Seedlings to Timber

2 foresters from the International Paper Company told our class that for every tree that was cut down, 5 seedlings are usually planted to replace it. This is one of several important jobs they have in managing forests. They also told our class that it usually takes 25 trees to build 1 house.

How many trees were cut down in the forest if the foresters planted 50 seedlings?

Also, how many houses can be built when those seedlings become grown trees?

Grade Levels Pre-K-2

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What This Task Accomplishes

This task assesses students' sense of whole number operations and computation to solve a real-world problem. Students are also required to use patterns and relationships while grouping the seedlings with the grown timber to be cut. This task will also demonstrate if students have an accurate strategy for counting by fives, and in grouping by 25.

What the Student Will Do

Some students will begin by grouping and diagramming the seedlings by fives as they match them with a cut tree. Other students will be more comfortable using different manipulatives to physically represent the seedlings and grown trees before diagramming them on paper. There will be a few students who may not understand the relationship of the seedlings to timber, which will lead to ineffective strategies. The students will also need to use data to solve for the number of houses to be built with the timber.

Time Required for Task

60 minutes

Interdisciplinary Links

This task evolved from a presentation that was done in our multi-age first-second grade classroom by the International Paper Company from Ticonderoga, New York. We had two foresters explain how they managed the thousands of acres of forest in New England. They also demonstrated measuring equipment they needed in doing their jobs. A third presenter showed an excellent video of the paper making process: seedling, to timber, to paper or house. The students could see the need for learning skills in mathematics, reading, technology and science.

The foresters gave each child a red pine seedling to plant at home, which was also part of our Arbor Day celebration. Computer skills were integrated as partners developed tree related word

problems for other students to try on the computer.

Teaching Tips

It is important for the students to have had prior experiences counting, grouping, and sorting objects in patterns of small and large numbers. These mathematical experiences, along with investment in the task, are important for student success. Any time a task is tied to a topic we are studying in our classroom, it becomes much more meaningful to the students.

Suggested Materials

- Real tree seedlings (contact local forester or nursery)
- Invite International Paper Company (or another local paper company) to present
- Make tree seedlings out of construction paper (use for oral problem solving in groups)
- Computer (partners can design word problems)
- Math manipulatives to represent seedlings/trees
- Paper
- Pencils

Possible Solutions

The student should clearly represent that 10 trees were cut down if 50 seedlings were planted. The second half of the task should show that two houses were built because it takes 25 trees to build each house.

Benchmark Descriptors

Novice
A Novice may apply inappropriate concepts to the problem despite the repetition and rewording of the question. The Novice will not have a strategy to solve the problem, and may have an explanation that is unrelated to the task.

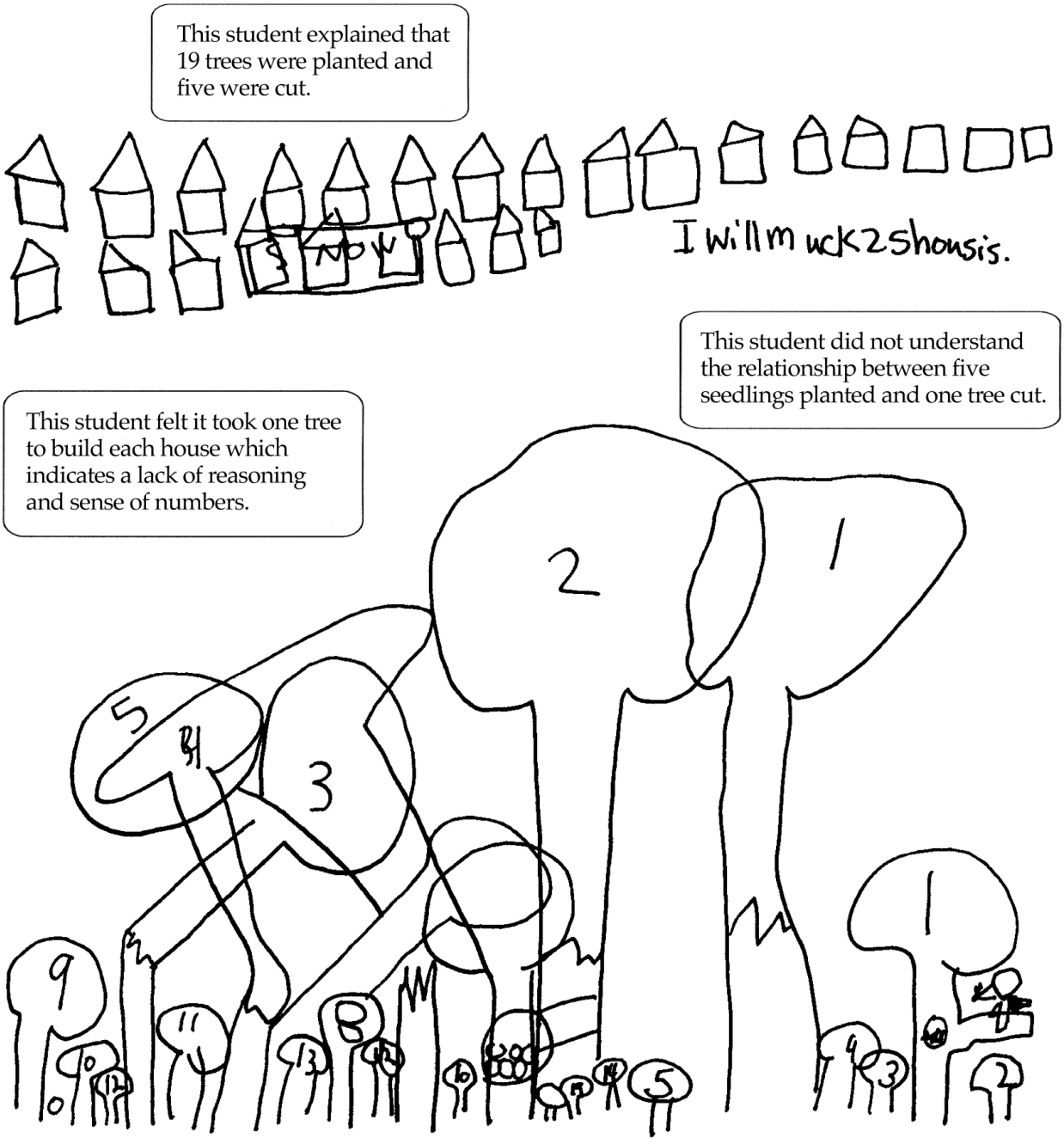
Apprentice
An Apprentice may try a strategy several times, indicting some mathematical reasoning. The lack of organization may lead to an inaccurate solution for the number of trees cut. An Apprentice may solve part of the problem such as finding a solution for the number of houses that were built, but not the number of trees that were cut down.

Practitioner
A Practitioner may use an effective strategy, of tally marks, for instance, to organize the number of trees that were cut down. A Practitioner may use accurate mathematical notation and representations indicating that this student has a broad understanding of the problem. A Practitioner is able to find a correct solution to both parts of the problem.

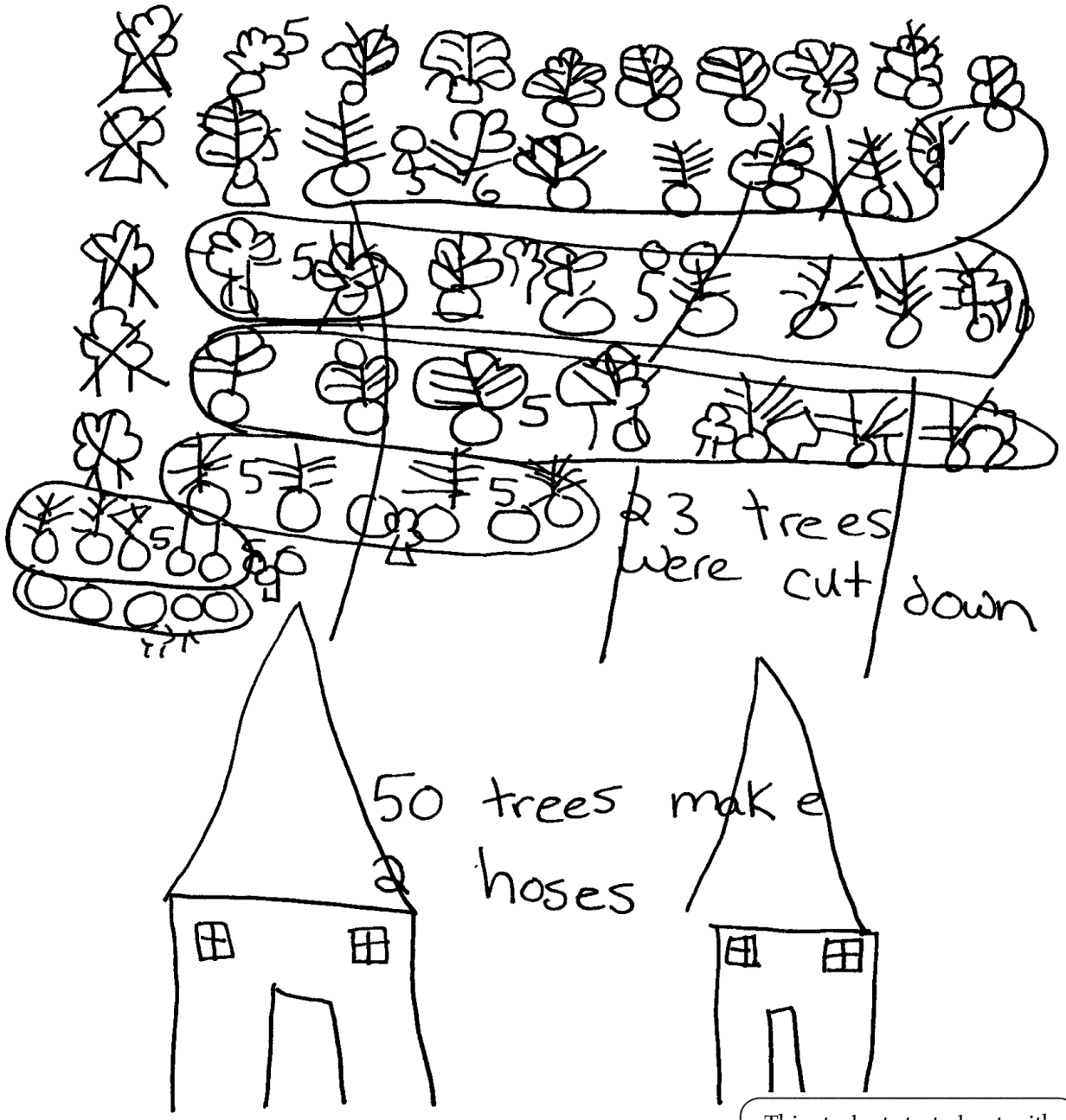
Expert

An Expert's explanation is clear and effective. The mathematical representation of the seedlings and trees indicate an efficient strategy that leads directly to a solution. The language used in the explanation shows a deep understanding of the concepts that were presented. An Expert may make a mathematically relevant observation or comment, for instance, that you could not build half of a house with the 10 trees that were cut down initially.

Novice



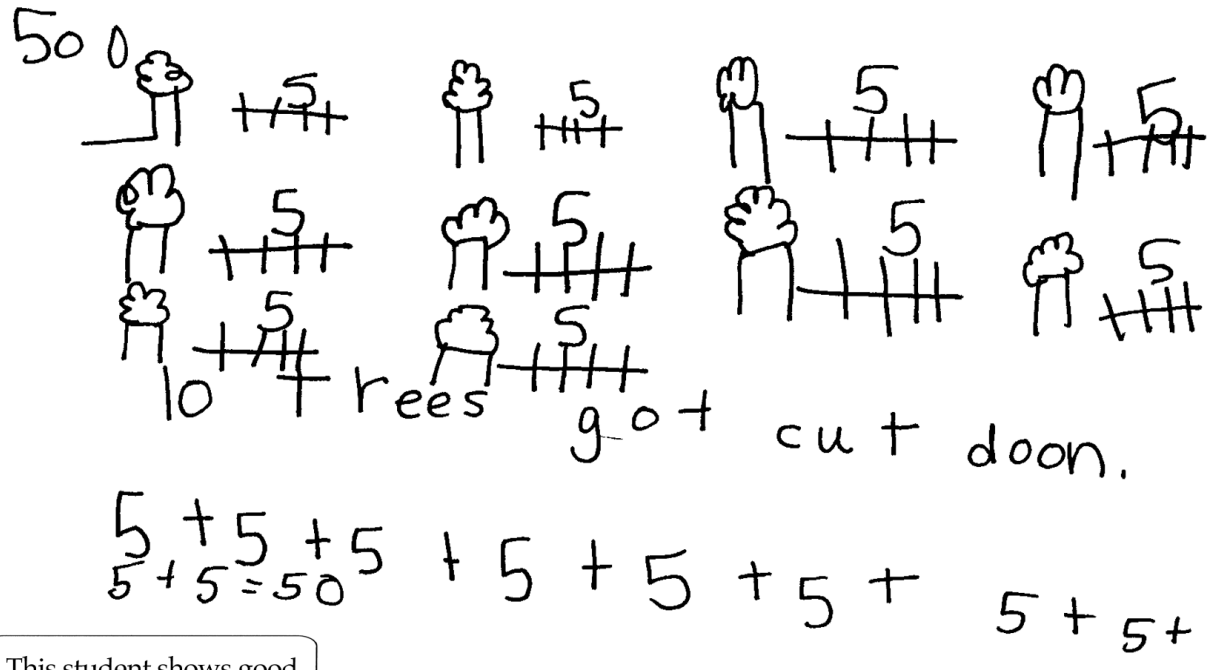
Apprentice



This student started a useful strategy, but needed to be more organized and accurate.

This student started out with 25 trees cut. S/he was asked to group his/her seedlings in some way which resulted in 13 trees cut.

Practitioner



This student shows good reasoning skills.

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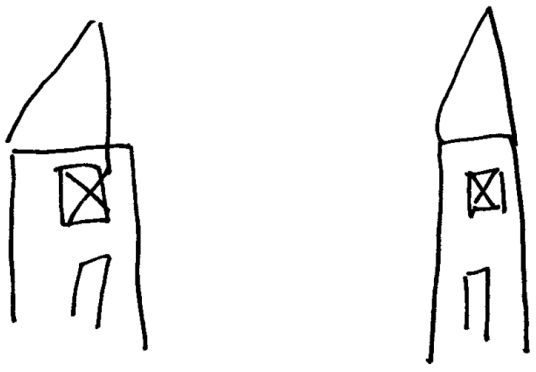
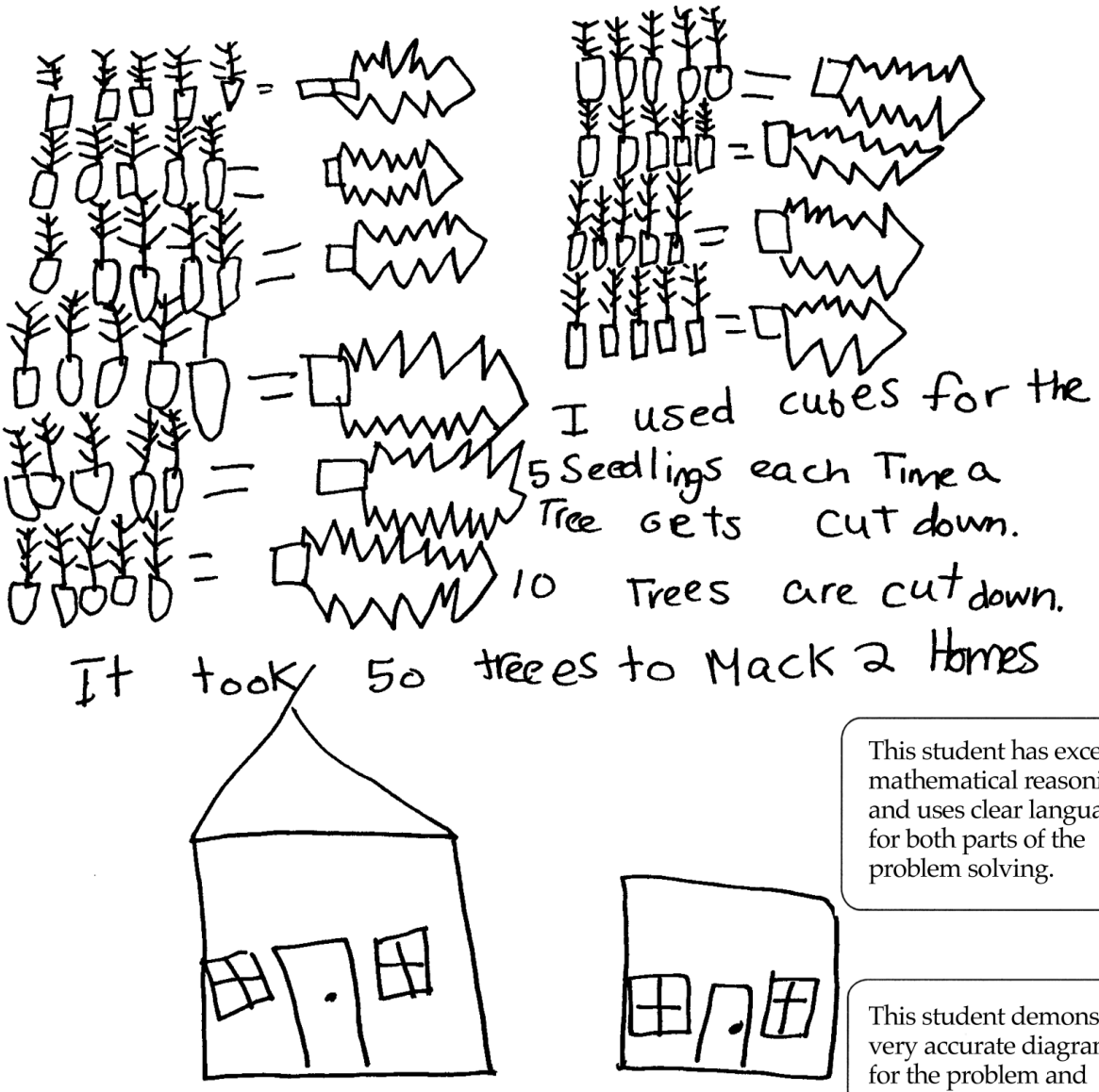
trees



The student used an efficient strategy of tally marks for the seedlings.

This student has a strong concept of number sense and mathematical notations.

Expert



This student has excellent mathematical reasoning and uses clear language for both parts of the problem solving.

This student demonstrates very accurate diagramming for the problem and mathematical notations.