

Academic Math Circle

Topic: Numberless word problems

Target Audience: Elementary grades 3-5 (can be widely adapted)

The intent of this academic circle is to develop mathematical thinking through introducing numberless word problems. An in-depth article on the topic can be found here:

<https://bstockus.wordpress.com/2014/10/06/numberless-word-problems/>

Learning Target: Students will analyze given information and create a question based on that information.

Materials: Chart paper, markers, index cards

Opening: Popcorn skip counting. Pick a skip counting interval based on the ability of your group. The game plays out like "Zip, Zap, Zup" but with consecutive skip counts instead of the words. Players stand in a circle facing each other. One person starts and says the first number as they "pass" the count to another player by making eye contact while holding their hands palms together and pointing to that player. Play continues that way until someone makes an error or can't respond. When a player makes an error, that player sits down and the game starts over. Play for as long as seems appropriate (up to about 3-4 mins)

Round 1: Introduce the problem (written on chart paper in the circle center). "Some girls entered an art competition. Fewer boys than girls entered the competition." **What math do you see here?** Pass the talking piece and allow participants to share. Summarize responses. Bring out the idea that there are *some girls* and that the number of boys must be smaller. (**understanding**)

Rounds 2-3: **Based on what we just learned, how many girls and boys *could have* entered the art competition?** Allow for a round (or part of a round based on your judgement). Summarize/ synthesize. **What if I add some information?** Add: 135 girls entered the competition. Fifteen fewer boys than girls entered. **How does this new information change your thinking?** Circulate the talking piece. Summarize (**analyzing**)

Round 4: **So, what question might we ask based on this situation?** Hand out index cards and markers. Ask participants to write a question based on the information given. They do not have to write an answer. After participants have written their questions, choose an option that best suits the group:

- Pass the talking piece and allow them to share. Chart responses. Allow students to pick the question(s) they will work on at their seat (preferred practice)
- Collect the questions and pose them selectively to the group
- Have students exchange questions with each other

Summarize. If the participants don't suggest it, ask "How many *children* entered the art competition?" (**creating**) This is also an opportunity to scale the difficulty of the question based on the participants. You could make this a 5th grade or 6th grade task by asking about fractions, ratios, or percents.

Round 5: **What was that experience like for you?**

Closing: The follow-up for this circle might be to go back to your seat and model a solution to the problem. What else might we do as a next step?

Academic Math Circle. No author or date. Roc Restorative. Student Support Services. Rochester City School District. <https://www.rcsdk12.org/Page/50645>