



Investigation/Lesson: Concepts of division: Tying to repeated subtraction
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Content Vocabulary:

- Division
- Subtraction
- Number line
- Divisor
- Quotient
- Dividend

Concepts/Skills/Core Content:

What are the goals of the lesson? What should a student know/be able to do as a result of this lesson?

The students will demonstrate their understanding of division as repeated subtraction. The students will use the concept of repeated subtraction in their problem solving.

Which core content bullet(s) is addressed in this lesson?

- MA-04-1.1.1, MA-04-1.3.1
- MA-05-1.1.1, MA-05-1.3.1

Materials:

What materials are needed for this lesson?

- Math notebooks (one for each child)
- Pencils
- Computer and Projector (or Overhead with markers)
- Number line transparency (If overhead is being used)
- Student sheets for exit slip
- Student homework sheet
- Counters for as a kinesthetic example

What materials preparation is necessary for this lesson?

Before the lesson, the teacher should think about how he or she is going to manage the materials needed to complete the lesson. One idea is to have tubs for each group of students and place all the supplies into the tub prior to the lesson. Copy all student sheets prior to the lesson.

Classroom/Materials Management:

How will students be grouped?

- Students will be provided the opportunity to work as a whole class, in small groups, and independently during the course of this lesson.

How will materials be distributed/returned?

- Students have tubs where their math notebooks are stored. The "getters" at each of the tables will distribute the tubs. All materials that are necessary will be placed in the tub for ease of distribution, or they get their notebook out of their desk if that is the place they keep them.
- Tubs will be collected from the tables by the "getters".
- The teacher will collect practice questions.

Thinking Through the Lesson:

Introduction (Warm Up/Anticipatory Set):

How will you introduce the lesson and connect it to prior student learning?

- Quick review questions to warm-up the students. These may be 3-5 questions reviewing concepts from a previous lesson.
- Introduce the objective for the lesson. Be sure to review the major vocabulary for the lesson.
- Read and explain the question: Mr. Z brought in 36 pieces of candy as a prize for the students in a math game. If he put 3 pieces of candy in each prize bag, how many students would receive a prize bag? To find out we have to think about what division is. In this lesson you will learn how division is like repeated subtraction.

Facilitation (Guided Practice):

How will you facilitate learning and move all students to higher order thinking?

- Think back to repeated addition and multiplication. Tie in how the two are related (teacher-led examples). Remember how MULTIPLICATION is repeated addition? For example: $6 \times 4 = 4 + 4 + 4 + 4 + 4 + 4 = 24$
- Show how you do the opposite for division (repeated subtraction). Let's reverse the process.
- The teacher can show a short web site based model on how to use the strategy of repeated subtraction when dividing. This model uses the number line as a visual tool for this strategy.
- Guided problem: Mark has 24 apples. He put them into bags containing 6 apples each. How many bags did mark use?
- Have students use counters with a partner to subtract amounts from 24. You can think about giving advanced students the more difficult problems. After being checked, the students can write the example into their writer's notebook. Share out with the class.
- Have students do two more problems for practice.
- Then the teacher will explain how a number line can help to further explain how division is like repeated subtraction. Teacher will model on the notebook computer (overhead). Think back to multiplication. Multiplication is repeated addition. It is like jumps on the number line. $6 \times 4 = 24$. Now division is the opposite of multiplication. So, division is repeated subtraction. $24 \div 6 =$.You make jumps of 6 backwards on the number line from 24, until you reach zero. How many jumps did you make? 4 jumps. You subtracted 6, four times.
- Have the students practice in groups to use the number line to determine division answers. After being checked, have students put their examples into their notebooks. Share out.
- Give students about four word problems to work on independently or in small groups. The teacher will circulate to be sure students are understanding the concept. The teacher will collect the practice sheets and go over the answers with students. They can come up to the computer to show how they came up with the answers using the strategy of repeated subtraction.

Closure:

How will you know what each student has learned/is able to do?

- How will you know what each student has learned/is able to do? So, back to Mr. Z's candies. If he brought 36 candies, using repeated subtraction, find out the answer of this problem. $36 \div 3 = ?$. Show your work. Use repeated subtraction strategy on the number line and write down the equation for each jumps. (Options: exit slip, homework or group activity)

Assessment:

How will you assess whether all students have learned what was expressed in the lesson goals?

Look at the students' work on the candy problems. Was each student able to show that they understood division as repeated subtraction? What misconceptions were there?

Student Notes/Notebooks:

Where and how will students record important classroom information? How will students know what to record?

The students will write examples into their own math notebooks once the problems they are checked by the teacher or another adult.

The students will be instructed to place specific examples into their notebooks.

How will students organize their notes/notebooks?

The students have used notebooks all year and know how to organize them.

The students will place the notebooks back into their tubs or desks.

How will you provide feedback to your students about their notes/notebooks and their organization?

Teacher can give specific praise to notes that are well organized and complete.

Literacy Connections:

Are there books or websites that would enhance learning in this lesson?

- Teaching Student-centered Mathematics (Grade 3-5) by: John A. Van de Walle and LouAnn H. Lovin
- Web Site used during this lesson: http://www.eduplace.com/math/mw/models/tm_3.html
- Power point presentation from: <http://www.primaryresources.co.uk/maths/mathsC2.htm>
Division by Repeated Subtraction (Chris Kirwan) .ppt file.

Homework (Independent Practice):

- Independent practice Sheet; including four word problems.
- Homework Sheet.