Deluxe Birthday Cake

For my birthday I received some wonderful birthday cakes! There was one cake that had many different flavors all in one cake! The cake was 4/12 chocolate, and the rest was carrot and yellow cake, but not in equal amounts.

What could this deluxe birthday cake look like? How do you know?

Remember to use as much math language as you can.

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Grade Levels 3 - 5

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Context

The students in my class had just helped me celebrate my birthday with three different birthday cakes they had baked. We had also begun work with fractions.

What This Task Accomplishes

Through looking at several different responses to this task, the children were able to see how fractional parts can look different and still be described by the same fraction. For example, when looking at two different sizes of cake, 1/12 may be equal to different quantities, yet still represent 1/12 of a whole. Another thing the children recognized was that 4/12 could be ANY four same-sized pieces of the cake and be correct. This task also seemed to be a natural connection to equivalent fractions for many children.

What the Student Will Do

Most children used graph paper to draw the cake. Due to the vagueness of the task, many children thought that different patterns of flavors, (i.e., checkerboard vs. striped), made the cake 'look" different. Although this is true, it complicates the problem immensely. Some children also attempted to divide the cake into an endless number of fractions...sixteenths, hundredths, etc.

If you use this task, you may possibly want to rephrase it to constrain the problem. The benefit of leaving it as is, is that it allows for many more decisions

Time Required for Task

One or two, 45-minute periods

Interdisciplinary Links

This type of task could be easily linked to units dealing with design and building concepts using different fraction amounts for different materials or colors. You could encourage children to

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create their own fraction riddles based on a pattern, picture, pizza, etc. that they have made.

Teaching Tips

As mentioned earlier, you may want to reword the problem for some children. Be prepared to help some children think about strategies that they could use to organize their work for a more complicated solution.

Suggested Materials

- Graph paper
- Rulers
- Fraction factory pieces
- Markers

Possible Solutions

Assuming that children were looking for the different fractional parts of each flavor, there are six different cakes.

Benchmark Descriptors

Novice
There is no evidence of understanding the task, no solution. The student does seem to make an initial attempt, but abandons it immediately.

Apprentice
Although this student did not complete the task, it is evident that s/he is using mathematical reasoning. The strategy used would lead this student to a solution if s/he had continued.

Practitioner
This student shows a broad understanding of the task. S/he employs mathematical reasoning, explains his/her solution, and uses appropriate representation with a color-coded key.

Expert
This student solves the task and clearly identifies his/her strategy using math language. His/her explanation is clear, and the reader does not need to infer how decisions were made.

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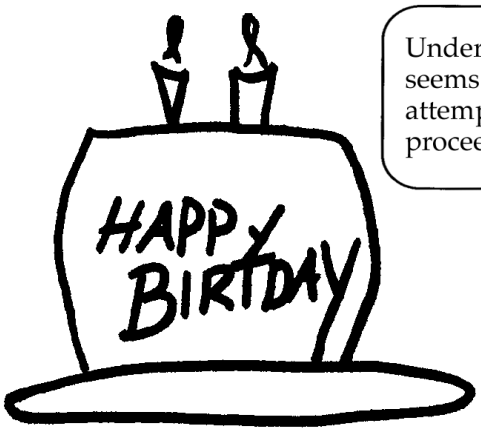
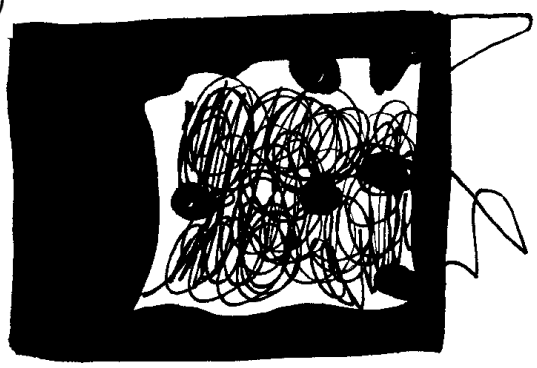
Novice



Understanding: The student seems to make some sort of attempt here but is unable to proceed toward a solution.



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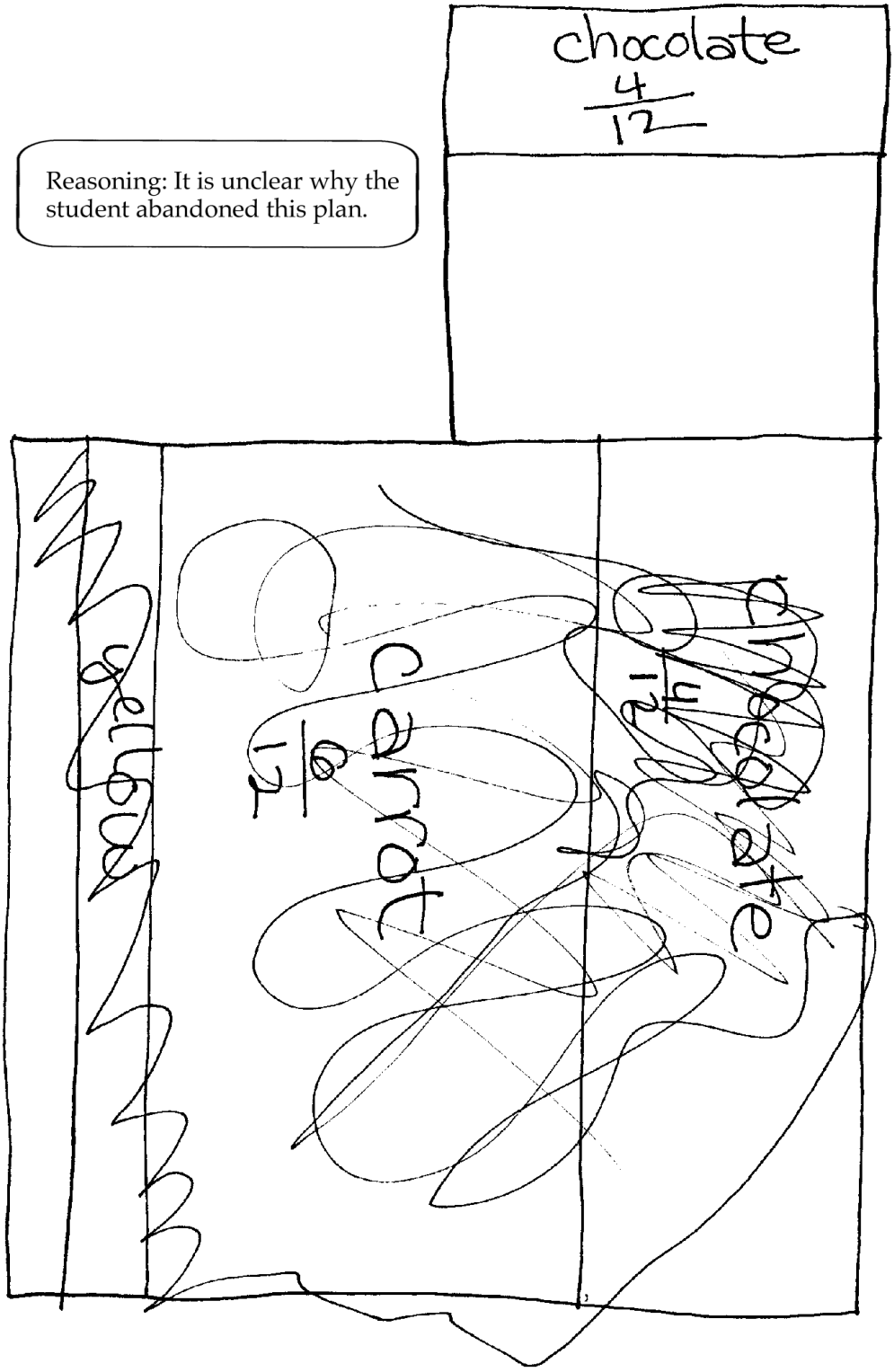
Apprentice



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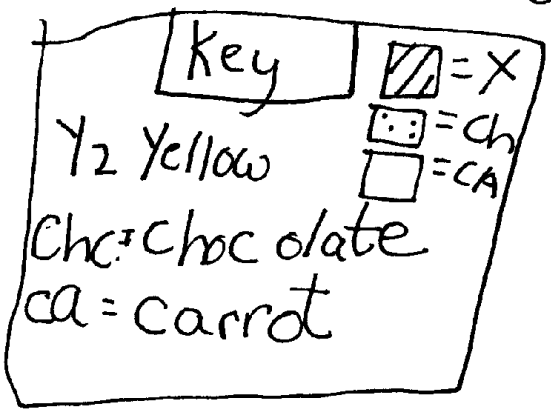
Practitioner

I took 12 sqares of graph paper so the cake looked like 1/4 was cut into 12ths, Then I added all the nubers that eaquled 8 because in every cake there has to be 4 12ths of ch cake. I added fo 8 because 4+8=17 I did not add 4+4 because 4 is the same as 9. There are only 6 ways to solve it.



Communication: The student's diagram clarifies this narrative as the student attempts to clearly explain reasoning.

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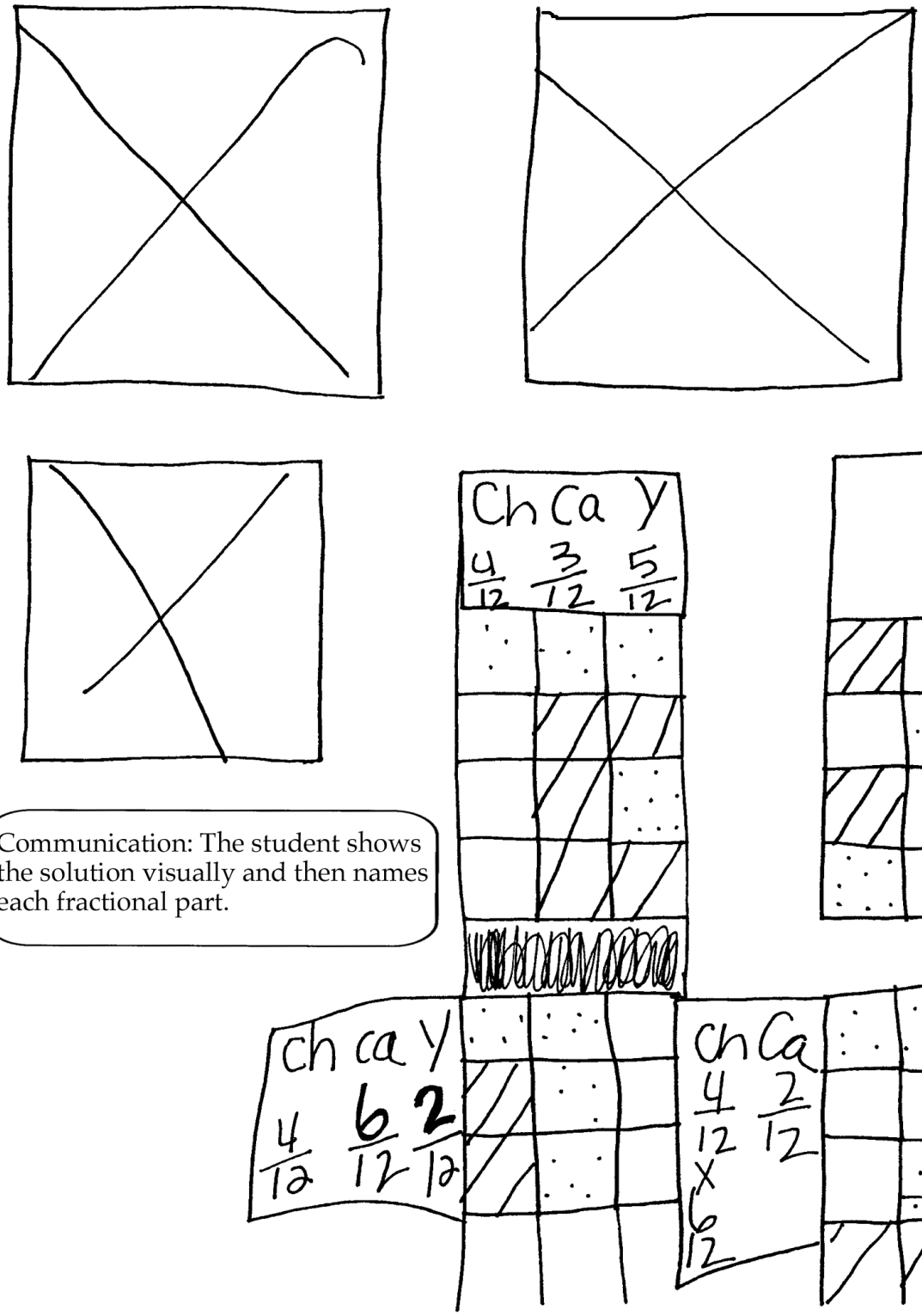
Practitioner



Communication: The student shows the solution visually and then names each fractional part.

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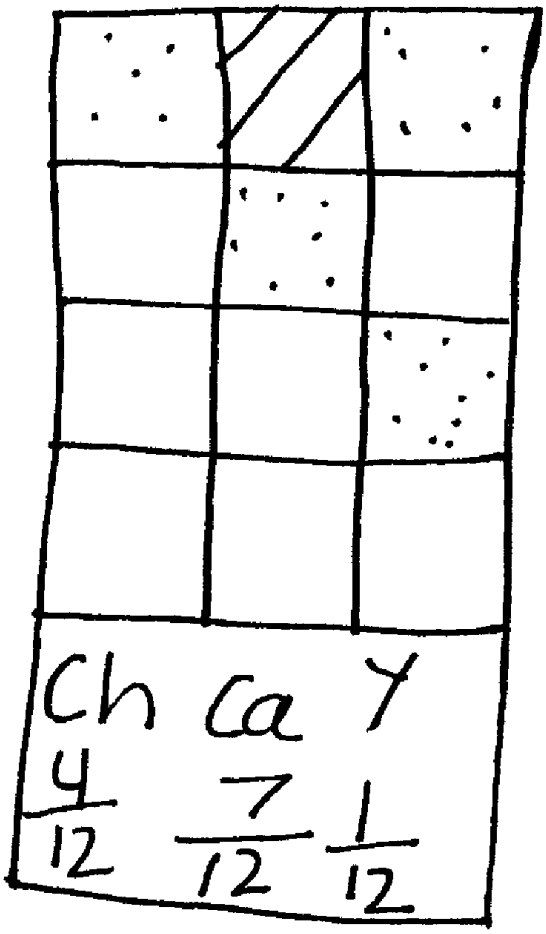
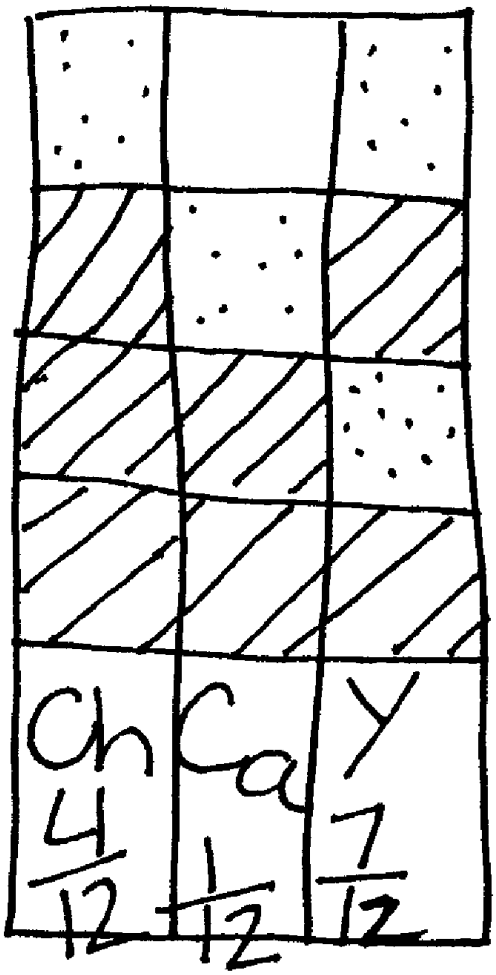
Practitioner





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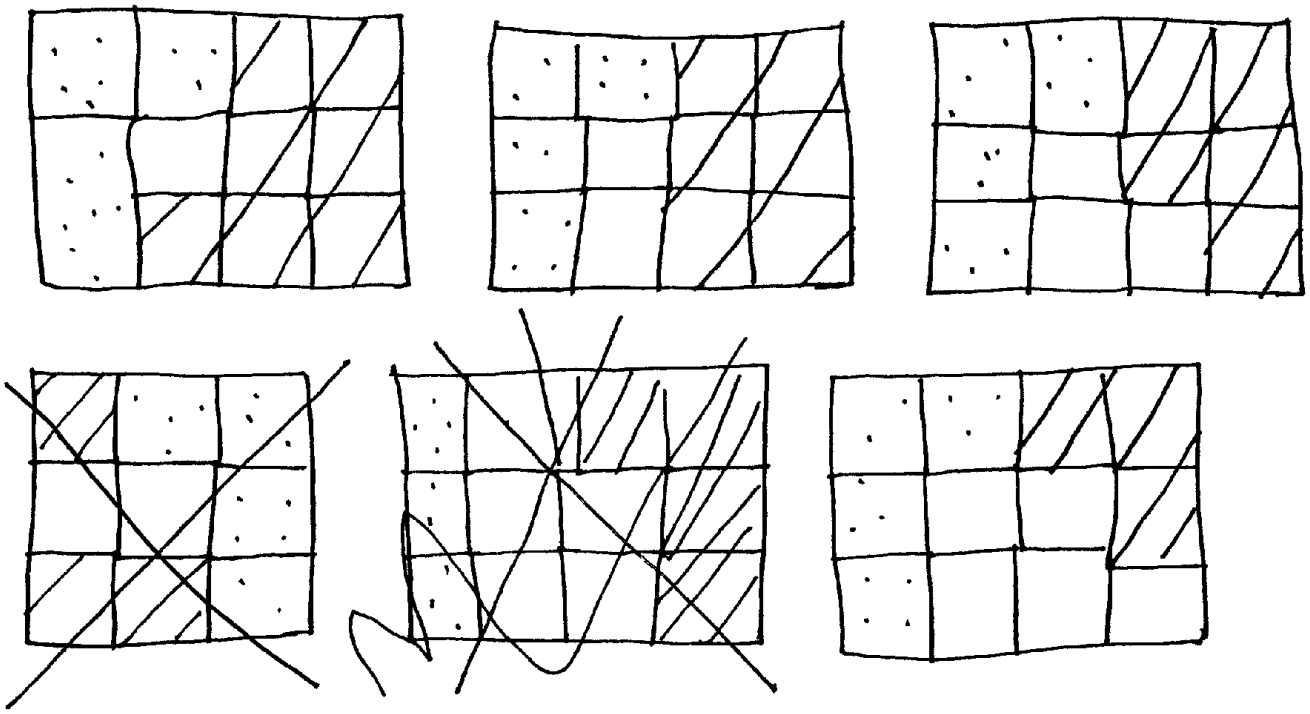
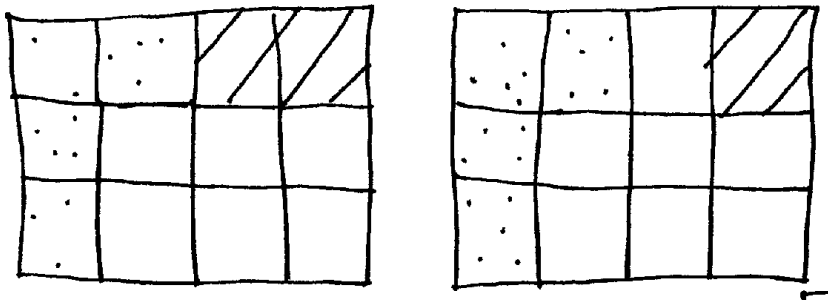
Expert

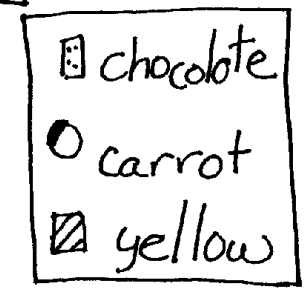


Reasoning: The student rejects incorrect solutions showing correct reasoning.



Strategy: The student arrives at multiple solutions in a very methodical way.

Communication: The student creates accurate and appropriate representations.



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