Grade 4 Suggested Materials and Activities to Support Mathematics Education

Below are activities, lessons, parent resources and literature that can be used to enhance and/or support 4th grade math instruction in the classroom. These activities use hands on concrete models to support conceptual understanding of the five domains. The activities take students from the concrete model to representational and the abstract understanding of the Florida Standards. They are written as a menu of options you may choose from dependent on the needs of your students.

Operations and Algebraic Thinking

In Grade 4, instructional time should focus on three critical areas: (1) developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry. **Cluster 1: Use the four operations with whole numbers to solve problems** **Cluster 2: Gain familiarity with factors and multiples** **Cluster 3: Generate and analyze patterns**	**A bibliography of children's literature with a focus on factors and multiples is provided, which can be integrated so that students can connect through literature.** 1. Two Ways to Count to Ten: A Liberian Folktale, Ruby Dee 2. Bean Thirteen, Matthew McElligot 3. Divide and Ride, Stuart Murphy 4. The Great Divide, Dayle Ann Dodds

Parent Resources	
How to Teach the Multiplication Tables to Your Child http://www.wikihow.com/Teach-the-Multiplication-Tables-to-Your-Child **Using Arrays to Multiply** http://www.cpalms.org/Public/PreviewResourceUrl/Preview/126354 **The Multiplication Game** http://www.cpalms.org/Public/PreviewStandard/Preview/5361 **Factor Tree** http://www.cpalms.org/Public/PreviewResourceUrl/Preview/53710 **Playing the Product Game** http://illuminations.nctm.org/lesson.aspx?id=5729 **The Factor Game** https://illuminations.nctm.org/Activity.aspx?id=4134	

Fantastic Factors	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/73130 In this lesson, students will start out using manipulatives to create rectangles which will be used to find factor pairs. Students will move to using a T-Chart to determine the factor pairs of numbers. Students will then use their T-Charts to determine if a number is prime or composite. ***Students should use graph paper to draw their arrays and show the factor pairs. Concrete – Representational step.*** **MAFS.4.OA.2.4:** Investigate factors and multiples a. Find all factor pairs for a whole number in the range 1-100 b. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. c. Determine whether a given whole number in the range 1-100 is prime or composite.

Fun with Factors	http://www.cpalms.org/Public/PreviewResource/Preview/28490 This is an introductory lesson addressing factors for number 1-20. Students will listen to the book, *Two Ways to Count to Ten,* as an introduction to finding factors. Factoring will lead students to discover differences and similarities between prime and composite numbers. Students will also discuss five claims about factors, prime, and composite numbers and create support from examples and non-examples to determine whether these claims are valid or invalid. **MAFS.4.OA.2.4:** Investigate factors and multiples a. Find all factor pairs for a whole number in the range 1-100 b. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. c. Determine whether a given whole number in the range 1-100 is prime or composite.
Factor That! Part I	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/72870 This is a foundational lesson in which the students will visually see the relationship between factors and multiples. As a result of this hands on lesson and guided discussion, they will learn to identify the factors of a given number. ***Students should use graph paper to draw their arrays and show the factor pairs. Concrete – Representational step.***

	This is lesson one of a 5 lesson unit. It can be used independently or as part of a week-long unit. **MAFS.4.OA.2.4:** Investigate factors and multiples a. Find all factor pairs for a whole number in the range 1-100 b. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. c. Determine whether a given whole number in the range 1-100 is prime or composite.
Identifying Multiples	http://www.cpalms.org/Public/PreviewResourceUpload/Preview/43224 The goal of this task is to work on finding multiples of some whole numbers. After shading in the multiples of 2, 3, and 4 on the table, students will see a key difference. In the fourth grade, the emphasis here should be on seeing that there is a visual difference in patterns and that this difference is related to whether and how numbers factor. This task could be used to introduce the notion of a prime number, or if students are already familiar with primes and composites, this is a good task to reinforce these ideas. **MAFS.4.OA.2.4:** Investigate factors and multiples a. Find all factor pairs for a whole number in the range 1-100 b. Recognize that a whole number is a multiple of each of its

	factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. c. Determine whether a given whole number in the range 1-100 is prime or composite.
The Product Game	http://www.cpalms.org/Public/PreviewResourceUrl/Preview/31853 This four-lesson unit develops students' fluency with multiplication facts and their understanding of the relationship between factors and multiples. While playing the Product Game and making their own game boards, students develop strategic thinking. They use Venn diagrams to represent the relationships between the factors or products of two numbers. In the fourth lesson, they make connections and expand their learning from the first three lessons. **MAFS.4.OA.2.4:** Investigate factors and multiples a. Find all factor pairs for a whole number in the range 1-100 b. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. c. Determine whether a given whole number in the range 1-100 is prime or composite.

Number and Operations in Base Ten

Cluster 1: Generalize place value understanding for multi-digit Whole numbers

Cluster 2: Use place value understanding and properties of operations to perform multi-digit arithmetic

Parent Resources

Multiplying: 2-digit number times 2-digit number (using distributive property)
http://www.cpalms.org/Public/PreviewResourceUrl/Preview/126586

Multiplying: 2-digit number times a 2-digit number (area model)
http://www.cpalms.org/Public/PreviewResourceUrl/Preview/126587

Division: Intro to remainders
http://www.cpalms.org/Public/PreviewResourceUrl/Preview/126616

Division: The importance of place value
http://www.cpalms.org/Public/PreviewResourceUrl/Preview/126609

A bibliography of children's literature with a focus on multiplication is provided, which can be integrated so that students can connect through literature.

1. Ten Times Better, Richard Michelson
2. A Remainder of One, Elinor J. Pinczes
3. One Hundred Hungry Ants, Elinor J. Pinczes
4. The King's Chess Board, David Birch
5. In the Next Three Seconds…Predictions for the Millennium, Comp. Rowland Morgan
6. Counting on Frank, Rod Clement

10X Bigger!	http://www.cpalms.org/Public/PreviewResource/Preview/73392 In this lesson students will move from constructing concrete models of what happens to a number when you multiply the number by 10 into drawing their own pictorial representations of the same process with numbers up to 1,000. They will develop an understanding of the rule *'a digit in one place represents ten times what it represents in the place to its right'* and apply this rule to a variety of situations. **MAFS.4.NBT.1.1:** Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.*
What's My Value?	http://www.cpalms.org/Public/PreviewResource/Preview/73256 This lesson will allow students to deepen their knowledge in place value. The teacher will use modeling, guided math groups, and independent practice to help students understand that the digit in one place represents ten times what it represents in the place to its right. Students will use base 10 blocks to build numbers and make general observations about the values of numbers. Students will also draw and label models, to make understanding concrete. In groups of 4-5, students will work together and discuss (using discussion questions) to deepen their knowledge on the topic. **MAFS.4.NBT.1.1:** Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.*

Multiplying Around the Block	http://www.cpalms.org/Public/PreviewResource/Preview/72717 The students will build upon their understanding of the place-value system and multiplying using base-ten models to build their understanding of multiplying with two-digit by two-digit numbers using area models. They will work with partners during the learning process to help them develop the usage of mathematical language when explaining their thinking and calculations to others. **MAFS.4.NBT.2.5:** Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using **strategies** based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
2- Digit Array Multiplication	http://www.cpalms.org/Public/PreviewResource/Preview/30612 This lesson explores a **conceptual** approach to multiplying two 2-digit numbers. Students will create, explore, describe and record arrays built with place value pieces. The lesson supplies the understanding that will make multiplying multidigit numbers easy to do. ***Students should use graph paper to draw their arrays and show the factor pairs. Concrete – Representational step.*** **MAFS.4.NBT.2.5:** Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using **strategies** based on place value and the properties of operations.

	Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Amazing Arrays 2 X 1	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/28052 This is a hands-on lesson for extending and practicing drawing arrays using area models that show a 2-digit number times a 1-digit number. Students are also required to use the distributive property of multiplication and the equations they represent. **MAFS.4.NBT.2.5:** Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Amazing Arrays 3 X 1 or 1 X 3	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/31673 This lesson is the third lesson in a unit beginning with Amazing Arrays and Amazing Arrays 2X1. In this lesson students solve a multiplication problem by drawing arrays and segment the areas in several ways to solve the problem. Students will also apply the distributive property, explore rotations of area models to demonstrate the commutative property of multiplication, and match a word problem with its array. **MAFS.4.NBT.2.5:** Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations.

	Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Area Model of Multiplication Using Base 10 Manipulatives (Double digit multiplication)	http://www.cpalms.org/Public/PreviewResource/Preview/8112 "Students will use base 10 manipulatives to build a rectangular array to represent double digit multiplication. Students will make the connection between the standard algorithm and the rectangular array" ***Students should use graph paper to draw their arrays and show the factor pairs. Concrete – Representational step.*** **MAFS.4.NBT.2.5:** Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using **strategies** based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Boxing Math – Using the Area Model for Multiplication	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/48348 A common mistake students make when learning to multiply is treating multiplication like addition, and multiplying ones by ones and tens by tens. In this lesson, your students will avoid that mistake as they learn to use the area model to do double digit multiplication. After group practice, students are taught a game to reinforce their learning.

	MAFS.4.NBT.2.5: Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Modeling Multiplication for Mastery	http://www.cpalms.org/Public/PreviewResource/Preview/73140 In this lesson, students will work to multiply multi-digit numbers using various strategies. Students will use arrays, array frames with base ten blocks, and area models to explore and justify their solutions. **MAFS.4.NBT.2.5:** Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using **strategies** based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Array for Charity	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/74069 Students will use array frames to find out how many pennies each of the classes in their school collected for a charity drive. Students will demonstrate and explain the array frame as well as determining how many pennies will go to each of the seven charities for which they have collected pennies.

	MAFS.4.NBT.2.5: Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using **strategies** based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Model Multiplication	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/73402 This concept based, hands-on lesson is intended to help you assess how well your students can use a variety of strategies and representations of 2 two-digit multiplication. **MAFS.4.NBT.2.5:** Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using **strategies** based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
Aaron and Anya's Quilt Challenge: Problem Solving and Interpreting Remainders	http://www.cpalms.org/Public/PreviewResource/Preview/76550 In this situational story, Aaron and Anya find a large piece of brightly colored fabric. They decide to cut it into squares to make a quilt. Students will find the area of the fabric by multiplying two digits by two digits. They will explore factors as they figure out the largest quilt square that can be cut for 25 students. There will be fabric left over; students will have to determine and justify remainders based on several different scenarios. Finally, students will create their own quilt

	square using grid paper. ***Students should use graph paper to draw their arrays and show the factor pairs. Concrete – Representational step.*** **MAFS.4.NBT.2.6:** Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using **strategies** based on place value, the properties of operations and/or the **relationship** between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. **MAFS.4.NBT.2.5:** Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using **strategies** based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. **MAFS.4.OA.1.2:** Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. **MAFS.4.OA.1.3:** Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations,

	including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. **MAFS.4.MD.1.3:** Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
Share and Share Alike	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/30729 This inquiry-based 5E lesson provides a framework for students to investigate division of a multi-digit number by a 1-digit divisor using hands-on materials. Students will have the opportunity to work with manipulatives such as base-10 blocks to physically divide a multi-digit number into equal groups. Students will discover the idea of remainders through their exploration. The lesson is designed to be chunked and can easily be spread over 2, 45-minute sessions. **MAFS.4.NBT.2.6:** Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

I See! Division with the Distributive Property	http://www.cpalms.org/Public/PreviewResource/Preview/72779 In this lesson, students will use visual models to represent division using the distributive property as a strategy. Students will have an understanding of how to decompose numbers in the context of division problems using an area model. **MAFS.4.NBT.2.6:** Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using **strategies** based on place value, the properties of operations and/or the **relationship** between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Numbers and Operations - Fractions

Cluster 1: Extend understanding of fraction equivalence and ordering

Cluster 2: Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers

Cluster 3: Understand decimal notation for fractions, and compare decimal fractions

Parent Resources

Explaining Fraction Equivalence with Pictures
http://www.cpalms.org/Public/PreviewResourceUpload/Preview/43264

Fraction Machine
http://www.cpalms.org/Public/PreviewResourceUrl/Preview/42143

Listing fractions in increasing size
http://www.cpalms.org/Public/PreviewResourceUpload/Preview/43254

Using Benchmarks to Compare Fractions
http://www.cpalms.org/Public/PreviewResourceUpload/Preview/43242

A bibliography of children's literature with a focus on fractions is provided, which can be integrated so that students can connect through literature.

1. Fraction Fun, David Adler
2. Time for Kids, "Get Your Healthy Lunches", Alexandria Sifferlin
3. Time for Kids, "Obesity Rates Falling", Cameron Keady
4. Surviving the Applewhites, Stephanie Tolan
5. What's Smaller Than a Pigmy Shrew?, Robert E. Wells
6. One Riddle One Answer, Lauren Thompson
7. Icebergs and Glaciers, Seymour Simon
8. Pythagoras and the Ratios, Julie Ellis
9. Gator Pie, Louise Mathews
10. Little Numbers and Pictures That Show Just How Little They Are, Edward Packard

Sugar in six cans of soda (visualize multiplication of a fraction) http://www.cpalms.org/Public/PreviewResourceUpload/Preview/43243	
"Are You My Equal?"	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/74084 This lesson gives students the opportunity to identify and model equivalent fractions by making fraction strips, solving situational problems, and creating a model representation of equivalent fractions. **MAFS.4.NF.1.1:** Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
Fraction Land	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/49482 This lesson is part of a series based on the above standard. All lessons in the series share the Fraction Land title and are available on CPALMS. By the end of the series, students will have created pieces for a game board and other items used to play. **MAFS.4.NF.1.1:** Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

Fraction Land II	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/49733 This lesson focuses on creating equivalent fractions using the numbers 2, 3, and 4. Students will practice multiplying the numerator and the denominator by 2, 3, or 4 to create equivalent fractions. ***This lesson incorporates the use of circle model.*** **MAFS.4.NF.1.1:** Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
Gardening in Schools	http://www.cpalms.org/Public/PreviewResource/Preview/48158 This Model Eliciting Activity is written at a 4th grade level. In this open-ended problem, students must consider how to rank potting soil based on factors like fraction of ingredients, price, and eco-friendliness. In teams, students determine their procedures and write letters back to the client. ***This lesson incorporates nonfiction reading passages.*** **MAFS.4.NF.1.2:** Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

Fractions Let's Compare	http://www.cpalms.org/Public/PreviewResource/Preview/34730 In this lesson students use area models, **number lines**, and the benchmark fraction of 1/2 to compare fractions that are less than one and have different numerators and denominators to solve real-world problems. **MAFS.4.NF.1.2:** Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
Mrs. Thinkwell's Dilemma	http://www.cpalms.org/Public/PreviewResource/Preview/49568 Mrs. Thinkwell is a 4th grade teacher, but she is having a hard time keeping her students engaged during the science lessons. The science lectures are just not working. Of course, there are a few students who seem to be doing well, but there are so many who are underachieving. She could not figure out the problem. Her principal suggested giving the students a multiple intelligence (MI) assessment and possibly utilizing small groups for instruction. She decided to try the MI assessment and received the results; but she still was unsure of what that meant for her classroom. Mrs. Thinkwell wants to utilize small groups in her classroom, but did not know the best way to group the students based primarily on their multiple intelligences. Students will help Mrs. Thinkwell by creating groups of students based

	on a class data set of MI Assessment results. **MAFS.4.NF.1.2:** Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
Fraction Line-up!	http://www.cpalms.org/Public/PreviewResource/Preview/29615 In this lesson, students will correctly model and compare fraction pairs and place on the inequality mat attached to this lesson. ***This lesson is a perfect example of representational that can easily be taken to the abstract by having students place the cards on a number line working in small groups. Once they create the number line with the cards, have the students draw a number line, divide it into equal parts and then place the fractions on the number line.*** **MAFS.4.NF.1.2:** Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction

	model.
Chocolate Fractions	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/26891 Chocolate bars will be used to introduce equivalent fractions. Students will find patterns for equivalent fractions through the concrete-representational-abstract process. ***Use connecting cubes as the concrete, graph paper to draw the representational beside the abstract numbers.*** **MAFS.4.NF.1.1:** Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
Create a Quilt – Equivalent Fractions	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/49773 In this lesson, students will work in cooperative pairs to design and construct quilts according to specified instructions. They will obtain the knowledge that fractions can be equivalent even though they may look different and are made up of different numbers. Students develop skills in reasoning as they defend and justify why two fractions are equivalent. ***Use connecting cubes as the concrete, graph paper to draw the representational beside the abstract numbers.***

	MAFS.4.NF.1.1: Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
Dynamic Decimals, Fractions and Money	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/28849 In this lesson, students will realize the connection between fractions, decimals and money through the use of a 100 grid. **MAFS.4.NF.3.6:** Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*
Decimal Place Value	http://www.cpalms.org/Public/PreviewResourceUrl/Preview/31832 Students learn about decimal place value and the relationship between tenths, hundredths, and thousandths. Students will explore decimal place value, read and write decimals using tenths, hundredths, and thousandths, and compare decimals using greater-than and less-than notation. **MAFS.4.NF.3.7:** Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.

Equivalency Detectives: Fractions and Decimals	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/29791 This is a lesson intended to reinforce students' ability to find equivalent fractions and decimals. The lesson requires prior essential vocabulary knowledge, and a basic understanding of converting fractions to decimals and decimals to fractions (specifically tenths and hundredths). **MAFS.4.NF.3.6:** Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*
Cookies, Fractions and Decimals, Oh My!	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/72072 This lesson asks students to recommend which cookie the owners of The Cookie Jar should add to their menu. Before they make their decision, the students have to convert decimal notation and fractions with denominators 10 and 100 to fractions with like denominators. Then they will be able to see exactly how many people voted for each cookie and they can factor in that information along with additional cookie facts to make their final recommendation. **MAFS.4.NF.3.6:** Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*

Cell Phone Inquiry	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/51031 Students will determine what cell phone would be the best phone for their teacher to purchase. Factors to consider are price, touch screen, camera, voice command, weight and size. **MAFS.4.NF.3.7:** Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.
Amazing Alice Cookies	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/48267 Students will help Amazing Alice Cookies choose the perfect chocolate chip brand to use for their cookies. Students will be given data in the form of fractions and decimals. Fourth grade students will compare decimals and order and compare fractions. Students will write a letter describing their procedure to the client. **MAFS.4.NF.1.2:** Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

	MAFS.4.NF.3.7: Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.
Comparing and Ordering Decimals	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/49356 In this cooperative learning activity, students will have five sets of decimal cards to sort and put in order - least to greatest. The lesson starts with a short whole group activity and then breaks off in to structured groups. The teacher is free to interact with each of the groups and monitor progress, participation, and understanding. ***This lesson has students put the decimals on a number line.*** **MAFS.4.NF.3.7:** Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.
Exploring Fraction Multiplication	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/48994 Students will be exploring repeated addition with circle fractions as it pertains to whole numbers times fractions.

	MAFS.4.NF.2.4: Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction a/b as a multiple of 1/b. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).* b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)* c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem.
Marshmallow Math	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/46877 In this lesson, students are physically engaged in measuring distances of tossed marshmallows to the nearest 1/2 foot. Using their measurements, they will represent the data on a line plot and then solve word problems involving addition and subtraction of mixed numbers. This is a fun lesson that motivates students to become excited about the difficult world of fractions. **MAFS.4.NF.2.3:** Understand a fraction a/b with a > 1 as a sum of fractions 1/b.

	a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem. **MAFS.4.NF.2.3c**: Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. **MAFS.4.MD.2.4:** Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots.

Adding Tenths and Hundredths	http://www.cpalms.org/Public/PreviewResource/Preview/43270 The purpose of this task is adding fractions being with a focus on tenths and hundredths. Each part of this task emphasizes a unique aspect of 4.NF.5. **MAFS.4.NF.3.5:** Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.*
How Many Tenths and Hundredths?	http://www.cpalms.org/Public/PreviewResource/Preview/43259 The purpose of this task is for students to finish the equations to make true statements. Parts (a) and (b) have the same solution, which emphasizes that the order in which we add doesn't matter (because addition is commutative), while parts (c) and (d) emphasize that the position of a digit in a decimal number is critical. The student must really think to encode the quantity in positional notation. In parts (e), (f), and (g), the base-ten units in 14 hundredths are bundled in different ways. In part (e), "hundredths" are thought of as units: 14 things = 10 things + 4 things. Part (h) addresses the notion of equivalence between hundredths and tenths. **MAFS.4.NF.3.6:** Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as*

	0.62 meters; locate 0.62 on a number line diagram
Relay Races	http://www.cpalms.org/Public/PreviewResource/Preview/36378 In this lesson, students solve word problems related to races to determine addends of fractions with like denominators that sum to a fraction that is less than or equal to one and has the same denominator as the addends. The focus is on addition, decomposing a fraction into a sum of fractions in more than one way, drawing linear models, and writing equations to represent the problems. **MAFS.4.NF.2.3:** Understand a fraction a/b with a > 1 as a sum of fractions 1/b. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.* c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and

	equations to represent the problem.
Decomposing Fractions	http://www.cpalms.org/Public/PreviewResource/Preview/49127 Using circle fraction manipulative students will investigate adding fractions by decomposing them into their smallest parts. **MAFS.4.NF.2.3:** Understand a fraction a/b with a > 1 as a sum of fractions 1/b. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.* c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

Learning to Love Like Denominators	http://www.cpalms.org/Public/PreviewResource/Preview/30114 Students engage in problem solving to explore the addition and subtraction of fractions with like denominators. Students make sense of the structure of addition and subtraction equations with like denominators and make generalizations to move from using manipulatives, pictures and number lines to simply adding or subtracting the numerator. **MAFS.4.NF.2.3:** Understand a fraction a/b with a > 1 as a sum of fractions 1/b. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.* c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.

	d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
Modeling Multiplication with Fractions	http://www.cpalms.org/Public/PreviewResource/Preview/33128 Students will relate multiplication strategies with fractions through problem solving situations. This lesson connects prior understanding of multiplication and equal groups to multiplication of fractions. **MAFS.4.NF.2.4:** Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction a/b as a multiple of 1/b. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).* b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)* c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual

Multiple Bake Sale Cookie Recipes with Fractional Ingredients	http://www.cpalms.org/Public/PreviewResource/Preview/45577 In this lesson students will explore ways to find the total quantity of mixed numbers multiplied by a whole number using a real-world situation. **MAFS.4.NF.2.4:** Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction a/b as a multiple of 1/b. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).* b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)* c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem.

Modeling Multiple Groups of Fractions	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/44684 In this inquiry lesson students will use a situational story to explore ways to find the total quantity of a fraction multiplied by a whole number using various models. **MAFS.4.NF.2.4:** Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction a/b as a multiple of 1/b. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).* b. Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)* c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem.

Equivalent Fraction Dominoes	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/37667 Students will identify equivalent fractions using an area model. They will reinforce their learning by playing equivalent fraction dominoes. ***Students should use colored tiles at first to model the fractions, and then draw the representation on graph paper.*** **MAFS.4.NF.1.1:** Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

Measurement and Data

Cluster 1: Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

Cluster 2: Represent and interpret data

Cluster 3: Geometric measurement: understand concepts of angle and measure angles

Parent Resources

Comparing areas and perimeters of rectangles
http://www.cpalms.org/Public/PreviewResourceUrl/Preview/126441

Angle Basics
http://www.cpalms.org/Public/PreviewResourceUrl/Preview/127616

Angle Measurements and Circle Arcs
http://www.cpalms.org/Public/PreviewResourceUrl/Preview/127626

Are these right?
http://www.cpalms.org/Public/PreviewResourceUpload/Preview/43278

Finding an unknown angle
http://www.cpalms.org/Public/PreviewResourceUpload/Preview/43273

A bibliography of children's literature with a focus on measurement and data is provided, which can be integrated so that students can connect through literature.

1. Sir Cumference and the Great Knight of Angleland, Cindy Neuschwander & Wayne Geehan
2. Measuring Penny, Loreen Leedy
3. On the Scale, a Weighty Tale, Brian Cleary & Brian Gable

Aaron and Anya's Quilt Challenge: Problem Solving and Interpreting Remainders	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/76550 In this situational story, Aaron and Anya find a large piece of brightly colored fabric. They decide to cut it into squares to make a quilt. Students will find the area of the fabric by multiplying two digits by two digits. They will explore factors as they figure out the largest quilt square that can be cut for 25 students. There will be fabric left over; students will have to determine and justify remainders based on several different scenarios. Finally, students will create their own quilt square using grid paper. ***Students should use graph paper to draw their arrays and show the factor pairs. Concrete – Representational step.*** **MAFS.4.MD.1.3:** Apply the area and perimeter formulas for rectangles in real world and mathematical problems. **MAFS.4.NBT.2.6:** Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. **MAFS.4.OA.1.3:** Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown

	quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. **MAFS.4.OA.1.2:** Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.
Area Action (Finding Area of Irregular Polygons)	http://www.cpalms.org/Public/PreviewResourceUrl/Preview/126441 In this lesson, students will work hands on to prove mastery of measurement while finding the area of irregular polygons. This lesson plans includes suggested centers as well. ***Use of graph paper to differentiate instruction will scaffold the lesson for those struggling.*** **MAFS.4.MD.1.3:** Apply the area and perimeter formulas for rectangles in real world and mathematical problems.
Marshmallow Math	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/46877 In this lesson, students are physically engaged in measuring distances of tossed marshmallows to the nearest 1/2 foot. Using their measurements, they will represent the data on a line plot and then solve word problems involving addition and subtraction of mixed numbers. This is a fun lesson that motivates students to become excited about the difficult

	world of fractions. **MAFS.4.NF.2.3:** Understand a fraction a/b with a > 1 as a sum of fractions 1/b. a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem. **MAFS.4.MD.2.4:** Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots.

Angles All Around Us	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/44413 This is a lesson that introduces right, acute and obtuse angles in a fun and challenging way. ***Using graph paper to draw the geometry vocabulary words helps students to draw accurate right, acute and obtuse angles without a protractor.*** **MAFS.4.MD.3.5:** Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles. b. An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees **MAFS.4.G.1.1:** Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

Angle Sums	http://www.cpalms.org/Public/PreviewResourceUrl/Preview/11308 This applet allows users to manipulate polygons (from triangles up to octagons) in order to find the relationship between the sum of the interior angles and the number of sides. **MAFS.4.MD.3.7:** Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.
Edible Angles: Decomposing Angles Into parts of a Whole	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/47957 This lesson is designed to help students understand that when an angle is decomposed into parts, the measure of the parts is equal to the whole measure of the original angle. By the end of this lesson, students should have a firm understanding of this standard. **MAFS.4.MD.3.7:** Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

Protractor Power: How to measure and create angles using a protractor	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/29855 Students will learn how to use a protractor to measure and create angles of different sizes. Students will work cooperatively to explore this skill. **MAFS.4.MD.3.6:** Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

Geometry

Elicit the help of your Art teacher. Vocabulary taught in Math class carries over into the Art class. Work together.

Cluster 1: Draw and identify lines and angles, and classify shapes by properties of their lines and angles **Parent Resources** **Shape Tool** http://www.cpalms.org/Public/PreviewResourceUpload/Preview/43273 **Geoboard** http://www.cpalms.org/Public/PreviewResourceUrl/Preview/54187 **Intro to lines, line segments, and rays** http://www.cpalms.org/Public/PreviewResourceUrl/Preview/127609	**A bibliography of children's literature with a focus on 2-dimensional shapes is provided, which can be integrated so that students can connect through literature.** 1. The Greedy Triangle, Marilyn Burns 2. Grandfather Tang's Story, Ann Tompert 3. Shape by Shape, Suse MacDonald 4. If You Were a Polygon, Marcie Aboff 5. I Spy Shapes in Art, Lucy Micklethwait 6. Shape Up!: Fun with Triangle and Other Polygons, David Alder

Geometric Map Makers	http://www.cpalms.org/Public/PreviewResourceUrl/Preview/127609 In this lesson, students will draw a point, line, line segment, ray, angle (right, obtuse, acute), perpendicular lines and parallel lines and identify these in two-dimensional figures. After practicing with these terms, students will create a map including a representation of each of the terms. ***Having students draw the vocabulary words on graph paper is a great differentiation tool.*** **MAFS.4.G.1.1:** Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
Geometry in the World of Art: Finding Lines of Symmetry	http://www.cpalms.org/Public/PreviewResourceUrl/Preview/1399 This lesson aims to teach students how to identify lines of symmetry and congruency. Students are first asked to cut a congruent shape out of a half-folded piece of paper, then to make a symmetric figure on a geoboard and then divide it with a rubber band. Students are then shown various symmetrical figures and asked to find as many lines of symmetry as they can.

	MAFS.4.G.1.3: Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.
Parallel and Perpendicular Lines	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/7330835 This is an interactive lesson exploring Parallel and Perpendicular lines. From the outset students are instantly engaged by a cutting edge technology video detailing the fastest train in the world. This transitions into a discussion about “parallel lines”, “perpendicular lines”, and “intersecting lines”. Then through several hands-on activities (designed to captivate their attention and make “real world” connections) students will learn to define, identify, label, and draw each. The lesson culminates with a written component where students compare and contrast parallel and perpendicular lines, including real world examples of each. Ultimately this lesson provides the understanding for a key component of geometry, preparing students for subsequent lessons involving distinguishing between parallelograms and rectangles.

	MAFS.4.G.1.1: Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
Polygon Express	http://www.cpalms.org/Public/PreviewResourceLesson/Preview/44410 Students will use a variety of polygons to compose a figure that will be the engine of a train called "The Polygon Express". Students will identify angles and side in order to classify polygons used in their design. **MAFS.4.G.1.1:** Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. **MAFS.4.G.1.2:** Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.

Supply List

Suggested class supplies for each student

Math Notebook/Journal
Math Folder
Scissors
Construction paper
Colored pencils
Pencils
Index cards
Place value charts thru hundredths
Hundreds charts
Number lines (can use string and index cards)
Number strips
Protractors
Rulers

Operations and Algebraic Thinking

(class set) two colored circles
(class set) square tiles

Number and Operations in Base Ten

(class set) place value blocks
painter's tape
(class set) student white boards
(class set) white board markers
Sock for erasing (1 each student)
(teacher set) magnetic place value blocks

Numbers and Operations – Fractions

(class set) geoboards and rubberbands
(class set) fraction bars
(class set) fraction circles
(class set) pattern blocks
(class set) colored tiles
inch graph paper for class use
cm graph paper
interlocking cubes
dimes, nickels, pennies to relate to decimal value

Measurement and Data

(12) meter/yard sticks
graph paper

Geometry

(class set) tan grams
(class set) two colored square tiles
(class set) pattern blocks
(per 2-3 students) 2-D shapes
cm graph paper