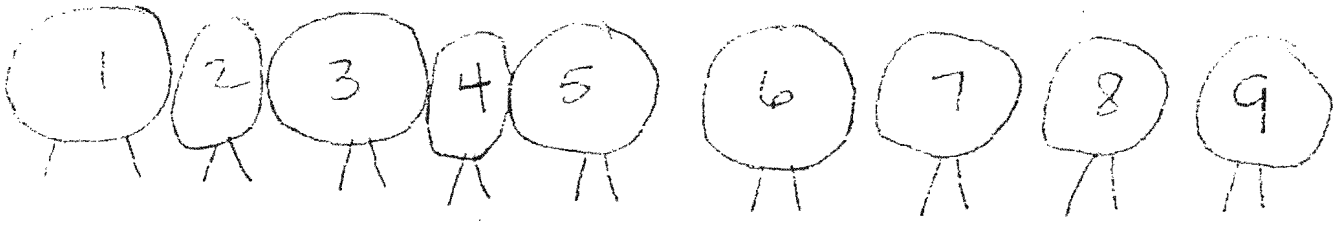
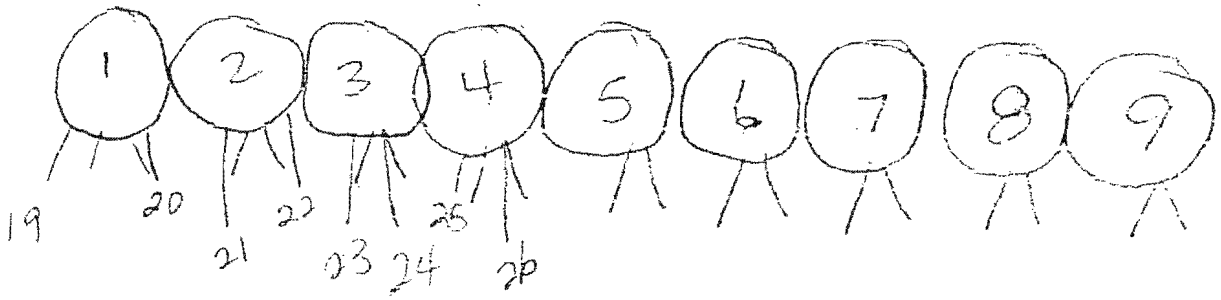
Grandpa's Farm

Fred and Patti go to Grandpa's farm. In the barnyard there are ducks and sheep. Fred and Patti see 9 animals all together. The animals have a total of 26 legs. How many ducks and how many sheep are there in the barnyard?



9 animals

all with 2 legs $9 \times 2 = 18$ legs



from 18 legs I added 2 to each animal to get to 26

that makes 4 sheep and 5 ducks

$4 + 5 = 9$ animals

$4 \times 4 = 16$

$5 \times 2 = 10$

$16 + 10 = 26$ legs

Scores and Commentary: Sample #1: Grandpa's Farm

Making Sense of the Problem	Representing and Solving the Problem	Communicating Reasoning	Reflecting and Accuracy	Reflecting Evaluating
5	5	4	4	4

Making Sense of the Problem: The translation of the key concepts (animal bodies and legs, the criteria for ducks and sheep) is thoroughly developed with the graphics combined with the number sentences, but lacks enhancements.

Representing and Solving the Problem: The process of beginning with the number of bodies, each having two legs; finding the total number of legs at that point and continuing to add two legs to each body. An accounting of all of the legs is insightful and elegant in its simplicity..

Communicating and Reasoning: The shown work follows a clear and coherent path and leads to a clearly identified solution. Communication would have been enhanced by a key explaining the representation.

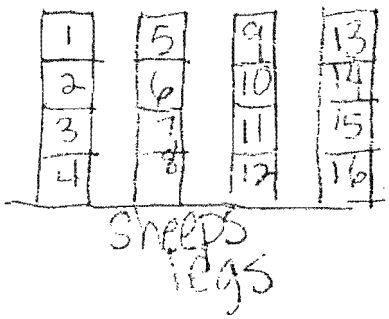
Accuracy: 4 sheep and 5 ducks is correct, mathematically justifiable and the solution to the task is supported by the work.

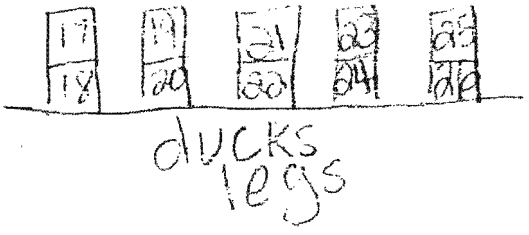
Reflecting and Evaluating: The reflection begins with the solution and justifies the total number of animals and the total number of legs as stated in the task. This is a complete review, the solution is stated within the context of the task and nothing more.

First I got 26 cubes because to figure out how many legs there is. I need 26 cubes.

then I put them together by 2 and 4 I tried diphrent things. next I fand that there were 4 sheep and 5 ducks and thar are 9 altogether.

Last I drew The square on the paper to prove that I'm rite





Scores and Commentary: Sample #2: Grandpa's Farm

Making Sense of the Problem	Representing and Solving the Problem	Communicating Reasoning	Accuracy	Reflecting and Evaluating
4	4	3	4	3

Making Sense of the Problem: The translation of the key concepts (animal bodies and and groups of legs, the criteria for ducks and sheep) is complete with the graphics combined with the prose. (Notice the limited use of prose).

Representing and Solving the Problem: A description of starting with 26 cubes for the number of legs, and then saying "I tried diphrent things" but did not record what they were and "put them together by 2 and 4" is only a partial representation of the process used to find the number of sheep and ducks. BUT----The graphic representation of the process shows what they ended with and that they did apply the required concepts

Communicating and Reasoning: The path connecting the interpretation, through the process, to the solution is not complete. The student did not clearly lead to the correct answer; it is partially displayed.

Accuracy: 4 sheep and 5 ducks is correct, mathematically justifiable and the solution to the task is supported by the work.

Reflecting and Evaluating: The "squares" show the total number of legs as well as using the criteria for sheep and ducks to end with the correct number of animals. This is not a complete review. Reasonableness was reviewed but was only partially justified.

1) Ducks = 2 legs
2) sheep = 4 legs

5 sheep = 20
4 x 5 = 20

3 ducks = 6
2 x 3 = 6

$$\begin{array}{r} 20 \\ +\ 6 \\ \hline 26 \end{array}$$

1st I figured out how many they each have. Then I multiplied the number of legs.

4 x 5 = 20
2 x 3 = 6

$$\begin{array}{r} 20 \\ +\ 6 \\ \hline 26 \text{ legs} \end{array}$$

Scores and Commentary: Sample #3: Grandpa's Farm

Making Sense of the Problem	Representing and Solving the Problem	Communicating Reasoning	and Accuracy	Reflecting Evaluating
3	3	3	2	3

Making Sense of the Problem: The translation of the key concepts (animal legs, the criteria for ducks and sheep) is partially complete due to not addressing the total number of animals.

Representing and Solving the Problem: The process begins with a clarification of what s/he understands about the number of legs on each animal in the barnyard. Because the student moves immediately to recording one combination of the animals that meets the total number of legs required and doesn't show the pictures, models, diagrams, or symbols used to arrive at the combination, this makes the representation of the strategy partially complete

Communicating and Reasoning: The student started with a solution but did not explain how they came to that solution. The path begins with the understanding of legs on each animal and then jumps to the identified solution, which then connects to the reflection. The reader can follow the faulty path, but there is not a clear pat to a solution.

Accuracy: 5 sheep and 3 ducks is an incorrect solution to the task. They only considered part of the problem but calculation they did was correct leading to an incomplete solution. (This is a good example of when an opportunity to hand the work back to the student would be a good move on the teacher's part.)

Reflecting and Evaluating: The review starts with "1st — I figured" and involves only a review of the calculations needed for the single combination identified as the solution. The fact that they never address the total of nine animals would imply they never looked back to review the conditions of the task.