In Line

There are 5 students in a practice group that is going on a treasure hunt. They need to line up at the door with a girl as the line leader and a boy as the line follower. There are 3 girls and 2 boys in the group. Show how many different ways they could line up and still follow the rules?

Remember to write a key so that we know what code you have used to show girls and boys.

On the easel:

3 girls
2 boys

A boy must follow the line.
A girl must lead the line.

Use a code with shapes, color, numbers, letters/words, symbols or diagrams.

(This list of possibilities was generated by the class because it was their first time doing this kind of problem.)

Grade Levels Pre-K-2

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Context

Our class works with the same cooperative group of five kids for three to four weeks. They do one of the four activities (math, art, reading or spelling) for a half hour each day on Tuesday through Friday. Lining up is also a big first grade event. We have an official assistant who leads the line wherever we go during the day. We line up to come in from three recesses and to go to any special event. They take lining up quite seriously and are always problem-solving ways to line up on their own.

When we discussed possible ways to code girls and boys, several students suggested using pink for girls and blue for boys. Others suggested long hair for girls and short hair for boys. Another student suggested dresses for girls and pants for boys. When we were going over the solutions, we discussed sexism and stereotypes for about 30 minutes. To explain sexism, we compared it to racism which led to a huge discussion of Martin Luther King, Jr. How timely that this came up days before the holiday.

What This Task Accomplishes

This task provides several solutions. Students need to create a key and use it appropriately. They need to organize possibilities using trial and error or by recognizing the solutions and how they are organized.

What the Student Will Do

- Place boys and girls in the end and beginning and then fill in the possible solutions.
- Use codes with symbols of color, numbers, letters/words, diagrams and shapes.
- Five people in line must mean there are five possibilities. To reach that, rules are forgotten.
- They will have the beginning of the line in a variety of places (top, bottom, left or right)
- Confuse the directions as doing as many codes as possible with the same solution. (* O O * * , # + + # #, or = - - = =)
- Forget one rule and increase possibilities.
- Do just one possibility.
- Randomly use pictures and symbols, but not understand the purpose of them.
- Make a code and not use it. Draw unrelated pictures.
- Long hair, pink or a dress to represent girls and short hair, blue or pants to represent boys. (Great opportunity for stereotype discussion.)
- Use trial and error until all possibilities are exhausted.

During the solution discussion, I shared my hesitation to have a boy or a girl lead or follow fearing I would be sexist either way. One student suggested that there could be three boys in the group and two girls and that would make it fair that a girl gets to lead and a boy follows.

Time Required for Task

15 - 20 minutes

Interdisciplinary Links

This task can be used with a unit on social studies and the discussion of sexism, racism and/or fairness.

Teaching Tips

Clarify that one code should be used for all of the solutions found.
For the first time, have the group generate a list of code possibilities.

Suggested Materials

Manipulatives (Some may try to use their possibilities before they write them down.)

Possible Solutions

g = girl and b = boy

gbggb

gggbb

ggbgb

Benchmark Descriptors

Novice
This student had no solution. S/he seemed to hear that there were three possible solutions so s/he talked about three, but none of the guidelines were followed. There was no evidence of strategy or mathematical reasoning. The explanation was based on random information. S/he was clearly guessing and his/her explanation was random. S/he did say that two of his/her solutions would not include one of the characters in his/her diagram to meet the requirement of five people in the practice group.

Apprentice
This student understood the directions to mean that s/he should find a solution and show it using three different codes. S/he found one correct solution, but it is clear that parts of the problem were misunderstood. S/he used a strategy that led to a solution, but not a complete solution. There is evidence of some mathematical reasoning, but the problem was incomplete.

Practitioner
The solutions show that this student has a broad understanding of the problem and the necessary concepts for its solution. S/he used a strategy that led to two out of three solutions. S/he used effective mathematical reasoning. There is clear representation of boys and girls.

Expert
This student organized his/her lines efficiently so that s/he could compare each line so that s/he did not repeat any possibilities. The solution reflects a deep understanding of the problem including the information necessary for its solution. The student was able to verify the results by trying an extra solution and discovered that it did not fit the rules.