

Global Strategy Stage (GloSS): Form H (Revised)

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

Materials Needed.

- 1 20 counters.
- 2 Two A5 sized cards to cover counters and isolate questions.

Questions

Task (1): Count 7 objects.

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

Say: Please get 7 counters for me.

Decision: If the student could not count 7 items, rate the student as Stage 0 on operational strategies. Stop the interview. Otherwise, proceed to Task (2).

Task (2): Work out $3 + 5$ on materials.

Actions: Place three 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 3 counters. Here are another 5 counters. How many counters do you have altogether?

Decision: If the student is unable to solve $3 + 5$ correctly, rate them at Stage 1 and stop the interview. If the student solves $3 + 5$ 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 $9 + 7$.

Actions: 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?

Decision: If the student solves the task by counting on (e.g. 10, 11, 12, 13, 14, 15, 16), rate them at stage 4 for addition and subtraction. If he/she uses a part-whole method (e.g. $9+1+6=10+6$ or $7+7+2=14+2$), they may be 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 houses are in each row? (Trace across a row with your finger)

How many rows are there? (Pointing to the rows)

How many houses are there altogether?

Actions: Show the problem card to the student.

Read the cards in turn, clarifying the meaning of words where necessary.

Decision: If the student counts in ones (1,2,3, ... 18), rate them at stage 3 for multiplication and division. If he/she skip counts (e.g. 2, 4, 6,...18 or 3, 6, 9,...18), rate them at stage 4 for multiplication and division. If he/she uses additive strategies (e.g. $6 + 6 = 12$, $12 + 6 = 18$),

they are at stage 5 or higher for multiplication and division. If he/she knows $3 \times 6 = 18$, then Task (7) will determine their multiplication and division stage.

Task (5): Here are sixteen caterpillars.

One quarter of the caterpillars go on each leaf of the swan plant.

How many caterpillars are on each leaf?

Actions: Show the problem card to the student. Provide 16 counters (caterpillars) if necessary. Read the cards in turn, clarifying the meaning of words where necessary.

Decision: If the student equally shares the caterpillars by ones, either physically or by imaging, rate them at stage 4 for ratios and proportions. Cease the interview. If he/she uses additive partitioning (e.g. $4 + 4 = 8$ so $4 + 4 + 4 + 4 = 16$), they are at stage 5 or higher for ratios and proportions.

Where 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 stop the interview if these tasks prove too difficult.

Task (6): There are 62 cookies in the jar. Your friends eat 37 of the cookies. How many cookies are there left?

Task (7): You need 42 carrots to fill six bags.
How many carrots do you need to fill twelve bags?

Task (8): There are twenty-four students in the class.
Three eighths of them are boys.
How many boys is that?

Actions: Show the student each problem.
Read the cards in turn, clarifying the meaning of words where necessary.

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 is use part-whole strategies to solve Task (6) 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 stop the interview.

Continue to Tasks (9), (10) and (11). If the student shows stage 6 strategies on one or more of the previous tasks, be prepared to stop a task if it proves too difficult.

Task (9): On a hot day the tomato plants absorbed 1.5 litres of water.
On a cold day they absorbed 0.885 litres (885 mL).
How much more water did the plants absorb on the hot day than the cold day?

Task (10): Ben needs to buy 114 cans of soft drink for the volley ball club party?
How many 6-packs should he get?

Task (11): The dog ate three eighths of an 800 gram can of dog food. The cat ate three-quarters of a 400 gram can of cat food. Which ate more, the dog or the cat?

Actions: Show the problem to the student.
Read the cards in turn, clarifying the meaning of words where necessary.

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.

Task (12): Each basketball net takes 0.38 metres of cloth to make.
You have 9.6 metres of cloth.
Is that enough cloth to make 25 nets?

Task (13): You can buy 8 avocados for \$6.00.
How many avocados will you get for \$15.00?

Actions: Show the problem to the student.
Read the cards in turn, clarifying the meaning of words where necessary.

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.

Typical Solutions

Stage & Behavioral Indicator	
0	Emergent Cannot count seven items, e.g. 1, 2, 5, 4, 3 6, 7, 10
1	One to One Counting Counts seven items, e.g. 1, 2, 3, 4, 5, 6, 7.
2	Counting from One on Materials Task 2: Opens hands, looks at sets of 3 and 5 counters, and counts all counters one by one.
3	Counting from One by Imaging Task 2: Images 3 and 5 in his/her head, counts all the imaged items one by one.
4	Advanced Counting Task (3): 10, 11, 12, 13, 14, 15, 16 in his/her head or with the aid of fingers to track the count of seven. Task (4): 2, 4, 6, 8, ... 18 or 3, 6, 9, 10, 11, 12, ..., 18, Task (5): One by one equal sharing of caterpillars between the swan plants
5	Early Additive Part-Whole Thinking Task (3): $9 + 7 = 10 + 6 = 16$, or $7 + 7 = 14$, $14 + 2 = 16$, or $8 + 8 = 16$. Task (4): $3 + 3 = 6$, $6 + 6 = 12$, $12 + 6 = 18$, or $6 + 6 = 12$, $12 + 6 = 18$ or $6 + 3 = 9$, $9 + 9 = 18$ Task (5): $\frac{1}{2}$ of 16 is 8, $\frac{1}{2}$ of 8 is 4.
6	Advanced Additive Part-Whole Thinking Task (6): $62 - 30 = 32$; $32 - 7 = 25$ or $32 - 2 - 5 = 25$ or $62 - 40 = 22$; $22 + 3 = 25$ or $37 + 3 = 40$; $40 + 22 = 62$; $3 + 22 = 25$. Task (7): Twice as many; double 42 is 84 or $42 \div 6 = 7$, $12 \times 7 = 84$. Task (8): $\frac{1}{8}$ of 24 is 3 (by division), $3 \times 3 = 9$, or $\frac{4}{8}$ of 24 = 12 so $\frac{3}{8}$ of 24 = $12 - 3 = 9$.
7	Advanced Multiplicative Part-Whole Task (9): $1.5 - 0.885 = 0.5 + (1 - 0.885) = 0.5 + 0.115 = 0.615 \ell$ or $0.885 + 0.015 = 0.9$; $0.9 + 0.1 = 1$; $0.015 + 0.1 + 0.5 = 0.615 \ell$ Task (10): $10 \times 6 = 60$; $20 \times 6 = 120$; 120 less one 6 pack is 114 so 19 packs or $114 \div 6 = 19$; $60 \div 3 = 20$ less one 3 pack is 57 so 19 packs or $12 \times 12 = 144 = 24 \times 6$ (packs); $144 - 114 = 30$ (5 packs); $24 - 5 = 19$ packs. Task (11): $\frac{3}{8}$ is half of $\frac{3}{4}$ so $\frac{3}{4} \times 400 = \frac{3}{8} \times 800$ so the cat and dog ate the same, or $\frac{3}{8} \times 800 = 300$ and $\frac{3}{4} \times 400 = 300$.
8	Advanced Proportional Part-Whole Task (12): $.38 \times 100$ nets = 38 meters; $\frac{1}{4}$ of 36 = 9; $\frac{1}{4}$ of 2 = .5 so 9.5m enough to make 25 nets. or $.38 \times 10 = 3.8$; $.38 \times 20 = 7.6$; $\frac{1}{2}$ of 3.8 = $.38 \times 5 = 1.9$; $7.5 + 2.0$ (tidying) = 9.5m. Task (13): $8 : 6 = 4 : 3$; $4 \times 5 : 3 \times 5 = 20 : 15$ so 20 Avocadoes or $8 : 6 = 16 : 12$; $8 : 6 = 4 : 3$ so $8 : 6 = (16 + 4) : (12 + 3) = 20 : 15$

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.

Task 2

E→AC?

$$3 + 5 = \square$$

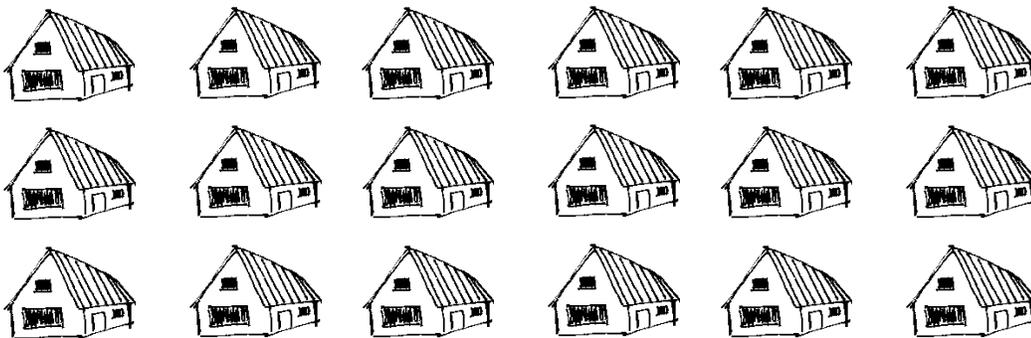
Task 3

AC-EA?

$$9 + 7 = \square$$

Task 4

1-1→EA?



How many houses are in each row?

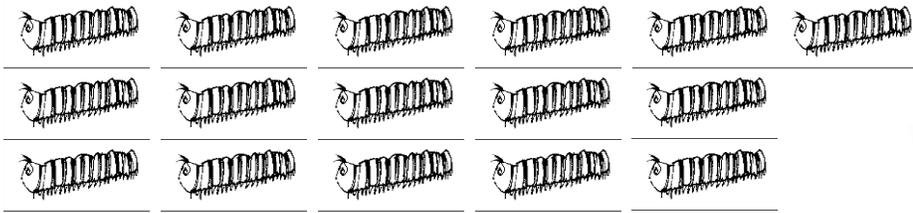
How many rows are there?

How many houses are there altogether?

Task 5

1-1→EA

You have 16 monarch caterpillars.



Here are sixteen caterpillars.

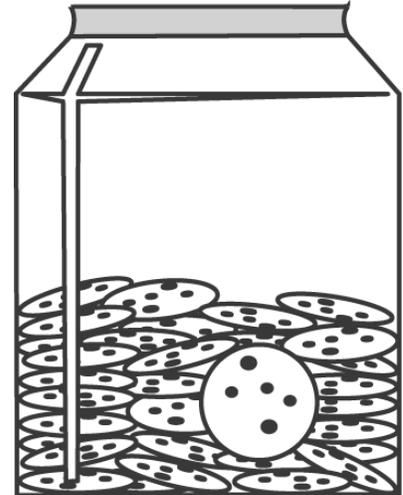
One quarter of the caterpillars go on each leaf of the swan plant.

How many caterpillars are on each leaf?

Task 6

EA→AA?

There are 62 cookies in the jar. Your friends eat 37 of the cookies.



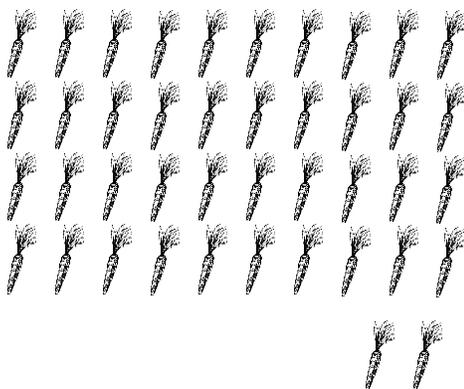
How many cookies are there left?

Task 7

EA→AA?

You need 42 carrots to fill six bags.

How many carrots do you need to fill twelve bags?



Task 8

EA→AA?

There are twenty-four students in the class.
Three eighths of them are boys.
How many boys is that?

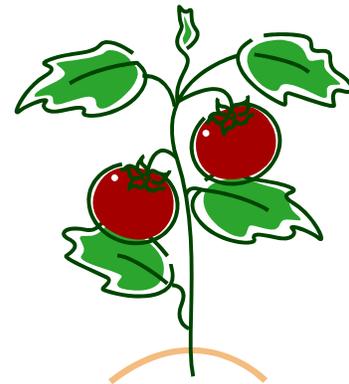


Task 9

AA→AM?

On a hot day the tomato plants absorbed 1.5 liters of water.

On a cold day they absorbed 0.885 liters (mL).



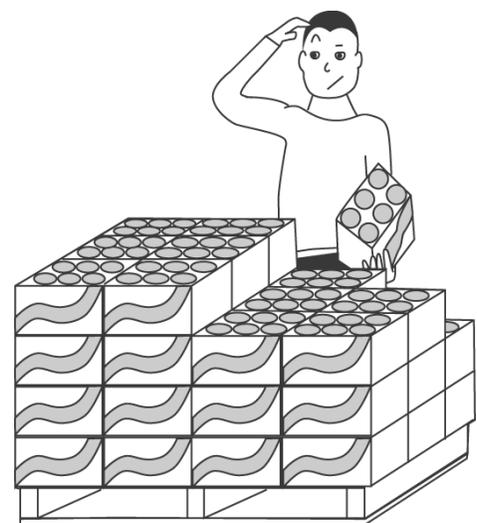
How much more water did the plants absorb on the hot day than the cold day?

Task 10

AA→AM?

Ben needs to buy 114 cans of soft drink for the volley ball club party?

How many 6-packs should he get?



Task 11

The dog ate three eighths of a 800 gram can of dog food.

The cat ate three quarters of a 400 gram can of cat food.

Which ate more, the dog or the cat?



AA→AM?



Task 12

Each basketball net takes 0.38 meters of cloth to make.

You have 9.6 meters of cloth.

Is that enough to make 25 nets?



AM→AP?

Task 13

You can buy 8 avocados for \$6.00

How many avocados will you get for \$15.00?



AA→AP?