

GPB Fifth Grade Session Resource Packet

You will need the following materials while participating in the session:

Fifth Grade Handouts (included in this packet)

Color tiles, cubes, rectangular or square container, grid paper, paper

Note-taking materials

Session Format:

- Why CCGPS?
- How to read the standards
- Fifth Grade Overview
- What's New in Fifth Grade
- Six Lenses
- Focus Activity- **Potatoes**
- Coherence Activity- **True or False**
- Fluency Activity- **Clear the Board**- http://www.mathsolutions.com/documents/0-941355-75-6_L.pdf
- Deep Understanding Activity- Fifth Grade Handout 1- **The Hiking Trail**
- Application - Mathematizing Fifth Grade
- Balanced Approach Activity- **Target 300**- http://www.mathsolutions.com/documents/0-941355-31-4_L2.pdf
- Suggestions and Resources

Six Lenses-

Focus

Coherence

Fluency

Deep Understanding

Applications

Balanced Approach

K-5 Overview

Kindergarten

- Know number names and the count sequence.
- Count to tell the number of objects.
- Compare numbers.
- Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.
- Work with numbers 11–19 to gain foundations for place value.
- Describe and compare measurable attributes.
- Classify objects and count the number of objects in categories.
- Identify and describe shapes.
- Analyze, compare, create, and compose shapes.

1st Grade

- Represent and solve problems involving addition and subtraction.
- Understand and apply properties of operations and the relationship between addition and subtraction.
- Add and subtract within 20.
- Work with addition and subtraction equations.
- Extend the counting sequence.
- Understand place value.
- Use place value understanding and properties of operations to add and subtract.
- Measure lengths indirectly and by iterating length units.
- Tell and write time.
- Represent and interpret data.
- Reason with shapes and their attributes.

2nd Grade

- Represent and solve problems involving addition and subtraction.
- Add and subtract within 20.
- Work with equal groups of objects to gain foundations for multiplication.
- Understand place value.
- Use place value understanding and properties of operations to add and subtract.
- Measure and estimate lengths in standard units.
- Relate addition and subtraction to length.
- Work with time and money.
- Represent and interpret data.
- Reason with shapes and their attributes.

3rd Grade

- Represent and solve problems involving multiplication and division.

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- Understand properties of multiplication and the relationship between multiplication and division.
- Multiply and divide within 100.
- Solve problems involving the four operations, and identify and explain patterns in arithmetic.
- Use place value understanding and properties of operations to perform multi-digit arithmetic.
- Develop understanding of fractions as numbers.
- Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.
- Represent and interpret data.
- Geometric measurement: understand concepts of area and relate area to multiplication and to addition.
- Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.
- Reason with shapes and their attributes.

4th Grade

- Use the four operations with whole numbers to solve problems.
- Gain familiarity with factors and multiples.
- Generate and analyze patterns.
- Generalize place value understanding for multi-digit whole numbers.
- Use place value understanding and properties of operations to perform multi-digit arithmetic.
- Extend understanding of fraction equivalence and ordering.
- Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
- Understand decimal notation for fractions, and compare decimal fractions.
- Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
- Represent and interpret data.
- Geometric measurement: understand concepts of angle and measure angles.
- Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

5th Grade

- Write and interpret numerical expressions.
- Analyze patterns and relationships.
- Understand the place value system.
- Perform operations with multi-digit whole numbers and with decimals to hundredths.
- Use equivalent fractions as a strategy to add and subtract fractions.
- Apply and extend previous understandings of multiplication and division to multiply and divide fractions.
- Convert like measurement units within a given measurement system.
- Represent and interpret data.

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- Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.
- Graph points on the coordinate plane to solve real-world and mathematical problems.
- Classify two-dimensional figures into categories based on their properties.

Resources:

Teaching Guides/CCGPS: <https://www.georgiastandards.org/Pages/default.aspx>
<https://portal.doe.k12.ga.us/Login.aspx>

Rekenrek: http://www.mathlearningcenter.org/media/Rekenrek_0308.pdf

Open Number Line:

http://www.uwosh.edu/coehs/mindsongmath/concepts/documents/Empty_Number_Line.pdf

Math Solutions Free Resources: <http://www.mathsolutions.com/index.cfm?page=wp9&crid=122>

VandeWalle, "Teaching Student-Centered Mathematics, 3-5" (Sent to every GA elementary school, Fall 2011)

Unit 1 Fifth Grade Webinar, 3:15, May 10, 2012

Scaffolding Task: The Hiking Trail

This task develops the concept of equivalent fractions students will need to add fractions with unlike denominators later in the unit. The purpose of this task is to encourage student development of strategies to find equivalent fractions.

Standards Addressed:

Standards for Mathematical Practice:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Content Standards:

Numbers - Fractions

Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

3. Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret $3/4$ as the result of dividing 3 by 4, noting that $3/4$ multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size $3/4$. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*

4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.

a. Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. *For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$, and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$. (In general, $(a/b) \times (c/d) = ac/bd$.)*

(for descriptors of standard cluster, see beginning of unit)

Essential Questions:

How can looking at patterns help us find equivalent fractions?

How are equivalent fractions helpful when solving problems?
How does the size of the whole determine the size of a fraction?
How can we tell if some fractions are related?
How can learning about fractions that are related help us solve problems?

D.O.K. Level

Level 3 (Strategic Thinking) requires reasoning, planning, using evidence, and a higher level of thinking than the previous two levels. In most instances, requiring students to explain their thinking is a Level 3. Activities that require students to make conjectures are also at this level. The cognitive demands at Level 3 are complex and abstract. The complexity does not result from the fact that there are multiple answers, a possibility for both Levels 1 and 2, but because the task requires more demanding reasoning. An activity, however, that has more than one possible answer and requires students to justify the response they give would most likely be a Level 3. Other Level 3 activities include drawing conclusions from observations; citing evidence and developing a logical argument for concepts; explaining phenomena in terms of concepts; and using concepts to solve problems.

MATERIALS:

Copy of the Task The Hiking Trail (1 per pair of students or small group)
Pencil
Ruler (60 inch tape measure or yardstick)
Accessible manipulatives

GROUPING: pair/small group task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION:

Comments: This task was adapted from *Contexts for Learning Mathematics Fractions, Decimals, and Percents* by Fosnot, Catherine Twomey et.al. A recording sheet is provided, but is not necessary for this task, especially if students are using a math journal or learning log. Students should draw representations of their mathematical thinking as well as use words and numbers to explain their thinking for three reasons:

SMP2. Reason abstractly and quantitatively.

SMP3. Construct viable arguments and critique the reasoning of others.

SMP4. Model with mathematics.

Students should be allowed to draw representations of their thinking. This allows them to “talk through” their process which in turn enables students the opportunity to attend to precision as they explain and reason mathematically.

Background Knowledge: Students engaging in this task have a deep understanding of fractions and the beginnings of fraction sense fostered in previous tasks. If students need additional support in developing this fraction sense, support students with activities from *Teaching Students Centered Mathematics*, by John A Van de Walle and LouAnn Lovin., pgs. 144 – 146 (activities 5.6 – 5.10).

Teacher Notes:

Opening

- Present one computation at a time and facilitate a discussion with students, asking them to find and explain the strategy they used to find:
 - $100/2$
 - $100/4$
 - $200/4$
 - $200/8$
 - $400/16$
- Introduce the problem and be sure everyone is clear with the context. Let students know that they will be designing a hiking trail for a four day Hike-a-thon. The trail is 60 km and is in the GA Mountains. The committee has decided what kind of informational markers and how often they should be placed. Your task is to figure out where to put informational markers along the way.
- A Camping area and Food Wagons should be at each fourth of the trail.
- Resting Points should be at every eighth of the trail.
- Water Stations should be at every tenth of the trail.
- Juice and Snack Tables should be at every fifth of the trail.
- Recycling and Trash Bins should be placed at every marker
- Kilometer Markers should be placed along the trail, so that hikers know how much of the course they've completed. These markers should be placed at every twelfth, sixth, and half of the course, as well as at all of the other locations above. These markers should show how many kilometers have been completed.

Work Session

Give pairs of students sixty inch measuring tapes or yard sticks. Have the pairs draw a sixty inch hiking trail on some butcher paper.

Students may use a variety of strategies including, but not limited to:

- Halving. They may take half of the halves to find fourths, and take half of the fourths to find eighths.
- Dividing by the denominator. Students may think of $1/5$ of $60 = 60/5$
- Adding parts. Students may think about $3/8$ as $1/8$ more than $2/8$.
- Use equivalence ideas developed in the ratio table task earlier. Students may say $6/8 = 3/4$ since $3 \times 2 = 6$ and $4 \times 2 = 8$

Possible questions that engage students

How can you tell that your answer is correct?

How do you know that marker goes there? Show me your thinking.

How can you tell that your markers are in the correct place? Is there another way to think about this?

Did you develop a shortcut to find your answers?

Did you identify any patterns or rules? Explain what you have found!

Closing

- After enough time has been devoted to the task, hang the work around the room and have students take some time to view and make comments on others' work. Students may ask questions, or make mathematical commentary on post-it notes and stick them to the work. Pay attention to students' talk and make note of what is discussed during this time as it may give you some ideas about who should share and in what order they should share.
- When students have finished the tour, come back to the large group and begin the closing of the lesson. The goal of this closing is to help students make generalizations about equivalent fractions. Help students reach this goal, not by telling, but by asking thought provoking questions about the work.

The Hiking Trail

Let students know that they will be designing a hiking trail for a four day Hike-a-thon. The trail is 60 km and is in the GA Mountains. The committee has decided what kind of informational markers and stations are needed and how often they should be placed. Your task is to figure out where to put informational markers and stations along the way.



- A Camping area and Food Wagons should be at each fourth of the trail.
- Resting Points should be at every eighth of the trail.
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