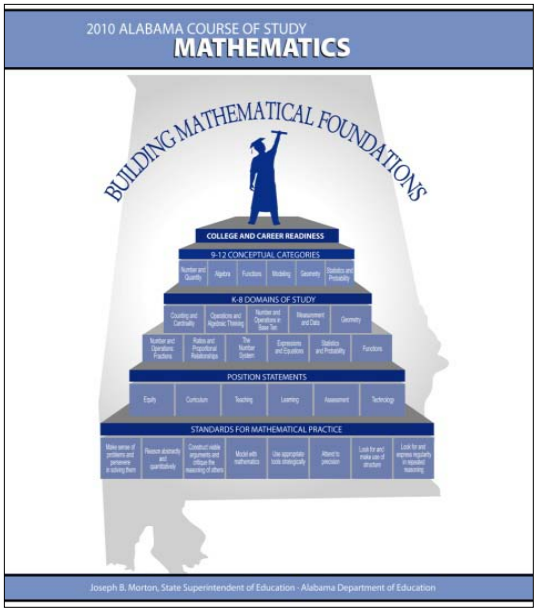
K - 5

Mathematics Participant Packet



November 2012

STANDARDS FOR MATHEMATICAL PRACTICE

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices are based on important "processes and proficiencies" that have longstanding importance in mathematics education. The first of these are the National Council of Teachers of Mathematics' (NCTM) process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report, *Adding It Up*: *Helping Children Learn Mathematics*. These proficiencies include adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations, and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently, and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy). The eight Standards for Mathematical Practice are listed below along with a description of behaviors and performances of mathematically proficient students.

Mathematically proficient students:

1. Make sense of problems and persevere in solving them.

These students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. These students consider analogous problems and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to obtain the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solve complex problems and identify correspondences between different approaches.

2. Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships. One is the ability to *decontextualize*, to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents. The second is the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

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

These students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. These students justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments; distinguish correct logic or reasoning from that which is flawed; and, if there is a flaw in an argument, explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until the middle or upper grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen to or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

4. Model with mathematics.

These students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, students might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, students might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts, and formulas and can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

5. Use appropriate tools strategically.

Mathematically proficient students consider available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a Web site, and use these to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

6. Attend to precision.

These students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. Mathematically proficient students are careful about specifying units of measure and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, and express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

7. Look for and make use of structure.

Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7×8 equals the well-remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. These students also can pause and reflect for an overview and shift perspective. They can observe the complexities of mathematics, such as some algebraic expressions as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.

8. Look for and express regularity in repeated reasoning.

They notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y - 2)/(x - 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As students work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details and continually evaluate the reasonableness of their intermediate results.

Connecting the Standards for Mathematical Practice to the Standards for Mathematical Content

The eight Standards for Mathematical Practice described on the previous pages indicate ways in which developing student practitioners of the discipline of mathematics increasingly must engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle, and high school years. It is important that curriculum, assessment, and professional development designers be aware of the need to connect the mathematical practices to the mathematical content standards.

The *Common Core State Standards for Mathematics*, also referred to as the Standards for Mathematical Content, are a balanced combination of procedure and understanding. Expectations that begin with the word "understand" are often especially good opportunities to connect mathematical practices to mathematical content. Students who lack understanding of a topic may rely on procedures too heavily. Without a flexible base from which to work, they may be less likely to consider analogous problems, represent problems coherently, justify conclusions, apply the mathematics to practical situations, use technology mindfully to work with the mathematics, explain the mathematics accurately to other students, pause for an overview, or deviate from a known procedure to find a shortcut. Thus, a lack of understanding effectively prevents a student from engaging in the mathematical practices.

In this respect, those content standards which set an expectation of understanding are potential "points of intersection" between the Standards for Mathematical Practice and the Standards for Mathematical Content. These points of intersection are intended to be weighted toward central and generative concepts in the school mathematics curriculum that most merit the necessary time, resources, innovative energies, and focus to qualitatively improve the curriculum, instruction, assessment, professional development, and student achievement in mathematics.

What Does Instruction for Mathematical Practice Look Like?

Watch the video clip of a teacher interacting with his/her students during a mathematics lesson.

Discuss the following.

1. What evidence was there of intentional attention by the teacher to a Mathematical Practice Standard? Did the teacher model the behavior or elicit it from his/her students?

2. Did the teacher unintentionally promote or prohibit student engagement with mathematical practices? How might these unintentional moves be used for more intentional development of mathematical practice?

3. What did you observe students doing that exhibited their use of a Mathematical Practice? How might the teacher encourage further or deeper use of this Mathematical Practice?

Building Sets of Ten

Students explore sets of up to 10 items and practice writing the numbers 0 through 10. Students count back from 10, identify sets of up to 10 objects, and record 10 on a chart. They also construct and decompose sets of up to 10 items.

Learning Objectives

Students will:

- construct and record groups of 10 objects
- identify and write the numeral 10
- write the numerals through 10
- construct and decompose groups of 10 objects

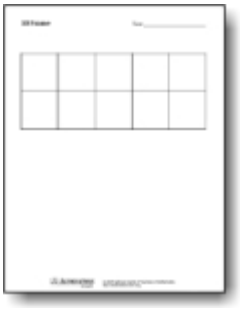
Materials

Connecting cubes
Crayons
Paper
Numeral Cards
10-Frame Activity Sheet
Steps to 10 Activity Sheet
Spinner Applet

Instructional Plan

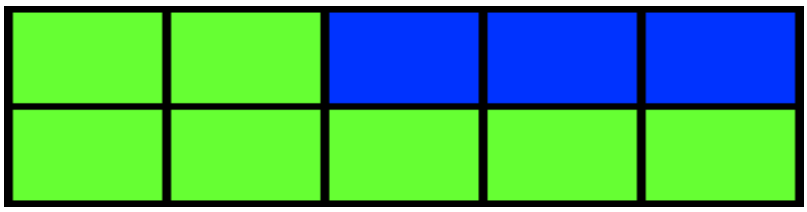
Give each student a blank piece of paper. Display a numeral using the numeral cards that are provided. Ask the students to draw the number of objects (such as circles, rectangles, squares, etc.) that matches the displayed numeral and to silently count the number of objects by writing a number on each one. This exercise provides information about the students' number recognition, ability to record the number displayed, and use of one-to-one correspondence to develop rational counting strategies. Use the information gained from this activity to adjust the pace of this lesson and plan experiences that support and challenge learners. Refer to the students' work to measure growth, strengths, and needs.

Display the numeral card for 0 and ask students to make a 0 in the air. Give them a 10-Frame activity sheet and connecting cubes in two colors.



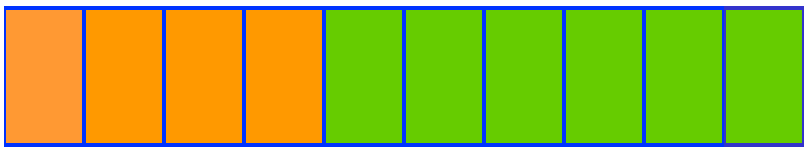
10-Frame Activity Sheet

Ask them to fill in each section of the "10" Frame with a single cube, counting aloud in unison as they do so.



Now have the students color the sections of the "10" Frame to match the cubes they placed in them. Ask a student to share with the class the way he or she showed 10. [For example, "I used seven green and three blue cubes."] Repeat with several children. Then tell the students to take these sheets home to share with their family.

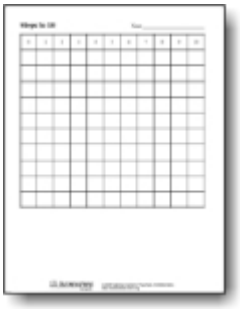
Go to the Spinner Applet. Create an 11-part spinner by entering the numbers 0 through 10, starting in the left column. As you enter each number, call on a volunteer to choose a color for that section of the spinner. After entering the 11 numbers, activate the spinner. After each spin, ask the students to say the number aloud and make a train with that many connecting cubes, using two colors. Call on a volunteer to tell how many of each color he or she used to make the train. [In the example below, the student might say, "I used four orange and six green cubes to make my train of 10."] Repeat several times, choosing different children to activate the spinner each time.



Next use the "Back" button on the Web site to return to the Number & Operations, preK-2 directory on the National Library of Virtual Manipulatives Web site, and select "Bar Charts." Set the number of columns to 11 and the number of rows to 11. Label the columns with the numbers 0 through 10 on the bottom of each column. Delete the term "label" and enter the values 0 through 10, one number in each column. Then click on one box over "1," seven boxes over "7," and so forth, starting at the bottom of each column and moving up one box at the time until the appropriate number of boxes are highlighted for that column. Remember that the column labeled "0" will have no boxes. Repeat this

activity several times, choosing different students to count and click on the boxes.

Now distribute the students' Steps to 10 sheets and ask them to color in the column for "10." Ask the students which numbers they have now shown on the chart [1 through 10]. Ask what they would need to do to complete the "0" column. [Nothing] Then ask them to compare the online bar chart with the paper chart they have created.



Steps to 10 Activity Sheet

End the lesson by showing a numeral and asking the students to perform a given action [e. g., stamping a foot, snapping their fingers, turning around] that number of times. Repeat this activity using several different numbers.

Questions for Students

Look at the connecting cubes in my hand. (Show 10 connecting cubes.) Take eight connecting cubes from my hand. How many connecting cubes are left in my hand?

[There are two connecting cubes.]
(Repeat, asking the students to take away other amounts from 10.)
When your hand is empty, how many connecting cubes are you holding?
[Zero]
Do you know a word that means "zero"?
[None]
Can you count to 10? Can you show me a group of 10?
Can you show a way to split the group of 10 into two groups? Can you do it a different way?
Make a group of eight and a group of 10. Which group has more? How many more? Which group has less? How many less?
[The group of 10 has two more. The group of 8 has two less.]
How can you change a train of nine to a train of 10? How can you change a train of 10 to a train of five?
[I can add five more blocks to make 10 blocks.]
(Repeat using other numbers.)

Assessment Options

1. Use the teacher resource sheet, Class Notes, to document your observations about

the students' abilities to do the following:

- Construct groups of 10 objects
- Identify and write the numeral 10
- Write the numerals up through 10
- Construct and decompose groups of 10 objects
- Record groups of 10 items

Teacher Reflection

- Which students can construct groups for all the numbers, 0 through 10? What are the next appropriate goals for them?
- Are there students still unable to count out 10 objects? What should I do at this time to help them reach this goal?
- Which students are not yet able to count rationally up through 10? What experiences do they need next?
- Which students are able to identify the numerals 0 through 10? Which students need help on specific numerals?
- Which students are not yet able to write the numerals 0 to 10? Which numerals are the most difficult for them? What additional experiences should I plan for them?
- Which students are not able to compare sets of 0 to 10 items? What learning activities should I plan for them?
- What adjustments will I make the next time that I teach this lesson?

NCTM Standards and Expectations

Number & Operations Pre-K-2

1. Develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers.
2. Connect number words and numerals to the quantities they represent, using various physical models and representations.
3. Count with understanding and recognize "how many" in sets of objects.

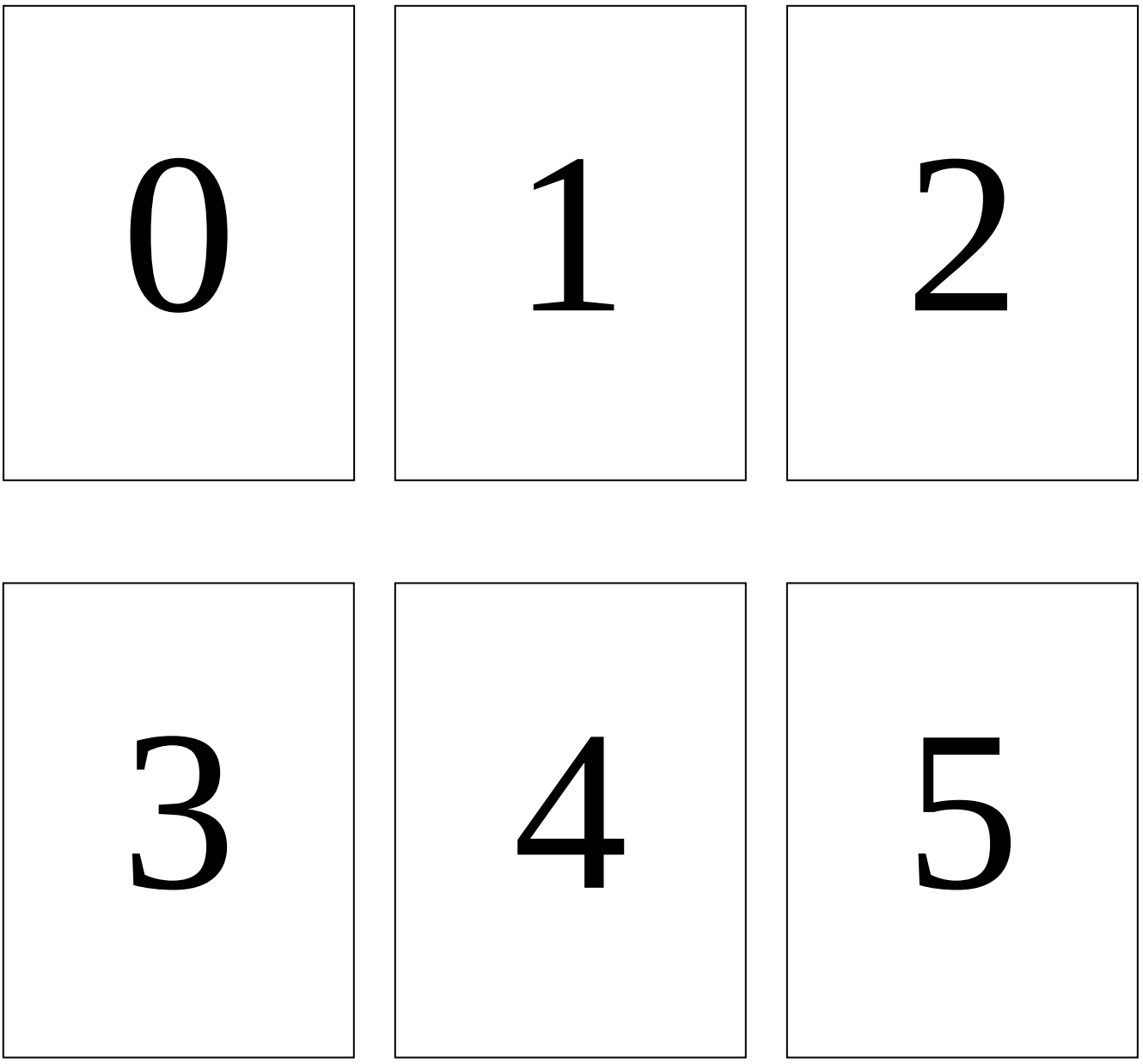
References

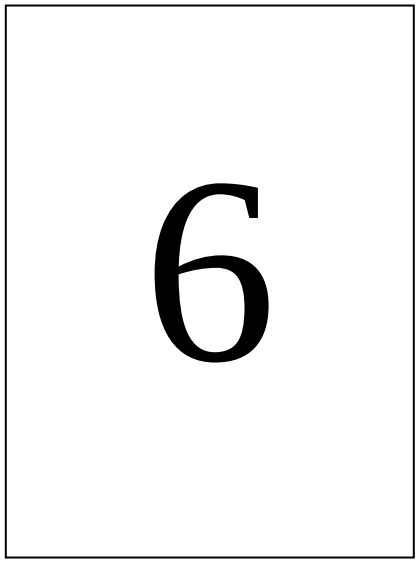
- Baratta-Lorton, Mary. *Mathematics Their Way*. Menlo Park, Calif.: Addison-Wesley, 1974.
- Burton, Grace M. *Towards a Good Beginning: Teaching Early Childhood Mathematics*. Menlo Park, Calif.: Addison-Wesley, 1985.

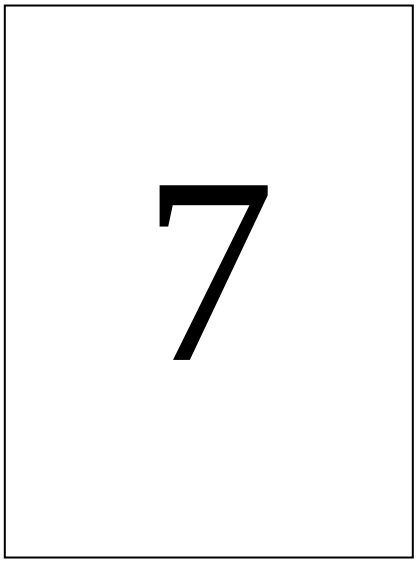
This lesson was developed by Grace M.
Burtonn.

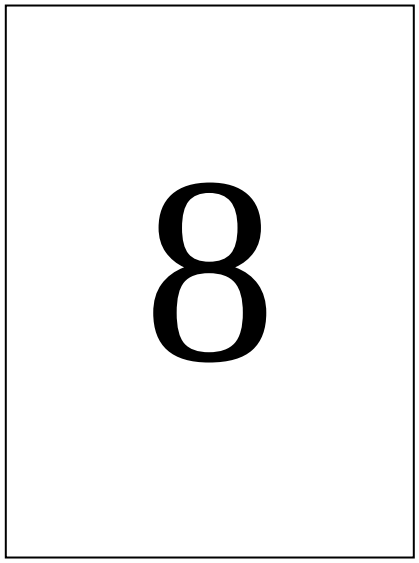
Numeral Cards

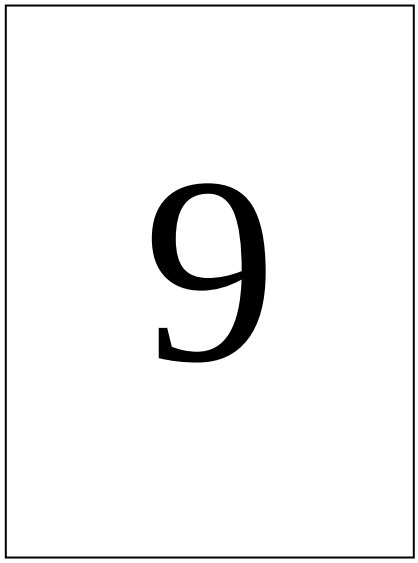
NAME _____

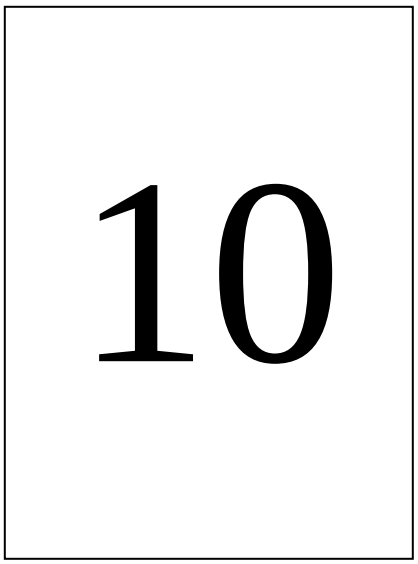












10 Frame

NAME _____

Steps to 10

NAME _____

0	1	2	3	4	5	6	7	8	9	10

Pattern Block Fractions

This lesson builds on the previous two lessons by focusing on the identification of fractional parts of a region and by recording them in standard form. Students continue to develop communication skills by working together to express their understanding of fraction relationships and to record fractions in written form.

Learning Objectives

Students will:

- identify fractions when the whole (region) and a part of the region are given
- represent the fractional relationship between the pattern block shapes using a standard form of the written notation [for example, the green triangle is *x* of the blue rhombus]
- identify the numerator in a fraction and understand that the numerator is the top number in a fraction and indicates the number of parts of the whole
- identify the denominator in a fraction and understand that the denominator is the bottom number in a fraction and indicates the number of parts into which the whole is divided

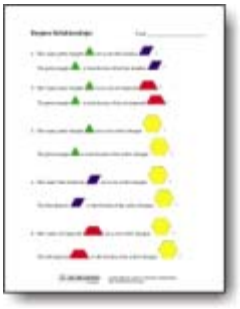
Materials

Pattern Blocks
Chart Paper
Markers
Region Relationships 2 Activity Sheet
Virtual Pattern Blocks, such as Pattern Blocks Program or National Library of Virtual Manipulatives: Pattern Blocks

Instructional Plan

For this lesson, students need a set of pattern blocks. (Only the yellow hexagons, red trapezoids, blue rhombi, and green triangles are needed. Students do not use the orange triangle or the tan rhombus for this lesson.) If students are seated at tables, one set of pattern blocks can be shared by the group.

Have students work in pairs to explore relationships. Guiding questions are provided to facilitate the exploration and concentrate on the mathematical focus of this lesson. Students should use pattern blocks to find relationships and to determine the answer. If overhead pattern blocks are available, the two pattern blocks being compared can be modeled on the overhead projector. Questions may be made available to students in hard copy. Please see Region Relationships 2 activity sheet. An overhead transparency of this worksheet can be made for use with the entire class.



Region Relationships 2 Activity Sheet

Again ask each of the guiding questions from the first lesson, Investigating with Pattern Blocks, but follow each question with another question about the fractional relationship. For example,

How many green triangles  are in one blue rhombus  ? [Two.]

The green triangle  is what fraction of the blue rhombus  ? [One out of two, or ½.]

Model the written form of each fraction by recording each fraction on the board or overhead in standard (fraction) form. Have the students record fractions in their math journals. For example,

2  = 1 

Therefore,

1  = ½ 

The students should have little difficulty expressing this relationship as a fraction. They have used the fraction ½ on numerous occasions even prior to kindergarten. This lesson should focus on the written format and what it really means. Lead the students in identifying and defining the numerator and denominator. Ask the students to explain

what the top number in the fraction represents. [Students should indicate that this top number is the numerator and shows the number of parts of the whole.] The students should also identify the purpose of the bottom number, or denominator, as the number that indicates the number of parts into which the whole is divided.

Continue with all other pattern block relationships, recording the fractions. You may choose to have the students record the relationships in a math journal to which they may refer later. Each group should record relationships on chart paper to share with the whole class. As each group shares, have the students record in their journal any relationships that they may have missed.

Have the students repeat the activity using virtual pattern blocks on the computer. They should be directed to the online Pattern Blocks Program. (As in the previous lesson, Virtual Pattern Blocks, students may need some help in figuring out how to use the applet. Show them that shapes can be dragged onto the work surface, and also show them how one shape can be used to cover another. Alternatively, students may use the National Library of Virtual Manipulatives: Pattern Blocks.)

Questions for Students

1. How many green triangles are in one blue rhombus? [Two]
   The green triangle is what fraction of the blue rhombus? [1/2]
   What part of this fraction is the numerator? [1]
   What does the numerator in this fraction mean or represent? [The one green triangle of the two that it takes to cover a blue rhombus.] What part of this fraction is the denominator?
   [2] What does the denominator in this fraction mean? [The number of green triangles it takes to cover one blue rhombus.]

2. How many green triangles are in one red trapezoid? [Three]
   The green triangle is what fraction of the red trapezoid? [1/3]
   What part of this fraction is the numerator? [1]
   What does the numerator in this fraction mean or represent? [The one green triangle of the three that it takes to cover a red trapezoid.] What part of this fraction is the denominator? [3]
   What does the denominator in this fraction mean? [The number of green triangles it takes to cover one red trapezoid.]

3. How many green triangles are in one yellow hexagon? [Six]
   The green triangle is what fraction of the yellow hexagon? [1/6]
   What part of this fraction is the numerator? [1]
   What does the numerator in this fraction mean or represent? [The one green triangle of the six that it takes to cover a yellow hexagon.] What part of this fraction is the denominator? [6]
   What does the denominator in this fraction mean? [The number of green triangles it takes to cover one yellow hexagon.]

4. How many blue rhombuses are in one yellow hexagon? [Three]
   The blue rhombus is what fraction of the yellow hexagon? [1/3]
   What part of this fraction is the numerator? [1]
   What does the numerator in this fraction mean or represent? [The one blue rhombus of the three that it takes to cover a yellow hexagon.] What part of this fraction is the denominator? [3]
   What does the denominator in this fraction mean? [The number of blue rhombuses it takes to cover one yellow hexagon.]

5. How many red trapezoids are in one yellow hexagon? [Two]
   The red trapezoid is what fraction of the yellow hexagon? [1/2]
   What part of this fraction is the numerator? [1]
   What does the numerator in this fraction mean or represent? [The one red trapezoid of the two that it takes to cover a yellow hexagon.] What part of this fraction is the denominator? [2]
   What does the denominator in this fraction mean? [The number of red trapezoids it takes to cover one yellow hexagon.]

Assessment Options

1. At this stage of the unit, it is important to know whether the students can do the following:
   - identify fractions when the whole (region) and a part of the region are given
   - represent the fractional relationship between the pattern block shapes using standard form of the written notation (e.g., the green triangle is *x* of the blue rhombus.)
   - identify the numerator in a fraction and understand that the numerator is the top number in a fraction and indicates the number of parts of the whole
   - identify the denominator in a fraction and understand that the denominator is the bottom number in a fraction and indicates the number of parts into which the whole is divided
2. The students' recordings can be used to make instructional decisions about their understanding of fraction relationships. Because this entire unit deals with relationships, areas needing additional work can be developed during subsequent lessons. You may choose to use the Class Notes recording sheet at the end of this unit to make anecdotal notes about the students' understanding and use those notes to guide your instructional planning.

Teacher Reflection

- Which students can identify fractions when the whole (region) and a part of the region are given? What activities are appropriate for the students who have not yet developed this understanding?
- Which students can represent the fractional relationship between the pattern block shapes using a standard form of the written notation (e.g., the green triangle is _ of the blue rhombus). What activities are appropriate for the students who have not yet developed this understanding?
- Which students can identify the numerator in a fraction? Do the students understand that the numerator is the top number in a fraction and indicates the number of parts of the whole? What activities are appropriate for the students who have not yet developed this understanding?
- Which students can identify the denominator in a fraction? Do the students understand that the denominator is the bottom number in a fraction and indicates the number of parts into which the whole is divided? What activities are appropriate for the students who have not yet developed this understanding?
- What parts of the lesson went smoothly? What parts should be modified for the future?

NCTM Standards and Expectations

Number & Operations 3-5

1. Develop understanding of fractions as parts of unit wholes, as parts of a collection, as locations on number lines, and as divisions of whole numbers.
2. Recognize and generate equivalent forms of commonly used fractions, decimals, and percents.
3. Use models, benchmarks, and equivalent forms to judge the size of fractions.

This lesson prepared by Tracy Y. Hargrove

Region Relationships

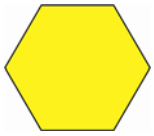
NAME _____

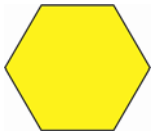
1. How many green triangles  are in one blue rhombus  ?

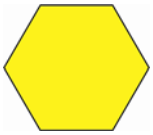
The green triangle  is what fraction of the blue rhombus  ?

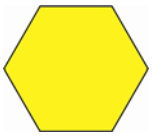
2. How many green triangles  are in one red trapezoid  ?

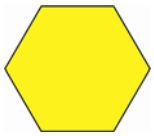
The green triangle  is what fraction of the red trapezoid  ?

3. How many green triangles  are in one yellow hexagon  ?

The green triangle  is what fraction of the yellow hexagon  ?

4. How many blue rhombuses  are in one yellow hexagon  ?

The blue rhombus  is what fraction of the yellow hexagon  ?

5. How many red trapezoids  are in one yellow hexagon  ?

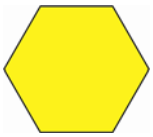
The red trapezoid  is what fraction of the yellow hexagon  ?

Figure 2.11:
CCSS Mathematical Practices Lesson-Planning Tool

Unit: **Date:** **Lesson:**		
Learning target: As a result of today's class, students will be able to _____		
Formative assessment: How will students be expected to demonstrate mastery of the learning target during in-class checks for understanding?		
Probing Questions for Differentiation on Mathematical Tasks		
Assessing Questions (Create questions to scaffold instruction for students who are "stuck" during the lesson or the lesson tasks.)	**Advancing Questions** (Create questions to further learning for students who are ready to advance beyond the learning target.)	
Targeted Standard for Mathematical Practice: (Describe the intent of this Mathematical Practice and how it relates to the learning target.)		
Tasks (The number of tasks may vary from lesson to lesson.)	**What Will the Teacher Be Doing?**	**What Will the Students Be Doing?** (How will students be actively engaged in each part of the lesson?)
Beginning-of-Class Routines How does the warm-up activity connect to students' prior knowledge?		

Tasks (The number of tasks may vary from lesson to lesson.)	**What Will the Teacher Be Doing?**	**What Will the Students Be Doing?** (How will students be actively engaged in each part of the lesson?)
Task 1 How will the learning target be introduced?		
Task 2 How will the task develop student sense making and reasoning?		
Task 3 How will the task require student conjectures and communication?		
Closure How will student questions and reflections be elicited in the summary of the lesson? How will students' understanding of the learning target be determined?		

Resources for Common Core State Standards

General sites:

Common Core Standards Official website sponsored by Council of Chief State School Officers and the National Governor's Association
http://www.corestandards.org

Council of Chief State School Officers – national association of state superintendents – helpful communications tools
http://www.ccsso.org/Resources/Programs/Implementing_the_Common_Core_Standards_(ICCS).html

International Center for Leadership in Education – White paper on Implementing the Common Core and resources to assist with developing an implementation plan
http://www.leadered.com/

Engage New York – this is the Common Core Site for New York State. You'll find videos, lessons and general resources here. New York will be posting curriculum units shortly to this site.
http://engageny.org

Hunt Videos – 30 videos on key topics of the common core

Jordan-Granite School Districts Consortium – these two school districts have developed resources on implementing the common core
http://wwwjordandistrict.org/?s=common+core&submit=search

National Parent Teachers Association – communication tools for every grade regarding the Common Core State Standards
http://www.pta.org/common_core_state_standards.asp

Northwest Regional Education Laboratory – general resources on the common core
http://educationnorthwest.org/resource/1334

Ohio Department of Education – Example of common core curriculum, units of study for grades K-12

http://www.education.ohio.gov/GD/Templates/pages/ODE/ODEPrimary.aspx?page=2&TopicRelationID=1696

Smithfield School District RI – samples units and resources developed by a school district in Rhode Island
http://www.smithfield-ps.org/ccss-resources-teachers

Student Achievement Partners – non-profit organization formed to support the Common Core State Standards
http://www.achievethecore.org

Successful Practice Network – Gold Seal Lessons – exemplary lessons developed by teachers to achieve the rigor and relevance of the common core
http://www.successfulpractices.org/

Teaching Channel – this website provides videos of classroom teachers presenting lessons in all content areas. Helpful to critique the instructional shifts required in the common core
http://www.teachingchannel.org/videos/surface-area-lesson?fd=1

Thinkfinity – Teacher resources developed by the Verizon Foundation
http://www.thinkfinity.org

Utah Education Network – lots of quality lessons in all content areas
http://www.uen.org/lesson

English Language Arts and Literacy

CCSS ELA and Literacy standards
Appendix A – Background information
Appendix B – Text exemplars and performance tasks
Appendix C – Writing exemplars
http://www.corestandards.org

Common Core Curriculum Maps – Funded originally by the Gates Foundation approximately 5000 teachers have contributed to the development of these units. Originally free you can still find the free document in the achieved files. E-versions and hardbound copies now available for a fee.
http://commoncore.org/maps

National Council of English Teachers
http://www.ncte.org/standards/commoncore

International Reading Association - Common core webinars and resources
http://www.reading.org/Resources/ResourcesByTopic/CommonCore-resourcetype/CommonCore-rt-resources.aspx

PISA Released Items for Reading
http://www.oecd.org/dataoecd/13/34/38709396.pdf

Mathematics

CCSS Mathematics Standards
http://www.corestandards.org

High School content maps and syllabi
CCSS Appendix A
http://www.corestandards.org

Deborah Ball – Professor at the University of Michigan – excellent videos illustrating quality math classes
http://www-perssonal.umich.edu~dball/publications/index.html

Hung-Hsi Wu's Home Page – served on the Math CCSS writing group. Excellent tools resources for high school teachers
http://math.berkeley.edu/~wu/

Illuminations –NCTM resources for teaching math (activities, lessons)
http://illuminations.nctm.org.

Illustrative Mathematics Project – Funded by the Gates Foundation this site features the domains of the Common Core State Standards for K-8 and the High School. The site is being developed to provide teachers with sample items for each of the standards.
http://illustrativemathematics.org

Inside Mathematics – resources and videos illustrating the mathematical practices
http://www.insidemathematics.org

Mathematical Practice rubrics and Supplement– Rubrics developed by a group of secondary teachers to help guide the implementation of the mathematical practices. The supplemental document provides additional resources for each of the eight mathematical practices
http://bestcase.wordpress.com/2011/07/22/mathematical-practices/

Mathematical Progression Documents – Describe in detail the development of the domains.
http://commoncoretools.wordpress.com

Mathematical Modeling in a Real & Complex World – Units developed by Montana University for high school mathematics
http://www.math.montana.edu/frankw/ccp/modeling/topic.htm

MSP Project Drew Kravin & Phil Gonzales – This site is a Math Science Partnership site that features units of study by grade level. The units were developed in partnership with classroom teachers
https://sites.google.com/a/wccusd.net/mcc-wccusd1/home/resources/lessons

National Council of Teachers of Mathematics (NCTM)
http://www.nctm.org

National Common Core Coalition – represent 8 national mathematics organizations
http://www.nctm.org/standards/mathcommoncore

National Council of Supervisor of Mathematics
www.mathleadership.org/ccss

One hundred Plus tools on Stem for teachers This is tool that was prepared by a teacher who has reviewed over one hundred different math, science and STEM sites. She has used the live binder tool to organize these resources. Live binder does not screen any of these tools. I'm providing the link as it captures many high quality sites in one place.
http://www.livebinders.com/play/play_or_edit?id=126258

Stepping Stones – 40 interdisciplinary projects for grades 7-12 developed by Indiana University to model real world application of mathematics
http://www.indiana.edu/~iucme/mathmodeling/lessons.htm

Think Math
http://thinkmath.edc.org

Wolfram Math World - search engine for mathematical problems
http://Mathworld.wolfram.com

Assessments

Next Navigator – online tools with 600 plus performance assessments aligned to the Common Core
http://www.nextnavigator.com/

Mathematics Assessment Project – Funded by the Gates Foundation this site provides, units, lessons, assessment and professional development on the common core for middle and high school grades.
http://map.mathshell.org/materials/background.php

PARCC – Partnership for Assessment for College and Careers – Assessment consortia developing new assessments for the common core state standards for approximately 25 states.
http://parcconline.org

Smarter Balanced Assessment Consortium - – Assessment consortia developing new assessments for the common core state standards for approximately 25 states.
http://smarterbalanced.org

National Assessment of Educational Progress – Released items
http://nces.ed.gov/nationsreportcard/about/naeptools.asp

PISA – Programme for International Student Assessment – released assessment items in Reading, Mathematics and Science. This assessment is administered to 15-year-old students internationally every two years.
http://www.oecd.org/dataoecd/14/10/38709418.pdf