



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 Slamdunk. 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.)



Scout Elf Friend Match

Mia, Amir, Jaylen and Zuri are friends. Each child has one Scout Elf. Each Scout Elf is named after their child's favorite activity. Use the clues below to find out which Scout Elf belongs to each child. There are four Scout Elves to match with their friends but you only get THREE clues!

Sprinkles Sugarbaker



Star Twinklewatcher



Oodles O'Mittens



Sam Slamdunk



Mia



Amir



Jaylen



Zuri

Clues:

- Zuri got a telescope for her birthday.
- Mia's favorite activity is knitting.
- Amir's basketball team won the championship this year.



Scout Elf Favorite Foods

Each of these Scout Elves made a silly scene with their favorite food! Use the clues below to find out which food each Scout Elf prefers. There are four foods to match with the Scout Elves, but you only get **THREE CLUES**!

Cookies



Milkshake



Tacos



Marshmallows



-  Gabby Giggles
-  Jack Jingle
-  Max Mistletoe
-  Pip Peppermint






Clues:

- Gabby's favorite food is not sweet.
- Pip needs a straw for his favorite.
- Jack's favorite food is sweet and crumbly.



Favorite Scout Elf Lessons

Blizzard, Twinkle, Figgy, Pancake and Noelle are all elves who LOVE Scout Elf School. When they're not with their families each Christmas, they're back in school studying how they can bring more and more cheer every year. Each of these five Scout Elves has a favorite subject at Scout Elf School. Can you use the clues to match each elf to their favorite subject? There are five matches to make but you only get FOUR clues!

	Flight Lessons	Arts & Crafts	Cooking	Comedy	Snowball Strategies
 Blizzard					
 Twinkle					
 Figgy					
 Pancake					
 Noelle					

- Clues:**
- Figgy likes Cooking more than any other subject.
 - Neither Twinkle nor Pancake like Arts & Crafts the most.
 - Blizzard's favorite is either Cooking or Snowball Strategies.
 - Pancake likes Flight Lessons more than the other elves do.



Around the World

Rosa, Nate, Sara and Laura are children who live in four different countries.

Their Scout Elves' names are Jingle, Lulu, Topper and Zip. But which Scout Elf belongs to which child?

Use the clues to discover where each child lives and what their Scout Elf is named.

	Jingle	Lulu	Topper	Zip	United Kingdom	Australia	Mexico	Canada
Rosa								
Nate								
Sara								
Laura								
United Kingdom								
Australia								
Mexico								
Canada								

Clues:

- The Canadian child is a boy who does not have a Scout Elf named Topper.
- Laura's Scout Elf's name sounds like a bell, and she lives in a kingdom.
- Sara's Scout Elf's name comes after Rosa's Scout Elf's name in alphabetical order.
- Lulu's family lives in Australia.



Answer Key

Scout Elf Friend Match

1. **Mia's** Scout Elf is **Oodles O'Mittens**.
2. **Amir's** Scout Elf is **Sam Slamdunk**.
3. **Jaylen's** Scout Elf is **Sprinkles Sugarbaker**.
4. **Zuri's** Scout Elf is **Star Twinklewatcher**.

Scout Elf Favorite Foods

1. **Gabby Giggles'** favorite food is **tacos**.
2. **Jack Jingle's** favorite food is **cookies**.
3. **Max Mistletoe's** favorite food is **marshmallows**.
4. **Pip Peppermint's** favorite food is a **milkshake**.

Favorite Scout Elf Lessons

1. **Blizzard's** favorite lesson is **Snowball Strategies**.
2. **Twinkle's** favorite lesson is **Comedy**.
3. **Figgy's** favorite lesson is **Cooking**.
4. **Pancake's** favorite lesson is **Flight Lessons**.
5. **Noelle's** favorite lesson is **Arts & Crafts**.

Around the World

1. **Rosa's** Scout Elf is **Lulu**, and she lives in **Australia**.
2. **Nate's** Scout Elf is **Zip**, and he lives in **Canada**.
3. **Sara's** Scout Elf is **Topper**, and she lives in **Mexico**.
4. **Laura's** Scout Elf is **Jingle**, and she lives in the **United Kingdom**.