

Illustrations–The Quotient Cafe



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<http://illuminations.nctm.org/Activity.aspx?id=4197>

Brief Description of Tech Tool: The Quotient Cafe is a tool for students to practice long division (up to 500 divided by 50), with and without remainders.

Technical & Cost considerations: The Quotient Cafe is a free tool that can be used on a PC, Chromebook/iPad, or tablet. It requires Java, the game could not be used on a smartphone.

Evaluation

1. What mathematics is being learned?

The Quotient Cafe's goal is to help students understand long division, by using partial quotient. The Quotient Cafe guides students through the problem, one step at a time. It could be used in and out of the classroom (teaching & practice).

Standards

- [CCSS.MATH.PRACTICE.MP4](#)
- [CCSS.MATH.CONTENT.3.OA.A.2](#)
- [CCSS.MATH.CONTENT.3.OA.A.3](#)
- [CCSS.MATH.CONTENT.4.OA.A.2](#)
- [CCSS.MATH.CONTENT.4.OA.A.3](#)
- [CCSS.MATH.CONTENT.4.NBT.B.6](#)

Proficiency Strands

- **Conceptual understanding:** The Quotient Cafe requires students to understand what the problem is asking them to do (divide, partial quotients, remainders). Students may use different

methods (repeated subtraction, equal groups, multiplication, division, addition) while solving the problems. By allowing students to use different methods, students are connecting the operations and developing and understanding of their relationships.

- **procedural fluency-** The goal of The Quotient Cafe is for students to solve division problems accurately, effectively and with partial quotients. Students have to figure out how to divide the food equally, and should be making connections between division and multiplication or repeated subtraction. This tool requires and understanding of how to solve the problem/find the quotient.
- **strategic competence-** The Quotient Cafe requires students to apply their problem solving strategies in order to find the quotient. Students have to understand the problem and work their way through it.
- **productive disposition-** The Quotient Cafe calls for higher level thinking; students are engaged and constantly making decisions. Their decisions are represented visually, students can plan their next steps based on current/previous position.

Additional comments on what is being learned

Students are practicing division, using partial quotients in The Quotient Cafe. This tech tool teaches students that there are many ways to arrive at the quotient. Students are able to make a variety of selections, they could use the basic facts they already know to get close to the quotient and problem solve from there. The tool is challenging and encourages students to check their work throughout the problem(s). Students who know their basic facts will need less partials, and students who do not will need more.

2. How is the mathematics represented?

In The Quotient Cafe, numerical, pictorial and real-world representations are used. The pictorial or visual representation allows the students to see how division works (equal shares, remainders, partial quotient); it pairs a visual with the math or basic fact. The numerical representation allows students to notice how division operates (dividend, divisor, quotient, remainder) and how the basic facts work together. The real-world representations allows the student to observe and solve “real world” division problems- people/animals sharing food/items. Technology makes the connections possible. This tools allows students to see division in numbers and pictures.

3. What role does technology play?

Technology supports learning by walking students through the problem, step, by step. The Quotient Cafe reminds students to check their work (ex: multiplication) if an answer is incorrect. Students are able to use the basic facts they know, and at their own pace. The Quotient Cafe provides a calculator, which can deter students from doing the math themselves

Affordances of Technology for Supporting Learning

- **Computing & Automating** - Guessing and Checking is not really an option, students must provide the answer to every multiplication or division problem, numerically. Students can compute or calculate with the provided calculator or by themselves, and they cannot move on until the product/quotient/remainder is correct.

- **Representing Ideas & Thinking** - Students must represent or display their knowledge of dividing with the use of basic facts.
 - Accessing Information -
 - Communicating & Collaborating -
 - **Capturing & Creating** - Throughout the problem, The Quotient Cafe captures or saves the students work, guiding them to the quotient.
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4. How does the technology fit or interact with the social context of learning?

The Quotient Cafe does not have a time limit or a “score”, in an educational setting, it can be played individually, with partners, in small groups and/or presented (whole group).

5. Additional Comments

I really enjoyed this game, I think it important for students to “see”, what division is. I like that students are required to calculate (with or without calculator), the game does not provide the answer(s). I would use this game for practice only, student work/progress is not saved (long-term), therefore I could not assess.