Bug Watching

I went bug watching after school every day for a week.

On Monday I saw 1 bug.
On Tuesday I saw 2 bugs.
On Wednesday I saw 3 bugs...
On Friday, after I went bug watching I said, "Wow! It's a pattern!"

How many bugs did I see that week?

Use pictures, numbers and words to solve this problem.

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Grade Levels Pre-K-2

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Context

We spend a lot of time in the primary grades working on patterns. We have the children look for patterns in their everyday world and we frequently hear, "It's a pattern!" We also do daily calendar activities and sometimes have difficulty assessing the calendar concepts outside specific calendar lessons. Teachers in our district have asked for a performance task that assesses patterning. This task was presented to both first and second grades for assessing this concept. The second graders created more sophisticated patterns.

What This Task Accomplishes

This task assesses the child's ability to process information that is not specified in the wording of the task. The child's concept of a school week will be demonstrated, as well as the sequence of the days of the week. This task also requires the use of patterning to solve the problem. It shows how a child perceives a pattern. Since the pattern is only begun with one, two, three, it shows which children can create more than one pattern (repeating, growing and/or building). In addition, this task shows a child's number sense and computational skills in totaling the number of bugs seen all week.

What the Student Will Do

Most students drew the bugs seen and added numbers to compute the total. Others chose to make a chart for the five days of the school week. Some children looked at the calendar to verify the days of the week. The children were encouraged to find more than one solution if possible. Some were able to find two or three ways, and others could not see past their original strategy.

Time Required for Task

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30 minutes

Interdisciplinary Links

This task works well with a science unit on insects or nature. The object watched for can be changed to fit into any unit (animals, stars, trees, litter, friends, etc.).

Teaching Tips

Set the stage for this activity with the students. Talk about going on a bug watch to look for bugs. Where would you go and what would you do? In this case you are not going to catch the bugs, you are only looking at them. You will write down the number of bugs you see every day after school for a week.

Remind the children that they have to think of the pattern that begins one, two, three. The next numbers in the pattern are not given.

Encourage the children to explain how they solved the problem. If the child is able to express him/herself in writing, then the child is to do so independently and the paper stands by itself. If the child is unable to write his/her own thinking, then the teacher (or other "scribe") must elicit the child's thinking or explanation without coaching.

I found it necessary to ask some of the children to explain their patterns because some created patterns that were valid, but not apparent to me at first.

Suggested Materials

- Paper
- Pencils
- Class calendar

Possible Solutions

There are several possible solutions depending on the pattern. Here are just a few:

Pattern	Total # of Bugs
1,2,3,5,8,12,21 (growing)	19
1,2,3,4,5,6,7,8,9 ... (growing)	15
1,2,3 1,2 1,2,3... (repeating)	9
1,2,3 2,1 2,3 2,1 2,3	9
1,2,3 2,2,3 3,2,3 4... (building)	10
1,2,3 2,5 2,7 2,9 2... (building)	13

Novice

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A Novice does not understand the problem and will not be able to incorporate implied information. There may be, however, some mathematical reasoning and number sense. The Novice may draw bugs for only three days, and will not be able to discern a pattern.

Apprentice
An Apprentice may demonstrate an understanding of the days of the week, some addition skills and some patterning. An Apprentice will not have a strategy that will lead to a full solution, for instance, not understanding that a total of all bugs seen needs to be determined through addition.

Practitioner
A Practitioner will fully understand the problem and arrive at one accurate solution. They are able to explain their strategy, pattern and solution, and communicate the problem well on paper.

Expert
An Expert will be able to solve the problem more than one way, and verify their results. More complex reasoning will be demonstrated in the patterns created and the organization of the data. An Expert will make mathematically relevant observations, such as identifying that the difference in the total depends on how the pattern is interpreted.

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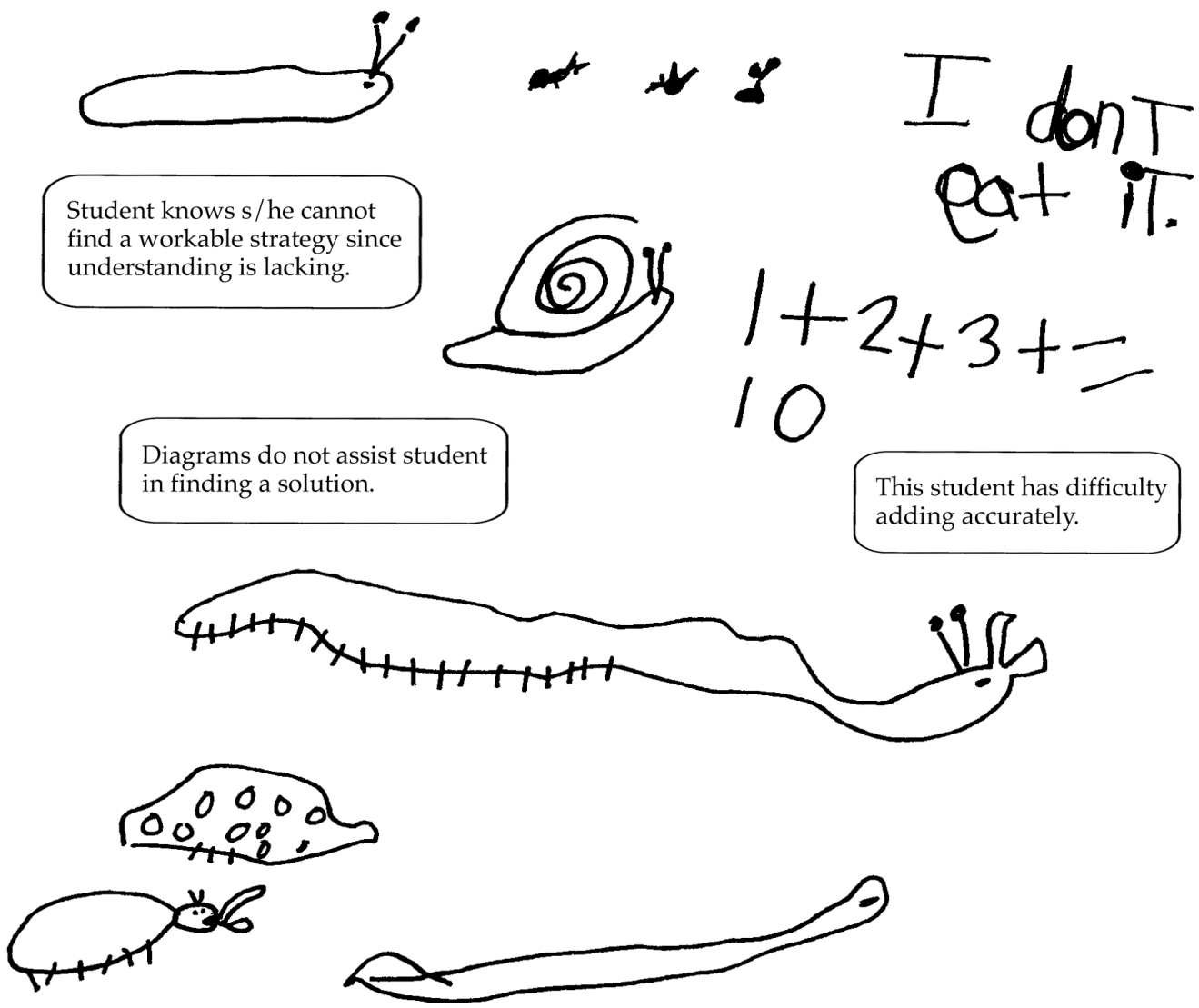
Novice



Student knows s/he cannot find a workable strategy since understanding is lacking.

Diagrams do not assist student in finding a solution.

This student has difficulty adding accurately.

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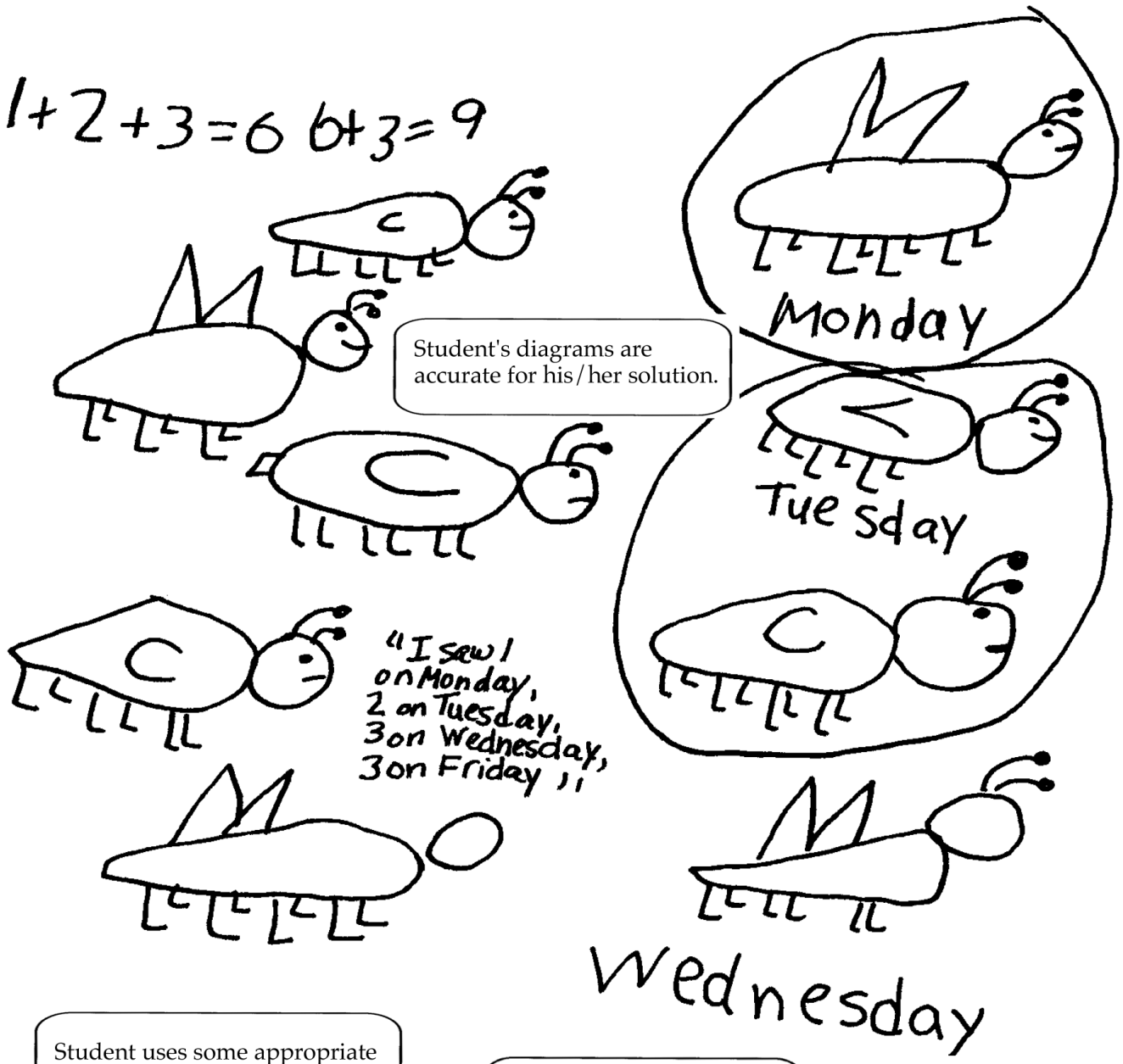
Apprentice



Student's diagrams are accurate for his/her solution.

Student uses some appropriate mathematical language.

Student lacks component of Thursday, and does not seem to have a concept of a pattern.

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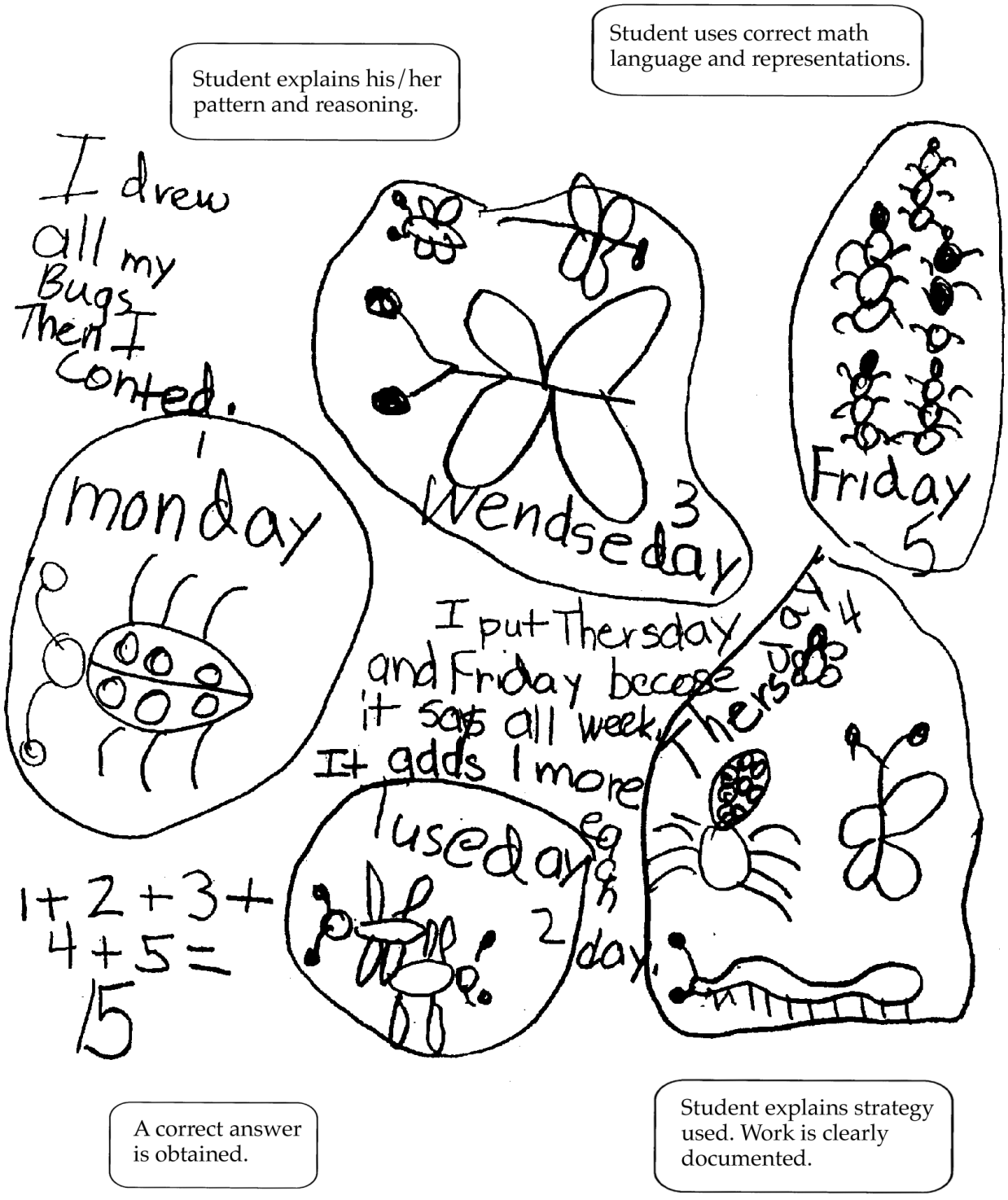
Practitioner



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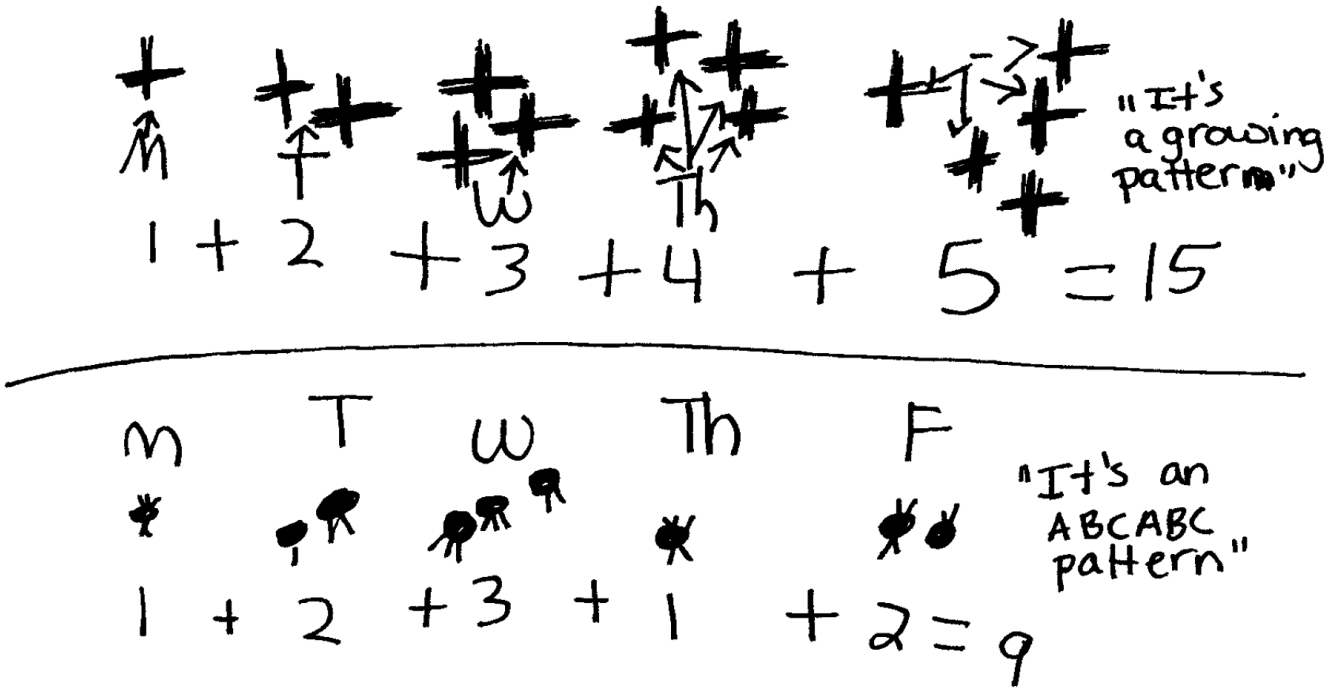
Expert



The student uses rich mathematical language.

Student's work is well documented and organized.

Student obtains three different solutions and comments on what type of pattern was found.

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