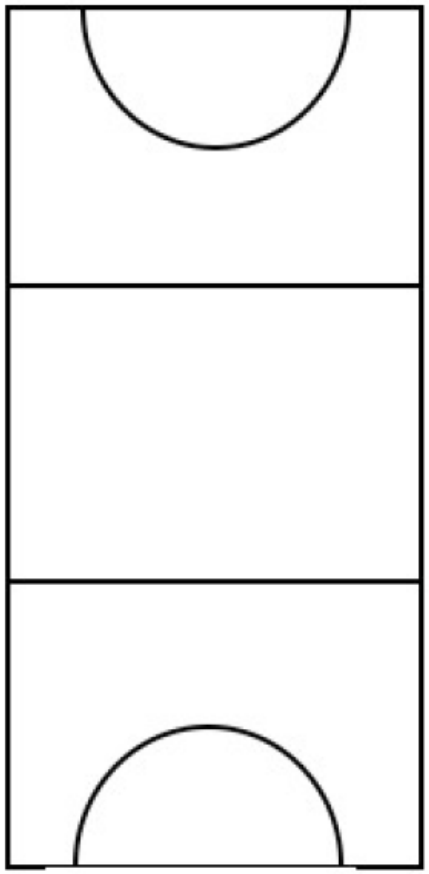
SAY: There are 5 motorbikes in each row.
SAY: There are 5 rows of motorbikes.
SAY: How many motorbikes are there altogether?

ACTION: *Sweep one row with your finger*
ACTION: *Point to each row one by one*

Stage	Strategy observed
3	**Cannot solve the problem** **Counts all objects from 1 on materials** (Stage 2) **e.g.,** 1, 2, 3, 4, **5**, 6, …, **25** **Counts all objects from 1 by imaging** (Stage 3) **e.g.,** 1, 2, 3, 4, **5**, 6, …, **25**
4	**Skip counting** (Stage 4) **e.g.,** 5, 10, 15, 20, 25
Early 5 or higher	**Uses an additive or multiplicative strategy e.g.,** - Repeat addition e.g., 5 + 5 + 5 + 5 + 5 = 25 - Additive strategies e.g., 5 + 5 = 10; 10 + 10 = 20; 20 + 5 = 25 - Multiplication strategies e.g., 4 × 5 = 20; 20 + 5 = 25 - Multiplication fact e.g., 5 × 5 = 25

INTERVIEW 2 TASK 5

These 15 players have to spread out evenly on the court.

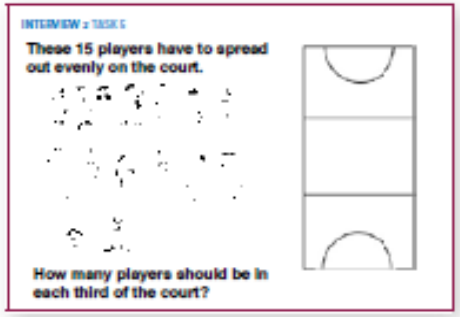


How many players should be in each third of the court?

TASK 5

ACTION: *Provide 15 counters (players).*
Allow the student access to these counters if necessary.

SAY: These 15 players have to spread out evenly on the court.
How many players should be in each third of the court?



Stage	Strategy observed
2–4	**Cannot solve the problem** **Equally shares the players, on materials or by imaging** (Stage 2–4)
Early 5 or higher	**Uses an additive or multiplicative strategy e.g.,** - Additive partitioning e.g., 5 + 5 = 10; 5 + 5 + 5 = 15 - Multiplication or division strategies e.g., 3 × 4 = 12; 12 + 3 = 15 - Multiplication or division fact e.g., 3 × 5 = 15 **or** 15 ÷ 3 = 5

DECISION: If **any** "E5" are circled in **Tasks 3, 4** or **5**, **or** if the "4s" are circled in **both Task 3** and **Task 4**, CONTINUE the interview.
Otherwise STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 2 TASK 6

I have 84 cards.
I give 7 cards to my friend.

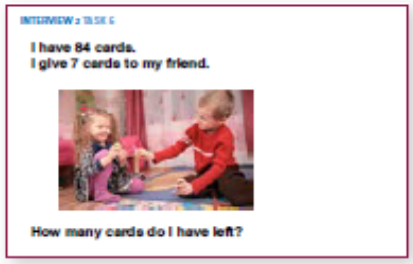
How many cards do I have left?

Section 4 TARGET: Stage 5
Early additive part-whole

*Do all **three** tasks.*

TASK 6

SAY: I have 84 cards.
I give 7 cards to my friend.
How many cards do I have left?



Stage	Strategy observed
Early 5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Counting back** (Stage 4) **e.g.,** 83, 82, 81, 80, 79, 78, 77 **Mix of counting and part-whole strategies** (Stage E5) **e.g.,** 84 – 4 = 80; 79, 78, 77
5 or higher	**Uses a part-whole strategy e.g.,** - Making to tens e.g., 84 – 4 = 80; 80 – 3 = 77 - Take off tidy number and compensates e.g., 84 – 10 = 74; 74 + 3 = 77 - Uses doubles e.g., 7 + 7 = 14 or 14 – 7 = 7 so 84 – 7 = 77

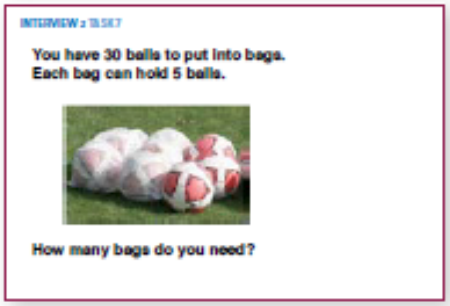
INTERVIEW 2 TASK 7

You have 30 balls to put into bags.
Each bag can hold 5 balls.

How many bags do you need?

TASK 7

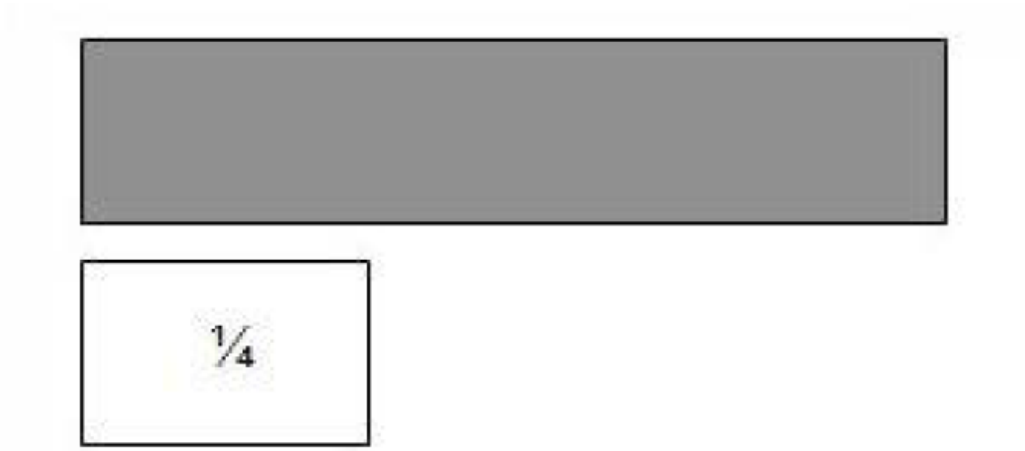
SAY: You have 30 balls to put into bags.
Each bag can hold 5 balls.
How many bags do you need?



Stage	Strategy observed
Early 5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Skip counting** (Stage 4) **e.g.,** 5, 10, 15, …, 30 **Repeated addition** (Stage E5) **e.g.,** 5 + 5 + 5 + … + 5 = 30
5 or higher	**Uses an additive or multiplicative strategy e.g.,** -Additive strategies e.g., 5 + 5 = 10; 10 + 10 + 10 = 30; 2 + 2 + 2 = 6 - Derive from multiplication facts e.g., 4 × 5 = 20; 2 × 5 = 10; 4 + 2 = 6 **or** 5 × 5 = 25; 25 + 5 = 30; 5 + 1 = 6 - Multiplication or division facts e.g., 6 × 5 = 30 **or** 30 ÷ 5 = 6

INTERVIEW 2 TASK 8

The white piece is one-quarter of a strip.

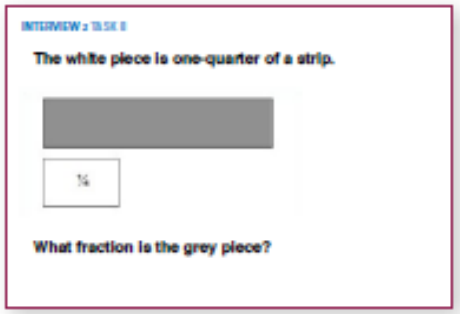


What fraction is the gray piece?

TASK 8

SAY: The white piece is one-quarter of a strip.
What fraction is the gray piece?

Note: Say "fourth" instead of "quarter" if this is more familiar to your student.



Stage	Strategy observed
Early 5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Answer other than three quarters** (Stage 3–4) **Answer of three quarters without reasonable justification** (Stage E5)
5 or higher	**Maps one quarter three times and says three quarters e.g.,** $\frac{1}{4}, \frac{2}{4}, \frac{3}{4}$

DECISION: If **any** "5" are circled in **Tasks 6, 7** or **8**, CONTINUE the interview.
If **only** "E5" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 2 TASK 9

Miriama scored 476 points on a video game.
Deb scored 123 points on the same game.

How many more points did Miriama score than Deb?

Section 5 TARGET: Early Stage 6
Advanced additive part-whole

*Do all **three** tasks.*

TASK 9

SAY: Miriama scored 476 points on a video game.
Deb scored 123 points on the same game.
How many more points did Miriama score than Deb?

Stage	Strategy observed
5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Repeat addition or skip counting in hundreds, tens and ones** (Stage E5) **e.g.,** [123] 223, 323, 423, 433, 443, ..., 473, 474, 475, 476; 300 + 50 + 3 = 353 **Mix of counting and part-whole strategies** (Stage E5/5) **e.g.,** [123] 223, 323, 423; 423 + 50 + 3 = 476; 300 + 50 + 3 = 353
Early 6 or higher	**Uses a part-whole strategy e.g.,** - Place value partitioning e.g., (400 – 100) + (70 – 20) + (6 – 3) = 300 + 50 + 3 = 353 - Adding on or subtracting in parts e.g., 123 + 300 = 423; 423 + 50 = 473; 473 + 3 = 476; 300 + 50 + 3 = 353

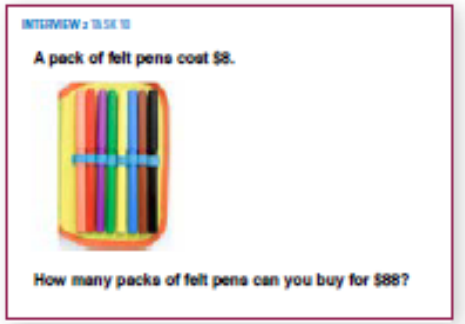
INTERVIEW 2 TASK 10

A pack of felt pens cost $8.

How many packs of felt pens can you buy for $88?

TASK 10

SAY: A pack of felt pens cost $8.
How many packs of felt pens can you buy for $88?



Stage	Strategy observed
5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses an additive strategy e.g.,** - Skip counting (Stage 4) e.g., 8, 16, 24, …, 88 - Repeated addition e.g., (Stage E5) e.g., 8 + 8 + … + 8 = 88 - Doubling additively (Stage 5) e.g., 8 + 8 = 16; 16 + 16 = 32; 32 + 32 = 64; 64 + 16 + 8 = 88
Early 6 or higher	**Uses a multiplicative strategy e.g.,** - Derives from multiplication facts e.g., 10 × 8 = 80; 11 × 8 = 80 + 8 = 88 - Multiplication facts e.g., 11 × 8 = 88 **or** 88 ÷ 8 = 11

INTERVIEW 2 TASK 11

Which is more money:
one-half ($\frac{1}{2}$) of \$20 or one-quarter ($\frac{1}{4}$) of \$40?

TASK 11

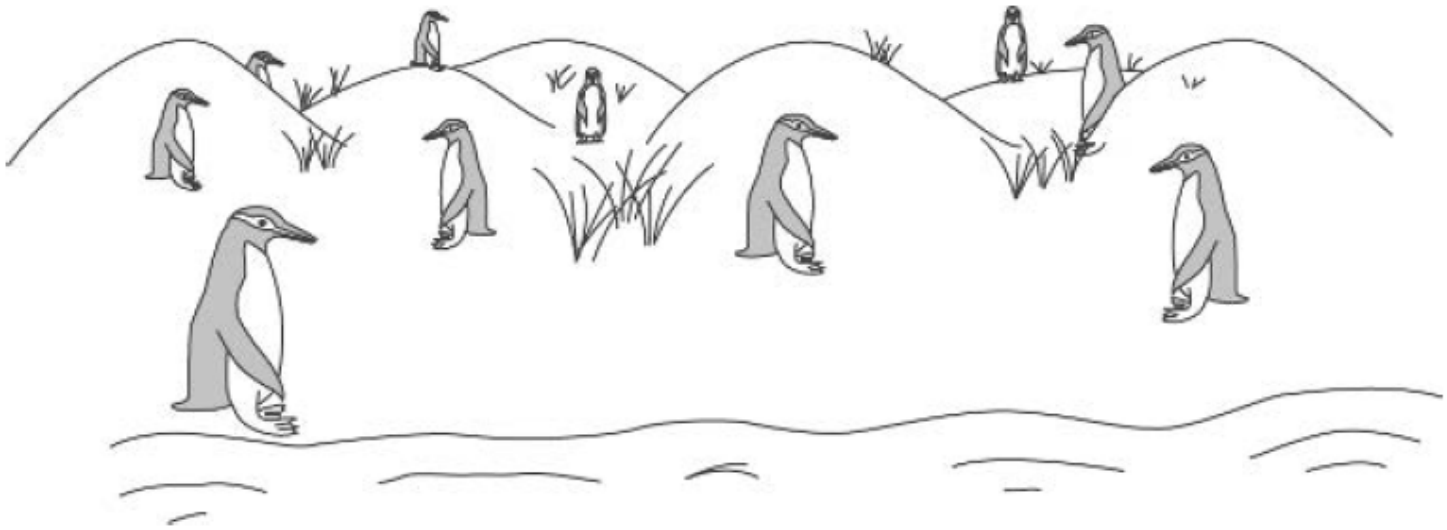
SAY: Which is more money:
one-half of $20 **or** one-quarter of $40?
Note: Say "fourth" instead of "quarter" if this is more familiar to your student.

Stage	Strategy observed
5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Gets both unit fractions from addition facts** (Stage E5) **e.g.,** $10 + 10 + 10 + 10 = 40$ so $\frac{1}{4}$ of 40 is 10 **and** $10 + 10 = 20$ so $\frac{1}{2}$ of 20 is 10
Early 6 or higher	**Uses multiplication or division facts e.g.,** $\frac{1}{4}$ of 40 is 10 because $10 \times 4 = 40$ or $40 \div 4 = 10$ **and** $\frac{1}{2}$ of 20 is 10 because $10 \times 2 = 20$ or $20 \div 2 = 10$

DECISION: If **any** "E6" are circled in **Tasks 9, 10** or **11**, CONTINUE the interview.
If **only** "5" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 2 TASK 12

Leeana counted 82 penguins on the beach.
Later, there were only 44.



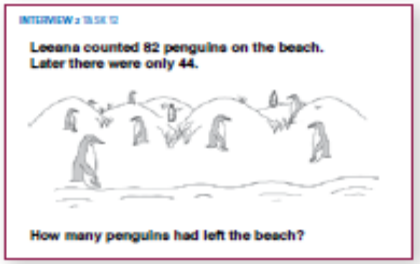
How many penguins had left the beach?

Section 6 TARGET: Stage 6
Advanced additive part-whole

*Do all **three** tasks.*

TASK 12

SAY: Leeana counted 82 penguins on the beach.
Later, there were only 44.
How many penguins had left the beach?



Stage	Strategy observed
Early 6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Mix of counting and part-whole strategies** (Stage E5) **e.g.,** [82] 72, 62, 52; 52 – 2 = 50; 50 – 6 = 44; 30 + 2 + 6 = 38 **Attempts part-whole strategy with error** (Stage 5) **e.g.,** 82 – 50 = 32; 32 – 6 = 26 (compensates in the wrong direction)
6 or higher	**Uses a part-whole strategy e.g.,** - Place value partitioning e.g., (80 – 40) + (2 – 4) = 40 – 2 = 38 - Making to tens e.g., 82 – 2 = 80; 80 – 30 = 50; 50 – 6 = 44; 2 + 30 + 6 = 38 **or** 44 + 6 = 50; 50 + 30 = 80; 80 + 2 = 82; 6 + 30 + 2 = 38 - Rounding and compensation e.g., 82 – 40 = 42; 42 – 4 = 38 - Equal additions e.g., 82 – 44 = 88 – 50 = 38

INTERVIEW 2 TASK 13

Tom has 8 times as many stickers as Sarah.
Tom has 72 stickers.

How many stickers does Sarah have?

TASK 13

SAY: Tom has 8 times as many stickers as Sarah.
Tom has 72 stickers.
How many stickers does Sarah have?

Stage	Strategy observed
Early 6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Adding strategies e.g.,** - Doubling additively (Stage 5) e.g., 8 + 8 = 16; 16 + 16 = 32; 32 + 32 = 64; 64 + 8 = 72; 8 + 1 = 9
6 or higher	**Uses a multiplicative strategy e.g.,** - Derived from a known fact e.g., 8 × 10 = 80; 80 – 8 = 72; 10 – 1 = 9 - Multiplication fact e.g., 8 × 9 = 72 **or** 72 ÷ 8 = 9

INTERVIEW 2 TASK 14

There are 8 swans on the lake.

The other two-thirds ($\frac{2}{3}$) of the birds on the lake are ducks.

How many ducks are there on the lake?

TASK 14

SAY: There are 8 swans on the lake.
The other two-thirds of the birds on the lake are ducks.
How many ducks are there on the lake?

Stage	Strategy observed
Early 6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses additive strategies only** (Stage 5) **e.g.,** 8 + 8 + 8 = 24 so 24 birds in total; 8 + 8 = 16
6 or higher	**Uses multiplicative strategies e.g.,** 3 × 8 = 24 so 24 birds in total **then** multiplies (or adds) to get i.e., 2 × 8 = 16 [**or** 8 + 8 = 16] **or** $1 - \frac{2}{3} = \frac{1}{3}, \frac{1}{3} = 8; \frac{2}{3} = 2 \times 8 = 16$

DECISION: If **any** "6" are circled in **Tasks 12, 13** or **14**, CONTINUE the interview.
If **only** "E6" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 2 TASK 15

The world record for men's shot put is 23.12 meters.
The world record for women is 22.63 meters.

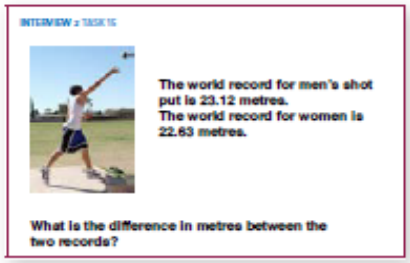
What is the difference in meters between the two records?

Section 7 TARGET: Early Stage 7
Advanced multiplicative part-whole

*Do all **three** tasks.*

TASK 15

SAY: The world record for men's shot put is 23.12 meters.
The world record for women is 22.63 meters.
What is the difference in meters between the two records?



Stage	Strategy observed
6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Subtraction misconception** (Stage 5) **e.g.,** - Subtracts the whole number then subtracts the smaller decimal from the larger e.g., 23 – 22 = 1; 0.63 – 0.12 = 0.51 so the answer is 1.51
Early 7 or higher	**Uses part-whole strategies with decimal place value understanding e.g.,** - Place value partitioning e.g., (23 – 22) + (0.1 – 0.6) + (0.02 – 0.03) = 1 – 0.5 – 0.01 = 0.49 - Making to ones e.g., 22.63 + 0.37 = 23; 23 + 0.12 = 23.12; 0.37 + 0.12 = 0.49 - Rounding and compensation e.g., 22.63 + 0.5 = 23.13; 23.13 – 0.01 = 23.12; 0.5 – 0.01 = 0.49 - Equal addition e.g., (23.12 + 0.37) – (22.63 + 0.37) = 23.49 – 23.00 = 0.49

INTERVIEW 2 TASK 16

I have 6 boxes filled with books.
Each box has 36 books.

How many books are there altogether?

TASK 16

SAY: I have 6 boxes filled with books.
Each box has 36 books.
How many books are there altogether?

Stage	Strategy observed
6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses additive strategies** (Stage 5) **e.g.,** - Doubling additively e.g., 36 + 36 = 72; 72 + 72 = 144; 144 + 72 = 216 **Uses a mix of multiplicative and additive strategies** (Stage 6) **e.g.,** 6 × 10 = 60; 60 + 60 + 60 = 180; 6 × 6 = 36; 180 + 36 = 216
Early 7 or higher	**Uses a multiplicative strategy e.g.,** - Place value partitioning with basic facts e.g., (6 × 30) + (6 × 6) = 180 + 36 = 216 - Rounding and compensation e.g., (6 × 40) – (6 × 4) = 240 – 24 = 216 - Doubling and halving e.g., 6 × 36 = 3 × 72 = 216

INTERVIEW 2 TASK 17

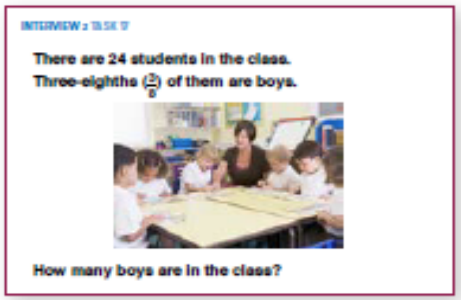
There are 24 students in the class.

Three-eighths ($\frac{3}{8}$) of them are boys.

How many boys are in the class?

TASK 17

SAY: There are 24 students in the class.
Three-eighths of them are boys.
How many boys are in the class?



Stage	Strategy observed
6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses additive strategies** (Stage 5) **e.g.,** $\frac{1}{8}$ of 24 is 3 because 3 + 3 + 3 + … + 3 = 24; $\frac{3}{8}$ of 24 = 3 + 3 + 3 = 9
Early 7 or higher	**Uses a multiplicative strategy e.g.,** $\frac{1}{8}$ of 24 is 3 because 8 × 3 = 24 **or** 24 ÷ 3 = 24 **then** multiplies (or adds) to get $\frac{3}{8}$ i.e., 3 × 3 = 9 [**or** 3 + 3 + 3 = 9] **Obtains from a known fraction e.g.,** $\frac{4}{8}$ of 24 = 12; $\frac{3}{8}$ of 24 = 12 – 3 = 9

DECISION: If **any** "E7" are circled in **Tasks 15, 16** or **17**, CONTINUE the interview.
If **only** "6" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 2 TASK 18

On a hot day, the tomato plants used 1.5 liters of water. On a cold day, they used 0.885 liters.

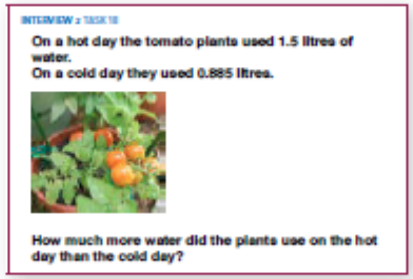
How much more water did the plants use on the hot day than the cold day?

Section 8 TARGET: Stage 7
Advanced multiplicative part-whole

*Do all **three** tasks.*

TASK 18

SAY: On a hot day, the tomato plants used 1.5 liters of water.
On a cold day, they used 0.885 liters.
How much more water did the plants use on the hot day than the cold day?



Stage	Strategy observed
Early 7	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Misinterprets or ignores decimal place value** (Stage 6) **e.g.,** 1.5 – 0.885 = 1 + (0.5 – 0.885) "=" 1 – 0.88 = 0.12
7 or higher	**Uses part-whole strategies e.g.,** - Place value partitioning e.g., (1 – 0) + (0.5 – 0.885) = 1 – 0.385 = 0.615 - Other partitioning e.g., 1.5 – 0.885 = 0.5 + (1 – 0.885) = 0.5 + 0.115 = 0.615 - Making to tenths and ones e.g., 0.885 + 0.015 = 0.9; 0.9 + 0.1= 1; 0.015 + 0.1 + 0.5 = 0.615 - Rounding and compensation e.g., 1.5 – 0.9 = 0.6; 0.6 + 0.015 = 0.615

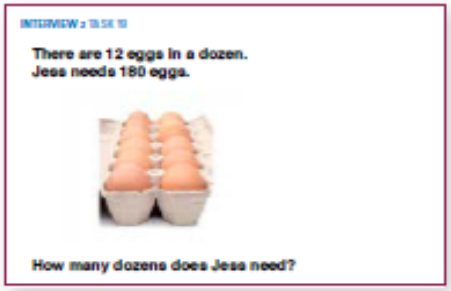
INTERVIEW 2 TASK 19

There are 12 eggs in a dozen.
Jess needs 180 eggs.

How many dozens does Jess need?

TASK 19

SAY: There are 12 eggs in a dozen.
Jess needs 180 eggs.
How many dozens does Jess need?



Stage	Strategy observed
Early 7	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses a mix of additive and multiplicative strategies** (Stage 6) **e.g.,** $10 \times 12 = 120$; $120 + 12 + 12 + 12 + 12 + 12 = 180$ **or** $12 + 12 + 12 + 12 + 12 = 60$; $60 \times 3 = 180$; $5 \times 3 = 15$
7 or higher	**Uses multiplicative strategies e.g.,** - Derive from basic facts with adjustment e.g., $12 \times 10 = 120$; $12 \times 5 = 60$ - Successive halving e.g., $180 \div 12 = 90 \div 6 = 45 \div 3 = 15$ **or** $180 \div 6 = 30$ so $180 \div 12 = 15$ **Uses proportional strategies e.g.,** - Proportionality e.g., $10 \times 12 = 120$; $\frac{1}{2} \times 120 = 60$; $120 + 60 = 180$; $\frac{1}{2} \times 10 = 5$; $10 + 5 = 15$ **or** 180 is half way between 120 (= 10×12) and 240 (= 20×12); **and** 15 is half way between 10 and 20 so the answer is 15

INTERVIEW 2 TASK 20

In a big candy packet, there are 24 reds and 16 blacks.
A smaller packet with the same mix has a total of 10 candies.

How many black candies are in that packet?

TASK 20

SAY: In a big candy packet, there are 24 reds and 16 blacks.
A smaller packet with the same mix has a total of 10 candies.
How many black candies are in that packet?

Stage	Strategy observed
Early 7	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses proportions inappropriately** (Stage 6) **e.g.,** 24 = 1.5 × 16, so the answer is 10 × 1.5 = 15 **or** 16 + $\frac{1}{2}$ of 16 = 24; 10 + $\frac{1}{2}$ of 10 = 15
7 or higher	**Evaluates the whole and then partitions it proportionally e.g.,** 16 ÷ (24 + 16) = $\frac{16}{40}$ = $\frac{2}{5}$; $\frac{2}{5}$ of 10 = 4 **or** 16:(24 + 16) = 16:40 = 4:10 so the answer is 4 **or** 24:16 is 40 in total; 40 in total is four times 10; 24:16 = (24 ÷ 4):(16 ÷ 4) = 6:4 so the answer is 4

DECISION: If **any** "7" are circled in **Tasks 18, 19** or **20**, CONTINUE the interview.
If **only** "E7" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 2 TASK 21

Each net for a game takes 0.38 meters of cloth to make.
You have 9.6 meters of cloth.

Is that enough cloth to make 25 nets?

Section 9 TARGET: Early Stage 8
Advanced proportional

Do both tasks.

TASK 21

SAY: Each net for a game bib takes 0.38 meters of cloth to make.
You have 9.6 meters of cloth.
Is that enough cloth to make 25 nets?

Stage	Strategy observed
7	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Attempts multiplication strategy e.g.,** $25 \times 0.4 = 10$
Early 8 or higher	**Uses multiplication strategies e.g.,** - Doubling e.g., $0.38 \times 20 = 7.6$; $\frac{1}{2}$ of $3.8 = 1.9$; $7.6 + 1.9 = 9.5$; so 9.5m can make 25 **or** $0.38 \times 20 = 7.6$; $9.6 - 7.6 = 2$; $2 \div 0.4 = 5$ (and 0.4 is more than 0.38) - Facts of 25 e.g., $25 \times 3 = 75$ so $25 \times 0.3 = 7.5$; $25 \times 0.08 = 2$; so $25 \times 0.38 = 7.5 + 2 = 9.5$ **or** 38 meters; $25 = \frac{1}{4} \times 100$; $\frac{1}{4} \times 38 = \frac{1}{4} \times 36 + \frac{1}{4} \times 2 = 9 + 0.5 = 9.5$ so 9.5m enough to make 25 nets.

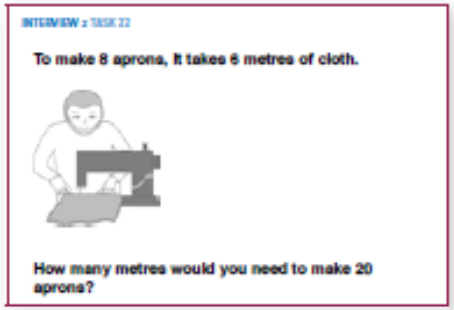
INTERVIEW 2 TASK 22

To make 8 aprons, it takes 6 meters of cloth.

How many meters would you need to make 20 aprons?

TASK 22

SAY: To make 8 aprons, it takes 6 meters of cloth.
How many meters would you need to make 20 aprons?



Stage	Strategy observed
7	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses inappropriate additive strategy** (Stage 5) **e.g.,** 8 + 12 = 20; 6 + 12 = 18 **or** 8 – 6 = 2; 20 – 2 = 18 **Uses estimation** (Stage 6/7) **e.g.,** Less than 1 meter to make 1 apron so about 15 **or** 16 meters
Early 8 or higher	**Uses a proportional approach e.g.,** - Multiplicative strategies e.g., 8 × 2.5 = 20; 6 × 2.5 = 15 - Unitising e.g., 8 aprons take 6 meters so 1 apron takes $\frac{6}{8}$ meter = $\frac{3}{4}$ meter; $\frac{3}{4}$ of 20 = 15 - Equivalent fractions or ratios e.g., 20:8 = 10:4 = 5:2 = 15:6 so the answer is 15

Stop the interview

Global Strategy Stages Assessment (GloSS)

Interview 3

GENERAL INSTRUCTIONS

- For the initial assessment of a student, begin with Task 1. After the first assessment, start the assessment at the place where the student last responded accurately.
- Ask the student **all** the tasks within a section.
- Read each task to the student and show them the related Task Card.
- Give the student time to answer the question (you may need to wait for a few minutes).
- Prompt the student if you need to. For example, ask *"How did you work that out?"* or *"Can you talk me through what you were thinking?".*
- Allow the student the opportunity to demonstrate **higher level strategies** based on The Number Knowledge Framework. If they use a simple strategy (e.g., counting), ask *"Can you do it another way?"*.
- Use the scoring guide below each task to determine the Number Framework Stage associated with the student's response.
- Circle the relevant stage on the student's recording sheet.
- Record the student's strategy in the space under "Observations".
- Use the decision rule provided at the end of each section to decide whether to continue the interview. If there is any doubt or if you think the student may be capable of showing higher strategies, **continue** the interview.
- Questions are designed so that they can be answered mentally. Students should not be provided with paper and pencil or any other writing tool to solve the problems; they should be encouraged to use mental, quantitative reasoning to apply strategies learned to solve the problems.

ALL MATERIALS NEEDED

- 20 counters
- Two index cards to cover counters
- Flip Book
- One recording sheet per student

Section 1 TARGET: Stage 1
One-to-one counting

TASK 1

ACTION: *Place 7 counters of the same color on the table.*
SAY: How many counters are there?

Stage	Strategy observed
0	**Student cannot count 7 objects**
1	**Correctly counts the 7 objects**

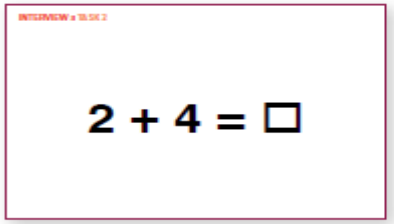
DECISION: If "1" is circled in **Task 1**, CONTINUE the interview.
If "0" is circled, rate the student at Stage 0 and STOP the interview.

INTERVIEW 3 TASK 2

$$2 + 4 = \square$$

Section 2 TARGET: Stages 2–3 or 4
Counting from one or Advanced counting

TASK 2



SAY: Please hold out your hands for me.
ACTION: *Place 2 counters in the student's hand.*

SAY: Here are 2 counters.
ACTION: *Place 4 counters in their other hand.*

SAY: Here are another 4 counters.
ACTION: *Close the student's hands to encourage imaging.*

SAY: How many counters have you got altogether?
ACTION: *Allow the student to open their hands if they find imaging difficult.*

Stage	Strategy observed
1	**Cannot solve the addition problem** (Stage 1)
2–3	**Physically counts all the objects from 1 on materials** (Stage 2) **Correctly counts all the items from 1 by imaging** (Stage 3)
4 or higher	**Counts on** e.g., 3, 4, 5, 6 **or** 5, 6 **Knows** 2 + 4

DECISION: If **either** "2–3" **or** "4" are circled in **Task 2**, CONTINUE the interview.
If "1" is circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 3 TASK 3

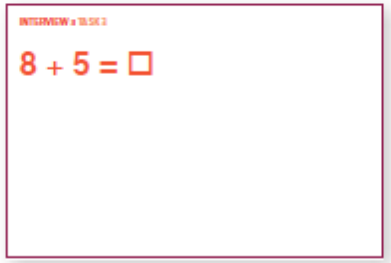
Section 3 TARGET: Stages 4 or Early 5
Advanced counting or Early additive part-whole

*Do all **three** tasks.*

TASK 3

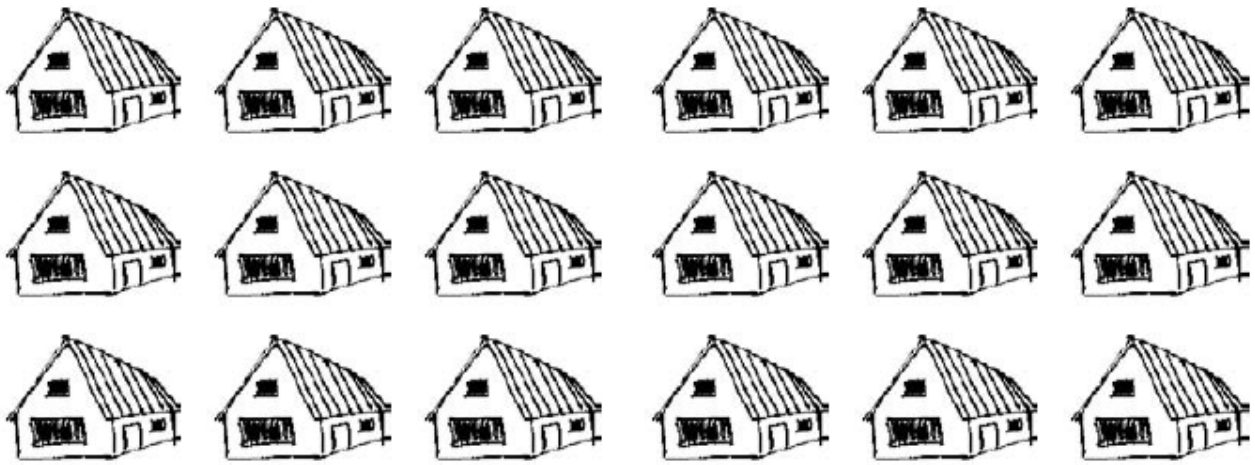
ACTION: *Place 8 counters under a card then place 5 under another card.*

SAY: Here are 8 counters, and here are 5 counters.
How many counters are there altogether?



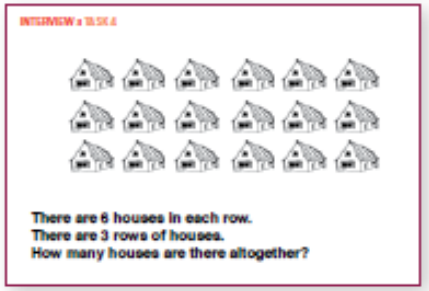
Stage	Strategy observed
3	**Cannot solve the problem** (After removing the cards – Stage 1) **Counts all objects from 1 on materials** (Stage 2) **e.g.,** 1, 2, 3, …, 13 **Counts all objects from 1 by imaging** (Stage 3) **e.g.,** 1, 2, 3, …, 13
4	**Counts on** (Stage 4) **e.g.,** 9, 10, 11, 12, 13 **or** 6, 7, …, 12, 13
Early 5 or higher	**Uses a part-whole strategy e.g.,** - Making to ten e.g., 8 + 2 = 10; 10 + 3 = 13 - Doubling with compensation e.g., 5 + 5 = 10; 10 + 3 = 13 **or** 8 + 8 = 16; 16 – 3 = 13 - Addition fact e.g., 8 + 5 = 13

INTERVIEW 3 TASK 4



There are 6 houses in each row.
There are 3 rows of houses.
How many houses are there altogether?

TASK 4



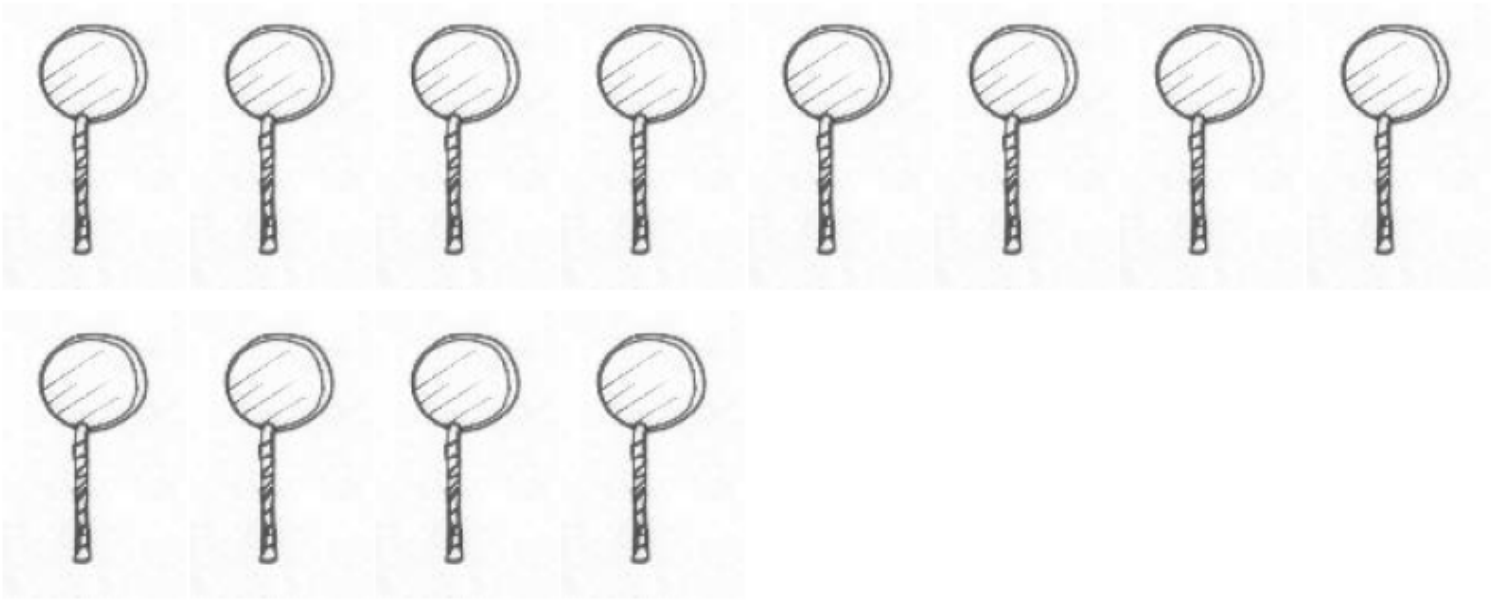
SAY: There are 6 houses in each row.
SAY: There are 3 rows of houses.
SAY: How many houses are there altogether?

ACTION: *Sweep one row with your finger*
ACTION: *Point to each row one by one*

Stage	Strategy observed
3	**Cannot solve the problem** **Counts all objects from 1 on materials** (Stage 2) **e.g.,** 1, 2, …, **6**, 7, …, **18** **Counts all objects from 1 by imaging** (Stage 3) **e.g.,** 1, 2, …, **6**, 7, …, **18**
4	**Skip counting** (Stage 4) **e.g.,** 6, 12, 18 [**or** 3, 6, 9, 12, 15, 18]
Early 5 or higher	**Uses an additive or multiplicative strategy e.g.,** - Repeat addition e.g., 6 + 6 + 6 = 18 or 6 + 6 = 12; 12 + 6 = 18 - Multiplication strategies e.g., 2 × 6 = 12; 12 + 6 = 18 - Multiplication fact e.g., 3 × 6 = 18

INTERVIEW 3 TASK 5

You have 12 lollipops for your party.
A quarter of the lollipops are lemon.



How many lemon lollipops are there?

TASK 5

ACTION: *Provide 12 counters (lollipops).*
Allow the student access to these counters if necessary.

SAY: You have 12 lollipops for your party.
A quarter of the lollipops are lemon.
How many lemon lollipops are there?

Note: Say "fourth" instead of "quarter" if this is more familiar to your student.

Stage	Strategy observed
2–4	**Cannot solve the problem** **Equally shares the lollipops, on materials or by imaging** (Stage 2–4)
Early 5 or higher	**Uses an additive or multiplicative strategy e.g.,** - Additive partitioning e.g., 6 + 6 = 12 and 3 + 3 + 3 + 3 = 12 - Multiplication or division strategy e.g., 3 × 3 = 9; 9 + 3 = 12 - Multiplication or division fact e.g., 4 × 3 = 12 or 12 ÷ 4 = 3

DECISION: If **any** "E5" are circled in **Tasks 3, 4** or **5**, **or** if the "4s" are circled in **both Task 3** and **Task 4**, CONTINUE the interview.
Otherwise STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 3 TASK 6

Tui has $36.
She needs $58 to buy a kitten.

How much more does she need to save?

Section 4 TARGET: Stage 5
Early additive part-whole

*Do all **three** tasks.*

TASK 6

SAY: Tui has $36.
She needs $58 to buy a kitten.
How much more does she need to save?

Stage	Strategy observed
Early 5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Counting on** or **Counting back** (Stage 4) **e.g.,** 37, 38, …, 58 **Skip counting in tens and ones** (Stage 4) **e.g.,** [36] 46, 56, 57, 58 **Repeat addition in tens and ones** (Stage E5) **e.g.,** 58 – 10 = 48; 48 – 10 = 38; 38 – 2 = 36; 20 + 2 = 22 **or** 36 + 10 = 46; 46 + 10 = 56; 56 + 2 = 58; 20 + 2 = 22 **Mix of counting and part-whole strategies** (Stage E5) **e.g.,** 36 + 4 = 40; 40 + 10 = 50; 51, 52, … , 57, 58
5 or higher	**Uses a part-whole strategy e.g.,** - Place value partitioning e.g., (50 – 30) + (8 – 6) = 20 + 2 = 22 - Adding on in parts e.g., 36 + 20 = 56; 56 + 2 = 58; 20 + 2 = 22 - Making to ten e.g., 36 + 4 = 40; 40 + 10 = 50; 50 + 8 = 58; 4 + 10 + 8 = 22

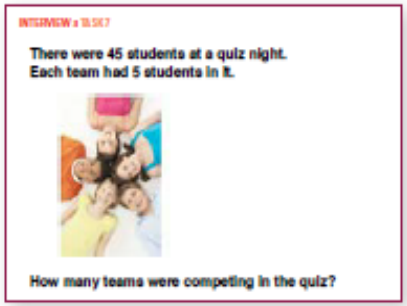
INTERVIEW 3 TASK 7

There were 45 students at a quiz night.
Each team had 5 students in it.

How many teams were competing in the quiz?

TASK 7

SAY: There were 45 students at a quiz night.
Each team had 5 students in it.
How many teams were competing in the quiz?



Stage	Strategy observed
Early 5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Skip counting** (Stage 4) **e.g.,** 5, 10, 15, …, 45 **Repeated addition** (Stage E5) **e.g.,** 5 + 5 + 5 + … + 5 = 45
5 or higher	**Uses an additive or multiplicative strategy e.g.,** - Additive strategies e.g., 5 + 5 =10; 10 + 10 = 20; 20 + 20 = 40; 40 + 5 = 45; 8 + 1 = 9 - Derive from multiplication facts e.g., 4 × 5 = 20; 20 + 20 = 40; 40 + 5 = 45; 8 + 1 = 9 - Multiplication or division facts e.g., 5 × 9 = 45 **or** 45 ÷ 5 = 9

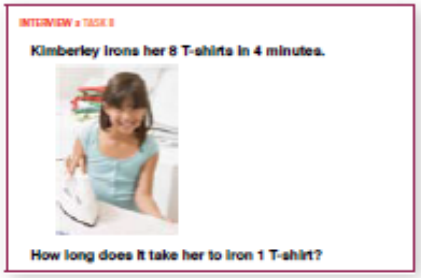
INTERVIEW 3 TASK 8

Kimberley irons her 8 T-shirts in 4 minutes.

How long does it take her to iron 1 T-shirt?

TASK 8

SAY: Kimberley irons her 8 T-shirts in 4 minutes.
How long does it take her to iron 1 T-shirt?



Stage	Strategy observed
Early 5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Incorrect additive strategy** (Stage 4) **e.g.,** 4 + 4 = 8; 1 + 4 = 5 minutes **or** 4 + 4 = 8 so 1 + 1 = 2 minutes
5 or higher	**Uses a proportional approach e.g.,** - Additive strategies e.g., $\frac{1}{2} + \frac{1}{2} + \ldots + \frac{1}{2} = 4$ **or** 4 + 4 = 8 and $\frac{1}{2} + \frac{1}{2} = 1$ so the answer is $\frac{1}{2}$ - Multiplicative strategies e.g., 4 is half of 8 so it's half of 1 minute **or** $4 \div 8 = \frac{1}{2}$ minute - Rate strategies e.g., 8:4 = 4:2 = 2:1 so the answer is $\frac{1}{2}$ a minute (= 30 seconds)

DECISION: If **any** "5" are circled in **Tasks 6, 7** or **8**, CONTINUE the interview.
If **only** "E5" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 3 TASK 9

There were 128 lambs in a field.
Another 74 lambs joined them.

How many lambs were there altogether?

Section 5 TARGET: Early Stage 6
Advanced additive part-whole

*Do all **three** tasks.*

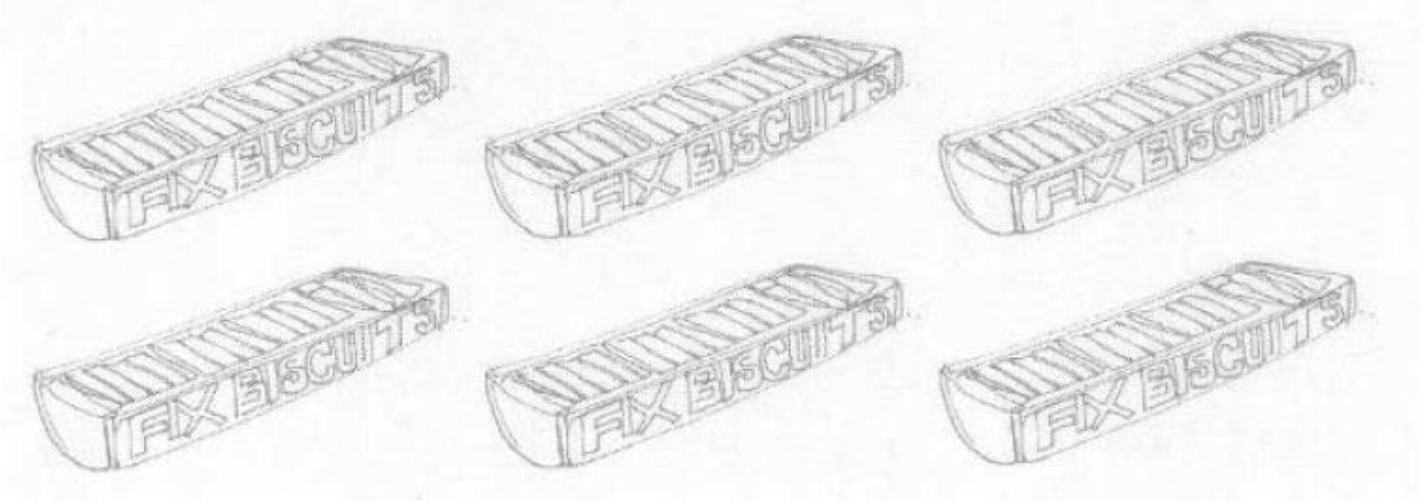
TASK 9

SAY: There were 128 lambs in a field.
Another 74 lambs joined them.
How many lambs were there altogether?

Stage	Strategy observed
5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Skip counting in tens and ones** (Stage 4) **e.g.,** [128] 138, ..., 198; 199, 200, 201, 202 **Repeat addition in tens and ones** (Stage E5) **e.g.,** 128 + 10 + 10 + … + 10 = 198; 199, 200, 201, 202 **Mix of counting and part-whole strategies** (Stage E5) **e.g.,** 128 + 10 + 10 + … + 10 = 198; 198 + 2 + 2 = 202 **Attempts part-whole strategy with error** (Stage E5) **e.g.,** 192 (no carrying)
Early 6 or higher	**Uses a part-whole strategy e.g.,** - Place value partitioning e.g., (120 + 70) + (8 + 4) = 190 + 12 = 202 - Adding on in parts e.g., 128 + 70 = 198; 198 + 4 = 202 **or** 120 + 74 = 194; 194 + 8 = 202 - Making to ten e.g., 128 + 2 = 130; 130 + 70 = 200; 200 + 2 = 202

INTERVIEW 3 TASK 10

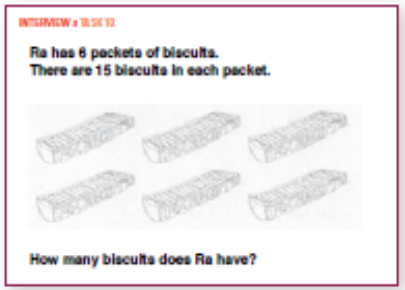
Ra has 6 packets of biscuits.
There are 15 biscuits in each packet.



How many biscuits does Ra have?

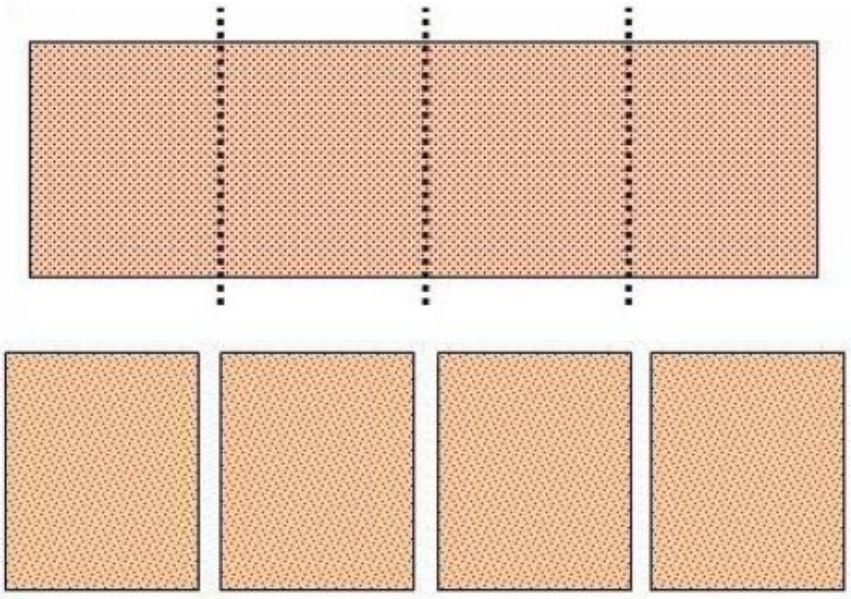
TASK 10

SAY: Ra has 6 packets of biscuits.
There are 15 biscuits in each packet.
How many biscuits does Ra have?



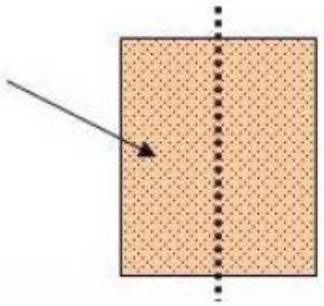
Stage	Strategy observed
5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses an additive strategy e.g.,** - Skip counting (Stage 4) e.g., 15, 30, 45, 60, 75, 90 [or 6, 12, 18, …, 90] - Repeated addition e.g., (Stage E5) e.g., 15 + 15 + … + 15 = 90 [**or** 6 + 6 + … + 6 = 90] - Doubling additively (Stage 5) e.g., 15 + 15 = 30; 30 + 30 = 60; 60 + 30 = 90
Early 6 or higher	**Uses a multiplicative strategy e.g.,** - Place value partitioning e.g., 6 × 10 = 60; 6 × 5 = 30; 60 + 30 = 90 - Derived from basic fact e.g., 6 × 10 = 60; 60 + 6 + 6 + 6 + 6 + 6 = 90 - Halving and doubling e.g., 6 × 15 = 3 × 30 = 90

INTERVIEW 3 TASK 11



You cut a sheet cake into 4 equal pieces.

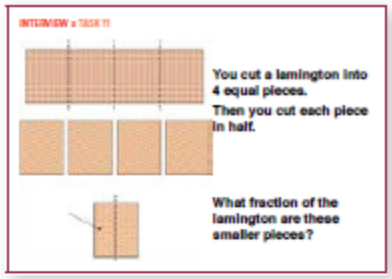
Then you cut each piece in half.



What fraction of the sheet cake are these smaller pieces?

TASK 11

SAY: You cut a sheet cake into 4 equal pieces.
Then, you cut each piece in half.
What fraction of the sheet cake are these smaller pieces?



Stage	Strategy observed
5	**Cannot solve the problem OR Uses an earlier numeracy stage** **Counting strategy** (Stage 4) **e.g.,** 1, 2, 3, ..., 8 so the pieces are eighths
Early 6 or higher	**Uses an additive or multiplicative strategy e.g.,** - Additive strategy e.g., 2 + 2 + 2 + 2 = 8, so these pieces are quarters, and the smaller ones are eighths - Multiplicative strategy e.g., 4 × 2 = 8 so the pieces are eighths

DECISION: If **any** "E6" are circled in **Tasks 9, 10** or **11**, CONTINUE the interview.
If **only** "5" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 3 TASK 12

Mitchell had 231 toy cars in his collection.
He sold 78 of them.

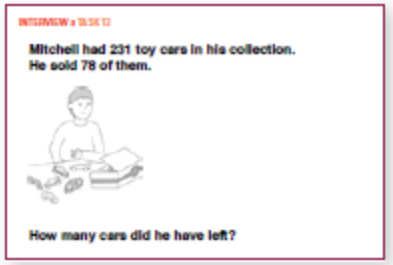
How many cars did he have left?

Section 6 TARGET: Stage 6
Advanced additive part-whole

*Do all **three** tasks.*

TASK 12

SAY: Mitchell had 231 toy cars in his collection.
He sold 78 of them.
How many cars did he have left?



Stage	Strategy observed
Early 6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Mix of counting and part-whole strategies** (Stage E5) **e.g.,** [231] 221, 211, 201, ..., 161; 161 – 1 = 160; 160 – 7 = 153 **Attempts part-whole strategy with error** (Stage 5) **e.g.,** 231 – 80 = 151; 151 – 2 = 149 (compensates in the wrong direction)
6 or higher	**Uses a part-whole strategy e.g.,** - Place value partitioning e.g., (230 – 70) + (1 – 8) = 160 – 7 = 153 - Making to hundreds e.g., 231 – 31 = 200; 78 – 31 = 47; 200 – 47 = 153 - Subtracting tidy number and compensation e.g., 231 – 80 = 151; 151 + 2 = 153 - Equal additions e.g., 231 – 78 = 253 – 100 = 153

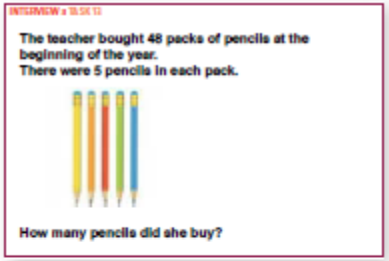
INTERVIEW 3 TASK 13

The teacher bought 48 packs of pencils at the beginning of the year.
There were 5 pencils in each pack.

How many pencils did she buy?

TASK 13

SAY: The teacher bought 48 packs of pencils at the beginning of the year.
There were 5 pencils in each pack.
How many pencils did she buy?



Stage	Strategy observed
Early 6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses additive strategies e.g.,** - Doubling additively (Stage 5) e.g., 48 + 48 = 96; 96 + 96 = 192; 192 + 48 = 240
6 or higher	**Uses a multiplicative strategy e.g.,** - Place value partitioning with basic facts e.g., (5 × 40) + (5 × 8) = 200 + 40 = 240 - Doubling and halving e.g., 48 × 5 = 24 × 10 = 240 - Rounding and compensation e.g., (5 × 50) – (5 × 2) = 250 – 10 = 240

INTERVIEW 3 TASK 14

Three friends share two pizzas.

What fraction of a pizza does each friend get?

TASK 14

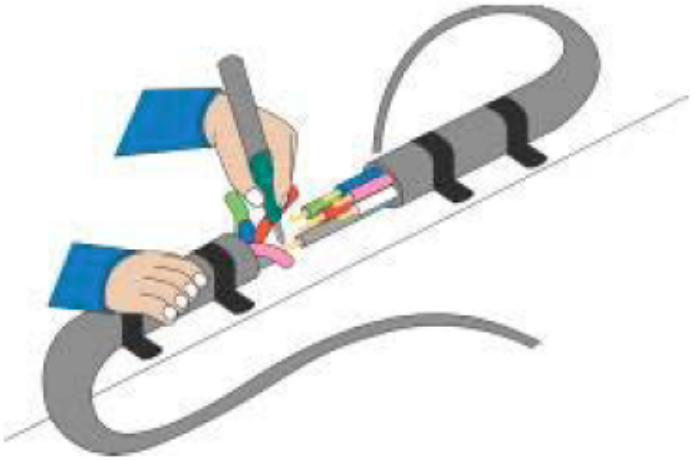
SAY: Three friends share two pizzas.
What fraction of a pizza does each friend get?

Stage	Strategy observed
Early 6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses an additive strategy** (Stage 5) **e.g.,** $\frac{1}{2}+\frac{1}{2}+\frac{1}{2}$ each, the remaining half is cut into three pieces, but cannot name the combined fraction.
6 or higher	**Uses a multiplicative strategy e.g.,** Two lots of $\frac{1}{3}$ of $1 = 2 \times \frac{1}{3} = \frac{2}{3}$ **or** 2 out of 6 pieces is $\frac{2}{3}$ of one pizza **or** $3 \times \frac{1}{2} = 1\frac{1}{2}$; $\frac{1}{3}$ of $\frac{1}{2} = \frac{1}{6}$; $\frac{1}{2}+\frac{1}{6}=\frac{2}{3}$

DECISION: If **any** "6" are circled in **Tasks 12, 13** or **14**, CONTINUE the interview.
If **only** "E6" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 3 TASK 15

The electrician has 5.33 meters of cable.
He uses 2.9 meters on a job.



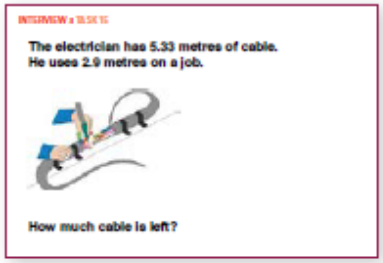
How much cable is left?

Section 7 TARGET: Early Stage 7
Advanced multiplicative part-whole

*Do all **three** tasks.*

TASK 15

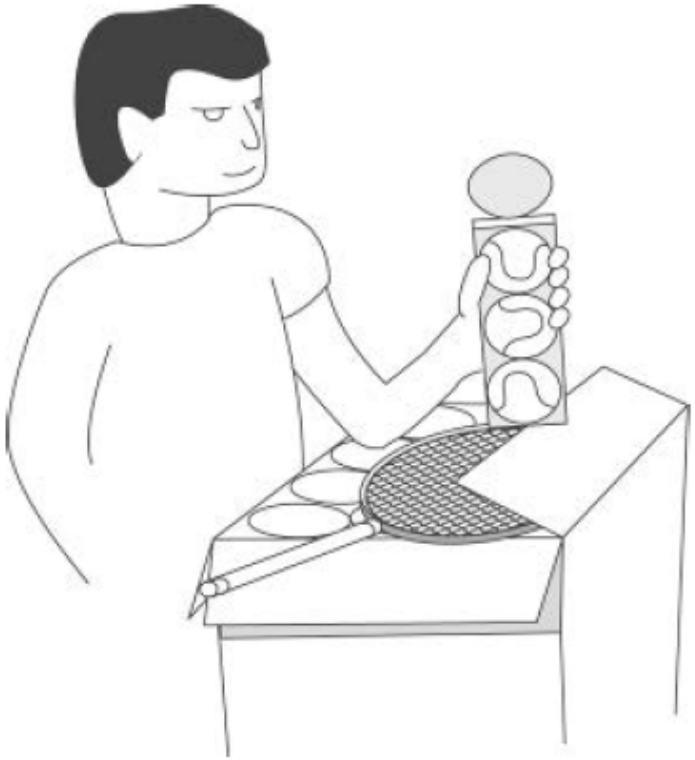
SAY: The electrician has 5.33 meters of cable.
He uses 2.9 meters on a job.
How much cable is left?



Stage	Strategy observed
6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Misinterprets decimal place value** (Stage 6) **e.g.,** - Ignores the decimal points e.g., 533 – 29 = 504 - Treats numbers after the decimal as whole numbers e.g., 5.33 – 2.9 = (5 – 2) + (0.33 – 0.9 "=" 0.24) = 3.24
Early 7 or higher	**Uses part-whole strategies e.g.,** - Taking off in parts e.g., 5.33 – 2.0 = 3.33; 3.33 – 0.9 = 2.43 - Place value partitioning e.g., (5 – 2) + (0.3 – 0.9) + 0.03 = 3 – 0.6 + 0.03 = 2.43 - Making to ones e.g., 2.9 + 0.1 = 3.0; 3.0 + 2.33 = 5.33; 0.1 + 2.33 = 2.43 - Rounding and compensation e.g., 5.33 – 3.0 = 2.33; 2.33 + 0.1 = 2.43

INTERVIEW 3 TASK 16

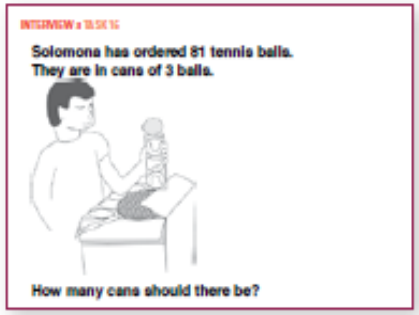
Solomona has ordered 81 tennis balls.
They are in cans of 3 balls.



How many cans should there be?

TASK 16

SAY: Solomona has ordered 81 tennis balls.
They are in cans of 3 balls.
How many cans should there be?



Stage	Strategy observed
6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses additive strategies (Stage 5) e.g.,** - Additive doubling or tripling e.g., 3 + 3 + 3 = 9; 9 + 9 + 9 = 27; 27 + 27 + 27 = 81 **Uses a mix of additive and multiplicative strategies (Stage 6) e.g.,** 20 × 3 = 60; 60 + 3 + 3 + 3 + … + 3 = 81 so the answer is 20 + 7 = 27
Early 7 or higher	**Uses multiplicative strategies e.g.,** - Derive from basic facts e.g., (3 × 20) + (3 × 7) = 60 + 21 = 81; 20 + 7 = 27 **or** 30 × 3 = 90; 90 – (3 × 3) = 90 – 9 = 81; 30 – 3 = 27 - Proportional adjustment e.g., 81 ÷ 9 = 9 so 81 ÷ 3 = 3 × 9 = 27

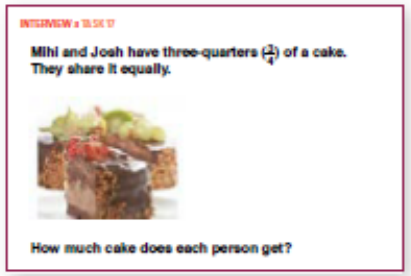
INTERVIEW 3 TASK 17

Mihi and Josh have three-quarters ($\frac{3}{4}$) of a cake. They share it equally.

How much cake does each person get?

TASK 17

SAY: Mihi and Josh have three-quarters of a cake.
They share it equally.
How much cake does each person get?

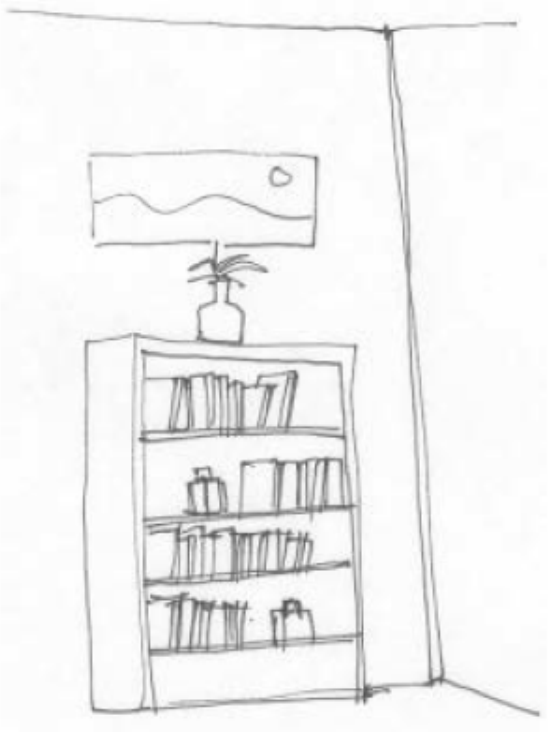


Note: Say "three-fourths" instead of "three-quarters" if this is more familiar to your student.

Stage	Strategy observed
6	**Cannot solve the problem** or **Uses an earlier numeracy stage**
Early 7 or higher	**Images three quarters, and equally shares e.g.,** $\frac{1}{4}$ plus ($\frac{1}{2}$ of $\frac{1}{4}$) $= \frac{1}{4} + \frac{1}{8} = \frac{2}{8} + \frac{1}{8} = \frac{3}{8}$ **Uses a multiplicative strategy e.g.,** $\frac{1}{2}$ of $\frac{1}{4}$ is $\frac{1}{8}$ so $\frac{1}{2}$ of $\frac{3}{4} = 3 \times \frac{1}{8} = \frac{3}{8}$

DECISION: If **any** "E7" are circled in **Tasks 15, 16** or **17**, CONTINUE the interview.
If **only** "6" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 3 TASK 18



The ceiling is 2.3 meters high. The bookcase is 1.845 meters high.

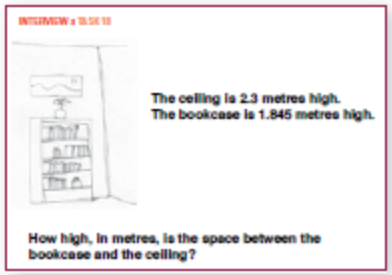
How high, in meters, is the space between the bookcase and the ceiling?

Section 8 TARGET: Stage 7
Advanced multiplicative part-whole

*Do all **three** tasks.*

TASK 18

SAY: The ceiling is 2.3 meters high.
The bookcase is 1.845 meters high.
How high, in meters, is the space between the bookcase and the ceiling?



Stage	Strategy observed
Early 7	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Misinterprets or ignores decimal place value** (Stage 6) **e.g.,** 2.3 – 1.845 = (2 – 1) + (0.3 – 0.845) "=" 1 – 0.842 = 0.158 **or** 0.152
7 or higher	**Uses part-whole strategies e.g.,** - Place value partitioning e.g., (2 – 1) + (0.3 – 0.845) = 1 – 0.545 = 0.455 **or** (2.3 – 1.8) + (0 – 0.045) = 0.5 – 0.045 = 0.455 - Making to ones e.g., 1.845 + 0.155 = 2.0; 0.155 + 0.3 = 0.455 - Rounding and compensation e.g., 2.3 – 1.9 = 0.4; 0.4 + 0.55 = 0.455

INTERVIEW 3 TASK 19

Joni has 1.5 kilograms of butter in the fridge.
A batch of scones requires 0.075 kilograms of butter.

How many batches of scones will Joni be able to bake?

TASK 19

SAY: Joni has 1.5 kilograms of butter in the fridge.
A batch of scones requires 0.075 kilograms of butter.
How many batches of scones will Joni be able to bake?

Stage	Strategy observed
Early 7	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Attempts multiplication strategy** (Stage 6)
7 or higher	**Uses multiplication strategies e.g.,** $0.075 \times 20 = 1.5$ [because $75 \times 2 = 150$] so the answer is 20 **or** $1500 \div 75$ (simplify by 5) $= 300 \div 15 = 60 \div 3 = 20$ **or** 2 batches need $2 \times 0.075 = 0.15$; $10 \times 0.15 = 1.5$; $2 \times 10 = 20$

INTERVIEW 3 TASK 20

One-fifth ($\frac{1}{5}$) of the birds on the lake are swans.
There are 40 other birds on the lake.

How many birds are on the lake altogether?

TASK 20

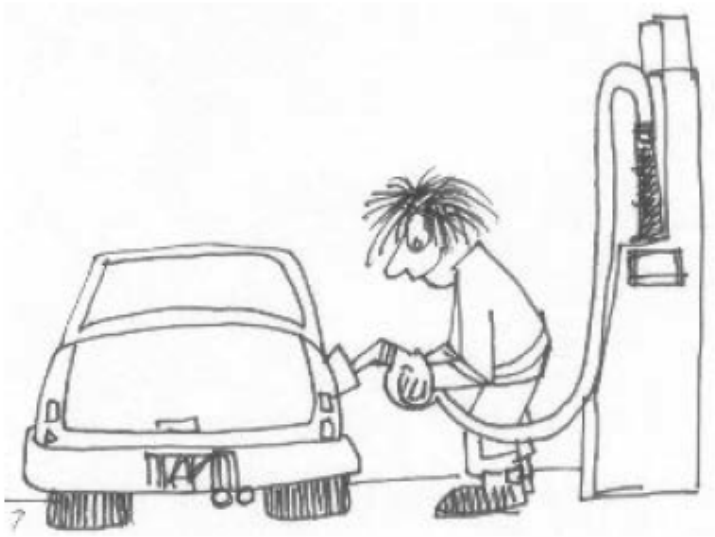
SAY: One-fifth of the birds on the lake are swans.
There are 40 other birds on the lake.
How many birds are on the lake altogether?

Stage	Strategy observed
Early 7	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses additive strategies** (Stage 6) **e.g.,** $\frac{4}{5}$ is 40 because 10 + 10 + 10 + 10 = 40 so $\frac{1}{5}$ is 10; $\frac{5}{5}$ is 40 + 10 = 50
7 or higher	**Uses a multiplicative strategy e.g.,** $\frac{4}{5}$ is 40 because 4 × 10 = 40, so $\frac{5}{5}$ is 5 × 10 = 50 $\frac{4}{5}$ is 40 so $\frac{1}{5}$ is 40 ÷ 4 = 10; $\frac{5}{5}$ is 5 × 10 = 50

DECISION: If **any** "7" are circled in **Tasks 18, 19** or **20**, CONTINUE the interview.
If **only** "E7" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 3 TASK 21

Fuel costs 210.9 cents a liter.
Your car takes 40 liters.



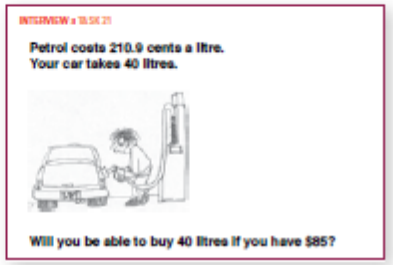
Will you be able to buy 40 liters if you have $85?

Section 9 TARGET: Early Stage 8
Advanced proportional

Do both tasks.

TASK 21

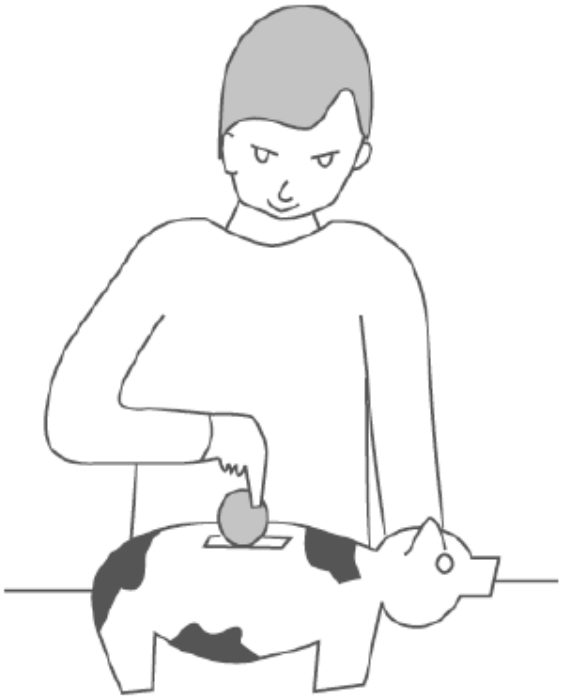
SAY: Fuel costs 210.9 cents a liter.
Your car takes 40 liters.
Will you be able to buy 40 liters if you have $85?



Stage	Strategy observed
7	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Attempts multiplication strategy e.g.,** 40 × 200 = 8000
Early 8 or higher	**Uses multiplication strategies e.g.,** - Place value partitioning e.g., 40 × 200 = 8000; 40 × 10 = 400; 40 × 0.9 = 36; 8000 + 400 + 36 = 8436c = $84.36 - Rounding dollars and cents e.g., Round 210.9 to 211 **then** 40 × $2 = $80; 40 × 10c = $4; 40 × 1c = 40c; $80 + $4 + 40c = $84.40 - Unitising (i.e. cost of fuel per liter if 40 liters costs $85) e.g., 80 ÷ 40 = $2; 5 ÷ 40 = $\frac{1}{8}$; $\frac{1}{8}$ of $1 = 12.5 cents; so could pay if petrol cost 212.5 cents per liter

INTERVIEW 3 TASK 22

Mei-ling saved $40 in 16 weeks.
She saved the same amount each week.



How much had she saved after 6 weeks?

TASK 22

SAY: Mei-ling saved $40 in 16 weeks.
She saved the same amount each week.
How much had she saved after 6 weeks?

Stage	Strategy observed
7	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses inappropriate additive strategy** (Stage 5) **e.g.,** 16 – 6 = 10; 40 – 10 = 30 **or** 6 + 10 = 16; 30 + 10 = 40 **Uses estimation** (Stage 6–7) **e.g.,** 6 ≤ $\frac{1}{2}$ of 16; 15 ≤ $\frac{1}{2}$ of 40; so an estimate is 15
Early 8 or higher	**Use a proportional approach e.g.,** - Equivalent fractions or ratios e.g., $\frac{6}{16} = \frac{3}{8}$; $\frac{3}{8} \times 40 = 15$ **or** 40:16 = 20:8 = 10:4 = 5:2; (10 + 5):(4 + 2) = 15:6 so the answer is 15 **or** 40:16 = 20:8 = 15:6 (using $\frac{3}{4}$ of 20 and $\frac{3}{4}$ of 8) so the answer is 15 **or** 40:16 (8 as a factor) = 5:2 = 15:6 so the answer is 15

Stop the interview

Global Strategy Stages Assessment (GloSS)

Interview 4

GENERAL INSTRUCTIONS

- For the initial assessment of a student, begin with Task 1. After the first assessment, start the assessment at the place where the student last responded accurately.
- Ask the student **all** the tasks within a section.
- Read each task to the student and show them the related Task Card.
- Give the student time to answer the question (you may need to wait for a few minutes).
- Prompt the student if you need to. For example, ask *"How did you work that out?"* or *"Can you talk me through what you were thinking?".*
- Allow the student the opportunity to demonstrate **higher level strategies** based on The Number Knowledge Framework. If they use a simple strategy (e.g., counting), ask *"Can you do it another way?"*.
- Use the scoring guide below each task to determine the Number Framework Stage associated with the student's response.
- Circle the relevant stage on the student's recording sheet.
- Record the student's strategy in the space under "Observations".
- Use the decision rule provided at the end of each section to decide whether to continue the interview. If there is any doubt or if you think the student may be capable of showing higher strategies, **continue** the interview.
- Questions are designed so that they can be answered mentally. Students should not be provided with paper and pencil or any other writing tool to solve the problems; they should be encouraged to use mental, quantitative reasoning to apply strategies learned to solve the problems.

ALL MATERIALS NEEDED

- 20 counters
- Two index cards to cover counters
- Flip Book
- One recording sheet per student

Section 1 TARGET: Stage 1
One-to-one counting

TASK 1

ACTION: *Place 6 counters of the same colour on the table.*
SAY: How many counters are there?

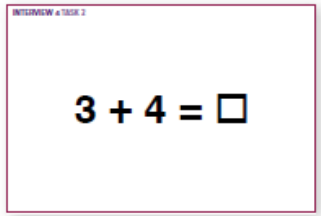
Stage	Strategy observed
0	**Student cannot count 6 objects**
1	**Correctly counts the 6 objects**

DECISION: If "1" is circled in **Task 1**, CONTINUE the interview.
If "0" is circled, rate the student at Stage 0 and STOP the interview

INTERVIEW 4 TASK 2

Section 2 TARGET: Stages 2–3 or 4
Counting from one or Advanced counting

TASK 2



SAY: Please hold out your hands for me.
SAY: Here are 3 counters.
SAY: Here are another 4 counters.
SAY: How many counters have you got altogether?

ACTION: *Place 3 counters in the student's hand.*
ACTION: *Place 4 counters in their other hand.*
ACTION: *Close the student's hands to encourage imaging.*
ACTION: *Allow the student to open their hands if they find imaging difficult.*

Stage	Strategy observed
1	**Cannot solve the addition problem** (Stage 1)
2–3	**Physically counts all the objects from 1 on materials** (Stage 2) **Correctly counts all the items from 1 by imaging** (Stage 3)
4 or higher	**Counts on** e.g., 4, 5, 6, 7 **or** 5, 6, 7 **Knows** 3 + 4

DECISION: If **either** "2–3" **or** "4" are circled in **Task 2**, CONTINUE the interview.
If "1" is circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 4 TASK 3

$$8 + 7 = \square$$

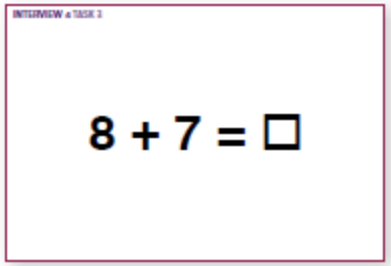
Section 3 TARGET: Stages 4 or Early 5
Advanced counting or Early additive part-whole

*Do all **three** tasks.*

TASK 3

ACTION: *Place 8 counters under a card then place 7 under another card.*

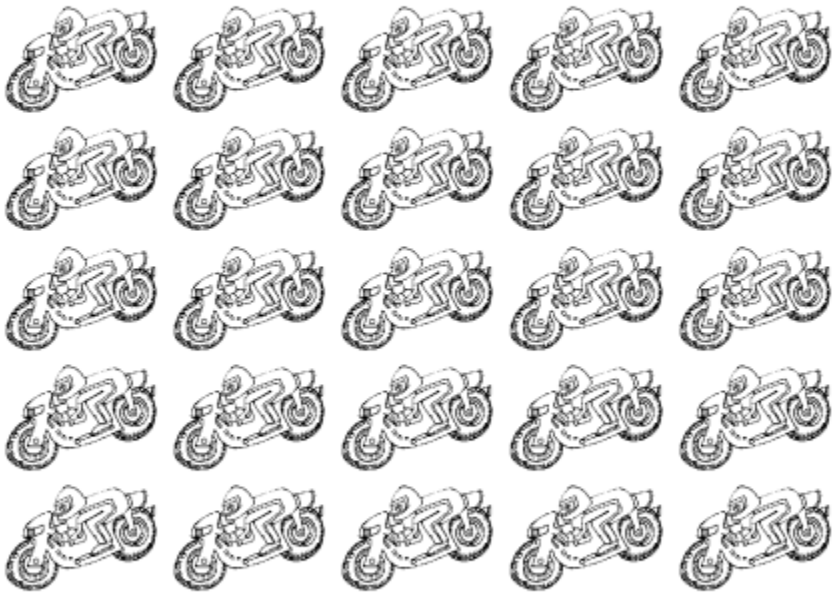
SAY: Here are 8 counters, and here are 7 counters.
How many counters are there altogether?



Stage	Strategy observed
3	**Cannot solve the problem** (After removing the cards – Stage 1) **Counts all objects from 1 on materials** (Stage 2) **e.g.,** 1, 2, 3, …, 15 **Counts all objects from 1 by imaging** (Stage 3) **e.g.,** 1, 2, 3, …, 15
4	**Counts on** (Stage 4) **e.g.,** 9, 10, 11, … , 14, 15 **or** 8, 9, 10, …, 14, 15
Early 5 or higher	**Uses a part-whole strategy e.g.,** - Making to ten e.g., 8 + 2 = 10; 10 + 5 = 15 - Doubling with compensation e.g., 7 + 7 = 14; 14 + 1 = 15 **or** 8 + 8 = 16; 16 – 1 = 15 - Addition fact e.g., 8 + 7 = 15

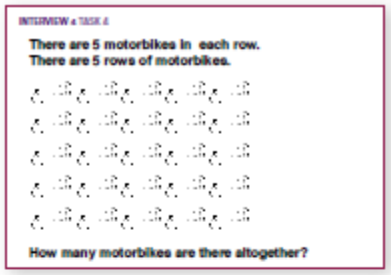
INTERVIEW 4 TASK 4

There are 5 motorbikes in each row.
There are 5 rows of motorbikes.



How many motorbikes are there altogether?

TASK 4



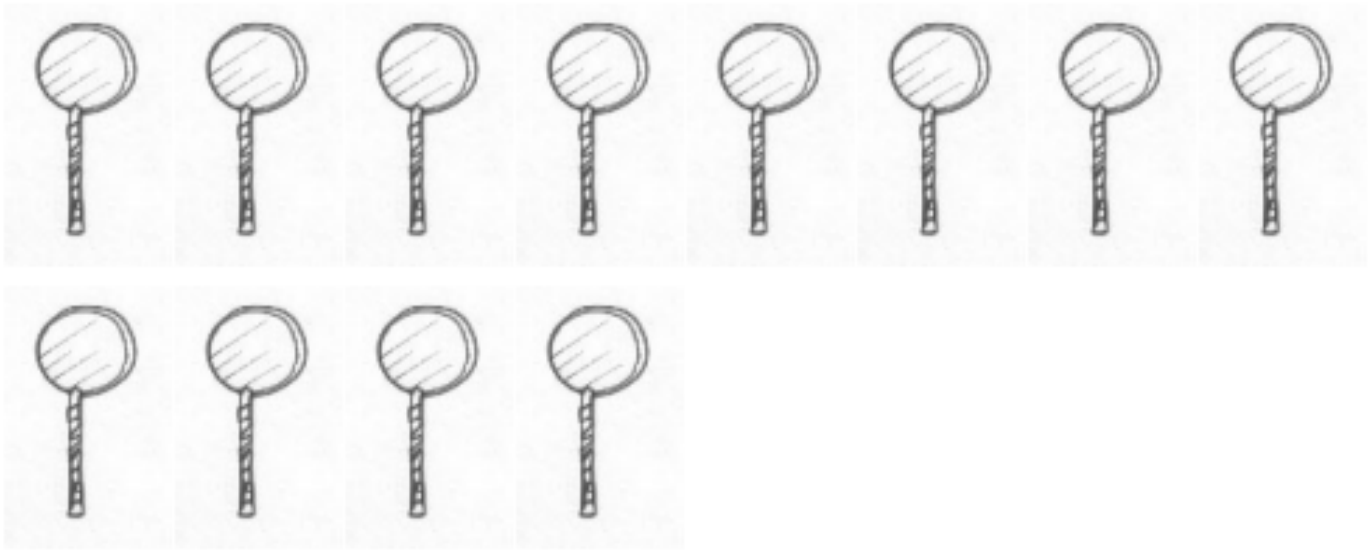
SAY: There are 5 motorbikes in each row.
SAY: There are 5 rows of motorbikes.
SAY: How many motorbikes are there altogether?

ACTION: *Sweep one row with your finger*
ACTION: *Point to each row one by one*

Stage	Strategy observed
3	**Cannot solve the problem** **Counts all objects from 1 on materials** (Stage 2) **e.g.,** 1, 2, 3, 4, **5**, 6, …, **25** **Counts all objects from 1 by imaging** (Stage 3) **e.g.,** 1, 2, 3, 4, **5**, 6, …, **25**
4	**Skip counting** (Stage 4) **e.g.,** 5, 10, 15, 20, 25
Early 5 or higher	**Uses an additive or multiplicative strategy e.g.,** - Repeat addition e.g., 5 + 5 + 5 + 5 + 5 = 25 - Additive strategies e.g., 5 + 5 = 10; 10 + 10 = 20; 20 + 5 = 25 - Multiplication strategies e.g., 4 × 5 = 20; 20 + 5 = 25 - Multiplication fact e.g., 5 × 5 = 25

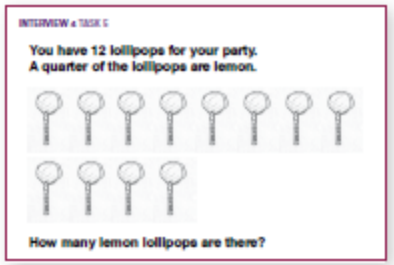
INTERVIEW 4 TASK 5

You have 12 lollipops for your party.
A quarter of the lollipops are lemon.



How many lemon lollipops are there?

TASK 5



ACTION: *Provide 12 counters (lollipops).*
Allow the student access to these counters if necessary.

SAY: You have 12 lollipops for your party.
A quarter of the lollipops are lemon.
How many lemon lollipops are there?

Note: Say "fourth" instead of "quarter" if this is more familiar to your student.

Stage	Strategy observed
2–4	**Cannot solve the problem** **Equally shares the lollipops, on materials or by imaging** (Stage 2–4)
Early 5 or higher	**Uses an additive or multiplicative strategy e.g.,** - Additive partitioning e.g., 6 + 6 = 12 and 3 + 3 + 3 + 3 = 12 - Multiplication or division strategy e.g., 3 × 3 = 9; 9 + 3 = 12 - Multiplication or division fact e.g., 4 × 3 = 12 or 12 ÷ 4 = 3

DECISION: If **any** "E5" are circled in **Tasks 3, 4** or **5**, **or** if the "4s" are circled in **both Task 3** and **Task 4**,CONTINUE the interview.
Otherwise STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 4 TASK 6

Janine has $49 in her piggy bank.
She gets $27 for her birthday.

How much money has Janine got now?

Section 4 TARGET: Stage 5
Early additive part-whole

*Do all **three** tasks.*

TASK 6

SAY: Janine has $49 in her piggy bank.
She gets $27 for her birthday.
How much money has Janine got now?

Stage	Strategy observed
Early 5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Counting on** (Stage 4) **e.g.,** 49, 50, 51, … , 76 **Skip counting in tens and ones** (Stage 4) **e.g.,** [49] 59, 69, 70, 71, ..., 76 **Repeat addition in tens and ones** (Stage E5) **e.g.,** 49 + 10 = 59; 59 + 10 = 69; 70, 71, ..., 76 **Mix of counting and part-whole strategies** (Stage E5) **e.g.,** [49] 59, 69; 69 + 1 = 70; 70 + 6 = 76
5 or higher	**Uses a part-whole strategy e.g.,** - Place value partitioning e.g., (40 + 20) + (9 + 7) = 76 - Adding on in parts e.g., 49 + 20 = 69; 69 + 1 + 6 = 76 **or** 40 + 27 = 67; 67 + 9 = 76 - Making to ten e.g., 49 + 27 = (49 + 1) + (27 – 1) = 50 + 26 = 76

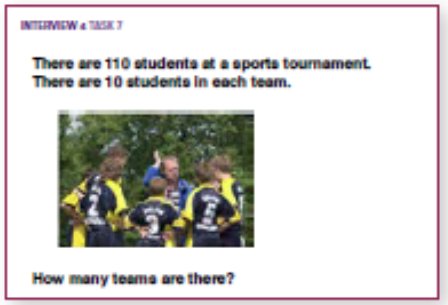
INTERVIEW 4 TASK 7

There are 110 students at a sports tournament.
There are 10 students in each team.

How many teams are there?

TASK 7

SAY: There are 110 students at a sports tournament.
There are 10 students in each team.
How many teams are there?

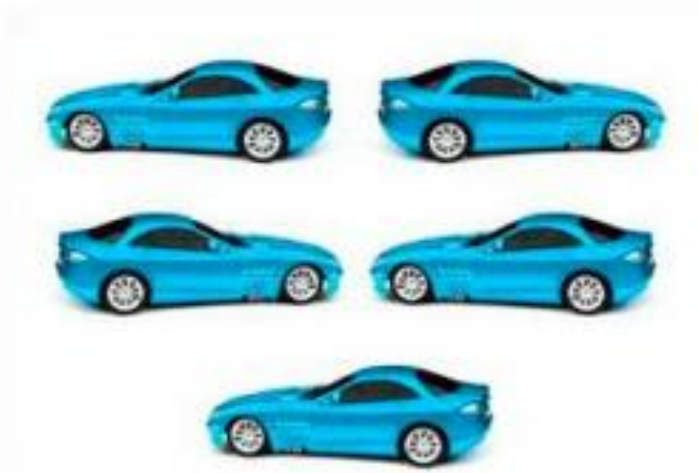


Stage	Strategy observed
Early 5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Skip counting** (Stage 4) **e.g.,** 10, 20, 30, 40, ..., 110 **Repeated addition** (Stage E5) **e.g.,** 10 + 10 + 10 + 10 + ... + 10 = 110
5 or higher	**Uses an additive or multiplicative strategy e.g.** - Additive strategies e.g., 10 + 10 = 20; 20 + 20 = 40; 40 + 40 = 80; 8 + 2 + 1 = 11 - Derive from multiplication facts e.g., 10 × 10 = 100; 100 + 10 = 110; 10 + 1 = 11 - Multiplication facts e.g., 11 × 10 = 110 so the answer is 11

INTERVIEW 4 TASK 8

There are 5 blue cars.

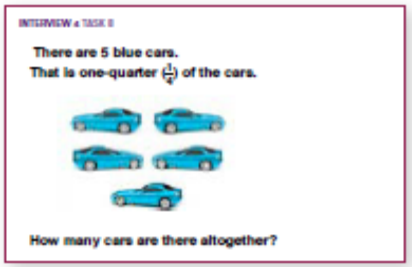
That is one-quarter ($\frac{1}{4}$) of the cars.



How many cars are there altogether?

TASK 8

SAY: There are 5 blue cars.
That is one-quarter of the cars.
How many cars are there altogether?



Note: Say "fourth" instead of "quarter" if this is more familiar to your student.

Stage	Strategy observed
Early 5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Counting strategy** (Stage 2–4) **e.g.,** 1, 2, 3, 4, **5**, 6, …, **10**, 11, …, **15**, 16, …, **20**
5 or higher	**Uses an addition or multiplication strategy e.g.,** - Additive strategies e.g., 5 + 5 = 10; 10 + 5 = 15; 15 + 5 = 20 - Multiplication facts e.g., 5 × 4 = 20 or 20 ÷ 4 = 5

DECISION: If **any** "5" are circled in **Tasks 6**, **7** or **8**, CONTINUE the interview.
If **only** "E5" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 4 TASK 9

147 lambs had already been born.
Another 36 lambs were born.

How many lambs were there altogether?

Section 5 TARGET: Early Stage 6
Advanced additive part-whole

*Do all **three** tasks.*

TASK 9

SAY: 147 lambs had already been born.
Another 36 lambs were born.
How many lambs were there altogether?

Stage	Strategy observed
5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Skip counting in tens and ones** (Stage 4) **e.g.,** [147] 157, 167, 177, 178, 179, …, 183 **Repeat addition in tens and ones** (Stage E5) **e.g.,** 147 + 10 + 10 + 10 + 1 + 1 + … + 1 = 183 **Mix of counting and part-whole strategies** (Stage E5) **e.g.,** 147 + 10 + 10 + 10 = 177; 177 + 3 + 3 = 183 **Attempts part-whole strategy with error** (Stage E5) **e.g.,** 173 (no carrying)
Early 6 or higher	**Uses a part-whole strategy e.g.,** - Place value partitioning e.g., (140 + 30) + (7 + 6) = 170 + 13 = 183 - Adding on in parts e.g., 147 + 30 = 177; 177 + 3 + 3 = 183 **or** 140 + 36 = 176; 176 + 4 + 3 = 183

INTERVIEW 4 TASK 10

You have 60 chairs to put around some tables.
5 chairs fit around each table.

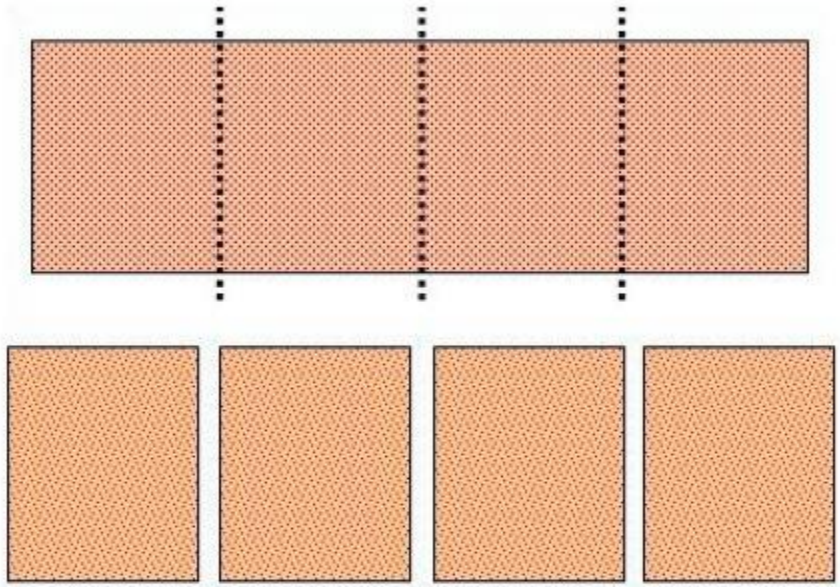
How many tables do you need?

TASK 10

SAY: You have 60 chairs to put around some tables.
Five chairs fit around each table.
How many tables do you need?

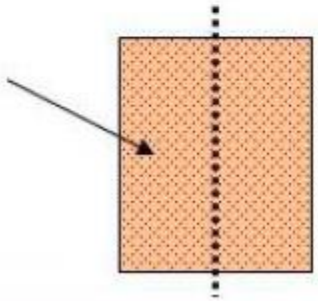
Stage	Strategy observed
5	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses an additive strategy e.g.,** - Skip counting (Stage 4) e.g., 5, 10, 15, 20, 25, ..., 60 or 60, 55, 50, ..., 5 - Repeated addition (Stage E5) e.g., 5 + 5 + 5 + ... + 5 = 60 - Doubling additively (Stage 5) e.g., 5 + 5 = 10; 10 + 10 = 20; 20 + 20 + 20 = 60
Early 6 or higher	**Uses a multiplicative strategy e.g.,** - Doubling and halving e.g., 6 × 10 = 60; 12 × 5 = 60 so the answer is 12 - Derives from multiplication facts e.g., 10 × 5 = 50; 2 × 5 = 10; 10 + 2 = 12 - Multiplication facts e.g., 5 × 12 = 60 or 60 ÷ 5 = 12

INTERVIEW 4 TASK 11



You cut a sheet cake into 4 equal pieces.

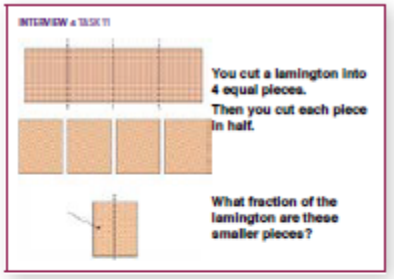
Then you cut each piece in half.



What fraction of the sheet cake are these smaller pieces?

TASK 11

SAY: You cut a sheet cake into 4 equal pieces.
Then you cut each piece in half.
What fraction of the sheet cake are these smaller pieces?



Stage	Strategy observed
5	**Cannot solve the problem OR Uses an earlier numeracy stage** **Counting strategy** (Stage 4) **e.g.,** 1, 2, 3, ..., 8 so the pieces are eighths
Early 6 or higher	**Uses an additive or multiplicative strategy e.g.,** - Additive strategy e.g., 2 + 2 + 2 + 2 = 8, so these pieces are quarters, and the smaller ones are eighths - Multiplicative strategy e.g., 4 × 2 = 8 so the pieces are eighths

DECISION: If **any** "E6" are circled in **Tasks 9, 10** or **11**, CONTINUE the interview.
If **only** "5" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 4 TASK 12

There are 143 calves on the farm.
89 of the calves are in the shed.

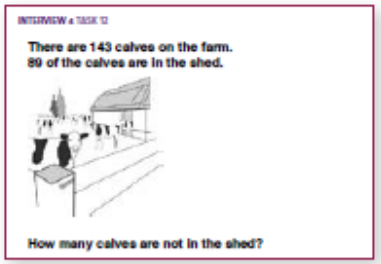
How many calves are not in the shed?

Section 6 TARGET: Stage 6
Advanced additive part-whole

*Do all **three** tasks.*

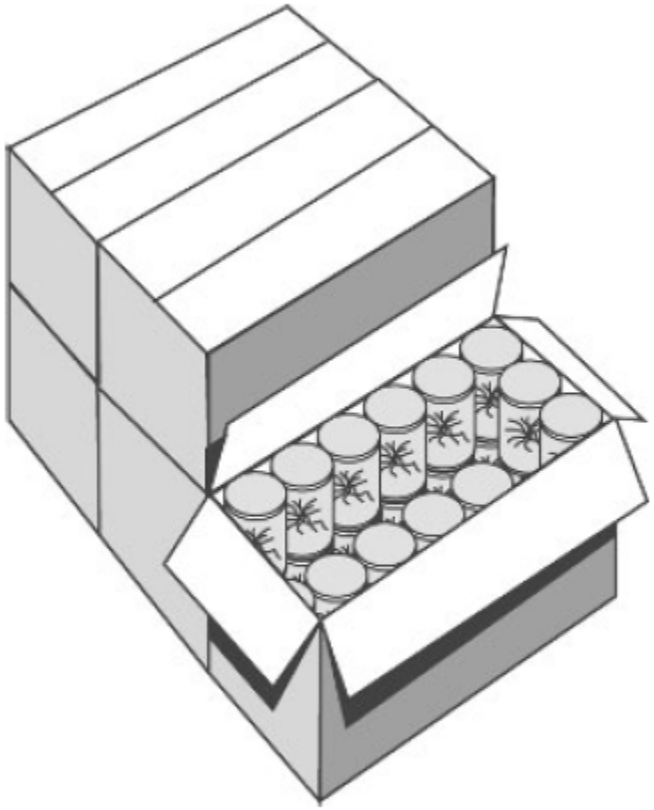
TASK 12

SAY: There are 143 calves on the farm.
89 of the calves are in the shed.
How many calves are not in the shed?



Stage	Strategy observed
Early 6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Mix of counting and part-whole strategies** (Stage E5) **e.g.,** [89] 99, 109, ..., 139; 139 + 1 = 140; 140 + 3 = 143; 50 + 1 + 3 = 54 **Attempts part-whole strategy with error** (Stage 5) **e.g.,** 143 – 90 = 53; 53 – 1 = 52 (compensates in the wrong direction)
6 or higher	**Uses a part-whole strategy e.g.,** - Place value partitioning e.g., (140 – 80) + (3 – 9) = 60 – 6 = 54 - Reversibility e.g., 89 + 1 = 90; 90 + 10 = 100; 100 + 43 = 143; 1 + 10 + 43 = 54 - Rounding and compensation e.g., 143 – 90 = 53; 53 + 1 = 54 - Subtracting in parts e.g., 143 – 80 = 63; 63 – 9 = 54 - Equal additions e.g., 144 – 90 = 54

INTERVIEW 4 TASK 13

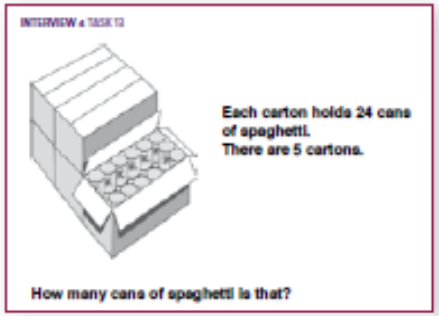


Each carton holds 24 cans of spaghetti.
There are 5 cartons.

How many cans of spaghetti is that?

TASK 13

SAY: Each carton holds 24 cans of spaghetti.
There are 5 cartons.
How many cans of spaghetti is that?



Stage	Strategy observed
Early 6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses an additive strategy e.g.,** - Doubling additively (Stage 5) e.g., 24 + 24 = 48; 48 + 48 = 96; 96 + 24 = 120
6 or higher	**Uses a multiplicative strategy e.g.,** - Place value partitioning e.g., 5 × 24 = (5 × 20) + (5 × 4) = 100 + 20 = 120 - Doubling and halving e.g., 5 × 24 = 10 × 12 = 120 - Derived from a known fact e.g., 25 × 5 = 125; 125 – 5 = 120

INTERVIEW 4 TASK 14

There are 8 swans on the lake.

The other two-thirds ($\frac{2}{3}$) of the birds on the lake are ducks.

How many ducks are there on the lake?

TASK 14

SAY: There are 8 swans on the lake.
The other two-thirds of the birds on the lake are ducks.
How many ducks are there on the lake?

Stage	Strategy observed
Early 6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses additive strategies only** (Stage 5) **e.g.,** 8 + 8 + 8 = 24 so 24 birds in total; 8 + 8 = 16
6 or higher	**Uses multiplicative strategies e.g.,** 3 × 8 = 24 so 24 birds in total **then** multiplies (or adds) to get i.e., 2 × 8 = 16 [**or** 8 + 8 = 16] **or** $1 - \frac{2}{3} = \frac{1}{3}$, $\frac{1}{3} = 8$; $\frac{2}{3} = 2 \times 8 = 16$

DECISION: If **any** "6" are circled in **Tasks 12, 13** or **14**, CONTINUE the interview.
If **only** "E6" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 4 TASK 15

Tony was 0.8 meters tall.
Three years later he was 1.25 meters tall.

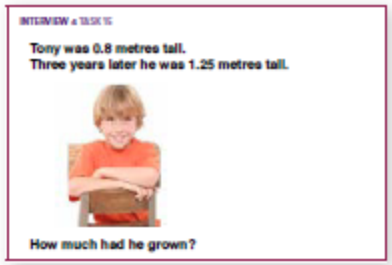
How much had he grown?

Section 7 TARGET: Early Stage 7
Advanced multiplicative part-whole

*Do all **three** tasks.*

TASK 15

SAY: Tony was 0.8 meters tall.
Three years later he was 1.25 meters tall.
How much had he grown?



Stage	Strategy observed
6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Misunderstands decimal place value** (Stage 6) **e.g.,** - Ignores the decimal points e.g., 125 – 8 = 117 **or** 125 – 80 = 45 [Check to see if they self-correct to 0.45 or 45cm then code as "E7"] - Treats numbers after the decimal as whole numbers e.g., 1.25 – 0.8 "=" 1.17
Early 7 or higher	**Uses part-whole strategies with decimal place value understanding e.g.,** - Place value partitioning e.g., (1.2 – 0.8) + (0.05 – 0) = 0.4 + 0.05 = 0.45 - Making to ones e.g., 0.8 + 0.2 = 1.0; 1.0 + 0.25 = 1.25; 0.2 + 0.25 = 0.45 - Equal addition e.g., 1.45 – 1.0 = 0.45

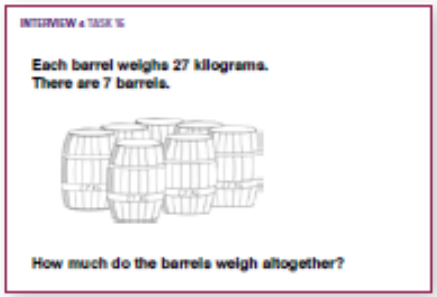
INTERVIEW 4 TASK 16

Each barrel weighs 27 kilograms.
There are 7 barrels.

How much do the barrels weigh altogether?

TASK 16

SAY: Each barrel weighs 27 kilograms.
There are 7 barrels.
How much do the barrels weigh altogether?



Stage	Strategy observed
6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses additive strategies** (Stage 5) **e.g.,** 27 + 27 = 54; 54 + 54 = 108; 108 + 108 = 216; 216 – 27 = 189 **Uses a mix of multiplicative and additive strategies** (Stage 6) **e.g.,** 20 × 7 = 140; 140 + 7 + 7 + 7 + 7 + 7 + 7 + 7 = 189
Early 7 or higher	**Uses a multiplicative strategy e.g.,** - Place value partitioning with basic facts e.g., (20 × 7) + (7 × 7) = 140 + 49 = 189 **or** (7 × 30) - (7 × 3) = 210 - 21 = 189 - Derive from basic facts e.g., (25 × 4) + (25 × 3) = 175; 175 + 2 × 7 = 189 **or** 10 × 7 = 70 so 20 × 7 = 140; 7 × 5 = 35; 7 × 2 = 14; 140 + 35 + 14 = 189

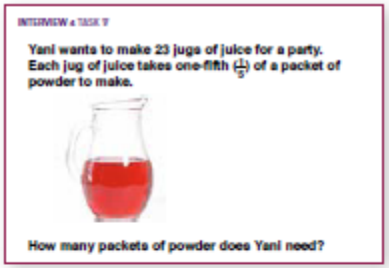
INTERVIEW 4 TASK 17

Yani wants to make 23 jugs of juice for a party. Each jug of juice takes one-fifth ($\frac{1}{5}$) of a packet of powder to make.

How many packets of powder does Yani need?

TASK 17

SAY: Yani wants to make 23 jugs of juice for a party.
Each jug of juice takes one-fifth of a packet of powder to make.
How many packets of powder does Yani need?



Stage	Strategy observed
6	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses additive strategies** (Stage 5) **e.g.,** 5 + 5 + 5 + 5 = 20 so 4 packets make 20 jugs, 1 more packet makes 25 jugs
Early 7 or higher	**Uses a multiplicative strategy e.g.,** - Division with remainder e.g., 23 ÷ 5 = 4 r 3, so 5 packets will make more than 23 jugs 4 × 5 = 20, for 20 jugs, so 5 packets would be needed - Division with fraction e.g., 23 ÷ 5 = 4 r 3 = $4\frac{3}{5}$; so need 5 packets

DECISION: If **any** "E7" are circled in **Tasks 15, 16** or **17**, CONTINUE the interview.
If **only** "6" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 4 TASK 18

One plant is 0.67 meters tall and the other is 0.9 meters tall.

Which one is taller and by how much (in meters)?

Section 8 TARGET: Stage 7
Advanced multiplicative part-whole

*Do all **three** tasks.*

TASK 18

SAY: One plant is 0.67 meters tall and the other is 0.9 meters tall. Which one is taller and by how much (in meters)?

Stage	Strategy observed
Early 7	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Misunderstands decimal place value** (Stage 6) **e.g.,** - Ignores the decimal points e.g., 67 – 9 = 58 - Treats numbers after the decimal as whole numbers e.g., 0.9 – 0.67 "=" 0.67 – 0.9 "=" 0.58
7 or higher	**Uses part-whole strategies with decimal place value understanding e.g.,** - Place value partitioning e.g., (0.9 – 0.6) + (0.00 – 0.07) = 0.3 – 0.07 = 0.23 - Making to tenths e.g., 0.67 + 0.03 = 0.7; 0.7 + 0.2 = 0.9; 0.03 + 0.2 = 0.23 - Subtracting in parts e.g., 0.9 – 0.6 = 0.3; 0.3 – 0.07 = 0.23 - Equal addition e.g., 0.9 – 0.67 = 0.93 – 0.7 = 0.23

INTERVIEW 4 TASK 19

There are 330 children wanting to play rugby.
Each team has 15 players.

How many teams will there be?

TASK 19

SAY: There are 330 children wanting to play rugby.
Each team has 15 players.
How many teams will there be?

Stage	Strategy observed
Early 7	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses a mix of multiplicative and additive strategies** (Stage 6) **e.g.,** 15 + 15 = 30; 30 × 10 = 300; 300 + 30 = 330; 20 + 2 = 22
7 or higher	**Uses multiplicative strategies e.g.,** - Partitioning e.g., 330 ÷ 15 = 330 ÷ (3 × 5); 330 ÷ 3 = 110; 110 ÷ 5 = 22 - Doubling e.g., 330 ÷ 15 = 660 ÷ 30 = 22 - Basic facts with adjustment e.g., 33 ÷ 3 = 11 so 330 ÷ 30 = 11; 11 × 2 = 22 **or** 2 × 15 = 30; 20 × 15 = 300; 20 + 2 = 22

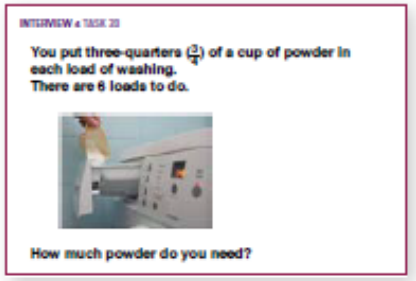
INTERVIEW 4 TASK 20

You put three-quarters ($\frac{3}{4}$) of a cup of detergent in each load of washing.
There are 6 loads to do.

How much detergent do you need?

TASK 20

SAY: You put three-quarters of a cup of detergent in each load of washing.
There are 6 loads to do.
How much detergent do you need?



Note: Say "three-fourths" instead of "three-quarters" if this is more familiar to your student.

Stage	Strategy
Early 7	**Cannot solve the problem** or **Uses an earlier numeracy stage**
7 or higher	**Uses an additive strategy e.g.,** $\frac{3}{4} + \frac{3}{4} = 1\frac{1}{2}$, $1\frac{1}{2} + 1\frac{1}{2} = 3$, $3 + 1\frac{1}{2} = 4\frac{1}{2}$ **Uses a multiplicative strategy e.g.,** $6 \times \frac{3}{4} = (6 \times 3) \div 4 = \frac{18}{4} = 4\frac{1}{2}$ **or** $\frac{1}{4}$ of $6 = \frac{6}{4} = 1\frac{1}{2}$; $1\frac{1}{2} \times 3 = 4\frac{1}{2}$

DECISION: If **any** "7" are circled in **Tasks 18, 19** or **20**, CONTINUE the interview.
If **only** "E7" are circled, STOP the interview. If in any doubt, CONTINUE the interview.

INTERVIEW 4 TASK 21

Ron has to drive 18.5 kilometers to meet his friend. He gets a flat tire after $\frac{1}{5}$ of the trip.

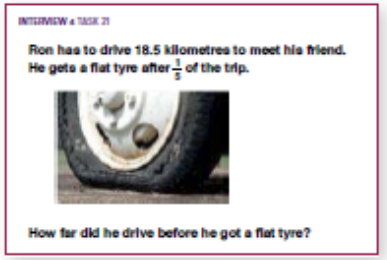
How far did he drive before he got a flat tire?

Section 9 TARGET: Early Stage 8
Advanced proportional

Do both tasks.

TASK 21

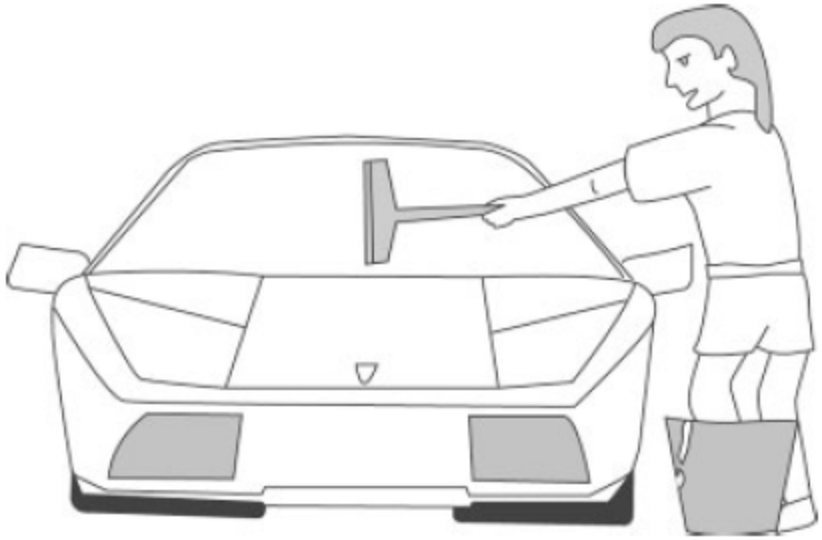
SAY: Ron has to drive 18.5 kilometers to meet his friend.
He gets a flat tire after one-fifth of the trip.
How far did he drive before he got a flat tire?



Stage	Strategy observed
7	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Attempts multiplication strategy** (Stage 6) **e.g.,** $5 \times 3 = 15$ and $5 \times 4 = 20$ so the answer is between 3 and 4 (and over 3.5)
Early 8 or higher	**Uses multiplication strategies e.g.,** - Uses decimal equivalent e.g., $\frac{1}{5} = 0.2$; $2 \times 18.5 = 37$ so $0.2 \times 18.5 = 3.7$ - Rounds and compensates e.g., $20 \div 5 = 4$; $1.5 \div 5 = 0.3$ so $18.5 \div 5 = 4 - 0.3 = 3.7$ **or** $18 \div 5 = 3$ r $3 = 3\frac{3}{5} = 3.6$; $\frac{1}{5} \times 0.5 = 0.1$; $3.6 + 0.1 = 3.7$ - Interpolates between known facts e.g., $5 \times 3 = 15$ and $5 \times 4 = 20$; 18.5 is $3.5 \div 5 = \frac{7}{10} =$ 0.7 of the way between 15 and 20, so the answer is 3.7 - Fractional multiplication, e.g., $18.5 = 18\frac{1}{2} = \frac{37}{2}$; $\frac{37}{2} \times \frac{1}{5} = \frac{37}{10} = 3\frac{7}{10}$ (= 3.7) - Doubling and halving, e.g., $18.5 \times 2 = 37$; $\frac{1}{5} \div 2 = \frac{1}{10}$; $37 \times \frac{1}{10} = 3.7$

INTERVIEW 4 TASK 22

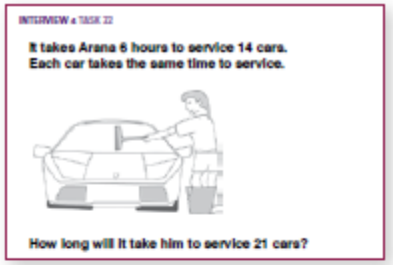
It takes Arana 6 hours to service 14 cars.
Each car takes the same time to service.



How long will it take him to service 21 cars?

TASK 22

SAY: It takes Arana 6 hours to service 14 cars.
Each car takes the same time to service.
How long will it take him to service 21 cars?



Stage	Strategy observed
7	**Cannot solve the problem** or **Uses an earlier numeracy stage** **Uses inappropriate additive strategy** (Stage 5) **e.g.,** 14 + 7 = 21; 6 + 7 = 13 **or** 14 – 8 = 6; 21 – 8 = 13 **Uses estimation** (Stage 6/7) **e.g.,** Half of 14 is 7; 6 is less than half of 14; 9 **or** 10 is less than half of 21
Early 8 or higher	**Uses a proportional approach e.g.,** - Multiplicative strategies e.g., 14 × 1.5 = 21; 6 × 1.5 = 9 - Unitising e.g., 6 cars take 14 hours so 1 car takes $\frac{6}{14}$ hour $= \frac{3}{7}$ hour; $\frac{3}{7}$ of 21 = 9 - Equivalent fractions or ratios e.g., 14:21 = 2:3 = 6:9 so the answer is 9 **or** 6:14 = 3:7 = 6:9 so the answer is 9

Stop the interview

IKAN

Individual Knowledge Assessment of Number (IKAN)

- The IKAN should be administered following the GloSS assessment.
- The IKAN contains two parts: Counting Interview (early numeracy) and Written Assessment.
- The IKAN Counting Interview (IKAN Part I) assesses students' early numeracy. This is a diagnostic interview of number where the teacher assesses the student individually. Students are being assessed on their ability to understand the forward and backward number counting sequence and their ability to recognize and sequence numbers. Part I should be used if a student scores within Strategy Stages 0-3 on the GloSS assessment and if they have never had this administered previously.
- The IKAN Written Assessment (IKAN Part II) assesses a student's ability to automatize numbers across multiple concepts (number order and sequence, basic facts, fractions, and place value). This is information a learner should know automatically and be able to recall without the use of paper and pencil. The IKAN allows teachers to assign a number knowledge stage to support a student's further growth and development. The IKAN Written Assessments can be found here. As the video advances through the questions students record their answers on the student recording sheet. Part II should be used if a student scores within Strategy Stage 4 or higher on the GloSS assessment.

Frequency of Administration

IKAN Administration: (3 times per year – BOY, MOY, EOY)

- The teacher should administer either Part I or Part II, depending on the learner's ability level.

Teacher Reminders:

1. Administer the GloSS Assessment before administering the IKAN Assessment.
2. If a student scores with Strategy Stages 0-3 on the GloSS assessment, the teacher should then administer the IKAN Part I (Counting Interview). Any other student, who has never had the Counting Interview administered, should begin with this portion of IKAN.

   If a student scores within Strategy Stage 4 or higher on the GloSS assessment and the student has shown mastery of the IKAN Counting Interview, the teacher should then administer the IKAN Part II (Written Assessment).

Individual Knowledge Assessment of Number (IKAN) – PART I
COUNTING INTERVIEW (Early Numeracy)

Name:_____

Student Counting Interview

***for students scoring within Strategy Stage 0 - 3**

Look for confusion between "teen" and "ty" numbers in questions (1), (3), (7), (8), and (9) and for "dropping back" to find the numbers after and before.

(1) Say: "Start counting from 1. Stop at 32."
Listen for student response: 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32
STUDENT MUST STOP COUNTING AT (32) AND NOT GO BEYOND

(2) Say: "Start counting from 51. Stop at 78."
Listen for student response: 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78

(3) Say: "Start counting from 1 by tens. Stop at 100."
Listen for student response: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 *STUDENT MUST STOP AT 100*

(4) Say: "Count backwards from 10. Stop at 0."
Listen for student response: 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0 *STUDENT MUST SAY "ZERO"*

(5) Say: "Count backwards from 23. Stop at 11."
Listen for student response: 23, 22, 21, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11 *STUDENT MUST STOP COUNTING AT (11) AND NOT GO BEYOND*

Action: Show each number card. For each number, ask the following three questions:

Questions:	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**	**(16)**	**(17)**
Show Card	**1**	**5**	**11**	**14**	**31**	**50**	**80**	**100**	**111**	**409**	**870**	**999**
What is this number?												
What number comes after?												
What number comes before?												

Place a check mark in the boxes above for each correct response.

******record dates when mastery was achieved FNWS/BNWS/R&S in the space below******
FNWS (#1 - 3):
BNWS (#4 & #5):
Number recognition to 1000:
"After" number recognition to 1000:
"Before" number recognition to 998:

FNWS – Forward Number Word Sequence **BNWS – Backward Number Word Sequence** **R&S – Recognition and Sequence** ***Adapted from NZMaths***

NUMBER RECOGNITION AND SEQUENCE CARDS

1	5	11	14
31	50	80	100
111	409	870	999

IKAN WRITTEN ASSESSMENT RECORDING SHEET

Individual Knowledge Assessment of Number (IKAN) Written Assessment	*This assessment is for students scoring within Strategy Stages 4 or higher on GloSS.				
	IKAN 1	IKAN 2	IKAN 3	IKAN 4	*(Circle the form used)*

Student Name: _____ **Teacher Name:** _____ **Grade Level:** _____ **Date:** _____

	Stage 4 Advanced Counting	Stage 5 Early Additive	Stage 6 Advanced Additive	Stage 7 Advanced Multiplicative	Stage 8 Advanced Proportional	
DOMAIN	**Part One**	**Part Two**	**Part Three**	**Part Four**	**Part Five**	**Domain Stage Score** *(for classroom use)*
Number Sequence and Order	1. 2.	1. 2.	1. 2.	1. 2.		
Fractions	3. 4.	3. 4.	3. 4.	3. 4.	1. 2.	
Place Value	5. 6.	5. 6.	5. 6.	5. 6.	3. 4.	
Basic Facts	7. 8.	7. 8.	7. 8.	7. 8.	5. 6. 7. 8.	
Total Correct						

Adapted from NZ Maths Numeracy Project, New Zealand Ministry of Education

Overall Number Knowledge Stage Score: _____

(Last Stage of Consecutive Mastery: Last stage where all items are correct, before student begins missing items)

THE NUMBER FRAMEWORK

At the core of numeracy development is The Number Framework. This framework was established to help teachers, parents, and students understand the requirements of the number knowledge and number strategies necessary to advance to higher levels of mathematical understanding. This framework was developed in New Zealand as a part of their Numeracy Project through the NZ Ministry of Education. In the two main sections of the framework, the distinction is made between strategy and knowledge. The Strategy section describes the mental processes students use to estimate answers and solve operational problems with numbers. The Knowledge section describes the key items of knowledge that students need to learn. It is important that students make progress in both sections of the framework. The strategy section of the framework consists of a sequence of global stages. Progress through the stages indicates an expansion in knowledge and in the range of strategies that students have available. The application of number knowledge and mental strategies is often described as 'number sense'. Strongly developed number sense leads to algebraic thinking.

The following table describes the key features of each strategy stage of the Number Framework as identified by the GloSS Assessment.

Stage 0: **Emergent**	The student is unable to consistently count a given number of objects because they lack knowledge of counting sequences and/or one-to-one correspondence.
Stage 1: **One-to-One Counting**	The student is able to count a set of objects or form sets of objects but cannot solve problems that involve joining and separating sets.
Stage 2: **Counting from One using Materials**	The student is able to count a set of objects or form sets of objects to solve simple addition and subtraction problems. The student solves problems by counting all the objects.
Stage 3: **Counting from One by Imaging (Visualizing)**	The student is able to visualize sets of objects to solve simple addition and subtraction problems. The student solves problems by counting all the objects.
Stage 4: **Advanced Counting**	The student uses counting on or counting back to solve simple addition or subtraction tasks.
Stage 5: **Early Additive Part-Whole**	The student uses a limited range of mental strategies to estimate answers and solve addition or subtraction problems. These strategies involve deriving the answer from known basic facts (e.g., doubles, fives, making tens).
Stage 6: **Advanced Additive Part-Whole** ***(Early Multiplicative Part-Whole)***	The student can estimate answers and solve addition and subtraction tasks involving whole numbers mentally by choosing appropriately from a broad range of advanced mental strategies (e.g., place value positioning, rounding and compensating or reversibility). The student uses a combination of known facts and a limited range of mental strategies to derive answers to multiplication and division problems (e.g., doubling, rounding or reversibility).
Stage 7: **Advanced Multiplicative Part-Whole**	The student is able to choose appropriately from a broad range of mental strategies to estimate answers and solve multiplication and division problems. These strategies involve partitioning one or more of the factors (e.g., place value partitioning, rounding and compensating, reversibility).
Stage 8: **Advanced Proportional Part-Whole**	The student can estimate answers and solve problems involving the multiplication and division of fractions and decimals using mental strategies. These strategies involve recognizing the effect of number size on the answer and converting decimals to fractions where appropriate. These students have strongly developed number sense and algebraic thinking.

STRATEGY STAGE DESCRIPTIONS

	Stage & Behavioral Indicator (GloSS Assessment)	
COUNTING STRATEGIES	**Stage 0** ***Emergent***	Students at the Emergent stage are unable to consistently count a given number of objects because they lack knowledge of counting sequences and/or the ability to match things in one-to-one correspondence. The student has no reliable strategy to count an unstructured collection of items. (e.g. Cannot count seven items; The student may say "1, 2, 5, 4, 3, 1, 6, 7")
	Stage 1 ***One-to-One Counting***	The One to One Counting stage is characterized by students who can count and form a set of objects up to ten but cannot solve simple problems that involve joining and separating sets, like 4 + 3. The student has a reliable strategy to count an unstructured collection of items. (e.g. Counts seven items, e.g. 1, 2, 3, 4, 5, 6, 7.)
	Stage 2 ***Counting from One using Materials***	Students at the Counting from One using Materials stage rely on counting physical materials, like their fingers. They count all the objects in both sets to find an answer to a joining or separating of sets problem. The student's most advanced strategy is counting from one using materials to solve addition problems. Given a problem involving the joining or separating of sets, the student at Stage 2 relies on counting physical materials, like their fingers or counters. They count all the objects in both sets to find an answer, as in five crayons and three more crayons. How many crayons is that altogether? (e.g. uses counters, head nods, fingers, beats, hands, etc. to combine sets of counters and counts all counters one by one.)
	Stage 3 ***Counting from One by Imaging (Visualizing)***	The Counting from One by Imaging stage is characterized by students counting all of the objects. Students at this stage are able to image visual patterns of the objects in their mind and count all of the objects from one. The student's most advanced strategy is counting from one without the use of materials to solve simple joining and separating problems. (e.g. Images 3 and 5 in his/her head, counts all the imaged items one by one.)
	Stage 4 **Advanced Counting**	Students at the Advanced Counting stage understand that the end number in a counting sequence measures the whole set and can relate the addition or subtraction of objects to the forward and backward number sequences by ones, tens, etc. The student's most advanced strategy is counting on or counting-back to solve addition or subtraction tasks. At this stage, the student understands that the end number in a counting sequence measures the whole set and can relate the addition or subtraction of objects to solve problems (e.g. Given 6 + 5, the student recognizes that 6 represents all six objects and counts on from there: 7, 8, 9, 10, 11). At this stage, the student also has the ability to skip count, such as 10, 20, 30, 40, 50, to get $50 in $10 bills. This is the beginning of grouping to solve multiplication and division problems.

NON-COUNTING STRATEGIES	**Stage 5 Early Additive Part-Whole**	At the Early Additive stage, students have begun to recognize that numbers are abstract units that can be treated simultaneously as wholes or can be partitioned and recombined. This is called part-whole thinking. The student shows any **part-whole** strategy to solve addition or subtraction problems mentally by reasoning the answer from basic facts and/or place value reasoning and knowledge. At this stage, the student is able to recognize that numbers are abstract units that can be treated simultaneously as wholes or can be partitioned and recombined. This is called part-whole thinking. A characteristic of this stage is determining answers from related known facts or acquired strategies, (e.g. finding addition answers by using doubles or making a ten). The strategies that these students commonly use can be represented in various ways, such as empty number lines, number strips, arrays, or function tables. (e.g. 9 + 7 = 10 + 6 = 16, or 7 + 7 = 14, 14 + 2 = 16, or 8 + 8 = 16)
	Stage 6 Advanced Additive Part-Whole	Students at the Advanced Additive stage are learning to choose appropriately from a repertoire of part-whole strategies. They see numbers as whole units in themselves, but also understand that "nested" within these units is a range of possibilities for subdivision and recombining. The student is able to use at least two different mental strategies to solve addition or subtraction problems with multi-digit numbers. (e.g. **62-37:** 62 - 30 = 32; 32 – 7 = 32 – 2 – 5 = 30 – 5 = 25) Simultaneously, the student's efficiency in addition and subtraction is reflected in their ability to derive multiplication answers from known facts. The students can also solve fraction problems using a combination of multiplication and addition-based reasoning. The student also applies Advanced Additive strategies with addition to problems involving multiplication, division, proportions and ratios. The strategies usually involve partitioning factors additively. (e.g. One quarter of 28 is… 14 + 14 = 28, so 14 is one half of 28, 7 + 7 = 14 so 7 is one quarter of 28)
	Stage 7 Advanced Multiplicative Part-Whole	Students at the Advanced Multiplicative stage are learning to choose appropriately from a range of part-whole strategies to solve and estimate the answers to problems involving multiplication and division. These strategies require one or more of the numbers involved in a multiplication or division to be partitioned, manipulated, then recombined. The student is able to use at least two different mental strategies to solve multiplication and division problems with whole numbers. At this stage, the student is able to choose appropriately from a range of part- whole strategies (i.e. halving and doubling, dividing by three and tripling, reversibility, and place-value partitioning) to solve and estimate the answers to problems involving multiplication and division. These strategies require one or more of the numbers involved in a multiplication or division problem to be partitioned, manipulated, and then recombined (e.g. 27 x 6, 27 = 20 + 7, 20 x 6 = 120, 7 x 6 = 42, and 120 + 42 = 162 OR 2 x 27 = 54, 3 x 54 = 162). A critical development at this stage is the use of reversibility and place value partitioning when solving division problems using multiplication (e.g. 72 ÷ 4, as 10 x 4 = 40, 72 – 40 = 32, 8 x 4 = 32, 10 + 8 = 18). Using Advanced Multiplicative Part-Whole strategies, the student is also able to solve and estimate the answers to problems with fractions, decimals, proportions and ratios using multiplication and division. (e.g. 5.5 + 6.8 = 5.5 + 7 – 0.2 = 12.3).
	Stage 8 Advanced Proportional Part-Whole	Students at the Advanced Proportional stage are learning to select from a repertoire of part-whole strategies to solve and estimate the answers to problems involving fractions, proportions, and ratios. These strategies are based on finding common factors and include strategies for the multiplication of decimals and the calculation of percentages. The student uses at least two different strategies to solve problems that involve equivalence with and between fractions, ratios and proportions. These strategies are based on finding common factors and include strategies for multiplication of decimals and calculation of percentages. The student is able to find the multiplicative relationship between quantities of two different measures. At this stage, the student is learning to solve from a repertoire of part-whole strategies to solve and estimate the answers to problems involving fractions, proportions, and ratios (e.g. Find the area of a strip of lawn that is 0.6m by 23.4m. (0.6 x 24) – (0.6 x 0.6) = 14.4 – 0.36 = 14.04).

Adapted from NZ Maths Professional Development Manual (2016)

OVERVIEW OF EXPECTATIONS

The shaded stages in the diagrams shown on the continuum shown on the next two pages are an indication of the expected levels of achievement. These expectations have been aligned to the grade-level curriculum expectations provided in the Georgia Standards of Excellence (GSE). The goal is for each student to be working within the designated strategy stage and number knowledge stage by the end of the school year for his/her grade level. Students should also be ready to work at the next stage. Individual goals should be set to ensure that learning is personalized for each and every learner. A range of achievement is normal and expected at each grade level. These expectations, and the indications of when to consider students to be "At Risk", "Cause for Concern", or "High Achievers" are a guide only. They are intended to assist principals, teachers, interventionists, and school staff in setting high, yet attainable expectations and develop teaching and learning plans for all students at each grade level in their school.

Students rated as **"At Risk"** are those who are sufficiently below expectations that their future learning in mathematics is in jeopardy. Students rated "at risk" require specialized teaching, modified classroom programs and extra support to continue their development and maintain positive attitudes. These students are in need of more intense interventions in the Multi-Tier Support System which can be found in Appendix B. The support required is likely to be beyond what can be reasonably expected from their regular classroom teacher alone.

Students rated as **"Cause for Concern"** are those who are below expectations, although at a stage where it is reasonable to expect regular classroom teachers to be able to move them to the expected stage. These students may need interventions within Tier 1 or Tier 2 of the Response to Intervention Pyramid.

"High achievers" are those students who are sufficiently above expectations and may require special teaching, modified classroom programs and extra support to continue their development and maintain positive attitudes. The support required could be beyond what can be reasonably expected from the classroom teacher alone. Their needs may be addressed through advanced content and accelerated learning plans for enrichment.

End of Year Strategy Stage Expectations

End of Grade Level	At Risk	Cause for Concern	At Expectation	Above Expectation

Kindergarten	**Stage 0** Emergent	**Stage 1** One-to-One Counting	**Stage 2** Counting from One using	**Stage 3** Counting from One by Imaging	**Stage 4** Advanced Counting	**Stage 5** Early Additive	**Stage 6** Advanced Additive	**Stage 7** Advanced Multiplicative	**Stage 8** Advanced Proportional
1st Grade	**Stage 0** Emergent	**Stage 1** One-to-One Counting	**Stage 2** Counting from One using	**Stage 3** Counting from One by Imaging	**Stage 4** Advanced Counting	**Stage 5** Early Additive	**Stage 6** Advanced Additive	**Stage 7** Advanced Multiplicative	**Stage 8** Advanced Proportional
2nd Grade	**Stage 0** Emergent	**Stage 1** One-to-One Counting	**Stage 2** Counting from One using	**Stage 3** Counting from One by Imaging	**Stage 4** Advanced Counting	**Stage 5** Early Additive **addition/ subtraction*	**Stage 6** Advanced Additive	**Stage 7** Advanced Multiplicative	**Stage 8** Advanced Proportional
3rd Grade	**Stage 0** Emergent	**Stage 1** One-to-One Counting	**Stage 2** Counting from One using	**Stage 3** Counting from One by Imaging	**Stage 4** Advanced Counting	**Stage 5** Early Additive **multiplication/ division*	**Stage 6** Advanced Additive	**Stage 7** Advanced Multiplicative	**Stage 8** Advanced Proportional
4th Grade	**Stage 0** Emergent	**Stage 1** One-to-One Counting	**Stage 2** Counting from One using	**Stage 3** Counting from One by Imaging	**Stage 4** Advanced Counting	**Stage 5** Early Additive	**Stage 6** Advanced Additive **addition/ subtraction*	**Stage 7** Advanced Multiplicative	**Stage 8** Advanced Proportional
5th Grade	**Stage 0** Emergent	**Stage 1** One-to-One Counting	**Stage 2** Counting from One using	**Stage 3** Counting from One by Imaging	**Stage 4** Advanced Counting	**Stage 5** Early Additive	**Stage 6** Advanced Additive **multiplication/ division*	**Stage 7** Advanced Multiplicative	**Stage 8** Advanced Proportional
6th Grade	**Stage 0** Emergent	**Stage 1** One-to-One Counting	**Stage 2** Counting from One using	**Stage 3** Counting from One by Imaging	**Stage 4** Advanced Counting	**Stage 5** Early Additive	**Stage 6** Advanced Additive	**Stage 7** Advanced Multiplicative	**Stage 8** Advanced Proportional
7th Grade	**Stage 0** Emergent	**Stage 1** One-to-One Counting	**Stage 2** Counting from One using	**Stage 3** Counting from One by Imaging	**Stage 4** Advanced Counting	**Stage 5** Early Additive	**Stage 6** Advanced Additive	**Stage 7** Advanced Multiplicative	**Stage 8** Advanced Proportional
8th Grade	**Stage 0** Emergent	**Stage 1** One-to-One Counting	**Stage 2** Counting from One using	**Stage 3** Counting from One by Imaging	**Stage 4** Advanced Counting	**Stage 5** Early Additive	**Stage 6** Advanced Additive	**Stage 7** Advanced Multiplicative	**Stage 8** Advanced Proportional

***By the end of 7th grade, students should have successfully completed through stage 8 of the GloSS. ***

End of Year Number Knowledge & GSE Expectations

End of Grade Level	At Risk	Cause for Concern	At Expectation	Above Expectation

	IKAN Counting Interview					IKAN Written Assessment				
Kindergarten	No Parts Mastered	FNWS/BNWS Mastered but R&S Not Mastered	FNWS/BNWS and R&S to 100 Mastered	FNWS/BNWS and R&S to 120 Mastered	FNWS/BNWS and R&S to 1000 Mastered	Stage 4 Advanced Counting	Stage 5 Early Additive	Stage 6 Advanced Additive	Stage 7 Advanced Multiplicative	Stage 8 Advanced Proportional
1st Grade	No Parts Mastered	FNWS/BNWS Mastered but R&S Not Mastered	FNWS/BNWS and R&S to 100 Mastered	FNWS/BNWS and R&S to 120 Mastered	FNWS/BNWS and R&S to 1000 Mastered	Stage 4 Advanced Counting	Stage 5 Early Additive	Stage 6 Advanced Additive	Stage 7 Advanced Multiplicative	Stage 8 Advanced Proportional
2nd Grade	No Parts Mastered	FNWS/BNWS Mastered but R&S Not Mastered	FNWS/BNWS and R&S to 100 Mastered	FNWS/BNWS and R&S to 120 Mastered	FNWS/BNWS and R&S to 1000 Mastered	Stage 4 Advanced Counting	Stage 5 Early Additive	Stage 6 Advanced Additive	Stage 7 Advanced Multiplicative	Stage 8 Advanced Proportional
3rd Grade	No Parts Mastered	FNWS/BNWS Mastered but R&S Not Mastered	FNWS/BNWS and R&S to 100 Mastered	FNWS/BNWS and R&S to 120 Mastered	FNWS/BNWS and R&S to 1000 Mastered	Stage 4 Advanced Counting	Stage 5 Early Additive	Stage 6 Advanced Additive	Stage 7 Advanced Multiplicative	Stage 8 Advanced Proportional
4th Grade	No Parts Mastered	FNWS/BNWS Mastered but R&S Not Mastered	FNWS/BNWS and R&S to 100 Mastered	FNWS/BNWS and R&S to 120 Mastered	FNWS/BNWS and R&S to 1000 Mastered	Stage 4 Advanced Counting	Stage 5 Early Additive	Stage 6 Advanced Additive	Stage 7 Advanced Multiplicative	Stage 8 Advanced Proportional
5th Grade	No Parts Mastered	FNWS/BNWS Mastered but R&S Not Mastered	FNWS/BNWS and R&S to 100 Mastered	FNWS/BNWS and R&S to 120 Mastered	FNWS/BNWS and R&S to 1000 Mastered	Stage 4 Advanced Counting	Stage 5 Early Additive	Stage 6 Advanced Additive	Stage 7 Advanced Multiplicative	Stage 8 Advanced Proportional
6th Grade	No Parts Mastered	FNWS/BNWS Mastered but R&S Not Mastered	FNWS/BNWS and R&S to 100 Mastered	FNWS/BNWS and R&S to 120 Mastered	FNWS/BNWS and R&S to 1000 Mastered	Stage 4 Advanced Counting	Stage 5 Early Additive	Stage 6 Advanced Additive	Stage 7 Advanced Multiplicative	Stage 8 Advanced Proportional
7th Grade	No Parts Mastered	FNWS/BNWS Mastered but R&S Not Mastered	FNWS/BNWS and R&S to 100 Mastered	FNWS/BNWS and R&S to 120 Mastered	FNWS/BNWS and R&S to 1000 Mastered	Stage 4 Advanced Counting	Stage 5 Early Additive	Stage 6 Advanced Additive	Stage 7 Advanced Multiplicative	Stage 8 Advanced Proportional
8th Grade	No Parts Mastered	FNWS/BNWS Mastered but R&S Not Mastered	FNWS/BNWS and R&S to 100 Mastered	FNWS/BNWS and R&S to 120 Mastered	FNWS/BNWS and R&S to 1000 Mastered	Stage 4 Advanced Counting	Stage 5 Early Additive	Stage 6 Advanced Additive	Stage 7 Advanced Multiplicative	Stage 8 Advanced Proportional

FNWS – Forward Number Word Sequence
BNWS – Backward Number Word Sequence

R&S – Number Recognition & Number Sequence

Adapted from the New Zealand Numeracy Project

NUMERACY PROJECT TASKS AND ACTIVITIES

Stage One

- The following list of activities is designed to be used for a student who scores at Stage One on the Numeracy Assessment Universal Screener.
- Teachers and interventionists should choose activities in the areas in which the student was unable to demonstrate mastery of a particular skill in order to create an "Intervention Prescription". These resources can be found here: https://nzmaths.co.nz/resource-finder/numeracy.

1:1 *Rote counting 0-10*	**1:2** *Saying the forwards and backwards number word sequence in the range 0-10, starting and ending with any number*	**1:3** *Numeral recognition (0-10)*	**1:4** *Number order: What comes before and after a given number in the range 0-10*	**1:5** *Ordering the numbers in the range 0-10*
❖ Caterpillar Legs ❖ Clapping ❖ Counting ❖ Counting as We Go ❖ Flower Petals ❖ How Many? ❖ How Many Claps? ❖ How Many Taps? ❖ Loud and Soft ❖ Number Fans ❖ Number Mat ❖ Tick Tock ❖ Where Do I Go?	❖ Before and After ❖ Birthday Cakes ❖ Caterpillar Legs ❖ Clapping ❖ Counting as We Go ❖ Feed the Elephants ❖ Flower Petals ❖ How Many Taps? ❖ Lily Pads ❖ Loud and Soft ❖ Number Fans ❖ Number Line Flips ❖ Number Mat ❖ Ten Frames ❖ Tick Tock ❖ Walk the Bridge	❖ Birthday Cakes ❖ Caterpillar Legs ❖ Feed the Elephants ❖ Flower Petals ❖ How Many Claps? ❖ How Many Taps? ❖ Lily Pads ❖ Lucky Dip ❖ Match it Up ❖ Number Fans ❖ Number Line Flips ❖ Number Mat ❖ Pipe Cleaner Numbers ❖ Ten Frames ❖ Toy Box ❖ Walk the Bridge ❖ Where Do I Go?	❖ Before and After ❖ Clapping ❖ Counting as We Go ❖ Feed the Elephants ❖ How Many Taps? ❖ Lily Pads ❖ Loud and Soft ❖ Number Fans ❖ Number Line Flips ❖ Number Mat ❖ Walk the Bridge	❖ Card Ordering ❖ Caterpillar Legs ❖ Feed the Elephants ❖ Number Line Flips ❖ Rocket – Where Will I Fit? ❖ Who is the Richest?

1:6 *Counting sets 0-10*		**1:7** *Forming sets 0-10*	**1:8** *Comparing two sets in the range 0-10*	**1:9** *Recognizing patterns to 5*
❖ Birthday Cakes ❖ Caterpillar Legs ❖ Facts to 10 ❖ Feed the Elephants ❖ Flower Petals ❖ Give Me Five ❖ How Many Cubes?	❖ How Many Taps? ❖ How Many? ❖ Match it Up ❖ Ten Frame Flashes – Empty Spaces ❖ Ten Frames Game ❖ Toy Box	❖ Birthday Cakes ❖ Caterpillar Legs ❖ Feed the Elephants ❖ Flower Petals ❖ Give Me Five ❖ How Many? ❖ Number Fans ❖ Ten Frames ❖ Toy Box	❖ Comparing Sets of Claps ❖ Comparing Small Collections ❖ Comparisons with Counters ❖ Comparisons with Fingers ❖ Ten Frame Flashes – Empty Spaces ❖ Ten Frames ❖ Who is the Richest?	❖ Adding and Subtracting with One Hand ❖ Fabulous Five ❖ Finger Patterns to 5 ❖ How Many Claps in All? ❖ Rekenrek Patterns to Five ❖ Ten Frames Game

NUMERACY PROJECT TASKS AND ACTIVITIES

Stage Two

- The following list of activities is designed to be used for a student who scores at Stage Two on the Numeracy Assessment Universal Screener.
- Teachers and interventionists should choose activities in the areas in which the student was unable to demonstrate mastery of a particular skill in order to create an "Intervention Prescription". These resources can be found here: https://nzmaths.co.nz/resource-finder/numeracy.

2:1 ***Rote counting 0-20***	***2:2*** ***Saying the forwards and backwards number word sequence in the range 0-20, starting and ending with any number***	***2:3*** ***Numeral recognition 0-20***	***2:4*** ***Number order: What comes before and after a given number in the range 0-20***	***2:5*** ***Ordering the numbers in the range 0-20***	***2:6*** ***Counting sets 0-20***
❖ Arrow Cards ❖ Clapping ❖ Counting ❖ Counting as We Go ❖ How Many Taps? ❖ Loud and Soft ❖ Number Fans ❖ Tick Tock ❖ Where Do I Go?	❖ Arrow Cards ❖ Before and After ❖ Clapping ❖ Counting ❖ Counting as We Go ❖ Flower Petals ❖ How Many Taps? ❖ Lily Pads ❖ Loud and Soft ❖ Number Fans ❖ Number Line Flips ❖ Number Mat ❖ Tick Tock ❖ Walk the Bridge	❖ Arrow Cards ❖ Birthday Cakes ❖ Caterpillar Legs ❖ Feed the Elephants ❖ Flower Petals ❖ How Many Taps? ❖ Lily Pads ❖ Lucky Dip ❖ Match it Up ❖ Number Fans ❖ Number Mat ❖ Pipe Cleaner Numbers ❖ Toy Box ❖ Walk the Bridge ❖ Where Do I Go?	❖ Before and After ❖ How Many Taps? ❖ Lily Pads ❖ Loud and Soft ❖ Number Fans ❖ Number Line Flips ❖ Number Mat ❖ Ten Frames ❖ Walk the Bridge	❖ Card Ordering ❖ Caterpillar Legs ❖ Counting as We Go ❖ Feed the Elephants ❖ How Many Taps? ❖ Rocket – Where Will I Fit? ❖ Who is the Richest?	❖ Birthday Cakes ❖ Caterpillar Legs ❖ Feed the Elephants ❖ Flower Petals ❖ How Many? ❖ How Many Cubes? ❖ How Many Taps? ❖ Match it Up ❖ Ten Frame Flashes – Empty Spaces ❖ Ten Frames ❖ Ten Frames Game ❖ Toy Box

2:7 ***Forming sets 0-20***	***2:8*** ***Comparing two numbers in the range 0-20 using number cards***	***2:9*** ***Instantly recognizing patterns to 10***	***2:10*** ***Solving addition problems to 20 by joining sets and counting all the objects***	***2:11*** ***Solving subtraction problems from 20 separating sets and counting all the objects***
❖ Birthday Cakes ❖ Caterpillar Legs ❖ Chains ❖ Feed the Elephants ❖ Flower Petals ❖ How Many? ❖ Toy Box	❖ Comparisons with Number Cards ❖ Tens Frame Flashes – Empty Spaces ❖ Ten Frames ❖ Ten Frames Game	❖ Adding and Subtracting with One Hand ❖ Both Hands ❖ Compatible Numbers to Ten ❖ Dinosaur Stomp ❖ Fabulous Fives ❖ Finger Patterns to 10 ❖ How Many Claps in All? ❖ Rekenrek Patterns to Ten ❖ Ten Frames ❖ Ten Frame Game	❖ Adding and Subtracting with Counters ❖ Adding and Subtracting with One ❖ Hand ❖ Both Hands ❖ Challenging Hands Problems ❖ Dinosaur Stomp	❖ Adding and Subtracting with Counters ❖ Both Hands ❖ Challenging Hands Problems ❖ Teens and Fingers

NUMERACY PROJECT TASKS AND ACTIVITIES

Stage Three

- The following list of activities is designed to be used for a student who scores at Stage Three on the Numeracy Assessment Universal Screener.
- Teachers and interventionists should choose activities in the areas in which the student was unable to demonstrate mastery of a particular skill in order to create an "Intervention Prescription".
- These resources can be found here: https://nzmaths.co.nz/resource-finder/numeracy.

3:1 ***Rote counting 0-50***	***3:2*** ***Saying the forwards and backwards number word sequence in the range 0-50, starting and ending with any number***	***3:3*** ***Numeral recognition 0-50***	***3:4*** ***Number order: What comes before and after a given number in the range 0-50***	***3:5*** ***Ordering the numbers in the range 0-50***	***3:6*** ***Counting up to 50 objects by grouping the objects in tens***
❖ Arrow Cards ❖ Clapping ❖ Counting ❖ Counting as We Go ❖ Knocks and Taps ❖ Loud and Soft ❖ Number Fans ❖ Tick Tock	❖ Arrow Cards ❖ Bead Strings ❖ Clapping ❖ Counting ❖ Counting as We Go ❖ Knocks and Taps ❖ Loud and Soft ❖ Number Fans ❖ Number Line Flips ❖ Tick Tock ❖ Walk the Bridge	❖ Arrow Cards ❖ Birthday Cakes ❖ Caterpillar Legs ❖ Knocks and Taps ❖ Lily Pads ❖ Lucky Dip ❖ Number Fans ❖ Number Line Flips ❖ Pipe Cleaner Numbers ❖ Ten Frames ❖ Walk the Bridge	❖ Bead Strings ❖ Clapping ❖ Knocks and Taps ❖ Lily Pads ❖ Loud and Soft ❖ Number Fans ❖ Number Line Flips ❖ Ten Frames ❖ Walk the Bridge	❖ Bead Strings ❖ Card Ordering ❖ Caterpillar Legs ❖ Rocket – Where Will I Fit? ❖ Who is the Richest?	❖ Bead Strings ❖ More Ones and Tens ❖ Ten in Tens
3:7 ***Comparing two numbers in the range 0-50 using number cards***	***3:8*** ***Instantly recognizing patterns to 10, including doubles***	***3:9*** ***Recalling facts within 5, and doubles to 10***	***3:10*** ***Solving addition problems to 20 by counting all the objects in their head***	***3:11*** ***Solving subtraction problems from 20 by counting all the objects in their head***	***3:12*** ***Solving addition and subtraction problems with decade numbers by counting tens in their head***
❖ Comparisons with Number Cards ❖ Ten Frames	❖ Adding and Subtracting with One Hand ❖ Both Hands ❖ Compatible Numbers to Ten ❖ Making Tens ❖ Rekenrek Patterns to Ten ❖ Rekenrek Reinforcing Five Grouping ❖ Rekenrek Reinforcing Ten Grouping ❖ Ten Frames	❖ Adding and Subtracting with Counters ❖ Adding and Subtracting with One Hand ❖ Imaging Many Hands ❖ Making Tens	❖ Adding and Subtracting with Counters ❖ Crossing the Five Barrier ❖ Counters in a Row ❖ Both Hands ❖ Bowl a Fact ❖ Imaging Many Hands	❖ Both Hands ❖ Bowl a Fact ❖ Crossing the Five Barrier ❖ Imaging Many Hands ❖ What's Hidden?	❖ More Ones and Tens ❖ Imaging with Tens Frames ❖ What's Hidden?

NUMERACY PROJECT TASKS AND ACTIVITIES

Stage Four

- The following list of activities is designed to be used for a student who scores at Stage Four on the Numeracy Assessment Universal Screener.
- Teachers and interventionists should choose activities in the areas in which the student was unable to demonstrate mastery of a particular skill in order to create an "Intervention Prescription". These resources can be found here: https://nzmaths.co.nz/resource-finder/numeracy.

4:1 ***Rote counting 0-100***	***4:2*** ***Saying the forwards and backwards number word sequence in the range 0-100, starting and ending with any number***	***4:3*** ***Numeral recognition 0-100***	***4:4*** ***Number order: What comes before and after a given number in the range 0-100***	***4:5*** ***Ordering the numbers in the range 0-100***	***4:6*** ***Comparing two numbers in the range 0-100 using number cards***
❖ Clapping ❖ Counting as We Go ❖ Knocks and Taps ❖ Lily Pads ❖ Number Fans ❖ Number Line Flips ❖ Tick Tock	❖ Bead Strings ❖ Clapping ❖ Counting as We Go ❖ Knocks and Taps ❖ Lily Pads ❖ Number Fans ❖ Number Line Flips	❖ Knocks and Taps ❖ Lily Pads ❖ Lucky Dip ❖ Number Fans ❖ Number Hangman ❖ Number Line Flips ❖ Pipe Cleaner Numbers ❖ Ten Frames	❖ Bead Strings ❖ Counting as We Go ❖ Knocks and Taps ❖ Lily Pads ❖ Number Fans ❖ Number Hangman ❖ Number Line Flips ❖ Ten Frames	❖ Arrow Cards ❖ Bead Strings ❖ Card Ordering ❖ Counting as We Go ❖ Rocket – Where Will I Fit? ❖ Who is the Richest?	❖ Comparisons with Number Cards ❖ Ten Frames
4:7 ***Saying the forwards and backwards number word sequences in the range 0-100 for twos, fives, and tens***	***4:8*** ***Recalling the facts up to 10, and the teen facts***	***4:9*** ***Recalling the number of 10s within decades that add to 100***	***4:10*** ***Solving addition problems to 100 by counting on in their head***	***4:11*** ***Solving subtraction problems to 100 by counting back in their head***	***4:12*** ***Solving addition and subtraction problems using groups of tens***
❖ Bead Strings ❖ Beep ❖ More Ones and Tens ❖ Number Hangman ❖ Number Strips	❖ Adding and Subtracting with Counters ❖ Bridges ❖ Building Teens ❖ Imaging Many Hands ❖ Make Ten ❖ Number Boggle ❖ "Teen" and "Ty" Numbers ❖ Teen Numbers ❖ Ten Frames ❖ Ten Frames Teen Numbers ❖ What's Hidden?	❖ Bead Strings ❖ Close to 100 ❖ Ten in Tens ❖ Zap	❖ Addition Dice ❖ Change Unknown ❖ Number Tiles ❖ Peek-a-Boo Adding ❖ Teddy Bear Walk – Addition ❖ Teddy Bear Walk – Addition & Subtraction	❖ Counting Back ❖ Teddy Bear Walk – Addition & Subtraction	❖ Adding Tens and Ones ❖ Adding Tens

4:13 ***Solving multiplication problems using skip counting by twos, fives, and tens***	***4:14*** ***Solve division problems by equal sharing in ones, twos, and fives***	***4:15*** ***Finding halves and quarters of sets, regions, and objects by sharing***	***4:16*** ***Finding simple fractions of regions***	***4:17*** ***Finding fractions of sets by sharing***
❖ Animal Arrays ❖ Array Games ❖ Blank Grids ❖ Number Strips	❖ Biscuit Boxes	❖ Fraction Animals ❖ Playdough Fractions ❖ Playdough Fractions – Feeding Animals ❖ Playdough Fractions – Same but Different	❖ Playdough Fractions ❖ Playdough Fractions – Feeding Animals ❖ Playdough Fractions – Same but Different ❖ Wafers	❖ Playdough Fractions ❖ Fair Shares

NUMERACY PROJECT TASKS AND ACTIVITIES

Stage Five

- The following list of activities is designed to be used for a student who scores at Stage Five on the Numeracy Assessment Universal Screener.
- Teachers and interventionists should choose activities in the areas in which the student was unable to demonstrate mastery of a particular skill in order to create an "Intervention Prescription".
- These resources can be found here: https://nzmaths.co.nz/resource-finder/numeracy.

5:1 ***Identify numbers in the range 0-1,000***	***5:2*** ***Say the forwards and backwards number word sequences by ones, ten, hundreds, and thousands in the range of 0-1,000,000, including finding numbers that are 10, 100, and 1,000 more or less than a given number***		***5:3*** ***Order the numbers in the range 0-1,000***	***5:4*** ***Recall the number of tens and hundreds in 100s and 1,000s***	***5:5*** ***Round three-digit whole numbers to the nearest 10 or 100***
❖ Number Fans ❖ Number Hangman ❖ Place Value Houses	❖ Counting ❖ Nudge ❖ Number Fans	❖ Number Hangman ❖ Rocket - Where will I fit? ❖ Skip-counting on the Number Line	❖ Rocket – Where Will I Fit? ❖ Squeeze - Guess my Number ❖ Who is the Richest?	❖ Close to 1000 ❖ How Many Ten Dollar Bills? ❖ Saving Hundreds ❖ Slavonic Abacus ❖ Zap	❖ Can You Guess?

5:6 ***Recall the multiples of 100 that add up to 1,000***	***5:7*** ***Identify the symbols for halves, quarters, thirds, fifths, and tenths including fractions greater than 1***	***5:8*** ***Order fractions with the same denominator***	***5:9*** ***Know the number 1, 10, and 100 before and after a given number in the range 0-1,000***	***5:10*** ***Recall addition and subtraction facts to 20***		***5:11*** ***Recall groupings within 100***
❖ Close to 1000 ❖ Tens and Ones ❖ Tens in Hundreds and More ❖ Zap	❖ Creating Fractions ❖ Fraction Pieces ❖ More Geoboard Fractions ❖ Non-unit Fractions	❖ Fraction Circles ❖ More Geoboard Fractions	❖ Number Hangman ❖ Skip-counting on the Number Line	❖ Bowl a Fact ❖ Bridges ❖ Bridges Game	❖ Comparisons ❖ Dinosaur Stomp ❖ What's Hidden?	❖ Adding in Parts ❖ Traffic Lights

5:12 ***Solve addition and subtraction problems by using doubles***	***5:13*** ***Solve addition problems by using compatible numbers***	***5:14*** ***Solve addition and subtraction problems by using place value partitioning***	***5:15*** ***Solve addition and subtraction problems by compensating with tidy numbers***	***5:16*** ***Solve multiplication problems by using repeated addition***
❖ Adding in Parts ❖ Adding Tens	❖ Compatible Numbers ❖ Three or More at a Time ❖ You Don't Need the Number	❖ Adding in Parts ❖ On and Off the Train ❖ Saving Hundreds ❖ Subtracting Tens and Ones ❖ Zap	❖ Jumping the Number Line ❖ Problems like 23 + ? = 71 ❖ Problems like ? + 29 = 81	❖ Adding Tens ❖ Animal Arrays ❖ Bowl a Fact ❖ Multidice Five ❖ Three's Company

5:17 ***Solve fives times tables by doubling and halving***	***5:18*** ***Find unit fractions of sets***	***5:19*** ***Find unit fractions of regions***	***5:20*** ***Solve division problems by sharing***
❖ Doubling and Halving ❖ Multiplication or out ❖ Twos, Fives, and Tens	❖ Creating Fractions ❖ Fraction Animals ❖ Wafers	❖ Creating Fractions ❖ Hot Stuff! ❖ Playdough Fractions ❖ Playdough Fractions – Feeding Animals ❖ Playdough Fractions – Same but Different	❖ Biscuit Boxes ❖ Introducing Decimal Fraction Place Value ❖ Pirate Crews

NUMERACY PROJECT TASKS AND ACTIVITIES

Stage Six

- The following list of activities is designed to be used for a student who scores at Stage Six on the Numeracy Assessment Universal Screener.
- Teachers and interventionists should choose activities in the areas in which the student was unable to demonstrate mastery of a particular skill in order to create an "Intervention Prescription".
- These resources can be found here: https://nzmaths.co.nz/resource-finder/numeracy.

6:1 ***Recall the multiplication and division facts for the multiples of 2,3,5, and 10***	***6:2*** ***Recall multiplication to 10 x 10, and the corresponding division facts***	***6:3*** ***Recall groupings of twos, threes, fives, and tens that are numbers to 100 and the resulting remainders***	***6:4*** ***Identify all of the numbers in the range 0-1,000,000***	***6:5*** ***Say the forwards and backwards whole number word sequences by ones, tens, hundreds, and thousands in the range of 0-1,000,000 including finding numbers that are 10, 100, and 1,000 more or less than a given number***	***6:6*** ***Order whole numbers in the range of 0-1,000,000***
❖ Beep ❖ Bowl a Fact ❖ Dividing: Thinking About Multiplication ❖ Using Calculators	❖ Beep ❖ Bowl a Fact ❖ Dividing: Thinking About Multiplication ❖ Multiplication Cards	❖ Bead Strings ❖ Beep ❖ Dividing? Think about Multiplying First ❖ Skip-counting on the Number Line	❖ Number Fans ❖ Number Hangman ❖ Place Value Houses	❖ Counting ❖ Hundreds Boards and Thousands Book ❖ Number Fans ❖ Skip-counting on the Number Line	❖ Arrow Cards ❖ Card Ordering ❖ Hundreds Boards and Thousands Book ❖ Number Fans ❖ Number Line Flips ❖ Who is the Richest?

6:7 ***Read decimals with tenths, counts forwards and backwards in tenths, order decimals with tenths***	***6:8*** ***Recall groupings within 1,000, (e.g. 240 + 760)***	***6:9*** ***Round whole numbers to the nearest 10, 100, or 1000***	***6:10*** ***Find out how many ones, tens, hundreds, and thousands are in all of a whole number***	***6:11*** ***Find the number of tenths and hundredths in decimals to two places***	***6:12*** ***Round decimals with up to two places to the nearest whole number***
❖ Card Ordering ❖ Number Fans ❖ Reading of Decimal Fractions ❖ Rocket – Where Will It Fit? ❖ Skip-counting on the Number Line ❖ Squeeze – Guess My Number ❖ Using Calculators	❖ Estimation ❖ Tens in Hundreds and More	❖ Sensible Rounding ❖ Swedish Rounding	❖ Changing Money ❖ How many Tens and Hundreds? ❖ Large Numbers Roll Over ❖ Tens in Hundreds and More ❖ Zap	❖ Linking Money and Decimal Fractions	❖ Linking Money and Decimal Fractions ❖ Sensible Rounding ❖ Swedish Rounding

6:13 ***Identify symbols for any fractions, including tenths, hundredths, thousandths, and those greater than 1***	***6:14*** ***Ask the forwards and backwards word sequences for halves, quarters, thirds, fifths, and tenths***	***6:15*** ***Order and compare unit fractions***	***6:16*** ***Rename improper fractions as mixed numbers and position improper fractions on a number line***	***6:17*** ***Solve addition and subtraction problems by going through tens***
❖ Fraction Pieces ❖ More Geoboard Fractions	❖ Card Ordering ❖ Creating Fractions ❖ Fraction Number Lines ❖ More Geoboard Fractions	❖ Bead Strings ❖ Card Ordering ❖ Who Has More Cake?	❖ Fractions Greater than 1 ❖ Trains	❖ Bridges ❖ Subtraction in Parts

6:18 ***Solve addition and subtraction problems by using place value***	***6:19*** ***Solve addition and subtraction problems by looking for compatible numbers***	***6:20*** ***Solve addition and subtraction problems by compensating with tidy numbers (including equal additions)***	***6:21*** ***Solve subtraction problems by using reversing***	***6:22*** ***Solve addition and subtraction problems using decomposition, leading to a written algorithm***
❖ Checking Addition and Subtraction by Estimation ❖ How many ten dollar notes? ❖ Make It Addition	❖ Bridges ❖ Make It Addition ❖ Make Ten	❖ Bridges ❖ Equal Additions ❖ Near Doubles ❖ When One Number Is Near a Hundred	❖ Don't Subtract - Add! ❖ Problems like 37 + ? = 79 ❖ Problems like 67 - ? = 34 ❖ Reversing Addition ❖ Subtraction to Subtraction ❖ When Subtraction becomes Addition	❖ A Standard Written Form for Addition ❖ Close to 100 ❖ Decomposition - A Written Form of Subtraction ❖ Mental or Written?
6:23 ***Choose critically from a range of mental strategies to solve addition and subtraction problems***	***6:24*** ***Derive multiplication facts from 2, 5, and 10 times tables***	***6:25*** ***Change the order of the factors to make multiplication facts***	***6:26*** ***Multiply by 10s, 100s, 1000s and other multiples of 10***	***6:27*** ***Solve multiplication and division problems by using multiplication facts***
❖ A Balancing Act ❖ Checking Addition and Subtraction by Estimation ❖ Make Ten ❖ Subtraction in Parts	❖ A Little Bit More/ A Little Bit Less ❖ Fun with Fives ❖ Loopy ❖ Number Mats and Number Fans	❖ Dividing: Thinking About Multiplication ❖ Multiplication Madness ❖ Turn Abouts	❖ Multiplying Tens ❖ Sherpa (Tensing)	❖ Dividing: Thinking About Multiplication ❖ Goesintas ❖ In and Out ❖ Long Jumps
6:28 ***Solve problems using a combination of addition, subtraction, multiplication, division mental strategies***	***6:29*** ***Find fractions of a set using multiplication and division***	***6:30*** ***Find fractions of regions***	***6:31*** ***Solve division problems involving fractions***	
❖ Bowl a Fact ❖ In and Out ❖ Loopy ❖ Mixing the methods - mental exercises for the day ❖ Multiplication Smorgasboard ❖ People's Ages	❖ Birthday cakes	❖ Fractional Blocks ❖ More Geoboard Fractions	❖ Seed Packets	

NUMERACY PROJECT TASKS AND ACTIVITIES

Stage Seven

- The following list of activities is designed to be used for a student who scores at Stage Seven on the Numeracy Assessment Universal Screener.
- Teachers and interventionists should choose activities in the areas in which the student was unable to demonstrate mastery of a particular skill in order to create an "Intervention Prescription".
- These resources can be found here: https://nzmaths.co.nz/resource-finder/numeracy.

7:1 ***Know benchmarks for converting between common fractions, decimals and percentages***	***7:2*** ***Identify and order decimals to three places***	***7:3*** ***Say the number one–thousandth, one–hundredth, one–tenth, one, and ten, etc., before and after any given number***	***7:4*** ***Round whole numbers and decimals, with up to two places, to the nearest whole number, or tenth***	***7:5*** ***Find the number of tenths, hundredths, and one–thousandths in numbers of up to three decimal places***	***7:6*** ***Use multiplication to solve addition and subtraction problems***
❖ Difficult Fractions to Percentages ❖ Equivalent Fractions, Decimals, and Percentages ❖ Estimating Percentages	❖ Bead Strings ❖ Rocket - Where will I fit? ❖ Who wins? ❖ Whole Number Rounding	❖ Hundreds Boards and Thousands Book ❖ More Reading of Decimal Fractions ❖ Nudge ❖ Number Fans ❖ Place Value Houses ❖ Skip-counting on the Number Line ❖ Tens in Hundreds and More	❖ Rounding Decimals ❖ Sensible Rounding ❖ Swedish Rounding ❖ Whole Number Rounding	❖ Measurement and Zeros	❖ Adding Sequences ❖ Average Ability ❖ Multiple Ways to Add and Subtract
7:7 ***Use a range of strategies to solve problems that involve a combination of addition, subtraction, multiplication, and division***	***7:8*** ***Solve multiplication and division problems by using place value***	***7:9*** ***Solve multiplication and division problems by using tidy numbers***	***7:10*** ***Solve multiplication and division problems by using proportional adjustment***	***7:11*** ***Solve multiplication and division problems by splitting factors***	***7:12*** ***Solve division problems that involve remainders***
❖ Divisibility Tests ❖ Nines and Threes ❖ Order of Operations ❖ Using 0	❖ Cross Products ❖ Division with Tenths ❖ Multiplication with Tenths	❖ Paper Power	❖ Cut and Paste ❖ Doubling and Halving ❖ Multiplying by 25 ❖ Proportional Packets ❖ The Equals Sign Again ❖ The Royal Cooking Lessons	❖ Little Bites at Big Multiplications and Divisions	❖ Applying Remainders ❖ Finding Remainders ❖ Introducing Decimal Fraction Place Value ❖ Pigeonholes ❖ Remainders

7:13	***7:14***	***7:15***	***7:16***	***7:17***
Solve division problems that have fractional solutions	***Solve addition and subtraction problems with integers (positive and negative numbers)***	***Solve problems that involve adding and subtracting fractions with related denominators***	***Solve problems that involve adding and subtracting decimals***	***Find fractions of regions using reunitizing, e.g. three quarters of a half is three eighths***
❖ Division with Tenths ❖ Seed Packets ❖ To Turn or Not to Turn	❖ 6 Minus 8 Does Work! ❖ Bucket balance ❖ Dollars and Bills ❖ Dropping and rising temperatures ❖ Hills and Dales	❖ Comparing Apples with Apples ❖ Estimating with Fractions	❖ Adding with Decimal Fractions ❖ Candy Bars ❖ How can Two Decimals so Ugly make one so Beautiful ❖ Introducing Decimal Fraction Place Value ❖ Mental or Written? ❖ Pipe Music with Decimals ❖ Subtraction with tenths	❖ Fractional Blocks

7:18	***7:19***	***7:20***	***7:21***	***7:22***	***7:23***
Find fractions of whole number amounts using multiplication and division	***Estimate and find percentages of whole number amounts using benchmark percentages***	***Find equivalent fractions***	***Order fractions based on their magnitude***	***Solve simple rate problems using multiplication***	***Find equivalent ratios and express them as equivalent fractions***
❖ Fractions Times Whole Numbers ❖ Whole Numbers Times Fractions	❖ Estimating Percentages ❖ 50% on is Not the Same as 50% off! ❖ GST Rules ❖ Inflation ❖ Percentage Increases & Decreases in One Step ❖ Percentages Problems in Two Steps ❖ Reverse Percentage Problems	❖ Arrow Cards ❖ Bead Strings ❖ Card Ordering ❖ Equivalent Fractions ❖ Equivalent Fractions, Decimals, and Percentages ❖ Fraction Number Lines ❖ Fractions ❖ Little Halves and Big Quarters ❖ Packets of Lollies ❖ The Same but Different	❖ Arrow Cards ❖ Bead Strings ❖ Card Ordering ❖ Fractions ❖ Little Halves and Big Quarters ❖ Packets of Lollies ❖ Super Liquorice ❖ Who Gets More? ❖ Who has more Cake?	❖ Comparing by Finding Rates ❖ Rates of Change ❖ Seed Packets	❖ Equivalent Fractions ❖ Equivalent Fractions, Decimals, and Percentages ❖ Fraction Number Lines ❖ Fractions ❖ Packets of Lollies ❖ The Same but Different ❖ Who has more Cake?

NUMERACY PROJECT TASKS AND ACTIVITIES

Stage Eight

- The following list of activities is designed to be used for a student who scores at Stage Eight on the Numeracy Assessment Universal Screener.
- Teachers and interventionists should choose activities in the areas in which the student was unable to demonstrate mastery of a particular skill in order to create an "Intervention Prescription".
- These resources can be found here: https://nzmaths.co.nz/resource-finder/numeracy.

8:1 ***Know what happens when a number is multiplied or divided by a power of 10***	***8:2*** ***Order fractions, decimals and percentages***	***8:3*** ***Identify and order decimals to three places (thousandths)***	***8:4*** ***Know benchmarks for converting between fractions, decimals, and percentages***	***8:5*** ***Know simple powers of numbers to 10***	***8:6*** ***Identify greatest common factors and least common multiples***
❖ Digits on the Move ❖ Zap	❖ Bead Strings ❖ Equivalent Fractions, Decimals, and Percentages ❖ Feeding Pets ❖ Little halves and Big Quarters ❖ Packets of Lollies ❖ Rocket - Where will I fit? ❖ Who Gets More? ❖ Who has more Cake? ❖ Who wins?	❖ Packets of Lollies ❖ Rocket - Where will I fit?	❖ Difficult Fractions to Percentages ❖ Estimating Percentages	❖ Zap	❖ Adding and Subtracting Fractions ❖ Highest Common Factors ❖ Lowest Common Multiples

8:7 ***Solve problems by finding the factors of numbers***	***8:8*** ***Solve problems by finding the prime factors of numbers***	***8:9*** ***Solve problems that involve exponents and square roots***	***8:10*** ***Solve problems that involve adding and subtracting fractions***	***8:11*** ***Solve multiplication and division problems that involve fractions***	***8:12*** ***Solve multiplication and division problems that involve decimals***
❖ Little Bites at Big Multiplications and Divisions	❖ Factor Trees ❖ Prime Numbers ❖ Recurring and Terminating Decimal Fractions ❖ Systematic Prime Factorization ❖ The Sieve of Eratosthenes	❖ Cubes and Cube Roots ❖ Locating Square Roots ❖ Powerful Numbers ❖ Square Roots ❖ Squaring ❖ Writing Very Large Numbers	❖ Adding and Subtracting Fractions ❖ Comparing Apples with Apples	❖ A Fraction Times a Fraction ❖ Brmmm! Brmmm! ❖ Dividing Fractions ❖ Estimation in Decimal Multiplication & Division Problems ❖ Fractions Times Whole Numbers ❖ Harder Division of Fractions ❖ When Big Gets Smaller ❖ When Small Gets Bigger ❖ Whole Numbers Times Fractions	❖ Division with Tenths ❖ Folding fractions and decimals ❖ Multiplication of Decimal Fractions ❖ Multiplication with Tenths ❖ Reversals with Multiplication and Division

8:13 ***Estimate and find percentages of whole number and decimal amounts***	***8:14*** ***Solve problems involving integers***	***8:15*** ***Solve problems involving ratios***	***8:16*** ***Solve problems involving rates***	***8:17*** ***Use rounding to check the answers to multiplication and division problems***
❖ Estimating Percentages	❖ 6 Minus 8 Does Work! ❖ Bucket balance ❖ Dollars and Bills ❖ Dropping and rising temperatures ❖ Hills and Dales	❖ Combining Proportions ❖ Extending Hotshots ❖ Extending Mixing Colors ❖ Hot Shots ❖ Inverse Ratios ❖ Mixing Colors ❖ Ratios with Whole Numbers ❖ Sharing in Ratios ❖ Tree-mendous Measuring	❖ Comparing by Finding Rates ❖ Rates of Change	❖ Checking Division by Estimation ❖ Checking Multiplication by Estimation ❖ Estimation in Decimal Multiplication & Division Problems ❖ Sensible Rounding