



Multiple Turnover Game

Primary

Number Sense and Numeration

By Andrea McIntyre

Adapted from Pearson Education (2012).

Curriculum Goals (From the Ontario Ministry of Education Curriculum Document)

Grade 3

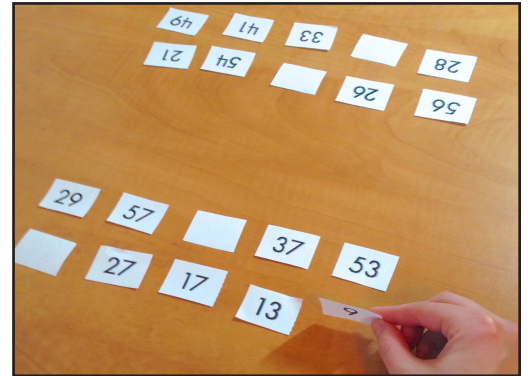
- Multiply to 7×7 using a variety of mental strategies

Grade 4

- Multiply to 9×9 using a variety of mental strategies; multiply two-digit whole numbers by one-digit whole numbers

Context

Whole class introduction and pairs or small groups.



Materials

One deck of numbered 'multiple' cards per group (2 - 4 students), with numbers 2-50, 2-80, or 2-113 depending on their level (see Appendix A)

- 2 – 50: Students who are still learning basic multiplication facts with products to 50 should play with these cards (Grade 3 students; Grade 4 students at a basic level)
- 2 – 80: Most students in Grade 4 can start with numbers 2-80, allowing them to review multiples to 50 and extend this knowledge to determine factors up to 80
- 2 – 113: Students who are confident with lower numbers and are ready for an extra challenge can use these cards

Optional: tracking sheet for students to record their multiple cards, the factors called and the cards that are turned over for each factor

Optional: calculators (to assist students in determining factors and multiples)

Summary

In this card game, each student is dealt 10 multiple cards faced-up. A student calls out a factor and if any of the students' cards have a multiple of that factor, he or she turns that card over.

Rules of the Game

- The object of the game is for the students to turn over all ten of their multiple cards by identifying whether their cards contain multiples of a given factor. They are encouraged to do so by using numerical reasoning based on their knowledge of factors and multiples. For example, they may recognize that all even numbers are multiples of 2.
- The game ends when one student has turned over all of their cards.
- Ten cards are dealt to each player. Each player arranges their multiple cards face-up in front of them so that all players may see them.
- The player with the smallest multiple card starts the game. He or she chooses a factor that is a whole number larger than 1.
- All players look for multiples of that number in their card set, and turn those cards face down.

Instructions

1. Introduce the game to the whole class by randomly choosing ten cards from the 2-80 numbered deck and drawing them on the board or chart paper. Say a factor (whole number greater than one), and ask students if any of the numbers written on the board are a multiple of that factor. Have students explain the strategy they used to identify the multiples. Explain the objective and rules of the game briefly.
2. Model how the game is played to the whole class, selecting 1 student to play with you. Start by choosing a factor. Make sure the students can see your cards and ask: "Are any of these numbers a multiple of (factor chosen)? How can we find out?" Invite students to share how they determined multiples of the factor. Ask students to look at your opponent's cards and ask the same questions, showing how you turn over cards that contain a multiple of the factor.
3. Have your playing partner now choose a factor. Deliberately turn over a card that does not contain a multiple of the factor to see if children understand and can catch the mistake. If students do not notice the error ask: "What do you think, can I turn this card over?"
4. Continue taking turns and play until all of one player's cards are turned over.
5. Provide each group of 2 to 4 students with a deck of multiple cards according to their level. Allow students approximately 20 minutes to play one or two rounds of the game.
6. Circulate and observe whether children are correctly identifying multiples of a factor and ask questions to make students' thinking and strategies explicit.

Questions to Extend Student Thinking

- How do you know the number is or isn't a multiple of the factor? What do you notice about the multiples?
- Why did you choose to call out that factor? You are looking to see if students can recognize factors of multiples and strategically choose a number that is a factor of their multiple cards.
- If students are using skip counting from 0 to determine multiples of a factor (e.g. factor is 4, multiple is 54), encourage them to start with a multiplication combination they know that will bring them closer to the target number by asking: Can you multiply 4 by a factor that will get you closer to 54 instead of starting from 0? Do you know 4×10 ? Can you start with that product? This questioning encourages children to use multiplicative thinking rather than repeated addition (Kinzer & Stanford, 2014).

Look Fors:

- Do students accurately identify most products of multiplication combinations up to 7×7 in Grade 3 and 9×9 in Grade 4? To what extent do students use direct retrieval?
- What characteristics of multiples do students use to determine if a number is a multiple of another number? For example, do they know that multiples of five end in 5 or 0? Do students recognize that they must name the number itself as a factor when they have a card with a prime number?
- What strategies do students use to determine factors of multiples that are more challenging? Are they able to reason from multiplication combinations they already know, or do they skip count? Skip counting from zero is a long and effortful process that is also prone to error. Conversely, the ability to break down complicated multiplication problems into simpler ones is an effective multiplication strategy that shows the student is using the distributive property and moving beyond an understanding of multiplication as repeated addition (Kinzer & Stanford, 2014).

References

Kinzer, C., & Stanford, T. (2014). The distributive property: The core of multiplication. *Teaching Children Mathematics*, 20(5), 302-309.

Pearson Education (2012). Investigation two: multiplication combinations. *Investigations in number, data and space: grade 4* (pp. 68-75). Glenview, IL: Scott Foresman.

This lesson was created as part of the 2015 first year mathematics curriculum course in the Master of Art Child Study and Education program at the Ontario Institute for Studies in Education, University of Toronto. This course was taught by Dr. Bev Caswell and ICS teachers Carol Stephenson, Zoe Donoahue, Lisa Sherman, and Ben Peebles.

Appendix A: Multiple Cards

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