Problem Solving:

Our first goal is to have students put something on their page that indicates they started. If you do not start you can never finish.

Starting Points ideally make sense from the information in the problem. So it may be a picture, some numbers or words that indicate the student has processed some or all of the problem.

Encourage students who are stuck to talk out the problem, then act it out. Be sure they understand the situation.
Encourage the reluctant starter to tell you anything they can about the problem and then draw or write down whatever they told you. If might be as simple as draw me twelve bracelets…

Once there is a starting point we look for evidence that there was an attempt to **explain their thinking or choice of actions.** The student makes an attempt to be sure you can understand what he or she decided to do.

Is there a **solution or answer** and it is evident. If not did they explain that they did not solve the problem. The answer should clearly be the answer to the question, so if there are units like cm or kg we know. In this problem we are looking for 4 more to indicate they realize they were looking for the missing addend.

Grade 2 Mathematics: Is there evidence of what youwould consider to be appropriate mathematical reasoning for the time of year.. Is the student performing where we hope. This will change over the course of the year. We will watch for growth or signs of transfer or application of prior learnings.

As the problem solving progresses we will watch for students who organize their data and bring that forward as a model for the class to consider. Organizing your data often helps you to see patterns that uncover the mathematics.

The examples that follow came from April Brown's Grade 2 class this November.
It is a missing addend situation. We would hope that by Christmas Grade twos were developing mental strategies for solving this kind of problem and preparing to work with two digit numbers in these kind of situations.

She plans to have some of the students demonstrate their solutions to the class. She plans to have them solve similar problems over the next few weeks with the goal that soon this will not actually be a problem for many of her students because they will recognize how to solve it and do so quickly in their heads.

Lisa is making bracelets. She has already made 8 bracelets.

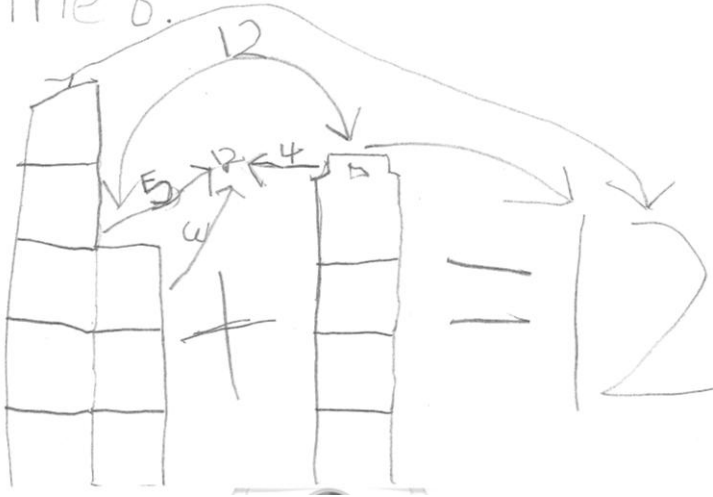She needs to make 12 all together so she can give one to each

of her cousins.

How many more bracelets does she need to make?

Show how you solved this problem. Use pictures, numbers and

Words.

$$6 + 6 = 12$$
$$4 + 2 = 6$$

4 more to adde onto the 8.

Starting Point:
Used doubles for 12

Explained her Thinking:
Broke one f the sixes again to see that 8 and 4 also make ten.

Her picture of the blocks shows eight made of 5 and 3. Two from the 4 make the 8 into two fives or ten.

It would appear from her arrows that 5 + 3 + 4 and 8 + 4 both equal twelve.

While we can not be sure without talking with her and hearing her explain it would seem she used mathematical reasoning to unpack the problem. She knew she needed to start from 12.

Answer: Yes, It is clear

Grade 2 Mathematics?
Yes

Feedback:
Will she still use doubles if the number of bracelets is 17 or 23 rather than 12?

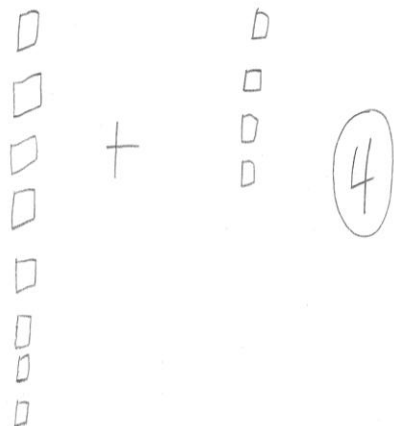Her similar problem is still about twelve.
Can she build a word problem that is like this one?
Does she understand what the mathematical structure of this problem is?

Student 2

Words.

I couted four more and got to 12. 8+4=12

□
□
□
□   □   +   □
□   □
□   □   (4)
□
□
□

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ryhan is bakingk cook
he already baked 7 cookie
and but he needs 13.

Students Problem 2

It would appear he understood the situation and moved directly into a strategy to solve.

Explained Thinking:
Yes, he/she used a counting on strategy to solve the problem. The picture confirms that it works but we are not sure if it was needed. The equation also confirms the solution but again we are not sure it was a too for thinking or just a way to finish.

Answer:
No he/she has not actually answered the question. How many more. The teacher must ask him what his answer is. We assumin the 4 circled may be his response.

Grade 2 Mathematics:
Counting on is a strategy we hope students bring from Grade one. Over the course of the year we need to see it disappear as strategies like bridging to ten make this a mental activity. Counting on in single counts is not a mental strategy.

Feedback
His/her similar problem suggests he/she understood the problem. However we need to see what question he/she ends the problem with to be sure. If it is How many more does he need to make? Then we might ask him/her to show the solution so as to be ready to mark the solutions of classmates as this would be a good follow up problem.

Student 3

Words.

$8+2+2=12$

I did it with my ten fingers.
I new that I had ten finger, So I aded on 4.
She needed to make 4 more bracelts.

$8+4=12$
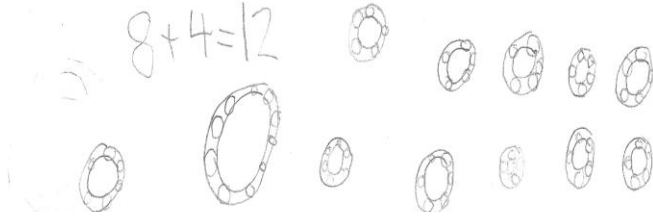
Starting Point:
She has started with an equation. The equation does make sense to the problem. When asked, she had a great deal of difficulty explaining how she made the fingers work. It is possible but she was not confident when she tried to re explain.

Explained her thinking:
She has tried to but her strategy is not clear. Did she see 8 plus 2 in her fingers and then know she needed to go two more? She was not able to explain.

Grade 2 Mathematics?
Yes.

Answer: Yes she has given the answer and clearly knows it answers the problem.

Her picture seems to have no value as a thinking tool. It is likely drawn because she somehow thinks she needs to. There is no evidence of a strategy used to make sense of the problem with the picture.

Feedback: She needs to be given a similar problem with different numbers. What will she try if the question were 15 bracelets and she has 7 so far…Let's see what her strategy is if the numbers are less finger friendly.
How about he needs 17 bracelets and she has 11 so far.

Bank of Problems Created in the Gr. 2 Assessment Day

1. Sam has a collection of 28 cars. He would like to have 39 cars. How many more cars does he need?
(a simpler version) Sam has a collection of 8 cars. He would like to have 19 cars. How many more cars does he need?

3. Bill has read to page 35. His mom wants him to turn off his light at page 52. How many more pages can he read?

4. Jack has 27 cars in his collector box. 40 cars can fit into his collector box. Jack wants to fill the box. How many cars does Jack need to fill the box?

5. There are 35 parking spaces at school. 27 of the parking spaces are used. How many parking spaces are left?

6. Santa has made 23 toy dolls. There are 35 girls on his list that want dolls. How many does Santa still need to make?

7. Bob had eleven marbles. He lost three marbles. How many marbles does he have left?

8. Sarah found 14 seashells. She found 7 shells under a rock. She found some more shells in the water. How many did she find in the water?

9. Betty is making cupcakes for her class. She has made 12 cupcakes so far. There are 18 kids in her class. How many cupcakes does she still need to make?

10. The Grade Two's are playing a soccer game against the Grade Three's. The Grade Three's have scored 7 goals. The Grade Two's have scored 9 goals. Which team won the game? How many fewer goals did the losing team score?

11. Students in Mark's class won 6 tickets to the Blades game. Students in Tommy's class won 3 tickets. How many more students won tickets in Mark's class compared to Tommy's class?

12. I measured my sunflower today. It is 34 blocks tall. Jamie said her sunflower was 29 blocks tall. How much shorter is Jamie's sunflower?

13. The Red Team's soccer balls weigh 25 kg altogether. The Blue Teams soccer balls weigh 8 kg altogether. How much lighter are the Blue Teams soccer balls?

14. The hockey team has 24 hockey sticks for their players. 17 kids have come and taken their sticks to start playing the game. How many players still need to get their sticks?