Global Strategy Stage (GloSS): Form E

The answers to these tasks determine which global strategy a student uses. A description of the stages follows the questions.

Materials Needed.

1   15 counters.

2   Two A5 sized cards to cover counters and isolate questions.

Questions

Task (1):   Count 9 objects.

Actions: Provide the students with access to a pile of counters of the same color.

Say: Please get 9 counters for me.

Decision: If the student could not count 9 items rate the student as Stage 0 on operational strategies. Stop the interview. Otherwise proceed to Task (2).

Task (2):   Work out 2 + 5 on materials.

Actions: Place two counters in the student's hand. Place five counters in his/her other hand. Close the student's hands to encourage imaging, but allow the student to open their hands if they find imaging difficult.

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

Decision: If the student is unable to solve 2 + 5 correctly, rate them at Stage 1 and stop the interview. If the student solves 2 + 5 correctly by physically counting all the counters, rate her/him at Stage 2 and stop the interview. Otherwise proceed to Task (3).

Task (3):   Find 8 + 6.

Actions: 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?

Decision: If the student solves the task by counting on (e.g. 8, 9, 10, 11, 12, 13, 14) rate them at stage 4 for addition and subtraction. If he/she uses a part-whole method (e.g. 8 + 6 = 10 + 4), they may be at stage 5 or higher for addition and subtraction.

In both cases continue with Tasks (4) and (5) to see if their strategies are consistent across the multiplication and division, and ratios and proportions domains.

If the student could not solve the problem, rate them at Stage 3 for addition and subtraction and use Tasks (4) and (5) to see if they solve all problems through counting ones.

Task (4): How many cars are in each row? (sweeping one row with your finger)
How many rows are there? (pointing to each row one by one)
How many cars are there altogether?

Action: Read the problem aloud.

Decision: If the student counts in ones (1,2,3, … 28), rate them at stage 3 for multiplication and division. If he/she skip counts (e.g. 2, 4, 6,…28 or 4, 8, 12,…28), rate them at stage 4 for multiplication and division. If he/she uses additive strategies (e.g. 7 + 7 =14, 14 + 14 = 28), they are at stage 5 or higher for multiplication and division.

Task (5): You have 20 jellybeans to put on the cake.
How many jellybeans go in each quarter of the cake?

Actions: Show the problem to the student and read it aloud. Provide 20 counters (jellybeans) and allow the student access to these counters if necessary.
Read the problem aloud

Decision: If the student equally shares the beans by ones, either physically or by imaging, rate them at stage 4 for ratios and proportions. Stop the interview.

If he/she uses additive partitioning (e.g. 10 + 10 = 20 so 5 + 5 + 5 + 5 = 20), they are at stage 5 or higher for ratios and proportions.

If a student uses additive strategies on one or more of tasks, (3), (4), or (5), continue onto Task (6), (7) and (8) to see if he/she uses more complex strategies. Be prepared to cease the interview if these tasks prove too difficult.

Task (6): There are 143 calves on the farm. 89 of the calves are in the paddock.
How many calves are in the shed?

Task (7): There are 9 packets. Each packet has 13 doughnuts.
How many doughnuts is that altogether?

Task (8): Here is $18. Your share is two thirds ($\frac{2}{3}$).
How much money do you get?

Actions: Show the student the problem.
Read the problem aloud.

Decision: Task (6) assesses the addition and subtraction domain.

Task (7) assesses the multiplication and division domain.

Task (8) assesses the ratios and proportions domain.

If the student uses part-whole strategies to solve Task (6) correctly, rate them at stage 6 in the addition and subtraction domain. If they do not solve the problem correctly using part-whole strategies, rate them at stage 5.

Refer to page 4 to see examples of stage 6 strategies for Tasks (7) and (8).
Otherwise rate the student at stage 5 for the matching domains and cease.

Adapted from New Zealand Numeracy Project

Continue to Tasks (9), (10), and (11) if the student shows stage 6 strategies on one or more of the previous tasks.

Task (9):   The electrician has 5.33 meters of cable. He uses 2.9 meters on a job.
How much cable is left?

Task (10):   The builder has 280 posts. She needs eight posts to build a pen.
How many pens can she build?

Task (11):   In a big Sweet Tarts packet there are 24 reds and 16 greens.
A smaller packet with the same mix has a total of 10 Sweet Tarts.
How many green Sweet Tarts are in the smaller packet?

Actions: Show the problem to the student.
Read the problem aloud.

Decision: Task (9) assesses the addition and subtraction domain.

Task (10) assesses the multiplication and division domain.

Task (11) assesses the ratios and proportions domain.

Refer to page 4 to find whether the student's responses reflect stage 7 strategies. Otherwise rate the student at stage 6 on the appropriate domains.

Continue to Tasks (12) and (13) if the student shows stage 7 strategies on one or more of the previous tasks.

Task (12):   The hair stylist has 4.5 liters of tint left. Each tint uses 0.375 liters.
How many tints can the hair stylist do?

Task (13):   28 of the students in Rooms 8 and 9 have blue eyes. The other 42 students have brown eyes.
What percentage of the students has blue eyes?

Actions: Show the problem to the student.
Read the problem aloud.

Decision: Task (12) assesses the multiplication and division domain.

Task (13) assesses the ratios and proportions domain.

Refer to page 4 to find whether the student's responses reflect stage 8 strategies. Otherwise, rate the student at stage 7 on the appropriate domains.

Adapted from New Zealand Numeracy Project

Typical Solutions

	Stage & Behavioral Indicator
0	**Emergent** Cannot count eight items, e.g. 1, 2, 3, 4, 6, 9, 8, ...
1	**One to One Counting** Counts eight items, e.g. 1, 2, 3, 4, 5, 6, 7, 8.
2	**Counting from One on Materials** Task 2: Opens hands, looks at sets of 2 and 5 counters, and counts all counters one by one.
3	**Counting from One by Imaging** Task 2: Images 2 and 5 in his/her head, counts all the imaged items one by one.
4	**Advanced Counting** Task (3): 9, 10, 11, 12, 13, 14 in his/her head or with the aid of fingers to track the count of six. Task (4): 2, 4, 6, 8, …, 28, or 4, 8, 9, 10, 11, …, 28, or 5, 10, 15, 20, 21, 22, 23, 28. Task (5): One by one sharing of counters onto the cake.
5	**Early Additive Part-Whole Thinking** Task (3): 8 + 6 = 10 + 4 = 14, or 6 + 6 = 12, 12 + 2 = 14, or 7 + 7 = 14. Task (4): 4 + 4 = 8, 8 + 8 = 16, 16 + 8 = 24, 24 + 4 = 28, or 7 + 7 = 14, 14 + 14 =28 Task (5): $\frac{1}{2}$ of 20 is 10, $\frac{1}{2}$ of 10 is 5.
6	**Advanced Additive Part-Whole Thinking** Task (6): 143 – 90 = 53, 53 + 1 = 54, or 89 + 1 + 10 + 43 = 143, or 143 – 80 = 63, 63 – 9 = 54 Task (7): 9 × 10 = 90, 9 × 3 = 27, 90 + 27 = 117, or 10 × 13 = 130, 130 – 13 = 117 Task (8): $\frac{1}{3}$ of 18 is 6 (by division), 2 × 6 = 12, or 18 – 6 = 12.

7	**Advanced Multiplicative Part-Whole**
	Task (9): 5.33 – 3.0 = 2.33, 2.33 + 0.1 = 2.43, or 2.9 + 0.1 + 2.33 = 5.33,
	      or 5.33 – 2.0 = 3.33, 3.33 – 0.9 = 2.43
	Task (10): 280 ÷ 8 as 240 ÷ 8 = 30, 40 ÷ 8 = 5, 30 + 5 = 35,
	      or 280 ÷ 2 = 140, 140 ÷ 2 = 70, 70 ÷ 2 = 35 (repeated halving)
	Task (11): 24:16 is 40 in total, 40 in total is four times10, 24:16 = 24 ÷ 4:16 ÷ 4 = 6:4 so 4 black, or 24:16 is $\frac{2}{5}$ green (dividing 16 and 40 by 8), $\frac{2}{5} = \frac{4}{10}$.

8	**Advanced Proportional Part-Whole** Task (12): 3.750 ÷ 0.375 = 10, 4.5 – 3.750 = 0.750, 0.750 ÷ 0.375 = 2, 10 + 2 = 12, or 0.375 = $\frac{3}{8}$, 4.5 = $4\frac{1}{2}$, $4\frac{1}{2} = \frac{36}{8}$, $\frac{36}{8} \div \frac{3}{8} = 12$. Task (13): 28 + 42 = 70, $\frac{28}{70} = \frac{4}{10} = 40\%$, or 28:42 = 4:6 = 40:60.

Adapted from New Zealand Numeracy Project

Description of Strategy Stages

	Stage & Behavioral Indicator
0	**Emergent** The student has no reliable strategy to count an unstructured collection of items.
1	**One to One Counting** The student has a reliable strategy to count an unstructured collection of items.
2	**Counting from One on Materials** The student's most advanced strategy is counting from one on materials to solve addition and multiplication problems.
3	**Counting from One by Imaging** The student's most advanced strategy is counting from one without the use of materials to solve addition and multiplication problems.
4	**Advanced Counting** The student's most advanced strategy is counting-on, or counting-back to solve addition or subtraction tasks, skip counting to solve multiplication tasks, and equal sharing by ones or repeated skip counting to solve division and fraction problems.
5	**Early Additive Part-Whole Thinking** The student shows simple part-whole strategies to solve addition, subtraction, multiplication, division or fraction problems mentally by reasoning the answer from basic facts and/or place value knowledge.
6	**Advanced Additive Part-Whole Thinking** The student is able to use at least two different mental strategies to solve addition or subtraction problems with multi-digit whole numbers, to derive multiplication answers from known facts, and use multiplication and division to find a fraction of a set.
7	**Advanced Multiplicative Part-Whole** The student is able to use at least two different mental strategies to solve addition and subtraction problems with related fractions and decimals, multiplication and division problems with whole numbers, and ratio and proportion involving equivalent fractions or replication of a ratio/rate.
8	**Advanced Proportional Part-Whole** The student uses at least two different strategies to solve problems that involve equivalence relationships with and between fractions, ratios and proportions.

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Task 2   E→AC?

$$2 + 5 = \square$$

Task 3   AC-EA?

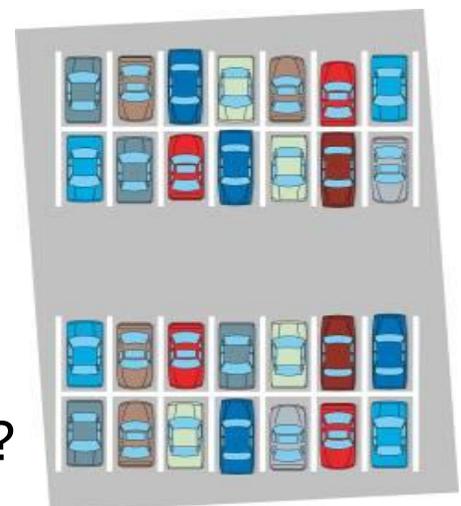$$8 + 6 = \square$$

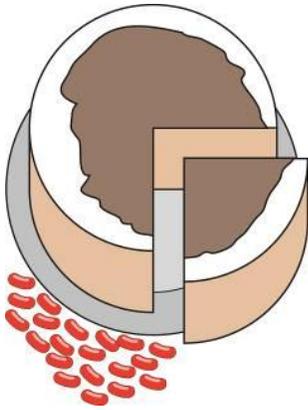Task 4   1-1→EA?

How many cars are in each row?

How many rows are there?

How many cars are there altogether?

Adapted from New Zealand Numeracy Project

You have 20 jellybeans to put on the cake.

How many jellybeans go on each quarter of the cake?

There are 143 calves on the farm. Eighty-nine, 89, of the calves are in the paddock.

How many calves are in the shed?

There are nine packets. Each packet has 13 doughnuts. How many doughnuts is that altogether?

Adapted from New Zealand Numeracy Project
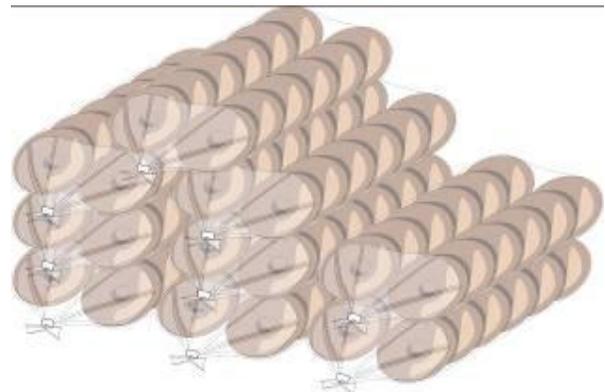
Here is $18. Your share is two thirds ($\frac{2}{3}$).

How much money do you get?

Task 9   AA→AM?
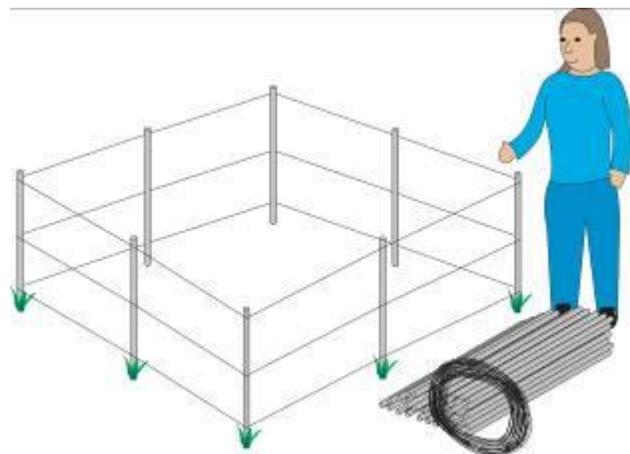
The electrician has 5.33 meters of cable. He uses 2.9 meters on a job. How much cable is left?
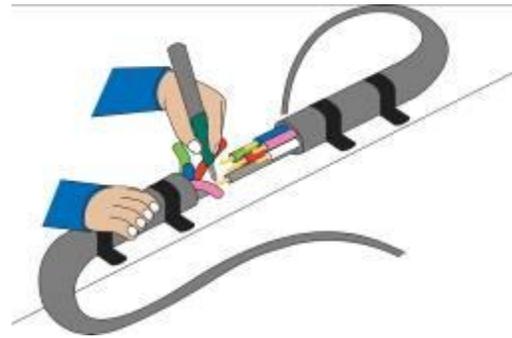
Task 10   AA→AM?

The builder has 280 posts.

She needs 8 posts to build a pen.

How many pens can she build?

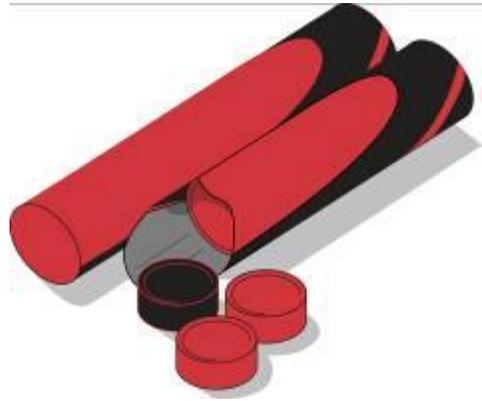*Adapted from New Zealand Numeracy Project*

Task 11   AA→AM?

In a big Sweet Tarts packet there are 24 reds and 16 greens.
A smaller packet with the same mix has a total of 10 Sweet Tarts.
How many green Sweet Tarts are in the smaller packet?

Task 12   AM→AP?

The hair stylist has
4.5 liters of tint left.
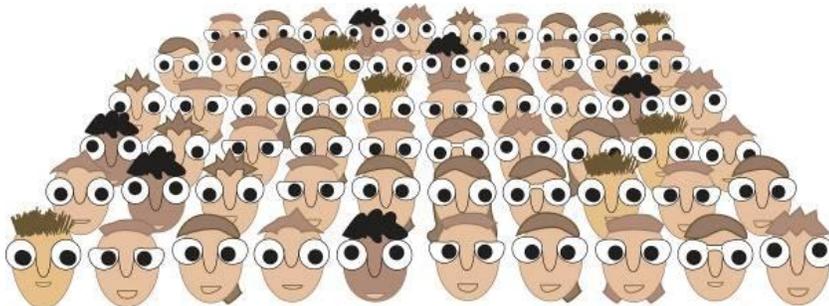Each tint uses
0.375 liters (375 mL).

How many tints can the
hair stylist do?

Task 13   AA→AP?

28 of the students in Rooms 8 and 9 have blue eyes.

The other 42 students have brown eyes.

What percentage of the students have blue eyes?

Adapted from New Zealand Numeracy Project