



Lessons from Scout Elf School:
Polar Puzzles





Note to Teacher

In the stories of Scout Elf School, the elves study logic to help them think, experiment and ask themselves questions to prepare for bringing lots of cheer to their families and classrooms each Christmas season. Students can also use logic to navigate new experiences, to solve mathematical problems, and to identify likely outcomes or best choices. By taking the information they've been given and asking relevant questions, students develop critical thinking and reasoning skills to help them solve problems.

CCSS Standards for Mathematical Practices

CCSS.MATH.MP.3 - Construct viable arguments and critique the reasoning of others.

CCSS.MATH.MP.8 - Look for and express regularity in repeated reasoning.

CCSS.MATH.MP.7 - Look for and make use of structure.

CCSS.MATH.MP.2 - Reason abstractly and quantitatively.

CCSS.MATH.MP.1 - Make sense of problems and persevere in solving them.

CCSS.MATH.MP.5 - Use appropriate tools strategically.

Introductory Activity

- Tell students that the class is going to play a game that will help develop their ability to solve problems using logic.
- Review the concept of logic and relevant vocabulary. A simple definition for logic is “using what you know to draw conclusions and identify new understandings.”

Depending on the level of your students, you may want to discuss:

- Data = what you know or information you are given
- Conclusion = make an inference based on relevant data
- A key aspect of making an inference is understanding the conditional (if/then). If I know A is true, then its logical counterpart B must also be true: If Sprinkles is a better baker than Joe, then Sprinkles cannot be the worst baker and Joe cannot be the best baker.



- Complete the Scout Elf Friend Match together as a class.
 - Read the instructions aloud and review the placement of the friends' names and the Scout Elves' names on the grid worksheet.
- Read all of the clues aloud before trying to fill out the grid. Remind students it is important to read all the clues first because the first clue may not provide the best information.
- Decide if there are any "absolute" clues. An absolute clue is a simple fact that matches two pieces of information together. In Scout Elf Friend match, students are trying to determine each child's favorite hobby so they can "match" it to each Scout Elf's name. For this puzzle, "Mia's favorite activity is knitting" would be the absolute clue. Students should look for the Scout Elf name that is most related to knitting.
- Place a check mark on the grid in the box that shows Mia's Scout Elf is Oodles O'Mittens.
- Place X marks in the other boxes on the horizontal row showing that Mia's Scout Elf cannot be Sprinkles Sugarbaker, Star Twinklewatcher, or Sam Slam dunk. Ask:
 - "If Mia's Scout Elf is Oodles O'Mittens, can her Scout Elf also be Sprinkles Sugarbaker? Why?"If needed, remind students that the instructions say that each child only has one Scout Elf.
- Additionally, place X marks in the other boxes on the vertical column to show that Oodles O'Mittens cannot belong to any of the other children. Ask:
 - "What more do we know? If Oodles O'Mittens is Mia's Scout Elf, can he belong to another child? How do you know?"
- Continue using the clues to make inferences and draw conclusions. Here are some questions you might ask:
 - What do you think Zuri's favorite activity is? Which Scout Elf's name fits her favorite activity?
 - What is Amir's favorite activity? Which Scout Elf's name fits his favorite activity?
 - If we don't have a clue for Jaylen's favorite activity, how can we decide which Scout Elf is his? Which Scout Elf do you think is his? What do you think Jaylen's favorite activity is?



Further Puzzle Practice

Teacher Note: Provide students with this list of Top Tips.

- Read the puzzle instructions.
- Read all clues before filling any part of the grid.
- Use absolutes first, marking simple facts that quickly solve a part of the puzzle.
- Cross off other boxes in a row or column when it is solved.

Beginning Learners

Scout Elf Favorite Foods Puzzle:

- Print the Scout Elf Favorite Foods puzzle for each pair of students.
- Divide students into groups or pairs to complete this puzzle together.
- Remind students of the Top Tips for solving logic puzzles.

Progressing Learners

Favorite Scout Elf Lessons Puzzle:

- Print the Favorite Scout Elf Lessons puzzle for each pair of students.
- Divide students into groups or pairs to complete this puzzle together.
- Remind students of the Top Tips for solving logic puzzles.

Advanced Learners

Around the World Puzzle:

- Print the Around the World puzzle for each pair of students.
- Divide students into groups or pairs to complete this puzzle together.
- Remind students of the Top Tips for solving logic puzzles.

(Specify that the Around the World Puzzle has more than one element to solve for and includes multiple sections. If students solve a horizontal row or vertical column, they should only mark off the other boxes on the same row or column in that one section without crossing the thicker line into the adjacent section.)