Division Lesson Summary

School Fundraiser

Overview
This investigation is given to students **before** the introduction of the standard long division algorithm. Students have had experiences in dividing three-digit numbers by one-digit numbers. Students have used a variety of strategies to divide, including skip counting, repeated addition, and repeated subtraction. However, most students are using the distributive property and subtraction or addition. Most can use the open array model to represent strategies that use the distributive property. For example:
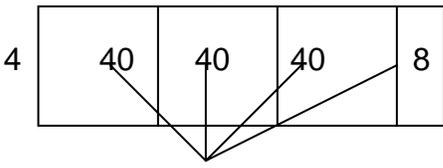
$$128 \div 4$$

$$4 \times 10 = 40$$
$$4 \times 10 = 40$$
$$4 \times 10 = 40$$
$$4 \times \underline{2} = \underline{8}$$
$$32 \quad 128$$

$$10 + 10 + 10 + 2 = 32$$

128

In this investigation, the students are asked to divide a three-digit number by a two-digit number. Students are encouraged to use their own strategies to find the answer. This investigation will facilitate the continued development of strategies, including the use of the distributive property. The teacher will connect strategies that use the distributive property and subtraction to the flexible division algorithm.

Learning Objectives
This investigation will help students to:

- consider division as determining the number of items in each group when the whole amount is known and the number of groups are known (partitive division)
- develop division strategies, such as using the distributive property and subtraction
- organize their strategies through the introduction of the flexible division algorithm

Learning Expectations
Students will:

- solve problems involving multiplication and division of whole numbers (four-digit by two-digit), using a variety of tools and strategies

Materials
- chart paper, markers

Getting Started

- Present the following situation to the class:

  My brother teaches in a school in another city and this school recently had a fundraiser. The school was raising money to buy board games for all the classrooms so the students would have something to play with during indoor recesses.

  He was in charge of organizing the fundraiser and collecting all the money. After counting all the money from the fundraiser he found that $782 had been raised for buying board games for the school.

  My brother called me last night and asked me if my class could help him out with a problem he is having. He teaches Grade 1 and thinks that this problem might be too hard for his class so he is asking us to help.

  He needs to figure out how much money each classroom in the school should get so that the money is given out evenly. He told me there were 17 classes in his school. My brother's class would like to buy a board game called Pictures Plus. My brother found it in a store and it costs $42. He is wondering if his class will be getting enough money to buy the game.

- Ask the students to make a prediction before the investigation:

  - What do you predict? Do you think there will be enough money for my brother's class to buy the Pictures Plus game? If you think that there will be enough, show a thumbs-up sign. If you disagree – if you think that there won't be enough money – show a thumbs-down sign.

- Remind students of the problem and have them share some initial ideas with an elbow partner:

  - How could you solve the problem to find out exactly how much money each classroom will get?

- Ask the following questions to help students understand the problem:

  - What do we need to find out?
  - What information is important to know?
  - What tools can we use to help solve the problem?

- Clarify the task and expectations for students' work:

  - Instruct students to work in pairs or small groups.
  - Tell students they can use manipulatives and paper and markers to find the solution.
  - Explain that all groups must choose a strategy that makes sense to them, because they will be sharing their solutions on the chart paper provided so everyone can see the strategy they used to solve the problem.

Working on It

Once students have started working, take on the role of facilitator and circulate among the groups to:

- Observe how well students are able to represent the situation and their strategies

- Probe and guide students' thinking by asking questions such as:

    – How can you show your thinking on your chart paper?
    – Where have you represented the amount of money each class is getting?
    – Is there another way you can answer this question?

Note: Some students may try to use the standard long division algorithm if they know it. Remind these students that they will need to explain their strategy and the numbers that represent both the total amount of money and the money each class is getting. If they use this algorithm, suggest that they try to solve the problem using a different strategy and then connect the algorithm with the new strategy.

- Select a number of groups (3 or 4) to present their solutions during the Reflecting and Connecting portion of the lesson. Selections should reflect a variety of strategies with varying efficiency and should encourage building connections.

Reflecting and Connecting

Gather the whole class together, then:

- Invite groups up to the front to present and discuss the strategies they used to solve the problem.

- Discuss and compare the various strategies that students used to arrive at the same answer. Emphasize that different methods are possible, but that some may be faster than others.

- Construct a flexible division algorithm to illustrate a student strategy that uses the distributive property and subtraction. For example:

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17│782
   -170│ 10
    612
   -170│ 10
    442
   -170│ 10
    272
   -170│ 10
    102
   - 34│  2
     68
   - 34│  2
     34
   - 34│  2
      0│ 46
```

- Summarize the strategies that were used to find the answer, including the distributive property (students don't need to know the name), and the new way of organizing a solution using the flexible division algorithm.