Witches Transportation

There were 20 witches who needed to get to the witches' convention in California. 12 lost their brooms so they needed to broom pool. There were 8 brooms, but no more than 4 could fit on a broom and no less than 2.

Explain with pictures, words and/or numbers how you are going to get them all there.

Grade Levels Pre-K-2

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What This Task Accomplishes

This task provides students with the opportunity to find multiple solutions. It also allows for students to create diagrams, sentences, numbers and equations to communicate their solutions. The task also presents a context for students to work with a task that has several components, in that there are several rules to be followed.

What the Student Will Do

Some students draw one broom with several witches at a time and guess/predict as they go. Some draw all brooms then fill each broom with one witch at a time. Others may draw all brooms, placing two witches on each and then placing the others. Still others will draw all brooms then fill each with four witches. They will then scatter the remaining witches or leave off brooms. Finally, some students will fill the brooms with four witches and erase one at a time until they get to 20.

Time Required for Task

60 minutes

Interdisciplinary Links

Halloween is undoubtedly one of the high points of the year for a first grader. We bring Halloween into all parts of the curriculum. We read books, write, sing songs, read poems and play games surrounding this holiday. Many of our math and science activities revolve around Halloween. We measure, observe and draw pumpkins. We estimate and count numbers of Halloween-related objects. Solving a Halloween problem is engaging for these kids, especially during their time of intense obsession with the holiday.

Teaching Tips

It would be helpful to students if the problem is read to them, and the four rules recorded so students can easily refer to them.

It may also be helpful to do the following pre-assessment activity before students begin to work the task independently:

Cut pictures of brooms and witches out of colored paper. In a whole group lesson, ask individual students to come to the front of the class and create possible broom loads (using the rules stated in the task) until all combinations are discovered. Discuss why some loads do and do not meet the requirements.

After students have solved the task independently, have them share their solutions with each other so students can see that there is more than one solution to the problem.

Suggested Materials

- Manipulatives that can represent witches and brooms
- Paper
- Pencils (to write with and/or to represent brooms)
- Halloween stencils

Possible Solutions

Two brooms with four and six brooms with two

Four brooms with three and four brooms with two

One broom with four, two brooms with three and five brooms with two witches

Benchmark Descriptors

Novice
This student was distracted by the limitation of having a certain number of witches on each broom. S/he seemed to think the broom would steer better with three witches. S/he put three on each broom until s/he ran out of witches and was confident that by showing the extra broom without witches meant s/he used eight brooms. This student counted until s/he got to 20.

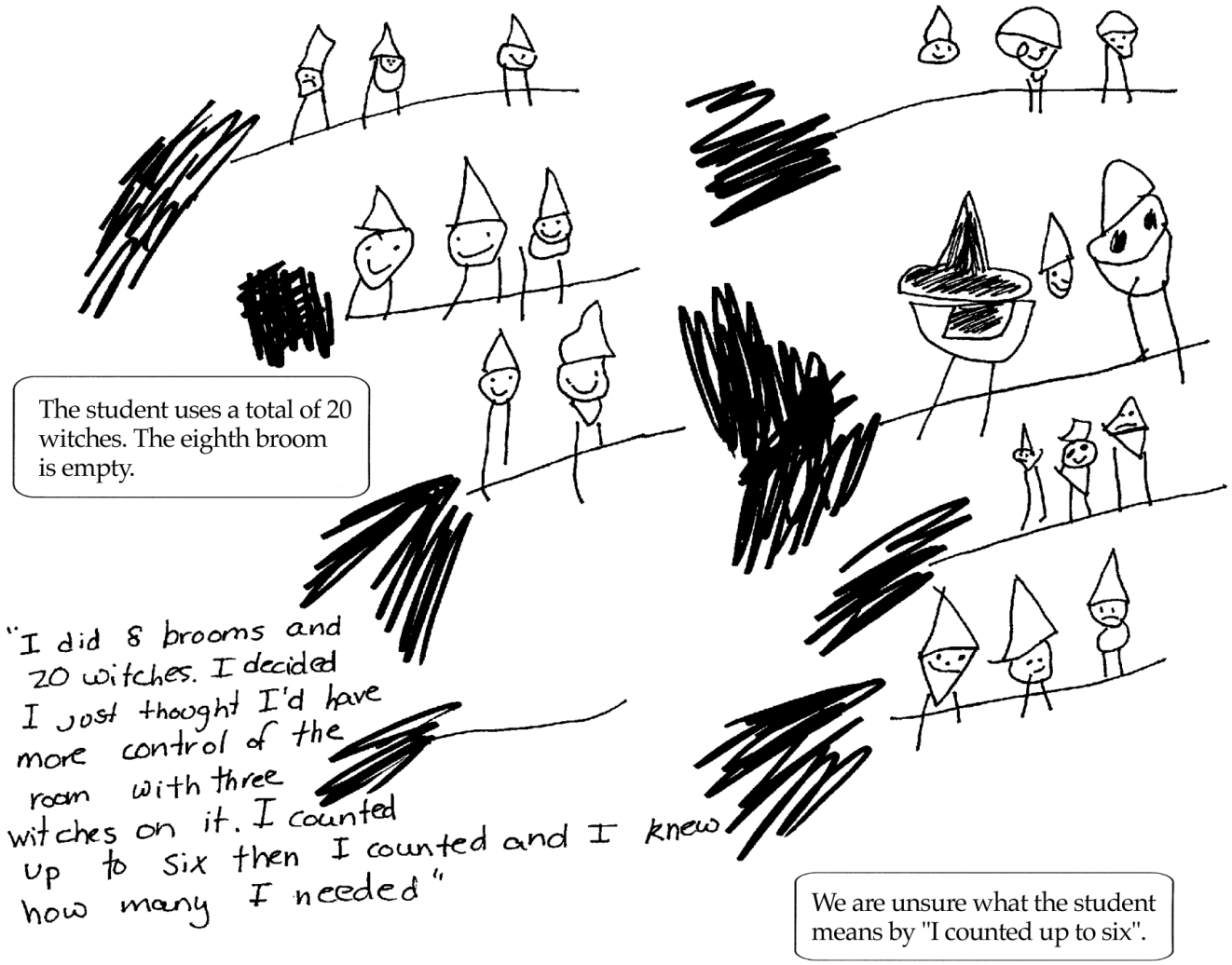
Apprentice
The idea of using eight brooms was missed by this student. This student solved some of the problem by using 20 witches and putting no more than four on a broom. S/he drew three on a broom and counted the total and then drew four and eventually five. His/her idea that s/he had no room was true in that there were no more witches to ride on the brooms. S/he fully grasped that the limit was 20 witches.

Practitioner
This student was comfortable with all of the limitations and requirements of the problem. S/he was able to find a solution using a strategy of estimating as s/he went along until all the brooms were full with appropriate numbers of witches. This student was very clear when explaining

his/her solution.

Expert
This student has a deep understanding of the problem and was able to find two solutions. S/he understands that four three's equals 12 and counted by two's to reach one of the solutions. S/he was able to represent one of his/her solutions with an addition equation. S/he wrote numbers next to each witch to verify his/her solution. This student's explanation involved appropriate use of mathematical terminology and notation.

Novice



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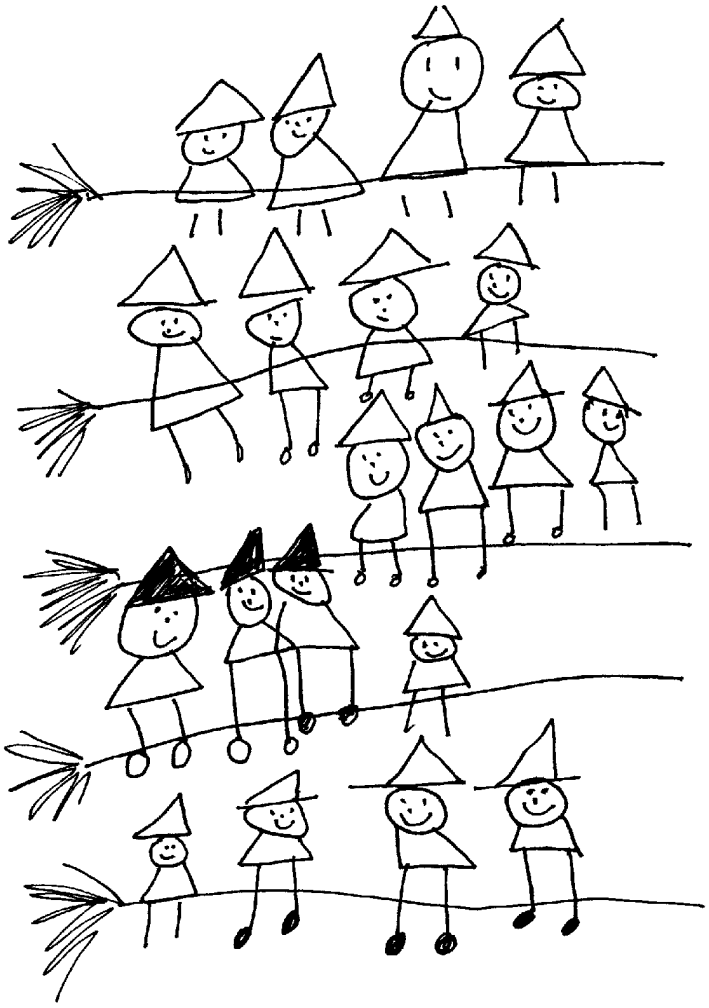
Apprentice

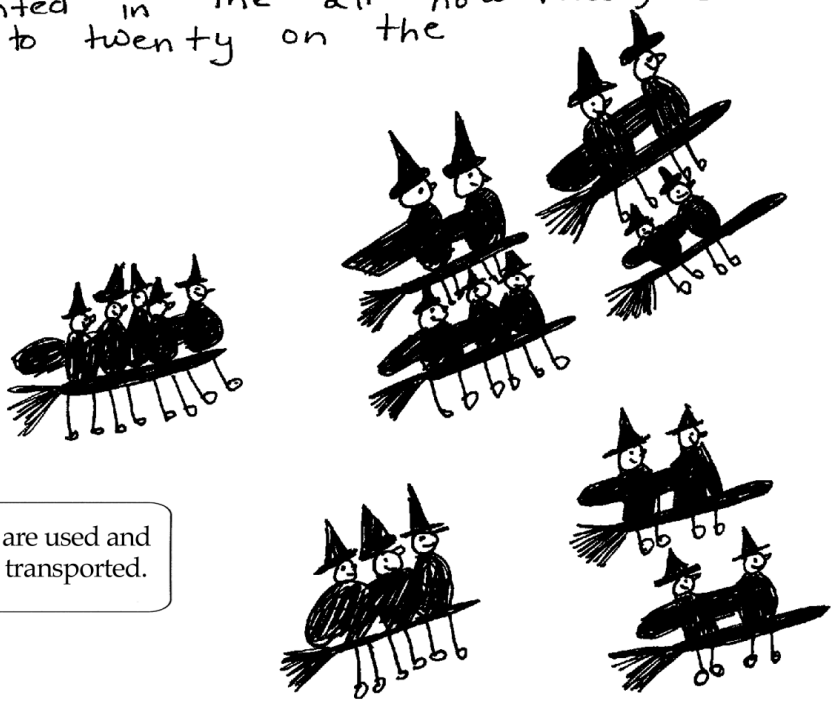


"I did them on five brooms. First I drawed three then I drawed four. (After three) I couldn't fit any more brooms. Four witches on the brooms. I have 20"

This student uses only five brooms, but transports all 20 witches.

Practitioner

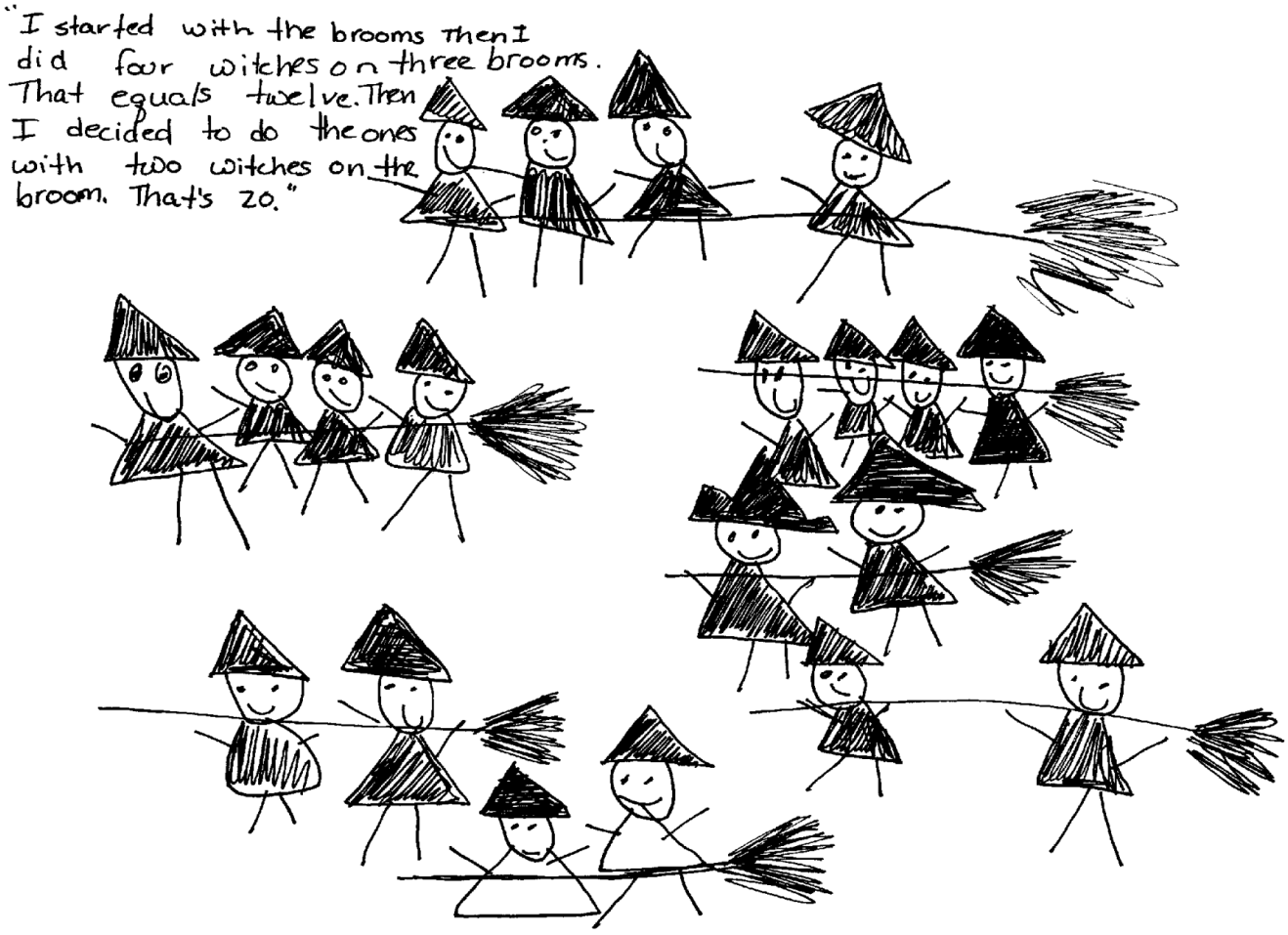
"I drew a broom w/ 3 witches and then I guessed 4 + 3 on the other brooms 10. Then I made a broom with two and I counted in the air how many other witches coonted up to twenty on the brooms.



All eight brooms are used and all 20 witches are transported.

Witches Transportation

Expert



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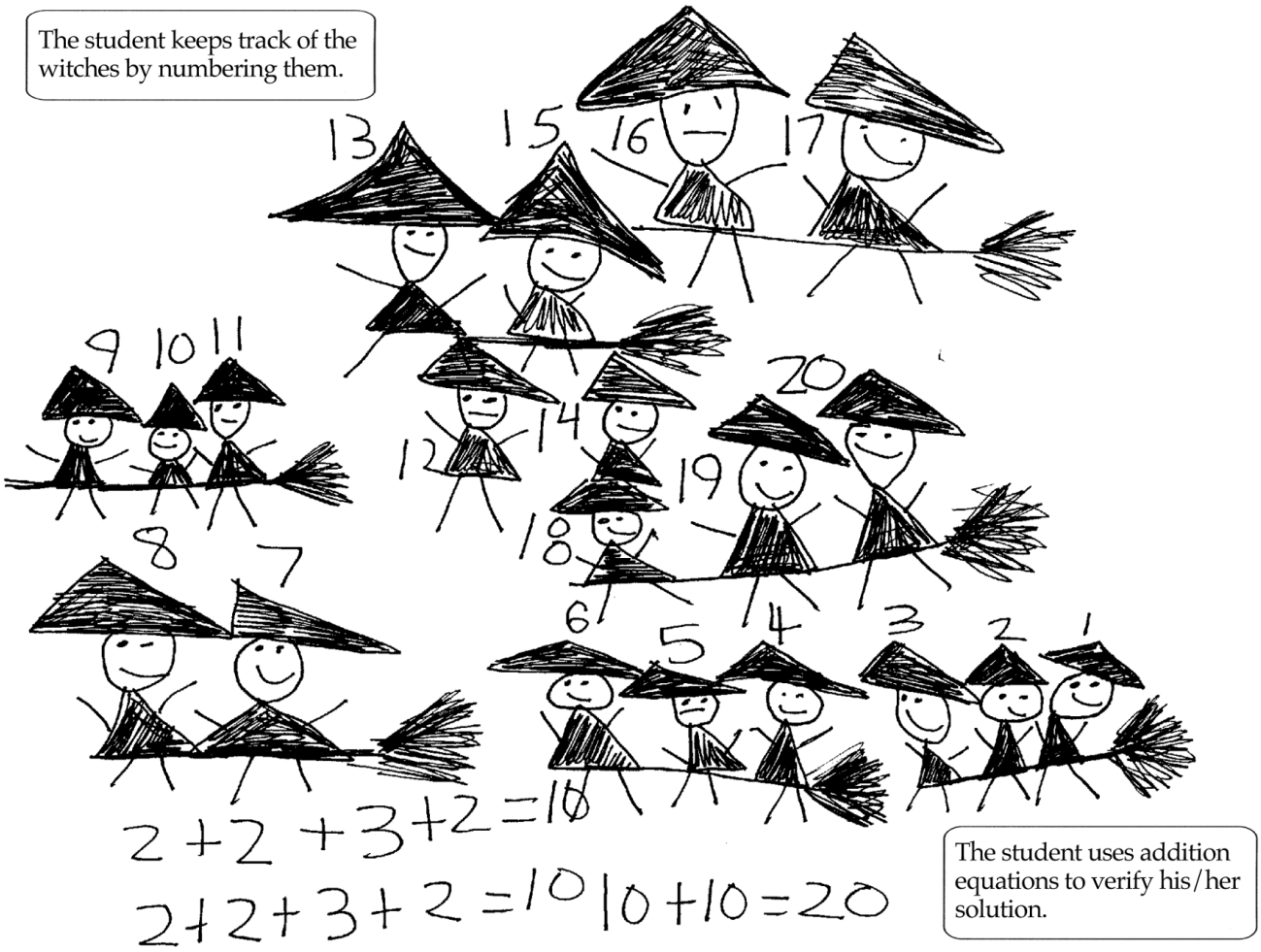

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