

Stranger in the Woods

A Lesson for Grades K–2

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Overview of Lesson

This lesson is an engaging opportunity to learn about students' level of understanding of number, specifically the strategies and models students use to represent their mathematical thinking. The literature piece *Stranger in the Woods: A Photographic Fantasy*, by Carl R. Sams II and Jean Stoick, provides a magical context for the problem. Using real photographs of wildlife, the storybook captures what happens when forest animals encounter a snowman (the stranger) in the woods. After reading the story, students solve an open-ended problem (a problem with more than one solution) at their tables, then reconvene as a whole group to process the experience and share and discuss their strategies.

Common Core State Standards for Mathematics

Counting and Cardinality: Standard K.CC

Know number names and the count sequence.

Operations and Algebraic Thinking: Standard K.OA

Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

Measurement and Data: Standard K.MD

Classify objects and count the number of objects in each category.

Operations and Algebraic Thinking: Standard 1.OA

Represent and solve problems involving addition and subtraction.

Operations and Algebraic Thinking: Standard 2.OA

Add and subtract within twenty.



Goals for Student Understanding

These goals are aligned to the mathematical practices in the Common Core State Standards.

Students will

- make sense of problems and persevere in solving them
- reason abstractly and quantitatively
- construct viable arguments and critique the reasoning of others
- model with mathematics
- use appropriate tools strategically
- attend to precision
- look for and make use of structure
- look for and express regularity in repeated reasoning
- apply what they have learned from other experiences to a problem-solving situation
- represent their mathematical thinking
- share their strategies with others

Setting

Whole group

Time

Approximately forty-five minutes

Materials

- the children's book *Stranger in the Woods*, by Carl R. Sams II and Jean Stoick (C. R. Sams II Photography, 2000)
- *Stranger in the Woods* Recording Sheet (Version 1, 2, or 3), 1 copy per student
- pencils or dark-colored markers for each table of students
- variety of manipulatives, including ten-frames, for each table of students
- *Stranger in the Woods* Teacher Checklist
- *Stranger in the Woods* Student Checklist, 1 copy per student

Key Vocabulary

classify

communicate

equation

model

partition

represent

sort

strategy



Lesson Outline

Introducing the Problem

1. Gather students in the whole-group area of your classroom. Read the book *Stranger in the Woods*. Tell students you have a problem that you would like them to help you solve. They can use pictures, words, numbers, and equations to represent their thinking. Explain that once everyone has had a chance to solve the problem, you'll share some students' strategies with the whole class.
2. Show students a copy of the *Stranger in the Woods* Recording Sheet (Version 1, 2, or 3). Read the problem at the bottom of the recording sheet several times. Ask for several volunteers to restate the problem.
3. Once it seems that students clearly know what the problem to be solved is, distribute a recording sheet to each student. Ask students to work at their tables to solve the problem. Have manipulatives and writing utensils (pencils or dark-colored markers) available on the tables for students to easily access on their own.

Teaching Tip

Restating the Problem

Asking students to restate the problem helps make everyone aware of the problem. This is beneficial for many children, especially English language learners and those who are not able to read the problem at the top of the recording sheet yet.

Teaching Tip

Differentiating Your Instruction

At the end of this lesson there are three versions of the *Stranger in the Woods* Recording Sheet. Each version presents a different number of animals for students to work with. Use the version with the number that best meets your students' individual needs (note that if you make changes to the numbers on the recording sheets, I recommend using correction fluid or tape to cover the original numbers instead of simply crossing them out). Many kindergarten students will be able to work on Version 1, the problem with five animals investigating the stranger in the woods. Provide Version 2 (with ten animals investigating the stranger) to first graders. There will likely be a need to further differentiate within any grade-level classroom. If some students need to work with a very small number, pose the problem with fewer than five animals. If some students are ready to work with a larger number, adjust the problem accordingly for them (you might want to give them Version 3 of the recording sheet, which refers to eighteen animals). During processing time, allow students to share solutions for each version of the problem that you posed.

Solving the Problem

4. Circulate as students are working. Remind students that you want them to represent their thinking on paper to share with others. Assist students who need clarification by asking, "Who can tell me what the problem is?" This reminds students what the problem is that they are solving and that they are working on solving the problem posed rather than a misinterpretation of the problem. If a student is having difficulty getting started, consider asking the following key questions.

Key Questions

- Which animals visited the snowman?
- How many visited the snowman in our problem?
- How could you represent the animals to share your thinking with others?



5. While circulating, take note of the strategies you want to share with the whole class.
6. As students finish, ask them to place their recording sheets in a designated location. Have each student do an independent task until everyone has a chance to finish.

Teaching Tip

As Students Finish

As students finish their work, ask them to either read a book or work on a flat pattern block design. Both of these tasks are flexible and offer students choices—students may work alone or with a partner; they may choose the book they want to read; or they may determine what they will create with pattern blocks. Both books and pattern blocks can be cleaned up quickly once everyone has finished the lesson's work and is ready to proceed to the next part of the lesson.

Processing the Problem

7. Think back on your observations while students were completing their recording sheets. Who solved the problem accurately? What strategies did the students use? Select a few pieces of student work to share with the whole class.
8. Gather students in the whole-group area of your classroom. Scaffold the strategies you share; begin with a simple, yet accurate representation and build up to more sophisticated strategies. Talk about the strategies used to represent mathematical thinking (drawing pictures, writing numbers, organizing ideas, using manipulatives, etc.). If students are comfortable sharing in the whole group, have them describe their own work. Hold each student's paper for everyone to see while he or she communicates his or her strategies to the class.

Strategies to Emphasize for This Problem

- representing with pictures, words, and numbers (with and without equations)
- organizing the information
- using a physical model
- creating a list (systematic thinking)

9. Point out that all of the equations and/or representations are different ways to make five (or whatever number of animals the students worked with).



Formative Assessment in Action: Questions

Use the following questions to help guide your observations of students as they are engaged in the lesson; your focused observations in turn will support the instructional decisions you'll make for individual students and your class.

- Does the student understand the problem?
- Does the student solve the problem in more than one way?
- How does the student represent his or her mathematical thinking—with counters (physical model), pictures, a ten frame, words, numbers, equations, or a combination of ways?
- Is the student able to communicate his or her ideas to others? In which settings is the student able to share—partners, a small group, the whole group?

What Happens in My Classroom

Once a strategy to represent mathematical thinking, such as drawing pictures, is shared, I say to the whole group, “Raise your hand if you used pictures to solve the problem.” I repeat this process for each strategy shared. I do not ask every child to come up to talk about his or her work, but I do validate useful strategies and recognize all students who are using them.

Figures 1 through 4 provide examples of how kindergartners in my classroom solved the problem featured in the first version of the *Stranger in the Woods* Recording Sheet.



Figure 1. Ariella stated, *The animals wanted to see the stranger*. She then listed the animals: *sqr [squirrel], deer, deer, deer, deer*.



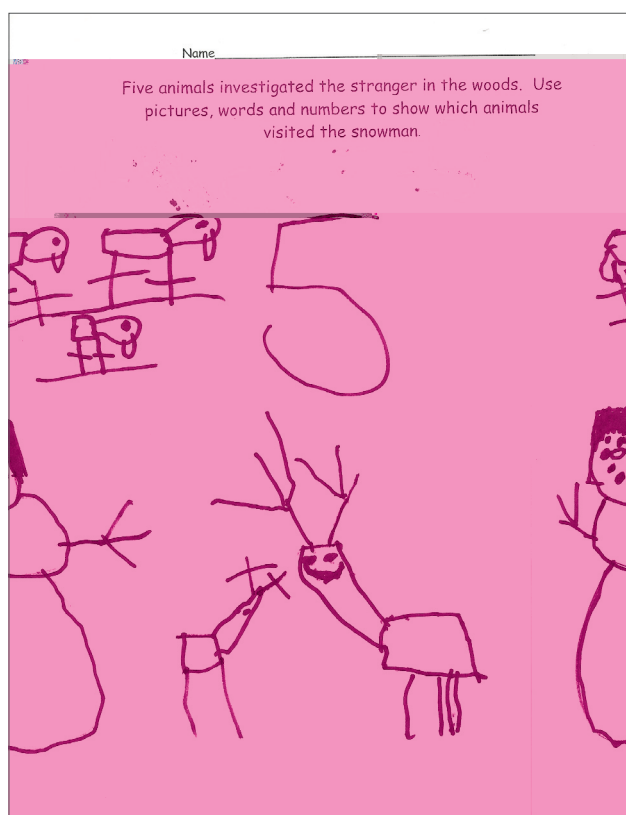


Figure 2. This student showed, through pictures, that there were three birds and two deer.

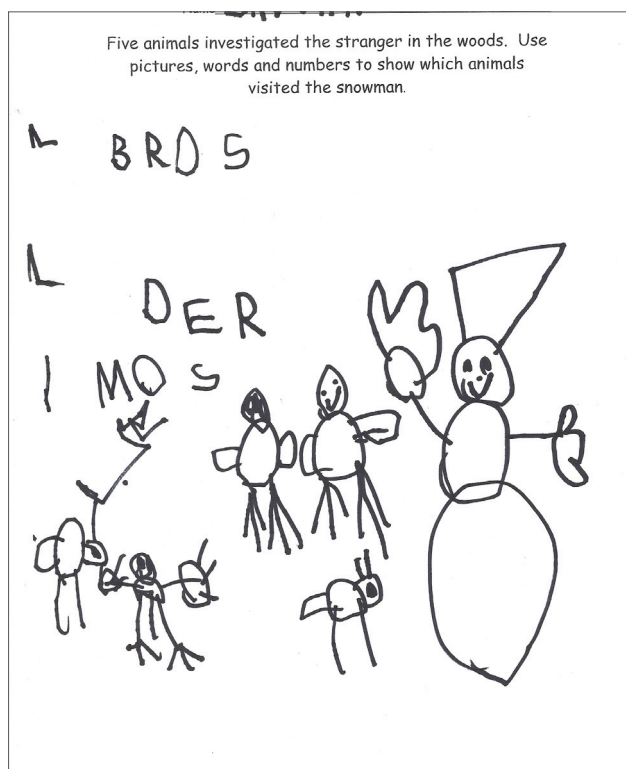


Figure 3. With pictures, words, and numbers, Davian showed that there were two birds, two deer, and one mouse.



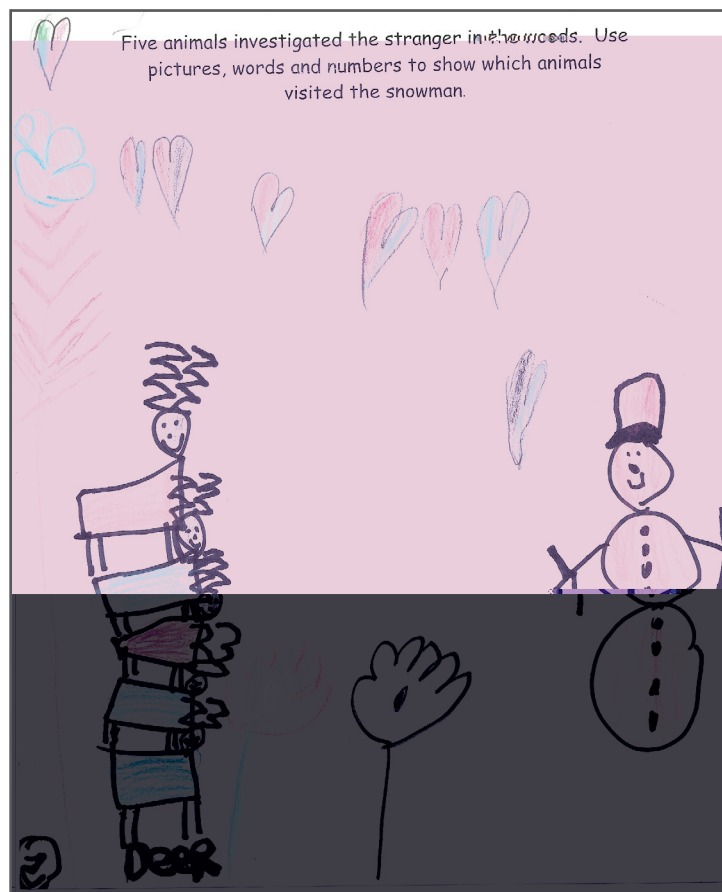


Figure 4. This student drew five deer.



Formative Assessment in Action: Teacher Checklist

Checklists are invaluable for focusing your observations as well as for documenting student behaviors, responses, and reactions to lessons. Each column in the checklist specifies what to observe while students are engaged in the mathematical activity. Have the checklist ready on a clipboard, and easily accessible, to ensure you'll do the necessary documentation and recording. For more on using teacher checklists as a successful formative assessment practice, see my multimedia resource *How to Assess While You Teach Math: Formative Assessment Practices and Lessons, Grades K–2*.

Stranger in the Woods Teacher Checklist

Student Name, Date	Draws Picture	Uses Organization (drawings or numbers are lined up)	Uses Multiple Representations (pictures, words, numbers, physical model)	Uses Mathematical Tools (ten-frame, hundreds chart, number line, T-chart)	Uses a Systematic Way to Demonstrate Thinking	Shares Work During Processing Time	Notes

Formative Assessment in Action: Student Checklist

This checklist helps students monitor their own learning, set math goals, and ultimately share academic progress with their parents. Each child should have his or her own student checklist and should keep it in his or her student notebook. For more information (including video clips) on using student checklists as a successful formative assessment practice, see my multimedia resource *How to Assess While You Teach Math: Formative Assessment Practices and Lessons, Grades K–2*.

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Stranger in the Woods Student Checklist

Name _____

Date _____

I used pictures.	I used words.	I used numbers.	I organized my work.	I used mathematical tools.	I shared my work with others.

Stranger in the Woods Recording Sheet, Version 1

Name _____

Date _____

The Problem

Five animals investigated the stranger in the woods. Use pictures, words, numbers, and equations to show which animals visited the stranger.



Stranger in the Woods Recording Sheet, Version 2

Name _____

Date _____

The Problem

Ten animals investigated the stranger in the woods. Use pictures, words, numbers, and equations to show which animals visited the stranger.



Stranger in the Woods Recording Sheet, Version 3

Name _____

Date _____

The Problem

Eighteen animals investigated the stranger in the woods. Use pictures, words, numbers, and equations to show which animals visited the stranger.

